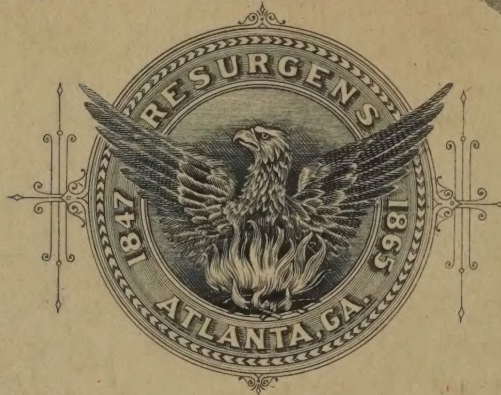


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Output Increased by the Systematic Scheduling of Shop Work

BY CRIS BERG*

IT is frequently asserted that modern management and production methods used in large manufacturing plants cannot be adapted economically to shops which employ only a few hundred men. Argument is based on the increased overhead when as a matter of fact it is often possible that the increase in overhead need be only a fraction of the savings which accrue from a more efficient use of man and machine hours.

It is logical that the plant owner should first turn to means of making the best use of the capital which already has been expended, and to a greater flexibility of his working force. When these combinations have been improved to their practical limit then, if conditions warrant, he should turn to additional capital expenditure. It is obviously unfair to equipment builders to install time and labor saving devices under conditions in which they cannot perform, or even are not allowed to perform, work in the manner and in the quantity for which they were designed.

Frequently shop capacity is reduced because the foreman is swamped with a flood of details which prevent him from performing his duty as a true supervisor. Routing and scheduling work through the shop and giving detail work to clerks is often well worth its cost.

A striking example of the results brought about by planning is afforded by the present practice of a small shop in which contractors' equipment is manufactured. Production is for the most part of a standard line of equipment, but due to making of extra parts and of repair parts for obsolete models, a fair share of the shop capacity is engaged on what is not unlike jobbing work. This plant, which is valued at about \$800,000, comprises a machine shop, structural shop, an electric steel foundry and an erection or assembly department. About 175 people are employed.

*Consulting engineer, Chicago.

¶ Faced with the necessity of larger output and lower costs, a comparatively small manufacturer of contractors' equipment took under consideration a shop expansion program estimated at \$250,000.

¶ But by investigating the possibility of more effective use of equipment on hand and of labor time, a 50 per cent increase in productive capacity was obtained at an expenditure of approximately \$30,000.

¶ To the systematic routing and scheduling of work through the shop, described in detail by Mr. Berg, is attributed the marked increase in output with the minimum of additional investment.

The owner realized that costs were high and he was in urgent need of increased production. He first gave thought to expanding his shop and obtained an estimate of \$250,000 for the work. A new foundry was to cost \$150,000 and \$100,000 was provided for new equipment to increase the productive capacity of the shop by 50 per cent. In the final analysis a more effective use of the equipment at hand and labor time resulted in the 50 per cent increase in productive capacity and not more than \$30,000 was expended. Included in this figure was one item of \$15,000 for a new electric furnace.

The capacity of the plant was increased so that it was necessary to take on new lines in order to keep operating at capacity. A 10-in. turret lathe

and a three-spindle drill press only were installed to replace old equipment. Several machines were turned around to rearrange production groups, and a few machine drives were altered to obtain more suitable feeds and speeds, this often entailing not more than the change of a single pulley. No change was made from the use of hand trucks and wheelbarrows for transporting parts in the shop.

The old plan of scheduling work through the shop had grown up with the plant. As orders became more numerous it was necessary to get out more work, but the only effort put forth was that of brute force. Foremen were so entangled in a mass of details, such as hunting jobs for the men, hunting drawings, etc., that they had little time to properly supervise either the quality or quantity of output. They were almost entirely without records, depending upon memory, although it was not uncommon to have 30,000 pieces or more in the shop at one time.

By far the most important change made in the methods of this plant was brought about by systematic scheduling of orders and machines. This change permitted foremen to function in their proper capacity as supervisors and, by

providing checks on material in process and in the storehouse, eliminated much of the previous delay.

Shop Order Forms Prepared by Production Department

In the present practice of this plant all manufacturing orders originate in the manager's office. Standard bills of material and all drawings needed in the production of the various models of machines manufactured are furnished by the engineering department. Files of blueprints on standard machines are kept in each shop department, and it is the duty of the engineering department to keep these files complete and up-to-date. Blueprints for special jobs are attached to the manufacturing order by the engineering de-

The make-up of these cards and tags may be noted from Fig. 4.

The shop order sheet is then put through a duplicating machine and a number of copies, one of which is shown in Fig. 3, obtained. At the same time a complete set of the castings issue and other cards shown in Fig. 4 is hectographed from the original shop order sheet. The cards are then checked and clipped together, forming a package for each part or lot to be manufactured, so that as they are handled in the shop they will not accidentally become separated or disarranged. The card on top is always the one to be removed for the next shop operation. The writing of the one order form, Fig. 1, from which all other instruc-

BILL OF MATERIAL

CUSTOMER ORDER NO.

DATE ENTERED

5-19-28

TO BE SHIPPED

DATE FIN.

ORDER NO. OR LOT NO.

THE COMPANY

SHEET NO.

NO OF SHEETS

ROUTING OF MATERIAL

NUMBER OF FORMS REQUIRED

ORDER OR LOT NO. AND ITEM	QTY	PCE OR PART NO.	DWG. NO.	MATERIAL	NAME AND DESCRIPTION	FROM	TO	WEIGHT	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH
S820-1	20	G-248	1951	C.S.	Gear	J4		300	310	309	331	346	311	325	322	319	321	
S820-2	20	U-232	1951	C.B.	Bush for G-248	J2		300	306	322	346							
S820-3	7	G-167	568E	Bz.	Worm Gear	J2		300										
S820-4	20	G-292	2129	BR	Gear	J2		300										
S820-5	40	W-218	1017	Br.	Collar	J2		300	310	321								
S820-6	5	G-164	565F	C.S.	Speed Gear	J4		300	310	315	319	321						
S820-7	8	G-24	B-811	C.S.	Exc. Rim Sprkgs.	J4		300										
	16	Halves			16 Halves													

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ORDER OR LOT NO. AND ITEM	QTY	PCE OR PART NO.	DWG. NO.	MATERIAL	NAME AND DESCRIPTION	FROM	TO	WEIGHT	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH
S820-1	20	G-248	1951	C.S.	Gear	J4		300	310	309	331	346	311	325	322	319	321	
S820-2	20	U-232	1951	C.B.	Bush for G-248	J2		300	306	322	346							
S820-3	7	G-167	568E	Bz.	Worm Gear	J2		300										
S820-4	20	G-292	2129	BR	Gear	J2		300										
S820-5	40	W-218	1017	Br.	Collar	J2		300	310	321								
S820-6	5	G-164	565F	C.S.	Speed Gear	J4		300	310	315	319	321						
S820-7	8	G-24	B-811	C.S.	Exc. Rim Sprkgs.	J4		300										
	16	Halves			16 Halves													

Fig. 1.—The Combination Shop Order and Route Sheet (the upper form) Is Prepared in the Production Order Department. It is printed and filled in with hectograph ink and becomes the standard form from which all other instruction cards and forms are impressed

Fig. 3.—Hectograph Copies of the Shop Order Are Made As Shown in the Insert. The hectographing eliminates the possibility of errors in retyping

partment, the order, prints and bill of material then being sent to the production department. The latter department does all the paper work, including preparation of the shop order sheets, route tags, time cards and other forms used in connection with the various regular and special production orders.

Shop orders, in the form of the combination shop order and route sheet shown in Fig. 1, are prepared in the production department from standard bills of material, stock requisitions and sales orders. Department numbers, symbols and other routing information is then added by the route clerk from the master route card shown in Fig. 2. There is also indicated, at the extreme right-hand side of the shop order sheet, in the "number of forms required" columns, the casting issue cards, route tags, transfer slips, time cards and other forms required for the particular part on order.

tions are hectographed, eliminates the possibility of errors in copying.

Before leaving the production department, a copy of the shop order, with its package of cards, is sent to the rate setter, who writes the piece rates and other related information on the time cards. The shop order is then ready for scheduling.

Dispatch Racks Used in Shop Departments

Departmental control of order of work and other steps in the production processes is facilitated by a "material-not-in" file and a route board, or dispatch rack, in each shop department. When the shop is ready for additional work, the order sheet and package of cards are sent to the time-keeper of the department in which the parts covered by the order first go into production. Until work on the order is

Fig. 2.—Master Route Card Used by the Production Order Department in Making Up the Combination Shop Order and Route Sheet Shown in Fig. 1. The production order department does all the paper work, including preparation of the route tags, time cards and other forms used in connection with regular and special production orders

Part Name

Used on

Description

Pe. or Part No.

Dwg. No.

Matl.

Weight

OPERATIONS		DESCRIPTION AND OPERATION	1st CHOICE				2d CHOICE				
Seq.	Symbol		Mach.	I.S. No.	Prep.	Each	Mach.	I.S. No.	Prep.	Each	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

Remarks

Cost: \$

Fdry. Tickets

Fdry. Pcs. Per Day

actually started, the order and cards are kept in the department's "material-not-in" file. When the work is to be started, the time, stores issue, transfer slips and route tags are removed from the package and sent to the stockroom for the material. The material is then delivered by the stockroom to the machine or bench at which the first operation is to be performed, the exact place of delivery being indicated on the route tag, which remains with the material or part in process until the part reaches its final destination in the plant. Transfer slips are made out in duplicate so that both the sender and receiver have a receipt for the movement of the material. These slips also serve as notification to the timekeeper of the department that the material is on hand ready for the first operation.

Upon arrival of the material in his department the timekeeper removes the package of cards from his "material-not-in" file and places it in the third or back pocket of the route board or dispatch rack, which has a section of three pockets for each machine or bench in the department. When ready to begin operations on a part on order, the foreman takes the package of cards from the third or back pocket assigned to the particular machine, bench or man performing the first operation and places it in the next, or middle, pocket of the same section of the route board. The packages of cards in the middle pocket are arranged in the order in which they are to be used, thus constituting an order-of-work file for a given machine, bench or man.

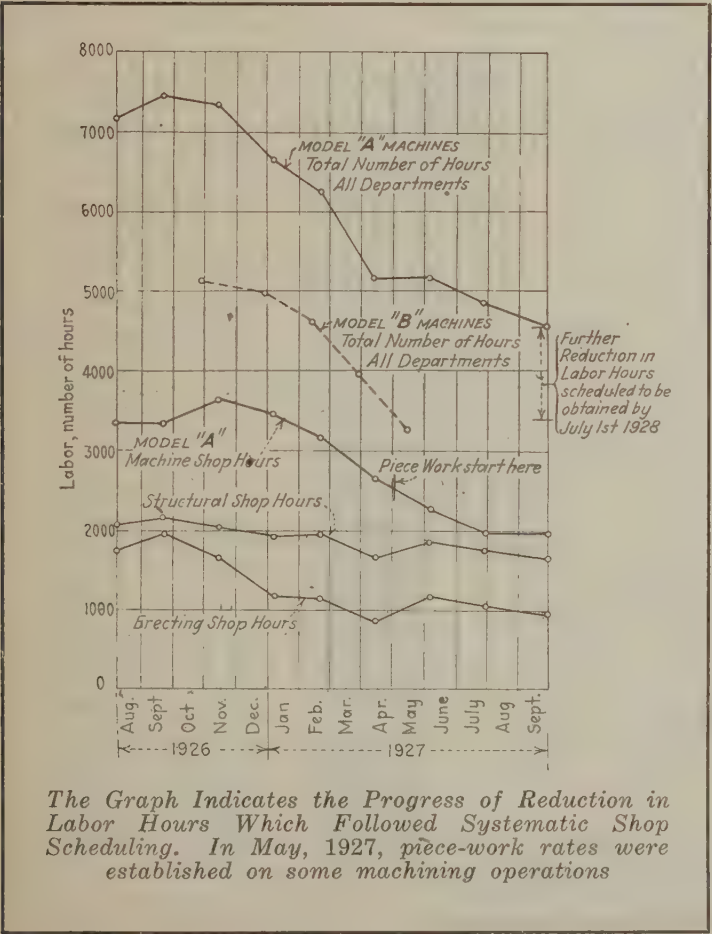
Blueprints Issued with Operation Time Cards

When work on a given order is to be started, the timekeeper takes the front package of cards from the second pocket of the route board, removes the first operation time card and stamps it for "start." The remainder of the package of cards is then put in the first pocket of the board, which shows that this machine is working on the job covered by the card. The first pocket, it should be noted, contains only the time cards and transfer slips for the part being worked on by the machine or bench to which the pocket is assigned.

With the time card, the blueprint of the part to be machined is issued, the blueprint being returned to the timekeeper at the completion of the job, at the time of stamping "out" the time on that particular operation. The timekeeper then takes the front package of cards from the second pocket of the same section of the route board, removes the top time card and stamps the starting time on it; in this manner each machine in the department is kept supplied with work.

The first operation having been completed, the timekeeper advances the package of cards to the third or rear pocket of the section of the route board assigned to the machine which is to do the second operation on the piece. Thus as each operation on a given part is completed the remainder of the cards on the production order are moved to another section of the route board, according to the sequence of operations.

For special orders that go through the shop in a single or job lot number, route tags similar in form to that shown in Fig. 4 are issued by the production order department. These tags are printed in eight colors. A white tag signi-



BALANCE ON TAG

CASTINGS ISSUE

CHARGE TO

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

DATE ISSUED

ISSUED

ROUTE TAG

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

1

2

3

4

5

6

310

309

331

346

311

325

190

117

135

197

TRANSFER SLIP

DATE

TRANSFER SLIP

BIN NO.

Order No. or Lot No. and Item

No. Pieces

Pce. or Part No.

Dwg. No.

Mat.

Name and Description

S820-1

20

G-246

1951

C.S.

Gear

Rec'd By

Route Sheet

Prog. Rec'd

File

Taken from

Delivered to

Inspector Foreman

S4

300

fies that the material going through the shop is to replenish stock. Dark red tags indicate that the parts to which they are attached are on a rush or a special order. Various other colors are used to designate the parts of certain models of standard machines.

Costs Compiled in Main Office

Timekeeping, in so far as shop costs are concerned, is done in the shop office. The main office cost department figures and compiles each day the cost of all completed jobs. On the following day a sheet showing total time and money for each operation performed on the various jobs, is prepared and sent to the foreman, who has at his

desk a file of former costs on similar jobs. This affords him the opportunity of comparing present with past performances. At the same time the main office gets a copy of the report as to detail and total cost. Two days after a lot of machines has been completed the general manager has all the cost data before him.

Savings made by the adoption of systematic routing and scheduling, and by other changes noted above, are shown on the chart on page 3. In November, 1926, machine shop hours on the model "A" machine were 3640 and by September, 1927, they had dropped to 1950. In the same year structural shop hours had been cut from 2150 to 1625 and erecting shop hours had been reduced from 1950 to

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

9

321

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

146

7

322

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

197

5

311

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

135

4

346

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

117

2

309

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

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ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

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MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

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ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

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20

G-246

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Gear

COMPANY

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MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

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310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

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MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

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MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

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MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

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OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

STARTED

MAN'S NO.

MACH. NO.

OP'N SEQ'CE

OPERATION

CHARGE TO

190

1

310

ORDER NO. OR LOT NO. AND ITEM

NO. PIECES

PCE. OR PART NO.

DWG. NO.

MAT.

NAME AND DESCRIPTION

S820-1

20

G-246

1951

C.S.

Gear

COMPANY

STOPPED

MAN'S NO.

M

The top curve shows the combined hours in the machine shop, structural shop and in the erecting department required on the model "A" machine. It is to be noted that total hours in September, 1926, were 7424, while in 1927 the figure had dropped to 4597. The dotted curve, marked model "B" machine, represents a total for departments previously listed and indicates that similar economies are being effected regardless of the type of machine that is on regular

2. Drawings are kept up to date and they are in the hands of workmen only as long as the various jobs are on the machines.

4. Machines are kept in good repair and they are operated at capacity. Foremen and the time study man train operators to work to the best advantage of all.

DATE		TRANSFER SLIP				BIN NO.	
Order No. or Lot No. and Item	No. Pieces	Pce. or Part No.	Dwg. No.	Mat.	Name and Description		

THE COMPANY

DATE		TRANSFER SLIP				BIN NO.	
Order No. or Lot No. and Item	No. Pieces	Pce. or Part No.	Dwg. No.	Mat.	Name and Description		

Rec'd By	Route Sheet	Prog. Rec'd	File	Taken from	Delivered to	
				300	S2	
						Inspector Foreman

Working of System Requires Small Increase in Payroll

5. Continuous compilation of time and cost data is in effect.

To keep this system working there are required on the payroll five additional people whose salaries total about \$500 a month. They are a typist, a time study man, a cost girl, an extra timekeeper and a boy who operates the hectograph machine.

DISCUSSING how the growth of plants and questions of costs have put engineering in the purchase of mechanical supplies and equipment, Carleton Reynell, McClellan & Junkersfeld, New York, told of the position in industry of the purchasing engineer in a paper presented at the recent Kansas City convention of the National Association of Purchasing Agents.

"In short, he acts as the preliminary commercial research man always on the lookout for something new. He brings to the attention of the operating engineer only the ideas which would be ultimately economical, and while of

"That purchasing has long been a function of engineering is evidenced by some of the ideas borrowed from the engineering profession by purchasing and other commercial departments. All the curves picturing business conditions, and now used to illustrate nearly every phase of business, base their origin on the analytical geometry and graphic statics developed years ago for engineering use. The purchasing engineering departments of some of our largest companies have, as you know, gone far in the development of these curves, combining market prices, production costs, freight overhead, profit and all other factors which enter into the ultimate cost.

"To approach more nearly a perfect balance of ideas on mechanical purchases many large corporations have wisely decided that it is best to consider each purchase separately from two angles, the commercial and the technical, and then agree on a final decision, after which the commercial man with technical knowledge can best handle the business end of the problem."

MR. LINCOLN, the author of this article, is vice-president of the Lincoln Electric Co., Cleveland. He joined the Lincoln organization in 1907, upon leaving Ohio State University, and took over the management of the company in 1914. He has been active in the applications of electric welding for several years and is prominently identified with the industry.



SOME of the developments of the Lincoln company since Mr. Lincoln's connection with it are: Variable voltage welder; use of arc welding in place of cast and riveted parts, including buildings and bridges; development of the automatic carbon arc welder and of the "electronic tornado" automatic welder described in THE IRON AGE of June 28.

"We Expect a Minimum Cost Reduction of 10 Per Cent Per Year," says J. F. LINCOLN

WE are not sure that setting this standard at a definite figure is a good or a bad thing. Indications are that the tendency always is not to go beyond the mark set, in spite of the fact that it may be possible to do so, and therefore this 10 per cent may be acting as a limit rather than a goal.

Cost reduction has been so rapid in the past few years in nearly all lines that a reduction of 10 per cent now seems under, rather than over, the proper standard. I think it is safe to say that when value, wage rates, and cost of raw materials are taken into consideration, that the automobile industry has reduced its cost by more than 10 per cent per year for the last ten years.

Three Fundamental Principles In Cost Reduction

In getting this reduction we have adopted, at our plant, three fundamental principles which we believe are essential in accomplishing the result:

The first of these is accurate knowledge of costs.

The second is an attitude of mind which regards all processes and methods as only temporary makeshifts and holds that there is always a better method of doing any job if one only had the vision and ingenuity to find it.

The third essential is the adoption of one or more manufacturing development principles.

These three principles are actually applied as follows: No one at our plant can tell from the total cost of a finished product whether or not it is too high; all of us can tell fairly accurately whether or not a single operation is too high. The only way we know of appreciating these differences is by determining all costs to their last detail so that we are dealing with individual operations on individual parts. After this has been done it is comparatively simple to deal with each operation and with each individual piece of raw material and see whether a new method of doing that particular operation can be devised. Very few cost systems give this information in the detail, accuracy and

recency which is necessary to make the picture plain enough so that the management can, from the picture, see what the next step should be.

The accompanying chart shows the cost of a certain line of equipment over a period of years. The broken line is the normal cost referred to a standard rate of overhead; the red line is the actual cost including the actual rate of overhead. Data of this kind are interesting and are undoubtedly valuable as an indication of what the entire organization is doing, and from a curve of this kind the management can see whether progress is being made or not. But it is of no value whatever in pointing out what management should do in order to correct the situation and to reduce the cost. It is only the detail cost on each operation and on each piece that would be of any value in indicating the actual steps that should be taken.

Every Process or Method Is Temporary

The second fundamental principle is the definite belief that every process, every manufacturing method, is always a temporary makeshift. The only reason that a better method is not used is because the management and engineers have not the vision and ingenuity to see what that new method is. As long as that attitude of mind is maintained management is on the continual lookout for different methods, different machines for manufacture, and different designs which will better the product and reduce its cost. To illustrate how this point of view works out I will cite the following recent occurrence at our plant: The superintendent came to the chief engineer with a rotor spider, saying that he was sure the manufacturing method was wrong because the records showed we had been manufacturing this part in exactly the same way for five years. The fact that everyone else was making these spiders in the same way did not make any difference. Investigation of this particular part showed that by a change in design and construction a very much better spider could be made at

less than one-third of the previous cost and without many of the handicaps which the old part had.

It may perhaps seem a rather radical point of view to take that all processes and methods are wrong. A glance back at the history of manufacturing, however, would prove this conclusively. There is no doubt that history will prove that any process on an average is antiquated within five years. If it is going to be antiquated within five years, why wait the five years? If we only had the vision we could antique it immediately and not wait for development. The organization that can beat obsolescence and arrive at the new method before its competition does is the successful organization.

The locomotive of 1823 was thought at that time to be a marvel of efficiency, power and speed. Economically it is absolutely useless today, and was absolutely useless within a very short time after it was built. The same development is antiquating nearly every mechanical device. This is what we call progress. Since history shows that nearly every device which mankind has ever used has been discarded for a better and cheaper device within a short time, is there any reason why we should think that the

nished satisfactory equipment or even furnished at a previous time the best equipment obtainable, is, to say the least, dangerous.

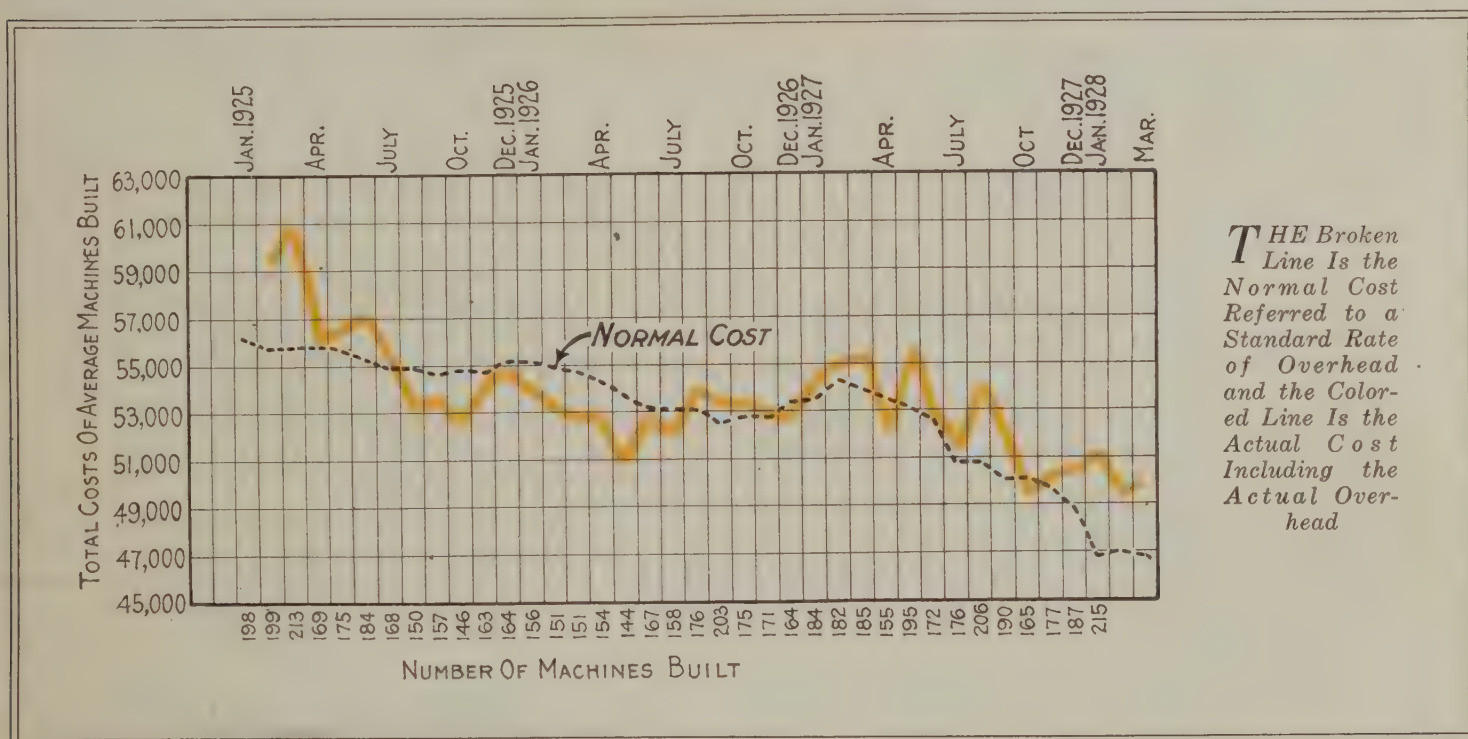
It seems to me that the very foundation of intelligent buying must be the idea that conditions are continuously changing and that because of this it is essential that all types of any product be continually investigated and bought on the results of that investigation. Blind buying of nameplates and buying from friends are two of the most insidious wastes that industry now supports.

In general the raw material, supplies and machinery are from three to ten times the cost of labor in the cost of any product, hence the chance for saving in buying is very great if approached by the same "show me" attitude of mind that is adopted in judging manufacturing methods.

This is the gospel on which the manufacturing methods, designs, and points of view of our whole organization are based.

Modern Manufacturing Principles Must Be Adopted

The third fundamental principle which we have adopted is the application of modern manufacturing methods.



present methods, machinery, designs, construction, have any more worth than those which we have been discarding continuously throughout our lives? Is there any proof at all that we have arrived at the millennium, or are even approaching it?

The big manufacturing job, then, becomes the forecasting of development and doing it before anyone else. Any concern that can do this will be enormously successful; the concerns who are not successful are those who do not do it.

"Show Me" Attitude Needed In Buying

Very closely connected with this matter of forecasting manufacturing methods, is intelligent buying. The Shaw Publishing Co., Chicago, investigated the buying habits of a large number of representative manufacturing companies and found that in purchasing machinery at least half the companies bought after making inquiry only to one supplier of the type of machine wanted. It may be, of course, that a thorough investigation had been made beforehand, but from my own experience this is doubtful.

Since manufacturing methods and designs are scrapped at least once every five years, it is probable that no manufacturer remains in the lead in his product continuously. To buy without investigation of what the market affords from a concern because on a previous occasion it has fur-

In our own case one of these principles, which our company has originated and developed, consists in the substitution of welded steel for cast iron, and we have been able within the last 15 years to make almost a clean sweep of the iron casting used previously. Since steel is five times as strong, two and one-half times as stiff, and one-third as costly per pound as a casting, the marked advantage made possible by this substitution is self-evident. That we have in practically all cases been able to accomplish this purpose, making the saving in raw material of the purchased steel more than compensate for the additional labor and overhead cost of fabrication and welding, is evidenced by the fact that throughout the entire line where this substitution has been made we have been able to reduce our cost by more than 20 per cent of the previous cast iron cost. This is entirely aside from any cost reduction which has been made by more efficient manufacturing operations.

From this substitution other advantages flow. The first is that it eliminates patterns, pattern manufacture, pattern storage, and pattern repair; the second is that it greatly reduces inventories.

This steady decrease of costs and the consequent steady decrease of selling prices has been looked at askance by

(Concluded on page 62)

Will Bessemer Production Drop?

Not If Inherent Advantages of Process and Properties of Steel Are Exploited

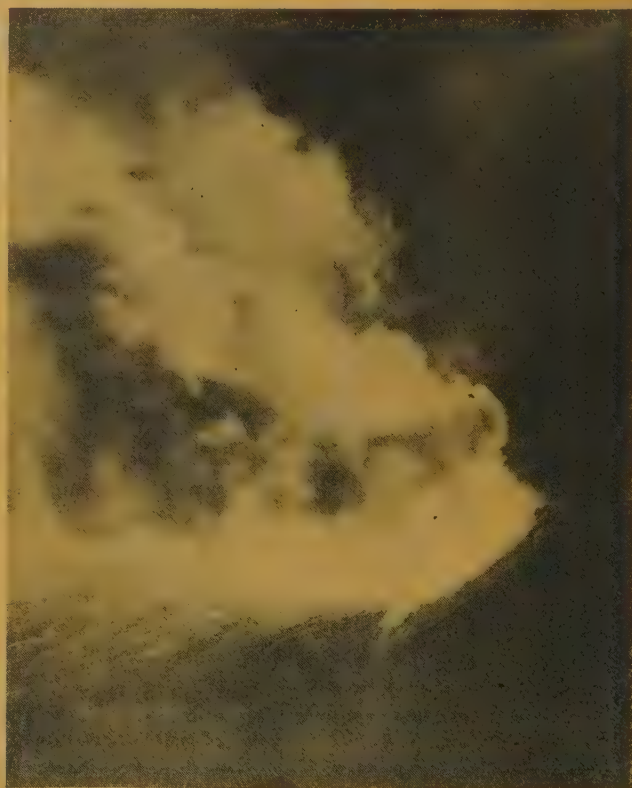
BY G. B. WATERHOUSE*

THIS short discussion takes up acid Bessemer steel, because it is the only Bessemer process carried out on the American continent. The process is most spectacular, beautiful in the simplicity of its conception and capable of turning out large tonnages of steel. In tonnage, it is the second steel-making process in our country, coming next to the basic open-hearth.

The process of making ordinary Bessemer steel may be briefly described. It is carried out in a refractory-lined vessel or converter, ranging in capacity up to 30 tons. Such a vessel lies on its side to receive its charge of molten pig iron. In most steel plants the molten iron is used as it comes from the blast furnaces, being stored in mixers or mixer-ladles. In some foundries making steel castings in small converters, cold iron is melted in cupolas. The proper amount of iron is brought to the converter in a ladle and poured in. This operation of charging is shown in the photograph at the head of this page, taken at the Illinois Steel Co. The blast is then turned on and the vessel turned up, the air generally passing through a hollow trunnion to the blast box under the converter, through a large number of small tuyeres and then through the metal. The blow or heat lasts for from 12 to 20 min. The silicon and manganese of the pig iron are oxidized and pass into the slag, although some manganese is volatilized. Considerable iron is also oxidized, mostly entering the slag. Carbon burns, giving rise to the large carbon flame. Such a flame is strikingly shown in a photograph of a converter in blow taken in the Lackawanna plant of the Bethlehem Steel Co. and reproduced in the full page engraving. Toward the end of the blow the flame drops, showing that the carbon has almost all been removed, the vessel is again turned on its side and the blast shut off. This operation is also spectacular and is well shown in the view at the bottom of this page, also taken at the Illinois Steel Co. The vessel now holds "blown metal," which contains very low percentages of carbon, manganese and silicon, but all the phosphorus of the original iron and almost all the

sulphur. It also contains fairly large amounts of dissolved oxide of iron.

In order to be made into steel, certain final additions are needed to deoxidize the metal and give the composition required for the desired physical properties. These final additions vary; they may be added either in the converter or the ladle, or both, but the usual addition is ferromanganese added with the stream of metal while it is being poured from the converter into the ladle. (A pile of ferromanganese is shown on the platform near the converter being charged with molten pig iron.) The ladle is then usually



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brought into position at the pouring platform, the metal is poured into ingots and the ingots of Bessemer steel are taken to the rolling mills for subsequent treatment.

A large tonnage of material is handled through the Bessemer converter and then transferred liquid to basic open-hearth furnaces for further refining. The product is usually called duplex steel and, in statistics, is included in the open-hearth total.

The statistical position of acid Bessemer steel production is shown by Table I, most of the figures of which are taken from the bulletins of the American Iron and Steel Institute.

Without going into an exhaustive analysis of these figures it may be pointed out that the Bessemer is a very important steel-making process, but, with a slowly declining trend, the percentage of the total tonnage has been decreasing until today it accounts for about 14 per cent of the total tonnage, or 19 per cent if the duplex steel is included. Duplex tonnage also appears to be slowly going down. This should really be placed in a different category, because it does not handle low-phosphorus pig iron nor make Bessemer steel, but treats higher phosphorus metal which is then sent to the basic open-hearth. The tonnage made of duplex steel depends closely upon economic conditions, principally the amount of scrap available for the open-hearth, its price and the tonnage requirements of the individual open-hearth plants.

Confining attention to straight Bessemer steel, it is a material that offers advantages over other steels for certain purposes. This is particularly true when it comes to free-machining and welding properties. For high-speed automatic screw stock Bessemer steel has never been surpassed. The very large tonnage of steel used for automatic screw machine products seems therefore preempted by this process. The demand for such material is increasing, the steel being either hot rolled or, more usually, cold rolled or drawn. A comparatively new development is the use of such material for case-hardened products, with splendid results. Its free-machining, together with its good welding properties, makes Bessemer steel valuable for butt-welded and lap-welded pipe, particularly the smaller sizes which are frequently cut, threaded and fitted in the field. A short, but rather general, questionnaire would indicate that Bessemer steel is holding its own in the field of skelp, particularly for making the smaller sizes of pipe. On the other hand, a demand for seamless steel pipe in certain sizes is causing the use of open-hearth steel; the specifications of many of the oil companies for open-hearth steel are also lessening the demand for Bessemer steel in tubular goods for the petroleum industry.

A large tonnage of Bessemer steel is being used for wire products, including wire nails, fencing, and the finer sizes of wire, and a great deal is rolled into sheet bars for

making sheets, tin bars and tin plate. Its inherent stiffness is often an advantage in wire or sheets, but for deep-drawing stock the dead soft open-hearth steel seems to be preferred. A considerable tonnage of Bessemer steel is still used in the form of bars, small structural shapes and for railroad purposes, such as spikes, bolts and nuts. The addition of copper in the usual amount of 0.20 to 0.30 per cent is fairly general for material exposed to atmospheric corrosion, such as certain wire products, sheets, railroad material and other special shapes.

In concluding this brief survey of the Bessemer steel situation it may be pointed out that the future promises that this method of steel manufacture will not only hold

Table I—Production and Percentage of Steel Ingots and Castings by Processes

Year	Total Gross Tons	Basic Open-Hearth		Duplex		Bessemer	
		Tonnage	Per Cent	Tonnage	Per Cent	Tonnage	Per Cent
1913	31,300,874	20,344,626	64.9	2,210,718	7.06	9,545,706	30.5
1914	23,513,030	16,271,129	69.2	835,690	3.55	6,220,846	26.4
1915	32,151,036	22,308,725	69.3	1,781,491	5.54	8,287,213	25.7
1916	42,773,680	29,616,658	69.2	3,436,457	8.03	11,059,039	25.8
1917	45,060,607	32,087,507	71.2	3,791,830	8.41	10,479,960	23.2
1918	44,462,432	32,476,571	73.0	3,870,017	8.70	9,376,236	21.1
1919	34,671,232	25,719,312	74.1	2,819,785	8.13	7,271,562	20.9
1920	42,132,934	31,375,723	74.4	3,279,119	7.78	8,883,087	21.1
1921	19,783,797	15,082,564	76.2	840,251	4.24	4,015,938	20.3
1922	35,602,926	28,387,171	79.7	1,651,089	4.63	5,919,298	16.6
1923	44,943,696	34,665,021	77.1	2,919,286	6.49	8,484,088	18.8
1924	37,931,939	30,719,523	80.9	2,131,856	5.62	5,899,590	15.5
1925	45,393,524	37,087,342	81.7	2,797,318	6.16	6,723,962	14.8
1926	48,293,763	39,653,315	82.1	2,815,980	5.83	6,934,568	14.3
1927	44,935,185	37,144,268	82.7	2,184,674	4.86	6,191,727	13.7

its own but improve its position. The reserves of Bessemer ores are larger than was recently supposed. As a method of steel making it is capable of good control, and for many purposes, as indicated, the steel offers advantages.

While considerable research is being carried out in order to improve the quality and extend the usefulness of Bessemer steel, there is need for still more work along these lines. Some of the methods used in making high-quality steels by the open-hearth and electric furnace can be applied to the Bessemer process, particularly in obtaining sound steel ingots and steel more free from non-metallic impurities than is usual at present. It is believed that, if proper attention is paid to having the right kind of pig iron, if proper and in some cases improved Bessemer plant and equipment is provided, and if increased care is given to the finishing of the steel, to ladle practice and pouring practice, the Bessemer converter will produce metal superior to the ordinary run of tonnage steels made today and increased uses can be found for such qualities. This, as mentioned before, will enable this method not only to hold its own in the fields now occupied, but will increase the tonnage made and the steel used in other lines now closed to it.

What of the Cost of Buying?

Who knows today which costs the most—to shop among 50 vendors or to establish a close cooperative relationship with 12? asked Earl Whitehorne, commercial editor of the *Electrical World*, New York, at the recent Kansas City convention of the National Association of Purchasing Agents. “How much more does it cost to interview 50 salesmen than to give the same time to representatives of six selected suppliers who qualify completely in all the other factors of value?

“There are four things to be done:

“1. If the purchaser would demand firm bids, then general price cutting would soon cease. For a firm bid is like a signed order. It’s the word of the house. It puts industry on the one-price basis just as solidly as the modern department store. It means that a price made is the best and final price and the buyer is expected to place the business

by selecting the firm bid that offers the best value—not price alone but value.

“2. While this practice of firm bids is crystallizing into a custom, whenever bidders are called back by a purchasing agent and asked for a better price, let the bidder demand that the other bids be shown to him, so that he will know that he is not being lied to, and that his price is indeed high for equal value.

“3. And while the trickery of baiting bidders still continues in the world of business, let bidders hold post mortem comparisons of bids, by submitting their bids on closed business to their trade associations for comparison and report.

“4. And let the buyer frankly and publicly proclaim that he will thereafter shun the man who cuts his price, because the first price is supposed to represent the honest value of the goods, and the man who cuts stands self-convicted either by trickery or weakness.”

TREATING FORD MODEL "A" PARTS



Heat - Treatment Schedule for
Shafts, Axles and Gears—Con-
tinuous Gas and Electric Fur-
naces Handle Production

BY FAY LEONE FAUROTÉ*

SPEAKING generally, the Ford Motor Co. uses some ten different types of steel in the new Model A. These include chromium-vanadium steels, chromium steels with extra manganese, high manganese steels, nickel steels, Bessemer stock, carbon key stock, low-carbon basic open-hearth steels, special electrical alloys for starters and generators, and pure iron for pole pieces. Taking into consideration all grades and classes used for production and non-production jobs, the list may be extended to over 50 varieties.

It is Ford's practice to designate steels by colors painted on one end of the stock. If on the low side of an analysis the steel is also painted white, or if on the high side, white with a green stripe. Men in charge of inventory may thus see at a glance what stock is available and what its chemical composition is.

Furnaces Put Wherever Needed in Production Line

Since the physical characteristics of steel are largely determined by the succeeding working and heat treatments, it is not surprising to find heat-treatment furnaces and operations forming no inconsiderable part of the process lines. Indeed, it is in these departments that some of the most interesting automatic machinery, conveyors, electric and gas furnaces are found. In such a large production there is a need for handling a vast quantity at one time and maintaining a constant procession of parts so that in no minor assembly will there be a shortage. This has forced the installation in many of the bays of conveyor furnaces, some continuous, others intermittent, with mechanical methods of quenching, tumbling or cleaning.

Tempering or drawing is also often performed in furnaces automatically controlled and mechanically fed. Where annealing is necessary interesting forms of apparatus have been devised whereby this slow cooling may occur under conditions of travel or over baths which, while chilling one part of the piece, may allow the other to gradually drop in temperature, thus producing in a single part those variations of structure and physical characteristics best suited to its use.

A good example of this may be seen in Fig. 1, showing

the heat-treatment operations on the outer end of the rear axle housing. In the background is the discharge end of an electric furnace. Stock moves through by an automatic pusher which feeds in five parts at a time, one in each groove. Reaching the required temperature (which, incidentally, is controlled by an automatic recording device), the parts are removed one by one and placed in a quenching device which cools only the lower portion, the upper half remaining at the higher temperature. This quenching frame holds four parts and as fast as the workman in the center can remove them to the conveyor alongside, the workman in the background puts others in their place. The device is so timed that the forging remains in the quenching frame only long enough to harden the lower section, after which the upper is allowed to anneal in the air while the lower travels along the surface of the water to the end of the bath. Then complete immersion cools the entire piece to handling temperature, and it is removed by a third workman.

Double-Deck Furnace Saves Space

It is sometimes necessary to complete the entire heat-treatment cycle in a very small space in the process line. Thus the crankshaft is heated, quenched and drawn in a very limited area. Fig. 2 shows two electric furnaces, one above the other, economical in both heat and space. Adjoining them is a special quenching machine.

The crankshaft is made of hot-rolled steel of the following composition: carbon, 0.35 to 0.40; manganese, 0.70 to 0.90; silicon, 0.07 to 0.15; phosphorus, 0.03 maximum; sulphur, 0.05 per cent maximum. After forging, it is normalized at 1560 deg. Fahr., air cooled, and then machined. The parts are fed from the far end through the lower, or hardening, furnace shown in the view by an automatic pusher device. The workmen remove each crankshaft as it appears, heated to 1500 deg. Fahr., and place it between the jaws of a rotating quenching machine at the right, which immerses the part in caustic solution. After the proper quenching time has elapsed, the machine presents the part at the opening again ready for tempering. The workman then drops it into the projecting hooks of a chain conveyor

*Mechanical engineer, New York.

which carries it through the upper furnace. There it is drawn at 650 deg. Fahr. to meet a Brinell hardness of 402 to 444. The front end is then redrawn to meet a Brinell hardness of 302 to 364, and the flange is drawn higher still to give a hardness of 228.

A similar unique electric furnace and quenching device makes the heat treatment of the Ford Model A camshaft worthy of notice. The furnace is round like a turret and consists of a rotating hearth or table, upon which the camshafts are laid one at a time as the table revolves past the door. The speed of the hearth is so timed that when the revolution has been made the shaft is at heat. After each end is given a preliminary quench, the shaft is hung in a vertical position in a rotating quenching bath of caustic soda, which automatically completes this portion of the heat treatment without further attention.

Differential heat treatments—that is to say, methods whereby one portion of a part receives one treatment and another a second treatment so adjusted to produce correct properties for the required duties of the various portions—are fairly common. The Model A rear axle shaft, for instance, is made of a piece of hot-rolled steel of the same chemical composition as the crankshaft. It is heated to 1480 deg. Fahr., and withdrawn when it has reached a temperature of about 350 to 400 deg. Fahr. It is then placed in a combination gas-electric furnace having longitudinal baffles dividing the hearth into three heat zones. The gear end is thus held at about 300 deg. Fahr. to preserve full hardness for gear wear, the central portion is heated to 500 deg. to meet a Brinell hardness of 477 to 512 and the wheel end to 800 deg. Fahr., thus giving the latter portion a Brinell hardness of 302 to 340, suitable for cutting a key-way and threading.

Uniform Temperatures in Gas Furnaces

Gas furnaces are largely used at the Highland Park plant. A continuous annealing or normalizing furnace of typical design is detailed in Fig. 3. Fig. 4 shows such a unit, from the discharge end, placed in line with a tumbling barrel for cleaning scale from normalized gear blanks before cutting the teeth. (These rings for differential gears, by the way, were originally a flat bar, but have been curled edgewise and butt welded into a com-

plete circle.) As shown in Fig. 3, the incoming end of the furnace is heated by Surface Combustion burners with 1¼-in. nozzles, ranged three on a side, staggered or alternate spacings being 3 ft. 4 in. apart. The combustion zone is separated from the work by a false arch, perforated with about 170 holes, 2 in. in diameter. After playing upon work sliding through on the rails, the hot gases go down into the checkerwork below the hearth, and are withdrawn through a central slot into a series of 13 vertical flues 4½ in. square, built in the side walls and connecting with a breeching built above the furnace, or into longitudinal flues below the floor level. Passing through this heated portion of the hearth, the work enters an unheated extension, with a descending roof. The hearth of this latter portion is built on three arches, principally to economize on brick work, and to provide ventilation through doors in the steel buildings up through wide slots at each side of the hearth.

Such a furnace has a hearth area of 43 sq. ft., can heat approximately 2500 lb. of steel per hour to 1550 deg. Fahr., and consumes 4530 cu. ft. of 530-B.t.u. gas per hour. The total flue area is 490 sq. ft.

At Fordson there is a growing tendency to use electricity for heating and heat-treatment operations. Many of the new installations use a ribbon heating element. Results are justified by the more accurate control of heat, general cleanliness, quietness of operation and simplicity of control. There is little outside radiation, so the workman can stand close to the mouth of the furnace without discomfort.

The ability of various parts to stand up under road con-

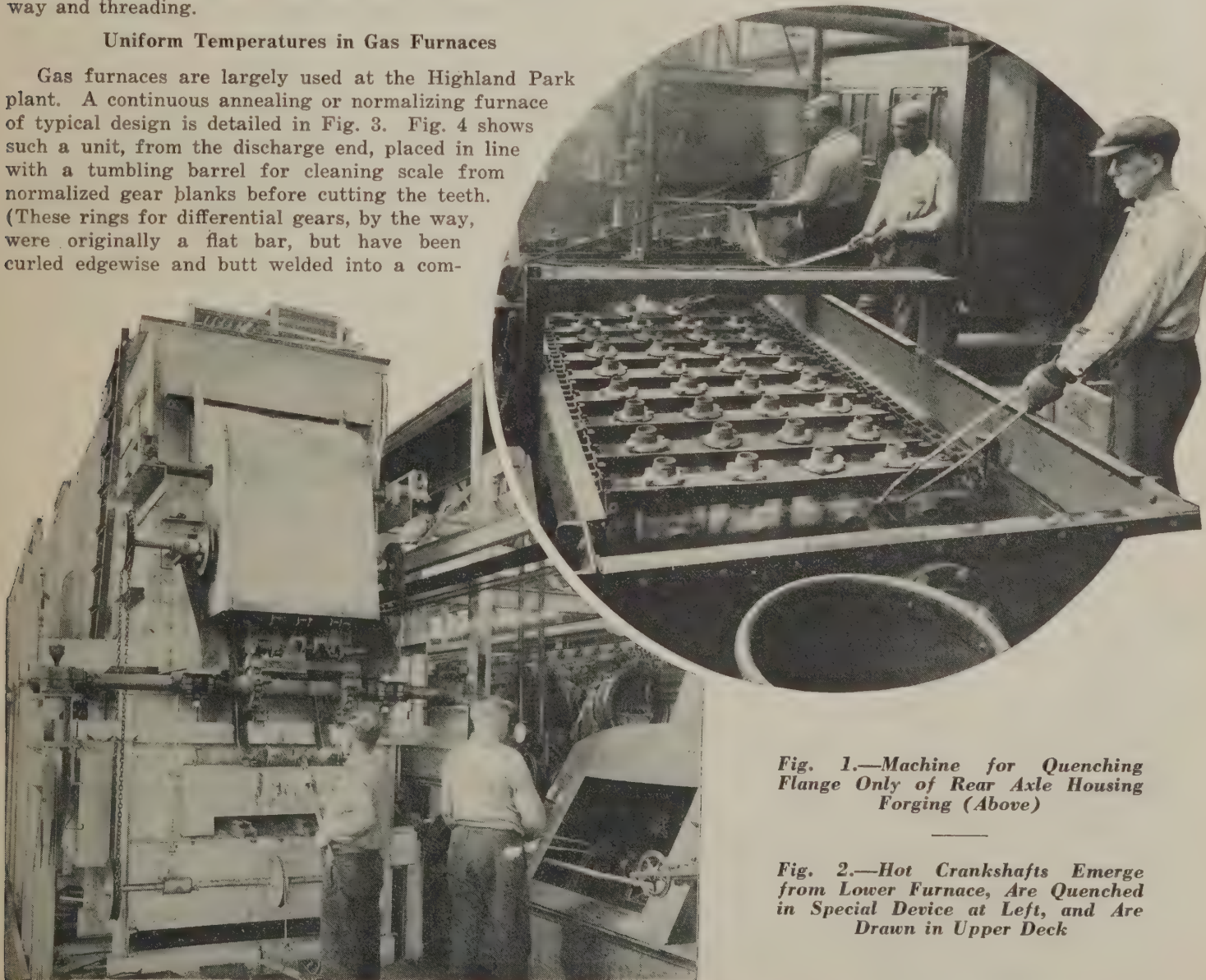


Fig. 1.—Machine for Quenching Flange Only of Rear Axle Housing Forging (Above)

Fig. 2.—Hot Crankshafts Emerge from Lower Furnace, Are Quenched in Special Device at Left, and Are Drawn in Upper Deck

ditions depends very largely upon the heat treatment. Ford parts are light but unusually strong. Therefore a few exact heat-treatment specifications will be of interest to production and metal-working executives.

Many parts, among them the following, are made of a medium-hard carbon steel with the following chemical composition: carbon, 0.35 to 0.40; manganese, 0.70 to 0.90; silicon, 0.07 to 0.15; phosphorus, less than 0.03; sulphur, less than 0.05 per cent.

The differential gear case is heated to 1470 deg. Fahr., quenched in water, and drawn at 1000 deg. Fahr. to a Brinell hardness 228 to 286.

The valve push rod is made of 0.6-in. cold heading wire, upset, counterbored and finished all over. Heat treatment: Heated to 1470 deg. Fahr., quenched in water, removed from quench at 350 to 400 deg. Fahr. to meet specification of Rockwell hardness C-50 to C-58.

The starter drive pinion is made of 1.44-in. cold-drawn steel, selected. Its surface is practically covered with gear and ratchet teeth, and the reamed counterbore must be maintained smooth and straight for 1½-in. length between the limits of 0.788 and 0.792 in. Heat treatment: 1470 deg. Fahr. in cyanide 10 min., quenched in oil. Surface must be file-hard.

The front brake operating wedge is made of hot-rolled steel. Heat treatment: Heated to 1470 deg. Fahr., quenched

in water, annealed at 450 deg. Fahr. to Rockwell hardness C-48 to 52.

The rear spring perch is an intricate forging made of hot-rolled steel. Heat treatment: Normalized after forging to meet a Brinell hardness of 143 to 196, then machined. A ball-shaped projection only is heated in cyanide at 1500 deg. Fahr. for 2 min. and quenched in water to file hardness.

The clutch disk is forged from 2 3/16-in. hot-rolled rounds. The drum is 3.66 in. in inside diameter, 2 9/32 in. long, and has gear teeth cut on its outer surface. Splines in the hub bore are broached, and the whole piece is held to within two or three-thousandths for eccentricity and flatness. Heat treatment after forging: Heated to 1470 deg. Fahr., quenched in water and drawn to 1000 deg. Fahr. to produce Brinell hardness of 255 to 302. After machining all over, it is heated to 1350 deg. Fahr. in cyanide and quenched in oil for a file-hard surface.

Treatment of 1 Per Cent Chromium Steel

A number of important transmission parts are cut or forged from a low-chromium steel of the following chemical composition: carbon, 0.35 to 0.38; manganese, 0.65 to 0.80; chromium, 0.90 to 1.10; silicon, 0.10 to 0.20; phosphorus, 0.03 maximum; sulphur, 0.04 per cent maximum.

The transmission main shaft is first annealed at 1650 deg. Fahr., held 1 hr., cooled in furnace to 1150 deg. Fahr.

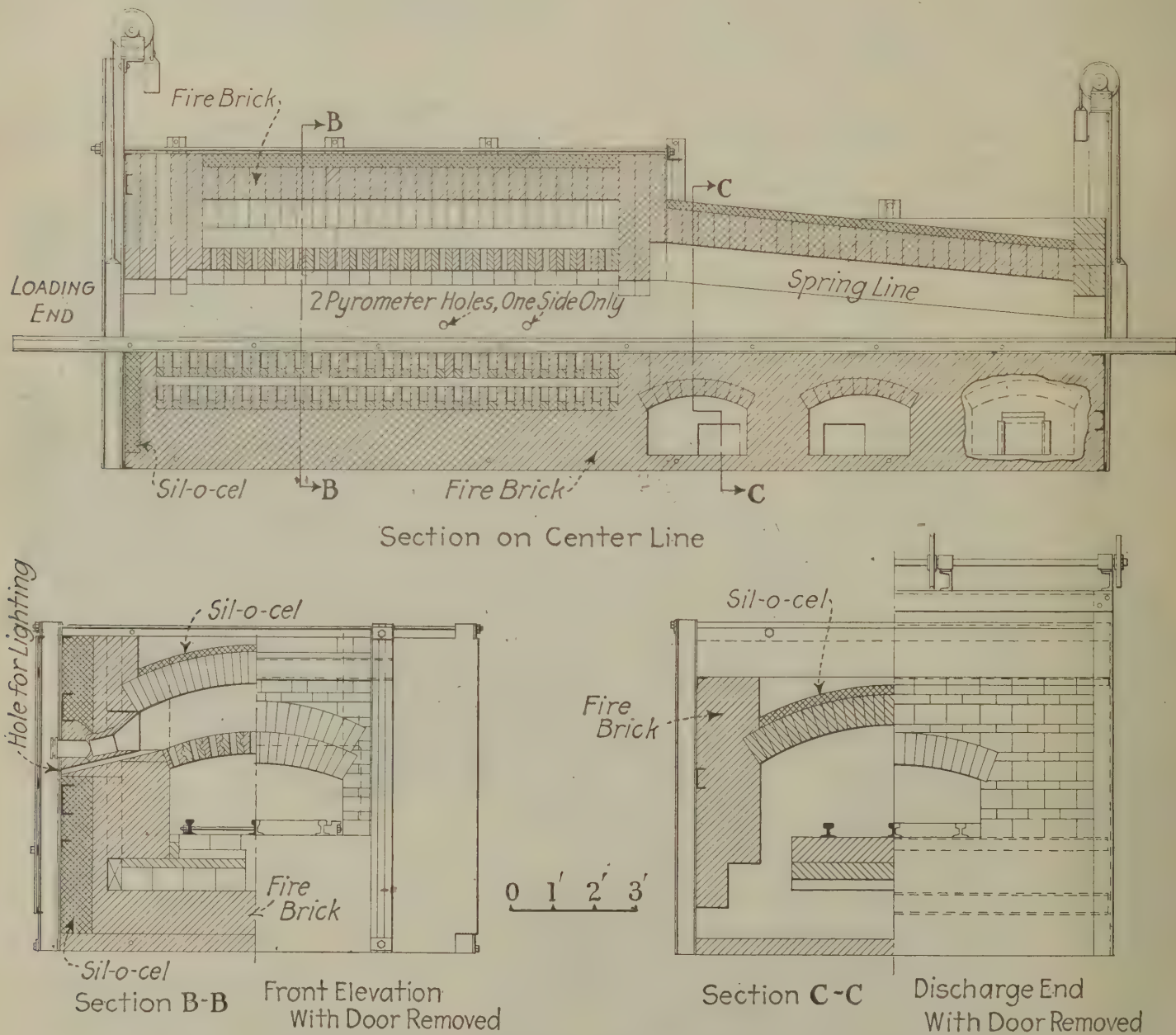


Fig. 3.—Construction Details of Typical Gas-Fired Annealing or Normalizing Furnace

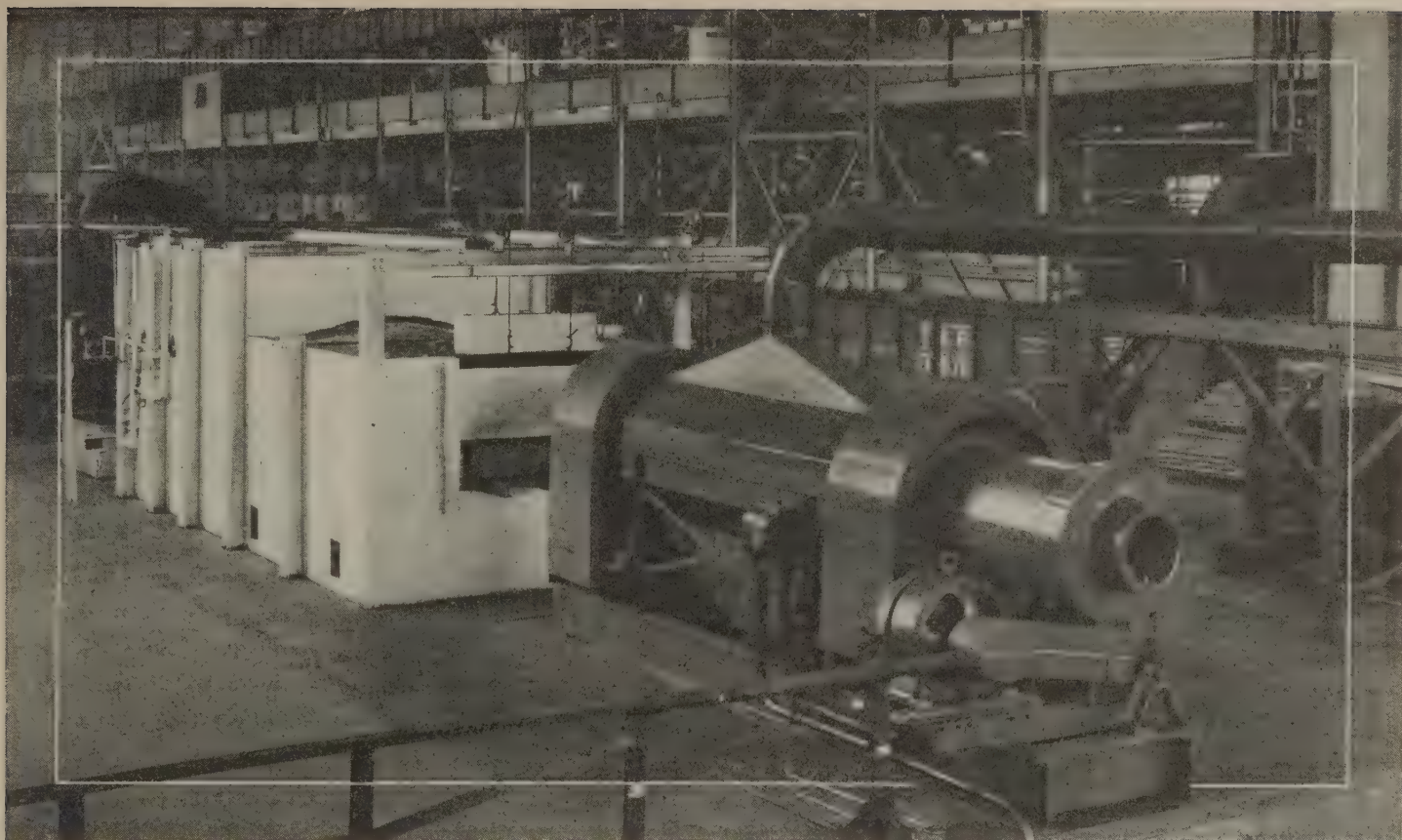


Fig. 4—Normalizing Furnace and Tumbling Barrel for Handling Welded Blanks for Differential Ring Gears

and finally cooled in air to produce a Brinell hardness of 187 to 217. It is then machined. Final heat treatment is: Heated to 1500 deg. Fahr. in cyanide, quenched in oil, drawn in oil at 400 deg. Fahr. 1 hr. to a Brinell hardness of 477 to 532 or a Rockwell C scale-hardness of 48 to 53.

The various transmission gears are taken from the low side of this chemical specification, and previous to machining they are annealed as above to a Brinell hardness of 170 to 196. After machining, they are heated to 1500 deg. Fahr. in cyanide, quenched in oil, and drawn in oil at 400 deg. Fahr. for 1 hr. to a Brinell hardness of 477 to 532 (Rockwell hardness of C-48 to 53).

Rear axle driving gears are held in cyanide somewhat longer and, after quenching and drawing, must be file-hard.

The differential driving gear is a steel forging. After forging, it is brought to 1650 deg. Fahr., taking 1 hr. to reach heat, and is soaked 15 min. and cooled slowly to a Brinell hardness of 170 to 207. Then, after machining, it is heated in cyanide at 1500 deg. Fahr., soaked 7 min., quenched in oil at 400 deg. Fahr. and left in oil 1 hr. Hardness specification: file-hard—Rockwell C-50 to 55.

Spindle arms and connecting rods are of lower carbon and chromium (carbon, 0.26 to 0.30 per cent; chromium, 0.80 to 1 per cent). The spindle arm is normalized at 1650 deg. Fahr. before machining, and then is given this heat treatment: Heated to 1500 deg. Fahr., quenched in caustic solution, removed from solution at 400 to 600 deg. Fahr., and drawn at 980 deg. Fahr. to a Brinell hardness of 286 to 321.

Piston pins are of still milder steel. The chemical composition is carbon, 0.10 to 0.15; manganese, 0.25 to 0.40; chromium, 0.25 to 0.35; silicon, 0.10 to 0.20; phosphorus, 0.03 per cent maximum; sulphur, 0.04 per cent maximum. Heat treatment is as follows: Carbonized at 1700 to 1750 deg. Fahr. (0.025 to 0.035 in. from finish size), normalized at 1650 deg. Fahr., cooled slowly, cleaned if necessary, taper-reamed, reheated at 1600 deg. Fahr., quenched in caustic soda solution to a hardness of C-58 minimum.

Case-Hardened Chromium-Vanadium Steel

Cyanide hardening of a chromium-vanadium steel makes a durable spindle bolt. It is forged from the following

steel: carbon, 0.17 to 0.22; manganese, 0.60 to 0.75; chromium, 0.65 to 0.80; vanadium, 0.12 to 0.15; silicon, 0.10 to 0.20; phosphorus, 0.03 per cent maximum; sulphur, 0.04 per cent maximum. After cleaning, machining and grinding, it is heated in cyanide to 1650 deg. Fahr. for 15 min., quenched in oil, to test file hard and have a cyanide case with a 0.007-in. minimum thickness.

The driving pinion is forged of the same steel and then annealed at 1650 deg. Fahr. to a Brinell hardness of 163 to 207. It is machined all over and copper plated. The gear teeth are then cut, and one boss (which must also be hard) is turned down slightly. A carbonized surface of 1/32 to 3/64 in. deep is given by carbonizing at 1750 deg. Fahr. for 6 hr. Pinions are cooled in the boxes, removed, heated to 1650 deg. Fahr. 10 min. in cyanide and quenched in oil. After drawing at 400 deg. Fahr. in oil, the hardened face of the gear must have a Rockwell hardness of C-58 to 65.

Stretching of Hot Steel Studied

The high temperatures and pressures associated with developments in power plant equipment, oil cracking processes, and the chemical industries generally, have shown the need for added information on the behavior of metals at high temperatures. This applies to a variety of properties but in particular to the elongation with time, or so-called creep of metals, when subjected to fixed loads for long periods.

In Technologic Paper No. 362 just issued by the United States Bureau of Standards are given the results of so-called "creep tests" in which the elongation of metal specimens was observed when subjected to fixed loads for long periods extending in some cases for more than a year.

Tests were made on a low-carbon structural steel, a high-chromium "stain-resisting" steel, a chromium-molybdenum structural steel, high-speed tool steel, and one of the high-chromium high-nickel "heat and corrosion resisting" steels at temperatures between 70 and 1350 deg. Fahr. So-called "creep charts" are given, so that the allowable stresses, if the steel is to last for some approximate length of time and with a certain amount of deformation, may be determined.

Unite to Cut Distribution Costs

Manufacturers and Jobbers Plan Cooperative

Program at New York Conference—

Committees Appointed

TO develop a plan for distributing steel and heavy hardware products that will bring a fair profit to both manufacturers and jobbers, a conference of producers and distributors was held at the Waldorf-Astoria, New York, May 28 and 29, under the auspices of the bolt, nut and rivet industry. There was an attendance of 300 manufacturers and jobbers from all parts of the United States.

A sequel of the conference will be another general meeting of manufacturers and distributors in Washington to work out plans for cooperation in greater detail. Committees named in the New York conference will convene in Washington within two months to organize permanently and to ask the Federal Trade Commission to approve their program.

Producing Costs Declining, Distributing Costs Rising

“ALMOST all lines of industry, in their study of cost reduction, have confined their effort to lower manufacturing costs,” said Charles J. Graham, president of the Bolt, Nut and Rivet Manufacturers Association, in an address opening the conference. “Millions have been spent in this, until today we have come close to perfection on this side of the picture. But the millions that have been saved by this method have been more than squandered by unsound selling policies, so our executives must now turn to the selling and distributing side, to stop the waste and to secure as great efficiency from this angle of their business as they are from the manufacturing side.

“The manufacturing industries of this country are not equipped to do a retail business. They do not need such equipment, for they already have set up for them in every important community in the country warehouse facilities for the proper distribution of their merchandise.

“Every jobber has his corps of salesmen who are fitted for the solicitation of general business. Their overhead expense is distributed over thousands of items, whereas the manufacturers’ must be borne by one, or in any event, by a very few.

“If all of the manufacturing industries of the country, particularly in the heavier lines, would analyze their selling costs, they would find that about 80 per cent of their sales expense is producing less than 20 per cent of their volume, and this 20 per cent of the volume, were it charged with its proper portion of sales expense, plus the fact that it is also the highest cost from an operating standpoint, would be shown to be largely responsible for the total lack of profit, and in many cases entirely responsible for the losses incurred. The losses of this 20 per cent must, in the operation of their business, be absorbed out of the profits of the 80 per cent low cost volume.

“The best example I can show of the truth of this statement was published in the *New York Times* on June 17, showing where a study has been made by one of our Government departments of the sales of a very large unnamed company. An analysis was made of nearly 800,000 orders, which was 60 per cent of the total number of orders received. It was found that these orders represented only about 10 per cent of the total volume, and averaged less than \$10 each. The significant part is that they showed an average loss of \$1.60 per order, or about 16 per cent.

“We have at this conference not only the distributors, but representatives from almost 50 manufacturing lines. The distributors are ready and willing to perform a service

for which they are adequately equipped. Their committees are organized and functioning in cooperation with the bolt, nut and rivet industry, and are in position to take on any additional duties that any of the other manufacturing lines might inflict upon them.”

What Has Been Done in Bolts and Nuts

Mr. Graham briefly outlined the demoralized condition of the bolt, nut and rivet industry in 1924, when losses totaling \$12,000,000 were incurred on a gross business of \$75,000,000, and the subsequent improvement after organized efforts were made to solve the distribution problem.

“We organized our present association in April, 1925, and an executive committee was appointed, which made a complete study of the causes which had brought us into the demoralized condition in which we had found ourselves in 1924,” said Mr. Graham. “The first study made was on cost accounting, and after a year of intensive work on the part of a special committee, headed by the assistant controller and chief cost accountant in the bolt and nut department of one of our leading companies, a cost system was devised, and made available to every plant in the industry.

Consumers Persuaded to Stop Making Bolts

“We found that many railroads and large industrials were manufacturing bolts and nuts, having been forced into it when they were unable to secure material during the war period, and also in the 1920 boom. We organized a department, with an ex-railroad man at its head, to go to these various companies with the idea of showing them they could purchase their material cheaper than they could manufacture it, and we have been successful in persuading many large roads to cease the manufacture of this product.

“In the industrial field, several large railroad car builders are now our customers, rather than our competitors. We hope eventually by this method to get back into our industry somewhere between 100,000 and 200,000 tons of product yearly, which will increase our operations and decrease our costs.

Scientific Base List of Prices Prepared

“Working in conjunction with the division of simplified practice of the Department of Commerce, we standardized our methods of packing, reducing the number of package sizes from 168 to 18. Each manufacturer now puts up his

product in standard containers, so that regardless of from whom a customer purchases, he gets the same quantity of bolts and nuts per case or keg. Another committee, working with a committee appointed by act of Congress, has been active in promoting the standardization of our product in sizes and styles. We have already reached the point where head sizes, nut sizes and thread fits are standard. However, we have only scratched the surface on this part of our program. Our basic list, from which discounts apply, was prepared as the result of a scientific study by a committee consisting of a number of the operating heads of various companies, the sales departments having nothing to do with it, so that today we have a completely scientific basic list, based on actual manufacturing costs. By using this list, every company with modern equipment should be able to make a fair return on each unit of equipment operated. The list was compiled on a machine-hour rate basis, so that the operation of a 1/4-in. machine will return the same proportionate profit as the operation of a 2-in. machine, the cost of equipment, floor space occupied, cost of tools and dies, cost of maintenance and percentage of overhead all being taken into consideration.

Advantages Gained by Cooperating with Jobbers

"Our market during the progress of this work had become more stable, proving to a degree the idea we had at the start that if we would carry on what we termed a constructive campaign, our selling prices would readjust themselves and eventually the price situation would more or less take care of itself. However, we found the greatest antagonism to our fairly well stabilized market came from the distributors.

"Our investigation as to the causes of the distributors' attitude showed that we were entirely responsible for it. In our struggle to secure enough orders to run our plants to capacity, we had practically lost sight of the distributor. We had become his most aggressive competitor and were soliciting trade which, by virtue of his facilities and location, he could handle in a much more satisfactory and economical way than we could, and we were not only disrupting his trade, but our own as well.

"In consultation with a Pittsburgh jobber we suggested he appoint a committee of distributors and we would appoint a committee of the local manufacturers to discuss a possible method of bettering the condition. To

determine who the large buyers of our product in that territory were, we requested the jobbers to furnish a list of all of their customers in all lines. The list contained 29,000 names. Our committee studied this list and found there were 11,000 bolt and nut buyers in the district, taking in a territory within a radius of 200 miles of Pittsburgh. Our committee studied this list of 11,000 accounts and finally selected 275 names on the list on which we made the start of our experiment.

Do Not Solicit Small-Lot Business

"The basis of our arrangement with the distributor is this: We say to him that, owing to the fact that the soliciting and handling of what might be termed the smaller run of orders is too expensive for us, we as manufacturers will only solicit business from the 275 accounts in this territory and will do everything in our power to have the balance of the trade flow through its proper channel—in other words, through the distributor. While we will not solicit trade, other than from the companies listed, we cannot legally and do not refuse to sell to the trade not appearing on this list. However, should we receive inquiries or orders from such trade, we will sell or quote them whatever prices we see fit. But we give the jobber the assurance that, on such inquiries or orders, we will each determine for ourselves as to what the average jobber's resale price out of warehouse stocks is in the territory, and will have regard for that situation.

Jobbers' Committees Organized

"The plan worked so satisfactorily to both parties in the Pittsburgh district that we determined to make it nation-wide, and carried it to every important distribution center in the United States. Our plan of operation, other than in Pittsburgh, was to secure a list of distributors in a given territory, send out an invitation for a conference, and then with a selected committee of the leading executives of a number of companies, visit this territory, explain our plan and request the jobbers to appoint a chairman, who in turn was to appoint a committee of distributors representing the territory of which this particular city was the center. We then appointed a committee of manufacturers, who subsequently met with the jobbers' committee to determine who the large buyers were in that particular territory, and to follow the same pro-

Seventeen Industries Represented on Manufacturers' Committee

AT the distribution conference a committee representing manufacturers was established. A joint meeting of this committee and the jobbers' representatives arranged for each manufacturer to call a conference of the leaders of his industry to consider a distribution plan which would best fit the needs of that industry. At these conferences delegates will be chosen to represent the different industries at a trade conference to be held in Washington later in the year, which conference will include both jobbers' and manufacturers' representatives. The committee of manufacturers follows:

Bolt, Nut and Rivet Manufacturers
CHARLES J. GRAHAM, Graham Bolt & Nut Co., Pittsburgh.

Wire Fence Industry
WILLIAM G. HUME, vice-president and general sales manager Keystone Steel & Wire Co., Peoria, Ill.

Wire and Nail Manufacturers
GEORGE W. JONES, general sales manager Pittsburgh Steel Co., Pittsburgh.

Wire Cloth Makers
GEORGE E. WATSON, vice-president in charge of sales Wickwire-Spencer Steel Co., Inc., New York.

Wheelbarrows
H. E. HAYMAN, General Wheelbarrow Co., Cleveland.

Valve and Packing Industry
JAMES R. WHITE, secretary Jenkins Brothers, New York.

Cap and Set Screw Industry
H. E. PENFIELD, Chicago Screw Co., Chicago.

Cordage Industry
J. S. McDANIEL, secretary Cordage Institute, New York.

Abrasive Industry
WILLIAM MCGREGOR, Carborundum Co., Niagara Falls, N. Y.

Welded Chain Manufacturers
FRANK A. BOND, vice-president United States Chain & Forging Co., Pittsburgh.

Makers of Fire Fighting Equipment
CHARLES H. MEIGS, commissioner Fire Equipment Manufacturers' Institute, New York.

Cold Finished Steel Bar Industry
EDWARD L. PARKER, president Columbia Steel & Shafting Co. and Edgar T. Ward's Sons Co., Pittsburgh.

Shovel Manufacturers
C. L. BUTTS, manager of sales Wood Shovel & Tool Co., Piqua, Ohio.

Horseshoe and Calk Manufacturers
ROSS R. HARRISON, general manager Bryden Neverslip Co., New Brunswick, N. J.

Electrical Goods Industry
W. E. SPRACKLING, president Tubular Woven Fabric Co., Pawtucket, R. I.

Hack Saw Makers
WILLIAM E. CROSS, Clemson Brothers, Middletown, N. Y.

Hand Tool Industry
F. R. PLUMB, president F. R. Plumb, Inc., Philadelphia.
S. HORACE DISSTON, Henry Disston & Sons, Inc., Philadelphia.

cedure after the list was created that we followed in Pittsburgh. We now have 34 such committees organized and in operation.

"The bolt, nut and rivet industry is now actively soliciting only 2690 accounts in the entire country, including the distributors, and every bolt and nut manufacturer in the United States has a copy of this list, whether he is a member of our association or not. Naturally our competition is much more active on the desirable business than ever before. We do not have any price agreements. We meet almost every two weeks. We have worked under advice of counsel ever since our organization started, and prices are never discussed, even on past transactions. We do not dictate or even suggest resale prices to the distributors, that being entirely within their province. The result has been that the distributors' attitude has changed from one of antagonism to one of a willingness to support a stable market. They are willing and anxious to pay a stable market price, realizing fully that a stable market for them is just as important as it is for the manufacturer.

"The benefit to the manufacturer extends beyond the removal of pressure from the distributor for lower prices. The plan has developed into an important factor in cost reduction and has brought about a reduction in that portion of our expense which had been mounting higher and higher every year. Our machines are able to operate to better advantage on quantity production. Our packing expense has been greatly reduced, as the bulk of our material, at least 95 per cent of it, goes out in standard container quantities. Shipping expenses are greatly reduced, as orders now come in heavy tonnages rather than in large number with little tonnage per order. It reduces clerical help, accounting expense, stenographic expense; in fact, every item that goes into overhead."

Schwab Indorses Plan

CONSIDERABLE impetus was given the movement toward better distribution by Charles M. Schwab, chairman Bethlehem Steel Corporation, New York, who, as president of the American Iron and Steel Institute, brought

to the conference the hearty support and indorsement of the iron and steel industry. "It will have the backing of everybody in the American Iron and Steel Institute," said Mr. Schwab, "as far as we are able to persuade them to carry it out, and I believe we will be. I hope the association that you have here outlined will reach such a development of perfection that we may use it as a model and adopt it for the whole iron and steel industry, because I believe in it and it is right."

Criticizing the weakness of the industry in the distribution of its products, Mr. Schwab said: "The whole talent has been devoted to seeing what we can do to reduce cost. Why didn't we give and why don't we give equal talent, equal energy and cooperation to devise a method of economically distributing our product? If the executives of the steel industry can't devise better ways of legally distributing their product, I am in favor of giving some of the men in the ranks a chance to see what they can do. Let those who built up the works see what they can do in the distribution of products. You know the distribution question is a difficult one. If it weren't, the best talent in the country would not be sought after to do it. The engineer and the works manager have done their jobs in the last 25 or 30 years. But those at the head, the executives in the selling and distribution departments, have their jobs ahead of them."

Opposes Preferential Prices

Discussing prices, Mr. Schwab stated that he was not in sympathy with the plan by which preferential customers by reason of their volume of business are regarded as entitled to better prices. "It is the little fellow," he continued, "that is entitled to better prices if anyone is, because the large buyer has chances which the small one has not. Let us have the same price for your product for everybody. I find that the great majority of our customers are happiest if they know they are paying the same prices as any competitors for steel. They don't want a better price and don't care whether it is \$2 or \$5 a ton. They

(Concluded on page 62)

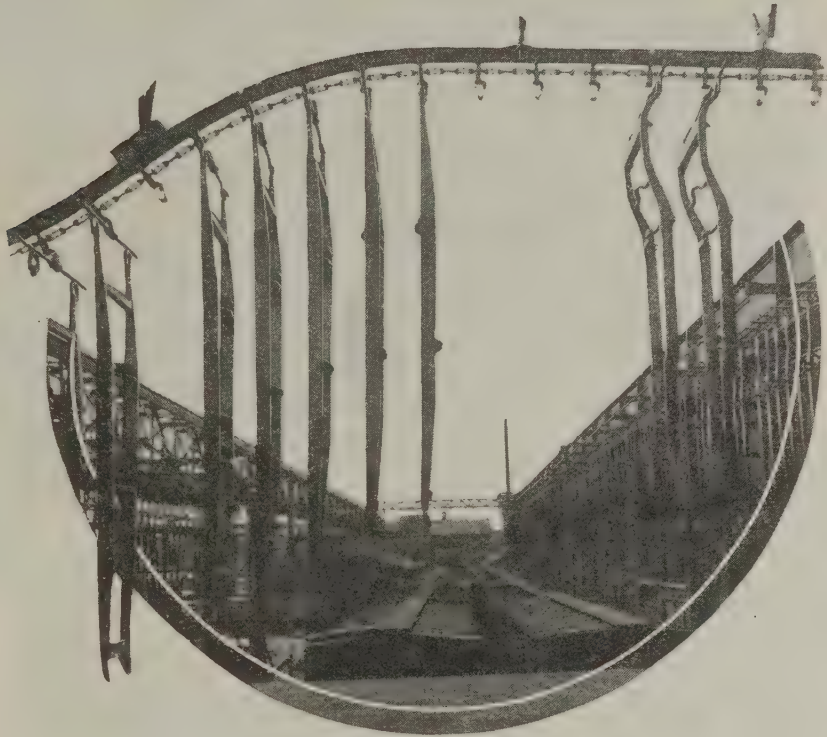
Chairmen of Jobbers' Committees Cooperating in National Distribution Conference

From those listed below the Messrs. Welton, Hansen, Sargent, Smith, Riddle, Puchta, French, Peden, Helm, Waterman, Morris and H. L. Gray, Simmons Hardware Co., St. Louis, and H. W. Caldwell, Hibbard, Spencer & Bartlett, Chicago, were named as a committee to meet with the committee of manufacturers' chairmen to confer on distribution problems

1. BOSTON, R. H. Welton, Chase, Parker & Co., Boston.
2. NEW YORK, W. E. Hansen, Hansen & Yorke, New York.
3. SYRACUSE, N. Y., A. B. Paull, Beals, McCarthy & Rodgers, Buffalo.
4. ALLENTOWN, PA., W. E. Bittenbender, Bittenbender Co., Scranton, Pa.
5. PHILADELPHIA, Fitzwilliam Sargent, Standard Supply & Equipment Co., Philadelphia.
6. BALTIMORE, Louis Moller, Anderson & Ireland, Baltimore.
7. RICHMOND, VA., Alvin M. Smith, Smith-Courtney Co., Richmond.
8. CHARLOTTE, N. C., Charles Nuchols, American Hardware & Equipment Co., Charlotte.
9. ATLANTA, George Winship, Fulton Supply Co., Atlanta.
10. JACKSONVILLE, FLA., L. J. Larzelere, Farquhar Machinery Co., Jacksonville.
11. PITTSBURGH, W. L. Rodgers, Pittsburgh Gage & Supply Co., Pittsburgh.
12. CLEVELAND, H. H. Riddle, George Worthington Co., Cleveland.
13. DETROIT, W. H. Basse, Joseph T. Ryerson & Son, Inc., Detroit.
14. INDIANAPOLIS, F. T. Holliday, W. J. Holliday & Co., Indianapolis.
15. CINCINNATI, George Puchta, Queen City Supply Co., Cincinnati.
16. NASHVILLE, TENN., Brown Buford, Buford Brothers, Nashville.
17. BIRMINGHAM, W. W. French, Moore-Handley Hardware Co., Birmingham.
18. MEMPHIS, TENN., James Pidgeon, Pidgeon-Thomas Iron Co., Memphis.
19. ST. LOUIS, George K. Conant, Sligo Iron Store, St. Louis.
20. CHICAGO, A. M. Mueller, Joseph T. Ryerson & Son, Inc., Chicago.
21. MILWAUKEE, I. R. Shadbolt, Shadbolt & Boyd Iron Co., Milwaukee.
22. ST. PAUL, MINNEAPOLIS and DULUTH, William J. Dean, Nicols, Dean & Gregg, St. Paul.
23. DES MOINES, IOWA, W. E. Muir, Luthe Hardware Co., Des Moines.
24. KANSAS CITY, Edward O. Faeth, Stowe Supply Co., Kansas City.
25. TULSA, OKLA., S. E. Clarkson, Oklahoma City Hardware Co., Oklahoma City, Okla.
26. DALLAS, TEX., Alfred Weaver, Briggs-Weaver Machine Co., Dallas.
27. HOUSTON, TEX., D. D. Peden, Peden Iron & Steel Co., Houston.
28. NEW ORLEANS, J. B. Simmons, Woodward-Wight Co., New Orleans.
29. PHOENIX, ARIZ., P. R. Helm, Pratt-Gilbert Hardware Co., Phoenix.
30. DENVER, H. V. Waterman, Hendrie & Bolthoff Machine & Supply Co., Denver.
31. SALT LAKE CITY, H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City.
32. SEATTLE, George W. Boole, A. M. Castle Co., Seattle.
33. SAN FRANCISCO, Henry Morris, 218 Chronicle Building, San Francisco.
34. LOS ANGELES, J. E. Webster, Ducommun Corporation, Los Angeles.

Flexibility in Making Automobile Frames

**Cleveland Plant
Can Quickly
Change from
One Run of
Frames to
Another**



**Has Progressive
Assembly with
Monorail and
Automatic
Conveyors**

THE Midland Steel Products Co. has just finished the complete rearrangement of the automobile frame department of its Cleveland plant. New semi-automatic assembly lines, with conveying equipment for handling work on monorail tracks, and a new automatic unit for cleaning, painting and baking, with automatic conveyors for delivering the finished frames to the car loading platforms, have resulted in marked improvement in the quality of product, it is said, as well as reductions in production costs and a saving of one-third of the floor space previously required.

Special consideration was given to the flexibility required by the ever changing conditions in the automotive industry, and equipment has been installed and lines arranged so that, though called upon today to turn out one automobile manufacturer's frame by the thousands, they may, with equal efficiency, turn out another manufacturer's frame by the hundreds tomorrow, the delay in adjustment being only a matter of a couple of hours.

The general plan used in the progressive assembly lines of the automobile plants has been followed. Everything has been laid out to eliminate useless handling and to make for continuous, progressive operations. Parts are kept moving through successive operations until they reach the point in the assembly line where they are needed to be brought together to form a finished frame. The old method of grouping presses and other equipment according to their types and sizes, with the accompanying handling back and forth, has been eliminated. Equipment is now grouped for a progressive movement of the parts as required by their design, all operations being in sequence and with all handling and movements reduced to the minimum.

Work May Be Shifted from One Frame Line to Another

At the present time the Cleveland plant has three frame lines, two devoted to the manufacturing of a completely assembled frame and the third for the making of complete sets of frame parts, which are shipped unassembled to automotive manufacturers. Each unit is sufficiently flexible to permit the shifting of the jobs from one to another with little expense and delay, thereby insuring a rapid inventory

turnover of automobile frames and eliminating large storage banks with their accompanying handling expense.

Great attention has been paid to a quick turnover of inventory. Steel is generally delivered directly from the freight cars to the pickling department and is on its way through into a finished frame, without delays or many handlings in the plant. The materials used are plates, sheets or hot-rolled strip—whichever is the most economical with a given design.

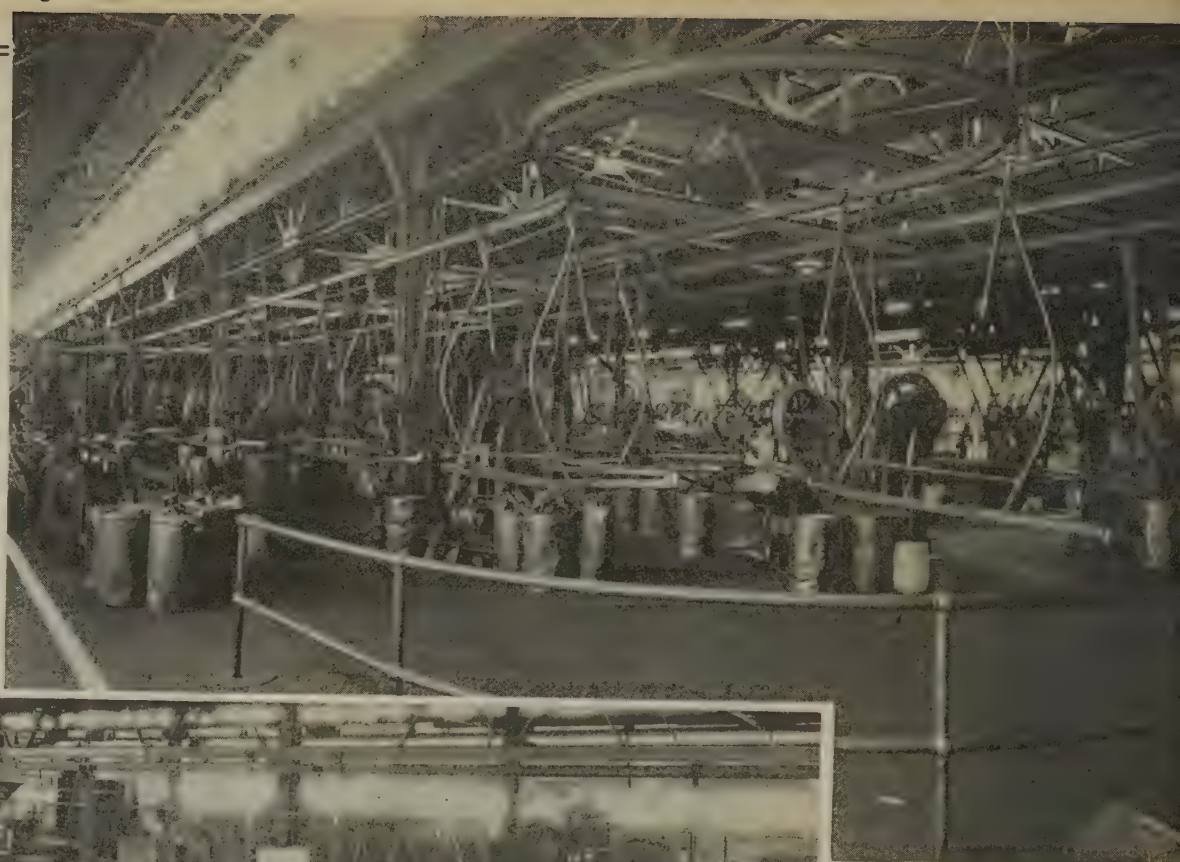
In pickling, all steel is handled in and out of the tanks in acid-resisting crates holding approximately 7 tons each. The crates are so arranged that each sheet is properly separated to insure complete action of the acid on the entire surface of the steel. After the acid immersion, the steel is rinsed in tanks of water and soda ash. In the final operation, before the steel is removed from the pickle crates, it is dipped in a tank of soluble oil. As the sheets are well separated for pickling, they receive a good coat of oil on both sides, eliminating the labor of lubrication with drawing compounds except in cases of difficult draws. From the pickle house the steel is delivered to the blanking presses in one of the frame lines.

Minimum of Manual Handling in Progressive Assembly

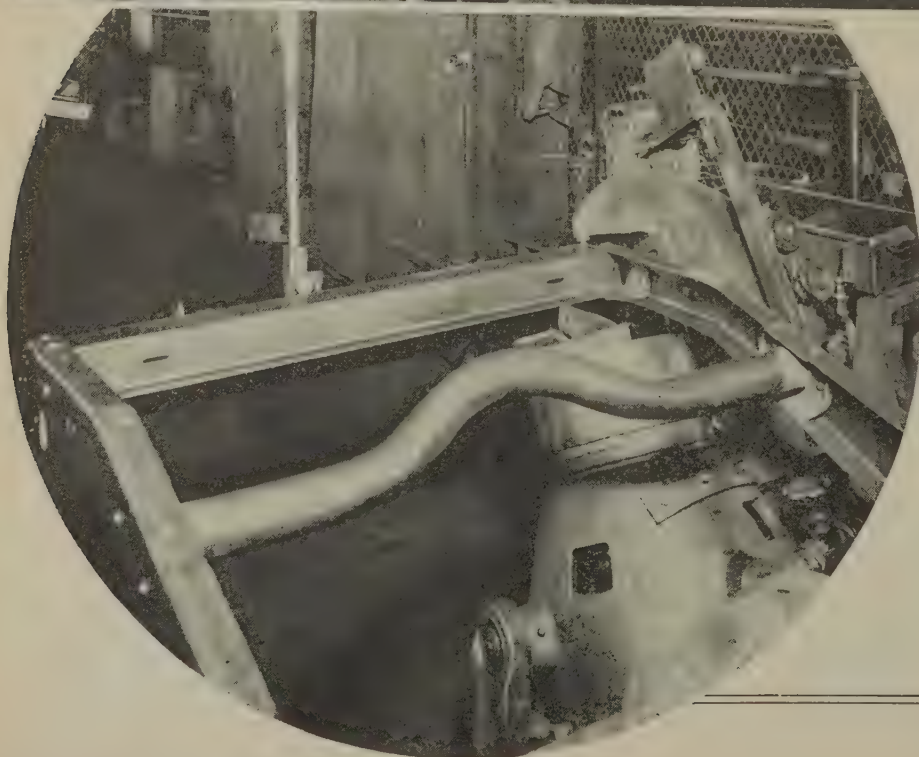
Each of the three lines is equipped with two mechanical presses for making side rails. In the first press, side rails are blanked and pierced in pairs in one operation, all holes being put in that will not distort during the forming operation. An automatic conveyor in the center of the press carries the blanks to the forming press, where they are formed in pairs. A conveyor from this press carries the rails to racks at the head of the side-rail assembly units. There are two side-rail assembly units on each line, one for right and the other for left hand members.

The side rail is set on a cradle suspended from a carrier that moves on a monorail track approximately 250 ft. long. The cradle is spring-suspended, making it flexible for handling the work during riveting operations. Riveting presses are so arranged along the conveyor that as the side rail is pushed along in its cradle to the presses the various spring

ONE of the Side Rail Assembly Lines. The rails, when formed, are hung on a cradle suspended from a monorail and are pushed along a line of presses that rivet on parts



THE Rails Pass from the Rail Assembly Line to the Rack in the Foreground, on Which the Frames Are "Nailed" Together with Rivets Driven in by Hand. Then the frames are suspended on the carrier in the background for the riveting operations



THE Bulldozer Riveting Machine for Driving Top and Bottom Flange Rivets Is Designed So That It Will Tilt to Meet Various Angles; Consequently the Die Head Can Be Placed at the Proper Angle to Assure a Perfect Riveting Condition. The holding fixture on the frame carrier is so designed that one man can easily turn the heaviest frame to any position required in riveting

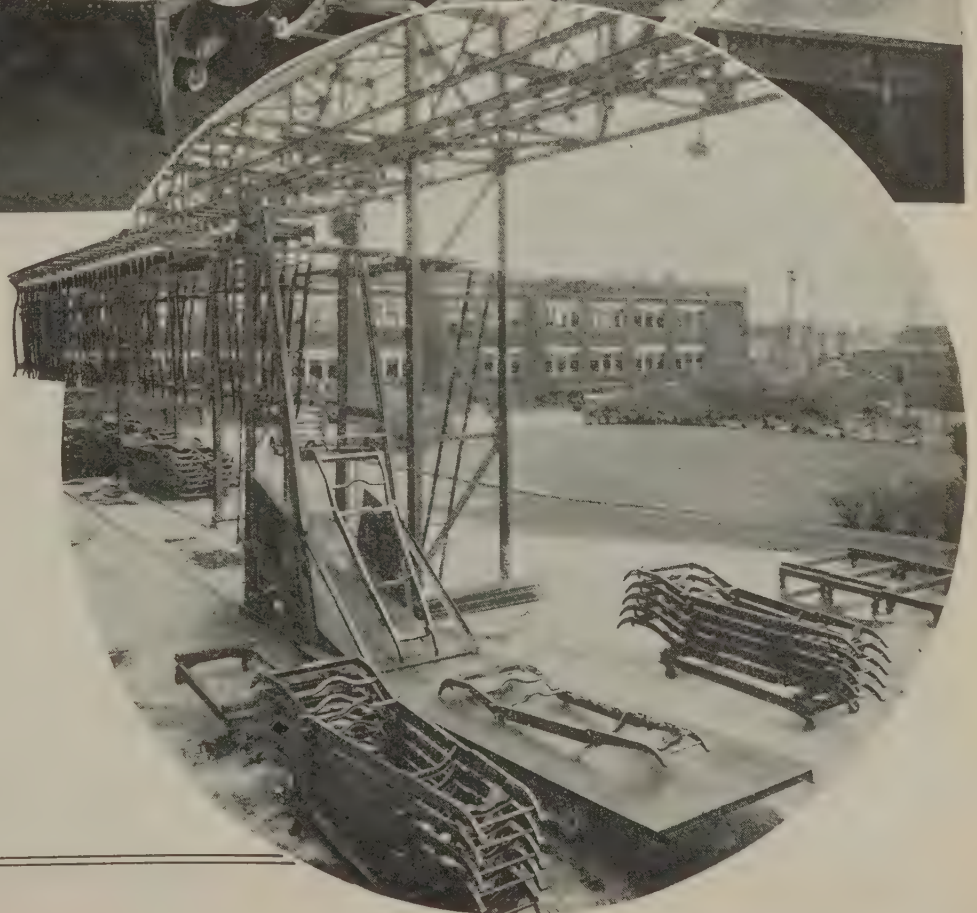


CLOSE - UP
View of a Machine for Riveting Webs. Different types of anvils can be used with this machine, as may be required for different types of frames. Riveting is done cold with special heat-treated rivets

COMPLETED
Frames on the Inspection Table. From here they are pushed to the entrance of the cleaning department at the right, where an automatic loading device picks them up and hangs them on an endless chain conveyor



ONE of Two Loading Docks, Showing a Section of the Endless Chain Frame Conveyor, and an Unloading Device that Automatically Detaches the Frames from the Conveyor Hooks and Deposits Them on the Table. Railroad cars for loading are spotted at the left. The conveyor, which is 2400 ft. long, is used to carry the frames through the cleaning and painting chambers and the baking oven, and out to the loading docks





FFRAME Parts, After Being Baked, Are Carried by Conveyor to a Loading Station. Here the parts are piled into shop boxes, which are moved by electric truck alongside open-top railroad cars

An Overhead Crane Dumps the Boxes into the Cars. Some of the parts, such as side rails and cross members, are handled in bundles

hangers, motor supports, brackets, etc., are riveted to the rail without removing it from the cradle. On completing this circuit the side rails, with all attachments riveted on, are placed on progressive assembly stands, where the frame is literally nailed together with special rivets in a temporary assembly preparatory to permanent riveting.

Spring Carrier Handles Frame During Riveting Operations

The completely assembled frame, nailed together, is then suspended on a spring carrier so designed that the frame can be quickly attached or detached. The holding fixture is arranged so that the heaviest frame can be turned, rotated or put in any position required for riveting. It is a simple task for one man to handle the heaviest frame. All riveting is done cold, special heat-treated rivets being used for this work. The riveting in the main assembly line is done on a series of specially designed Hanna riveters of the bulldozer type of 20-ton capacity. The design of these machines makes it possible to get in various angles, corners and radii formed by the frame design, making proper allowance for standard mill variations in steel, and drive a rivet which will stand any tests that it may be expected to undergo.

The completely riveted frame, on reaching the end of the conveyor, is delivered to continuous inspection stands, where it is checked for accuracy of dimensions. It is then delivered to a platform for loading into an enamel unit. A special carrier made of steel tubing is quickly attached to the frame, using the spring hanger holes. The frame is then picked up by an automatic loading device, consisting of two endless chains carrying dogs on which the carrier tube rests, and is lifted to a vertical position. When it has reached the proper point, a hook on the main automatic endless chain conveyor grabs the tube carrier between a collar at its center and the frame is automatically transferred to the main conveyor for movement through the washing, enameling and drying unit. The movements of the loader and main conveyor are synchronized and are effected without any man power.

The main conveyor is approximately 2400 ft. long. Frames, which are suspended on this conveyor on 24-in.

centers, pass consecutively through cleaning, rinsing, drying and painting compartments on the first floor up to a baking oven, approximately 650 ft. long, located on the roof of the plant. In the cleaning chamber the frames are washed with hot water containing a cleaning solution, delivered under pressure from above, with live steam discharged through nozzles at the side. In the rinsing compartment hot water flows over the frames, after which they pass into a drying chamber. They then enter the painting chamber, where a special lacquer-resisting primer is applied automatically. From here they move up to the oven, where they are given a 1-hr. drying in a temperature of approximately 400 deg. Fahr. The materials used, the time of drying and the temperature are calculated to deliver a high-class, long-lived weather-resisting finish.

Passing from the oven, the conveyor makes a horse-shoe circuit at the side of the plant over two docks, between which are two spur tracks. This makes it possible to load from either dock, unloading machines being so arranged that selected frames can be removed on one side of the loop with the remainder passing around to the opposite dock.

Automatic Unloading Machines on Each Dock

Automatic unloading machines are provided on each dock. The unloading machines are similar to the loading machines except that the operation is reversed. They are mounted on tracks so that they can be placed opposite the door of the car into which the frames are to be loaded. The unloader is completely automatic and detaches the frame from the main conveyor, allowing it to slide slowly down to a flat table, where the conveyor tube is removed. Frames are stacked on trucks, on which they are run into the box car for loading. The outstanding feature of this conveying equipment is that the entire unit will handle any and all types of frames as they come off the production lines.

A highly efficient production line has been installed for the manufacture of frame parts that are shipped unassembled. This unit starts out with two mechanical presses, one for blanking and piercing and the other for forming the side rails. After they come off the forming press, they are

delivered directly to a continuous rail assembly line, at the end of which they are hung on an endless chain conveyor which carries them automatically through washing, rinsing and drying chambers and then loops downward through a dip painting tank. Moving upward slightly, this conveyor takes the side rails through a baking oven, which is located 10 ft. above the floor, so that working space is available underneath.

The cross members and other small parts are fabricated on specially arranged lines of presses along the side of the baking oven, and a separate conveyor is provided to handle these parts. Each part passes from the blanking, forming and sub-assembly operations in a continuous movement without delays in handling. The workman on the final operation hangs the part directly on a hook of the conveyor, which passes at his side. This conveyor carries the parts along the side of the oven, makes a 180-deg. turn and goes through the same cleaning, rinsing, drying, painting and baking unit that is used for the side rails. The smaller conveyor emerges from the oven near the point at which it was loaded when moving in the opposite direction, and then passes under the oven for unloading.

Some Frame Parts Bundled, Others Shipped Loose

Various parts are removed at predetermined stations. Side rails, cross members and all parts which can be are put in standard bundles. The other small parts are dumped into shop boxes. The bundled parts are picked up with a crane and stacked into gondola cars, from which they are likewise unloaded at the automobile plants. The loose small parts are automatically dumped in partitioned gondola cars, from which they are removed with a magnet at the motor car assembly plants.

The frame parts unit has a capacity of over 2000 completed sets of frame parts in 9 hr. With an average of 46 parts to each frame going through this line, over 92,000 parts are formed from raw steel and are delivered, completely painted, to open-top cars in 9 hr.

In addition to this plant in Cleveland, the Midland Steel Products Co. also has a large plant in Detroit, which will be rearranged in a similar manner, following appropriations just authorized. Through its predecessor, the Parish &

Bingham Co., the company has followed the development of transportation for a third of a century. It was first organized to do a general stamping business, making watch cases. It launched out into the transportation field of the day, by making hardware parts for horse-drawn vehicles, harness, etc. When the bicycle came into vogue the company was a large manufacturer of sprockets, and in 1903, which was the year the first pressed steel channels were developed, it went into the automotive field. The following year marked the company's first production of automobile frames.

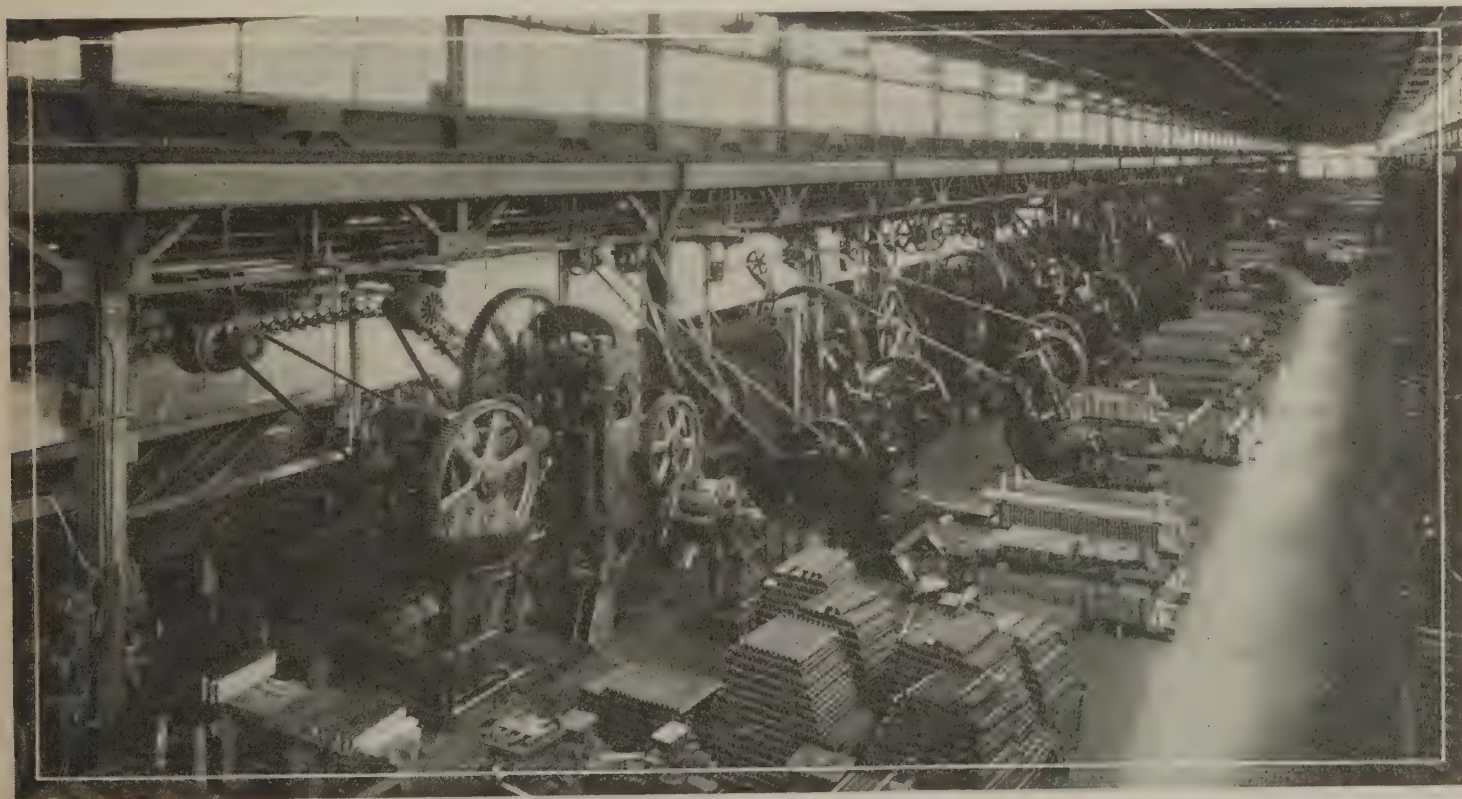
The company, with its predecessor, claims to have produced a greater percentage of automobile frames manufactured in the United States than any other single unit. In the past 10 years it has manufactured 12,432,000 automobile frames, which is 44 per cent of the 28,000,000 automobiles manufactured in the United States during that period.

Factory Payrolls Influenced by Speculation

Factory payrolls move inversely with speculation in securities and with money rates, according to Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., in an article in the July 1 issue of *Looking Ahead*. Five charts, for the years 1919-1921, 1920-1923, 1921-1924, 1923-1925 and 1924-1928, show that factory payrolls increase following decreasing speculation and lowering money rates and that payrolls decrease following increasing speculation and increasing money rates.

"What is going to be the effect upon factory payrolls, upon the amount of manufacturing done in the United States during 1928 and 1929 and possibly 1930 and 1931, of this four years' upward spurt in speculation (1924-1928)? We make no prediction," says Mr. Simonds. "We do not even claim that bull markets will always be followed by decreasing factory payrolls. If this is always the case, it makes little or no difference whether the one that comes first is the cause of the other or not.

"When speculation turns down in the next bear market, it will mean, according to the charts, that some months later factory payrolls will begin to increase and continue to increase for as long as the bear market continues."



PARTS for Frames That Are Shipped Unassembled Are Made on This Row of Presses. They are then suspended on a conveyor directly back of the presses, which carries them through the cleaning departments and baking oven, one side of which is shown in the rear

More Apprentices, Fewer Unemployed

Unskilled Workers Suffer Most in the Displacements Due to
Machines, Yet the Skilled Are Scarce—One-Operation
Men Are No Solution of the Problem

BY C. J. FREUND*

BUSINESS men have paid a great deal of attention in the past half year to the problem of unemployment. In fact, it may be said that they have given more thought of late to that subject than ever before, probably for the reason that the last half year has seen the most serious period of unemployment since industrial leaders learned to appreciate fully the detrimental effect of unemployment upon business conditions. Social workers and social agencies do not ordinarily influence business men directly to any great extent. However, in recent months sociologists have disturbed the American business mind with reports of many men out of work, and hence out of the market to a large extent and an additional burden upon the various communities.

Estimates of the number of persons unemployed in February varied greatly, ranging between one million and four million. Secretary Davis of the Department of Labor considered the number to be about 1,800,000. But the lack of exact figures did not shake the general conviction that unemployment was serious and many committees and commissions undertook a careful study of the question.

Labor-Displacing Influences Steadily at Work

The problem appears to be particularly pressing because economists have pointed out that unemployment is no longer the result of temporary depressions only, but has been brought about by the greater mechanization of manufacturing processes and is a permanent and growing condition which becomes more or less severe, but will not disappear altogether.

The constant invention and installation in manufacturing plants of machines and processes whereby one or two men can turn out more work in a day than a dozen men were able to do in a week ten years ago is bound to have its effect upon the lives of the people in our cities. In the oil industry, for instance, output has increased 85 per cent in the last four years while the number of employees in the industry has decreased 5 per cent in the same time. In the meat packing industry production has increased 20 per cent and employment has decreased 19 per cent since four years ago. Similar conditions obtain in most industries.

Many Material Handlers Lose Places

Unfortunately the unskilled worker suffers first in a period of less employment and suffers most. There is an element of tragedy in the fact that the man who has the smallest income is usually the first to be thrown out of work. Besides having the smallest and most uncertain income, the unskilled laborer, if married, is almost certain to have a larger family than his more fortunate fellow workers in the skilled trades and in clerical positions. However, it is but natural that the untrained man should be most affected in a period of unemployment. The unskilled laborer is the least intelligent of industrial workers, he is least prepared to adjust himself to a change of conditions

in industry. Hence, in the fierce rough and tumble of competition following upon restricted activity in industry, he is the first to be crowded out.

Also, much of the invention of machinery in the last few years has been in the field of material handling, which is the proper field of the unskilled workingman. Formerly, when a car of coal was to be unloaded, a half dozen men were hired to shovel it over the sides and a half dozen more brought it in wheelbarrows to bins or piles where it was stored. Today, the car is lifted above the pile of coal and its bottom drops out, or the car is emptied by turning it upside down. It is not so long since truckers in machine shops brought work from one machine to another. These truckers have been very largely replaced by mechanical conveying systems. Everywhere the common laborer finds less and less demand for the strength which is all he can offer to industry. In 1922 there were 80 applicants for every 100 common labor jobs in the State of New York. Today, every hundred of such jobs attracts 400 applicants.

Yet Skilled Workers Are Scarce

On the other hand, manufacturers everywhere find it impossible to get sufficient skilled mechanics. On account of the laws restricting immigration it is no longer possible to import skilled men from Europe, and until the laws were passed American manufacturers did not realize the extent to which they were dependent upon European skill. In the past, American boys have shown no considerable tendency to go into trades because they have been taught, however indirect and unintentional the teaching may have been, that any kind of manual work, or any occupation involving manual work, was beneath the dignity of an American citizen of the finest type.

As a result, employment agents go out looking for mechanics, even though great numbers of men are waiting in their anterooms and still greater numbers in the public employment offices. Not long since a foundry employment manager was unable to find 20 molders, although thousands of men were said to be out of work in the city. He made efforts to import them from other centers but failed. Less than five months ago a prominent machinery manufacturer expanded his business and sought 65 high-class machinists. To this day he has not got those 65 machinists together, although there were, and may still be, many hundreds of men waiting at the various local public employment offices. Everywhere one hears the same story: great numbers of men who call themselves mechanics in various lines but very few who are really capable of doing first class work.

Unskilled Men Must Be Trained

This shortage of skilled mechanics when large numbers of unskilled men are out of work suggests the obvious wish that a portion of the unskilled men for whom there is no work were trained mechanics for whom there is a distinct demand. But this wish need not be a wish merely. It suggests the possibility of partial relief and solution of the

*Apprentice supervisor, Falk Corporation, Milwaukee.

problem. Of course, it is impossible to transfer the best men in the unskilled class to the rank of mechanics as easily as marching them from one side of the street to the other. *Nevertheless, it can be done; it can be done by means of industrial training.*

Only the will of the manufacturer is necessary; the material is already there. Every superintendent and works manager knows that the unskilled men in his plant include a number who are energetic, ambitious and responsible, who have a natural gift for mechanical work but who have been denied by circumstances the opportunity to learn a trade. Men of this kind are anxious to improve themselves and if the employer will only provide facilities for learning, these men will soon promote themselves above the laboring class. Is there anything more ridiculous than the attitude of the employer who complains of the lack of skilled mechanics, wonders what to do when laborers are out of work because of material handling equipment which has been installed, admits freely that a number of his laborers have much natural ability, and does nothing about it? He would display much ingenuity in the solution of some problem in finance or production but the training of some of his laborers for better work never occurs to him.

Of course, industrial training will not completely solve the problem of unemployment nor can it be expected to influence the situation to any extent unless it becomes general throughout the country.

Also, since every modern undertaking must be well organized to be successful, apprenticeship suggests itself as the type of industrial training which will be most effective because apprenticeship is the most highly organized industrial training.

One-Operation Men Certainly Not the Answer

There is much more room for trained men in industry than most people realize. One sometimes hears it said that there is no place for the skilled mechanic in modern production industries. The very managers of automobile plants have been known to say that they want nothing except men who can be taught a mechanical operation and are willing to stay at it indefinitely.

But where do such managers find their superintendents, their foremen and inspectors? Who is there to show these same mechanical operators what to do and how they are to do it? Mechanics are necessary in production industries to take care of the maintenance of machinery and to set it up in the first place. Skilled men of the highest class are required to plan and to make the tools and fixtures which make production work possible. Only highly trained men can plan the routing of work, the placing of machines and the proper arrangement and correlation of various departments. Although every machine operator in production industry need not be a trained mechanic, still our production industries offer the skilled workman more opportunities than were ever dreamed of before quantity manufacture came into being.

Mass Production Industries Not All the Story

Besides that, who has said that all American manufacturing is going on a production basis? It will be a long time before locomotives, for instance, will be built by the thousands from one design and assembled and taken out of the shops on a moving production line. Neither is it likely that freight cars will be manufactured in this manner, although the building of locomotives and freight cars, and passenger cars, too, is an industry of no mean importance. The public utilities have grown tremendously in recent years. In a typical American city the consumption of electric power was 106,000,000 kw. hr. in 1916. The power consumption in 1926 was 610,452,000 kw. hr., an increase of nearly 500 per cent in ten years.

Undoubtedly there has been a similar development of electric service in every American city. In order to supply this increased demand for electric power, boilers and gener-

ators must be built together with auxiliary machinery of different kinds. Still, it is unlikely that high production methods will be applied to the manufacture of 60,000-kw. turbo-generators. Furnaces, cars, cranes and rolling machinery must be built for the gigantic steel industry; mining machinery, engines and boilers for ships; printing presses, paper-making machines, equipment for food industries and for chemical industries, machine tools for the use of the varied production industries which depend upon them. All these are branches of manufacturing which do not lend themselves to mass production and in which the trained mechanic is more essential and can find more opportunity than at any previous time in history.

More Trained Men Needed in Sales

Moreover, the manufacture of standardized equipment of different kinds in quantity has created a great demand for highly trained men to do sales and service work. Men are now needed in the field to point out to the customer how standardized machinery and equipment may be adapted to his needs where in years past the customer's engineers designed special machinery to do the work.

Also, the saying is still true that there is always room at the top. A capable superintendent is extremely rare. A first-class foreman is not easily found. In a manufacturing organization of 3000 men, how many could qualify for president? The high salaries paid to industrial executives, even when they are not heavy stockholders, frequently not stockholders at all, is the best evidence of the scarcity of real leadership in industry.

The entire industrial world beckons to the trained man. On all sides, in every department of manufacturing and commercial activity, everywhere there are positions waiting for the man who has a certain skill. Regardless of the number of intelligent and resourceful laboring men who might be given trade training, all could find work to do. Thousands of them would release more experienced mechanics for positions of greater importance and responsibility. The surplus of unskilled men could be reduced indefinitely by transfer to the skilled class without building up a surplus of mechanics, without even satisfying the demand.

Apprenticeship Is Eminently the Solution

Apprenticeship will be particularly effective in relieving the pressure of unemployment among the unskilled because it reaches directly into the heart of the problem. Apprenticeship is the particular course of industrial training whereby the unskilled man becomes skilled, hence apprenticeship will accomplish the transfer of men from the unskilled to the skilled more readily and more efficiently than any other method of education.

Modern apprenticeship will attract large numbers. Fortunately American young men have learned to be suspicious of the old-fashioned, haphazard training programs which were largely promises and exploitation. Experience has shown that when real apprentice training is provided with a contract arrangement, proper supervision, well-thought schedules of work and pay, school work, and careful shop instruction, it is not difficult to attract sufficient boys and young men. In fact, the well established corporations which have been training apprentices for a number of years all have a waiting list for every trade.

Apprenticeship is an institution which produces results, not only for the present but more particularly for the future. The young men who are saved from swelling the unskilled labor class remain good mechanics for years to come and do their share in the training of other young men of a new generation. Again, apprenticeship affects exactly the right type of boys and young men. Regular trade apprentices ordinarily are boys who have not been able to complete their education. The very fact that they become apprentices marks them as being capable and energetic beyond the average, and the type of young men who should be transferred from the unskilled class to the skilled.

Business Analysis and Forecast

Expects Better Business by Fall

Recession Meanwhile of Greater Than Seasonal Proportions
—Renewed Boom Not Looked For

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

CONDITIONS unfavorable to business expansion appear to be predominant and to indicate a period of moderate liquidation and recession during the early summer months. The recession is likely to be of greater than seasonal proportions. Higher money rates and political uncertainties are tending to restrict buying, and the sagging trend of commodity prices—partly a result of the foregoing—reacts to the same effect. Needless to say, however, deflation in the stock market no more forecasts a sharp recession in business than the inflation of last year forecast expansion.

AT present the chief interest centers in finance. The outstanding development in June was the reversal of the stock market's inflationary trend. The large gold supply and accumulation of funds in the hands of corporations, together with the Reserve Bank policy of last year, has led to tremendous inflation in stocks, and the more recent gold exports together with the change in reserve policy finally checked this inflation and brought about a very sharp reaction. Money had come to cost about 6.28 per cent, bonds to yield about 4.4 per cent, and common stocks, after rising to a point where the yield was only 3.95 per cent, even at this writing yield but 4.33 per cent. The return on invested capital and the yield on securities were much lower than interest rates, even commercial

paper rates being higher than the yield on bonds and stocks. The readjustment was bound to come.

Probably this adjustment is not yet complete. Brokers' loans are still abnormally high (we estimate that they should be reduced to about \$3,100,000,000 to be normal), and there is no reason to believe that the Reserve Banks are satisfied. Security yields continue much below interest rates. Under the circumstances, further liquidation is to be expected. But the time will come when, as speculative requirements are reduced and high money rates tend to attract funds from abroad, while yields on securities increase, forces making for easier money will gain the ascendancy and equilibrium will be restored.

Nothing in prospect for industrial earnings now seems

Factors in the General Business Outlook

Favorable

1. Increase in building contracts and permits, and a large volume of structural steel bookings in May
2. Recovery of retail and wholesale trade in May
3. Farm purchasing power improved
4. Large automobile production
5. Increased merchandise exports in May
6. Considerable liquidation in securities without any severe financial disturbance
7. Strong financial position of leading companies
8. Light mercantile inventories

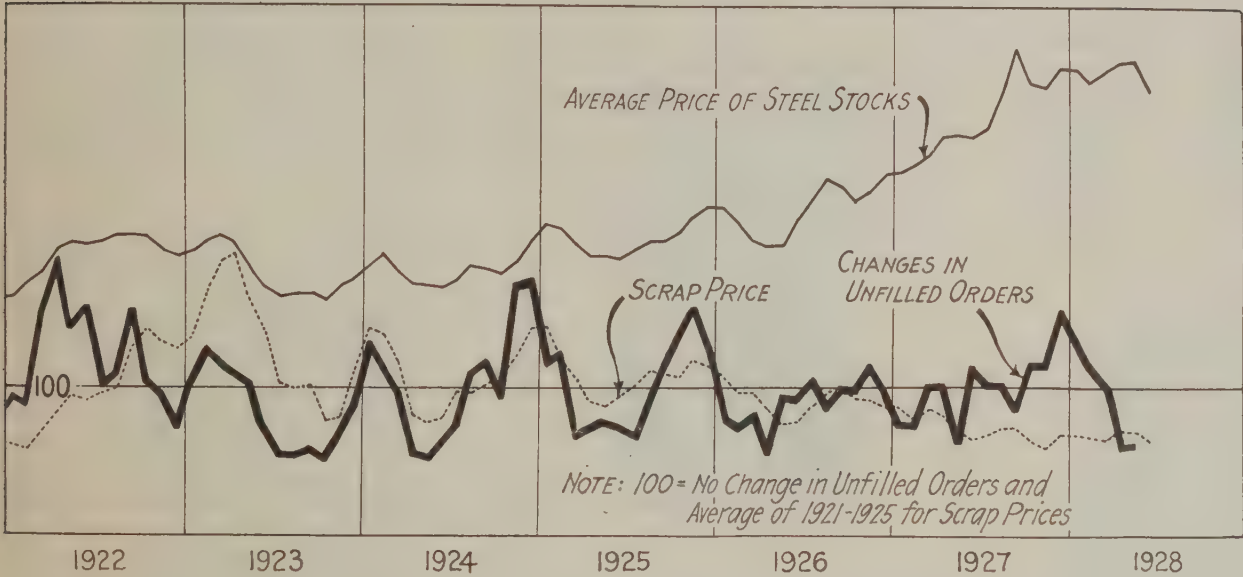
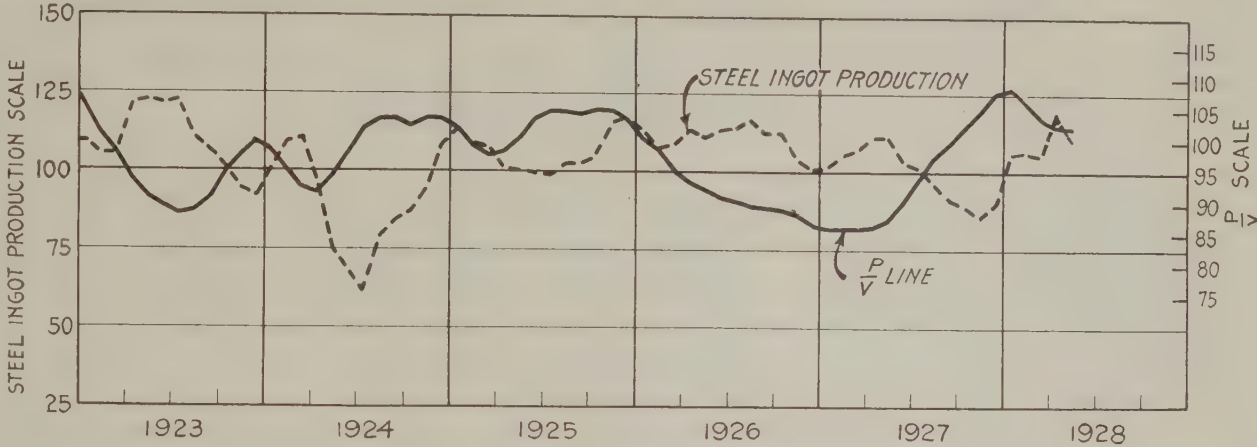
Unfavorable

1. A further decline in the P-V Line
2. Declining commodity prices
3. Declining unfilled orders for steel and other basic commodities
4. Severe competition and narrow profits
5. Increased business failures
6. Unfavorable conditions, with increases in physical inventories, in a number of industries (e.g., textiles, shoes, tires, lard, zinc, paper, sugar, bituminous coal, and some branches of iron and steel)
7. Money rather tight, due to large gold exports and brokers' loans and accumulation of bonds on dealers' shelves
8. The severe setback in the stock market
9. Continued unseasonable weather
10. Political uncertainties

to give reason for expecting a renewed boom in business, nor is there any reason to expect that any considerable proportion of the gold that we have shipped abroad will return. It does seem, however, that by fall the readjustment will be fairly well along and that, with easier money, a sounder valuation of securities, and greater political certainty, the constructive forces may take the lead.

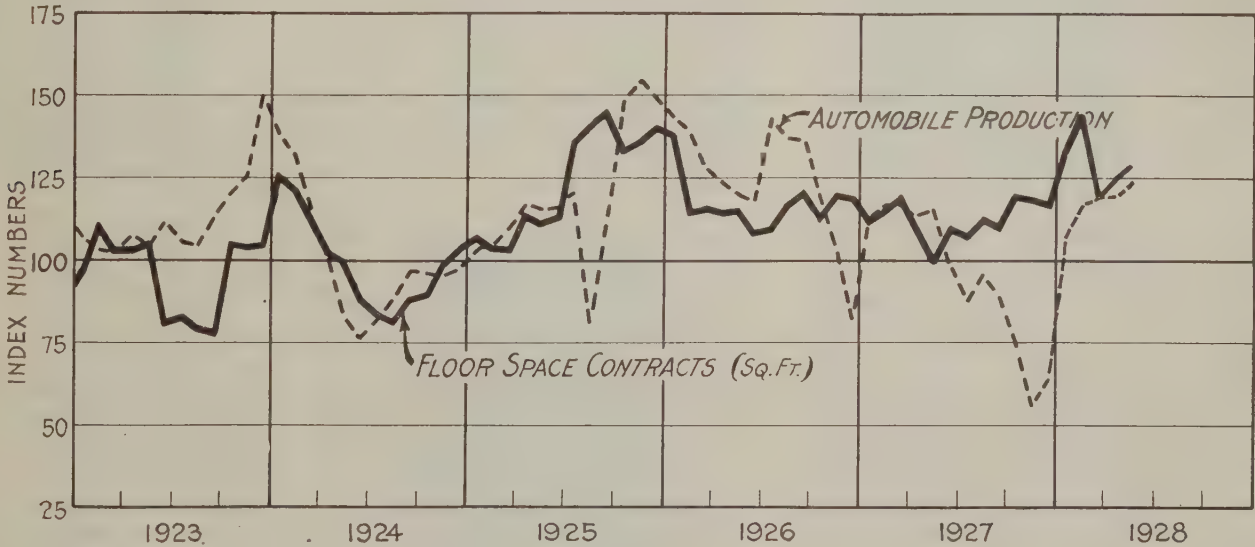
Commodity prices, except in cases of threatened crop shortage, are for the most part sagging. Certainly curtailment is desirable in a number of industries, as stocks of goods are accumulating, notably in the case of zinc, cotton and silk textiles, shoes, leather, and lard. Even in the case of copper, production has recently been gaining on shipments. The decline in the P-V Line is moderate and

DOWNWARD Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Appears to be Rounding Off for a Rise. Steel production (adjusted) after rising for five months has turned downward again



UNFILLED Orders Have Declined Further; Stock Prices, Though at a High Level, Are Irregular and Scrap Prices Are Weak. All three indexes point to lower operating conditions

BOTH Building Activity and Automobile Output Showed an Advance in May. They are higher than at the same season in any of the past five years



The P-V Line (a ratio between commodity prices and the physical volume of trade) continued its moderate downward trend in May and, along with other unfavorable indications and the prevalence of uncertainty in several important respects, this trend forecasts a period of moderate recession in general business. As in recent months, this barometer continues to indicate that the activity of industry is somewhat in excess of the demand for industrial products at current prices.

gradual, however, showing no serious maladjustments, though it indicates that demand is relatively weak in comparison with supplies.

The May decline in the adjusted curve of steel ingot production is in accord with the forecast given by the P-V Line early this year, and reflects the decline in unfilled steel orders that began in April. Apparently the influence

(Concluded on page 62)

Metal Studies by Testing Society

Extensive Investigations Under Way on Corrosion-Resistance of Sheets, and Properties of Steel Castings and Die Castings

AT Atlantic City last week, the American Society for Testing Materials held a series of meetings which broke all records for attendance. Growth of this society has been constant since its organization in 1898, but the meeting last year, held at French Lick Springs, somewhat off the main travel routes, was not up to its predecessors. Up to Wednesday evening of last week 808 members had registered (already a record); counting the later arrivals of those who attended discussions on non-metallic materials on Thursday and Friday, the total doubtless approached 1000. Total membership of the society, as of June 1, was 4193. The volume of the society's publication for the last calendar year also sets a record at 3975 pages. Newly elected officers are:

President: G. W. Thompson, chief chemist National Lead Co., Brooklyn.

Vice-President: K. G. Mackenzie, consulting chemist, Texas Co., New York.

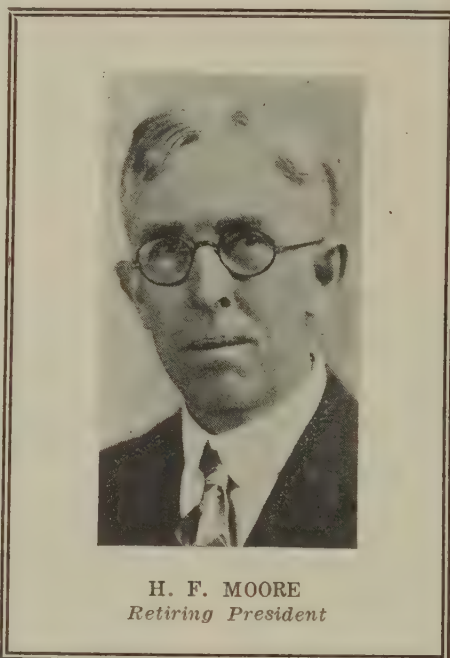
Members of Executive Committee: T. R. Lawson, head, department of civil engineering, Rensselaer Polytechnic Institute, Troy, N. Y.; H. S. Mattimore, engineer of materials Pennsylvania State Highway Department, Harrisburg, Pa.; P. D. Merica, director of research International Nickel Co., New York, and Samuel Tobias Wagner, consulting engineer Reading Co., Philadelphia.

Notable Special Addresses

A GRATIFYING innovation was due to the retiring president, Prof. H. F. Moore of the University of Illinois. The audience, gathered to listen to his address, "Hooke's Law of Stress and Strain—an Address Commemorative of the 250th Anniversary of Its Announcement," was wholly unprepared for the brilliant biographical sketch which reached back into a forgotten time and revived the dour experimenter and inventor, and his contemporaries, Robert Boyle, Isaac Newton and other founders of the Royal Society.

Dr. Frank B. Jewett, in the Edgar Marburg lecture, also departed from the custom of discussing some phase of materials testing. He described in broad outlines the 15-year research which preceded the establishment of

transoceanic telephony. A moving picture then showed the special apparatus and personnel required to complete a call from America to Great Britain by means of long distance land lines and a wireless stretch across the north Atlantic. Such powerful sending stations require vacuum tubes



H. F. MOORE
Retiring President

with capacities measured in horsepower rather than watts; the lecturer dwelt upon the refinement and research in materials which have made possible such tubes.

A third pleasant event was the award of the Charles B. Dudley medal to A. V. de Forest. It is given each year for the most meritorious paper read before the society. His paper appeared in a symposium on magnetic testing, and was entitled "A Method of Graphic Representation of Magnetic Characteristics." It described automatic equipment which will probably result in a more rapid adaptation of such testing methods to commercial problems. A brief description of Mr. de Forest's method was printed on page 1459 of THE IRON AGE for May 19, 1927.

Researches on Metals and Alloys

A PRONOUNCED change in the activities of the American Society for Testing Materials, especially in so far as metals are concerned, is apparent. During the early years of

its existence the various committees had a busy time to harmonize the differences between the desires of the producers and the consumers of tonnage commodities. Satisfactory agreement having been reached on trade customs, it then became evident that many questions remained of a more technical nature, and about which little or no precise information was available. Consequently the active committees at present are those which are engaged in some research to clear up questions of fact. No less than 26 of such projects are now under way, in the field of metallic materials alone.

Sulphur and Phosphorus in Steel

AS an instance, a committee to investigate the effect of phosphorus and sulphur in steel was organized in 1919, under the chairmanship of Dr. George K. Burgess, director Bureau of Standards. This committee has enjoyed the cooperation of many organizations and firms and has been able to report as the result of a thorough investigation that residual sulphur up to 0.077 per cent is not detrimental to steel plate (see THE IRON AGE, July 3, 1924, page 55) nor to rivet steel in quantities up to 0.06 per cent (see THE IRON AGE, July 1, 1926, page 5). In order to make a similar study of steel for forging, containing less than 0.02 per cent phosphorus, a series of eight basic open-hearth heats has been made under observation by Jones & Laughlin Steel Corporation, ranging in residual sulphur from 0.031 to 0.116 per cent, rolled and distributed for test.

It has also been decided that the influence of phosphorus on steel castings is that phase of the phosphorus problem of most immediate importance. Consequently the Atlantic Steel Castings Co., Chester, Pa., has made eight heats in a 10-ton stationary acid open-hearth furnace. Series A with low carbon has phosphorus ranging from 0.025 to 0.10; while phosphorus in the higher carbon castings in Series B does not go so high. Funds for the work were raised by the American Foundrymen's Association and the Steel Founders' Society of America. Test bars were made in open molds of dried sand, six bars 1½ in. square by 12 in. long being cast

on the bottom of a large block. The test bars are then cut off, cleaned and equal portions of Series A were given the following heat treatments before testing:

Annealed bars: Heated to 1650 deg. Fahr., held 2 hr., cooled in furnace (1600 deg. Fahr. for Series B).

Normalized bars: As above, but removed from furnace and cooled individually in still air.

Normalized and drawn: After normalizing, reheated to 1150 deg. Fahr., held 3½ hr., cooled in furnace (1250 deg. Fahr. for Series B).

In cooperation with the American Petroleum Institute, a program is being formulated to study the effect of added phosphorus on the weldability of pipe steel, and on the properties of pipe made therefrom. These tests will cover the range of carbon 0.06 to 0.12 and phosphorus 0.025 to 0.10.

Corrosion of Metal

ANOTHER research committee, headed by J. H. Gibboney, Norfolk & Western Railway Co., placed various kinds of sheet steel on outdoor racks some 12 years ago, and has been observing the condition periodi-

cally since. Failure in smoky atmosphere was rapid. The rack in the clear air of Fort Sheridan, Ill., has been dismantled, since it is apparent that the sheets are failing in substantially the same order as at Pittsburgh, namely, copper-free materials first; copper-bearing iron and steel later. Failures at Fort Sheridan in the non-copper-bearing groups have occurred after 37 months' exposure; copper-bearing sheets started to fail only after 130 months.

Tests on similar sheets submerged in fresh water, brackish water and mine water show that corrosion resistance of submerged iron and steel sheets is practically uninfluenced by copper content.

These exposure tests have attracted such wide approval that two years ago an inclusive series of steel sheets having commercial zinc coatings (hot galvanized sheets) were exposed at five different localities. It is too early to observe anything but the early stages of corrosion, but in time this test will answer many questions regarding the mutual effect of thickness and composition of the coating and of the underlying metal. Several thou-

sand samples of coated wire, fencing, conduit, pipe, bolts, hardware and structural shapes are now being collected and will be placed on test racks this autumn. Several railroads and highway departments are cooperating in a plan for similar investigations of flexible metal culverts.

Corrosion of non-ferrous metals is also to be studied. A comprehensive plan has been outlined by a committee under T. S. Fuller, General Electric Co., and \$4,250 subscribed toward the necessary expenses. Twenty commonly used alloys will be exposed in sea water, in "mother liquor" from a salt works, in caustic soda solutions from chemical and paper factories, in hydrochloric and sulphuric pickling solutions. Galvanic and electrolytic effects will also be studied by exposing standardized couples of various metals to atmospheric corrosion, and to various solutions as noted above.

Properties of Structural Steel

A research committee on the yield point of structural steel, in which the Association of American Steel Manufacturers, the American Railway Engineering Association, the American



F. B. JEWETT
Marburg Lecturer

FRANK B. JEWETT, vice-president of American Telephone & Telegraph Co., and head of the Bell Telephone Laboratories, delivered the third Edgar Marburg Lecture. He graduated in 1898, taught electricity and physics at Massachusetts Institute of Technology, and joined the engineering department of the Telephone Co. in 1904. From 1912 to 1925 he was assistant chief engineer, chief engineer and vice-president of Western Electric Co. He has received many honors from learned institutions and national governments.

G. W. THOMPSON, the new president of the society, is a director of National Lead Co., and its chief chemist since 1892. He has also been president of the American Institute of Chemical Engineers (1918). In 1927 Armour Institute of Technology conferred on him the degree of Doctor of Science. His principal interests in the American Society for Testing Materials has been in preservative coatings for structural materials and in the general methods of testing.



G. W. THOMPSON
The New President



A. V. DE FOREST
Dudley Medallist

A. V. DE FOREST is research engineer for the American Chain Co., Inc., Bridgeport, Conn., having held that post since 1918. Mr. de Forest is a graduate naval architect from Massachusetts Institute of Technology (1912) and did post graduate work in metallography at Princeton and Columbia Universities. Prior to joining the Laboratory of the American Chain Co., he was for two years in the research department of the Remington Arms Union Metallic Cartridge Co. He is well known among the members of the Steel Treating society.

New Members, Executive Committee, American Society for Testing Materials



H. S. MATTIMORE



P. D. MERICA



S. T. WAGNER

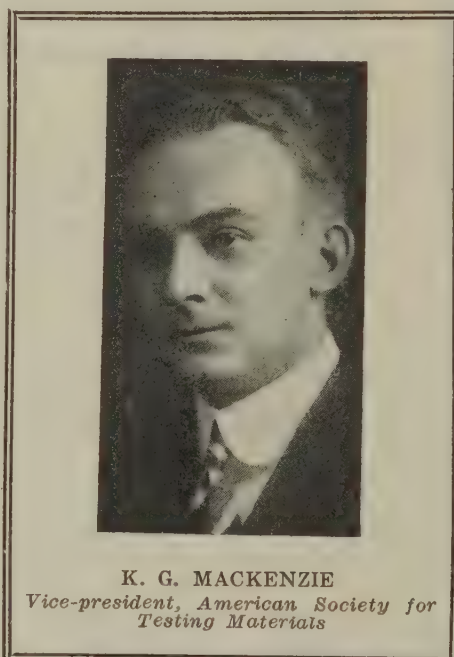
Society of Civil Engineers and the American Institute of Steel Construction are cooperating, reported through its chairman, M. O. Withey, professor of mechanics, University of Wisconsin.

Six hundred specimens were made by the Illinois Steel Co., cut from three grades of round steel bars, selected from very uniform heats of ordinary bridge steel and nickel and silicon structural steel. Five laboratories then determined the influence of the speed of testing. Stress at the yield point was determined by four methods, viz., drop of beam, scaling of specimen, use of multiplying dividers to note 0.5 per cent strain, and acceleration of a sensitive strain gage.

All steels showed a consistent increase in yield point as the speed of pulling increased. For instance, silicon structural steel bars have a yield point of 49,500 lb. per sq. in. when pulled at the rate of 0.05 in. per min., but show a yield 6500 lb. higher when pulled at 2 in. per min. The corresponding difference for carbon steel is 3900 lb. and for nickel structural steel 4800 lb. In discussing this point, L. B. Tuckerman of the Bureau of Standards said that the scatter between results of different laboratories and different methods of test would be even less at lower testing speeds. H. E. Smith, engineer of materials New York Central Lines, emphasized the practical point that the greatest discrepancies in rapid testing come from overrunning the counterpoise in an attempt to keep it balanced against the increasing load; thus a fictitiously high yield point is shown at the drop of the beam.

Professor Withey's committee also tested a large number of pieces taken from mill run structural shapes and plates. The above results of rapid loading were noted, somewhat more

intensified. He believes that the indications of the proportional divider are the most positive; scaling occurs at about 5 per cent above the yield point determined by dividers. It is



also noted that shapes $\frac{3}{8}$ in. thick have a yield point 11 to 19 per cent higher than those with flanges or web $\frac{7}{8}$ in. thick, when the samples are cut from corresponding places on the cross-section. In such testing, large

differences may be expected if samples are taken at random, on account of the influence of ingot segregation at the top and of various amounts of working during rolling on different portions of the cross-section.

This latter point was emphasized in a second paper by Professor Withey, entitled "Tests of Specimens Cut from Different Portions of Structural Steel Shapes." Nearly 400 tests were cut from carbon steel H-beams, channels, angles and plates, such as are fabricated into columns. The table shows the average results, where "highest average stress" represents the weighted average for a single cross-section, figured from the various test pieces taken therefrom. Considerable variation occurred in the 10-in., 20-lb. channels; mean values are as follows:

	Tension	Toe	Root
Ultimate strength (lb.)...	54,500	52,500	
Elongation in 8 in. (per cent)	19.1	28.6	
Yield point (lb.).....	33,900	31,400	
Proportional limit (lb.)...	28,400	27,300	

Such differences in ductility are not due to carbon segregation or differences in grain size. The lowest values noted were as follows:

Ultimate strength: 48,000 lb. per sq. in. in the root of a 10-in., 20-lb. channel.
Elongation: 13.0 per cent in the root of a 10-in., 15-lb. channel.
Yield point: 27,600 lb. per sq. in. in the root of a 10-in., 20-lb. channel.
Proportional limit: 14,700 lb. per sq. in. in the toe of a 10-in., 20-lb. channel.

Basing judgment on weighted averages for whole shapes, the most representative specimen for H-columns may be obtained from the middle of the outstanding flanges. For the channels the web specimens best represent the average in strength tests and the root specimens in elongation measurements. For plates, specimens from the centers are somewhat less variable than the edge specimens and just as representative.

Die Castings Under Investigation

Under chairmanship of H. A. Anderson of the Bell Telephone Laboratories a committee of leading producers and consumers of die castings has embarked on a program that will require the manufacture and testing of approximately 45,000 alumi-

(Concluded on page 61)

Ranges in Average Properties					
Property Tested	Kind of Stress	Highest Average Stress, Lb. per Sq. In.	Shape Having Highest Stress	Lowest Average Stress, Lb. per Sq. In.	Shape Having Lowest Stress
Proportional limit	Tension	39,700	8-in., 32-lb. H-column	25,100	10-in., 20-lb. channel
Yield point	Tension	41,800	8-in., 32-lb. H-column	31,700	10-in., 20-lb. channel
Ultimate strength	Tension	64,200	8-in., 32-lb. H-column	52,200	10-in., 20-lb. channel
Proportional limit	Compression	37,600	10 by $\frac{7}{8}$ -in. plate	22,500	10-in., 15-lb. channel
Yield point	Compression	40,900	8-in., 32-lb. H-column	30,900	10-in., 20-lb. channel

Care of Anti-Friction Bearings

Chicago Meeting of Association of Iron and Steel
Electrical Engineers Was Given Over
Also to Electric Drives

DEVELOPMENT and conservation of power, as well as distribution of cost of energy; application of electric drives; control instruments and anti-friction bearings were foremost among the topics discussed by members of the Association of Iron and Steel Electrical Engineers at their twenty-fourth annual convention, held June 25 to 28 at the Hotel Stevens, Chicago. Ninety-five manufacturers displayed advanced equipment in the exhibition hall of the hotel.

Value of Ball and Roller Bearings Stressed

DISCUSSING anti-friction bearings for roll necks, J. H. Van Campen, chief engineer E. W. Bliss Co., Salem, Ohio, stated that success depends principally upon three factors: (1) Selection of the proper type and size of bearing; (2) proper mounting of the bearing on the roll neck; (3) lubrication of the bearing.

"Of the various types of mills," he said, "the backed-up type such as the cluster mill and the four-high mill offer the best conditions for anti-friction bearing applications, as the allowable space limits are greater than in any other type of mill. Next comes the two-high mill, and last the three-high mill. The greatest percentage of anti-friction bearing applications to date have been made on the backed-up type of mills.

Keeping Dirt Out of the Bearing

"In sealing anti-friction bearings used on roll necks, and where the speed conditions permit, the most effective method appears to be in applying grease, which should be made from a good grade cylinder stock oil having a viscosity of 150 sec. at 100 deg. Fahr. universal Saybolt, under a slight constant pressure. Pressure

applied should be so that there is a small leakage of grease from the seals. This will not allow any infiltration of dirt, scale or water, and will give protection to the bearing.

"Another important feature, essential to the success of anti-friction bearings on roll necks, is the care used by mill crews when removing and replacing the bearings during roll changes. These bearings are a fine piece of mechanism and very expensive. Therefore, no dirt should be allowed to get into the mountings when they are removed. The roll necks should be cleaned thoroughly when replaced, and the bearings properly adjusted in the mill before beginning operations.

"There is no doubt that it would be well worth the time and expense of mill operators using anti-friction bearings to take the bearings out of their housings and thoroughly clean them with a light oil about every six months, to eliminate accumulation of dirt, grit and so forth, which gets into the bearings, as this would greatly prolong their life.

"There are today approximately 150 mills in this country which have anti-friction bearings on the roll

necks. Most of these have been installed during the past two years."

Bearings from Viewpoint of Operator

THAT the ball or roller bearing is not a panacea for all bearing trouble was admitted in a paper on "Anti-Friction Bearings for Electric Motors," by J. S. Murray, electrical engineer, Follansbee Brothers Co., Follansbee, W. Va. "Properly selected and applied, however, they offer a definite and tangible return on investment. Improper application, except in rare cases, results in unsatisfactory service and high maintenance costs. The fundamentals of anti-friction bearing practice must be understood, to obtain its most satisfactory performance.

"Due to the comparatively small width of anti-friction bearings, the projected area between the bore of the inner race ring and the outside diameter of the shaft leads to high values of pressure under usual operating loads. This pressure will amount to from 500 to 1000 lb. per square inch. This intensity of pressure requires a positive means for securing the two together, to prevent relative

Salient Facts on Motor Drive

ECONOMIES in electric operation have resulted in practically a 100 per cent application of motor drive in new mills laid down in recent years. Fully 55 per cent of all rolling mills in this country are now electrically driven. Main roll electric drives represent over 2,000,000 installed horsepower, and this is increasing at the rate of 13 per cent annually.

Steel mill power plants are now using individual generating units as large as 30,000 kw.

Since 1919 the steel industry has increased tonnage output per wage earner by 56 per cent.

rotation. If clearance exists between these parts, there will be a rotation similar to that of a spur gear meshing with an internal gear of slightly larger pitch diameter. This creeping under high pressures will develop destructive wear of shaft, with heating. To overcome this, it is necessary to have a press fit of inner race on the shaft, and whenever possible secure the race against a shaft shoulder by an adequate locking device.

Ample Lubrication Essential

"Today there are few motors built which do not provide for ample lubrication space, to allow for enough grease or oil to insure operation over a long period of time without renewal. There is little wearing out of the lubricant, since it has only two func-

tions to perform. The first is to lubricate the parts of the retainer in contact with the balls or rollers and the second to keep the highly polished surfaces from corrosion. As a result, only a small quantity of oil or grease is required, and consequently the lubrication problem is greatly reduced. Several manufacturers now make a neutral mineral lubricant which is desirable for anti-friction bearings. At intervals of from one to two years, the old grease or oil should be replaced with new lubricant. The only precautions which need be taken are to keep the lubricant clean and not to use too much of it.

"Where there is a long overhang of the shaft beyond the bearing, or where the load to be carried is large, it is usual practice to mount a roller

bearing at the drive end of the shaft, with ball bearing at the opposite end for thrust. This arrangement obviously eliminates difficulties due to expansion of the shaft, as the rollers of the roller bearing may move laterally across the face of the outer ring.

"On very large motors, subjected to heavy radial loading with comparatively light end thrust, a combination of two roller bearings is employed. The roller bearing at the closed end of the motor is of the self-contained type, locating the armature endwise, while the drive-end bearing is of the separable type. Some manufacturers prefer to use the self-contained roller bearing at each end of the shaft, in which case the drive-end bearing is allowed to float endwise."

Electric Drive for Rolling Mills

SELLECTION of motors for main drives of merchant, bar and rod mills was discussed by C. B. Houston, General Electric Co., Schenectady, N. Y. After reviewing the development of various types of mills and their drives, he called attention to the fact that there are now in use on both rod and merchant bar mills about every form of motor, both alternating and direct current, that exists. There is to be also the wound-rotor induction motor with almost every conceivable form of speed-adjusting equipment—Scherbius, Kraemer and frequency-converter types. Some of the latter are in operation at the International Nickel Co., Huntington, W. Va., and also at the Laclede Steel Co., St. Louis. Alternating current adjustable-speed, brush-shifting motors are applied to the 14-in. and 9-in.

mills at the Halcomb Steel Co., Syracuse, N. Y.

"Strange to say, it was not until early this year," he said, "that the first synchronous motor has been sold for driving a rod or merchant bar mill. This is an 800-hp., 300 r.p.m., 85 per cent power factor, 2200-volt, 60-cycle motor and is intended to drive four stands of the 10-in. merchant mill No. 2 at the Madison, Ill., works of the Laclede Steel Co.

Tendency to Use Direct Current

"Direct current motors, with their adjustable-speed characteristics, are used with and without regulating devices. In fact, there is an ever growing tendency toward a greater use of direct current because of the flexibility which its application makes available in operation of the mill.

Direct current motors are applied even on continuous rod mills, where not many years ago alternating current motors with some form of speed adjustment were used. This is true even at some additional expense of initial cost or lower efficiency, although, with the improvements which have been made in recent years in the design and manufacture of direct current apparatus, there does not always exist a differential either in cost or efficiency in favor of alternating current machines. For the continuous and for many of the semi-continuous mills only direct current can logically be considered, as for example the Illinois Steel Co. 10-in. mill No. 4, or even the Bourne-Fuller Co. new 10-in. merchant mill.

[Other topics will be reported in next week's issue.]

Two Pacific Coast Uses of Steel



Metal net coverings over manholes (left) are used by the Pacific Gas & Electric Co., San Francisco, to protect workers in the manhole and to keep pedestrians from falling into them. The coverings consist of two frames hinged in the center and covered with wire sufficiently strong to bear the weight of an automobile.

A portable safe (right) carries cash between the cashier's department of the Emporium department store in San Francisco to the bank's money truck. It is regarded as too heavy for bandits to pick up and yet may easily be wheeled along by one person.



Productivity Per Man Employed

Study of Pig Iron Output as Symptomatic of Manufacturing in General—Enormous Gain in 75 Years

PRODUCTION of pig iron in the United States increased 7178 per cent between 1850 and 1925, while during the same period the production per man increased 4928 per cent, according to Ethelbert Stewart, commissioner of labor statistics, Department of Labor, in an article on productivity of labor appearing in the June number of *Monthly Labor Review*. In 1850 the number of employees at the blast furnaces was 20,298, while the output was 504,245 gross tons, and the production per man was 25 tons. In 1925 the number of employees was 29,188, the output 36,700,566 tons and production per man 1257 tons. Using 1850 for the index number 100, the 1925 productivity index number is 5028.

Mr. Stewart pointed out that the purpose of his article is to show the great and continuous spread over three-quarters of a century between the number of employees and the volume of production. After showing that there was employment of less than 9000 more persons at blast furnaces in the 75 years, or an increase of 44 per cent, Mr. Stewart declared that the manufacturing industries, particularly as represented by the blast furnaces, are not going to take care of the increase in the working population. He did not go into the question of increased consumption of pig iron per capita, nor did he deal with production along the lines of two articles by W. S. Pilling in *THE IRON AGE* of June 6, 1912, and in *THE IRON AGE* of April 28, 1921, showing production of pig iron by decades, both in tons and per capita of population.

Without referring by terms to the modern mechanization of the blast furnace and the vast increase in its capacity as compared with former years, Mr. Stewart's discussion is reminding of this subject and the problem which he sees is stated as follows:

"Concretely stated, the facts are these: The increase in population from 1850 to 1925 was 397.5 per cent. If we take blast furnaces as an example, the take-up of this population by industries increased 44 per cent. Production increased 7178 per cent. Production per man increased 4928 per cent. Stated differently, the number of wage earners in blast furnaces in 1850 was 882 per million of population. In 1921, which, however, was a slump year, there were 173 wage earners in this industry per million of population. And many other industries, while not so spectacular, showed the same tendency.

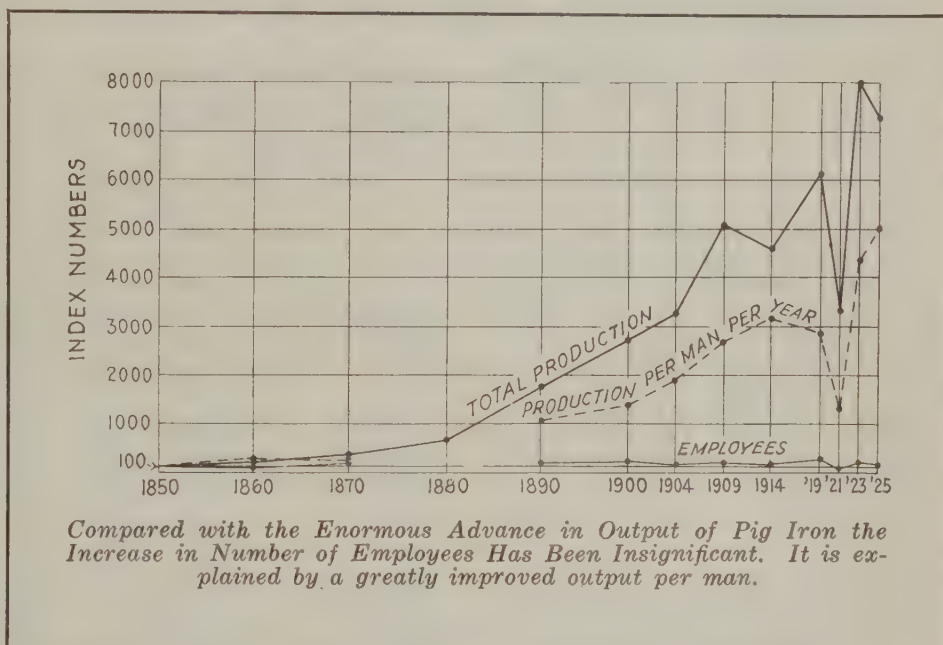
"It must be apparent that the at-

titude which one will take toward these figures will depend upon whether one is interested in the prosperity that comes from enormous production and almost startling output per employee or whether one is looking for a job. The problem of today is to reconcile these two points of view."

In his table the number of employees engaged at blast furnaces in census years (except 1880) is taken from the census reports. In 1880 the Bureau of Census so classified this

71 years earlier. While production in 1921 was only about half what it was in the preceding census year, it still showed an index number of 3310, while the output per man-year dropped to 331 tons, the index number being 1324, against 3180 in 1914 and 2864 in 1919.

"The tremendous slump in productivity just after the war deserves a much more careful study than it has received. We do not know all of the factors entering into this. The slump was world-wide, affecting the coun-



group that the employees shown included those in foundries and a number of other industries, which made the figures for blast furnaces in that year unusable. In 1890, however, the census returned to its old classification. The figures of total production of pig iron in the United States were taken from the census reports from 1850 to 1890 and the reports of the American Iron and Steel Association from 1899 to 1925.

It was pointed out by Mr. Stewart that between 1850 and 1870 there was no great divergence among the three factors of production, employment and output per man-year. From 1870 on, he explained, the trend of production was sharply upward. The index number in 1870 was 363. By 1890 the index of production had reached 1754 and the index of output per man-year 1060, while the employment index was 165.

"One of the more puzzling problems revealed by this presentation," said Mr. Stewart, "is the tremendous drop in 1921. Actual employment dropped below the figure of 1850, or

tries which did not participate in the war with almost as great severity as those that did. One of the perfectly apparent reasons is the demoralizing effect upon all labor of the cost-plus plan of letting contracts during the war. Under a cost-plus plan the less a worker does the more valuable he is to his employer, and petty bosses were not slow in making this apparent to the workers themselves. We are fortunate in having recovered from the influence of that diabolical scheme as rapidly as we have.

"A second clear explanation is that the younger, more enthusiastic, energetic and 'peppy' employees in all industries enlisted for the war, leaving a much less experienced and less dependable group of workers to take care of industry. Even when the enlisted men returned, the mental and physical effect of the war was very noticeable for some time.

"Another cause, and perhaps a more easily measurable one, was that, though production fell from practically 37,000,000 tons in 1920 to less

than 17,000,000 in 1921, a certain proportion of the employees must be retained if the plant is to operate at all, and that regardless of production. An apparent weakness in this reasoning is developed by the fact that the index of employees fell much more noticeably than did the index of production. For instance, the index of employees in 1919 was 213 and in 1921 it was 92, while the index of production dropped from 6151 to 3310.

"In view, again, of the widespread decrease in productivity, affecting Denmark, Norway and Sweden practically as much as it did England and the United States, attention must be called to the fact that a more comprehensive study of that slump than has yet been made is needed.

"Even the second reason here as-

signed is not entirely defensible, for as jobs become scarce there is the general tendency to work hard to hold on to the job in hand."

Referring to the chart accompanying the article, Mr. Stewart pointed out that it shows that, while production declined from 1909 to 1914, production per man per year was going steadily up, and that, while total production from 1914 to 1919 was going up rapidly, production per man per year was going down. It was explained that the chart, while drawn in continuous lines, is really a "spot" chart and speaks for census years only, because the number of employees, which is the essence of the calculations, could be secured only for census years. From 1850 to 1900 these censuses covered 10-year periods; from 1900 to 1919 they covered 5-year

periods; since 1919 they have covered 2-year periods.

"Therefore, when we say that production declined from 1909 to 1914, it does not mean that this was true of each year during the period," Mr. Stewart said, "and as a matter of fact it was not true. But from the very inception of the war, and before the United States entered the conflict at all, production per man began to decline. On the other hand, from 1923 to 1925 production dropped sharply while output per man per year went steadily upward. And these facts likewise are shown the world over, in so far as productivity figures in foreign countries are available and dependable. The psychological effect of war upon human productivity is here only suggested. There is no serious attempt to furnish an answer."

Scrap Prices Drop Sharply at Close of First Half of Year

June Shows Lowest Average Since December — Second Quarter Average Above First Quarter

AVERAGE prices of heavy melting steel scrap at Chicago, Philadelphia and Pittsburgh developed weakness about the middle of May and have been going down ever since. The average on May 15 was \$14 a gross ton, which has given way to \$13.25 at the end of June. With one exception, every week in that period showed a decline. At \$13.74, however, the average for the second quarter was above the \$13.69 average for the first quarter of the year. In the second quarter of 1927 the average was \$14.09 a ton.

Meantime, pig iron has dropped, all through the second quarter of the year, to the lowest level it has had in more than 12 years. The differential between THE IRON AGE pig iron composite at the end of June and the scrap average was less than \$4 a ton. This compares with more than \$6 a ton about two years ago.

Finished steel has had only slight fluctuations since early 1927. It has declined during the second quarter to 2.341c. a lb., which, with the exception of the level of last fall and early

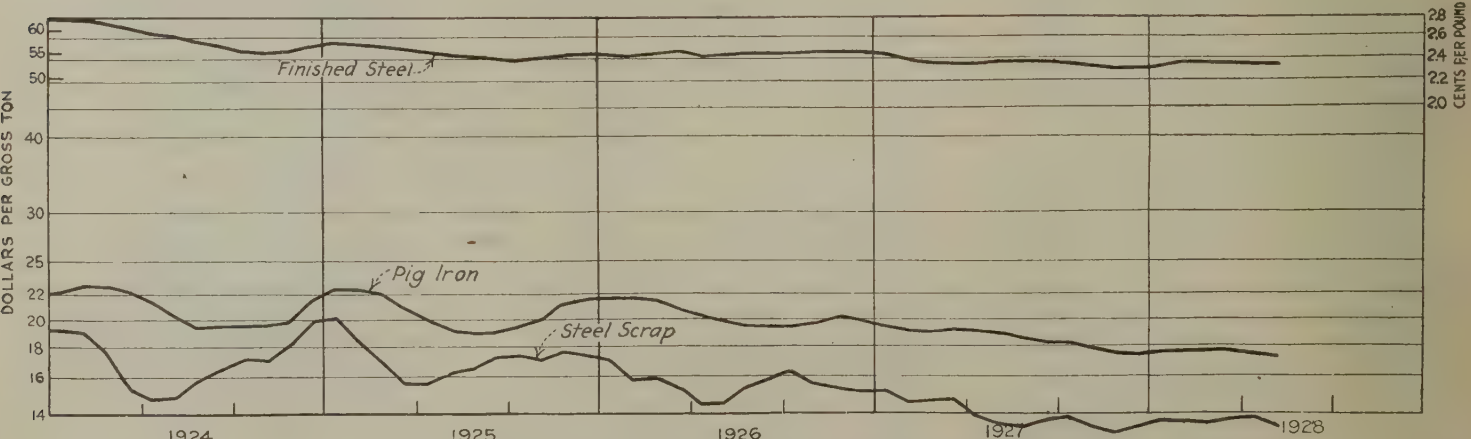
COMPOSITE PRICES ON IRON AND STEEL PRODUCTS			
	(Per Gross Ton) Steel Scrap	Pig Iron	Finished Steel, Per Lb.
1925 average ..	\$17.12	\$20.58	2.465c.
January, 1926 ..	16.97	21.79	2.447c.
February	15.50	21.77	2.428c.
March	15.83	21.65	2.433c.
April	15.27	20.96	2.439c.
May	14.35	20.69	2.416c.
June	14.40	20.00	2.420c.
July	15.42	19.51	2.431c.
August	15.88	19.46	2.431c.
September	16.25	19.46	2.439c.
October	15.58	19.69	2.449c.
November	15.25	20.13	2.453c.
December	15.08	19.94	2.453c.
Year's average ..	15.48	20.42	2.439c.
January, 1927 ..	15.17	19.44	2.432c.
February	14.58	19.07	2.378c.
March	14.65	19.03	2.367c.
April	14.71	19.21	2.360c.
May	13.95	19.09	2.360c.
June	13.60	18.92	2.369c.
July	13.48	18.56	2.367c.
August	13.80	18.17	2.367c.
September	13.92	18.03	2.357c.
October	13.48	17.96	2.319c.
November	13.18	17.59	2.299c.
December	13.48	17.55	2.310c.
Year's average ..	14.00	18.55	2.357c.
January, 1928 ..	13.70	17.63	2.318c.
February	13.71	17.73	2.361c.
March	13.65	17.73	2.362c.
April	13.81	17.67	2.359c.
May	13.90	17.45	2.350c.
June	13.52	17.23	2.341c.
Average 6 mo. ..	13.72	17.57	2.349c.

winter, is the lowest it has had since the summer of 1922.

Comparative figures for 30 months, covering steel scrap, pig iron and finished steel, are given in the table. The diagram carries the story of these changing prices over a period of more than four years.

SKF Dominant in German Bearing Industry

HAMBURG, GERMANY, June 16.—With the acquisition of the Riebewerke, the Svenska Kegellager Fabriken Aktiebolag (SKF), is a dominant figure in German production of roller and ball bearings. With a plant at Stuttgart, Germany, SKF has been manufacturing for some time and recently instituted suit against the Riebewerke for infringement of patents. This was followed by the purchase of the Riebewerke by SKF. There are now only two German ball and roller bearing manufacturers not controlled by the Swedish company.



Scrap Has Gone Lower in Recent Weeks, Reaching Almost the Low Level of Last Fall. Pig Iron is the lowest it has been in almost 13 years and finished steel is below its prevailing level of the past 5 years

June Pig Iron Output Declines

Estimates, Collected by Wire, Make the Daily Rate 3221 Tons or 3 Per Cent Less Than May—Net Loss of 8 Furnaces

ACCORDING to data gathered by wire on July 2 from producers estimating their output in most cases, the June production showed a decline from that of May of about 3 per cent. The estimated total for last month was 3,081,300 gross tons, or 102,710 tons per day. This compares with an actual production in May of 3,283,856 tons, or 105,931 tons per day. The decline in June was therefore 3221 tons per day, or about 3 per cent. In May there was a decrease from April of about $\frac{1}{4}$ of 1 per cent.

These preliminary returns indicate that there were six furnaces blown in and 14 shut down in June—a net loss for the month of eight furnaces. The number operating on July 1 was apparently 190 furnaces, against 198 on June 1 and 195 on May 1. The prin-

Pig Iron Production by Districts, Gross Tons				
	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York and Massachusetts.....	200,322	212,333	205,556	216,224
Lehigh Valley	60,600	77,195	81,140	80,058
Schuylkill Valley	52,428	53,162	60,062	51,325
Lower Susq. and Lebanon Valleys....	29,207	32,019	31,522	33,301
Pittsburgh district	606,178	700,880	663,784	639,693
Shenango Valley	102,672	114,779	100,073	101,946
Western Pennsylvania	117,822	126,790	116,405	101,365
Maryland, Virginia and Kentucky....	116,658	100,508	102,678	103,857
Wheeling district	144,108	124,948	115,284	133,764
Mahoning Valley	289,902	309,842	310,227	296,491
Central and Northern Ohio.....	350,352	357,900	336,200	330,176
Southern Ohio	40,756	26,380	25,548	25,729
Illinois and Indiana.....	633,594	694,636	693,271	715,439
Mich., Minn., Mo., Wis., Colo. and Utah	127,797	137,987	134,163	139,101
Alabama	201,554	207,045	199,487	223,314
Tennessee	7,350	7,452	10,104	7,891
Total	3,081,300	3,283,856	3,185,504	3,199,674

cipal loss was in steel making furnaces.

Actual data for the June pig iron production will be published in THE

IRON AGE, July 12. The table gives the estimated production by districts for June and the actual output for the three preceding months.

To Reorganize New York Metal Exchange

At a meeting of the stockholders of the New York Metal Exchange, 23 William Street, New York, Thursday, June 28, it was decided to revise the rules and reorganize the exchange. The object is to make the institution a more active factor in the non-ferrous metal markets. Activities will center first in the tin market, with the aim of augmenting dealings later in zinc, lead and copper.

Malleable Castings Orders Ahead of Last Year's

Production of malleable castings in May totaled 61,458 net tons, against 56,880 tons in April, according to reports received by the Department of Commerce from 133 identical plants, seven of which, with an aggregate monthly capacity of 3850 tons, were idle during May. Except for March, production in May was the greatest for any month in more than a year. It compared with 57,655 tons in May, 1927.

Orders booked in May amounted to 54,429 tons, against 53,099 tons in April, while operations were at the rate of 67.3 per cent and 62.5 per cent respectively. May shipments involved 58,264 tons, compared with 57,372 tons in April. Shipments in May were the largest, except for March, in more than a year. Last May the total was 57,269 tons.

For the five months ended with May production aggregated 295,523 tons, against 292,124 tons for the corresponding period of last year; orders

were 276,830 tons and 268,438 tons respectively; operations, 64.5 per cent and 55.2 per cent, and shipments, 280,076 tons and 286,374 tons.

Addition Built for Expansion Upward

Heavy foundations in a new building being added to the plant of the Brown Instrument Co., Philadelphia, will permit other floors to be added later, as requirements demand. The present structure will be two stories high, measuring 44 x 60 ft. in plan. Construction will be of the fireproof type.

This is the third addition made to the Brown plant within the last eight years. Its primary purpose is to provide research facilities needed with the rapid expansion in the variety of the company's products and a continual widening in the application of instruments to the activities of industry and science.

Bar Iron Plants May Be Merged

Charles Hart, president Delaware River Steel Co. (which operates a blast furnace at Chester, Pa.), who recently became active in the management of the Lebanon Iron Co., Lebanon, Pa., is negotiating for the purchase of the Scranton Bolt & Nut Co., Scranton, Pa., with a view to the consolidation of the properties. C. E. Brodhead, vice-president Scranton Bolt & Nut Co., informs THE IRON AGE that nothing has been concluded.

The Scranton company was organized in 1899 and has been an important factor in the East in the manufacture of iron bars, bolts and nuts and spikes. Its annual capacity is about 40,000 tons of bars. The Lebanon Iron Co. has an annual capacity of about 35,000 tons. Included in the equipment of the Lebanon plant are eight Ely mechanical puddling furnaces.

Will Increase Output of Auto-Body Sheets

The Otis Steel Co., Cleveland, through its board of directors, has authorized the carrying out of an expansion program in order to increase its output of full finished automobile body sheets. The plans contemplate additions to its soaking pit and blooming mill units at its Riverside works. Three new soaking pits will be erected. An additional heating capacity of 7200 tons of ingots per month will be provided and a corresponding increase in semi-finished steel. A new normalizing furnace, electrically operated, will be erected, with which the company will be able to increase its finished sheet output 2000 tons per month.

Concrete Bar Sales Expand

The Concrete Reinforcing Steel Institute reports that bars sold and shipped in the first five months of 1928 were 12 per cent above the tonnage in the corresponding period in 1927 and 4 per cent above the same period in 1926.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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For More Economic Distribution

ON nothing have men in the steel industry been more agreed, and for a long time agreed, than on the need of better methods for the distribution of their product. But admitting the weakness of a steel salesmanship that wins but small profit on an enormous investment is quite another thing from actually squaring selling policies with the familiar exhortations on the evils of price cutting.

The reasons for the divergence between the preachments of Gary, Schwab and others and the practice of steel company sales departments are well known. As commonly discussed they are an overbuilt steel industry, the Sherman act, preferred customers, unrestrained selfishness of some sellers, machinations of some purchasing departments, and too often a salesmanship that knows no higher skill than a lower price.

Complicated and baffling as the problem is, we need not assume that the steel industry will be continually defeated by it, even granting that Congressional relief through amendment of the Sherman act is more remote than some other remedies. Meanwhile the subject of better selling and distribution is having attention from various branches of the metal-working industries. One effort in particular has advanced to a point at which its results can be appraised and some measure taken of its adaptability to wider fields of manufacture and distribution. We refer to the plan under which the Bolt, Nut and Rivet Manufacturers' Association has been working with such success in the past two years in co-operation with the hardware and mill supply jobbers of the country.

Two days of last week were given to a largely attended conference in New York, as told at length on other pages, at which steps were taken to extend to other products commonly handled by distributors in iron, steel, heavy hardware and supply lines, the methods originally devised for the distribution of the product of the bolt, nut and rivet industry. Knowledge of these methods has been carried to every iron and steel jobbing center of the country by the officers of the bolt and nut association and has attracted attention widely through discussions at various trade conventions in the past eighteen months.

At a time when the cost of distribution is challenged in so many quarters, beginning with the farmer, as responsible for the high level of living costs, it is noteworthy that the bolt and nut manufacturers' plan meets the challenge by a claim of economies not only for manufacturers and distributors but for the ultimate consumer. That, indeed, is the test which every organized effort must meet, that sets out to change existing competitive lines. It is the test which separates good

from bad trusts, and is in no small part the basis on which the rule of reason is applied in the enforcement of the Sherman act. As was well suggested by Mr. Alexander, president of the National Industrial Conference Board, in his address before the distribution conference last week, the issues involved are to be judged not from the standpoint of the individual producer alone but from the broad viewpoint of national economy.

On the showing it has thus far made, the plan of the nut and bolt and rivet manufacturers has gone far toward commending itself both for its rescue of an industry from a profitless condition and for the economic benefit a stable market has conferred on both distributor and consumer.

Hoover As An Engineer

WASHINGTON was a land surveyor. We doubt if he should be characterized as an engineer. If Herbert Hoover should be elected to the presidency, it may correctly be said that he would be the first engineer to be installed in that great office. Also, he would be the first economist and the first administrator of business affairs, for the great engineer, especially the great mining engineer, is almost bound to be those things as well as just engineer. Hoover's professional colleagues tell us that they regard him as a great engineer. Indeed there is ample evidence that they so regarded him more than 15 years ago, long before his name had popular recognition.

After some early experience in the United States, Hoover became associated with the great engineering-managerial house of Bewick, Moreing & Co., and worked for it in China during some stirring times and later in Australia when the gold mines of Kalgoorlie were being developed. He worked for it so efficiently that very soon he was invited to become a member of the firm, and while still a very young man he had earned a competency for himself. He played a great part in directing the operation of the whole group of gold mines at Kalgoorlie; and later, turning his attention to zinc, he was most instrumental in organizing the production of zinc ore at Broken Hill in Australia and in developing the great Bawdwin mine in Burma.

But while becoming thus an administrator and financier Hoover never relaxed from the purely professional part of his engineering, and in that interest he gave freely of himself to his professional colleagues and to the public, this being distinct from what he gave to the stockholders in his companies. He was the first to clarify the minds of mining engineers on the correct principles of valuing mines, formulating what came to be known as the Hoover laws, the Hoover actuarial tables, etc. This, moreover, directed the collective en-

gineering mind into economic thought, for the natural corollary of the principle that a mine is the more valuable the more quickly it is liquidated is the question of the probable price for its product.

Hoover next found time to write a treatise on the principles of mining, published in 1909, in which he described and discussed the technical methods of extracting ore from the ground. This was immediately pronounced a classic of technical literature, and after 20 years still is so viewed and so consulted. It was of the kind of technical treatises that live.

Even better known, however, became his translation of Agricola's *De Re Metallica*, in which Mrs. Hoover collaborated. This was the first of the world's treatises on mining and metallurgy and its German author wrote it in Latin, as was the custom of scientists of the 16th century. Academic scholars had tried time and again to translate this great work and had made sorry messes of their jobs, for the alchemists and their successors knew of many things that the Romans did not, and in writing of them in Latin they were obliged to coin words that were not to be found in any lexicons. Thus the scholars could but guess their meaning, and being ignorant of the technology they often guessed wrong, sometimes ludicrously.

With Mrs. Hoover as the classicist and Herbert Hoover as the technologist there was no guessing, but correct inference out of knowledge of what the author was talking about. Along with this Hoover explained and discussed matters in voluminous annotations which if collected would have constituted in themselves a treatise on the history and philosophy of mining. For this great translation the academic world bowed in respect and to Mr. and Mrs. Hoover the Mining and Metallurgical Society of America awarded its gold medal.

All of these things happened previous to the Great War. In the upheaval of August, 1914, many Americans found themselves stranded in London. Hoover, who was in London at that time, organized his professional colleagues to finance their fellow citizens and get them home. Probably no one but Hoover would have thought of undertaking such a thing. When he appealed to his fellow mining engineers he knew what he was doing. Most mining engineers have been travelers to remote places. At one time or another they have lost their baggage or their purses, or have encountered all imaginable difficulties that they have had to overcome. The predicament of thousands of helpless Americans in Europe was to them only old things multiplied, and they unraveled the tangle with the expedition that everybody knew 14 years ago but has now forgotten.

After that the career of Herbert Hoover and his uniform efficiency became matters of general knowledge. Any publicist can write of them. We are writing of Hoover the engineer.

The Vice-Presidency

WITH the end of the Coolidge administration there will have been 35 presidential terms in the United States and that great office will have been held by 29 men. Of these six died in office. Of the 29 presidents three were elected directly to the presidency from the vice-presidency. These statistics show how important the vice-presidency has been in our political system. Nearly one-third of our presidents have previously held the office of vice-president, three of them having suc-

ceeded by election and six following the death of the president. Of the latter, two retained the presidency by subsequent election. It may be deduced from this that five out of nine of the vice-presidents who succeeded to the presidency were wanted by the people. Of the other four three were colorless, but one was threatened with impeachment, wherefore he was not colorless. The historical record makes it clear that the vice-presidency is not a nomination lightly to be considered.

In recent practice, a president having been nominated after a factional fight, the nomination for the vice-presidency has been determined on grounds of political expediency in respect to vote-getting, and this has often resulted in the secondary nominee being more or less out of sympathy with his principal. Thus, Mr. Dawes as vice-president has been distinctly out of sympathy with Mr. Coolidge. Often, also, the vice-presidential nominee has been of inferior standing, a man whom the people would never think of putting up for president in the first instance. Sometimes the vice-presidential nomination has been careless and accidental. Of course, we must not overlook that such casualness gave us Roosevelt and Coolidge.

The last is really the important thing. Our national experience, during 140 years, has demonstrated that the possibility of the vice-president becoming president by accident is one out of five. We ought therefore to use great care in selecting the man for that office. And if we are minded to elect to the presidency a man who is an exponent of certain policies, his understudy ought logically to represent the same policies.

Seasonal Steel Prospects

AT this mid-year time it is important to allow for a seasonal trend in gaging the favorableness of steel tonnage prospects. It is nothing to predict that steel production will be smaller in the second half of this year than in the first half, for that is normal; hence unfavorable deductions should not be drawn from the prospect, unless it is unusually unfavorable, which is not the case.

In only one of the nine years that have elapsed since the war was more steel produced in the second half than in the first half. That exceptional year was 1922, a year of recovery from severe depression. The other eight years showed an average decline of 10¾ per cent in production from the first half to the second half, and the normal second half has one more working day than the first half. In rate of production the division is a 53-47 division, which may reasonably be taken as standard.

Actual half yearly production of steel ingots is shown in the table below. In certain years round figures are given for the first half because the official monthly figures were not complete. The totals are official:

Steel Ingot Production—Gross Tons			
	First Half	Second Half	Total
1919	17,500,000	16,194,795	33,694,795
1920	20,825,000	20,056,392	40,881,392
1921	10,320,000	8,904,084	19,224,084
1922	15,875,000	18,693,418	34,568,418
1923	23,326,965	20,158,700	43,485,665
1924	19,737,034	17,074,123	36,811,157
1925	22,383,071	21,757,667	44,140,738
1926	24,153,809	22,732,396	46,936,205
1927	24,000,000	19,776,717	43,776,717

Production in the first half of this year was probably above 24,500,000 tons, but there was the benefit of an

extra working day, while the second half will be short one working day.

History does not suggest that steel prices are lower in second halves than first halves on account of the difference in tonnage. A convenient and simple reference is the table on page 113 of THE IRON AGE annual number, Jan. 5, 1928, showing the monthly average composite price of finished steel. From the figures no such trend can be seen. Allowance of course must be made for the fact that there were generally falling prices after 1923 until December of last year.

It will be observed from the above table that 1927 showed a larger drop from first half to second half than any other year. This year has made a good start by passing the first half of last year and has retained the lead to date. It will be particularly easy for the second half of this year to compare favorably with the second half of last year. It would require only a 67 per cent operating rate to make the same tonnage. That is under the percentage rates reported for the second half of last year, but the capacity rating is raised $2\frac{1}{2}$ per cent for this year.

Just why there should naturally be lighter production in the second half of a year is not fully explained. Rails are an influence, the northern roads requiring delivery during the first half of the year for their season's replacements; and a corresponding principle probably applies in mild degree in many activities.

Demands for Better Tonnage Steel

JUST 100 years ago the Institution of Civil Engineers was incorporated in Great Britain by royal charter, and during the first week of last month meetings were held to commemorate the occasion. There was a wide diversity in the subjects considered, since the scope of the institution includes nearly all branches of engineering. Progress was recounted in reinforced concrete construction, railroads, electric traction, shipbuilding, fuel economy, boiler construction, power transmission, domestic heating—many of these subjects being quite outside the field of civil engineering as understood in America.

Even the most rapid glance through the "introductory notes" and the reported discussion cannot fail to reveal the all-important place iron, steel, and the alloys have had in this diverse engineering development. Of course, many branches of applied science which were non-existent and undreamed of a hundred years ago have grown into such large proportions as to affect the daily life of every citizen. Many revolutionary changes dependent upon a cheap and plentiful supply of uniform steel had to wait perforce until the open-hearth process was perfected. Other progress, as in electricity, leaned more heavily on copper. But one cannot help realizing, when he stops to think of the century's amazing development of machinery and fixed structures, that it could not have gone very far except for the metallurgist.

Inspiring though these thoughts may be, it is more important to look ahead. If past progress has been due to sound metal, that of the future will as certainly require continual improvement in quality. Railroad engineers are asking a longer rail which will safely bear the heavy wheel loads without rapid wear. Bridge

and structural engineers want a mild steel that can be stressed to a higher safe figure, and above all one that does not rust so fast. Shipbuilders say they could reduce the weight of a hull 15 per cent if they were furnished plates and beams with a minimum proportional limit of 38,000 pounds per square inch. Steam engineers now ask metallurgists for an entirely new set of metals for the high superheat plants that must be installed if steam is to compete with internal combustion engines. The needs of aircraft for special alloys are well known.

But whereas the demands for special qualities were recently confined to products of small tonnage, the requirements of the immediate future will be for higher grades of strictly "tonnage" steel. Rails have to be better. Mild steel must corrode less. Ship steel must be stronger. Sheet steel must be smoother and take more punishment. Steel is no longer 'just steel. More and more of the common or garden varieties will be bought with an intelligent eye to the most service per dollar.

Fortunately the way of improvement in many directions is well known. We know how intimately the choice of the raw material and the melting practice affect the toughness of steel rails. We know how a little copper in steel improves the resistance to atmospheric corrosion, and how a little extra manganese increases the elastic limit remarkably. We know how important ingot practice, soaking, and rolling mill drafts and temperatures are to surface finish and uniform physical properties. All such considerations will have increasing weight in the tonnage mill as the months go by. Research will discover other ways to improve quality.

It would be the greatest error to depend too much on steels as standardized at present. The Portland cement industry has been rudely awakened from such a state. "Cement is cement, take it or leave it," they said, and, until people started taking wholly unstandardized products which set hard and strong in hours instead of days and did not crumble in alkaline ground waters, progress in quality was slow—in fact unnecessary. By this recent development concrete, the principal competitor of steel for bridges and structures, has taken a new lease on life. Steel cannot delay an equivalent or greater improvement if it is to stave off competition from many sides—if it is to provide for the continued advance in engineering and construction.

The Iron Age in a New Garb

WE begin this, the 122d volume of THE IRON AGE, with a moving of the pages of reading matter close to the front of each issue, and with changes in both the size and appearance of the printed page. By the departure in size, we relinquish our years-long adherence to the golden mean in page proportions but we put into practice what we have preached generally regarding standardization, as these pages now conform to one of the standards that have come into being among periodicals. Otherwise the new arrangement aims to continue, if not to enhance, readability, and what further modifications may be made will look to seeking at all times reader convenience.

This Issue in Brief

Can the management methods that are making money for the large manufacturers be used successfully by smaller plants? Yes, says engineer, for the savings more than equal the cost of the additional overhead.—Page 1.

* * *

Manufacturing costs must be reduced 10 per cent each year. Machinery builder sets this as the minimum, but has always exceeded it. First requisite in reducing costs is intimate knowledge of costs. The second requisite is that attitude of mind which regards all processes as temporary, to be tolerated only until a better way is found.—Page 6.

* * *

Predicts increase in output of Bessemer steel. Its free-machining and welding properties will not only enable Bessemer steel to hold its own, but will enable it to improve its position, metallurgist believes.—Page 11.

* * *

Too much buying is done without adequate investigation, says machinery builder. Many buyers forget that conditions are constantly changing, and when they send an inquiry to only one supplier, they fail to profit by gains which may have been made.—Page 7.

* * *

Is the cost of buying too high? If it costs too much to interview 50 salesmen, why not select six suppliers who qualify completely, and place the order with one of those six? asks editor. Purchaser should demand firm bids, and shun the two-bidder. Bidders baited by unfair buyers should hold post-mortem comparison of bids, by submitting bids on closed business to their trade associations for report.—Page 11.

* * *

Heat-treating different portions of same part differently is common practice with Ford. In one case a furnace with three heat zones is used, so that varying degrees of hardness may be imparted to different portions of the rear axle shaft.—Page 13.

When buying anti-friction bearings be sure you select the right bearing and apply it properly. Otherwise, unsatisfactory service and high maintenance cost will result.—Page 31.

* * *

Systematic routing and scheduling of work reduces machining time 46 per cent in moderate-sized shop. Formerly foremen were entangled in a mass of details—hunting jobs for the men, hunting drawings, etc. Now they devote their time to supervising operations, with the result that the machine hours on a certain job have been cut from 3640 to 1950.—Page 4.

* * *

If you are performing a certain operation today the same way as five years ago, the chances are that you are behind the times. Industrial history shows that most manufacturing processes are obsolete within five years, says machinery builder. The successful firm is that which studies processes closely and beats obsolescence.—Page 7.

* * *

Are you saddling manufacturing executives with "paper work" which could be done by clerks? In many plants foremen and other department heads are unable to give full time to supervision and study of cost-cutting methods, because of the records they are obliged to maintain.—Page 1.

* * *

Purchasing engineer is the "lookout man" for the organization. He functions as the preliminary research man, for people with something new to offer come to him. Best results are obtained by considering each purchase separately from two angles, commercial and technical.—Page 5.

* * *

Industry suffers from a shortage of skilled labor, while unemployment exists among unskilled workers, says apprentice supervisor. America is not training sufficient skilled labor to supply its needs. Apprentice training is the obvious answer to the problem.—Page 25.

With security yields below interest rates, further liquidation of security prices is to be expected, says Dr. Haney. Yield on common stocks is now only 4.33 per cent, and there are no prospects for a substantial increase in industrial earnings.—Page 26.

* * *

On what portion of your sales do you lose money? Taking business as a whole, 80 per cent of sales expense is producing less than 20 per cent of the volume, says association head. Losses on high-cost business must be paid out of the profits on the 80 per cent low-cost volume.—Page 16.

* * *

Cooperation puts an entire industry on a profitable basis. Bolt, nut and rivet manufacturers are furnished with a common cost system; quantity buyers are listed, and small business is left to jobbers; package sizes have been reduced from 168 to 18. No price agreements have been made, but prices have been stabilized. As a result, the entire industry has gone from red ink to black.—Page 16.

* * *

Copper-bearing iron and steel sheets corrode as quickly as do copper-free sheets when submerged in water. Tests by A. S. T. M. reveal that copper content does not retard corrosion in fresh water, brackish water and mine water.—Page 29.

* * *

Daily output of pig iron declined 3 per cent in June. Average production was 102,710 tons per day, against 105,931 in May. On July 1 there were 190 furnaces in blast, eight less than the June 1 total.—Page 35.

* * *

Quantity buyers should not get lower prices, says C. M. Schwab. "It is the little fellow," he declared, "who is entitled to better prices if anyone is, because the large buyer has chances which the small one has not."—Page 18.

Iron and Steel Markets

Large Steel Orders for Pipe Lines

Total of 175,000 Tons Placed—Steel Shipping Orders Hold
Up Despite Holiday Interruption in Operations—
Valley Basic Iron Stronger

THE danger of preconceptions regarding the course of steel business has been given fresh emphasis. Independence Day week, as is customary, will see a reduction of activity, but it will be reflected in plant operations rather than in demand. Mills have less contract tonnage than at the opening of the second quarter, but the volume of shipping orders in both releases against past commitments and short-term purchases is holding up well.

At Chicago, bookings for the week were the fourth largest of the year and backlogs increased in virtually all lines except rails and sheets. Present demand there, it is believed, will sustain ingot output at 80 per cent of capacity, following recent declines largely attributed to diminishing rail specifications.

In other districts, buying is more cautious, but without materially reducing the total tonnage reaching the mills for rolling. Releases against expiring contracts for plates, shapes and bars at 1.85c., Pittsburgh, will cover the needs of many consumers through July. On the other hand, some contract buyers did not fully exercise their second quarter options, while those who have placed third quarter contracts at the advanced quotation of 1.90c. evidently expect a downward adjustment of invoice prices in case the market again recedes.

Mill operations are less dependent than formerly on large individual orders, but the maturing of several pipe lines after months of negotiation has added a substantial tonnage to the large volume of business coming from miscellaneous sources, and from the automotive, implement, canning and building industries. For four pipe lines a total of 175,000 tons of steel was ordered during the week, following the placing of 50,000 tons two weeks ago.

The automotive industry continues to take a large tonnage of steel and, as yet, shows no signs of a sharp summer slump. June specifications from motor car builders were only slightly smaller than in May and, while some automobile companies are reducing operations, others are maintaining output without change. The Chevrolet Motor Co. has announced a minimum production schedule of 100,000 cars monthly for the current quarter.

Farm equipment makers, having completed inventories, have resumed full production, with sizable schedules arranged for many weeks to come.

Sustained building activity is indicated by the addition of nearly 30,000 tons to the large amount of structural steel work pending, and by awards during the week of 42,000 tons.

Tin plate mills are well supplied with specifications, but will not be embarrassed by the holiday interruption in operations, since rainy weather has been holding back canning.

Pig iron production in June, estimated from telegraphic reports to THE IRON AGE, averaged 102,710 tons a day, a decline of 3 per cent from the May rate. There was a net loss of eight active blast furnaces during the month. Output for the first half of the year, estimated at 18,520,200 tons, was the smallest since 1924, in sharp contrast with steel ingot production, which will undoubtedly prove a half-year record.

Pig iron prices show no signs of strength except in the Valleys, where there has been another recovery in basic iron to \$16, furnace, or an advance of 65c. over the recent minimum. Foundry melt, on the average, is holding its own, although shipments of pig iron to the automotive industry are expected to decline this month, possibly as much as 20 per cent compared with June.

Scrap markets continue to weaken. Heavy melting steel at Pittsburgh has declined 25c. a ton for the third time in three weeks. The same grade has dropped 25c. a ton at Chicago and St. Louis.

The Pennsylvania Railroad has ordered 12,000 tons of track supplies. Leading makers of track spikes have announced an extra of 25c. per 100 lb. for less-than-car-load lots in both large and small sizes.

The growth of steel consumption for building purposes is shown by shipments of concrete bars in the first five months of this year, as reported by the Concrete Reinforcing Steel Institute. The total was 12 per cent larger than in the corresponding period last year and 4 per cent greater than in 1926.

The larger domestic producers of gravel fluorspar have announced an advance of \$1 a ton to \$17 a net ton, mines.

Recovering slightly from its low point, THE IRON AGE composite pig iron price is now \$17.25, against \$17.21 last week. The finished steel composite remains at 2.341c. a lb. for the fifth week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 2, 1928	June 26, 1928	June 5, 1928	July 5, 1927
No. 2, fdy., Philadelphia.....	\$20.76	\$20.76	\$20.76	\$21.26
No. 2, Valley furnace.....	16.75	16.75	16.75	18.00
No. 2, Southern, Cin'ti.....	19.19	19.19	19.69	21.69
No. 2, Birmingham.....	15.50	15.50	16.00	18.00
No. 2 foundry, Chicago*.....	18.00	18.00	18.00	20.00
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.75
Basic, Valley furnace.....	16.00	15.75	15.35	17.50
Valley Bessemer, del'd P'gh...	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	18.00	18.00	18.00	20.00
Malleable, Valley.....	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh.....	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	33.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	33.00	33.00
O.-h. sheet bars, P'gh.....	32.00	33.00	34.00	33.50
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp grvd. steel, P'gh, lb.....	1.85	1.85	1.85	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.14
Tank plate, Pittsburgh.....	1.85	1.85	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.85	1.85	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	2.00
Beams, New York.....	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,

Per Lb. to Large Buyers:	July 2, 1928	June 26, 1928	June 5, 1928	July 5, 1927
	Cents	Cents	Cents	Cents
Sheets, black, No. 24, Pittsburgh	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.80	3.10
Sheets, galv., No. 24, Pittsburgh	3.50	3.50	3.50	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.70	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.70	2.55
Plain wire, Pittsburgh.....	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill..	2.55	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh..	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago				
dist. mill.....	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$14.00	14.25	14.75	14.75
Heavy melting steel, Phila.....	13.00	13.00	13.50	14.00
Heavy melting steel, Ch'go.....	12.25	12.50	12.75	12.00
Carwheels, Chicago.....	13.00	13.00	13.25	13.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	16.00	16.00	16.00
No. 1 cast, Ch'go (net ton)....	13.50	13.50	14.00	14.50
No. 1 RR. wrot. Phila.....	13.50	13.50	15.00	16.00
No. 1 RR. wrot. Ch'go (net)...	11.00	11.00	11.50	11.00

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.87½	14.87½	14.87½	12.62½
Electrolytic copper, refinery...	14.50	14.50	14.50	12.25
Zinc, St. Louis.....	6.20	6.15	6.12½	6.15
Zinc, New York.....	6.55	6.50	6.47½	6.50
Lead, St. Louis.....	6.15	6.15	6.17½	6.02½
Lead, New York.....	6.30	6.30	6.30	6.30
Tin (Straits), New York.....	46.12½	46.25	49.25	64.50
Antimony (Asiatic), N. Y....	9.62½	9.62½	10.50	12.00

Pittsburgh

Steel Business Holds Up Better Than Usual at This Time of Year—Large Pipe Line Orders

PITTSBURGH, July 2.—The slowing down in the steel industry common to Fourth of July week is in plant operations rather than in demand. Few steel makers yet detect the recession in consumptive requirements usual at this time of the year, the vital difference between the opening of the second quarter and the start of this quarter being that order books run lighter in contracts and heavier in specified tonnage, and the latter is much the more satisfactory condition so long as consumption holds up. A frequent expression as to the state of trade is that it is much better than it ordinarily is at this time of the year. Tin plate has never given a better account of itself than it is doing just now and additional pipe line orders have brought the total placed in the past two weeks to more than 200,000 tons. Locally, structural steel business does not reach sizable proportions, but in the country at large it is highly satisfactory.

In spite of the introduction of new models and the cessation of production of old models by several automobile builders, the demand for steel from that direction is holding up remarkably well. Last month surprised manufacturers of most finished steel products in the volume of the production and shipments of cars.

There is little new as to prices, except that sheets appear to have reached bottom and that makers of

bars, plates and shapes are more earnest in their endeavors to establish 1.90c., base Pittsburgh, as the third quarter contract price.

Primary materials still are weak. It is several years since heavy melting steel scrap was priced as low as it has been sold in the past week. The pig iron market is inactive. Coal is very dull and prices are of buyers' making, since producers lacking Lake cargo business are finding it difficult

to market their outputs. Cheap raw materials are somewhat of a drag on steel prices.

Pig Iron.—Interest in the market on the part of melters is limited, and the business of the past week has not amounted to much. The Westinghouse Electric & Mfg. Co. is still taking bids against its inquiry for last half requirements of its local and Cleveland foundries. The tonnage wanted is not specified, but it is assumed it will be of fair size and it is the only important business now pending. Small lots of foundry iron are moving. Some producers report sales at \$17, Valley furnace, for the base grade, but as others are taking business at \$16.75 and have gone as low as \$16.50 in competitive territory, it is assumed that \$17 prevails only at destinations to which the freight rate is lower than that into the Pittsburgh district. Important users of basic iron appear to be covered against their immediate requirements and interest in Bessemer and malleable iron is small. Low phosphorus iron is selling fairly well at around \$28.25, delivered. W. P. Snyder & Co. make the average price of basic iron from Valley furnaces in June as \$15.43,

compared with \$16.25 in May, and of Bessemer \$17, compared with \$17.29 the month before.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17 00
Gray forge	\$16.25 to 16.50
No. 2 foundry.....	16.75
No. 3 foundry.....	16.25 to 16.50
Malleable	17.00
Low phos., copper free...	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Ferromanganese is firmly held at \$105, Atlantic seaboard, for both the domestic and the imported product, but almost all of the recent shipments to consumers and those that they will receive this month carry a price of \$100. Small consumers who depend upon the spot market have paid the present price, but users who were under contract for the first half of the year had until last Saturday to specify against them and have at least this month's coverage at the lower figure. Consumers of spiegeleisen are specifying well against contract commitments, and shipments of ferrosilicon are in fair volume.

Semi-Finished Steel.—To get orders for sheet bars makers here now find it necessary to make a price of \$32, f.o.b. Pittsburgh, as an outside producer is supplying a Pittsburgh district mill which has a freight rate of a little more than \$1 a ton from Pittsburgh, at \$33, delivered. Some makers still ask more, but at this juncture sales at more than \$32, f.o.b. Pittsburgh, are difficult, and it is probable that third quarter contracts will carry that price, which represents a drop of \$2 a ton from the open, although flexible, quotation of the first half of the year. Billets and slabs are fairly firm, with makers disposed to resist the pressure of buyers against prices. On wire rods, \$42, base Pittsburgh, appears to be all that can be done. Forging quality billets and blooms are selling at \$38, base.

Bars, Plates and Shapes.—Makers in this area seem to be more determined in their adherence to 1.90c., Pittsburgh, as the basis of third quar-

ter contracts, but buyers are in no hurry to close for that period and a test of that price awaits some show of interest in supplies on their part. Cold-finished bar makers are not busy and appear to have good-sized stocks of hot-rolled bars, and much the same situation exists among bolt, nut and rivet makers. In view of the recent decline of \$2 a ton on cold-finished bars, there is some disposition on the part of other bar buyers to hold off to see whether the mills will insist on 1.90c. for hot-rolled bars. Much of the fabricated steel business in this area is in small projects. Plate prospects are brightened by a considerable tonnage of large outside-diameter pipe that is before the market, but they would be even brighter if there were signs of more railroad car business.

Rails and Track Supplies.—Leading makers have announced an extra of 25c. per 100 lb. for less than carload lots of both large and small spikes, with the shipment rather than the size of the order to govern. General business in rails and track supplies remains quiet.

Wire Products.—While total shipments of wire products for the first half of the year have been appreciably larger than in that period last year, the showing of June was unfavorable compared with June, 1927. The explanation is in the fact that, as the spring was backward and excessive rain followed it, the movement of goods into consumption, notably in the agricultural sections, has been limited. That, coupled with the heavy stocks accumulated to escape price advances, has left distributors with rather sizable supplies. Nails are commonly selling at \$2.55, base per keg, Pittsburgh, and plain wire at \$2.50, base per 100 lb., but there is some resistance to the latter price.

Tubular Goods.—Another good-sized line-pipe order has come to a Pittsburgh maker, this being one for 500 miles of 10-in. pipe, believed to be for the Atlantic Refining Pipe Lines Co., to run from Midland, Tex., to Atreco, the Gulf port of the At-

lantic Refining Co. The purchase covers approximately 50,000 tons and makes a total of 100,000 tons that has been placed with local makers in the past two weeks. A Youngstown maker will furnish 300 miles of 16-in., approximately 42,000 tons, for a Louisiana gas line and the same producer is reported to have taken 136 miles of 20-in. for the gas line for the Inland Gas Corporation, an interest of the American Rolling Mill Co., which is to pipe natural gas from the Kentucky field to the Ashland, Ky., plant of the latter. Buttwelded pipe for building and construction work is moving steadily, but not much activity is seen in lapwelded pipe for oil well development, although the demand from the Seminole field is said to be a little more active.

Tin Plate.—Observance of the Fourth of July will mean a reduction of mill operating schedules this week by as much as one-third; the day is a regular steel mill holiday and most manufacturers are dropping one turn on July 3 and on July 5, besides the three on the holiday itself. All makers are well supplied with specifications on contracts but can afford a breathing spell in output, since the rainy weather is holding the crops back and the pack is also being retarded. The sale of bottled beverages also has been restricted by the weather, and this affects the use of caps, which are made of tin plate.

Cold-Finished Steel Bars and Shafting.—Business has not been helped by the recent reduction of \$2 a ton in prices; rather, it has made buyers a little more conservative, because there were no signs of real weakness prior to the cut.

Hot-Rolled Flats.—Business in strips is good enough, but the price situation remains very unsatisfactory, with what are regarded as regular quotations applying only on small-lot business. Net prices continue to be made on the sizable tonnages and, translated back to a base price, produce very low figures. The extras over base evidently are profitable on

THE IRON AGE Composite Prices

Finished Steel
July 1, 1928, 2.341c. a Lb.

One week ago.....	2.341c.
One month ago.....	2.341c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron
July 1, 1928, \$17.25 a Gross Ton

One week ago.....	\$17.21
One month ago.....	17.23
One year ago.....	18.71
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75, Feb. 14;	\$17.21, June 26	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.00c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.06c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.10c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland	2.15c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh.....	3.00c. to 3.15c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c. to 3.45c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55 to \$2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails.....	2.55 to 2.65

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.50
Annealed fence wire.....	2.65
Spring wire	3.50
Galv'd wire, No. 9.....	3.10
Barbed wire, galv'd.....	3.35
Barbed wire, painted.....	3.10

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c. to 2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c.
No. 24, del'd Cleveland.....	2.79c. to 2.89c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$2.90
2100 (1¼% Nickel)	0.55	3.20
2800 (3¼% Nickel)	1.50	4.15
2500 (5% Nickel)	2.25	4.90
3100 Nickel Chromium	0.55	3.20
3200 Nickel Chromium	1.35	4.00
3300 Nickel Chromium	3.80	6.45
3400 Nickel Chromium	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.85
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100 Chromium Spring Steel	0.20	2.85
6100 Chromium Vanadium Bars	1.20	3.85
6100 Chromium Vanadium Spring Steel	0.95	3.60
9250 Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Black	Galv.
1½	45	19½	1½ to ¾	+11	+39
1¼ to ¾	51	25½	¾	22	2
1½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1½	41	24½	1½ to ¾	+19	+54
1¼ to ¾	47	30½	¾	21	17
1½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 2¾ in.....	37
3 in.....	45
3¼ to 3½ in.....	42½
4 to 13 in.....	46
	1½ in.....+18
	1¾ to 1½ in.....+8
	2 to 2½ in.....-2
	2½ to 3 in.....-7
	3½ to 4½ in.....-9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over	7 Fives
	1 Ten
	2 Tens
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn	Hot Rolled
1 in.	63
1¼ to 1½ in.....	55
1¾ in.	39
2 to 2½ in.....	34
2½ to 2¾ in.....	42
	3 in.
	3½ in.
	4 in.
	4½, 5 and 6 in..
	48
	50
	53
	45

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads) ..	55
Carbon, 0.30% to 0.40%, base	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

the wider material, in view of the price cuts that are being made on stock 6 in. wide or wider. Hoops and bands are firmer in price than strips.

Cold-Rolled Strips.—Demand has fallen off much less than it usually does at this time of the year, and some makers find June orders ahead of those for May. Prices, however, are dominated by the hot-rolled strip market, and most business carries the minimum quotation of 3c., base, or 2.75c. for lots of 3 tons or more.

Fluorspar.—The larger domestic producers have announced an advance of \$1 per ton in gravel spar to \$17 per net ton at mines. The smaller producers have not acted, and such business as has been done lately has been at \$16. Most users are covered for the next few months and not much new business is in sight, unless this advance prompts some buying.

Sheets.—Mill operating schedules are lower this week by as much as one-third, but it is the observance of the Fourth of July, one of the regular steel industry holidays, rather than a lack of business, that is responsible. There is no evidence yet of the recession in consumptive requirements common to this time of the year and orders, while individually small and for very prompt shipment, are quite numerous. Prices are steadier at least to the extent that they are no lower now than they were a week ago.

Bolts, Nuts and Rivets.—Buyers have been prompt in entering contracts for third quarter. Specifications are constant, but are kept well within actual requirements and a 50 per cent operation of productive capacity is sufficient to supply the demand.

Coke and Coal.—The market still is extremely dull. While a little Lake cargo coal business has developed, it is not nearly the size it was expected to be, and with demands from other directions also light, prices still are

very much in the buyers' favor. There is only a limited demand for spot furnace coke and prices hold chiefly because offerings are light. So many foundries are under contract that interest in spot offering amounts to little.

Old Material.—Dealers are more anxious to book orders than melters are to place them and, while the market has been fairly active in the past week, it is largely because dealers have made prices that have induced consumers to take supplies. Two steel companies in this district have bought No. 1 heavy melting steel at \$14, one of them getting at least 10,000 tons at that figure, which sets another new low mark for the year. Weakness in the lighter grades is unrelieved, with machine shop turnings still offered at \$9 and blast furnace grades no longer quotable at more than \$10. Heavy breakable cast scrap has been sold at \$12. Compressed sheet scrap is not at all plentiful and is virtually at par in price with heavy melting steel.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:
Heavy melting steel.....\$13.75 to \$14.25
Scrap rails 13.75 to 14.00
Compressed sheet steel.... 13.50 to 14.00
Bundled sheets, sides and ends 13.00 to 13.50
Cast iron carwheels..... 14.00 to 14.50
Sheets bar crops, ordinary 14.00 to 14.50
Heavy breakable cast..... 12.00 to 12.50
No. 2 railroad wrought.... 14.00 to 14.25
Heavy steel axle turnings. 12.50 to 13.00
Machine shop turnings... 9.00

Acid Open-Hearth Grades:
Railr. knuckles and couplers 15.00 to 15.50
Railr. coil and leaf springs 15.00 to 15.50
Rolled steel wheels..... 15.00 to 15.50
Low phos. billet and bloom ends 19.00 to 19.50
Low phos., mill plate.... 17.50 to 18.00
Low phos., light grade.... 16.50 to 17.00
Low phos. sheet bar crops. 17.50 to 18.00
Hvy. steel axle turnings.. 12.50 to 13.00

Electric Furnace Grades:
Low phos. punchings.... 16.50 to 17.00
Hvy. steel axle turnings.. 12.50 to 13.00

Blast Furnace Grades:
Short shov'l'g steel turnings 10.00
Short mixed borings and turnings 10.00
Cast iron borings..... 10.00
No. 2 busheling..... 8.50 to 9.00

Rolling Mill Grades:
Steel car axles..... 18.00 to 18.50
No. 1 railroad wrought... 10.50 to 11.00
Sheet bar crops..... 16.00 to 16.50

Cupola Grades:
No. 1 cast..... 14.25 to 14.50
Rails 3 ft. and under.... 15.50 to 16.00

Malleable Grades:
Railroad 13.75 to 14.00
Industrial 13.25 to 13.50
Agricultural 12.75 to 13.00

Heavy Reduction in Pig Iron Imports

Imports of pig iron in May are reported by the Department of Commerce as 9732 gross tons. This is less than half the April figure of 20,845 tons and represents a reduction of nearly 44 per cent from the 16,664 tons of May, 1927.

In spite of this falling off, however, the total for the first five months, at 63,496 tons, is more than 35 per cent above the corresponding figure last year. The increase has been accounted for by a gain of more than 21,000 tons in receipts from

Great Britain. India has sent a slightly larger tonnage, but shipments from Germany have fallen off to almost nothing and there has been a reduction in receipts from the Netherlands.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT (In Gross Tons)

	May	
	1928	1927
United Kingdom.....	4,556	3,600
British India.....	3,026	10,402
Germany.....	.....	180
Netherlands.....	1,888	2,315
Canada.....	.....	95
France.....	.....	.....
Belgium.....	.....	.....
Norway.....	41	.....
All others.....	221	72
Total.....	9,732	16,664

Iron Ore Imports Hold Well

Imports of iron ore in May are reported by the Department of Commerce at 211,270 gross tons. This is more than 5½ per cent below the April imports of 224,841 tons but represents a gain of 30 per cent over the March arrival of 162,654 tons. It is 14 per cent higher than the incoming tonnage a year ago, at 186,208 tons in May.

For the first five months of the years imports have been about 3 per cent higher than last year. Heavy gains are reported in incoming tonnages from Chile, Canada and French Africa, while there was a sharp reduction in imports from Cuba and Sweden. More than half of the total for the five months in each year came from Chile. For May, 1928, Chile furnished more than two-thirds of the total.

SOURCES OF AMERICAN IMPORTS OF IRON ORE

	May	
	1928	1927
Canada.....	290	2,365
Cuba.....	33,000	48,000
Chile.....	141,800	101,500
Spain.....	.....	.....
Sweden.....	.....	9,294
French Africa.....	34,375	25,025
Other countries.....	1,805	24
Total.....	211,270	186,208

Electric Power Production in United States in 1927

Production of electric power by public utility plants in the United States in 1927 is placed by the Geological Survey at 80,205,474,000 kwhr. Of this amount 50,336,466,000 was produced by the combustion of fuels and 29,875,008,000 by water-power. Fuels produced 62.8 per cent of the total. Consumption of fuels included 41,888,497 net tons of coal, 6,782,192 bbl. of oil, 62,919,197,000 cu. ft. of natural gas, and a certain amount of wood and other combustibles.

There were 1820 operating companies in the United States, Jan. 1, 1928, having a total of 3740 plants and an aggregate generator capacity of 27,690,841 kw.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates.....	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands.....	3.60c.
Hoops.....	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles.....	3.55c.
Galv. sheets (No. 24), 25 or more bundles.....	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets.....	3.10c.
Galv. corrug. sheets (No. 28), per square.....	\$4.31
Spikes, large.....	3.40c.
Small.....	3.80c. to 5.25c.
Boat.....	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list.....	
Machine bolts, 100 count, 60 per cent off list.....	
Carriage bolts, 100 count, 60 per cent off list.....	
Nuts, all styles, 100 count, 60 per cent off list.....	
Large rivets, base per 100 lb. \$3.50.....	
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.....	3.00 to 3.10
Common wire nails, per keg.....	3.00
Cement coated nails, per keg.....	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1½-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$44 to \$45. Cleveland mill base, \$43 to \$44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	

Manganese ore, washed, 52% manganese, from the Caucasus.....	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.00 to \$11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens..	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens.....	9.00
Foundry by-prod., del'd St. Louis..	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines..	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines.....	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace
10%	\$35.00
11%	37.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$16.00 to \$17.00
No. 2 lump, Illinois and Kentucky mines..	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
†Machine bolts	Per Cent Off List
†Carriage bolts	70
Lag bolts	70
Flow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E..	70
Stove bolts in packages, Pittsburgh. 80, 10 and 2½	
Stove bolts in packages, Chicago.. 75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.. 75, 20, 10, 5 and 2½	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(½-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

	Per Cent Off List
(¾-In. and Smaller)	
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread..	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Chicago

First Half Steel Shipments Largest in Many Years—Ingot Output Now at 80 Per Cent

CHICAGO, July 2.—Shipments of steel by Chicago producers in the first six months of this year totaled the largest for a like period in many years and exceeded the corresponding period of 1927 by 15 per cent. Following a dull November and December, orders bulked large in January, while March and May were record months. June shipments were not as heavy as those in May, and the tendency is still downward, though at a slower pace than is usually to be expected at this time of year. Ingot output, after dropping for three consecutive weeks, is now at 80 per cent of capacity. The general demand for heavy tonnage steel products is well sustained, and it therefore appears that the slower rate of ingot output is largely chargeable to dwindling shipments of rails.

Chicago producers are naming 2c. as the third quarter price on shapes, plates and bars. Although the practice of spot purchasing is more widespread than earlier in the year, there is an increasing interest in advance buying, and sales for the week are the fourth largest this year and exceed those of any seven-day period since the middle of February. Backlogs are heavier in practically all commodities except rails and sheets. Specifications are fully equal to shipments.

Bids have been submitted at Denver, Colo., on 12,000 tons of steel pipe.

No. 6 furnace has been put out at Gary, leaving 25 active steel works stacks out of 36 in the district.

Pig Iron.—Price levels to the east of Chicago are of interest to local buyers of pig iron, who are uncertain as to the general trend of business and the effect of neighboring markets on Chicago quotations. Shading of differentials on high silicon iron is being practised by a few sellers and distress lots of iron brought in by boat can be had at prices below the Chicago market level. A user in western Michigan has taken 700 tons of 8 per cent silvery at the market. A melter in Illinois will buy 100 tons of the 7 per cent grade. Bargain lots of charcoal iron are still to be had at well below the quoted price of \$24, furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	21.51
So'th'n No. 2 (barge and rail)	21.01
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Local dealers are using \$33, Hazard, Pa., as the basis for quoting on 19 to 21 per cent spiegeleisen, but the market is slow and no sales have been made. Specifications for ferrosilicon and ferromanganese are of moderate size.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Following several weeks in which oil producers showed little interest in added storage facilities, there is now before the steel trade

fully 14,000 tons of tank plates for three oil companies in the Southwest. In the local market both sales and deliveries of plates are of moderate size. Demand from the general manufacturing trade is steady, and fabricators are taking normal tonnages for this time of the year. But railroad car builders, who have not been forced to extend themselves since the turn of the year, are operating at less than 40 per cent of capacity on orders against which practically full specifications already have been entered at the mills. The outlook in the railroad equipment market is not promising. The Chicago & Eastern Illinois is asking for prices on 100 40-ft. automobile cars. This is essentially a revival of an old inquiry, which originally was for 500 cars. Word is being passed around that the Missouri-Kansas-Texas will place orders for 19 passenger and baggage cars next week. Action is still awaited on 10 air dump cars and 250 gondola bodies for the Rock Island. The price situation in this district has been somewhat clarified by the action of one producer in announcing 2c. per lb., base Chicago, as the basis for third quarter contracts and spot orders. That there is still some doubt as to the course to follow is indicated by the fact that other sellers are delaying action until they are surer of the general trend. In the absence of heavy tonnage business, it is believed by some that 2c., Chicago, can be held for the time being.

Mill prices on plates, per lb.: 2c., base Chicago.

Structural Material.—A feature of this market is the tonnage required for bridge work, both for railroads and State highways. In addition to the large project announced a few days ago at Louisville, Ky., there is a railroad bridge at Melville, La., that will take 4200 tons. Orders have been placed for 1200 tons of steel for a bridge across the Missouri River, 1000 tons for a bridge at Menominee, Wis., and 500 tons for a span at Garland City, Ark. At Chicago, it is reported that 3500 tons for the Austin High School has been awarded and that 2200 tons has been placed for a motor car assembly plant at Kansas City, Mo. Some fabricators in Chicago are finding it advisable to increase their efforts to obtain contracts, though the situation here as a whole is quite fav-

orable for this time of the year. Indiana shops are well supplied with work and the same is true to the southwest. In Nebraska, however, 70 per cent of shop capacity appears to be a fair estimate of output. Weather conditions in the last 10 days have not been favorable to outdoor construction and building programs have been set back. Prices for plain material are steady at 2c., Chicago. Open announcement of this quotation for third quarter business has been made by only one producer.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Bolts, Nuts and Rivets.—Users of these commodities, having found stocks inadequate for early July consumption, are issuing larger specifications, and it now seems assured that production of bolts, nuts and rivets will be continued at close to 65 per cent of capacity. It is noteworthy that railroads are in need of larger quantities.

Reinforcing Bars.—Large tonnages of rail steel bars are quoted at 2c. per lb., and billet concrete bars bring 2.30c., Chicago warehouse. Small lettings are numerous, and, because of the extra amount of labor needed to complete them, shops have an air of activity that is not reflected in the volume of shipments. The Harmon Sports Arena, Chicago, requiring 450 tons of bars, is out for figures, and an old project, Sheridan Towers apartment building, Chicago, in which 450 tons will be used, has been revived and final action may be taken on the contract in a few days. Contracts and fresh inquiries are given on page 59.

Bars.—Improvement is noted in the demand for soft steel bars from miscellaneous sources. Deliveries run from three to four weeks, depending on the range of sizes in individual orders and rolling schedules at mills. Accessory manufacturers who cater to the automobile industry have not diminished their pace and forgers are busy. Agricultural implement manufacturers, having passed the inventory period, have swung into full production, with sizable schedules arranged for many weeks to come. Mild steel bar output is well above the current ingot rate, which stands close to 80 per cent of capacity. Prices in Chicago are 2c. per lb., and some forward contracting has been done at that figure. For the third consecutive week new business and specifications for iron bars have been well above the average week so far this year. Much of this tonnage comes from miscellaneous sources. Prices are steady at 2c., Chicago. Though reports are current that several manufacturers of automobiles have cut output, they are evidently builders who do not depend on this district for steel. In alloy steel bars, shipments and new orders for the past week compare favorably with the average over the last month. Buyers of rail steel bars are taking smaller quantities and are demanding prompt shipment. New buying is in fair total

volume but does not equal mill output, which is at capacity. Stocks in the hands of producers are unbalanced and small, following a heavy run on steel fence posts and hard steel reinforcing bars. Prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—Demand is remarkably steady when it is considered that the seventh month of the year is at hand. Trade from manufacturing consumers is well sustained, and mill operations remain close to 65 per cent of capacity. Orders placed by the railroads are of fair size, having varied little in many weeks. Demand for field fencing in rural districts is lighter. Jobbers in the South are finding business quiet. Distributors in the Middle West report a steady demand, and trade in the Northwest is much improved. Although rains have improved the crop outlook in some parts of the country, in some sections an excess of water is interfering with cultivation of the fields. Mill prices for wire and wire products are given on page 43.

Rails and Track Supplies.—Outstanding among track supply orders this week is one placed by the Pennsylvania Railroad. In all, 12,000 tons was purchased by that line, though it is not known here how the tonnage was distributed. Miscellaneous orders from Western railroads total 5000 tons. Shipments of track accessories are steady, and the rate of production has not changed for over four weeks. The heavy-section rail market is quiet. Rail output is close to 75 per cent of mill capacity. Several carload orders for light rails have been placed.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Coke.—Shipments of by-product foundry coke are a trifle lighter, reflecting the slower operations of foundries in this district. Second half contracting has gone forward steadily and prices are firm.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Galv. sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.

Per Cent Off List

Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Old Material.—A consumer has purchased close to 1000 tons of No. 1 railroad heavy melting steel at \$12.75 a gross ton, delivered, a figure 25c. below the last purchase. Taken as a whole, this market is dragging and the trade is bearish. A few specialties are scarce and firm in price, but, for the most part, the supply of scrap is fully equal to, or even greater than, consumption. Larger buyers have fair stocks on hand and are well protected by contracts. The reaction in the market has brought prices obtained by railroads to the lowest point in months. The trade has sized up the slackening rate of steel production as an indication of dullness in the scrap market during the summer months.

Prices deliv'd consumers' yards, Chicago:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.25 to \$12.75
Shoveling steel.....	12.25 to 12.75
Frogs, switches and guards, cut apart, and misc. rails	13.25 to 13.75
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels.....	15.25 to 15.75
Railr'd tires, charg. box size.....	15.50 to 16.00
Railr'd leaf springs, cut apart.....	15.50 to 16.00

Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs.....	15.75 to 16.25

Electric Furnace Grades:	
Axle turnings.....	12.50 to 13.00
Low phos. punchings.....	14.50 to 15.00
Low phos. plate, 12 in. and under.....	14.00 to 14.50

Blast Furnace Grades:	
Axle turnings.....	9.50 to 10.00
Cast iron borings.....	9.00 to 9.50
Short shoveling turnings..	9.00 to 9.50
Machine shop turnings....	6.25 to 6.75

Rolling Mill Grades:	
Iron rails.....	13.50 to 14.00
Rerolling rails.....	14.75 to 15.25

Cupola Grades:	
Steel rails less than 3 ft..	15.50 to 16.00
Angle bars, steel.....	14.25 to 14.75
Cast iron carwheels.....	13.00 to 13.50

Malleable Grades:	
Railroad.....	12.50 to 13.00
Agricultural.....	11.50 to 12.00

Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	14.00 to 14.50
Iron arch bars and transoms.....	19.50 to 20.00
Iron car axles.....	23.50 to 24.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought...	11.00 to 11.50
No. 2 railroad wrought...	11.00 to 11.50
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50

Cupola Grades:	
No. 1 machinery cast.....	13.50 to 14.00
No. 1 railroad cast.....	13.00 to 13.50
No. 1 agricultural cast.....	12.50 to 13.00
Stove plate.....	11.00 to 11.50
Grate bars.....	11.25 to 11.75
Brake shoes.....	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cast Iron Pipe.—The Santa Fe Railroad is reported to have placed 650 tons of 10-in. pipe for delivery at Galesburg, Ill. At Chicago, two bidders quoted \$40, delivered, or \$31.80. Birmingham, on 1620 tons of 6 and 8-in. Class B pipe. The Allied Contractors, Chicago, have taken a general contract at Winfield, Ill., calling for about 400 tons of 6 and 8-in. Class

B pipe. Morton Grove, Ill., has placed 1000 tons of 6 and 8-in. pipe through a contractor. Orders this week have been in fair volume, but fresh inquiry is sluggish. Rainy weather is interfering with pipe laying and contractors are less anxious for deliveries. Several pipe foundries will close next week for repairs. Prices are firm at \$32 to \$33, Birmingham, for 6-in. diameters and larger.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$40.20 to \$41.20; 4-in., \$44.20 to \$45.20; Class A and gas pipe, \$4 extra.

Sheets.—Users continue to take sheets in small lots. New sales are light and, therefore, do not relieve the stress at mills in arranging rolling schedules. One group of hot mills in Chicago will be idle all next week, and production at Milwaukee will be halted for the coming seven days. Believing that stocks in the hands of users are running low, producers now look forward to the end of July as about the time when demand will turn upward. Light tank makers are less busy, and the roofing trade is taking a smaller tonnage. Base prices at Chicago district mills are weak at 3.60c. for galvanized, 2.75c. for black and 2.10c. for blue annealed sheets.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Northern and Southern Cast Iron Pipe Makers Combined

James B. Clow & Sons, Chicago, have purchased a controlling interest in the National Cast Iron Pipe Co., Birmingham. Both companies produce cast iron pipe. Each will retain its present name and the officers and organization of both will remain intact.

E. E. Linthicum, president and founder of the National company, will continue in that capacity. A change in the board of directors, to give the new owners proper representation, will be made. Paul A. Ivy will go with the National company as vice-president.

James B. Clow & Sons have been in business since 1878. Their pipe plants are located at Newcomerstown and Coshocton, Ohio, and their main offices are in Chicago, where they also conduct one of the largest plants in the country for the manufacture and distribution of plumbing and heating supplies.

Steel & Tubes, Inc., Cleveland, has engaged the Sessions Engineering Co., Chicago and Detroit, to prepare plans and specifications and supervise the construction of its new welded steel tubing plant to be erected at Ferndale, Mich., a Detroit suburb. Construction will start Aug. 1 and it is expected that the plant will be completed by Jan. 1.

New York

Pipe Order for 50,000 Tons Placed by Texas Co.—Price Uncertainty in Steel

NEW YORK, July 2.—Pig iron sales have been adversely affected by inventory-taking and totaled only 6000 tons for the week. Shipments, however, have not been held up as much as usual, indicating that foundries have little iron in stock and will need additional metal as soon as they resume operations. An improvement in orders for castings is rather generally reported, particularly among jobbing foundries, whose business has been of a spotty character since the first of the year. The General Electric Co. is inquiring for 500 tons of high-silicon malleable pig iron for Schenectady and is reported to have placed 150 tons of low phosphorus for the same plant. The Worthington Pump & Machinery Corporation has closed for 445 tons of foundry for its Holi-yoke, Mass., plant and 40 tons for Harrison, N. J. New inquiries in this district, most of them small, total about 2500 tons. In addition, a Massachusetts melter is in the market for 1200 tons of foundry iron. The price situation is virtually unchanged, with Buffalo foundry iron ranging from \$16 to \$17, base furnace, and eastern Pennsylvania foundry from \$19.50 to \$20, base furnace.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91 to \$21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Ferroalloys.—An inquiry from the Ford Motor Co. for 1000 tons of ferro-manganese for delivery in the third quarter has appeared, but otherwise business before the market is confined to carload and small lots. Prices are unchanged at \$105, seaboard. The spiegeleisen market is firm at \$33 for the high-grade alloy. There has been a fair business in carload and small lots.

Plates, Shapes and Bars.—Uncertainty as to prices exists, notwithstanding recent announcements by mills that 2.05c., Coatesville on plates, 2.05c., Bethlehem, on shapes, and 1.90c., Pittsburgh, on bars, would be the ruling third quarter quotations. These prices have not been established, except on a few minor transactions, though a good many contract buyers have signed up for third quarter at the new levels. Specifications against these contracts probably will not be received in any great number for a few weeks, and price developments in the interim will be watched closely by both sellers and consumers. The fact that many contract buyers did not exercise in full their second quarter options at prices \$1 a ton below the level announced for this quarter may indicate either a decline

in consumption or lack of confidence in price stability. On plates spotty weakness has developed. Although most of the sales are at 2.17½c., delivered New York, concessions of \$1 a ton have been given on desirable

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Back	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box..	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

orders. A Pittsburgh price of 1.80c., equal to 2.14c., delivered New York, also has appeared in some instances. Quotations received last Friday by the New York Central Railroad on its third quarter requirements disclosed a variety of price ideas. On plates the low Eastern quotation was 1.85c., Newberry Junction, submitted by the Central Iron & Steel Co., Harrisburg, Pa. The Lukens Steel Co., which three months ago quoted 1.85c., same delivery point, put in a price of 1.90c., Newberry Junction. The Carnegie Steel Co. bid 1.90c., Youngstown, or 2.03c., West Seneca, N. Y., on the three commodities; Youngstown Sheet & Tube Co., 1.90c., Youngstown; Jones & Laughlin Steel Corporation, 1.90c., Youngstown, or 2c., Buffalo; Bethlehem Steel Co., 1.90c., West Seneca; Otis Steel Co., 1.85c., Cleveland, on plates; Granite City Steel Co., 1.85c., Granite City, Ill., on plates; Alan Wood Iron & Steel Co., 2.18½c., Newberry Junction, on plates. Chicago bids were 2.10c., Chicago, by the Illinois Steel Co. and 2c., Indiana Harbor, by the Inland Steel Co. Many large structural projects involving substantial tonnages are under negotiation and probably will be awarded during the summer. Among those not previously reported are an office building for the American Exchange-Irving Trust Co. at 1 Wall Street and a garment manufacturing building on Seventh Avenue, each of which will take about 10,000 tons. A high school building in Brooklyn calls for 3500 tons.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Pipe.—The Texas Co., New York, has given an order for 50,000 tons of steel pipe to the Youngstown Sheet & Tube Co., for a pipe line in Texas. This is a portion of a large pipe line project which the Texas Co. has under way. A recent contract for about 25,000 tons was awarded to the A. O. Smith Corporation, Milwaukee, for fabrication.

Sheets and Strips.—Weakness continues in sheets, but prices are no lower. The galvanized product is quite freely obtainable at 3.50c. or less, Pittsburgh, while on black sheets the open market price is 2.65c., Pittsburgh. Sales of blue annealed sheets are still commonly made at 2c., Pittsburgh, but the extra of 10c. per 100 lb. on widths exceeding 40 in. is frequently waived on desirable orders. On cold-rolled strip steel, concessions of \$1 a ton have been given by some mills on orders of fair size, thus making the market range 2.70c. to 2.75c., Pittsburgh, for lots or 3 tons or more. On hot-rolled strips concessions of \$1 a ton have not been infrequent. Quotations on the black sheet requirements of the New York Central Railroad, opened last Friday, ranged from 2.65c., Niles, Ohio, mill, put in by the Mahoning Valley Steel Co. to 3.05c., Newberry Junction, the bid of Bethlehem Steel Co. Blue annealed quotations covered a wide range, from 1.99c., Youngstown, bid by the Sheet

Metal Mfg. Co., to 2.38½c., Newberry Junction, put in by the Alan Wood Iron & Steel Co. The Otis Steel Co. quoted 2c., Cleveland, and the Youngstown Sheet & Tube Co. and the Sharon Steel Hoop Co. both bid 2c., Youngstown.

Cast Iron Pipe.—The market has been slightly more active in the past week, but business is still rather dull and buying is confined mostly to small lots, principally by private users. Southern makers continue to quote \$32 to \$33, Birmingham, while Northern foundries seem to be adhering to a range of \$37.60 to \$38.60, delivered New York. The Warren Foundry & Pipe Co. is low bidder on 300 tons of 8-in. and 12-in. water pipe for the city of New York, and the United States Cast Iron Pipe & Foundry Co. is low on 500 tons for 12-in., class C pipe for Yonkers, N. Y. Bloomfield, N. J., opened bids on July 2 for a small tonnage of pipe and fittings.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Warehouse Business.—June business was slightly smaller than that of May with most jobbers in this district. Black and galvanized sheet prices still show weakness, but 3.80c. to 4c. per lb., base, on black and 4.50c. to 4.70c., base, on galvanized are representative of the market.

Old Material.—Buying prices are substantially unchanged, but an undertone of weakness continues in most grades. No. 1 heavy melting steel is being bought at \$12.50 per ton, delivered, and blast furnace scrap at \$9 to \$9.50 per ton, delivered. These are the most active grades, except for some purchasing of yard grade of heavy melting steel at \$10 to \$10.50 per ton, delivered to Harrisburg, Pottsville and Conshohocken, Pa.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.50 to \$9.85
Heavy melting steel (yard)	6.25 to 7.00
No. 1 hvy. breakable cast.	11.00 to 12.00
Stove plate (steel works)...	7.00 to 7.25
Locomotive grate bars...	7.00 to 7.50
Machine shop turnings...	6.00 to 6.50
Short shoveling turnings...	6.00 to 6.50
Cast borings (blast furn. or steel works).....	6.00 to 6.50
Mixed borings and turnings.....	6.00 to 6.50
Steel car axles.....	14.50 to 15.00
Iron car axles.....	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25
Forge fire.....	6.50 to 6.75
No. 1 railroad wrought.....	9.50 to 10.00
No. 1 yard wrot., long....	8.00 to 8.50
Rails for rolling.....	10.00 to 10.50
Cast iron carwheels.....	11.00 to 11.50
Stove plate (foundry)....	8.50 to 9.00
Malleable cast (railroad)...	10.00
Cast borings (chemical)...	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.00 to \$15.00
No. 1 hvy. cast (columns bldg. materials, etc.), cupola size.....	12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....	11.50 to 12.50

Reinforcing Bars.—About 700 tons of bars is to be purchased this week by Rodgers & Hagerty, Inc., general contractor for a section of the New York subway. A considerable tonnage will be needed for the Samuel Tilden High School in Brooklyn, for

which estimates are being prepared. The volume of small orders is keeping up at a good rate, and although the total business placed during the first half of the year was not up to the expectations of most of the distributors, prospects for the summer months are good. The mill price is somewhat weaker, and although some distributors are still getting 2c., Pittsburgh, for small orders, others are openly quoting 1.90c., on any attractive tonnage. The Youngstown warehouse price is unchanged at 2.20c. per lb. or 2.57½c., on cars at New York, and out of New York warehouse the common quotations are 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c.

for less than 2 tons, all delivered at job.

Coke.—With scarcely any activity in the market and decreasing operations in the Connellsville district, prices are being maintained at \$3.50 per ton, Connellsville, for standard foundry coke and \$2.50 to \$2.75 for the furnace grade. Special brands of foundry coke are quoted at \$4.85, f.o.b. ovens, and delivered prices are: To northern New Jersey, Jersey City and Newark, \$8.56 per net ton; to New York and Brooklyn, \$9.44 per net ton. By-product foundry coke is unchanged at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06 to \$10.29 per net ton, New York or Brooklyn.

Philadelphia

Steel Prices Not Firm at \$1 Advance and Few Contracts Have Been Made

PHILADELPHIA, July 2.—Apparently few third quarter contracts for bars, shapes and plates have been made at the new level of prices announced as effective for third quarter. The new prices are 1.90c., Pittsburgh, for bars, 2.05c., Coatesville, for plates and 2.05c., Bethlehem, for shapes. Recent sales have been at prices \$1 a ton lower in the case of bars and plates and \$1 to \$2 lower on shapes. At the opening of bids last week by the New York Central Railroad on its third quarter requirements there were low quotations of 1.90c., West Seneca, N. Y., on bars, 1.90c., Newberry Junction, on shapes and 1.85c., Newberry Junction, on plates. The Pennsylvania Railroad has not yet appeared as a buyer for third quarter except on track materials and steel pipe.

Pig Iron.—Many foundries in this district are shutting down for several days to a week for the usual inventory period, and the market has become less active than in recent weeks. Contracting for third quarter has been light. The price on the foundry grade is unchanged at \$20, furnace. Low phosphorus has been sold in fair quantities in other districts, but locally demand is light.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X.....	21.76
Basic (del'd east. Pa.)...	\$19.00 to 19.50
Gray forge.....	19.75 to 20.25
Malleable.....	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)...	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace).....	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—The larger consumers have been covering for third quarter and second half at \$105 per ton, seaboard. A recent inquiry is for 1000 tons of 78 to 82 per cent ferromanganese for the Fordson plant of the Ford Motor Co.

Billets.—Rerolling quality billets are still quoted at \$33 per ton, Pittsburgh, but about \$1 a ton less could be done on a desirable specification. The forging grade is firm at \$38 per ton, Pittsburgh.

Bars.—Mills are asking 1.90c., Pittsburgh, or 2.22c., delivered, Phila-

delphia, on new business, but recent sales have been at 1.85c., Pittsburgh. It is likely that the new department store building for Strawbridge & Clothier will be built of reinforced concrete, in which case about 4000 tons of bars will be required.

Shapes.—Efforts to bring shape prices up to the levels of bars and plates do not appear to have met with much success, and although 2.05c., Pencoyd, or 2.11c., Philadelphia, and 2.05c., Bethlehem, or 2.18c., Philadelphia, are still being quoted on current business, a price \$1 a ton below the above-mentioned minimum is not uncommon; on especially desirable tonnage even less than 2c., Pencoyd, is said to be obtainable.

Plates.—Mills are obtaining 2.05c., Coatesville, or 2.15c., Philadelphia, on small orders for prompt shipment. In some cases contracts have been made at 2c., Coatesville, or 2.10c., Philadelphia.

Sheets.—Few contracts have been made for the third quarter, consumers evidently intending to buy as their needs arise. Blue annealed sheet sales are being made at 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., Philadelphia. Black sheets are quiet at 2.65c., Pittsburgh, or 2.97c., Philadelphia, and galvanized sheets are still quoted at about 3.50c., Pittsburgh, or 3.82c., Philadelphia.

Warehouse Business.—June business was smaller than that of May and current buying is confined almost

entirely to very small lots. Prices are being maintained and the quantity differentials are generally observed.

Old Material.—All grades of scrap continue weak. Railroad grate bars are quotable at \$11 to \$12 per ton, delivered, on the basis of recent small sales to foundries at about \$12 per ton, though steel plants have not paid above \$11. The total of No. 1 heavy melting steel recently bought by a large eastern Pennsylvania consumer is reported at 25,000 to 30,000 tons, and the price was \$13 per ton, delivered. Yard grade of heavy melting steel has been bought at \$10.50 per ton, delivered Harrisburg and Pottsville, Pa. While heavy axle turnings are quoted at \$12 per ton, the maximum that has been paid by steel mill consumers, small lots have been sold to steel foundries at \$12.50 and \$13 per ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00 to \$13.50
Scrap T rails	12.50 to 13.00
No. 2 heavy melting steel	10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	10.00 to 10.50
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equiv.)	12.00
Cast borings (for steel works and roll. mill)	10.50
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate (for steel works)	11.00
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast f'nace scrap	9.50 to 10.00
Mach. shop turnings (for roll. mill)	11.00 to 11.25
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	17.00 to 17.50
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

Imports.—In the week ended June 30, arrivals of iron ore totaled 6450 tons from Algeria, and 602 tons of chrome ore came in from Portuguese Africa. Only 251 tons of pig iron was received, all from the Nether-

lands. Steel arrivals consisted of 100 tons of steel bars, 841 tons of structural shapes, 183 tons of skelp, 50 tons of steel plates and 62 tons of

steel bands from Belgium; 31 tons of blooms from France; 106 tons of structural shapes and 34 tons of steel scrap from Germany.

Cleveland

Steel Buyers Slow to Contract for Third Quarter—Basic Pig Iron Is Firmer

CLEVELAND, July 2.—The third quarter has started with very little contract tonnage on the mill books. There is still a lack of confidence on the part of buyers that the 1.90c. price will be maintained on steel bars, plates and structural material, although mills are still holding out for the advance. Quite a few contracts were taken at 1.90c. during the week, but in these cases buyers evidently felt assured that should the market settle down to 1.80c. they will be given advantage of the lower price. An Ohio mill has closed some third quarter plate contracts at 1.85c., but is now asking 1.90c. Although plates appear to be still available at 1.85c., consumers as a rule are still inclined to withhold the placing of contracts and mills are making little effort to force sales.

Specifications against expiring second quarter contracts showed a fair gain in the past week and as mills continued to take current orders up to July 1 at the 1.85c. price, many consumers are covered for their July requirements. In spite of the better specifications during the week, the tonnage booked in this territory in June fell slightly below that of May.

Several of the automobile companies in the Michigan territory are slowing down production and will take considerably less steel this month than in June. However, large orders are coming from one or two car companies which are bringing out new models and recent production has been maintained by one or two makers of low priced cars. Taking it altogether, business from the automotive field is expected to be quite satisfactory for July and most of the automobile makers are buying for a month's requirements, although some have inquiries out for the third quarter.

Pig Iron.—The market has continued fairly active in most districts served by furnaces operated by Cleveland interests. Sales by these producers during the week totaled 34,000 tons in foundry and malleable iron. An Ohio sanitary interest purchased 1000 tons and there was some round-lot buying in the Michigan territory. The National Malleable & Steel Casting Co. purchased 1000 tons of basic iron from a broker for its Sharon, Pa., plant at \$16.50, delivered. This will be shipped from the Youngstown district and indicates a firmer tone in the basic market. Following the recent 50c. per ton concession to \$17.50, furnace, for foundry and malleable iron for Cleveland delivery, that has become the ruling Cleveland price. This makes the price 50c. a ton under the delivered price of Valley iron at \$16.75, furnace. Prices are unchanged in other sections. Lake furnace quotations range from \$16.25 to \$17, except in Michigan, where \$17.50 is being maintained. A Cleveland producer is seeking business in the Michigan territory. Shipments during June were about equal to those in

May. The usual July shutdown has resulted in some curtailment in shipping orders. Shipments to the automotive industry are expected to show a falling off of 20 per cent this month, compared with June's.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.00
S'th'n fdy., sil.	1.75 to 2.25	21.50
Malleable		18.00
Ohio silvery, 8 per cent		28.00
Basic Valley furnace		16.00
Stand. low phos., Valley furn.		26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-Finished Steel.—A local maker has reestablished its present prices of \$32.50 to \$33, Cleveland, for sheet bars, billets and slabs for the third quarter and has closed with many of its customers on that basis. This producer is still able to keep all of its 14 open-hearth furnaces in operation.

Coke.—There is a fair demand for foundry coke in specifications against contracts, but little new demand. Prices are unchanged at \$3.50 to \$4.85 a ton, ovens, for standard Connellsville foundry coke and \$7.75 for Ohio by-product coke.

Bolts, Nuts and Rivets.—Orders from the automotive and agricultural implement manufacturers and jobbers are holding up well. One local maker reports a gain of 10 per cent in business during June over May, although this is probably exceptional. Most buyers have covered with third-quarter contracts. Rivets are dull.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅜-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.

†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.75c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Iron Ore.—Water shipments of Lake Superior ore during June were 8,926,216 tons, compared with 8,458,866 tons during the same month last year. Lake shipments to July 1 were 14,295,125 tons, compared with 17,771,423 tons during the corresponding period last year.

Sheets.—New demand is light, consumers' stocks are low and most buyers want quick deliveries. Buyers, as a rule, are showing no interest in third quarter contracts. Specifications from the automotive industry are holding up well. Prices show virtually no change. Black sheets are well stabilized at 2.65c., Pittsburgh, although some business is going at 2.60c. Blue annealed sheets range from 1.90c. to 2c., Pittsburgh, and galvanized from 3.45c., Valley, to 3.50c., Pittsburgh. Jobbers are quoting car lots at 3.55c., Valley. Auto body sheets are firm.

Strip Steel.—A fair amount of new business in hot-rolled was placed by the automotive industry during the week and most large consumers are under cover for either the third quarter or several weeks' requirements at prices they paid for the last quarter, or 1.75c., Pittsburgh, for 6-in. and wider strip and 1.85c. for 3 to 6-in. material. A fair volume of activity has developed. On cold-

rolled strip the \$2 a ton reduction to 2.65c., Cleveland, for 3 tons and over now appears to be quite general.

Wire Products.—The nail market in northern Ohio has a weaker tone than recently and buyers are finding it easier to secure the \$2.55 per keg price. This is commonly quoted to jobbers. Wire is firm.

Reinforcing Bars.—Keen competition is still causing price irregularities on billet steel bars. Rail steel bars are unchanged at 1.75c., mill. New inquiry is light.

Warehouse Business.—The volume of sales during June was about the same as in May. Prices are well maintained, except on black and galvanized sheets.

Old Material.—A Cleveland mill purchased 4000 to 5000 tons of machine shop turnings during the week at an average price of about \$7.85 a ton. Dealers have bought some scrap against these contracts at \$7.50, but some are now offering only \$7.25. This is a good advance over prices that have been prevailing here recently for local scrap that must find an outside market, but the mill price is well under the price at which Detroit scrap with a \$3 a ton freight rate can be delivered in Cleveland. The general tone of the market is weak. Blast

furnace scrap is 24 cents a ton lower, evidently reflecting the weakening in pig iron prices. The maximum price now is \$9.25, and although the supply is not plentiful at that price, distress material has sold as low as \$9. Dealers are now buying heavy melting steel scrap covering the specifications of a local mill at \$13.40, as compared with a recent price of \$13.60.

Prices per gross ton, deliv'd consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.00 to	\$13.25
No. 2 heavy melting steel.	12.50 to	12.75
Compressed sheet steel.	12.50 to	13.00
Light bundled sheet		
stamp'gs	11.50 to	11.75
Drop forge flashings.	11.50 to	11.75
Machine shop turnings.	7.25 to	7.50
No. 1 railroad wrought.	11.50 to	12.00
No. 2 railroad wrought.	13.50 to	13.75
No. 1 busheling.	11.00 to	11.25
Pipes and flues.	9.00 to	9.50
Steel axle turnings.	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops.	16.50 to	17.00
Low phos., billet, bloom and slab crops.	17.00 to	17.50
Low phos. sheet bar crops	16.50 to	17.00
Low phos. plate scrap.	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings.	9.00 to	9.25
Mixed bor'gs and short turn'gs	9.00 to	9.25
No. 2 busheling.	9.00 to	9.25
Cupola Grades		
No. 1 cast.	16.25 to	16.75
Railroad grate bars.	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable.	15.00 to	15.50
Rails for rolling.	16.25 to	16.50

RAILROAD EQUIPMENT

THE Erie Railroad has ordered 100 steel furniture cars and the Chicago & Eastern Illinois is inquiring for 100 automobile cars. The Norfolk & Western will rebuild 500 90-ton steel gondolas at its Roanoke shops. Details of the week's business follow:

Chesapeake & Ohio is inquiring for six gas-electric rail motor cars and five trailers.

Saginaw Logging Co., Saginaw, Mich., has purchased one 2-8-8-2 type locomotive from Baldwin Locomotive Works.

International Railways of Central America have ordered four 2-8-2 type locomotives from Baldwin Locomotive Works.

Chicago & Illinois Midland has ordered one 4-4-0 type locomotive from Baldwin Locomotive Works.

Erie Railroad has placed order for 100 steel furniture cars with Magor Car Corporation.

Norfolk & Western will rebuild 500 90-ton steel gondola cars at its Roanoke, Va., shops.

Cities Service Corporation, New York, has made inquiry for four tank cars.

Chicago & Eastern Illinois will buy 100 40-ft. automobile cars.

Wage Coal and Coke Scale Reduction

The H. C. Frick Coke Co., coal and coke subsidiary of the United States Steel Corporation, has posted notices of an adjustment in wage scales, effective July 1, the first change made by this company since Aug. 23, 1922.

No change has been made in the scale for pick mining, nor in the rate for outside day labor, but all other classifications have been reduced and will now draw wages slightly higher than the average of independent companies.

The adjustment has no significance outside of the coal industry. Since August, 1922, the company has been paying substantially the so-called Jacksonville wage scale without the check off and has been standing alone for more than a year in paying that scale, as the operators who formerly operated under an agreement with the union did not renew the arrangement with its termination on April 1, 1927. It was a recognition of the fact that its scale was unnecessarily high that prompted the revision. The official statement observes:

"The H. C. Frick Coke Co. has always paid and will continue to maintain its policy of paying the highest prevailing rate in the district in which it operates."

The United Engineering & Foundry Co., Pittsburgh, has completed at its Frank-Kneeland plant one of its new No. 130 slab shears. It is of the motor-driven, down cut, crank and pitman type with a cast steel knife head running in slides fitted with bronze liners. It has a speed of 12 cuts per min. and a stroke of 10 in. The pressure exerted between the knives, which have no rake and are 45 in. long, is 1,300,000 lb., capable of shearing a hot soft steel slab 6 in. thick and 40 in. wide.

Steel Furniture Business Far Ahead of Last Year

Orders for steel furniture in the "business group" in May were valued at \$3,085,365, against \$2,915,344 in April, according to reports received by the Department of Commerce from 33 manufacturers. May, 1927, showed only \$2,381,369. Sales of steel furniture in the "shelving group" in May were valued at \$732,921, compared with \$740,658 in April, according to reports received from 15 companies. In May, 1927, the total was \$686,144.

Shipments in the "business group" in May were valued at \$3,213,018, against \$3,065,637 in April, while unfilled orders at the end of May were valued at \$2,232,594, compared with \$2,359,877 at the end of April.

For the five months ended with May orders in the "business group" were valued at \$15,828,064, compared with \$13,812,453 for the corresponding period of last year, while shipments were valued at \$15,069,196 and \$13,876,272 respectively.

May shipments of shelving furniture were valued at \$768,562, against \$716,104 in April, and unfilled orders were valued at \$752,512 and \$793,903 respectively.

Orders in this group for the five months ended with May were valued at \$3,824,735, compared with \$3,232,206 for the corresponding period of last year, while shipments were valued at \$3,678,536 and \$3,117,543 respectively.

San Francisco

Shapes in Chief Demand—Concrete Bars Made Best Showing in First Half

SAN FRANCISCO, June 29 (By Air Mail).—Tonnage movement on the Pacific Coast during the first half of the year, with one exception, reinforcing steel bars, did not equal the volume for the first half of 1927. Mill representatives are, however, well satisfied in general with bookings. The unsatisfactory price structure applies both to plain material and to finished products. The outlook for the rest of the year is fair.

Building activity in Los Angeles is well maintained and during the first 20 days of the month 2100 permits were issued, with a valuation of \$6,878,087, compared with 2092 permits and a value of \$6,147,557 for the same period in June, 1927.

Pig Iron.—Little of importance has happened in the foundry iron market during the past week, both sales and inquiries involving relatively small lots. No change is noted in prices, which are as follows:

Prices per gross ton at San Francisco:	
*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00
**German fdy., sil. 2.75 to 3.25	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards this week did not exceed 400 tons. Bookings for the first half of the year, as reported each week in THE IRON AGE, aggregated 33,098 tons. The Pacific Coast Steel Co. secured 155 tons for the Sears-Roebuck Building at Tacoma, and 100 tons for a mausoleum in San Jose, Cal. Prices in the Bay district are slightly stronger and 2c. on out-of-stock material appears to be the general run now, fewer 1.80c. quotations coming out.

Plates.—Plate awards during the first half of the year were nearly a third less than the bookings for the corresponding period last year. This condition is due to the inactivity in the oil fields in California and also to the fact that several large pipe line projects went to reinforced concrete instead of riveted or welded steel. No awards of size were reported this week. Prices range from 2.25c. to 2.30c., the former figure applying to desirable tonnage.

Shapes.—The structural steel shape market continues to be the most active one on the Coast. Awards this week were light, only two projects of over 100 tons going through.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{8}$ -in. and over	3.15c.
Small angles, under $\frac{3}{8}$ -in.	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue ann'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.50c.
Struc. rivets, $\frac{1}{2}$ -in. and larger	5.65c.
Com. wire nails, base per keg	\$3.40
Cement c't'd nails, 100-lb. keg	3.40

The Wallace Bridge & Structural Steel Co. took 450 tons for a clinker storage warehouse for the Pacific Coast Cement Co. at Seattle; and Judson-Pacific Co. secured 270 tons for an addition to the Robert Dollar Building in San Francisco. For the first half of this year 87,075 tons of shape

and plate material were booked. Prices on plain shapes from domestic sources remain firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe has fallen off and awards this week totaled less than 500 tons. Bookings during the first half of the year totaled 41,834 tons, which approximated the tonnage placed during the same period a year ago. The U. S. Cast Iron Pipe & Foundry Co. took 115 tons of 8 to 20-in. centrifugal pipe for Seattle. The Gateway Concrete Pipe & Products Co., Holtville, Cal., were awarded 321 tons of 4 to 10-in. class B pipe for Holtville. Pending business does not exceed 1100 tons.

Coke.—Both sales and inquiries of coke were limited to small lots. Stocks in foundry yards appear sufficient to take care of present requirements.

Boston

Railroad Bridge Work to Take 15,000 Tons of Steel—Coke Price Unchanged

BOSTON, July 2.—Most of the pig iron orders taken in the past week called for car lots or special analyses. The aggregate tonnage was less than it has been for any similar period in months. Prices appear steadier, as there is little incentive to shade them. One foundry is inquiring in 1200 to 1500 tons of No. 2X and No. 1X. Otherwise there is no prospective business of importance. A large majority of the jobbing foundries report business as poor, but most of the large ones and the most important manufacturing foundries say it is better than a month ago. At the current rate of melt, New England foundries in general have sufficient iron on hand or on order to last into the third quarter, and some cases into the fourth.

Foundry iron prices per gross ton deliv'd to most New England points:

Buffalo, sil. 1.75 to 2.25	\$20.91 to \$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	24.15 to 24.65
Va., sil. 1.75 to 2.25	25.71
Va., sil. 2.25 to 2.75	26.21
Ala., sil. 1.75 to 2.25	22.41 to 24.27
Ala., sil. 2.25 to 2.75	22.91 to 24.77

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. announce that there will be no change in the price of by-product foundry coke in July. It remains at \$11 a ton, delivered within a \$3.10 freight rate zone. Both companies also report a decided improvement in the demand for such fuel. Shipments in the closing week of June were larger than for any similar period in almost a year. In explanation, it is said that a large number of foundries suddenly ran out of fuel. The New England iron melt has not increased perceptibly. Domestic fuel is moving in fair volume.

Shapes and Plates.—No important fabricating jobs have been awarded,

but there have been a large number of small lettings. With five new Boston & Maine Railroad bridges up for figures, indications are that approximately 15,000 tons of steel will be awarded within the next fortnight. Mills generally quote standard plates at 1.90c. per lb., base Pittsburgh, but fabricators claim that price could be shaded on a sizable tonnage. Bookings are only fair. Buying of plates continues on a hand-to-mouth basis, with 1.90c. per lb., base Pittsburgh, the going price on ordinary orders.

Cold-Rolled Strip.—Buying of cold-rolled strip steel is only fair. So far there has been no general third quarter buying. While most mills are endeavoring to obtain the equivalent to 3.30c. per lb., Worcester, for 1 to 3-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway round	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot pressed nuts	.50 and 5
Cold-punched nuts	.50 and 5
Stove bolts	.70 and 10

*Including quantity differentials.

ton lots, others have cut prices as low as 3.15c.

Warehouse Business.—New England warehouses did a larger business in June than in May, or in June, last year. This showing is all the more noteworthy in view of general business conditions and to the hand-to-mouth character of purchases from warehouse. Prices are firmer than a month ago, cuts being few and by small sellers. No reduction has been made in cold-finished stock, despite the cut in mill prices.

Cast Iron Pipe.—So far as can be ascertained the C. & R. Construction Co. has not placed the 4000 tons of 30-in. pipe required for its State contract. There is a possibility that steel pipe will be used. Portland, Me., is calling for bids on a sizable tonnage of 16-in. flexible-joint pipe, although the Government has not approved that city's plans. Lynn, Mass., is calling for bids on July 2 for 150 tons of 6-in. to 12-in. pipe. Private business is seasonally quiet. The price situation

remains unchanged. The market for 4-in. pipe is firm at \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and at \$41.10 to \$42.10 for 6-in. to 12-in. Larger pipe is still subject to concessions. The usual \$5 differential is asked for Class A and gas pipe.

Old Material.—Buying and selling continues on a small scale. Anticipated purchases of yard and No. 1 steel for export to Danzig did not develop, but is reasonably certain to come within a week or 10 days. The export movement has been held up by a lack of steamer space. Prices in general appear easy, although not actually lower, except in the case of No. 1 heavy melting steel and steel turnings. About the most that dealers will now pay for heavy melting steel is \$8.10 a ton, on cars shipping point. One of the eastern Pennsylvania mills is reported as buying directly and offering \$9 a ton, but no actual sales are reported in New England. The most that dealers will generally pay for steel turnings for steel

mill use is \$5 a ton, off 50c. less than a week ago, but \$5 to \$5.50 is paid where shipment is made to blast furnaces. New England foundries continue to take small tonnages of both textile cast and No. 1 machinery, the aggregate sales for the week running into several hundred tons.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$7.75 to	\$8.10
Scrap T rails.	8.00 to	8.50
Scrap girder rails.	7.50 to	8.00
No. 1 railroad wrought.	9.00 to	9.50
No. 1 yard wrought.	7.00 to	7.50
Machine shop turnings.	4.75 to	5.00
Cast iron borings (steel works and rolling mill).	5.25 to	5.50
Bundled skeleton, long.	5.00 to	7.00
Forge flashings.	6.50 to	7.00
Blast furnace borings and turnings.	5.00 to	5.50
Forge scrap.	5.50 to	6.00
Shafting.	12.00 to	12.50
Steel car axles.	14.50 to	15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to	7.50
Rails for rolling.	9.50 to	10.00
Cast iron borings, chemical	10.00 to	10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast.	\$13.50 to	\$14.00
No. 1 machinery cast.	14.00 to	14.50
No. 2 machinery cast.	12.50 to	13.50
Stove plate.	10.00 to	10.50
Railroad malleable.	13.50 to	14.50

Birmingham

One Blast Furnace Goes in and Another Is Ready—Steel Backlogs Maintained

BIRMINGHAM, July 2.—Pig iron sales are showing a gradual improvement following the recent price reduction. No marked movement has developed and the buying as a whole is steady. Some of the more important tonnages are still in abeyance, which is attributed largely to a carry over into July. Consumers appear to be satisfied with the new price of \$15.50 for No. 2 foundry iron. Shipments during the past week were off slightly. June shipments were a little ahead of those of the preceding month. The new No. 5 Fairfield furnace of the Tennessee company was blown in June 26 on foundry. The new No. 6 furnace at Fairfield is expected to be blown in by the middle of the month. Nineteen furnaces are now in blast. Of this number 11 are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	\$15.00 to 16.00

Finished Steel.—Operating backlogs are being well maintained in most lines. Inquiries vary from day to day, but are considered satisfactory as a whole. Prices show more steadiness than for several weeks. The minimum price on plates and shapes is now 2.05c., base, f.o.b. Birmingham. Structural steel fabricators and bar manufacturers report a noticeable increase in sales during the past week. The Ingalls Iron Works secured contracts for 3700 tons for a powerhouse at Mount Holly, N. C., for the Duke Power Co. and 250 tons for a hydroelectric plant at Watersville,

N. C., for the Phoenix Utility Co. The Tennessee company is now operating six open hearths at Ensley instead of seven. Five are in operation at Fairfield and the Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—Pressure pipe manufacturers experienced another quiet week from the standpoint of both sales and inquiries. The market has lapsed into a dull period every few weeks during the past five months. Plant operations are up to normal and shipments continue to run close to production. Prices show a tendency toward firmness, with quo-

tations at \$32 to \$33 for sizes of 6 in. and over.

Coke.—Most of the contract business for the last half has been placed. The spot market is only moderately active. Quotations remain unchanged, the base being \$5 for both spot and contract.

Old Material.—The market is still lacking in consumer interest and shows no indication of a change from the unusual dullness of the past three weeks. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.	\$8.50 to	\$9.00
Scrap steel rails.	11.00 to	11.50
Short shoveling turnings.	7.50 to	8.00
Cast iron borings.		8.00
Stove plate.		13.50
Steel axles.	19.00 to	20.00
Iron axles.	20.00 to	21.00
No. 1 railroad wrought.	10.00 to	10.50
Rails for rolling.		13.00
No. 1 cast.		14.25
Tramcar wheels.	12.50 to	13.50
Cast iron carwheels.	12.00 to	13.00
Cast iron borings, chem.	13.50 to	14.00

Buffalo

Mill Operations Average 80 Per Cent—Boat Shipments Reduce Local Scrap Demand

BUFFALO, July 2.—Little pig iron business has been placed recently. Inquiries are almost entirely for lots of 50 to 100 tons. The Massey-Harris Harvester Co. is still in the market for 1000 to 2000 tons for Batavia, N. Y., and Canada, and this seems to be the only outstanding tonnage. Shipments against old orders are good, and prices in this district, at \$17 for No. 2 plain and \$17.50 for malleable, appears to be firm. Twelve furnaces are in blast here.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.	17.50
No. 1X fdy., sil. 2.75 to 3.25.	18.50
Malleable, sil. up to 2.25.	17.50
Basic.	\$16.50 to 17.00
Lake Superior charcoal.	27.28

Finished Steel.—Mill operations continue to average about 80 per cent. Bars and shapes are fairly firm, but sheets are softer. On bolts and nuts the market is stable. Specifications for bolts and nuts are a shade lighter

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struct. shapes.	3.40c.
Soft steel bars.	3.30c.
Reinforcing bars.	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds.	3.95c.
Cold-rolled strip steel.	5.85c.
Black sheets (No. 24).	4.20c.
Galv. sheets (No. 24).	4.70c. to 5.05c.
Blue ann'd sheets (No. 10).	3.70c.
Com. wire nails, base per keg.	\$3.65
Black wire, base per 100 lb.	3.90

than last month, though orders and specifications from automotive companies exceed expectations. A considerable tonnage in small lots of reinforcing bars has been booked. Included was 400 tons for the caissons of the new Rand Building, Buffalo. Demand for bars from warehouse is heavier because mills are charging an extra on lots of 2 tons or less.

Old Material.—The outstanding feature of the market is the practically complete suspension for three weeks of all scrap shipments to the largest consumer in the district. Operations at this plant continue high, but boat shipments of scrap from Detroit are cutting into the business of local dealers. One consumer has bought 1000 tons of heavy melting steel at \$14.25, and stove plate has been sold at \$13.50. No. 2 steel has been purchased at a reported price of \$12.25. A small tonnage of No. 1 machinery cast has been sold at \$14 to \$14.25. The Michigan Central, Pennsylvania and Erie Railroad lists close the week of July 2. The tendency of the market is to soften.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.00 to \$14.25
No. 2 heavy melting steel.	12.25 to 12.75
Scrap rails	13.50 to 14.00
Hydraulic comp. sheets.	12.25 to 12.75
Hand bundled sheets.	8.50 to 9.00
Drop forge flashings.	12.00 to 12.50
No. 1 busheling.	12.25 to 12.75
Hvy. steel axle turnings.	12.00 to 12.50
Machine shop turnings.	7.75 to 8.25

Acid Open-Hearth Grades	
R'l'r'd knuckles and couplers	15.00
R'l'r'd coil and leaf springs	15.00 to 16.00
Rolled steel wheels.	15.00
Low phos. billet and bloom ends	16.00 to 16.50

Electric Furnace Grades	
Hvy. steel axle turnings.	12.00 to 12.50
Short shov. steel turnings.	10.00 to 10.50

Blast Furnace Grades	
Short shov. steel turnings.	10.00 to 10.50
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings.	9.50 to 10.00
No. 2 busheling.	9.00 to 9.25

Rolling Mill Grades	
Steel car axles.	15.50 to 16.00
Iron axles	12.00 to 12.50
No. 1 railroad wrought.	12.00 to 12.50

Cupola Grades	
No. 1 machinery cast.	14.25 to 14.75
Stove plate	13.00 to 13.25
Locomotive grate bars.	11.50 to 12.00
Steel rails, 3 ft. and under.	16.50
Cast iron carwheels.	12.00 to 12.50

Malleable Grades	
Industrial	15.00
Railroad	15.00
Agricultural	15.00

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struct. shapes.	3.25c.
Bars, soft steel or iron.	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).	4.45c.
Galv. sheets (No. 24).	5.25c.
Blue ann'l'd sheets (No. 10).	3.60c.
Black corrug. sheets (No. 24).	4.50c.
Galv. corrug. sheets.	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, $\frac{7}{8}$ -in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.	60
Less than 200 lb.	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.	60
Less than 200 lb.	50

St. Louis

Third Quarter Pig Iron Sales—Several Railroad Steel Inquiries

ST. LOUIS, July 2.—The principal pig-iron purchase of the week was 1200 tons by stove manufacturer in the district from the St. Louis Gas & Coke Corporation for third quarter shipment, and other stove foundries contributed to that maker's total of 2600 tons for the week. Most stove foundries in the district will close the first week in July for inventory, and then it is expected that they will resume on nearly full scale, when furnaces look for considerable buying from this source. An Indiana implement maker took 500 tons for third quarter and the only other sizable order of the week was 300 tons from an Iowa job foundry. Sales of Southern iron were light. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd.	19.92
Northern malleable, deliv'd.	20.16
Northern basic, deliv'd.	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Buying of coke is disappointing to the by-product ovens in the district. Dealers are acting slowly in laying in their winter's supply, and foundries are behind their contract schedules.

Finished Iron and Steel.—The Granite City Steel Co. reports that all of their departments are operating full except galvanized sheets, which is at 60 to 65 per cent of capacity. Incoming business in sheets shows some improvement, and that company is holding firm at recent new prices, although it is understood that some mills are cutting prices to get business. The Missouri Pacific and Missouri-Kansas-Texas Railroads are in the market for third-quarter requirements of plates, shapes and bars, and the St. Louis Southwestern Railroad has asked for prices on third quarter requirements of track bolts and track

spikes. Warehouse business is fair in the St. Louis industrial district, although not quite up to this period last year, but very little is coming from the oil fields, whose demand normally is large. Business with structural fabricators is light.

Old Material.—The market for scrap continues quiet, and there is little buying by consumers or by dealers, the latter having about covered on all contracts. Mills give no indications of buying anything soon except small tonnages here and there to fill out. Heavy melting steel, heavy shoveling steel, railroad springs, No. 2 railroad wrought, No. 1 busheling, steel car axles, No. 1 railroad wrought, steel angle bars, and cast iron car wheels are 25c. a ton lower, and machine shop turnings, wrought iron bars and transoms are 50c. lower. Relaying rails of 60 to 90-lb. weights are in fairly good demand from the coal fields. Railroad lists include: Chicago, Burlington & Quincy, 4500 tons; Big Four Lines, 1000 tons; Missouri Pacific Railroad, 160 carloads; Mobile & Ohio, 26 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.	\$10.75 to \$11.25
No. 1 locomotive tires.	12.00 to 12.50
Heavy shoveling steel.	10.75 to 11.25
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart.	12.25 to 12.75
Railroad springs.	13.25 to 13.75
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought.	11.00 to 11.50
No. 1 busheling	9.50 to 10.00
Cast iron borings.	8.75 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings.	6.50 to 7.00
Steel car axles.	17.25 to 17.75
Iron car axles.	25.50 to 26.00
Wrot. iron bars and trans.	18.50 to 19.00
No. 1 railroad wrought.	9.75 to 10.25
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars.	11.50 to 12.00
Cast iron carwheels.	13.00 to 13.50
No. 1 machinery cast.	13.00 to 13.50
Railroad malleable	11.25 to 11.75
No. 1 railroad cast.	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricult. malleable.	12.00 to 12.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Youngstown

Numerous Holiday Week Suspensions—Bar Iron Mill Wages Advanced

YOUNGSTOWN, July 2.—Iron and steel production schedules in the Mahoning Valley reach a low point of the year in this week, because of suspensions for the Independence Day observance. All of the non-integrated sheet rollers in the upper-Mahoning Valley area will be idle for the week.

The Republic Iron & Steel Co. will operate its strip mills at the Warren property, but its sheet and tin plate units will be idle. Operation of finishing mills of the Youngstown Sheet & Tube Co. will be at a low ebb. The Carnegie Steel Co. suspends for the Fourth only, resuming Thursday with 75 per cent operations. Some finish-

ing mills will remain idle until Thursday morning, when they will be started. The A. M. Byers Co. will operate its Trumbull county plants three turns for three days, with puddle mills at 55 per cent. Sharon Steel Hoop Co. suspends for the entire week.

The Newton Steel Co., maker of highly finished steel sheets used largely in the automobile trade, suspends the week of the Fourth for repairs and overhauling. The company still has a considerable volume of unfilled business on its books. Earnings the first four months were at the annual rate of \$10 per common share.

Steel companies will take advantage of the suspensions to make the usual needed mid-year repairs to rolling mill equipment and to furnaces.

For July-August, tonnage rates paid boilers and finishing hands in mid-Western puddle and rolling mills

advance 1½ per cent, as a result of the bi-monthly settlement in Detroit. The average selling price of bar iron shipped during the 60 days ended June 20 was disclosed at \$1.90 per 100 lb., as compared with \$1.85, at the previous examination of sales sheets.

Canada

Demand for Foundry and Malleable Pig Iron Improves— Structural Steel Outlook Promising

TORONTO, ONT., July 2.—During the last week of June the demand for foundry and malleable pig iron in the Canadian markets improved. Developments centered chiefly around third quarter contract placing, and a number of good orders were taken. It is estimated that about 60 per cent of the regular contract buyers are covered to the end of September, and about 10 per cent of the remainder have placed contracts to take care of their needs to the middle of August. Third quarter contracts were closed at prevailing prices, and at the moment there is little prospect of advances. Spot sales are being maintained at a steady level. Spot demand during June compared favorably with that of April and May. Prices are firm but unchanged.

Prices per gross ton:

	Delivered Toronto	
No. 1 fdy., sil.	2.25 to 2.75	\$23.10 to \$23.60
No. 2 fdy., sil.	1.75 to 2.25	23.10 to 23.60
Malleable	.....	23.10 to 23.60
	Delivered Montreal	
No. 1 fdy., sil.	2.25 to 2.75	24.50 to 25.00
No. 2 fdy., sil.	1.75 to 2.25	24.50 to 25.00
Malleable	.....	24.50 to 25.00
Basic	.....	23.50 to 24.00
	Imported Iron, Montreal Warehouse	
Summerlee	.....	33.50
Carron	.....	33.00

Structural Steel.—Improvement in business has followed the return of structural steel workers to their jobs. Delivery on old contract account has been resumed and many buildings that were held up are now going ahead and builders are trying to make up for the time lost. A strong demand is reported for structural steel and reinforcing bars in the Toronto and Montreal markets. Orders for upward of 5000 tons were closed during the week and between 25,000 and 40,000 tons is pending. For an office building to be erected by L. J. Wookey, Foy Building, Toronto, 3000 tons of structural steel will be required. Approximately 4000 tons of structural steel and 2000 tons of reinforcing bars will be needed in connection with building program for the Royal Hotel and Terminal Syndicate, Hamilton, Ont., of which F. G. Engholm, Bloor Building, is engineer. For the proposed printing plant at Calgary, Alta, for the Alberta Publishing Co., 1000 tons of structural steel and 500 tons of reinforcing bars will be needed. The Dominion Bridge Co., Winnipeg, Man., and the Hamilton Bridge Co., Hamilton, Ont., have the contract to supply approximately 6000 tons of structural steel for the new assembly plant at Regina, Sask., for General Motors of Canada, Oshawa, Ont.

Old Material.—With the exception of a few orders for third quarter delivery, business shows practically no change from that of the past week or two. Some interest is shown in materials for third quarter, but the majority of consumers prefer the hand-to-mouth method of buying. Orders for steel scrap from the Hamilton, Ont., district ran a good tonnage during the week, and several large orders for machinery cast, malleable scrap and wrought iron were received from

buyers throughout the province. In the Montreal market dealers report a steady demand for heavy melting steel, machinery cast, wrought iron and steel axles and standard car wheels. For the fiscal year ended March 31, exports of iron and steel scrap totaled 76,147 tons, compared with 68,395 tons for the corresponding period ended March 31, 1927.

Dealers' buying prices:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00	
Rails, scrap	10.00	9.00	
No. 1 wrought.....	9.00	11.00	
Machine shop turnings..	7.00	5.00	
Boiler plate	7.00	6.00	
Heavy axle turnings....	7.50	6.50	
Cast borings	7.50	5.00	
Steel turnings	7.00	5.50	
Wrought pipe	5.00	5.00	
Steel axles	14.00	20.00	
Axles, wrought iron....	16.00	22.00	
No. 1 machinery cast....	.....	16.00	
Stove plate .....	.....	13.00	
Standard carwheels .....	.....	16.00	
Malleable .....	.....	13.00	
	Per Net Ton		
No. 1 machinery cast....	15.00	....	
Stove plate	9.00	....	
Standard carwheels	13.00	....	
Malleable scrap	13.00	....	

Detroit

Not Meeting Usual Summer Slump in Automobile Demand —Oakland to Expand Foundries

DETROIT, July 2.—Automobile production totals for June will differ probably not a great deal from May figures, some companies increasing production slightly and others slowing off somewhat.

Industrial employment in this area, according to the Employers' Association Index under date of June 19, fell off 273 from the figure of the week previous. The total as of June 19 stands at 263,197, which includes two-thirds of the city's working population. This figure compares with 191,303 in the corresponding week a year ago.

The production totals for the first five months of this year for Cadillac Motor Car Co. stand at 17,437 units, which is an increase of 39 per cent over the production for the similar period of 1927.

Charles F. Barth, general manager, announced June 26 that the minimum production scheduled by the Chevrolet Motor Co. for July, August and September had been set at 100,000 cars a month, as his company had failed to meet the usual buying slump noted at this time of year. The highest single day's production of Chevrolet units was attained May 28, with a score of 7075. It is certain that the Chevrolet company in the first half of 1928 will show the greatest production in its history.

The Ford Motor Co.'s production of model A stands somewhere between 2800 and 3000 units per day. The highest single day's production was that of June 11, showing in excess of 3000 units. For the week ended June 20, Ford company's employment showed 115,967, a decrease from the week previous, when the total stood at 117,200.

An additional group of foundry buildings will be constructed at Pontiac by the Oakland Motor Car Co., as increased capacity for Oakland and Pontiac cars. Work on this group will start immediately and will include six buildings, totaling 200,000 sq. ft. of floor space. The foundry unit will employ about 700 men.

The Packard Motor Car Co. has closed down for its vacation period of two weeks. Changes and alterations will be made to increase capacity over the standard figure of 4600 cars a month.

The weekly output of Willys-Overland Co. for the last three weeks has exceeded 10,000 units. This company enters July with approximately 20,000 unfilled orders on the books.

General Motors' sales for the current quarter have been in excess of 200,000 units a month. May sales stand at 207,325 units, with March and April just below the 200,000 mark. Sales for the first six months are better than 1,000,000 units.

The truck division of Dodge Brothers, Inc., reports 3000 unfilled orders for the new six-cylinder line, and production schedules have been increased.

The Fisher Body Corporation set a new high record for production on April 20, with a daily output of 7280 bodies.

Auto-body sheet stands at 4c., Pittsburgh, with blue annealed sheet from 2 to 2.10c., Pittsburgh. Cold finished bars are quoted at 2.10c., Pittsburgh, hot rolled 3 in. and narrower, 2.20c. to 2.30c., Pittsburgh, 3 to 6 in., 1.85c. to 2.10c., Pittsburgh,

with 6 in. and wider, 1.75c. to 1.90c., Pittsburgh. Bars, plates and shapes remain at 1.85c. to 1.90c., Pittsburgh.

There have been no large sales of scrap during the past week. Shipments by producers in July will be below those of last month. Prices are as quoted week ago.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:	
Hvy. melting and shov. steel	\$11.00 to \$11.50
Borings and short turnings	7.00 to 7.50
Long turnings	5.75 to 6.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 6.50
Flashings	9.00 to 9.50

Cincinnati

Pig Iron Business Almost at Standstill But Steel Buying Improves in Spots

CINCINNATI, July 2.—Weakness in prices and the usual seasonal decline in foundry operations have had a depressing effect on pig iron sales, which have been almost at a standstill. The only sizable order in the past week was for 500 tons of foundry iron for the Louisville & Nashville. With the exception of an inquiry for 2000 tons of foundry iron from a Hamilton, Ohio, melter, pending business is of little consequence. Southern iron is quoted at \$15.50, base Birmingham, but users are reluctant to make forward purchases in view of the uncertainty regarding the trend of their production in the next two months and of the likelihood that they may buy at the present price throughout the third quarter. Southern Ohio iron is selling at \$18, base Ironton, with occasional dips of 50c. a ton. Lake Erie furnaces are reported to be accepting orders in competitive territory at from \$16 to \$16.50, base furnace. Jackson County silvery is unchanged at \$25, base Jackson, for 8 per cent.

Prices per gross ton, deliv'd Cincinnati:	
So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—The underlying tone of the market is slightly stronger than a week ago, although specifications against old contracts still are lagging somewhat and consumers are hesitant about signing third-quarter contracts for bars, structural shapes and plates at the new schedule of 1.90c., base Pittsburgh. Steel companies report that from 30 to 40 per cent of their customers have signed up for their requirements over the next 90 days at that figure. Sales of bars have been holding up well, and much of the tonnage has been taken by agricultural implement manufacturers, who are operating practically at capacity. Structural steel has been quiet, because of the dearth of sizable jobs in this district. In fact, most fabricators have been compelled to curtail production on account of the lack of orders. While prices of sheets have not dropped further in the past week, the situation has not improved. Galvanized sheets for roofing purposes

are selling in the South at from 3.30c. to 3.50c., base Pittsburgh, with 3.40c. prevailing as a common average. On metal furniture sheets mills have quoted 3.85c. to 3.90c., base Pittsburgh, on No. 24 gage, A grade, but have made concessions of from \$2 to \$3 a ton to large users. Blue annealed and automobile body sheets, on the other hand, have been fairly well stabilized at 2c. and 4c., base Pittsburgh, respectively. Bookings of district mills have approached 80 per cent of capacity, while operations are being carried on at about 90 per cent. Specifications from the automobile industry have been sustained at a satisfactory rate, and demand for special enameled stock has been good. There has been a recession in orders for wire goods, the decrease being largely of a seasonal character. Common wire nails continue to be quoted at \$2.50 per keg, base Ironton, and plain wire at \$2.40 per 100 lb., base Ironton.

Reinforcing Bars.—The Pollak Steel Co. will supply 188 tons of rail steel bars for an addition to the plant of the Andrew Juergens Co., Cincinnati, and 133 tons for a building to be erected in Detroit by the Swift Packing Co. Awards of from 25 to 100 tons of bars have been numerous. Prices are firm, with new billet bars quoted at 1.85c. to 1.90c., base Pittsburgh, and rail steel stock at 1.80c., base mill.

Warehouse Business.—Sales in June were slightly better than those during May, although two important jobbers report a falling off in business in the past month. Soft steel and iron bars lead in volume of orders, with

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforce. bars	3.15c.
Rail steel reinforce. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'd sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.95
Cement c'd nails, base 100 lb. keg	2.95
Chain, per 100	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel b'l'r tubes, 2-in.	19.00
4-in.	39.00

structural shapes and plates closely following. Demand for steel boiler tubes and for steel pipe has been fair. There has been no change in prices. The decline in sheet quotations in other markets has not affected schedules locally, and jobbers are of the opinion that present prices are not likely to be disturbed.

Coke.—For shipment from Ashland, Portsmouth and Indianapolis, by-product foundry coke will remain at \$7 per net ton, f.o.b. ovens, during July. Domestic grades also will be unchanged, with egg size at \$4.50, ovens, walnut, \$3.50, and No. 2 nut, \$3. At Detroit, by-product foundry coke is selling this month at \$9, delivered in the local switching district, and for outside shipment the average delivered price is \$10. Domestic coke in egg and nut sizes continues at \$5.50, ovens, for delivery outside of Detroit and at \$6, delivered in Detroit. The Louisville & Nashville has purchased 480 tons of beehive foundry coke from a Wise County producer. The Procter & Gamble Co., Cincinnati, is inquiring for 5000 tons of furnace coke for its local plant. Shipments of by-product foundry in June were about 5 per cent less than in May.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, \$9.02; Wise County coke, \$7.09 to \$7.59; New River coke, \$9.09 to \$9.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—Consumers are buying sparingly, although a pick-up in sales is expected in the next two weeks. Cast iron borings, machine shop turnings and cast iron carwheels are down 25c. a ton, but other items are holding firm. Railroad lists closing this week include the New York Central, 8000 tons, Virginian, 800 tons, and Big Four, 2200 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	\$10.75 to \$11.25
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	7.50 to 8.00
Machine shop turnings	7.00 to 7.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

The National Industrial Conference Board, Inc., 247 Park Avenue, New York, has published a book entitled "Employee Stock Purchase Plans in the United States," which is the result of a comprehensive survey of all the different types of stock ownership systems that are or have been in use in the United States. The volume was prepared by Margaret L. Stecker and assistants under the supervision of the board's economic council. Companies engaged in the making of steel or fabrication of products from steel figure largely in the various plans discussed.

Non-Ferrous Metal Markets

Fairly Large Sales of Tin But Under Those of Preceding Week—Both Tin and Zinc Slightly Higher

Copper.—Demand continues exceedingly light both from foreign and domestic consumers and the week has been an uneventful one. Sales have consisted mostly of small lots. Quotations continue very firm, electrolytic copper being quoted at 14.75c., delivered in the Connecticut Valley, with Copper Exporters, Inc., still holding at 15c., c.i.f. European ports. Lake copper is quoted at 14.87½c., delivered, in a quiet but steady market.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commercial grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	31.50c. to 32.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c.
Tin, bar	56.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.75c.
Lead, American pig.....	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	55.50c.
Solder, ½ and ½.....	30.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 2	June 30	June 29	June 28	June 27
Lake copper, New York.....	14.87½	14.87½	14.87½	14.87½	14.87½
Electrolytic copper, N. Y.*....	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	46.12½	46.12½	47.32½	47.00	46.92½
Lead, New York.....	6.30	6.30	6.30	6.30	6.30
Lead, St. Louis.....	6.15	6.15	6.15	6.15	6.15
Zinc, New York.....	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis.....	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price ¼c. higher.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 14.87½c., delivered. The average price of electrolytic copper was 14.50c., refinery, or 14.75c., delivered in the Connecticut Valley.

Tin.—For the week ended Saturday, June 30, sales of tin were about 1200 tons, which is considerably lighter than the turnover of 1700 tons for the week previous. The interesting feature is that about half of the tin sold was taken by consumers. Toward the end of the week the tone of the market was better because many felt that the bottom had been reached. Today, Monday, this conviction was not quite so firm and the market was dull and

weaker, with spot Straits tin quoted at 46.12½c., New York. Prices in London today were considerably lower than a week ago, with spot standard quoted at £211 15s., future standard at £208 7s. 6d., and spot Straits at £214. The Singapore price today was £215 2s. 6d. Statistics for June show total deliveries into consumption in the United States at 6950 tons, with 2148 tons reported in stock and landing on June 30. The world's visible supply on July 1 was 16,231 tons, a decrease of 833 tons from the previous month. This was considered favorable in view of the large Straits shipments in June of 8516 tons. Banca shipments last month were small at 806 tons, and Chinese shipments were only 10 tons, which helped to create

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since May 25. Zinc sheets have been quoted at 9.25c., base, since the advance of June 7, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.25c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.

Rods—	
High brass	17.00c.
Naval brass	19.75c.

Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of river.

Sheets, 0 to 10 gage, 3 to 30 in. wide		33.00c.
Tubes, base		42.00c.
Machine rods		34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.25c.	8.50c.
Brass, light	6.25c.	7.75c.
Hvy. machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	8.50c.	9.375c.
No. 1 red brass or compos. t'ngs	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	19.25c.	
Copper, hot rolled.....	23.50c.	
Copper, cold rolled, 14 oz. and heavier	25.75c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	25.62½c.	
Copper	26.50c.	
Brazed Brass Tubes.....	27.25c.	
Brass Rods	17.00c.	

a decrease in the visible supply. It is reported that the Banca shipments for the first half of July will be more than the June total. Another report today is that Straits shipments in July will reach 9000 tons, a factor in the weaker tone of the market today. Sales in the Far East, which have been conspicuous recently, were light last week, except on June 29, when they were about 400 tons.

Lead.—Prices are unchanged and the market has been quiet, with demand only moderate. The quotation of the leading interest continues at 6.30c., New York, as the contract price, with 6.15c., St. Louis, the prevailing level in the outside market.

Zinc.—Advance orders on the books of producers are reported to be the lowest in many months. It is pointed out that buyers of prime Western zinc are pursuing the familiar hand-to-mouth policy in the expectation of lower prices. Producers are making no concessions, quotations having advanced five points to 6.20c., East St. Louis, or 6.55c., New York. Both demand and inquiry are not large. Ore at Joplin was unchanged Saturday at \$40 a ton, at which about 7000 tons was sold, with production

about 11,000 tons, both practically unchanged from the week previous.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Chinese metal is quoted unchanged at 9.50c. to 9.75c., New York, for all positions, with demand light.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 2.—Sales are individually small. Prices for copper are strong, but quotations on tin and antimony are lower. The old metal market is dull.

Prices, per lb., in carload lots: Lake copper, 14.75c.; tin, 48.50c.; lead, 6.25c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

trestle and head frame for Montreal Mining Co., to Worden-Allen Co.

FORDSON, MICH., 520 tons, soaking pit building for Ford Motor Co., to Massillon Bridge & Structural Co.

MADISON, WIS., 300 tons, motor-bus terminal and headquarters building for Wisconsin Power & Light Co., to Worden-Allen Co.

MENOMINEE, WIS., 1000 tons, bridge, to Wisconsin Bridge Co.

CHICAGO, 1600 tons, Marshall Field Estate development, to Duffin Iron Co., local.

CHICAGO, 3500 tons, Austin High School, to McClintic-Marshall Co.

POWERTON, ILL., 150 tons, building for Super Power Co., to Mississippi Valley Structural Steel Co.

LAPORTE, IND., 200 tons, building for United States Slicing Machine Co., to American Bridge Co.

JONES COUNTY, IOWA, 130 tons, highway bridge, to unnamed bidder.

MINNEAPOLIS, 140 tons, building for Zinsmeyer Baking Co., to Minneapolis Steel & Machinery Co.

KANSAS CITY, MO., 2200 tons, Chevrolet assembly plant, to Kansas City Structural Steel Co.

GARLAND CITY, ARK., 500 tons, bridge for St. Louis Southwestern, to Virginia Bridge & Iron Co.

SAN FRANCISCO, 270 tons, Dollar Building addition, to Judson-Pacific Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

SACO, ME., 1500 tons, two Boston & Maine bridges.

SALMON FALLS, ME., 500 tons, Boston & Maine bridge.

HAVERHILL, MASS., 1000 tons, Boston & Maine Railroad bridge.

BOSTON, 200 tons, Packard Motor Co. service station.

STATE OF VERMONT, 500 tons, highway bridges.

HARTFORD, CONN., 600 tons, Memorial Hall.

NEW YORK, 500 tons, building for American Bank Note Co. at Hunt's Point.

NEW YORK, 3000 tons, apartment building at Park Avenue and Fifty-eighth Street.

NEW YORK, 2500 tons, hospital at 471 Central Park West.

NEW YORK, 2000 tons, apartment building at Park Avenue and Seventy-first Street.

NEW YORK, 1500 tons, apartment building at Central Park West and Ninety-fourth Street.

NEW YORK, 1000 tons, apartment building in East End Avenue.

NEW YORK, 500 tons, building for Kresge & Co. on Third Avenue.

BROOKLYN, 3500 tons, Samuel Tilden High School.

STATE OF NEW YORK, 300 tons, highway bridges.

ONEONTA, N. Y., 500 tons, building for Hartwick College.

BUFFALO, 1000 tons, Bailey Avenue bridge; bids taken.

CLEVELAND, 200 tons, building for Federal Foundry Supply Co.

MELVILLE, LA., 4200 tons, bridge for Texas & Pacific Railroad.

CHICAGO, 760 tons, building for Miehle Printing Press & Mfg. Co.

CHICAGO, 400 tons, Kresge store.

CHICAGO, 600 tons, printing plant for R. Law.

MISSOURI PACIFIC RAILROAD, 500 tons, bridge.

OMAHA, NEB., 500 tons, addition to office building of Union Pacific Railroad.

OKLAHOMA CITY, OKLA., 650 tons, highway bridge.

Fabricated Structural Steel

Miscellaneous New York Jobs Take Nearly Half of 42,000 Tons Awarded—New Projects Will Require 28,900 Tons

MORE than 15,000 tons of the 42,000 tons of fabricated structural steel reported placed in the last week will go for miscellaneous work in New York, principally apartment buildings. Other large jobs placed were a power house at Mount Holly, N. C., calling for 3700 tons, and a Chicago high school, which will take 3500 tons. Outstanding among new projects, which call for 28,900 tons, are 4200 tons in a bridge for the Texas & Pacific Railroad, 3500 tons for a high school in Brooklyn and 3000 tons for a New York apartment building. Awards follow:

BOSTON & MAINE RAILROAD, 400 tons, bridges, to Boston Bridge Works, Inc.,

STATE OF VERMONT, 200 tons, highway bridges, to Bethlehem Steel Co.

NEW YORK, 13,700 tons, in the following awards as reported to the Structural Steel Board of Trade: Addition to Lord's Court Building at Exchange Place and William Street, bakery in Westmoreland Avenue at White Plains, N. Y., and apartment buildings at Madison Avenue and Seventieth Street, 171 East Seventy-ninth Street, 343 East Fifty-seventh Street, 317 East Fifty-seventh Street, Lexington Avenue and Seventy-fifth Street, Madison Avenue and Seventy-fifth Street, 200 East Sixty-eighth Street and 36 West Sixty-seventh Street, to Hedden Iron Construction Co.; alteration to Mechanics Bank at Court and Montague Streets in Brooklyn, synagogue at 721 West Eighty-third Street, and Brooklyn Eye and Ear Hospital at Grand Avenue and Cumberland Street, to George A. Just Co.; Roerich Museum at Riverside Drive and 103rd Street, to Taylor-Fichter Steel Construction Co.

NEW YORK, 500 tons, professional building on East Sixty-first Street, to Bethlehem Steel Co.

BROOKLYN, 1000 tons, theater, to Hedden Iron Construction Co.

JERSEY CITY, 500 tons, building for Pennsylvania Railroad, to Belmont Iron Works.

DEERWATER, N. J., 6000 tons, power station for United Gas Improvement Co., Philadelphia, to McClintic-Marshall Co.

ALLENTOWN, PA., 180 tons, Bell Telephone building, to Lehigh Structural Steel Co.

PHILADELPHIA, 660 tons, dormitories at Girard College, to American Bridge Co.

PHILADELPHIA, 645 tons, building for Drexel Institute, to American Bridge Co.

STATE OF NEW JERSEY, 135 tons, bridge, to Phoenix Bridge Co.

BALTIMORE & OHIO RAILROAD, 250 tons, bridges, to American Bridge Co.

SPARTANBURG, S. C., 1000 tons, building for Drayton Mills, to Carolina Iron & Steel Co.

MOUNT HOLLY, N. C., 3700 tons, power house for Duke Power Co., to Ingalls Iron Works, Birmingham.

WATERSVILLE, N. C., 250 tons, hydroelectric plant for Phoenix Utility Co., to Ingalls Iron Works Co.

LOUISVILLE, KY., 250 tons, caissons for bridge across Ohio River, to St. Louis Structural Steel Co.

PITTSBURGH, 1100 tons, Pittsburgh Coal Co. washer building, to Pittsburgh Engineering & Construction Corporation.

MASSILLON, OHIO, 120 tons, manufacturing building for Central Alloy Steel Corporation, to Massillon Bridge & Structural Co.

TOLEDO, OHIO, 300 tons, Nurses Home, to American Bridge Co.

IRONWOOD, MICH., 500 tons, stockpile

Japan Expands in Manchuria

To Build Oil Shale Recovery Plant at Fushun—Anshan Works Projects Blast Furnace

IN view of the political situation in China and the prospects of an early difference of opinion between the Chinese Nationalists and the Japanese Government over control in Manchuria, something of Japanese investment in that territory and need for its resources is perhaps noteworthy.

The South Manchuria Railway Co., the most important Japanese interest in Manchuria, has recently received reports on the present status of oil shale and the iron industry of that country, from which the following has been taken: The annual production of crude oil in Japan proper amounts to only about 280,000 to 290,000 tons. The production of oil from shale excavated in Manchuria would mean, it appears, the prolongation of the life of Japan's crude oil production by 22 to 23 years, as the average consumption of the country is 1,700,000 tons of heavy oil.

The shale deposit at the Fushun collieries amounts to about 5,400,000,000 tons, with an estimated crude oil content of 5.5 per cent, and it is calculated that this deposit would provide a total of about 200,000,000 tons of heavy oil. This shale is not subject to oil recovery at present, but in January of this year it was decided to establish an oil refining plant at Fushun with an annual capacity for treating 1,360,000 tons of oil shale, about 4000 tons a day. Preparations are proceeding for completing this plant and by the end of July, 1929, the plant is expected to be completed. Meanwhile orders are being placed for machinery required in the various departments of the plant and for other construction work.

Anshan Works Expanding

To reduce Japan's dependence upon other countries for supplies of iron,

a program of expansion has been projected at the Anshan Steel Works in Manchuria, a plant owned by the South Manchuria Railway Co. An appropriation of 5,500,000 yen (\$2,640,000) has been made for construction in 1928 and 1929, which will increase the production of the plant from 200,000 tons of pig iron annually to about 280,000 tons.

The new construction includes the erection of a modern 500-ton blast furnace in addition to the two 300-ton furnaces now in operation. The old furnaces will have their capacities increased to 350 tons a day.

In this connection, it is noteworthy that while Japan has some coal, although not sufficient for all requirements, there is almost no iron ore available in the country. To supply the demand, iron ore is imported from Central China and the South Seas. The Anshan district in Manchuria, however, is exceedingly rich in iron ore with estimated deposits of 300,000,000 tons with an average metal content of 35 per cent iron.

REINFORCING STEEL

OUTSTANDING among new projects totaling 5000 tons, which have been reported during the last week, is a drainage improvement job at Los Angeles requiring 2300 tons. The following awards involve about 2300 tons:

BOSTON, 400 tons, North Station, to Barker Steel Co.
DEDHAM, MASS., 125 tons, bridge, to Barker Steel Co.
FALL RIVER, MASS., 100 tons, coal pocket, to Barker Steel Co.
LONG ISLAND CITY, N. Y., 250 tons, building for Bayonne Steel Ceiling Co., to Truscon Steel Co.
CINCINNATI, 188 tons, addition to plant of Andrew Juergens Co., to Pollak Steel Co.
DETROIT, 133 tons, building for Swift Packing Co., to Pollak Steel Co.
SEWICKLEY, PA., 150 tons, Pennsylvania Railroad work, to Kalman Steel Co.
CHICAGO, 280 tons, Chicago Woman's Club, to an unnamed bidder.
CHICAGO, 150 tons, Sacred Heart Academy, to Barton Spiderweb System.
CHICAGO, 125 tons, apartment building on Sherwin Avenue, to Concrete Engineering Co.
CHICAGO, 200 tons, Chapin Studios, to Joseph T. Ryerson & Son.
MASON CITY, IOWA, 100 tons of rail steel bars, industrial plant, to Republic Iron & Steel Co.
CHICAGO, 120 tons, of rail steel bars, Chicago Arms apartment building, to Concrete Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 300 tons, Packard Motor Co. service station addition.
CAMBRIDGE, MASS., 150 tons, hospital.
NEW YORK, 100 tons, Queens Vocation School at Queens Village, L. I.
CHICAGO, 100 tons, garage at Twenty-sixth Street and Michigan Avenue.

CHICAGO, 100 tons, factory building on Ogden Avenue.
CHICAGO, 250 tons, garage at Wabash Avenue and Harrison Street; Alfred S. Alschuler, architect.
CHICAGO, 300 tons, printing plant for William J. Igoe.
CHICAGO, 450 tons, Sheridan Towers.
CHICAGO, 450 tons, Harmon sports arena.
MILWAUKEE, 135 tons, bridge; bids close July 12.
ST. LOUIS, 380 tons, hotel at Twelfth and Locust Streets; McKelvey-Carter Construction Co., general contractors.
LOS ANGELES, 2288 tons, Drainage Improvement District No. 26; bids July 16.

British Market Depressed and Mills Urge Government Aid

LONDON, ENGLAND, June 22.—With the exception of one or two markets, particularly tin plate, there has been no improvement in the iron and steel industry. British steel makers are still pressing for some form of government aid, especially urging the inclusion of iron and steel under the Safeguarding of Industries act, and in this connection a deputation of steel makers waited on the Prime Minister on June 20. It was pointed out that the industry is operating on a day-to-day basis of 60 to 70 per cent of capacity, that of the material used in ship construction only about 20 per cent is foreign steel, and that upward of 80 per cent of the shipbuilders have adopted the British steel makers' rebate offer. Mr. Baldwin, however, again made it quite clear that the policy of the government would not be changed during the existence of the present Parliament, and referred the deputation to the government's relief of rates plan. At the same time the Chancellor of the Exchequer received

a similar deputation from the North East Coast, and promised to place the request before the Cabinet.

Meanwhile, demand is generally poor. With the exception of the Cleveland furnaces, the pig iron market is depressed. Cleveland makers, fortunately, have fairly well filled order books, but the volume of new business is not in proportion to the orders being executed.

In other districts, the situation is worse, and in Scotland three furnaces are being blown out, making less than 30 blast furnaces in blast out of a total of 100. Hematite iron is also depressed and makers are burdened with heavy stocks. On the northeast coast one more furnace has been blown out. Curtailment of output is the result of poor demand, as foreign iron is no longer competitive.

In semi-finished material conditions are better, as the Welsh makers of sheet bars are fully occupied in supplying tin plate mills and the market is strong because of the shortage of steel scrap.

The heavy steel industries are in a worse position than for some time. New shipbuilding contracts are negligible, and export demand for plates and shapes is at a low level. Lighter material is moving fairly freely, but the bulk of the tonnage needed is for the heavy mills. Business in Continental material has been on a small scale. What business has been done appears to have been transacted by the Continental mills direct with overseas buyers.

The David Joseph Co., Cincinnati scrap iron dealer, has decided to abandon its Cincinnati yards and is dismantling its equipment there. It will retain its yards at Youngstown, Portsmouth, Ohio, and Ashland, Ky.

PERSONAL

BLAINE S. SMITH has resigned as vice-president of the Universal Portland Cement Co. (Steel Corporation subsidiary) to become president of the Pennsylvania-Dixie Cement Corporation, succeeding John A. Miller, who becomes chairman of the board. Mr. Smith had been connected with the Universal Portland Cement Co. since 1908. In 1915 he was made general sales manager and later vice-president.

COL. HARRY C. WILDER, on Aug. 1, will resign as director of sales for the Northern New York Utilities, Inc., Rome, N. Y., and will join the Rome Wire Co. in charge of public utilities sales.

T. H. SCAFFE, for some time associated with the Detroit branch of the United States Electrical Tool Co., Cincinnati, has been appointed district manager in that city. R. N. Brayer, previously identified with the Boyer-Campbell Co., Detroit jobber, has been added to the Detroit personnel of the Electrical Tool company.

A. J. FORSCHNER, for some time sales manager in charge of the sand, gravel and stone department of the R. H. Beaumont Co., Philadelphia, has been appointed vice-president of the Atlas Conveyor Co., Inc., 20 South Fifteenth Street, Philadelphia. He was formerly president of the Alfred J. Forschner Co., distributor of power scrapers and slack line excavators. The Atlas company plans to extend its activities to include the manufacture of drag scrapers for excavating sand and gravel.

FRANCIS A. EMMONS, sales and advertising manager of the Foote Brothers Gear & Machine Co., Chicago, has been elected president of the Engineering Advertisers' Association of Chicago.

E. T. CORBUS, formerly with Edgar T. Ward's Sons Co., Boston, is now located at the Pittsburgh office, and has been succeeded in Boston by J. A. Parsons.

W. H. GERHAUSER has been elected president of the American Shipbuilding Co., Cleveland, to succeed Alfred G. Smith. Mr. Gerhauser has been vice-president and secretary of the company.

M. F. LIEBERMAN, Ambridge, Pa., was elected president of the Sheet Metal Contractors' Association of Pennsylvania at the annual convention, held at Erie, Pa. Emil Bordt, Lancaster, Pa., was named vice-president; Robert Warren, Erie, secretary, and Harry G. Hartline, Erie, treasurer. The 1929 convention will be at Lancaster.

H. A. WEBER, who has been district manager of sales in Boston for the Weirton Steel Co., has been transferred to New York as assistant district manager of sales in that office, and W. E. Snellgrove has been made Boston district manager of sales.

E. T. WEIR, who has been elected a director American Iron and Steel Institute, has been president Weirton Steel Co., Weirton, W. Va., since 1908, and has been active in the steel industry since 1890, when as a boy he entered the employ of the Braddock Wire Co., Braddock, Pa. Later he went to work for the Oliver Wire Co., Pittsburgh, and remained with that company until 1901, when he joined



ERNEST T. WEIR

the American Tin Plate Co., first as manager of its Monongahela works and later at its Monessen mills. In 1905, in association with J. R. Phillips, he organized the Phillips Sheet & Tin Plate Co. at Clarksburg, W. Va., of which he became president in 1908, the name of the company having been changed to the Weirton Steel Co. in 1918.

He is president of the Bank of Weirton, and a director of the Bank of Pittsburgh, National Association; Edgewater Steel Co., Oakmont, Pa.; Hanna Ore Mining Co., Cleveland; Redstone Coal & Coke Co., Brownsville, Pa.; Weirton Improvement Co.; Oak Hill Supply Co., located in the Monongahela Valley, and the Peoples Bank of Holidays Cove, W. Va. He is a member of United States Chamber of Commerce, the Pittsburgh Chamber of Commerce, American Iron and Steel Institute, Engineers' Society of Western Pennsylvania, Civic Club of Allegheny County, and the West Virginia Manufacturers' Association.

R. C. WALKER, formerly manager of the Meyer Furnace Co., Peoria, Ill., has been elected president and general manager of the Midland Furnace

Co., which is erecting a plant at Columbus, Ohio.

E. J. KEARNEY, secretary and treasurer of the Kearney & Trecker Corporation, Milwaukee, sailed for Europe on June 22.

MAURICE A. OUDIN, vice-president of the International General Electric Company, Inc., who has returned from an extended visit in Europe, was decorated with the Order of Commander of the Crown of Italy by the King of Italy in recognition of his good offices in behalf of a closer international relationship and of the specific benefit to the engineering profession of Italy.

L. P. LINDEMUTH, of Carney & Lindemuth, consulting engineers, 40 Wall Street, New York, has returned to the United States after nearly a year's absence in Australia. While there he was open-hearth consultant at the steel works of the Broken Hill Proprietary Co. at Newcastle, where L. P. Ross, formerly in charge of the furnaces at Wharton, N. J., has been carrying on blast furnace construction and operation for the Broken Hill company. Mr. Lindemuth sailed the portion of his return trip between Newcastle and the Fiji Islands in a 20-ton ketch, being accompanied by Stewart Keightley, for a number of years an officer in the Royal Australian Navy. The two started from Newcastle on March 3. The original plan was to make the entire voyage in the ketch from Newcastle to San Francisco by way of New Caledonia, Loyalty Islands, Southern New Hebrides, Fiji, Tonga, Samoa, Union Islands, Phoenix Islands and Honolulu.

J. RAMSEY SPEER has resigned the presidency of the Mackintosh-Hemp-hill Co., Pittsburgh. F. Hughes Moyer, vice-president in charge of operations, has been made executive vice-president and is to direct the affairs of the company. It is understood that new interests have become associated with the management.

WILLIAM J. OLCOTT has resigned as president of the Oliver Iron Mining Co., Duluth, operator of the Lake Superior iron mines of the United States Steel Corporation. He has been president of the company 19 years. Pentecost Mitchell, for many years a vice-president of the Oliver company and its operating head, has succeeded Mr. Olcott as president. J. H. McLean, a vice-president of the Oliver company, has also resigned. Continued poor health is given as the reason for the resignation of both officials. Prior to his connection with the Oliver Iron Mining Co., Mr. Olcott was general manager of the Lake Superior Consolidated Ore Mines, which were absorbed by the Oliver company.

STUART SMITH, formerly president of the Stuart S. Smith Co., San Francisco, has been appointed manager of the construction equipment division of the Jenison Machinery Co., recently

formed to succeed the northern California division of the Smith-Booth-Usher Co. He will serve as vice-president and director of the company and will have headquarters at 58 Fremont Street, San Francisco.

C. S. PROUDFOOT, Vanadium Corporation of America, Niagara Falls, N. Y., was elected president of the Association of Iron and Steel Electrical Engineers at the association's convention held recently in Chicago. Other officers elected were F. W. Cramer, Bethlehem Steel Co., Johnstown, Pa., vice-president; James Farrington, Wheeling Steel Corporation, Steubenville, Ohio, treasurer, and A. G. Place, Youngstown Sheet & Tube Co., Youngstown, secretary.

F. L. STONE has been appointed general sales manager of the Universal Portland Cement Co., Chicago, succeeding Blaine S. Smith who recently resigned to become president of the Pennsylvania-Dixie Cement Corporation. Mr. Stone started as a salesman with the Universal company 18 years ago. For the last ten years he has been assistant general sales manager.

F. C. YOUNG, who has been Cleveland district sales manager for the Union Drawn Steel Co., Beaver Falls, Pa., has been appointed assistant general sales manager of that company and has been succeeded in Cleveland by A. C. Geldner, who has been connected with the Cleveland sales office.

R. S. DUTTON, manager of sales for Pickands, Brown & Co., Chicago, has returned from a two months' vacation in southern Europe.

Institute Medal Committees Appointed

Rules governing the award of the Gary Memorial Medal and the American Iron and Steel Institute Medal, both of which were authorized at the last meeting of the institute, have been approved. The award of the Gary medal (gold), which will be awarded each year for outstanding achievement in the iron and steel industry, will be made by the directors of the institute upon recommendation of the following board of award: James A. Campbell, Willis L. King, James A. Farrell, Samuel Mather and Charles M. Schwab.

The American Iron and Steel Institute Medal, of bronze, will be awarded annually by the directors, on recommendation of a committee on arrangements, for a paper, read before the institute, having special merit and importance in connection with iron and steel manufacture. The committee on arrangements includes: James A. Farrell, chairman; James A. Burden, Eugene G. Grace, E. A. S. Clarke and John A. Topping.

OBITUARY

HJALMAR OSTERBERG, for many years special agent in the tin plate division of the Wheeling Steel Corporation, Wheeling, W. Va., died on June 25, aged 59 years. He was born in Sweden and came to this country when very young, obtaining work in the sheet and tin plate mills in the Pittsburgh district and finally becoming associated with the American Sheet & Tin Plate Co. Later he helped to organize the Osterberg Sheet & Tin Plate Co., Waynesburg, Pa. When that enterprise was abandoned in 1913, he became identified with the Wheeling Sheet & Tin Plate Co. as special sales representative, and had

been continuously associated with that company through its various mergers into the Wheeling Steel Corporation.

JAMES S. CAFFREY, one of the founders of the Smith & Caffrey Co., Syracuse, N. Y., died in that city on June 30, aged 75 years. William B. Smith, his associate in the formation of the firm 35 years ago, died on March 24. The company took over the old Phoenix foundry in 1911 and Mr. Caffrey became vice-president, having served in that capacity until his retirement five years ago. He was born in Providence, R. I., and located at Syracuse 50 years ago.

Metal Studies by Testing Society (Concluded from page 30)

num-base die castings. Results have already been received on 15,000 individual test pieces—in fact the data are so profuse that definite recommendations were withheld pending study by statistical methods.

Before active testing was commenced, much preparatory discussion was necessary to secure agreement on the list of alloys, and the size and shape of tension, impact and corrosion specimens to preserve the correct relation of surface to cross-section so important in die casting. Twelve aluminum-base alloys have been produced to the following chemical specifications:

Aluminum-Base Die Casting Alloys

	Copper, Per Cent	Silicon, Per Cent	Nickel, Per Cent	Iron, Per Cent	Aluminum, Per Cent, Balance
I	4	..	..	1½ to 2	94
II	10	..	..	1½ to 2	88
III	14	..	..	1½ to 2	84
IV	..	5	..	1½ to 2	93
V	..	13	..	1½ to 2	85
VI	2	3	..	1½ to 2	93
VII	4	5	..	1½ to 2	89
VIII	1½	¾	2¼	1½ to 2	94
IX	4	1½	4	1½ to 2	89
X	..	2	5	1½ to 2	91
XI	2	8	..	1½ to 2	88
XII	8	1	..	1½ to 2	89

It was also necessary to devise a usable method of hardness testing, and the committee has met this by a special Rockwell "E" scale, using ⅛-in. steel ball penetrator, and minor and major loads of 10 kg. and 100 kg., respectively.

At the Atlantic City meeting it was agreed to extend the program to cover zinc-base die castings, wherein various grades of zinc, ranging from the relatively impure Prime Western to electrolytic zinc of 99.90 per cent purity, Horsehead zinc of 99.94 per cent purity, and a special electrolytic zinc of 99.97 or 99.98 per cent. Such tests, especially the corrosion expo-

sure tests to be arranged, will do much to settle the question whether the instability of zinc-base die castings is due to lead and cadmium impurities.

Eventually it is hoped to have ample information about commercial die-cast metal, and its variation piece to piece and factory to factory, which will enable a specification to be written. While it is recognized that in die casting, as in all types of casting, a test piece gives merely a general indication of the quality of the metal in the actual casting, it is thought that when producing large quantities of important castings a special block can be slipped into the die at intervals and test pieces cast which will be of much control value to both producer and purchaser.

May Organize Lead Institute

Important interests in the lead industry have taken steps to organize a lead institute, similar in character to the Copper Institute. Discussions thus far have been informal, but a meeting of the leading interests may be held this month, at which details will be worked out with the idea of forming the institute in the fall.

One of the chief functions of the new organization will be to gather consumption data and other statistics to keep producers informed of the conditions of forward orders. Production statistics are already available.

Among the large corporations interested are the National Lead Co., the American Smelting & Refining Co., and the Western Electric Co., all of which are understood to have signified their intention of joining such an organization.

Unite to Cut Distribution Costs

(Concluded from page 18)

don't care what they pay that is reasonable, so long as they are assured that they don't pay a greater price than anyone else."

As a method for preventing ruthless price cutting, Mr. Schwab suggested the appointment of a committee to act as an arbiter, not so much to say what shall be made, but to watch what is being done. "Each company should report to that committee monthly or quarterly how much business he has done. Nothing need be said about price, but the monthly report of business done should be insisted upon. Occasionally someone will report more business than his position and the statistics of the past would warrant. Now if he has given his word that he is going to cooperate and does that, he is not cooperating and therefore is not a man to be taken into confidence as one who is doing a legitimate business.

"What does cooperation mean? Fifty men sit together and say that they are going to cooperate. The next day a good order comes along and someone goes out and takes it regardless of anybody's cooperation. If I understand the law correctly there is no reason why someone might say that the price of bolts and nuts is so-and-so. If other manufacturers want to cooperate there is nothing in the laws, as I understand them, that doesn't say that I can sell my goods at the same prices publicly announced that they will sell theirs. It is a question of personal confidence and relation with each other. You can go and cut your prices to get business if you like, but you will find when the end of the year comes round that you have not a greater percentage of the business than you would have had if you had gone ahead pursuing the normal tone and price of your business."

The progress made by trade association in bettering business conditions was emphasized by Gilbert H. Montague, general counsel National Welded Chain Association of the United States, in a talk on "Recent Steps in Business Self-Government." This progress, he pointed out, has been possible largely since 1925 when the Supreme Court rendered certain decisions making it possible for manufacturers to organize for the purpose of exchanging views and ideas concerning the conduct of their respective businesses. "Since that time," said Mr. Montague, "trade associations have grown to be second only to the national Government as governing bodies."

Committees Formed to Promote Distribution Plan

In the discussion which accompanied each session, it was clearly brought out that manufacturers and jobbers alike are heartily in favor of a distribution plan either similar to or patterned after the plan now used by the bolt, nut and rivet manufacturers. This sentiment was brought out by some 40 men representing jobbers in all parts of the country and manufacturers of a score or more distinct lines of products.

In order to investigate more thoroughly the possibilities of introducing the distribution plan used by the bolt and nut industry into other fields of manufacture, George Puchta, Queen City Supply Co., Cincinnati, suggested that two committees be formed, one to be made up of one representative of each of the several manufacturing industries represented at the meeting and the other to be composed of a number of the jobbers' chairmen from the various districts which have already been organized through the efforts of the bolt and nut industry. It was decided that these two committees should meet together for the purpose of considering plans for placing distribution on a more profitable basis. The personnel of these committees is included elsewhere in this story.

The possibility of arriving at manufacturing economies by comparing costs with those of competitors was stressed

by Mr. Schwab. "You will get all the advantages which the Steel Corporation has by reason of its variety of works, if you will just adopt the things they have naturally adopted by consolidation. No one would question the legality of that. If that is a great measure of economy and a great economic step forward, why is it not equally right for you who dispose of your products to discuss prices and conditions with reference to distribution? American manufacturers don't want to break the present law, but our business justifies our existence with the present law."

Business Analysis and Forecast

(Concluded from page 27)

of conditions represented by the P-V Line has been more quickly effective in the steel industry than was the case in 1923, the decline in ingot production coming about as soon after the decline in the P-V Line as it did in the early portions of 1924 and 1925. Parallelism between the two indexes is not sufficiently close to enable precise forecasts, but a further decline in production at a somewhat greater rate than usual for the season is indicated for the next two or three months.

The rate of changes in unfilled steel orders is an excellent barometer of the trend of business, its direction, or rise and fall, generally anticipating the course that business will take two or three months subsequently. The curve may hold close to its present low level for four or five months as it did in 1925.

Two of the great key industries of the country made a favorable showing in May. The automobile and building industries both increased more than usual for the month and were more active than in May of either of the two preceding years. If one were to allow for a normal rate of growth over a period of years, both industries would show activity at about the normal level. These facts explain both the well sustained volume of steel production and the large total volume of industrial activity. They do not, however, agree with the relatively unfavorable showing of railroad freight traffic, which runs considerably behind a year ago, and this fact leads us to infer that the automobile and building industries are somewhat ahead of the condition of the total for all industries.

The normal seasonal trend in both industries is rather sharply downward from now on, the decline carrying through September for building and through December for automobile production. In view of the current high money rates, some degree of political uncertainty, and the probable sagging trend of general business, it is probable that the two industries will fall off during the summer to a somewhat greater extent than usual for the season.

We Expect a Minimum Cost

(Concluded from page 7)

many manufacturers. They are suspicious that the products are sold below cost or without a fair margin of profit. I rather think that just the opposite is the fact. In general, the manufacturer who is forward looking and is quoting low prices usually has a very satisfactory margin of profit above his cost, as his annual statements show.

There is no reason to believe that the present tendency of lower selling prices will not continue and that we will not have this continual process of cost reduction and lower and lower selling prices. It is altogether proper that this tendency should continue, as it is on this basis that the prosperity of this country is based. Lower costs mean the possibility of each of us having more things, and that, after all, is what material prosperity is.

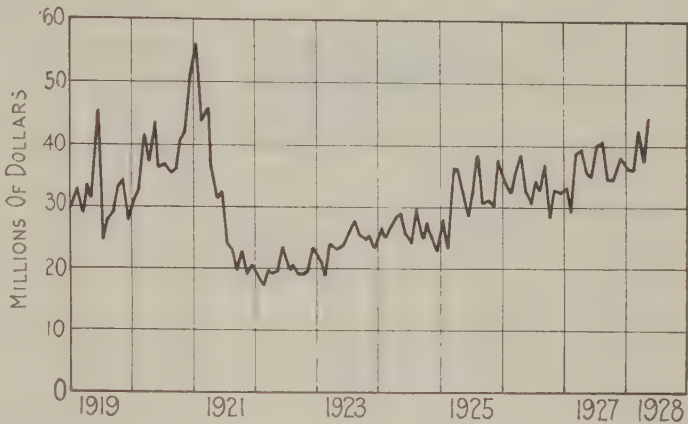
Fifth Largest Machinery Exports

May Total Was Exceeded in Only Four Previous Months,
All of Which Were More Than Seven
Years Ago

WASHINGTON, June 28.—Making a gain of \$7,294,784, or a little more than 19 per cent, exports of machinery in May were valued at \$44,670,652, against \$37,375,868 in April. For May of last year the value was \$35,791,991. For the five months ended with May, 1928, the value was \$196,649,126, an increase of \$19,117,419 or approximately 10% per cent over the total of \$177,531,707 for the corresponding period of last year. Only four previous months have exceeded the shipments made in May: June, 1919, with \$46,420,000; December, 1920, with \$50,322,000; January, 1921, with \$56,706,000; March, 1921, with \$45,796,000.

Exports of industrial machinery in May accounted to a substantial degree for the increased foreign shipments, being valued at \$20,274,976, a gain of approximately 17 per cent over exports of this class of equipment in April, valued at \$17,412,396. In May of last year exports of industrial machinery were valued at \$16,304,363. For the five months ended with May, 1928, an increase of almost \$5,000,000 was made over exports for the corresponding period of 1927, the respective totals having been \$89,173,624 and \$84,291,019.

Exports of power-driven metal-working machinery in May were valued at \$1,970,348, compared with \$1,827,938



Steady Gain in Machinery Exports Is Shown, After the Collapse of the 1920 Boom Had Spent Itself

in April, and \$1,494,498 in May of last year. For the five months ended with May the value was \$9,788,382, against \$7,231,825 for the corresponding period of last year. Exports of other metal-working machinery in May were valued at \$577,610, against \$397,842 in May of last year. For the five months ended with May of the present and last

Machinery Exports from the United States
(By Value, in Thousands of Dollars)

	May		Five Months Ended May	
	1928	1927	1928	1927
Locomotives	\$125	\$56	\$904	\$3,598
Other steam engines.....	221	193	452	711
Bollers	140	159	453	828
Accessories and parts.....	103	61	301	210
Automobile engines	1,714	1,333	6,876	6,063
Other internal combustion engines	712	648	3,040	2,968
Accessories and parts.....	338	256	1,572	1,670
Electric locomotives	368	25	939	463
Excavating machinery	929	337	3,525	1,884
Concrete mixers	117	124	445	532
Road-making machinery	274	306	894	927
Elevators and elevator machinery	414	410	1,775	2,036
Mining and quarrying machinery	1,429	1,105	5,538	6,263
Oil-well machinery	1,107	1,245	5,635	8,798
Pumps	611	599	2,784	2,730
Bending and power presses..	102	134	633	516
Power hammers	208	320	310	361
Power-driven metal-working machines (a)	1,970	1,494	9,788	7,232
Other metal-working machinery and parts.....	577	398	2,459	1,909
Textile machinery	1,315	805	5,665	4,318
Sewing machines	820	678	3,700	3,937
Shoe machinery	149	144	774	614
Flour-mill and gristmill machinery	41	61	206	195
Sugar-mill machinery	310	202	190	1,112
Paper and pulp mill machinery	253	308	1,505	1,996
Sawmill machinery	82	57	384	311
Other woodworking machinery	168	151	764	566
Refrigerating and ice-making machinery	1,011	926	3,376	3,239
Air compressors	727	547	2,706	2,464
Typewriters	2,371	1,801	9,797	8,979
Power laundry machinery...	148	84	482	659
Typesetting machines	450	275	1,894	1,631
Printing presses	730	424	2,642	2,480
Agricultural machinery and implements	10,144	7,481	43,719	34,391
All other machinery and parts	14,443	12,645	70,522	60,941
Total	\$44,671	\$35,792	\$196,649	\$177,532

(a) Principal items detailed in another table.

Imports of Machinery into the United States
(By Value)

	May		Five Months Ended May	
	1928	1927	1928	1927
Metal-working machine tools.....	\$90,182	\$56,917	\$269,491	\$244,256
Agricultural machinery and implements	507,778	536,118	2,579,811	3,124,228
Electrical machinery and apparatus.....	202,991	312,455	960,486	1,255,408
Other power-generating machinery.....	40,482	16,491	72,552	38,678
Other industrial machinery	931,932	1,516,578	3,647,659	4,166,026
Vehicles except agricultural	256,528	225,384	1,176,884	970,034
Total	\$2,029,893	\$2,663,943	\$8,706,883	\$9,798,630

Exports of Power-Driven Metal-Working Machinery

	May, 1928		April, 1928	
	No.	Value	No.	Value
Engine lathes	63	\$126,294	39	\$78,449
Turret lathes	60	110,497	41	56,602
Other lathes	41	140,333	125	159,525
Vertical boring mills and chucking machines	17	42,563	8	7,720
Thread-cutting and automatic screw machines....	63	80,635	64	78,357
Knee and column type milling machines	22	49,293	19	36,746
Other milling machines.....	34	88,974	43	109,522
Gear-cutting machines	43	101,770	30	64,481
Vertical drilling machines..	23	13,112	62	38,491
Radial drilling machines....	10	21,913	8	39,574
Other drilling machines.....	72	26,231	71	32,241
Planers and shapers.....	24	63,348	46	84,802
External cylindrical grinding machines	77	202,345	59	143,088
Internal grinding machines.	95	90,068	37	43,956
Metal-working tool-sharpening machines	80	77,733	44	24,790
Total	724	\$1,235,109	696	\$998,344

year the values were \$2,458,567 and \$1,908,965, respectively. As listed in THE IRON AGE table, exports of power-driven metal-working machinery numbered 724 units valued at \$1,235,109, against 696, valued at \$998,344, in April.

Total imports of machinery and vehicles in May were valued at \$2,424,688, a slight decrease under those for April, valued at \$2,427,259. For May of last year the value was \$3,389,320. For the five months ended with May the values were \$11,401,985 in 1928 and \$13,038,408 in 1927, showing a decrease of almost one-eighth for the five months

of the current year. Imports of industrial, office and printing machinery in May were valued at \$1,457,391, against \$1,378,840 in April; and \$6,684,804 for the five months ended with May of 1928, as compared with \$7,688,333 for the corresponding period of last year. Imports of machinery listed in THE IRON AGE table were valued at \$2,029,893 in May, against \$1,935,751 in April, and \$2,663,943 in May of last year. For the five months ended with May, 1928, and 1927, the values were \$8,706,883 and \$9,798,630, respectively.

Research and Market Study Needed in Steel

Future of Pittsburgh District Said to Depend on Laboratories, Sales
Departments and Quality of Personnel

“THE future of steel in Pittsburgh depends on the ability of the industry to maintain the necessary research, and to put the results of that research into production effectively,” declares Dr. Stephen L. Goodale, department of metallurgy, University of Pittsburgh, in the June issue of *Pittsburgh Record*, published by his college. “It depends also on a study of markets so that new conditions shall find our steel managements here prepared for them. Again, it depends upon maintenance of the high quality of the personnel engaged in steel production. If these conditions are met there need be no fear of a failure of sustained growth, and Pittsburgh will continue to be the greatest steel center of the country and probably of the world.”

The recent growth of steel capacity in the West, he points out, represents the building up of a very young industry and naturally has been relatively rapid compared with that in Pittsburgh. The steel industry at Pittsburgh, he states, will doubtless grow at a satisfactory rate when compared with the growth in other districts in the future.

Pittsburgh Can Lead in Research

• Pittsburgh has not lost any of its material advantages as a steel producing center, and it can expect to profit by the quality of its leadership and the momentum its industry has acquired during years of ascendancy, according to Doctor Goodale.

“There are three lines of effort along which study and planning will help—research, study of markets and living conditions,” he said.

“Pittsburgh is well supplied with research institutions. For example, at the Mellon Institute of Industrial Research more than a hundred problems are under investigation at this time; and a number of these have a direct bearing on the steel industry. The personnel of a number of different departments in our local collegiate institutions is usually engaged for at least a part of its time in the study of problems in the steel industry.

“The United States Bureau of Mines, in its Pittsburgh experiment station, is conducting important fun-

damental research work on the open-hearth process of steel making and on other problems of the steel industry. The American Sheet & Tin Plate Co., the National Tube Co. and the Aluminum Corporation of America are notable examples of large corporations which maintain separate metallurgical research laboratories in this district, and the Westinghouse Electric & Mfg. Co. also has an important metallurgical department in its large research laboratory. There are always a large number of research problems under investigation at the various plants of the steel companies, mostly of an immediately practical nature.

“There is still room for extensive additional fundamental research in the steel industry, as this industry in general is considerably behind the chemical and electrical industries in promoting research and in securing the advantages to be derived therefrom.

“In electrical engineering, the General Electric and Westinghouse companies, and a number of other successful organizations, have large and well planned research departments. They have spent much on problems of fundamental information, in addition to the research directed to solving questions of immediately practical application and importance. All of these interests have profited largely by the results of such work themselves, and have advanced the uses of electricity in the service of mankind.

Market Changes Require Study

“From time to time new developments of various kinds bring about major changes in the relationships between different industries and considerable shifting of the centers of locations of industries. Some new product is developed and to a large extent replaces products previously in use. For instance, one may cite bakelite, a product of research in chemistry, and aluminum and the alloys of aluminum which serve excellently for many uses in place of iron or steel. To this extent aluminum is a competitor of steel. Other light and strong metals, such as magnesium

and its alloys, are being actively developed.

“Steel producers need now more than ever before to study developments not only in steel but in other metals in order to plan ahead wisely to meet the competition that is forecast by such present developments.

Good Living Conditions Important

“If Pittsburghers wish to retain for this city its present steel supremacy one of the essentials required is that workers in steel shall find here good living conditions in terms of necessities and, in increasing measure, in terms of modern luxuries also. The large cities in our country are in direct competition for the best personnel in all walks of life.

“The whole community should join hands in a determined effort to keep Pittsburgh as good a city as can be in which to live. Economical and efficient administration of city and county affairs should be demanded, so that citizens shall receive the maximum in return for the heavy taxes which every great modern community demands of its people.”

Steel Cartel Quota Unchanged—New President Elected

WASHINGTON, July 2.—The International Steel Cartel will maintain its present quarterly production schedule of 7,321,750 metric tons of steel ingots in the ensuing three months and will make no change in over-production penalties, according to a preliminary announcement covering the results of the meeting of the entente at Düsseldorf, Germany, June 25, relayed by cablegram to the Department of Commerce by its commercial attaché in Paris.

It also was reported that Aloyse Meyer was formally elected president of the cartel to fill the vacancy caused by the recent death of Emile Mayrisch, first president. M. Meyer is director-general of the Acieries Reunies de Burbach-Eich-Dudelange in Luxemburg.

European Markets Generally Dull

Continental Quotas Unchanged—German Export Prices Reduced—Wales Expects Benefit from Delimited Export Markets—Antwerp Strike a Disorganizing Factor

(By Cable)

LONDON, ENGLAND, July 2.

Pig iron is dull and the outlook is unfavorable. Dorman, Long & Co., damped one Newport blast furnace, reducing the number of North-east Coast furnaces that are active to 34.

Only 27 Scottish stacks are now operating. Business generally is quiet and with the Glasgow Fair holiday approaching, little revival is anticipated before the end of August. Hematite iron is weaker on heavy stocks but prices are below cost.

Foreign ore is also quiet but Bilbao Rubio remains steady on the continuance of Swedish mines stoppage.

Finished iron and steel continue dull. Japan bought a few thousand tons of ship steel, and India placed some lines owing to the idleness of local Indian plant. But demand generally is poor and makers are operating part time only. Dorman, Long & Co. closed one Britannia steel furnace.

Continental iron and steel is quieter on the continued abstention of substantial buying, but market is likely to become disorganized if the strike of Antwerp dockers spreads as threatened.

The International Raw Steel Cartel

made no alteration in quotas for the third quarter.

Belgian pig iron output for May was 360,000 tons and that of raw steel 329,000 tons. Fifty-six blast furnaces were active at the end of May.

French production for May was 871,000 tons of pig iron and 794,000 tons of raw steel. On May 31, there were 150 furnaces in blast.

Welsh tin plate bars are firm on continued demand and a shortage of steel scrap. Tin plates are quieter

on the uncertainty of the tin market, but inquiry still is strong. Further important steps have been taken toward delimiting certain leading export markets, whereby Wales expects to receive substantial benefit and probably Welsh export prices will be raised.

There is an improved demand for galvanized sheets, especially from India and South Africa. Japan bought fair quantities of thick and thin gages of black sheets.

Germany Reduces Export Prices 25c to 50c a Ton

(By Radio)

BERLIN, GERMANY, July 2.

The international market is duller. Following the example of France and Belgium, Germany has reduced her export prices on rolling mill products by 1 to 2 shillings a ton.

The German home market is quieter. Demand steel has been reduced by increasing dullness in the engineering branches and by slowness in the revival of building.

June home prices of pig iron, semi-finished steel products and rolled products, including steel rails, are retained for July.

Production of both pig iron and

steel is declining. Mills producing bars are best occupied and have delivery terms averaging 2½ months. The market for tubes and medium and thin sheets is weaker.

Average Age of German Equipment Is Low

HAMBURG, GERMANY, June 16.—New plants, equipments and general machinery acquired by the German steel industry in the years following the war have brought the average age of machinery and furnaces down to a point where they compare favorably with other European producing countries. At the end of April there were

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.87 per £ as follows:

Durham coke, del'd....	£0 17½s.	to £0 17¾s.	\$4.27	to	\$4.33
Bilbao Rubio ore*.....	1 2½		5.48		
Cleveland No. 1 fdy.....	3 8½		16.56		
Cleveland No. 3 fdy.....	3 6		16.07		
Cleveland No. 4 fdy.....	3 5		15.83		
Cleveland No. 4 forge....	3 4½		15.71		
Cleveland basic (nom.)..	3 5		15.83		
East Coast mixed.....	3 9	to 3 9½	16.81	to	16.93
East Coast hematite....	3 10½		17.17		
Rails, 60 lb. and up....	7 15	to 8 0	37.75	to	38.96
Billets	6 5	to 6 15	30.44	to	32.88
Ferromanganese	13 15		66.97		
Ferromanganese (export)	13 0	to 13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	6 0		29.22		
Tin plate, base box.....	0 18¾	to 0 18½	4.47	to	4.53
Black sheets, Japanese specifications	13 7½		65.14		
C. per Lb.					
Ship plates	7 12½	to 8 2½	1.66	to	1.77
Boiler plates	9 0	to 10 10	1.95	to	2.28
Tees	8 2½	to 8 12½	1.77	to	1.99
Channels	7 7½	to 7 17½	1.60	to	1.71
Beams	7 2½	to 7 12½	1.55	to	1.66
Round bars, ¾ to 3 in..	7 5	to 7 15	1.58	to	1.69
Steel hoops	9 0	to 10 0	1.95	to	2.17
Black sheets, 24 gage...	9 15	to 10 0	2.12	to	2.17
Gal. sheets, 24 gage....	13 10		2.93		
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium	£3 3s.	to £3 5s.	\$15.34	to	\$15.83
France	3 3	to 3 5	15.34	to	15.83
Luxemburg	3 3	to 3 5	15.34	to	15.83
Basic pig iron (nom.):					
Belgium	3 1	to 3 2	14.85	to	15.09
France	3 1	to 3 2	14.85	to	15.09
Luxemburg	3 1	to 3 2	14.85	to	15.09
Coke	0 18		4.39		
Billets:					
Belgium	4 15		23.14		
France	4 15		23.14		
Merchant bars:					
Belgium	5 13½	to 5 14	1.23	to	1.26
France	5 13½	to 5 14	1.23	to	1.26
Luxemburg	5 13½	to 5 14	1.23	to	1.26
Joists (beams):					
Belgium	4 17½	to 4 18	1.06	to	1.07
France	4 17½	to 4 18	1.06	to	1.07
Luxemburg	4 17½	to 4 18	1.06	to	1.07
Angles:					
Belgium	5 10	to 5 12½	1.21	to	1.23
½-in. plate:					
Belgium (a)	6 11		1.44		
Germany (a)	6 11		1.44		
⅝-in. ship plate:					
Belgium	6 7		1.40		
Luxemburg	6 7		1.40		
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

109 furnaces in blast with an average age of 13 years. Steel furnaces show an average age of 16 years for the Thomas and only 9 years for the open-hearth furnaces.

General machinery and equipment in the steel industry have an average age of 14 years and machine tools of 8 years. The average age of equipment

in other industries, however, is better than in the steel industry. Among the wire makers, nail machines only average 7 years and wire drawing machinery is only 6 years. The general averages for other countries are about 170 per cent higher in Great Britain, 30 per cent higher in Belgium and 80 per cent higher in France.

Steel Export Association Operating

Recent Tin Plate Purchase by Japan Distributed to Five Mills— Importers Protest Shape Duty

NEW YORK, July 2.—The newly formed Steel Export Association, which is understood to include most of the independent mills as well as the United States Steel Products Co., is apparently functioning. On about 62,000 base boxes of oil can tin plate for the Nippon Oil Co., bids of American mills are understood to have been substantially the same and the business was awarded to the leading Japanese export houses in New York for execution by an American mill or mills. The various bidders on this tonnage reported themselves not in a position to accept more than a small portion of the total, so that the award was finally made on a basis of equal distribution to four of the bidders, United States Steel Products Co., Bethlehem Steel Export Corporation, Weirton Steel Co. and Jones & Laughlin Steel Corporation, and 3000 tons to the Wheeling Steel Corporation, which was the maximum that company was willing to accept.

Among buyers for export the impression seems to be that large contracts will probably be handled in a manner similar to the method used with the Nippon Oil Co. tin plate order. On smaller tonnages, the impression prevails that a mill may accept half the order, which would necessitate the buyer placing the remainder with another maker, or will take the entire tonnage, but refrain from quoting on a similar inquiry for the same material that might develop shortly afterward.

Association May Gain New Markets

Foreign traders are inclined to discount the report that the Steel Export Association is a combination to maintain a higher level of prices in export sales. It is pointed out that while there has been severe competition among American sellers seeking export business, orders have seldom been taken at a price that was lower than necessary to meet the competition of Continental mills. At present the United States is not a dominant factor in the sale of iron or steel to any foreign market of importance, and traders seem to believe that the new association, by distributing business in a single market among the various mills which it includes, will be able to institute a real effort to establish itself in that market with a

lower loss to the individual mill, as losses on such business will be better distributed.

With a market definitely secured for American mills, it is pointed out by foreign traders that producers here would be in a more tenable position than at present to suggest or receive the suggestion of an agreement with European mills bearing on the limitation of shipments of steel to the United States or to certain centers of consumption abroad.

Business with South America and Japan

Export business with South American markets is reported to be showing continued improvement, although orders are individually small. Japanese buying is light, but in addition to the award of tin plate by the Nippon Oil Co., the Kioto Oil Co. in Japan recently awarded about 3000 base boxes of a total inquiry for 12,000 boxes and is expected to return to the market soon for the remaining tonnage. Kioto municipality has awarded three miles of grooved and girder rails to a Japanese exporter and the order will be filled by an American mill. Tokio municipality has opened bids on nine miles of 91-lb. high T-rails and 100-lb. girder rails. A recent report from Japan states that the Kawasaki Dockyard Co. at Kobe, the leading black sheet producer of the country, will continue increasing its capacity for light gage black sheets and by 1929 expects to have a maximum production of 150,000 tons a year, compared with its present output of slightly less than 100,000 tons. The Government Works at Yawata is also planning a small increase in its black sheet output, so that it is estimated that with the Kawasaki mills turning out 150,000 tons of sheets annually the total for the entire country will be close to 200,000 tons.

Importers Protest Shape Duty

Importers of Continental steel in the United States, who are affected by the recent decision of the United States Treasury Department, which increases the duty on bar sized channels, angles and tees from 20c. per 100 lb., the structural rate, to 30c. per 100 lb., the duty on bars, have filed a brief with the Customs Court and action is expected this week. No decision on

the reclassification of reinforcing bars under a paragraph calling for a lower duty is expected until some time this fall.

An active movement of foreign steel is reported at present as some sizable tonnages of material have been arriving in the past week, which were bought some time ago when the market was at a lower level. When this material has been disposed of, a period of dullness seems to be expected, as very little purchasing has been done by importers here since the recent rapid advances in Continental steel prices. Meanwhile, in the past week European quotations have been reduced, the third small reduction in about three weeks, and plain steel bars are now offered at 1.80c. to 1.85c. per lb., base, delivered New York, with structural shapes at 1.61c. to 1.71c. per lb., base. Small sales of hot rolled strip steel and hoops are reported and importers claim that deliveries from Continental mills are rather less extended than a fortnight ago, when two to three months was the usual time offered.

Decline in German Exports and Imports in May

Showing a loss of 10,266 metric tons, or 2.8 per cent, exports of iron and steel products from Germany in May totaled 353,815 metric tons, compared with 364,081 tons in April, according to radiograms received from Berlin by the Department of Commerce, Washington. Imports in May were the smallest of the current year, amounting to 166,020 tons, compared with 190,527 tons in April, a decline of 24,507 tons, or approximately 12.8 per cent.

Of the 21 classifications in the export list, 12 showed decreases and nine increases in May. Exports of semi-finished steel declined to 47,829 tons from 54,706 tons, while the greatest reduction was in plain wire, which decreased to 27,797 tons from 37,188 tons. The greatest gain was in iron and steel bars, rods and angles, which increased to 87,448 tons from 76,968 tons. Of the 21 classifications in the import list, 13 showed declines in May. The outstanding decreases were in iron and steel bars, which dropped 10,126 tons to 63,931 tons from 74,057 tons, and in rails, which declined 6799 tons to 5784 tons from 12,583 tons.

Production of pig iron in Germany in May was 1,044,056 tons, a reduction of 1412 tons from the April total. Steel production increased to 1,247,781 tons, a gain of 86,376 tons. At the end of May there were 104 furnaces in blast, a decrease of three from the April total.

The Edgar Allen Steel Co., Inc., manufacturer of high speed, carbon and alloy tool steels, has removed its New York office to 741 Washington Street and its Chicago office to 21 North May Street.

Machinery Markets and News of the Works

Machine Tool Demand Remains Steady

June Buying at Same Rate as in May and Sales for First Six Months Considerably Ahead of Same Period of 1927—Exports Gain in May

BUSINESS in machine tools in June ran at about the same rate as in May. An unusually good month was experienced in the Chicago district, due for the most part to the large volume of sales to agricultural implement makers.

Sales during the first six months of 1928 are estimated as approximately 20 per cent greater than in the same period in 1927. Companies specializing in high-production equipment participated generously in the business available, and another noteworthy feature is that demand has been from widely scattered sources in the general industrial field.

Steady trend of the machine tool orders in the first half of this year is also reflected from the monthly Index of Machine Tool Orders compiled by the National Machine Tool Builders' Association. The net orders of 63 reporting companies in the first month of 1928 were the highest of any month since May, 1920. February orders were also at a high level and the March index showed a continued upward trend, the level reaching that of the summer of 1919. In April the volume of orders was again fairly heavy, but in May it was somewhat less than April, but not enough to turn the trend line downward.

Recession during the summer months is no doubt to be expected, although in some quarters it is believed that business will continue at a fair rate.

Exports of machine tools during May increased approximately 24 per cent as compared with April. The figures are: 724 machines valued at \$1,235,109 in May, as against 696 machines valued at \$998,344 in April. Engine, turret and other lathes to the number of 164 account for 31 per cent of the total value of the May exports, and cylindrical, internal and tool grinders, numbering 252, for about 30 per cent.

Demand from the automobile industry has been comparatively light in the past 30 days, although some activity developed in the Michigan district during the week, with the purchase by the Pontiac Motor Car Co. of a fair sized lot of production machinery. The Wright Aeronautical Corporation, which has been making purchases for some time, is in the market for equipment that is expected to total close to \$200,000.

New York

NEW YORK, JULY 2.—The two outstanding buyers of machine tools in this territory continue to be the Wright Aeronautical Corporation, Paterson, N. J., and the General Electric Co., Schenectady, N. Y. The Wright company, which has been quite a steady buyer for several months, is at present in the market for equipment that will probably total close to \$200,000. The General Electric Co. has been buying against a list of 60 or more items for its refrigerating machinery plants, and last week asked for prices on an additional list of 15 presses. In the Buffalo district, the Curtiss Aeroplane & Motor Co. has been buying a few tools and is in the market for further equipment.

Among the railroads, the New York Central has a substantial number of inquiries upon which bids have been submitted, and recently inquired for a 21-in. lathe. The Brooklyn & Manhattan Transit Co. is inquiring for a small engine lathe and a saw. While there has been a slight decline in the volume of inquiries from small users during the past week, the heavy buying in prospect from large companies continues of substantial proportions.

Sales of tools in past week have been well distributed among different types of machines. Lathes continue an important item, and Pratt & Whitney Co. reports orders for a total of 12 engine lathes, of which five 13-in. were for one company, four 16-in. for a second company and three 20-in. for a third.

Department of Plant and Structures, Municipal Building, New York, has taken out a permit for a three-story housing station and destructor plant to cost \$820,000, with power equipment, conveying, and other machinery; also for a two-story auxiliary building, 50 x 375 ft., ramp type, for conveying refuse, etc., to de-

structor station, to cost \$130,000 with equipment.

Greenwich House, 29 Barrow Street, New York, operating a vocational training school, will soon begin superstructure for three-story metal-working and wood-working shop at 16 Jones Street, to cost in excess of \$100,000 with equipment. Complete art metal-working tools and machinery will be installed. Delano & Aldrich, 126 East Thirty-eighth Street, are architects.

A. J. Thomas, 2 West Forty-sixth Street, New York, architect, will soon take bids on general contract for two-story automobile service, repair and garage building, 75 x 200 ft., to cost about \$100,000 with equipment.

Common Council, Albany, N. Y., has approved additional appropriation of \$100,000, making total fund of \$460,000, for municipal airport development, including hangars, repair and conditioning shops, oil storage and distributing stations and other buildings.

Hudson Hardware Co., 236 Main Street, Yonkers, N. Y., has asked bids on general contract for one-story storage and distributing plant on Saw Mill River Road, to cost close to \$50,000 with equipment. J. S. Bartley, 30 Fairview Avenue, is architect.

Jorgensen Brothers, Inc., 140 Lott Street, Brooklyn, operating an automobile repair works, has awarded general contract to Perri Contracting Co., 26 Court Street, for a one-story addition to cost about \$40,000 with equipment. George J. Lobenstein, 885 Flatbush Avenue, is architect.

M. Silverstein, 26 Court Street, Brooklyn, architect, will soon begin erection of two-story automobile service, repair and garage building, 120 x 250 ft., to cost approximately \$175,000 with equipment.

New York & Richmond Gas Co., 691 Bay Street, Stapleton, S. I., operating an artificial gas plant and system, is disposing of a preferred stock issue to total \$1,500,000, a portion of proceeds to be used for expansion and improvements. William J. Welsh is president.

Koeppen Metal Products, Inc., 361 Manhattan Avenue, Union City, N. J., operating a chromium plating works, has acquired property at Carlstadt, N. J., for erection of two-story plant, 80 x 350 ft., to cost close to \$70,000 with equipment. Present works will be removed to new location.

Mount & Robertson, Inc., 62 Broad Street, New York; cabinet manufacturer, has acquired plant at Boulevard and Ninth Street, West New York, N. J.,

heretofore used for textile manufacture, and will remodel for new factory.

P. D. Kinney, Newark, has taken out permit for a one-story machine repair shop at 59-61 Lock Street, to cost about \$25,000 with equipment.

American Can Co., 120 Broadway, New York, has plans for extensions and improvements in seven-story plant at Jersey City, to cost about \$40,000. A. B. Heiser is company architect.

Public Service Electric & Gas Co., Public Service Terminal, Newark, is arranging for sale of preferred stock issue to total about \$28,000,000, a portion of proceeds to be used for extensions and improvements in power plants, power switching stations, transmission lines, etc.

Frederic P. Humphreys, head of Fred-eric P. Humphreys, Inc., 347 Madison Avenue, New York, naval architect and

yacht builder, and associates have organized Humphreys Shipyard Corporation to build Diesel engine-driven yachts and similar seacraft. New company has acquired property of Monmouth Marine Railways, Keyport, N. J., for establishment of plant.

Steelcraft Coverator Co., Inc., 641 Lexington Avenue, Brooklyn, has been formed to make radiator cabinets and shields and kindred metal specialties. Plant at above address is equipped and in operation, but company is in market for steel furniture sheets, 12 to 24 gage, steel tubing, angle iron and metal grilles.

Gravity Separator & Equipment Co., 15 East Twenty-sixth Street, New York, has been organized to manufacture gravity separators and special equipment for separating water from oil, grease, tar or other fluids of varying specific gravity. Manufacturing is being done by contract and awards have been made.

has been appointed New England representative for Axmann Sand-Throwing Machine Co., Cleveland, manufacturer of sand-throwers and kindred equipment.

St. Louis

ST. LOUIS, July 2.—Arrangements have been made by Stifel, Nicolaus & Co., St. Louis, for purchase of Moloney Electric Co., with local plant at Kings-highway and Union Avenue, manufacturer of electric transformers, in which controlling interest heretofore has been held by American Brown Boveri Electric Corporation, 420 Lexington Avenue, New York. New owner has arranged for bond issue of \$1,500,000 a portion of proceeds to be used for expansion.

Universal Automobile Service Co., 633 North Grand Boulevard, St. Louis, has plans under way for six-story service, repair and garage building, to cost in excess of \$400,000 with equipment. Pleitsch & Price, Arcade Building, are architects.

Gruendler Patent Crusher & Pulverizer Co., 320 North Fourth Street, St. Louis, has purchased property at Glasgow and North Market Streets, and plans early construction of one-story machine shop, approximating 21,000 sq. ft. of floor space, to cost about \$50,000 with equipment.

Missouri Power & Light Co., Jefferson City, Mo., is disposing of bond issue of \$1,500,000, a portion of proceeds to be used for expansion in power plants and system.

Capital Garage, Inc., 1025 Wyandotte Street, Kansas City, Mo., will proceed with superstructure for a seven-story and basement service, repair and garage building, 125 x 130 ft., to cost in excess of \$200,000 with equipment. C. A. Smith, Finance Building, is architect.

Brandon Stove Co., East Markham Street, Little Rock, Ark., has filed plans for rebuilding portion of four-story plant, recently destroyed by fire, with loss reported at more than \$40,000 including equipment.

The International-Great Northern division of Missouri Pacific Railway is in market for a 90-in. heavy-duty driving wheel lathe for turning locomotive tires.

H. C. Peterson, Bankers' Reserve Life Building, Omaha, Neb., architect, will soon take bids for two-story automobile service, repair and garage building, to cost \$110,000 with equipment.

Following recent acquisition of Davis Boring Tool Co., Spring and Forest Park Avenues, St. Louis, Larkin Packer Co., 6200 Maple Avenue, manufacturer of oil well equipment and supplies, has begun erection of one-story addition, to be used largely for machine shop in connection with removal of acquired interest to that location, to cost about \$25,000.

Mapes Consolidated Mfg. Co., Tenth and Locust Streets, Kansas City, Mo., has authorized construction by day labor of one-story and basement machine shop, 56 x 80 ft., to cost about \$21,000 with equipment. John C. Lawrence, Commercial Building, is architect.

Plant and general offices of Scullin Steel Co., St. Louis, are at 6700 Manchester Avenue. Sales department only is located in Security Building, Fourth and Locust Streets.

East St. Louis Casting Co., Sixteenth Street and Kansas Avenue, East St. Louis, Ill., has plans for one-story foundry for furnace castings, to cost more than \$30,000 with equipment.

New England

BOSTON, JULY 2.—Comparatively few machine tools were sold the past week. Dealers were active, however, following up prospects which give promise of closing this month. It is reported that the Boston & Albany Railroad has bought some of the tools included in its list of about 25 machines, including radial drills and milling machines. The third list of tools for the Boston Hyde Park district school includes the following:

Two 14-in. x 6-ft. tool room lathes.	One 15-in. shaper.
One 13 x 30-in. geared-head lathe.	One 2½-in. radial drill.
One 1¼ x 8-in. turret lathe.	One 24-in. turret lathe.
One 20-in. shaper.	One heavy-duty geared-head engine lathe.
One 16-in. crank shaper.	Two 15-in. x 6-ft. engine lathes.

It is understood the city will purchase these machines, as well as others contained in two previous lists, some time this month. A manufacturer of electrical goods is in the market for a radial drill. Several textile mills have signified their intention of replacing machine shop tools within the next few months. This is the first time in more than a year the mills have evinced any interest in metal-working equipment. A New England machine tool builder is expected shortly to be in the market for some equipment.

Small tools are moving in good volume once more. The most active houses say there has not been a month this year when sales have not run ahead of those last year.

Hunt Spiller Mfg. Corporation, 383 Dorchester Avenue, Boston, has started work on a one-story, 40 x 70 ft. addition. Plans are private.

The city of Brookline, Mass., has awarded contract for alterations to its manual training school. Maurice P. Meade, 80 Boylston Street, Boston, is architect.

Albert Kahn, Inc., 100 Marquette Building, Detroit, is taking bids for a three-story, 117 x 234 ft., service plant addition for Packard Motor Car Co., Commonwealth Avenue and Melvin Street, Boston.

Nashoba Cold Storage Co., Ayer, Mass., has awarded contract for a cold storage plant. Motors and conveying equipment will be used. Haynes & Mason, 280 Main Street, Fitchburg, Mass., are architects.

York Ice Machinery Corporation, 200 Causeway Street, Boston, engineer, is preparing plans for a \$100,000 ice making plant for Ice Utilities, Inc., Fall River, Mass.

American Radiator Co., 120 Federal Street, Boston, has asked bids on general contract for one-story addition to plant at Somerville, 76 x 168 ft., to cost close to \$60,000 with equipment. William A. Dykeman, 10 Devonshire Street, is architect. Headquarters are at 40 West Fortieth Street, New York.

James Purdon, 50 Congress Street, Boston, architect, has revised plans for two-story automobile service, repair and garage building, 100 x 150 ft., to cost approximately \$110,000 with equipment.

In connection with expansion and im-

provement program, American Writing Paper Co., Holyoke, Mass., has approved plans for three-story beater room addition, 40 x 52 ft., and steam power house, 45 x 56 ft., to cost more than \$65,000 with equipment. Entire program will approximate \$500,000.

Plans are under way for establishment of municipal airport at Southington, Conn., including hangars, repair and recondition shops, oil storage and distributing building, etc. Site has been acquired in Plantsville section. Southington Exchange Club, Dewey S. Blakeslee, president, is in charge.

Public Service Co. of New Hampshire, Manchester, plans early construction of transmission line from recently acquired power plant at Bristol to Ossipee and Conway, N. H., about 35 miles, including switching station, substation, etc., to cost about \$100,000.

Henry G. Thompson & Son Co., New Haven, Conn., manufacturer of metal cutting saws and saw machines, has made arrangement with Bay State Saw & Tool Co., Winchester, Mass., by which it will manufacture Bay State line of hack saws. Bay State plant will be removed to New Haven and E. T. Bailey will continue as president.

Fafnir Bearing Co., New Britain, Conn., has let contract to Aberthaw Co., Boston, for erection of manufacturing building in addition to two other structures now under construction. It will be six stories, 60 x 290 ft.

W. Scott Thomas, 303 National Exchange Bank Building, Providence, R. I.,

Pittsburgh

PITTSBURGH, JULY 2.—For some machine tool dealers, June bulked fairly heavy in point of sales, but for most of them it was a rather lean month. Standard machines and tools did little, and it was special machinery that contributed largely to order books of some dealers whose business averaged well with earlier months of the year. Crane business is light, but there are few steel companies in this and nearby districts that are not figuring on improvements and asking for prices for estimating purposes.

Contract has been let by Pittsburgh Safety Glass Co., Frick Building, Pittsburgh, subsidiary of Pittsburgh Plate Glass Co., same address, to Mellon, Stuart & Co., Oliver Building, for new plant at Creighton, Pa., to cost approximately \$800,000 with machinery.

Board of Education, Ambridge, Pa., is considering installation of manual training equipment in addition to junior high school, to cost about \$180,000 with equipment. Bids will soon be asked on general contract by W. Ward Williams, 309 Fourth Avenue, Pittsburgh, architect.

Bids will be received by United

States Engineer office, Huntington, W. Va., until July 10 for 11,900 lb. button-head rivets; 218 steel buckle plates; 700 bolts and 32,053 lb. plates, circular 216

United States Corrugated Fiber Box Co., Seventeenth Street, Wheeling, W. Va., is said to be completing plans for an addition to cost in excess of \$85,000 with equipment.

Pittsburgh Parking Garage, Inc., 555 Sixth Avenue, Pittsburgh, has awarded general contract to Mellon, Stuart & Co., Oliver Building, for seven-story service, repair and garage building, 60 x 200 ft., to cost more than \$200,000 with equipment.

manufacturing plant, to cost close to \$70,000 with equipment.

Haverford Township School Board, Brookline, Pa., plans installation of manual training equipment in two-story addition to junior high school to cost \$200,000, for which plans are being completed by Boyd, Abel & Gubert, Otis Building, Philadelphia, architects.

Detroit

DETROIT, July 2.—Plans are under way by Automatic Products Co., 1145 West Grand Boulevard, Detroit, manufacturer of screw machine products, for one-story addition, 120 x 450 ft., to cost in excess of \$150,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects.

Belle Isle Creamery Co., 3600 East Forest Avenue, Detroit, has filed plans for two-story automobile service, repair and garage building for company trucks and cars to cost about \$90,000 with equipment. Williams & Coughlan, Kresge Building, are architects.

Flint Super-Speedway Airport, Inc., Flint, Mich., has secured permission to sell stock in amount of \$798,000, fund to be used for establishment of airport, to include hangars, repair and mechanical shops, oil storage and distributing buildings, and other units.

Verner, Wilhelm & Molby, Book Building, Detroit, architects, have plans under way for naval airport at Grosse Isle, Mich., consisting of metal hangars, machine and repair shops, administration building, oil storage and distributing building and other units.

Oakland Motor Car Co., Pontiac, Mich., has authorized plans for group of foundry buildings, comprising six one-story structures, totaling 200,000 sq. ft. of floor space, to cost more than \$500,000, with equipment. Company is also planning for installation of new chassis parts plant unit.

International Harvester Co., 606 South Michigan Avenue, Chicago, truck division, is said to be completing plans for one-story factory branch, service and repair building at Detroit, to cost close to \$100,000 with equipment.

V. J. Waier & Co., 2539 Woodward Avenue, Detroit, architects, have plans for three-story automobile service, repair and

garage building to cost upward of \$100,000 with equipment.

Grand Haven Stamping Works, Inc., Grand Haven, Mich., has completed arrangements for one-story addition, to cost more than \$25,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has acquired property at Grand Rapids, Mich., and plans early erection of new factory branch and distributing plant, to cost about \$180,000 with equipment.

Marquette County Commissioners, Ishpeming, Mich., have plans for a new automobile service, repair and garage building for County motor trucks and cars, to cost about \$85,000 with equipment.

Contract for new General Motors engineering laboratory has been awarded to the Everett Winters Co., Detroit. It will be 12 stories, 210 x 231 ft., and will cost approximately \$2,500,000.

Great Lakes Chemical Works, Idaho Avenue at Detroit Terminal Railroad, Detroit, whose plant was destroyed by fire June 12, has moved into new quarters at West Jefferson Avenue and Junction Street and has installed equipment for production of Babbitt metal, solder, type metal and metal oxides, practically doubling former capacity.

Buffalo

BUFFALO, July 2.—Contract has been let by Carborundum Co., Buffalo Avenue, Niagara Falls, N. Y., to Laur & Mack, 1400 College Street, for a five-story addition, to cost in excess of \$85,000, with equipment. L. J. Call is company engineer.

American Cyanamid Co., Niagara Falls, Ont., with headquarters at 535 Fifth Avenue, New York, is arranging for increase in capital stock from 320,000 to 500,000 shares, to total about \$3,297,000, a considerable portion of fund to be used for extensions and improvements in plants at Niagara Falls and Warners, N. J., and for new plant on site lately secured at Linden, N. J.

George J. and Albert P. Ahles, 623 Roosevelt Avenue, Rome, N. Y., have organized Fort Stanwix Mfg. Co., capitalized at \$36,000, and plan early operation of plan for manufacture of tools, dies, jigs and kindred products.

E. B. Green & Sons, and Albert H. Hopkins, 1 Niagara Sq., Buffalo, architects, have plans for six-story automobile service, repair and garage building, to cost in excess of \$500,000 with equipment, to be owned and operated by Genesee Motoramp Garage, Inc., 93 Pearl Street.

Curtiss Aeroplane & Motor Co., Inc., Kail Street, Buffalo, is arranging for increase in capital from 300,000 to 600,000 shares of stock, no par value, a considerable portion of proceeds to be used for expansion and improvements, including construction of new plant units. A reconstruction program, arranged by previous financing is now under way, to cost approximately \$250,000.

D. H. P. Mfg. Co., Inc., Johnstown, N. Y., has been organized by Henry and Mitchell Denkert, 308 South Melcher Street, with capital of \$50,000, and contemplates early operation of plant for manufacture of water strainers, filters and kindred products.

Plans are being considered by Sealright Co., Inc., Fulton, N. Y., manufacturer of special sealed cardboard containers, etc., for a two-story addition to cost more than \$200,000 with machinery.

Philadelphia

PHILADELPHIA, July 2.—Property at 1202-10 Filbert Street, Philadelphia, has been purchased by Nevin Bus Terminal Co., Philadelphia, as site for multi-story service, repair and terminal garage, to cost in excess of \$180,000 with equipment.

Board of Education, Nineteenth and Ludlow Streets, Philadelphia, contemplates installation of manual training equipment in new four-story senior high school in Olney section, to cost close to \$500,000, for which plans will be drawn by Irwin T. Catharine, address noted, architect.

Thomas W. Swanger, 4607 Fern Hill Road, Philadelphia, and associates have organized Swanger Brothers Co., to operate local plant for manufacture of tools and machine specialties. William E. Swanger, Hackettstown, N. J., is also interested in new company.

Pennsylvania Salt Mfg. Co., Widener Building, Philadelphia, has authorized immediate construction of plant on 43-acre tract, recently acquired at Tacoma, Wash., to be operated by its subsidiary, Tacoma Electrochemical Co. Three buildings will comprise initial unit, totaling close to 30,000 sq. ft. of floor space, to cost more than \$200,000 with equipment. Entire project will cost approximately \$1,000,000.

Christian Gunther, Jr., 1618 Germantown Avenue, Philadelphia, and associates have organized Titgen-Eastwood Co., with capital of \$50,000, and contemplate early operation of plant for production of foundry equipment and supplies.

Department of Institutions and Agencies, Trenton, N. J., is completing plans for one-story industrial building at Colony for Feeble Minded, Vineland, N. J., to cost about \$100,000 with equipment. C. N. Leatham, State Office Building, is architect.

Tidewater Fertilizer Co., New Castle, Del., has acquired local industrial property and will remodel for new plant unit, with installation of electrically-operated machinery, conveying equipment and auxiliary apparatus.

Bethlehem City Ice Co., Bethlehem, Pa., care of Butz & Clader, 523 Hamilton Street, Allentown, Pa., architects, is having plans prepared for one-story ice-

The Crane Market

INQUIRY for overhead traveling cranes has declined somewhat in the past week or 10 days, but there is some good business still to be placed. Among recent inquiries is a request for prices on two 5-ton electric cranes from the Fairbanks Co., New York, for its plant at Binghamton, N. Y. The United States Hoffman Machinery Corporation, New York, is in the market for two small cranes and some monorail with hoists for its plant at Syracuse, N. Y. Inquiry for locomotive cranes is less active than a few weeks ago. Action seems to be expected soon on the list of cranes and steam shovels being inquired for by Dwight P. Robinson & Co. for export to South America.

In the Chicago district the Appleton Machine Co., Appleton,

Wis., is about to buy two 10-ton electric traveling cranes, and the Public Service Co. of Northern Illinois is in the market for a 15-ton and 35-ton electric traveling crane.

Among recent purchases are:

Montan Treating Co., Boston, a 15-ton, 8-wheel locomotive crane, reported purchased from American Hoist & Derrick Co.

Griffin Wheel Co., Chicago, three 1-ton wheel pitting cranes, through Page Sales Service, Chicago, from Milwaukee Electric Crane & Mfg. Co.

American Rolling Mill Co., Butler, Pa., a 25-ton overhead crane from Morgan Engineering Co.

Kitts Steam Specialty Co., Inc., Oswego, N. Y., manufacturer of valves, traps and steam specialties, has moved from 56 East Second Street to its new plant at West Second and Erie Streets.

Oswego Falls Corporation, Fulton, N. Y., has awarded contract to Austin Co. for two-story factory, 100 x 113 ft., at its Sealright branch, for manufacture of paper containers.

Gulf States

BIRMINGHAM, July 2.—Plans are being arranged by Texas Co., Texas Co. Building, Houston, Tex., for construction of pipe line from West Texas to Houston, about 470 miles, to cost close to \$10,000,000 with booster stations, etc. It is purposed to extend line shortly following from Houston to Port Arthur, Tex., about 90 miles, where main refinery of company is located.

Rome Electric Range Co., Rome, Ga., recently reorganized with capital of \$1,500,000, is planning removal of plant to Huntsville, Ala., where facilities will be provided for increased capacity.

Traders' Oil Mill Co., Fort Worth, Tex., plans one-story addition to cottonseed oil mill to cost \$25,000 with equipment.

Claiborne Parish School Board, Haynesville, La., is considering installation of manual training equipment in two-story and basement high school to cost \$200,000, for which bids have been asked on general contract. Edward F. Neild, City Bank Building, Shreveport, La., is architect.

Clyde Steamship Co., Pier 36, North River, New York, is said to be planning new cold storage and refrigerating plant at its pier at Miami, Fla., to cost about \$55,000 with equipment.

Texas Wire & Nail Mfg. Co., Galveston, Tex., is completing work on new plant and plans early operation; galvanized wire department will also be placed in service within few weeks. Plant will have capacity of about 2000 kegs of nails. 50 tons of galvanized wire, and about 100 tons barbed wire per day. Company has authorized installation of department for keg manufacture. Charles Jackson is plant superintendent.

S. S. Dutton Co., Sanford, Fla., is planning to rebuild its ice and precooling plant recently destroyed by fire, with loss in excess of \$100,000 including machinery.

Central Power & Light Co., San Antonio, Tex., plans extensions and improvements in La Palma power plant, vicinity of San Benito, Tex., including installation of 10,000-kw. turbo-generating unit and accessory equipment. Additions will also be made in transmission lines.

Board of Education, Port Arthur,

Tex., plans installation of manual training equipment in new two-story Thomas Jefferson High School, to cost \$400,000, for which bids will soon be asked on general contract. M. Lemmon, Construction Industries Building, Dallas, Tex., is architect.

James B. Clow & Sons, Inc., North Talman Avenue and West Lake Street, Chicago, manufacturer of plumbing equipment and supplies, pipe, etc., has acquired a controlling interest in Na-

tional Cast Iron Pipe Co., Birmingham, and contemplates expansion in facilities for increased production.

Pecos Valley Refining Co., Pyote, Tex., has approved immediate addition to gasoline refinery to cost more than \$125,000 with equipment.

Refining Castings Corporation, Dallas, Tex., has been formed to operate gray iron foundry, specializing in refinery castings. Contracts for building and equipment have been let.

Chicago

CHICAGO, JULY 2.—June closed as an unusually good month in the machine tool trade. The character of business, however, was quite different from a year ago at this time. In the first six months of 1928 only one major railroad list has been submitted to dealers in this district. In the absence of railroad business there has been a large volume of orders from agricultural implement manufacturers, a fair amount of which has been for replacement and plant betterment, and a large number of machine tools have been purchased for plant extensions, especially in tractor works. For several months there has been a good run of miscellaneous orders from scattered sources. Fresh inquiry from the railroads includes a 36-in. shaper for the Rock Island and a 36-in. boring mill for the Chicago, Burlington & Quincy. Used tools are in fair demand.

Contract has been let by Mills Novelty Co., 4110 Fullerton Avenue, Chicago, manufacturer of vending machines and parts, to Thomson & Son, 30 North La Salle Street, for a four-story addition, to cost \$175,000 with equipment. F. Rogers, 14 West Washington Street, is architect.

Board of Education, Decatur, Ill., plans installation of manual training equipment in new three-story junior high school, to cost \$300,000, for which bids will soon be asked on general contract. Brooks, Bramhall & Dague, National Bank Building, are architects.

R. B. Kurzon, 105 West Monroe Street, Chicago, architect, will soon take bids on general contract for three-story automobile service, repair and garage building, to cost about \$425,000 with equipment.

C. S. Card Iron Works Co., Denver, Colo., has plans for one-story addition to machine shop, 40 x 240 ft., to cost about \$23,000 including equipment.

Lubbers & Bell Co., North Second Street, Clinton, Iowa, manufacturer of hardware products, will proceed with work by day labor on one-story addition, 85 x 160 ft., to cost close to \$40,000 with equipment. A. N. Morrell, Clinton, is architect.

Halsam Products Co., 1801 Warren Avenue, Chicago, manufacturer of toys, etc., is completing new three-story plant, 35 x 125 ft., to replace a structure destroyed by fire several months ago.

Peoples Gas Light & Coke Co., 122 South Michigan Avenue, Chicago, has

awarded general contract to Ford & Phillips, 559 West Van Buren Street, for one-story meter building and laboratory, with repair and parts departments, testing division, etc., to cost in excess of \$50,000 with equipment.

William Robertson & Son, Chicago, manufacturers of high pressure lubricators, have moved their office and factory to 1424 North Halsted Street.

O. C. Keckley Co., Chicago, has acquired control of Lowerie Mfg. Co., Springfield, Ill., manufacturer of hydraulic presses.

Indiana

INDIANAPOLIS, July 2.—Contract has been let by Warner Gear Co., Muncie, manufacturer of automobile transmissions, to Albert J. Glaser, 610 South Jefferson Street, for a two-story addition, to cost about \$80,000 with equipment; also contract to Austin Co., Cleveland, for one-story machine shop, 150 x 250 ft., to cost approximately \$50,000 with equipment. R. P. Johnson is president.

DuBois-Robineau Furniture Co., Du Bois, has awarded general contract to Van Hoy Construction Co., Logansport, Ind., for rebuilding two-story factory recently destroyed by fire, to cost \$100,000 with equipment.

Certaineed Products Co., Anderson, manufacturer of roofing products, etc., will make extensions and improvements in plant to cost in excess of \$50,000 with equipment.

Board of Sanitary Commissioners, City Hall, Indianapolis, O. C. Ross, president, will receive bids until July 17 for centrifugal pumping machinery and auxiliary equipment for extensions in sewage disposal plant in Eagle Woods district. Charles H. Hurd, Merchants' Bank Building, is engineer.

Evansville Ice & Storage Co., 10 North Eighth Street, Evansville, has asked bids on general contract for two-story cold storage and refrigerating plant, to cost about \$65,000 with equipment. G. E. Wells, Inc., 100 West Monroe Street, Chicago, is engineer.

Truck Engineering Co., East Pontiac Street, Fort Wayne, has engaged Guy Mahurin, Standard Building, architect, to prepare plans for two one-story units at

motor truck equipment plant, to cost more than \$35,000 with equipment. Roy Spaulding is general manager.

Stanworth Tool Mfg. Co., manufacturer of counterbores, countersinks, end mills, reamers, etc., formerly at Indianapolis, is now operating in its new plant at Lebanon. Manufacturing space has been tripled, new equipment has been installed, and production has been considerably increased.

Taylor Brothers Mfg. Co., Elkhart, has been organized to manufacture grease guns, non-corrosive terminals and cables, cantilever tool boxes and measuring devices. Products will be manufactured by company or under contract, principally at plant of Indiana Aluminum Ware Corporation. C. E. Taylor is president of company.

Cincinnati

CINCINNATI, JULY 2.—Machine tool buying was sustained at a moderate rate the past week, with the result that sales in June closely approximated those in May. Three or four leading builders report that bookings last month were from 10 to 15 per cent better than in the previous month. On the other hand, a number of manufacturers noted a downward trend in orders. The tone of the market is healthy, and most executives are optimistic about the outlook for business during the summer. While a recession is expected, it is not likely that it will assume grave proportions. Several companies are of the opinion that purchases will continue at the present rate through July and August.

Sales in the first six months of 1928 were from 15 to 20 per cent ahead of those in the same period of 1927. It is worthy of note that those companies which have specialized in building high production tools are the ones which have made the best records during the first half of the year. Automobile makers have accounted for only a small percentage of the machinery sold in the last 30 days, most of the business having been placed by companies in the general industrial field.

Bids will be received by State Department of Public Welfare, Columbus, for new power plant and equipment at local Institution for Feeble Minded, as per plans and specifications at office of Herbert B. Briggs, Ohio-Hartman Building, State architect. Same department has plans under way for power plant and equipment, water supply and tunnel system at State institution at Apple Creek, to cost more than \$200,000, for which bids will be asked in August. J. E. Harper is director.

Constructing Quartermaster, Wright Field, Dayton, Ohio, will receive bids until July 20 for expansion joints.

Procter & Gamble Co., Gwynne Building, Cincinnati, has filed plans for addition to plant at St. Bernard, Ohio, comprising pumping plant, tank and tower building, and lime recovery unit, to cost about \$45,000.

United States Stove Corporation, South Pittsburg, Tenn., recently organized under Delaware laws, has acquired local plant and business of Wetter Mfg. Co., manufacturer of stoves, heating equipment, etc. New owner is disposing of bond issue for \$175,000, portion of proceeds to be used for extensions and improvements.

Atlantic Ice & Coal Co., 106 Collins Street, S.E., Atlanta, Ga., has plans for ice-manufacturing plant at Knoxville, Tenn., with initial output of 125 tons per day; a cold storage unit will also be built, entire project to cost in excess of \$150,000 with equipment. Engineering department is in charge.

Board of Education, Louisville, plans installation of manual training equipment in new three-story high school to cost \$235,000, for which plans have been filed. S. D. Jones is business director.

Cleveland

CLEVELAND, JULY 2.—Increased activity developed in the machine tool market in the Michigan territory the past week. The Pontiac Motor Car Co. purchased a fair sized lot of production machinery, and some other good business is pending from another automobile manufacturer. The market continues rather quiet in the Cleveland territory. There is some demand from manufacturers of automobile parts and tire molds, but orders are confined mostly to single tools. The Columbia Chemical Co., Barberton, Ohio, came into the market for a number of machines, but is understood to have purchased used tools from a Chicago dealer. Turret lathes continue to move well in single orders. Machinery business in June, on the whole, will show about the same volume as during May.

Plans are being drawn by the Federal Foundry Supply Co., 2639 East Seventy-ninth Street, Cleveland, for new one-story plant, 90 x 255 ft., to cost about \$130,000 with equipment. E. A. Welland & Co., 2725 Pittsburgh Avenue, are architects.

Radio Electric Co., Scienceville, Ohio, manufacturer of lighting equipment,

nickel-plated desk lamps, etc., has approved plans for one-story plant, 60 x 165 ft., to cost about \$50,000 with equipment.

Ohio Power Co., Canton, Ohio, will issue bonds in amount of \$6,333,000, and preferred stock for \$2,111,400, a portion of proceeds to be used for extensions and improvements.

Board of Trustees, Marsh Foundation School, Van Wert, Ohio, Dr. R. R. Reeder, director, is having plans drawn for new industrial arts building, to cost more than \$90,000 with equipment. Langdon, Hohly & Gram, Security Building, Toledo, Ohio, are architects.

Thompson Products Co., 2196 Clarkwood Road, Cleveland, manufacturer of bolts, nuts, etc., has awarded general contract to deHamel Construction Co., Plymouth Building, for one and two-story addition, 53 x 122 ft., to cost about \$55,000 with equipment.

White-Chevrolet Co., Zanesville, Ohio, local representative for Chevrolet automobile, is completing plans for three-story and basement service, repair and garage building, totaling about 45,000 sq. ft. floor space, to cost close to \$95,000 with equipment. W. S. Jameson, 31 North Fifth Street, is architect.

Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, has acquired municipal light and power plant at Ashtabula, Ohio, and plans expansion and betterments, including construction of transmission lines for connection with present system, as well as other lines for power supply in Ashtabula dock district.

Steubenville Pressed Steel Co., Steubenville, Ohio, has been formed to manufacture and fabricate pressed steel products. Temporary quarters have been leased and company has begun manufacture of garage hardware.

Pacific Coast

SAN FRANCISCO, June 27.—H. W. Hull, 851 Monadnock Building, San Francisco, and associates have made application for permission to construct and operate a hydroelectric power plant on Independence Creek in Klamath National Forest, to cost in excess of \$200,000.

Diamond Hardwood Flooring Co., Los Angeles, plans rebuilding portion of mill destroyed by fire June 19, with loss more than \$80,000 including equipment.

Chaffey Union High School District, Ontario, Cal., is planning new vocational school unit in connection with high school group, to cost in excess of \$300,000. Allison & Allison, Hibernian Building, Los Angeles, are architects.

Board of Public Works, San Francisco, has granted appropriation of \$50,000 for addition to municipal car barns, for repair and garage service for motor buses used on system. M. M. O'Shaughnessy is city engineer.

Watsonville Ice & Cold Storage Co., Watsonville, Cal., is arranging an expansion and improvement program to cost \$250,000, including installation of equipment. Initial work will consist of extensions and betterments in power house to cost about \$75,000.

Union Pacific Railroad Co., Portland, has taken out permit for a one-story forge and blacksmith shop at its repair yards, to cost close to \$30,000 with equipment. Plans have also been completed for one-story flue shop.

Culmuck Furniture Co., Oakland, Cal., will rebuild portion of factory recently destroyed by fire, with loss estimated at \$65,000 including equipment.

Riverside Cement Co., Riverside, Cal., operating mills at Crestmore, near Riverside and at Oro Grande, Cal., is disposing of a preferred stock issue to total \$6,500,000, a portion of proceeds to be used for extensions and improvements. John Treanor is president.

Port of Seattle Commission, Seattle, has plans for a municipal grain elevator with capacity of 1,000,000 bu., to cost \$900,000, with elevating, conveying, screening and other machinery. Engineering department is in charge.

Jenison Machinery Co., 50 Fremont Street, San Francisco, has been formed to acquire good will and stocks of San Francisco office of Smith Booth Usher

Co., operating in northern California as distributor of machine tools, woodworking machinery, construction equipment, pumps, engines, motors and other products.

Hardie Mfg. Co., maker of spray and power pumps, has purchased site at Fifteenth and Northrup Streets, Portland, Ore., and will erect two-story brick and concrete building.

undertaken this summer. D. P. Cruikshank is vice-president.

Imperial Oil Co., King and Church Streets, Toronto, has purchased site on Ninth Avenue for establishment of a garage, office, warehouse, boiler house, barrel washing plant, light products pump house, etc., to cost approximately \$300,000.

Western Canada

Langley Electric Mfg. Co., Ltd., 677 Notre Dame Avenue, Winnipeg, is receiving bids, no closing date set, for a one-story addition, 66 x 100 ft.

Dominion Carton & Envelope Co., Edmonton, Alta., has let contract to L. F. Toby, 433 Tegler Building, for a one-story factory, 100 x 184 ft., to cost \$35,000. Architect is R. P. Blakey, 417 Empire Block.

Claydon Co., Ltd., 708 Confederation Life Building, Winnipeg, has been awarded contract for an addition, 305 x 317 ft., to Weston freight car shops at Winnipeg for Canadian Pacific Railway.

South Atlantic States

BALTIMORE, July 2.—Plans are being completed by International Harvester Co., Truck Division, 606 South Michigan Avenue, Chicago, for one-story factory branch, service and repair building at Baltimore, to cost close to \$115,000 with equipment. Bids will be asked on general contract.

Tidewater Oil Co., 11 Broadway, New York, with main refinery at Bayonne, N. J., has acquired tract of five acres, vicinity of Pennington Avenue and Baltimore & Ohio Railroad, Baltimore, for new storage and distributing plant, to cost more than \$350,000 with machinery.

United Railways Co., Continental Building, Baltimore, is having plans completed for one-story and basement motor bus service, repair and garage building, 195 x 400 ft., to cost in excess of \$150,000 with equipment. W. H. Emory, Jr., 18 East Lexington Street, is architect and engineer.

Lexington & Thomasville Gas Co., Thomasville, N. C., is considering construction of new central artificial gas plant, to cost more than \$150,000 with equipment.

Bids will be received by Chemical Warfare Service, Edgewood Arsenal, Md., until July 13 for one steam heated tray dryer with fan; one sifting machine; one grinding mill and auxiliary equipment, circular 120; until July 13 for one oxygen bomb-testing apparatus; one laboratory outfit, and one 12-in. recording hygrometer, circular 119.

Public Improvement Commission, Munsey Building, Baltimore, has plans for a

two-story storage and distributing plant for municipal service, to cost about \$375,000 with conveying, elevating and other equipment. J. E. Greiner, Lexington Building, is engineer.

McGowan-Motes Motor Co., 521 Broad Street, Augusta, Ga., will soon begin erection of one-story service, repair and garage building, 130 x 145 ft., to cost about 100,000 with equipment. Willis Irvin, S. F. C. Building, is architect.

District Commissioners, District Building, Washington, contemplate installation of manual training department in new E. A. Paul Junior High School, Brightwood district, to cost \$500,000, for which bids will soon be asked on general contract. A. L. Harris, District Building, is architect.

City Council, Shelby, N. C., has approved plans for extensions and improvements in municipal electric light and power plant, including installation of additional equipment.

Henry I. Grines, Asheville, N. C., architect, has filed plans for three-story automobile service, repair and garage building, 145 x 200 ft., to cost upward of \$100,000 with equipment.

American Chatillon Corporation, 393 Seventh Avenue, New York, has awarded general contract to McClintic-Marshall Co., Oliver Building, Pittsburgh, for rayon mill at Rome, Ga., to include power house, machine shop and other mechanical units, to cost in excess of \$3,500,000. Lockwood, Greene & Co., 1 Pershing Square, New York, are architects and engineers.

Canada

TORONTO, JULY 2.—Machine tool sales have fallen off the past week, but from recently announced programs of some industrial companies for plant extensions, prospects for an early resumption of buying are good. The automotive industry continues to buy for replacement and the General Motors of Canada, Oshawa, is having lists prepared for equipment for a new plant in western Canada and another in Ontario. A brisk demand is reported for small tools from mining fields of Ontario.

Construction has been started on a newsprint mill at Liverpool, N. S., for Royal Securities Corporation, Montreal. Work has also been started on a 20,000-hp. hydroelectric plant by Nova Scotia Power Commission to supply power for mill. Foundation Co. of Canada, Ltd., Montreal, has general contract for both mill and power plant.

Weaver Canadian Co., Ltd., Chatham, Ont., manufacturer of automobile jacks and pumps, garage equipment, etc., is having plans prepared for a new plant, 36 x 190 ft.

Bids are being received by B. A. Jones, architect, 14 Ontario Street South, Kitchener, Ont., for one-story addition, 50 x 125 ft., to plant of Galt Art Metal Co., 385 Dundas Street, Galt, Ont.

American Can Co., 2065 Jeanne d'Arc Street, Montreal, will build a five-story

addition to its factory, 130 x 200 ft. Company engineers have plans.

W. H. Wardwell, 1463 Union Avenue, Montreal, is preparing plans for a 10-story warehouse for Manufacturers Terminal Co., 1835 Ontario Street East, Montreal.

Bids will be called soon for a new plant on Coxwell Avenue for Service Station Equipment Co., Ltd., 510 King Street East, Toronto, manufacturer of gasoline pumps. It will be one story, 122 x 340 ft., steel and brick construction.

Ralston, Purina Co., Ltd., Main Street, Woodstock, Ont., has awarded contract to Harding Construction Co., Buffalo, for a five-story addition, 80 x 80 ft., to cost \$60,000.

Steel Equipment Co., Pembroke, Ont., is planning an addition to its factory to cost approximately \$70,000; work to be

Hell Co., 1131 Montana Avenue, Milwaukee, Wis., manufacturer of steel dump bodies, hydraulic hoists and tank equipment, etc., has placed general contract with Klug & Smith, consulting engineers, 69 East Wisconsin Avenue, local, for erection of a one-story addition, 74 x 302 ft. Inquiry is being made for miscellaneous equipment, including punches, shears, drills, shapers, lathes, etc. Hydro-Hoist Co., a subsidiary, recently was consolidated with Heil Co., and present enlargement is for benefit of both operations. Julius P. Heil is president, treasurer and general manager.

Modine Mfg. Co., 1700 Racine Street, Racine, Wis., manufacturer of automobile, truck and industrial radiators and coolings systems, will place contracts about Aug. 1 for additions costing approximately \$100,000.

Board of Education, Antigo, Wis., is taking bids until July 7 for a two-story addition, 52 x 74 ft., to Antigo Vocational Training School, to be used largely for metal and wood-working processes. Designer is Donald M. Schopeke, 125 Wausau Road, Antigo.

Hochenauer-Stresau, Inc., Milwaukee, has been organized to manufacture machinery, mechanical appliances and devices. Principals include Carl J. Hochenauer, 1510 Maryland Avenue, who has been a sales manager of A. O. Smith Corporations; R. S. Stresau and Leo Mann. Definite plans will be made public later.

Belle City Mfg. Co., Racine, Wis., manufacturer of individual threshing outfits, crawler attachments for tractors, etc., has taken over production and marketing of line of corn harvesting and husking machines heretofore made by Continental Mfg. Co., Springfield, Ohio. No important additions to plant or equipment will be made at this time, however.

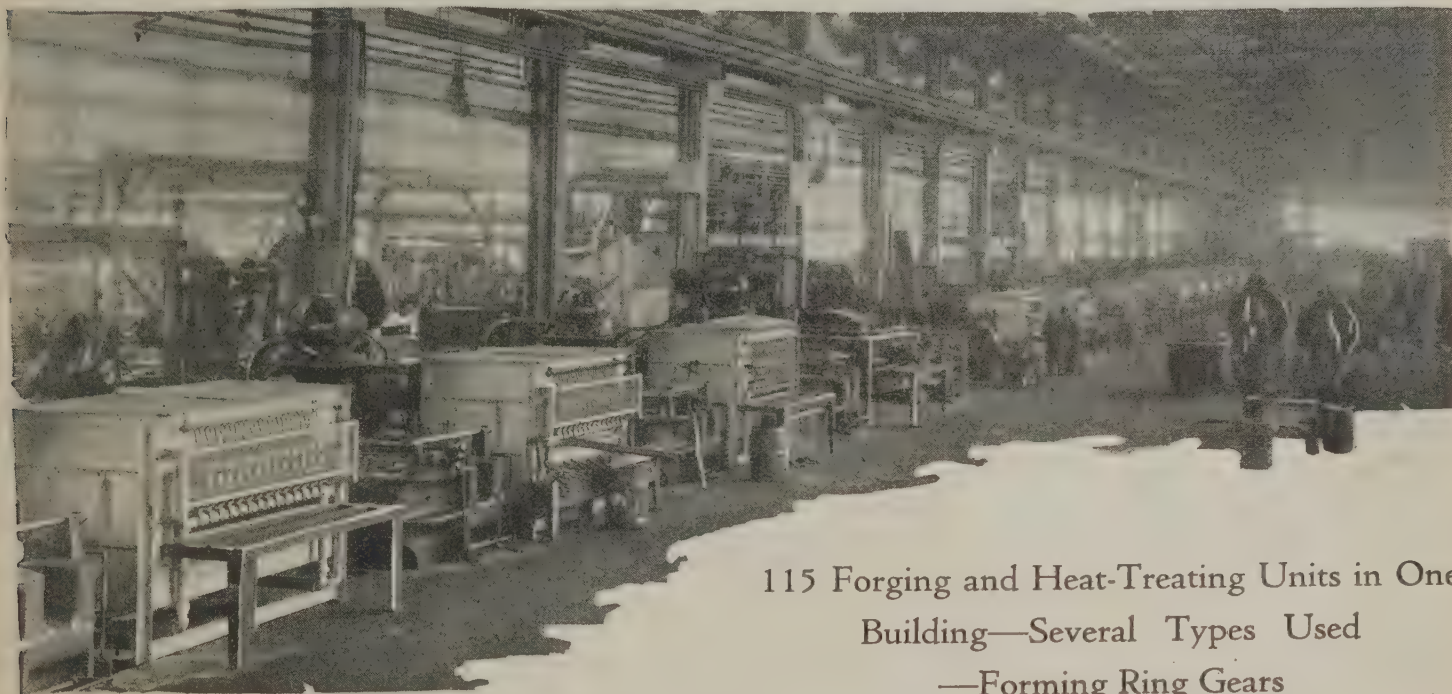
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Ford Uses Many Electric Furnaces



115 Forging and Heat-Treating Units in One Building—Several Types Used—Forming Ring Gears

BY FAY LEONE FAUROT*

PROBABLY the largest group of electric furnaces to be found in any one building in the world is in the Fordson plant of the Ford Motor Co. This big installation is in the spring and upset building. Here there are 115 electric furnaces using a total of about 20,000 kw. Seventy-six are operating in the spring department and 28 in the forging department, the remaining 11 being used on miscellaneous work.

Nickel-chromium in ribbon form is used as a resistor in those furnaces where the temperature does not exceed 1500 deg. Fahr. In some of the high-temperature furnaces troughs of carbide compound filled with pulverized carbon are used. Others are fitted with globar resistors, a non-metallic resistance element resembling silicon-carbide in appearance. Two of the furnaces use wire and one uses graphite for a heat source.

Alternating current is supplied at the building at 13,200 volts. From a substation it is carried to two distribution points, where it is transformed into 220 and 440 volts respectively. The 76 furnaces in the spring department are capable of handling 6000 rear springs and 12,000 front springs for the new Ford Model A, and 2500 springs for the truck, in two 8-hr. shifts. Two of the furnaces, on the

eye operation, are equipped with transformers which permit the voltage to be increased when it is desired to accelerate heating the springs.

Ford engineers say that the metal resistor type of furnace is long lived, simple and efficient. The form of its resistor makes it an easy matter to locate the heat source in any part of the furnace, or to have varying degrees of temperature in different parts of the same furnace. Elements composed of lengths of nickel-chromium on frames of fused aluminum oxide and fire clay are installed in floor, walls or ceiling of a furnace, or in any two or three of these places if desired. Thus heat may be put exactly where needed. When a break-down occurs these resistors may be removed easily through panels in the furnace walls, and repairs made in a short time.

Ribbon resistor-type furnaces have been operated for as long as a year without any apparent change in the area of the cross-section of the resistor or other deterioration of its structure. Ribbons of various cross-sections are used, those of common size being 0.03 x 1½ in.; 0.08 x 1½ in.; 0.08 x 1¾ in.; ¼ x 1¾ in., and 0.05 x 1¾ in. The usual combination alloy for temperatures up to 1900 deg. Fahr. is about 80 per cent nickel and 20 per cent chromium. In small laboratory furnaces the resistor is often in the form of a continuous wire.

The globar type of resistor is well regarded also, es-

*Mechanical engineer, 420 Lexington Avenue, New York.

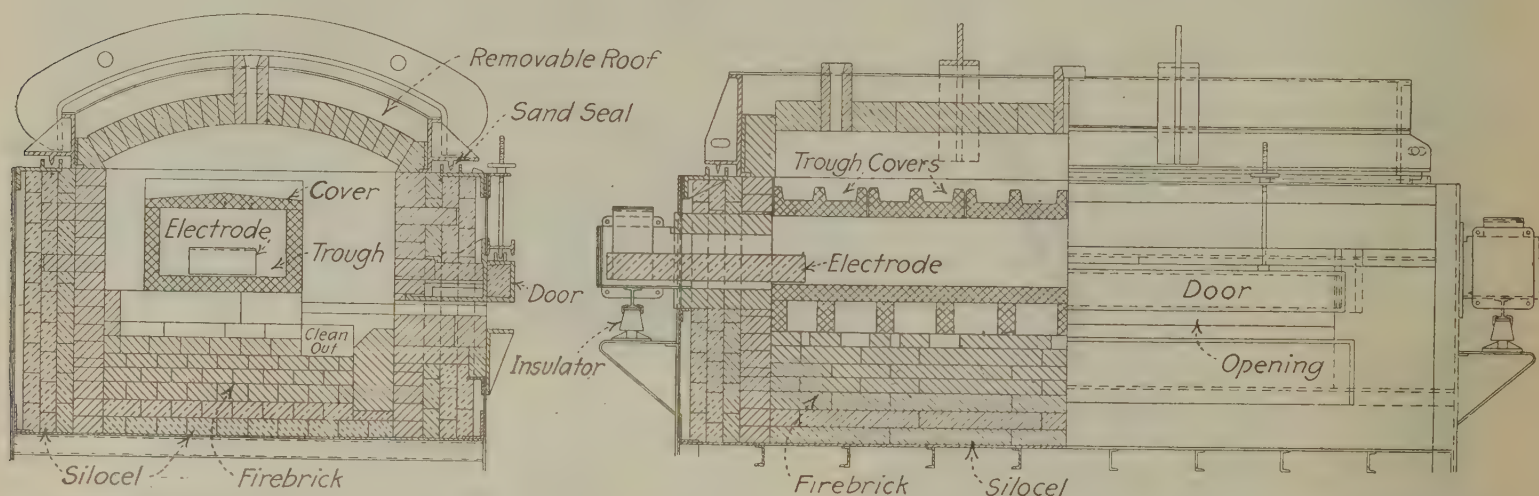
At head of page is general view of one group of the electric furnaces in the spring and upset building at the Fordson plant.

pecially for those furnaces that operate at higher temperatures than 1500 deg. Fahr. For forging furnaces, where temperatures range from 2300 to 2400 deg. Fahr., the globar units give excellent results. They have been known to last 1000 to 1200 hr. and with further development it is said 2500 hr. will be possible. They are economical, easy to introduce into the furnace, rigid, strong and not liable to deterioration. They may be used for lower temperatures also, and of course give satisfactory results. The Ford Motor Co. engineers began experiments with globar resistors in 1925, but it was not until 1926 that the results achieved seemed to warrant their continued use. Since then, however, this form of resistor has been steadily gaining in favor.

The operation of the spring-forming machinery is interesting. Spring steel stock cut to proper size is put on a conveyor and carried through the furnace, both ends of the stock being heated to a proper curling temperature meanwhile. Leaving the furnace they pass downward, are lifted off and inserted in a double press which curls both ends at one operation. Each unit is capable of heating and curling eight spring leaves a minute or 3840 a day. These furnaces are rated at 170 kw. to 252 kw.

with a capacity to heat 2000 lb. of steel an hour to 2250 deg. Fahr. at a power consumption of not to exceed 400 kw. hr. a ton, heating billets 2½ in. in diameter by 8½ in. long. This furnace is approximately 12 ft. long and 7 ft. wide, built of sheet steel, lined with 2 in. of Silocel powder, 4½ in. of Silocel brick, 2½ in. of C-22 insulation brick and 4¼ in. of high-grade fire brick. The furnace roof, of arched type, is removable, equipped with a sand seal, lined with 5 in. of insulation and 4½ in. of refractory brick. The heating elements consist of two covered troughs of silica-carbide containing granular graphite. These troughs, supported on piers, extend lengthwise of the furnace, having suitable power input connections at the ends. Stock to be heated is charged into the furnace through seven openings 12 in. square in the back of the furnace. Heated stock is removed from the front of the furnace through similar openings. All the openings are fitted with hand-operated, counterweighted doors, sealed at the top. The floor of the heating chamber is flat, with the bottom of the discharge opening at 3 ft. 6 in. above the floor line.

Electrical equipment for this furnace includes 225 kw. oil-cooled transformers with primary windings for 440-volt, 60-cycle alternating current, arranged for connection to



ELECTRIC Forging Furnace Having as its Heating Element a Trough of Carbide Compound Filled with Pulverized Carbon and Energized Through a 78-In. Space Between the Two Large Electrodes. This furnace was furnished by the Electric Furnace Co., Salem, Ohio

The 28 electric furnaces in the forging department operate at a temperature of 2350 deg. Fahr. and require a total of 7732 kw. Seventeen of these furnaces use globar resistors, 1¼ in. in diameter x 28 in. There are twenty-seven heating elements to the furnace. Total power per furnace: 337 kw. at 220 volts, three-phase, 60 cycles; of which 187 kw. is on No. 1 control and 150 kw. on the second.

These furnaces are approximately 8 ft. wide, 4 ft. deep and 6 ft. 5½ in. high and are lined with suitable insulation and refractory brick to provide a heating chamber 5 ft. 6 in. wide, 22 in. deep and 22½ in. high to top of arched roof. The whole is inclosed in a steel-plate shell, well braced and reinforced to prevent warping.

Stock to be heated is inserted through a slot adjustable for opening 1 in. to 4½ in. The globar elements, rated at 10 kw. each on a 110 to 120-volt power supply, are star-connected for operation on the 220-volt, three-phase 60-cycle alternating current supplied. They are controlled by Leeds & Northrup recording controllers. These forging furnaces are lined with fire brick, red Silocel and natural Silocel. The resistors are held at each end by water-cooled spring contacts, thus arranged for quick replacement. The furnaces can heat 1000 lb. of steel an hour to 2250 deg. Fahr., with a power consumption giving about 4¾ lb. heated per kw. hr. on stock up to 2 in. in diameter.

A special 450-kw. trough resistor type furnace is designed to operate at a temperature of 2400 deg. Fahr. and

three-phase power supply, with secondary wound with six taps for variable power supply to furnace. The switching and metering equipment consists of one 1000-amp. magnetically operated oil-break switch, for primary circuit for furnace temperature control through Leeds & Northrup recording controller, one 2000-amp. six-point hand-operated selective type oil-break switch for secondary circuit for varying power input to furnace, one indicating type watt-meter, one current transformer and the panel. There is also a relay for magnetic switch operations from Leeds & Northrup controller.

While the greatest number of electrical furnaces are to be found in the spring and upset building of the Fordson plant, there are other installations in the motors and rolling mill buildings.

Three of the 19 furnaces in the motors building are quench furnaces, 24 ft. long, rated at 237½ kw. These are used for hardening the Model A crankshafts. Each furnace here has a capacity of eighty-five crankshafts an hour. They operate at a temperature of 1500 deg. Fahr. To save floor space, the drawing furnaces are built on top of the quench furnaces. The shafts are carried up and through these furnaces on a conveyor, the drawing furnaces using 189 kw. and operating at 700 deg. Fahr.

Other electric furnaces in the motors building include one 82-kw. continuous furnace for hardening push rods, with a capacity of 4800 an hour, one 149-kw. continuous furnace for hardening piston pins, also having a capacity

ELECTRIC Forging Furnace at the Ford Works. The height of opening for charging and withdrawing is adjustable to a maximum of 4½ in. The springs supporting the globar heating elements are back of the screen. A forging machine (behind the operator) is close alongside each furnace

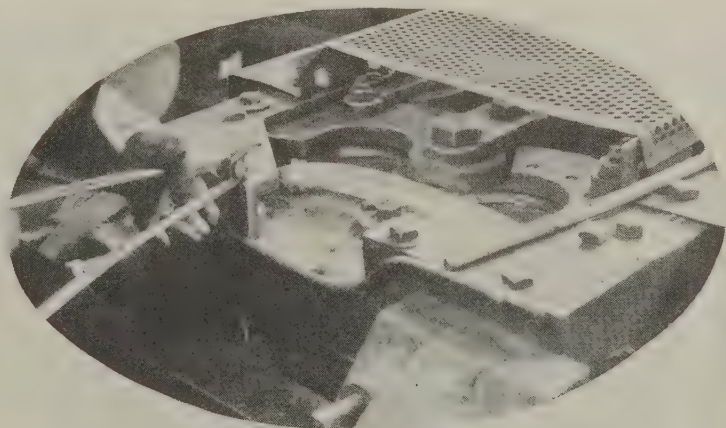
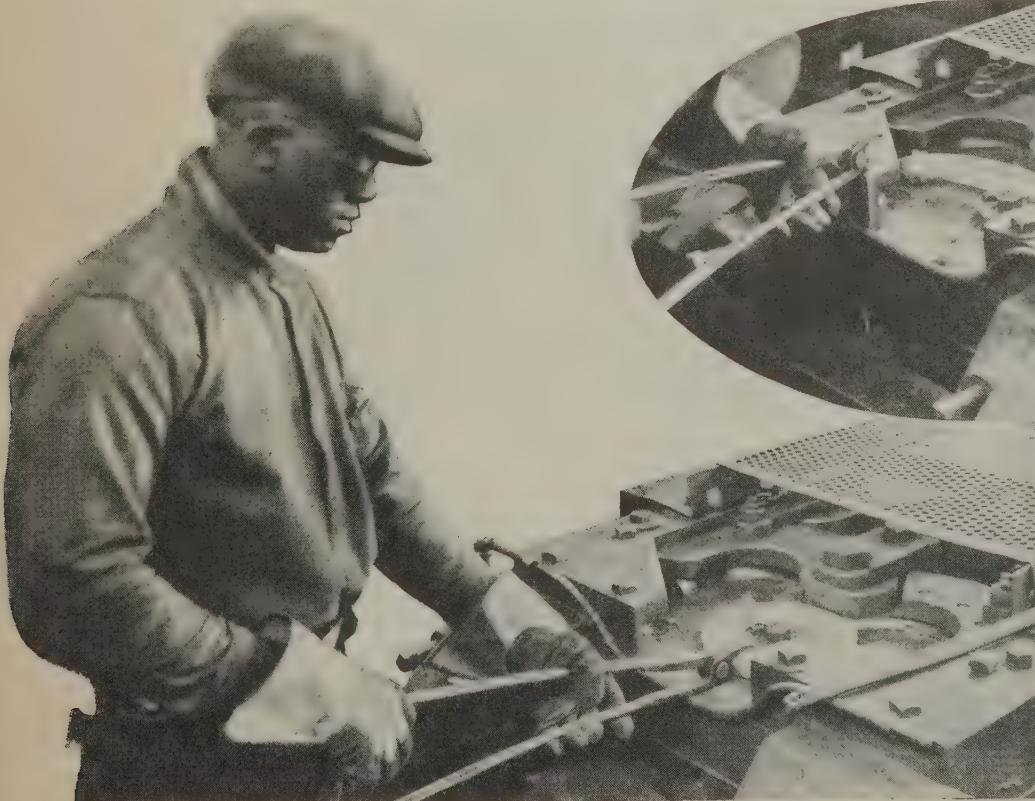


of 4800 an hour; two rotary furnaces, 116 kw., approximately 14 ft. in diameter, which are used for hardening camshafts and which have a capacity of 204 each hour; three continuous quench furnaces, 207 kw., operating at 1500 deg. Fahr., and three drawing furnaces, 199 kw., for heat treating connecting rods and with a capacity of 11,000 rods in 8 hr. Practically all gears are drawn in three continuous furnaces, each 42 ft. long.

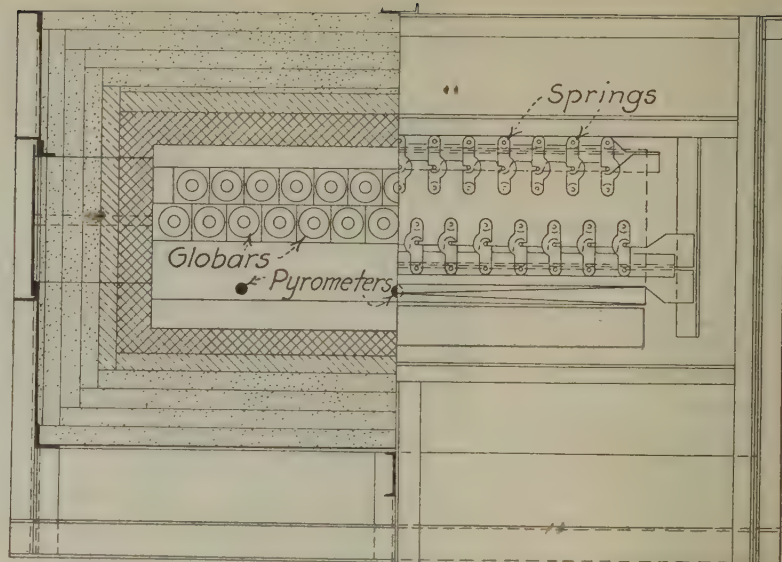
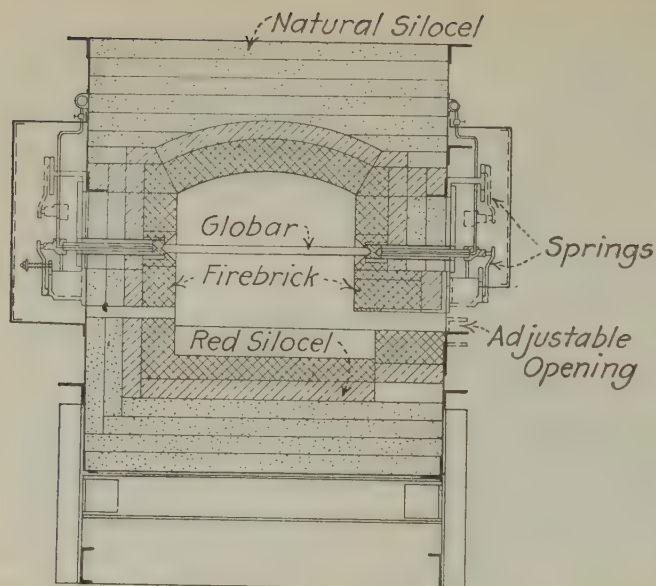
In the rolling mill building are two electric continuous furnaces for heating bar steel for forming ring gears. These use 400 kw. and 300 kw. respectively, both operating at 2000 deg. Fahr. Six other forging furnaces, totaling about 2700 kw., and each operating at about 2350 deg.

Fahr., and two continuous hardening furnaces of 300 kw. each, complete the present installation in the rolling mill building.

When electric power may be had at a low cost, such as 1c. a kwhr., the use of the electric furnace would seem to offer the solution of many of the troublesome problems arising in the forming and heat treatment of steel. In the main the advantages far outweigh the disadvantages. While the first cost of the installation, with its accompanying electrical control apparatus, is high, and the cost of energy per B. t. u. is high, these costs are more than balanced by other economies of operation and control. It is true that an electric furnace heats up slowly from atmos-



FORMING a Ring Gear for the Ford Model A. A piece of steel bar of right section and length is heated to forging temperature and then placed successively in two presses. The first one bends the two ends into a short circular segment, while the second one, shown here, completes the forming of the circle. The forming elements are brought forward by action of the toggles, being pivoted on the same center. The lower illustration shows the result after the forming members have been withdrawn



GENERAL Arrangement of a Globar Furnace, as Used in Forging Practice at the Fordson Works. Each globar element is supported at both ends by a fixture, water-cooled and held in place by springs. This is a Holcroft furnace, with several of its features developed by Ford engineers

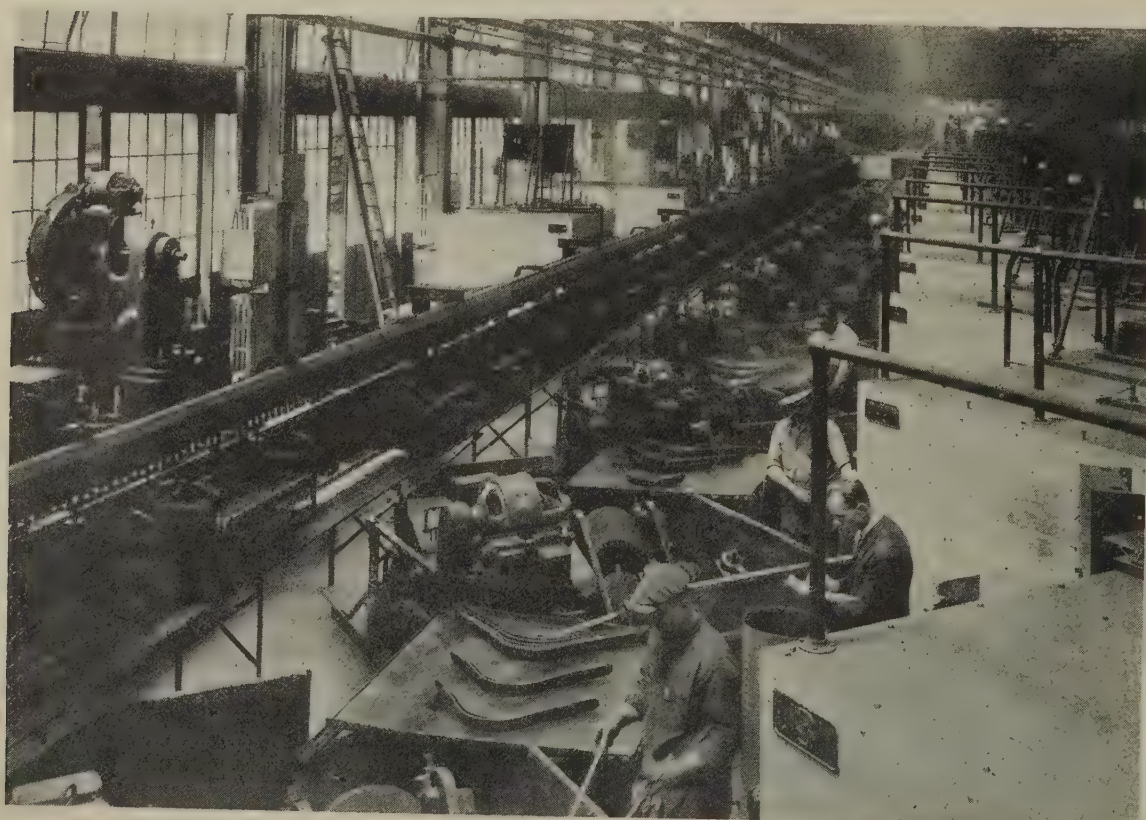
spheric temperature at the start, but its close control afterward balances its account in this respect. Costs of repairs are apt to be high, too, but this condition may be ameliorated by avoiding delays and by making provision for quick replacement of resistors or other failing parts. Finally, there is likely to be some loss in case of intermittent operation.

On the other hand, in the operation of electric furnaces there is first of all a temperature regulation which is at once simple and sure. It is easily controlled automatically, and can be made to stay within very small variable limits. A recording controller makes hand operation or personal attention on the part of the workman or foreman unnecessary. The installation of an electric furnace is simple. It takes up little room. It is clean, both as to outside appearance and operation. The workman can stand near the opening in working position without discomfort. The outside heat is hardly noticeable, even in the hottest weather. Strange as it may seem, there is at times an actual necessity for closing the roof ventilators to prevent an excessive

draft in the spring department, on some days when the wind is in the right direction to cause an excessive draft. The temperature in this furnace room in August is not excessive.

Incidentally, all Ford furnaces are painted with aluminum. The effect both in clean appearance and radiation is at once apparent. In the case of the electric furnace labor cost is at a minimum and a high quality of product is possible, for several reasons. There are no troublesome gases to deal with, no products of combustion in the furnace or escaping into the outside atmosphere of the shops. The space around and above the furnaces may be kept clean; there is little to cause dirt or dust. Electric furnaces may be moved easily, shifted about as work or process lines require. There is little additional equipment needed and most of it can be put on one panel; it is moved with the furnace and set up just as easily.

The stock can be kept clean, there is little tendency to scale, no opportunity for steel to absorb harmful ingredients, such as sulphur, while being heated. The tempera-



HEAT Treatment of Springs in the West Half of the Spring and Upset Building Is Accomplished in a Battery of Electric Furnaces. To conserve space, the drawing furnaces, which operate at a lower temperature, are located on top, as shown. The parts pass from the lower furnace to the one above by means of a conveyor system

ture can be maintained at the desired level and there is no possibility of burning the stock. The furnace can be put into operation at the throwing of a switch, and shut down in the same easy way. The life of the heating chambers is long, because there is no combustion taking place in them and hence no deterioration from gases or fumes.

The fact that there is available at Fordson 500,000 hp.

made at low cost makes the use of electric furnaces for the purpose of heating steel for forging and hardening possible in a large degree. Yet it is beginning to be realized elsewhere that the advantages of electric heating are so many that even this element of power cost may not be so important as it seems. Certainly Henry Ford has shown his confidence in it, and the results seem to justify his judgment.

Automatic Control of Operations

Instruments Giving Both Records of Past Performance and Manipulation of Valves Under Pre-determined Conditions

USE of recording and controlling instruments in the iron and steel industry was reviewed by C. C. Eagle and Roy M. Walker, Bristol Co., Waterbury, Conn., at the Chicago meeting of the Association of Iron and Steel Electrical Engineers. They said that the increasing use of arc welding has created a demand for an instrument to record the cycle of operations and give a history of the work done by the welder. A recording shunt ammeter does this so well that it is regularly furnished with some welding machines. It gives a record of time worked by the welder, so that the faithful welder gets full credit for his work. The character of the curves shows the type of work. If a large stick or two sticks are used, instead of one, to rush the work, this is shown up by the excess current. Reversed polarity hastens the work and badly weakens the weld, and is unmistakably recorded on the chart. If an electrode is thrown on the ground and left there, the straight line curve shown on the chart indicates the grounding of the electrode. Reference to the chart is a help to the welder and enables the supervisor to correct irregularities.

Checking of operations on the reversing valves on open-hearth furnaces is considered of the greatest importance in most steel plants. It is essential that the reversing valve be thrown on schedule from one checker chamber to the other, so that each may be brought up to the proper temperature and fuel not wasted after the checker has absorbed this heat.

An effective way of checking this operation is to install an electric time recorder on the reversing valve. This time recorder has a pen operated by an electromagnet. This pen is wired to a contact on the reversing valve, so placed that, with the valve in one position, the circuit is open; with the valve in the other position, the circuit is closed. The pen moves over when the valve is in one position and moves back when the valve is reversed. The resulting record shows at a glance the exact time of each reversal.

In addition to this record for the superintendent, one plant uses a single-pen recorder at each valve to guide the operator and indicate to him how the furnace was running during the previous shift.

Automatic Control Eliminates Human Factor

Some tendency has been shown of late to do more than keep a record of the reversing valve operations. It has been felt that automatically controlling these operations, thus removing the human factor, would be a decided step forward and well worth some expenditure. This plan also takes into consideration the fact that the checker chamber at one end of the furnace frequently heats up more slowly than that at the opposite end.

A scheme of accomplishing this control has been worked out, using two pyrometer controllers. The location of the thermo-couple has been the greatest problem to consider here. Temperatures in the hot part of the checker work are so high as to require the use of platinum couples,

resulting not only in great initial expense, but also in great care and upkeep of thermo-couples. It has been pretty definitely established that a cooler spot in the rear of the checker work can be located where the changes of temperature are directly proportional to those in the hot zone. This permits the use of base metal couples and results in comparatively little upkeep.

Once this cool spot has been located, and the temperature there corresponding to the maximum temperature desired in the checker work determined, the rest is a simple procedure. A thermo-couple is located in each checker chamber and each couple connected to a pyrometer controller. The spotter on each controller is set at the temperature corresponding to the maximum temperature desired. The two controllers are then wired to the motor at the reversing valve. As soon as checker chamber *A* reaches the desired temperature a contact is closed in controller *a*, which starts the motor of the reversing valve, throwing it over to chamber *B*. Then, as soon as *B* reaches the desired temperature, a contact is closed in controller *b*, and the valve is thrown back to *A*. By means of an automatic reversing switch from the thermo-couples, one controller only will do this work.

Reversing Valves by Temperature Differential

A successful installation has been made to control the reversal of valves by differential temperature. By connecting the two thermo-couples in series, and opposed to each other, the control instrument is operated by the difference in the temperatures in the two checker chambers.

Some open-hearth departments have found it highly desirable to keep a daily check of temperatures in different parts of the checker work. This gives a valuable line on stoppages from dirt, soot, etc. For this work a portable indicating pyrometer is used. The usual range is 0 to 2500 deg. Fahr., using a base thermo-couple with a nichrome or some other high-temperature metallic protection well.

In a warehouse where sheets are stored, considerable expense is caused by the rusting of the sheets, including those in the center of a pile. This condition may be guarded against by reference to a recording psychrometer. This recorder is supplied with a small motor and fan to assure circulation of air over the wet bulb. The range of about 30 to 110 deg. Fahr. is satisfactory. If the record shows the atmospheric condition when dew will form, fans are started to circulate warm air throughout the warehouse, to prevent moisture collecting on the sheets.

To get the best possible efficiency from an instrument it must be selected with the right thermo-couple or bulb, the right length of lead, and the right range. Accuracy of the readings, under the severe operating conditions usually encountered in a steel mill, is the prime requisite. Then models are selected with protection cases suitable for the surroundings. Heavy cast iron cases, out of place on a fine switchboard, are ideal in a room filled with gas or acid fumes.

New Products from an Old Iron

TRANSFORMATION of a gray iron foundry, the principal product of which was brake shoes, into a manganese steel and gray iron production shop has been successfully undertaken by the American Manganese Steel Co., Chicago. This company purchased the Burnside, Ill., plant of the American Brake Shoe & Foundry Co., which consisted of seven and one-half acres of ground, improved with modern foundry buildings housing two cupolas, and a raw material storage yard served by a gantry crane. New equipment installed includes a 1½-ton per hour electric furnace, an annealing furnace, a core baking oven, new sand-handling and preparing equipment, and miscellaneous items, such as a 500-ton press used for straightening frogs.

The two cupolas (Whiting No. 7 and No. 8) were allowed to remain in their former location, which is on the west side of the main building and easily accessible to the storage yard and the material-handling and charging equipment. These units are available for use in supplying gray iron castings to the jobbing trade. The electric furnace is located in the northwest corner of this building, not far from the cupolas and close to the material yard, which extends parallel to the main building. Beneath the gantry crane is an industrial track, from which spurs extend at frequent intervals into the main building.

This plant produces work requiring large molds and flasks, and it was therefore decided that a large shake-

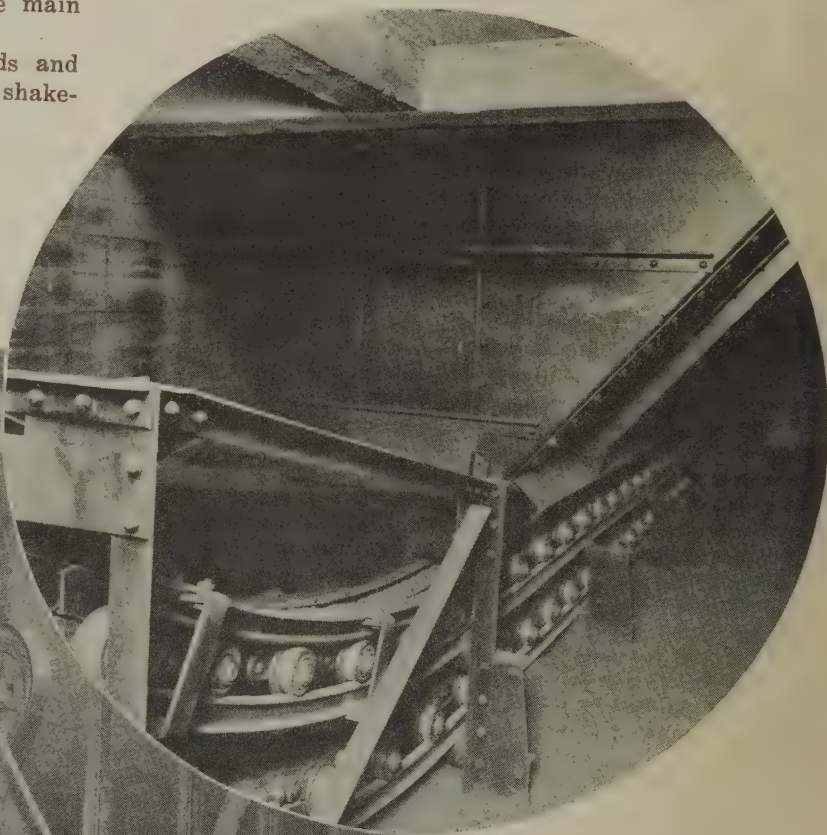
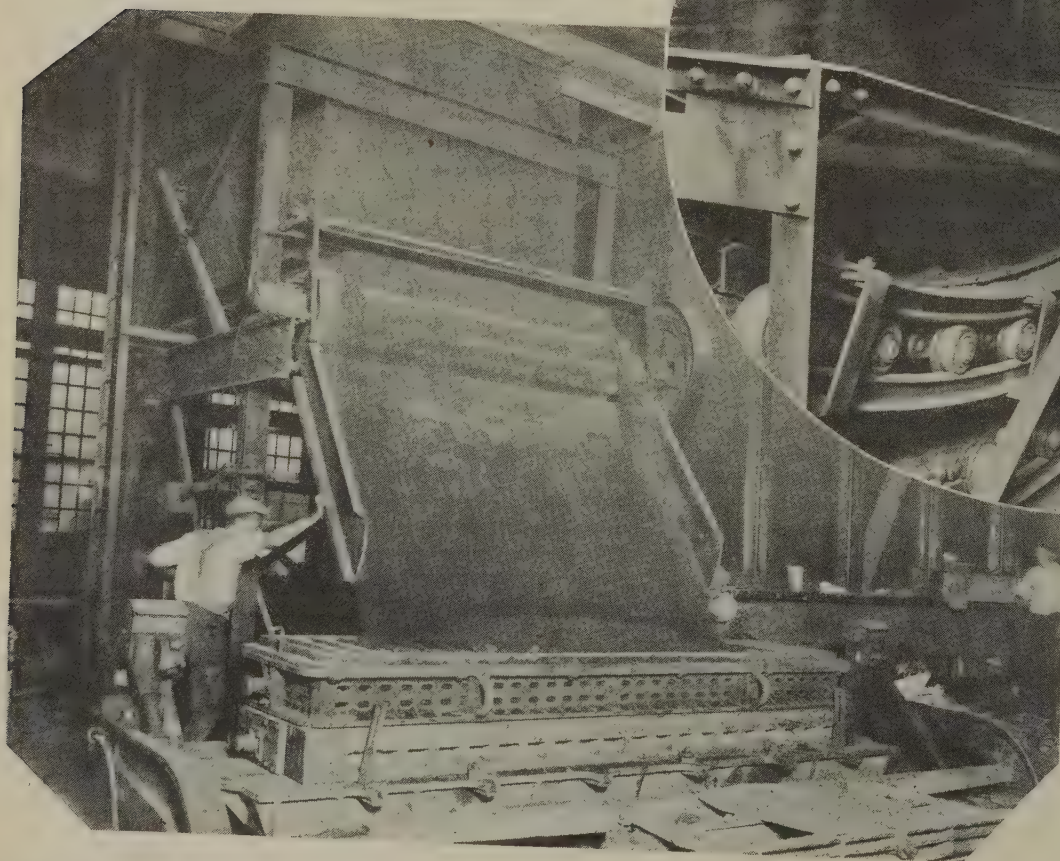
out hopper would serve two purposes: first, that of providing shake-out floor area for the large molds and, second, a storage or reservoir for the shake-out sand. This hopper is 16 x 20 ft. in area, and the top, which is covered with bar grating through which the sand drops, is set level with the floor.

Used sand is fed through the bottom of this shake-out bin to an apron conveyor, at the head of which is placed a short-center magnetic separator belt for removal of scrap, gagers, etc., before delivery to the bucket elevator. Scrap is removed through a trap door and is then loaded in boxes, which are carried away by an overhead crane.

From the magnetic separator the sand is elevated by a 7 x 12-in. bucket elevator to a tapered, hexagonal revolving screen, which acts as a breaker of lumps and also screens and removes refuse. This screen is housed in a steel box to which is attached a suction line and dust collector for the removal of dust and fines from the sand.

From the screen the sand is delivered to a belt conveyor, at the head end of which a two-way spout is arranged for diverting the sand to the facing-sand mill. If backing sand is being prepared, water is added in proper quantity by a spray pipe, which extends across

A FEEDER Apron (Below), 96 In. Wide, Delivers Sand to Large Flasks on a Holt Rollover Machine



SAND is Taken from the Shake-out Hopper by a 30-In. Apron Conveyor. This hopper, covered by a grating, acts also as a storage for used sand

Foundry

Modern Equipment Transforms Chicago Plant So That Electric Manganese Steel Castings Can Be Made—Sand Handling and Annealing Furnace Features

the bed of sand passing on the belt conveyor. The sand is then discharged to a double paddle mixer or pug mill, which mixes and reconditions it. Backing sand is handled by a short cross-belt conveyor and a long distributing belt conveyor operating alongside the columns in the main foundry bay. By means of adjustable plows, this sand may be discharged at any point to shoveling hoppers for floor molding purposes.

If old sand is required for preparation as facing, the water spray is shut off and the sand is diverted to a hopper which was erected over a No. 3 Simpson mill, located in a side room just off the main foundry. This hopper has two compartments, one fed with old sand by means of the belt conveyor described above, and the other receiving new sand from the storage by means of the crane and grab bucket. Facing sand is distributed from the mill throughout the foundry by boxes mounted on electric lift trucks.

At the end of the distributing belt conveyor, sand is discharged to a large overhead hopper, fitted on the bottom with an 8-ft. apron feeder that delivers sand to long flasks used for making guard rails. These flasks are filled in about 4 sec., and the feed is regulated by electric push

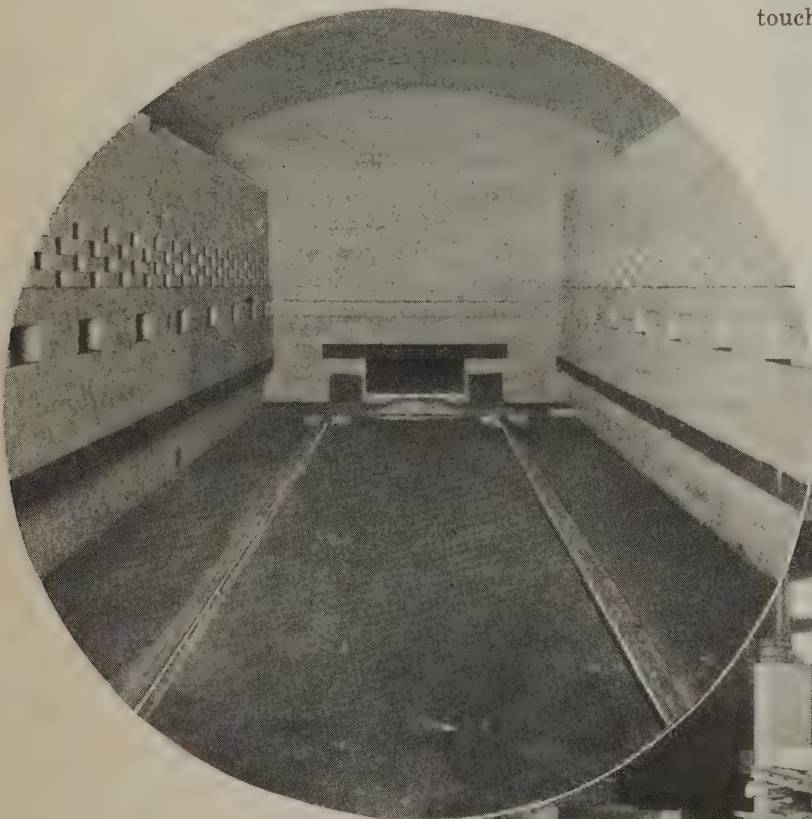
buttons, which control the motor operating the apron feeder. This sand-preparation and handling equipment was installed by the Link Belt Co., Chicago.

The 1½-ton electric furnace was designed by the Pittsburgh Electric Furnace Corporation, Pittsburgh. It has been located so that another unit, with a capacity of 3 tons per hour, can be installed at a later date. Power is supplied at 12,000 volts, three-phase, 60 cycles by the Commonwealth Edison Co., Chicago.

Electric Furnace Has Special Features

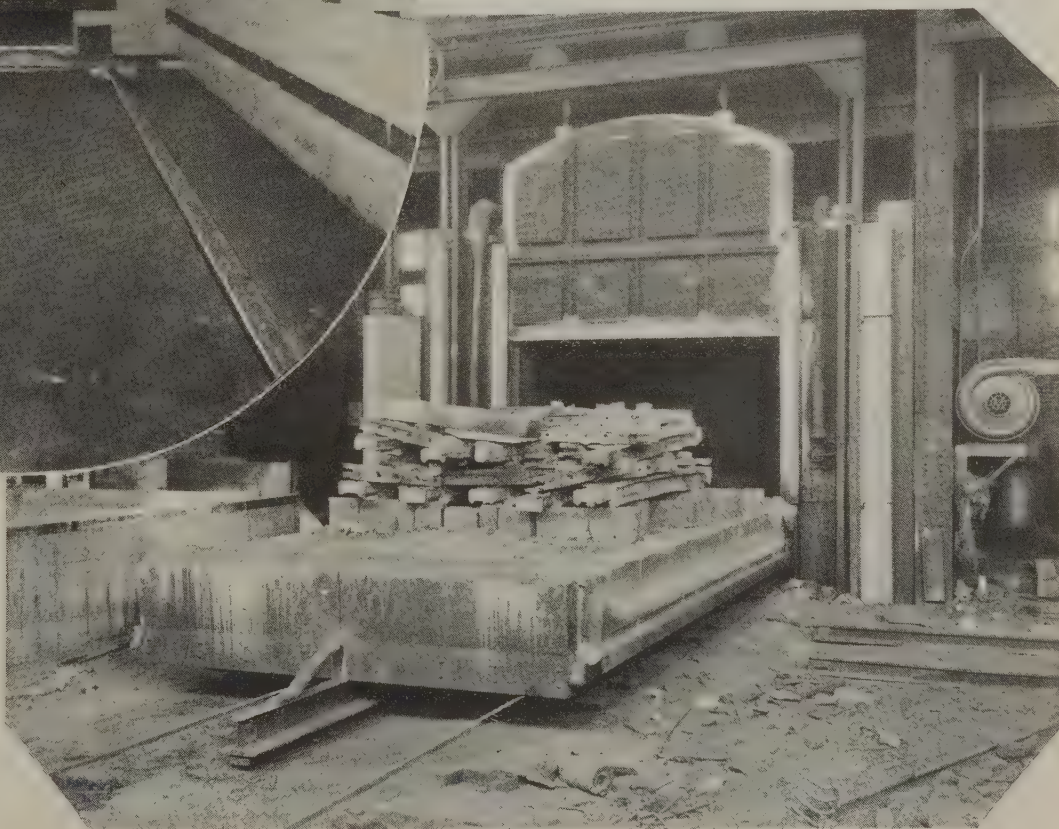
One of the features of the mechanical construction of this furnace is that ball and roller bearings are used throughout the electrode-operating gear mechanism, and the electrodes are counterbalanced so that the regulating circuit has only to overcome the inertia of the system. The electrode arms to which the clamps are fitted are fastened to one end of a flexible steel cable, which passes over ball-bearing sheaves and around a fiber sleeve on a winch drum and then up through ball-bearing sheaves to where a counterweight is fastened. This counterweight is equal in weight to the electrode arm plus the usual operating length of the electrode.

When the electrode is lowered to the point where it touches the scrap in the furnace, the tension on the wraps



GASES Enter the Working Chamber of the Annealing Furnace (Above) Through Ports So Proportioned As to Give Proper Heat Distribution

THE Annealing Furnace (Below) Is Designed with Double-Pass Combustion Chambers and Has a Capacity of 12 Tons per Hour. It is charged by means of a car



of cable around the fiber sleeve of the winch drum is loosened and the sleeve expands, allowing the winch motors to turn without unwinding the cable further. The same operation occurs when the electrodes are raised too high. The counterweight then comes up against its stop and releases the "friction bite" on the fiber sleeves of the winch drums, and again the winch is free to turn without further overhauling of the cable. This system of counter-weighted friction-bite hoist mechanism avoids the use of limit switches at the top and bottom of the travel of the electrode arms.

The core drying oven is 40 ft. wide by 80 ft. long. It is fired by means of coke heaters, and the temperatures range from 700 to 800 deg. Fahr. It is of the lift-door type and is loaded by means of cars, which are moved in and out of the oven by a crane. Made by the Swartwout



Prepared Sand Hoppers Are Filled from a Distributing Belt Conveyor

Co., Cleveland, the oven is constructed with walls containing 4 in. of insulating material, which is protected on both sides by 14-gage, rust-proofed steel sheets.

Annealing Furnace Has Reducing Atmosphere

The annealing furnace has a capacity of 12 tons of castings per charge. The annealing period is 6 hr., which is followed by a heat soaking time of 2 to 3 hr. The unit was designed by the Carborundum Co., Niagara Falls, N. Y., to anneal manganese steel castings in a reducing atmosphere at a temperature of about 1950 deg. Fahr. The loading car is 8 ft. wide by 18 ft. long.

A feature is the use of Carboradiant combustion chambers, by means of which uniform temperature and control of furnace temperature and atmosphere are said to be obtained. The combustion chambers, which are of the double-pass type, are arranged in pairs on both sides of the annealing furnace. One burner for each chamber fires into the lower pass, in which vaporization of the oil and mixing with air are accomplished. The gases are then led to the upper pass, from which they travel into the working chamber through ports provided by spacing the top tiles of the upper pass. These ports are dimensioned to

so proportion the amount of gases discharged along the length of the chamber to give proper heat distribution.

These chambers are designed to have a uniform temperature throughout their length, and they deliver heat by radiation to the lower portion of the charge on the car, thus offsetting the drop in temperature of the gases as they pass down through the castings to the off-take ports located along the sides at the level of the car top.

Proper atmosphere is maintained within the furnace because the oil is vaporized and mixed with the air supplied for combustion before entering the working chamber. Burner adjustment is regulated by observing, through peep holes in the furnace shell above each combustion chamber, the color of the gases leaving the ports in the top of the combustion chambers.

Between the combustion chambers and the charge is interposed a firebrick screen wall, designed to regulate the radiant heat delivery from the combustion chambers to the load. The lower section of the wall is checkered to permit a greater quantity of radiant heat to reach the lower zone of the charge, where the combustion gases are at their lowest temperature. Excessive temperatures and destructive flame action are confined within the combustion chambers, conditions which the chambers are said to be capable of resisting because of the high refractoriness of the silicon carbide tile from which they are constructed.

The output of the foundry is varied. Several standard lines are made, such as manganese steel track supplies, centrifugal pumps to handle gravel and coarse material, and steam shovel dippers. The gray iron capacity is devoted almost wholly to jobbing orders, most of which come from railroads.

High-Pressure Steam Boilers

Conclusions as to the best type of high-pressure steam boiler under present limitations were recently submitted to the American Society of Mechanical Engineers by George A. Orrok, consulting engineer, New York Edison Co., New York. For three pressure ranges the conclusions are:

1—Very high-pressure boilers (2000 lb. and over). Flash type, tubes 2 in. or less in diameter, no header, no drums, all welded joints, except at collectors and manifolds where flanged or coned joints should be used. These boilers may consist of a single coil for small outputs or multiple coils as in the Benson boiler.

2—High-pressure boilers (800-1600 lb.). Water-level type, consisting of a bank of tubes of larger diameter than those indicated for the flash type, with walls not to exceed one-tenth of the outside diameter in thickness. Tubes to be expanded in headers or small-diameter drums whose thickness when exposed to fire should not exceed one-tenth of the outer diameter. Water-line drum should not contain when half full more than 10 per cent of the water content of the boiler. The boiler should be high rather than low, so that the water in the tubes may be under sufficient static head to insure steadiness of steam, and restrictions in discharge opening to steam drums should be sufficient to obviate serious moisture in the steam. Dry pipes or separators should precede the superheater. Steaming economizers should not be used, but the feedwater should be heated by economizer or the regenerative system so that little water heating is left to be done by the boiler itself. Water-cooled furnace walls should be used in sufficient amount to make the furnace repairs a negligible quantity.

3—With temperatures in excess of 750 deg. Fahr. we must be content with a shorter life of tubes and be prepared to replace coils or tubes from time to time. The only alternative is the use of much-higher-cost alloy steel.

Mr. Orrok discussed in his paper such matters as the effect of tube inclination, the releasing surface and steam space, boiler materials and safety in operation.

The Rising Tide of Iron and Steel

Curve of Production from 1919 to 1927 Closely Parallels the
Record-Breaking Pre-War Trend

BY E. E. THUM

THE article by Edwin C. Eckel in the June 14 issue of THE IRON AGE, entitled "Iron Industry Facing Great Changes," contains many observations which should be thoughtfully considered by all men in the metal industries who are planning ahead for future growth. I find myself unable to agree with one of his conclusions, namely, that "we are not likely to resume our normal or pre-war rate of increase for a good many years to come." The very graph he uses to show the world pig iron output indicates that production is now, and has been since 1919, increasing at a rate closely parallel to the pre-war trends, save only for a 12 or 13-year setback due to that upheaval.

Of course, one cannot certainly predict the future from the past, except in elementary physical science; nevertheless, good information on past performances, interpreted in the light of current events, is the best basis for predictions about industrial developments. As a case in point, a person in 1895 would have been justified in plotting future production of pig iron in a slowly rising curve, extrapolated from the known trend up to that time. Subsequent history would have proved the conservatism of this prophecy.

Even in 1905, after the actual production had taken a definitely higher rate, Sir Robert Hadfield in his presidential address before the Faraday Society prophesied that the world's production would continue to increase at the same rate it had during the preceding 30 years; that is, slightly over a million gross tons yearly. The graph shows how much he underestimated the ability of the people to absorb iron; for it took the profound dislocation of a great war to bring his trend line within calling distance of actual production.

In making his calculations Sir Robert assumed that the 40 million tons of iron made in 1900 was consumed by only 200 million people; and if two-thirds of the total population of the earth would eventually use the metal at the same rate the annual consumption would be above 250 million tons. This gives what he thought was the eventuality—an annual consumption of 400 lb. per capita. But in the

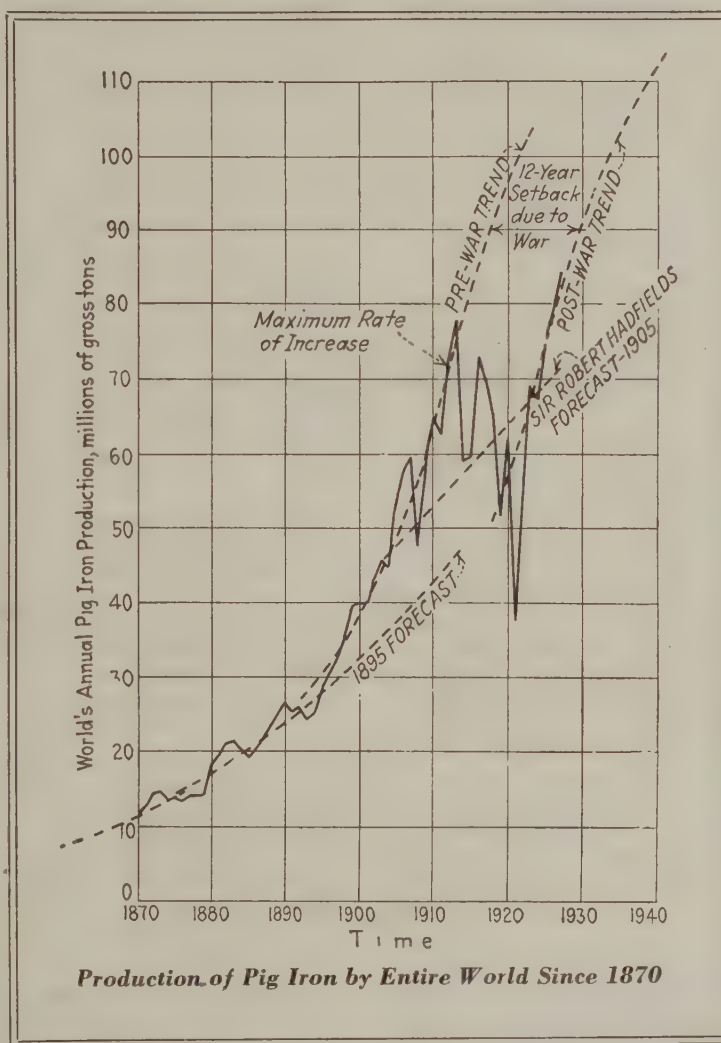
United States last year 120 million people consumed 35 million tons of pig iron, a per capita consumption of 650 lb. in round numbers.

On this basis it appears that the mechanical age has called for more and more iron; so the acceleration of production between 1904 and 1916 may be taken as a definite trend and not as a temporary burst of speed. But, of course, there must be a maximum some time. The production curve will sooner or later show a point of inflection. From then on the curve will reverse itself, gradually approaching the time when new production merely replaces natural wastage and decay. If such a point of inflection in the curve marked "pre-war trend" be placed at the year 1912 or 1913, and the line exactly reversed in curvature, I believe the predictions would not have been unduly optimistic and would have represented what would have happened in normal growth. Dr. John A. Mathews of the Crucible Steel Co. of America has also expressed the opinion that the rate of future increase will be curtailed through the economies resulting from alloy steels and corrosion-resisting alloys.

If this curve representing pre-war trend is moved over parallel to itself 12 years, it will be found to fit closely the recorded pro-

duction since 1919. And why shouldn't it? The urge to use labor-saving devices, to travel with speed and comfort, to beautify our buildings, bridges and highways, is here just as strong now as before the war. The war absorbed so much wealth and man power that the entire civilized world staggered along in a dazed condition, having lost sight of the old economic landmarks. It is surprising such substantial recovery as is shown by the actual production figures could be made in as little as 12 years. But the figures show it has been done!

This post-war trend line crosses the year 1936 at a production of 105 million tons. Dividing this figure by the factor 0.87 (the ratio between world production of pig iron and that of steel, a constant ratio since 1915) the figure of 120 million tons is computed to be the expected produc-



tion of steel in that year. This checks fairly closely the figure 115 million tons, estimated as the probable 1936 production of steel, in THE IRON AGE editorial printed June 23, 1927.

I therefore agree with Mr. Eckel that the maximum

rate of annual increase in iron and steel production may have been reached or passed. But I believe that nothing less than another devastating war will prevent the steady expansion in output called for by the post-war trend line sketched in the figure.

Production and Use of Die Castings

European and American Practice Contrasted—Availability Depends on
Machining Labor Eliminated—Heavy Price of Dies
Must Be Absorbed by Savings

BY SAMUEL TOUR*

GENERALLY speaking, the pressure die casting process requires (1) a machine capable of delivering molten metal under pressure to a die; (2) a metallic mold or die to receive the molten metal; (3) a suitable alloy which will function in the machine and form in the die, and which will yield a casting with the desired physical properties.

Die castings, properly speaking, do not include castings poured by gravity into a metallic mold or die, but presuppose the use of definite pressure. Proper combination of the three essentials noted gives a casting of sharp detail, finished or practically finished, requiring little or no machining, checking to close dimensional tolerance and rapidly producible in large quantities. The process often makes possible the use of much thinner walls than can be cast by any other method.

It is incorrect to say that castings cannot be considered as practical die-casting jobs in lots of less than 10,000 pieces. As a general rule, the pressure die-casting process is most economical where the elimination of machining and finishing operations is possible. The number of castings necessary to absorb completely the initial cost of the die depends, therefore, upon the amount of costly machining and finishing operations eliminated by the use of pressure die castings. Often this saving is so great that 1000 castings or even a few hundred will justify the construction of a die.

Present estimated annual production of pressure die castings in the United States is from 10,000,000 to 12,000,000 lb. of aluminum-base castings and from 50,000,000 to 60,000,000 lb. of zinc-base die castings. It is evident, therefore, that these types of castings are being widely used.

Pressure die castings are used in automobile parts such as steering wheel spiders, carburetor parts, oil purifier parts, oil pumps, fans, water pumps, electric starters, spark and throttle control parts, windshield wipers, instrument boards, speedometers, hand rests, interior trim handles, cowl, etc. They are used extensively in vacuum cleaners, washing machines, typewriters, check writers, adding machines, calculating machines, small motors, magnetos, radio condensers, radio frames, loud speakers, telephones, vending machines, instrument parts, instrument cases, small machine parts, ornamental parts, furniture, cooking utensils and electric refrigerators.

Producers generally purchase their raw materials in zinc, aluminum, lead and tin-base and mix their own alloys. Customers usually designate which type of alloy is desired and supply information as to service requirements of the

finished castings. They then depend upon the producer to select, in the type specified, the particular composition which his experience tells him will result in the best castings for the purpose. Obviously, no one alloy will meet the service requirements of all such castings.

European Die-Casting Practice

In another appendix to the committee report, E. V. Pannell, consulting engineer, British Aluminum Co., Ltd., New York, discussed the construction of die castings in Europe, of the type commonly called by that name in the United States. In Great Britain it is estimated that the heavy metal die-casting production is from 3,000,000 to 5,000,000 lb. a year.

In some cases, he said, the machines used are quite primitive, being entirely manual in operation. A number of them, mostly of the plunger type, are of Swedish design. Another Swedish design, semi-manual, uses air also, at from 16 to 40 lb. pressure. With small castings this machine is driven from a counter-shaft and produces up to 30 castings an hour of not more than $\frac{1}{4}$ lb. each. With manual operation, much heavier castings can be made.

An English machine designed with plunger and rack and pinion feed has a die-preheating chamber. It will operate with metals up to a melting point of 930 deg. Fahr. The metal pot holds 55 lb. of zinc-base alloy.

The production of light alloy die castings in England does not possess the potentialities of the American situation. Castings from a given pattern are called for in relatively small numbers. As the orders average perhaps not over one-tenth the number called for in the United States on a single order, the die charges for castings are ten times as great.

In the automotive field, particularly, this limiting condition is found. In the United States 4,500,000 automobiles are produced by about 45 leading makers and average 100,000 each. In Great Britain 100 makers produce 150,000 cars, or an average of 1500 cars of a given design. Standardization, therefore, is carried to a much smaller degree than in America and the great diversity of parts called for is best served by the use of permanent-mold castings.

For reasons growing out of this situation, and similar situations in other industries, the entire annual production of light alloy die castings in Great Britain probably does not exceed 1,500,000 lb. A similar amount is produced in Germany and an appreciably smaller quantity in France.

In Europe there is a certain amount of prejudice against the use of the air-operated machine. This no doubt is on account of the relatively high cost of compressed air for a small shop. It is asserted also that air leakage and the behavior of compressed air on the molten aluminum are a disadvantage. Lack of density in the castings is mentioned.

*Metallurgist Doehler Die Casting Co., Batavia, N. Y. This is an abstract of an appendix to a committee report at Atlantic City in the last week of June, at the meeting of the American Society for Testing Materials.

Better Planning of Production Is Crux of Distribution Problem

Output in Keeping with Market Analysis Would Prevent Domestic Dumping, Says Economist—Research in Distribution Urged

THE problem of distribution affects our whole national economy; it is much broader in scope than the marketing program of the individual manufacturer, declared Magnus W. Alexander, president National Industrial Conference Board, New York, in addressing the distribution conference held in New York, June 28 and 29, under the auspices of the bolt, nut and rivet industry.

"Distribution," he said, "involves much more than transportation, marketing and handling. To many distribution means simply the disposal of their own output, that is, the problem of marketing their own goods. Market analysis and salesmanship, it is believed, can solve the problem. We must examine the issue, however, not from the standpoint of the individual producer alone, but from the broad viewpoint of national economy.

"It is seldom recognized that the distribution problem goes much deeper and, in fact, has its roots in production. Faultily planned production cannot be rectified—although in part it may be corrected—by even the most excellently planned marketing program, a fact evidenced in the failure of many carefully designed and strongly financed advertising and sales campaigns."

Growing Proportion of Employed Engaged in Distribution

One heritage of war days, Mr. Alexander pointed out, is our over-expanded plant capacity, a condition aggravated by a greatly accelerated pace of production resulting from continuously increasing industrial efficiency.

"The fact remains, however, and much evidence has been adduced to prove the point, that productive efficiency in certain lines, particularly in the last few years, has set a pace which might easily outstrip domestic consumption under present conditions. There has arisen, therefore, a great deal of discussion of the 'distribution problem.'

"Statistical data on the process of distribution are as yet remarkably scant," said Mr. Alexander. "It is claimed, on the basis of individual observations and on inquiries into specific lines of commodities, as agricultural products, for instance, rather than on comprehensive, scientific data, that the cost of distribution generally has been steadily and disproportionately increasing and that economic gains, achieved by efficiency in production, in part are lost by waste in distribution.

"We know that in many instances the consumer price is several times that of production cost, and census data for the past 50 years give substantial evidence that the economic cost of distribution has been constantly rising as compared with the cost of production. In 1870, 8,629,000, or 88 per cent of all those gainfully occupied in production and distribution combined, were engaged in production proper, that is in manufacturing, mining and agriculture, as against 24,470,000, or less than 70 per cent of all those thus gainfully occupied in 1927."

Domestic Dumping One Cause of Higher Distribution Costs

The essential waste in distribution, according to Mr. Alexander, occurs in the competitive over-production of

certain commodities that happen to be convenient for the manufacturer to produce, resulting in expensive high-pressure sales campaigns and frequently in ruinously low prices. This kind of marketing has been characterized as domestic dumping.

"Every well informed business man knows," declared

the speaker, "that goods are being sold continuously at or even below the cost of production. This naturally raises a far-reaching question: Is it economically sound and socially desirable that goods be sold without profit, or at a loss, over a considerable period of time? Is that sound or constructive competition?

"A producer may be able to dispose of a certain amount of his output at no profit or even at a loss and continue to exist by virtue of the profit made on the bulk of his output. But is it not inevitable, because of the interdependence of one business transaction on another, and the interdependence of all industries, that such a policy is bound to disorganize trade and in the end is bound to react disastrously upon him who sells at or below the cost of production?

"It is this very circumstance of selling a portion of quantity production at or below the cost of production that has sharpened competition between producers in many instances to the point of being ruinous, and probably has tended greatly to increase distribution costs where high-pressure selling has been applied."

The speaker urged more thorough market analysis and closer study of consumer demand to avoid needlessly sharp competition with resulting dwindling profit margins.

Large-Scale Enterprises Sharpen Competition

"One of the most interesting and significant features of our business evolution during the past decade," asserted Mr. Alexander, "is that large-scale enterprise, which a quarter of a century ago was feared as a danger to free competition, today is a prime factor in accentuating competition.

"Business conditions in the United States during the past decade have presented a paradoxical situation: Great national prosperity with record business activity, but at the same time a competitive struggle which has resulted in precarious profit margins.

"We see, furthermore, that the very method of production that has contributed so much to our national income, namely, efficient mass production, which has effected high productivity per worker and has made it possible to combine high wage levels with low prices, is the very factor that today is accentuating the competitive struggle and thereby emphasizing also certain distribution problems to which trade associations might well devote their earnest attention."

Although, broadly speaking, there can be no over-production, there certainly can be a surplus output of a given variety of commodity at a given time. "It is therefore in planning what to produce that the fundamental solution of the distribution problem lies," declared Mr. Alexander.

Jobbers and retailers, he indicated, are not necessarily to blame for mounting costs of distribution, as they are called upon by customers for increasingly elaborate service. The average ratio of profits to receipts is considerably smaller in trade than in manufacturing and other lines of business activity.

Some Increases in Distribution Costs Justified

"It is necessary in discussing the increasing costs of distribution to distinguish between what constitutes actual and avoidable waste, such as unnecessary cross-hauling, congestion of perishable commodities, unnecessary handling, misdirected high-pressure sales methods, and such other elements which increase distribution costs but add nothing to the products; and those elements in distribution that increase either the convenience or the desirability of the commodity and are demanded by the producer, as, for instance, packaging, quick delivery in small quantities and other various services performed by the dealer for his customers," said Mr. Alexander.

"These latter services in essence become a refinement of the products and are to be classed as manifestations of

our rising standards of living rather than as costs representing economic waste."

Need for Scientific Research in Distribution

Prosperity in the United States in the past decade has been due, in large measure, to industrial productivity and the elimination of economic waste in production through mechanization, he asserted. Rationalization of the distributive process, combined with careful production planning, should result in a further substantial economic gain.

"The pressure of our present competitive struggle is a challenge to renewed effort to do our utmost in stimulating scientific research and to apply its results to production and distribution alike. Constant vigilance, comprehensive and accurate information and scientific analysis of all facts and economic trends having any bearing on our business activity are the keys to the maintenance of our economic well-being," asserted Mr. Alexander.

"Ours may rightly be called a machine civilization," said Mr. Alexander in conclusion, "but it should always be remembered that we owe to the machine both the leisure and the price for our cultural and social progress."

Individual Roller Table Drives

Improvement in Control, Compared With the Inflexibility of Group Drives —Breakdown of One Roller Does Not Cripple Train

GROUP roller drives, as for roller tables, whether of the cable and sheave type, or bevel gear type, lack flexibility in that the individual rollers cannot be controlled, said J. C. Dobelbower, Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., speaking at the Chicago meeting of the Association of Iron and Steel Electrical Engineers. "In case of motor trouble, breakage of cable or gears, the entire table is out of commission. With the roll-out motor drive the failure of a driving motor affects only the one roller—in fact, a number of motors in the train could fail without a shutdown of the table. This also permits shutting down some of the motors, to produce a drag on the speed of the strip or bar, if desired. There are also fewer bearings to lubricate than on the group drive, which means less maintenance and fewer chances of trouble.

"With any of the types of motor for roller drive it is essential that the insulation throughout be such that it will stand up under the heat obtaining and all parts must be of extra rugged construction. In installing roll-out motors it is essential also that each motor be protected by an overload relay or fuse, to prevent roasting out in case the motor is stalled, due to jamming or any other abnormal condition, unless the motor is designed to permit stalling.

Control of Speeds Desirable

"Power for driving roll-out motors is best obtained by use of a motor-generator set. This should consist of a variable-speed d.c. motor driving an alternator. By the use of this combination the speed of the alternator can be varied, thus changing the frequency and voltage of current delivered to the roll-out motor. This permits the operator to control the speed of the strip or bar on the table.

"Roll-out motors of the general purpose design can, if desired, be ventilated. If this is done, however, it is necessary that clean air be supplied; the ventilation can be obtained by bringing the air in at one end of the motor at the bottom, and discharging it at the bottom of the opposite end. This type of motor, however, should not

require ventilation, as it is comparable to any fully inclosed motor operating in a hot place. The roll-out motor of the design where the motor is built directly in the roller is, however, a different problem. The motor, in this case, is subjected directly to the heat from the strip or rod being carried on the outer surface of the motor. Thus heat is applied to the surface which, in the ordinary design of motors, is the surface from which heat is radiated."

American Standards Association to Succeed Standards Committee

Reconstruction of the American Engineering Standards Committee to keep pace with the growth of the industrial standardization movement in the United States is now under way, it is announced by the committee. The principal features of the reconstruction are the definite federation of national organizations, under the name American Standards Association, in such a way that trade associations interested in standardization may more readily join in the direction of the movement; placing the technical work of approving standards in a standards council; and concentrating administrative and financial responsibility in a board of directors composed of 12 industrial executives.

The underlying principles remain unchanged. The basic functions remain completely in the hands of the representatives of the member-bodies. The individual members, whether of the board of directors or of the standards council, are appointed or nominated by the member-bodies, which thus remain the fundamental units in the organization.

The name American Standards Association is being adopted as more accurately descriptive of the reorganized association, and also because of the misunderstandings and misconceptions which have frequently occurred in connection with the words "engineering" and "committee." The scope of the work is, however, being limited to those fields in which engineering methods apply.

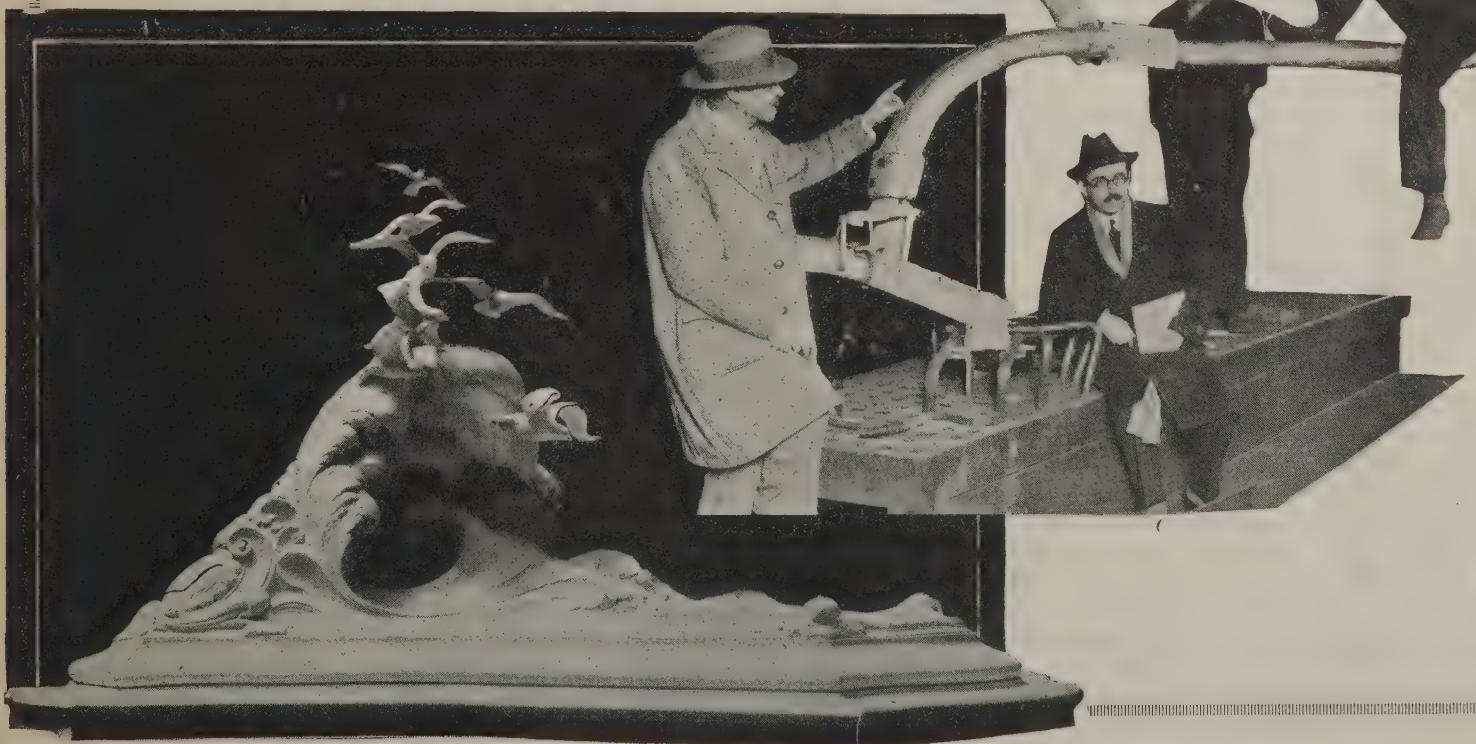
Cast Steel Core for Bronze Gulls

*To Support a Feature of a Monument on the Potomac to America's
30,000 Lost at Sea*



TO the more than 30,000 Americans who have perished at sea since the nation was founded—heroes of naval battles and martyrs to commerce, rescue work or adventure, a striking monument is to be built on the banks of the Potomac River in Washington, on a site in East Potomac Park granted by Congress, not far from the National Cemetery in Arlington. The memorial is to cost \$500,000. About a third of this sum has been contributed, many gifts coming from school children. A national campaign to raise the remaining \$350,000 is being directed by William Fellowes Morgan, Jr., 107 Cliff Street, New York.

A reproduction below of a photograph of the model of this Navy and Marine Memorial shows the free-flying gulls, which make the monument an unusually interesting piece of sculpture. To support the considerable weight of the gulls the steel armature shown at the right was constructed at the Tietjen & Lang branch of the Todd Shipyards Corporation at Hoboken, N. J. Begni del Piatta, the sculptor who introduced the use of the steel, is shown seated in the center of the group.



Heat Savings from Insulating Furnaces

One Year's Operation May Pay Installation Cost—Quantitative Results Outlined and Thicknesses Recommended

INSULATION applied to open-hearth furnace regenerators has not only minimized radiation losses, but also has cut air leakage losses, said L. B. McMillan, consulting engineer, Johns-Manville Corporation, New York, in a paper before the Chicago meeting of the Association of Iron and Steel Electrical Engineers.

Among the advantageous results attained through the use of insulation on checker chambers are: (1) Direct saving in fuel consumed per ton of steel produced; (2) increased temperature of the preheated air and gas; (3) improved conditions of furnace atmosphere, due to reduced air leakage; (4) increased speed of heats; (5) increased production; (6) decreased losses during Sunday shut-downs; (7) increased temperatures in gases delivered to waste-heat boilers, resulting in increased steam production.

All of these results have been secured in varying degrees in many installations. In some cases the saving in fuel has been the outstanding advantage. In others increased speed of heats and increased production have been most noticeable. In still others the most notable feature was increased steam production in the waste-heat boilers. Naturally, with varying conditions of operation the various items will not show up in the same proportion in each installation. But in every installation investigated it was found unmistakably apparent that highly desirable results were being obtained, and this without detrimental effect on the brickwork, where insulation was properly proportioned to the conditions encountered.

Air Infiltration Is Bothersome

There are cases where the spaces around the checker chambers are well ventilated and relatively cool, with correspondingly lower wall surface temperatures, yet where the losses are undoubtedly greater than in others where the chambers are in confined spaces, where much higher temperatures prevail. In still other cases, the rate of air infiltration through the walls is such that the temperature of the wall may be deceptively low. In such cases losses by radiation may not be excessive, but air infiltration losses in such cases are none the less real and preventable.

The best means of estimating the savings in heat transmission losses is through the use of calculations based on the thicknesses and conductivities of the materials, and the temperature conditions involved. Such computations show that, in reduced transmission losses alone, the insulation of checker chambers is fully justified; and the saving through reduction of infiltration losses is just so much more net gain.

Calculating the Benefits in Dollars

What these savings in B.t.u. an hour really mean is best visualized by expressing them in terms of savings in dollars per 100 sq. ft. a year. In the case of a 13½-in. roof at an average inside temperature of 2400 deg. Fahr., the saving in B.t.u. an hour by 2-in. insulation is 443 B.t.u. If the furnace is operated 6000 hr. a year, the equivalent saving in dollars per sq. ft. is 53c.; or \$53 per 100 sq. ft. a year, even at a value of heat of only 20c. per 1,000,000 B.t.u. This annual saving is considerably more than the cost of the insulation, so that the initial cost is repaid in a few months' operation, after which the saving is clear gain. In fact, from the heat-saving viewpoint, the use of

much thicker insulation would be justified. But other practical considerations make it advisable to limit the thickness of efficient insulation on the roofs to about 2 in., which successful installations have shown to be entirely safe.

On side walls, however, thicker insulation may be used and the heat loss reduced to a more economical basis, without fear of danger to refractories, because the brick work is thicker, and the average temperatures are lower. It is true that the temperatures to which the upper portions of the side walls are exposed are the same as those under the roof, but the omission of insulation at the skew back, and the downward flow of heat through the thick wall to the cooler lower portions, prevent the raising of the mean temperature of the wall to a dangerous point, even in the case of the portion above the checkers.

Saving by 4-in. insulation on an 18-in. firebrick wall at an average inside temperature of 2000 deg. Fahr. is 365 B.t.u. per sq. ft. an hour. This is equivalent to a saving of \$44 per 100 sq. ft. a year on the basis of 6000 hr. operation and a value of heat of 20c. per 1,000,000 B.t.u. This saving is sufficient to pay an annual return of about 70 per cent on the investment represented by the cost of insulation. A thickness of insulation of 3 in. to 4 in. is clearly justified on these portions of the side walls.

Percentage Factors Do Not Tell the Story

Referring to the question of savings in terms of total fuel cost, a word of warning was issued in connection with such percentages. Percentages are useful if properly interpreted; when misinterpreted, they are likely to be highly misleading. A saving of 3, 5, or even 10 per cent might look small in comparison with total costs, or with savings which might be effected in other directions, as by more careful operation, etc. The true perspective is obtained by comparing the annual saving with the annual cost of effecting that saving, regardless of what percentage relationship these bear to the total operating cost. In the case of insulation, the saving may appear to be small when expressed as a percentage of the total fuel bill, but likewise the annual cost of maintaining the insulation is a still smaller percentage of that small total fuel bill, therefore the saving looms large when compared with the cost of effecting it.

Example of a Well-Designed Insulation

In a typical installation of new checker chambers the walls above ground, and to a point about 1 ft. below grade, are insulated to a total thickness of 3¾ in. with block insulation applied in two layers, so that the second layer overlaps all of the joints in the first layer. Temperature measurements on checker chamber walls insulated in this manner have shown an average of approximately 1200 deg. Fahr. between the insulation and the firebrick. This increased temperature at the outer surface of the brick demonstrates the effectiveness of the insulation in limiting heat flow through the wall, and yet is not so high as to result in a dangerously high mean temperature in the brickwork.

The roofs are insulated to a total thickness of 1¾ in., with 1¼-in. block insulation and ½-in. cement. The use of as thick insulation on the roofs as on the side walls

should be recommended, but observed temperatures averaging approximately 1100 deg. Fahr., between the 1¾-in. construction described above and the brickwork, indicate that the thickness of insulation could be increased to 2 in. without endangering the brickwork. The fact that the temperatures under the roof are not maintained continuously at the maximum point, and that the peaks are of very short duration, insures that the mean temperature of the brickwork is well within the range of safety.

Earth Is Not a Natural Insulator

The walls below grade and the floors of the chambers are insulated with 2-in. block. It was formerly the general belief that, because of the resistance to heat flow offered by dry earth, insulation was not required on the underground portions. However, a more thorough analysis of the situation shows that the use of some insulation on these portions is highly advisable, but probably the thickness used should not exceed 2 in. The earth may not in most cases be dry at any great depth below the chambers, and the evaporation of moisture which penetrates into the dry zone around the furnaces represents a considerable expenditure of heat.

Furthermore, the theory as to the relative insulating effect offered by the dry earth is based on the so-called "steady state" of temperatures. But this steady state is not even approximately attained for many months after

the furnace starts up. All the while during this period heat is being dissipated, to increase the temperature of the surrounding earth, and before this rate of dissipation becomes negligibly small the furnace is shut down to be reconditioned for another campaign. Still another justification for insulation on these portions is, of course, the protection which it affords to the foundations and steel buckstays.

Insulation of existing checker chambers is just as important as in the case of new ones. In some cases it may be even more important, because of the effect of insulation in minimizing air infiltration losses. The block insulation itself provides a considerable increased resistance to air leakage and, furthermore, the outer surface of the insulation may be maintained more effectively airtight than the bare brickwall. The walls above grade and the crowns may be insulated as described above for new furnaces, except that, in cases where rebuilding is anticipated within a few years, the thickness of insulation may be reduced somewhat, as, for example, to 3-in. thickness on the walls and 1½-in. thickness of blocks on the roofs. Insulation of the underground portions of old checker chambers should, of course, be deferred until the time of rebuilding. But, since the savings by insulation of the above-ground portions repay the cost quickly, even a few years' use would make that part of the work a profitable investment.

Producing Wide, Thin Strip and Skelp

Arrangement of Mills and Their Motor Drives to Roll With Minimum Chilling and Low Power Drafts

TOLERANCES to which skelp must be rolled are usually not extremely close, and the gage for a given width is usually heavier than for other strip. These general conditions were outlined by A. F. Kenyon, Westinghouse Electric & Mfg. Co., East Pittsburgh, in a paper entitled "Selection of Main Drive Motors for Strip and

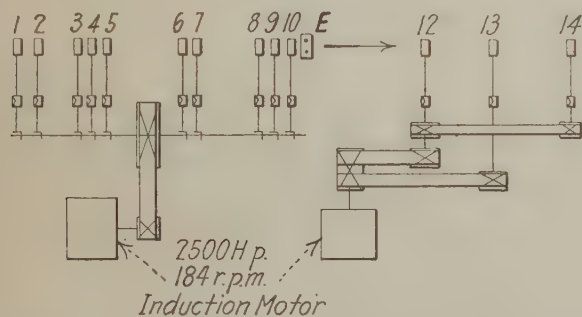


Fig. 1—Continuous Skelp Mill, 13-In., With Rope Drive. The stands are so spaced that the steel is never simultaneously in two groups of roughing stands or two stands of the finishing train

Skelp Mills," read at Chicago last month before the Association of Iron and Steel Electrical Engineers. "Most skelp mills," he pointed out, "do not require the refinements of arrangement which are so necessary to the successful operation of a strip mill.

"For light and medium tonnage production of the smaller sizes, a simple mill train, or a looping finishing train with a separately driven roughing stand, serves well. Wide skelp is produced in much the same manner and on the same types of mills as plate. The 13-in. continuous skelp mill shown by Fig. 1 is laid out to roll skelp in sizes ranging from 13/16 in. wide x 0.067 in. to 0.115 in. thick, up to 7¼ in. wide x 0.160 in. to 0.225 in.

thick, at a delivery speed from the last stand of about 1150 ft. a minute.

"Ten roughing stands are arranged in four groups, the groups being so spaced that the same piece is never in more than one group of stands at any one time, although it may be simultaneously in the two or three stands of each group. The finishing stands, also, are spaced so that the pieces run out before entering the succeeding stands. The mill is driven by two duplicate 2500-hp., 184 r.p.m. induction motors through rope drives.

"With the more recent installations, gear drives rather than rope are generally used, and there is also the tendency

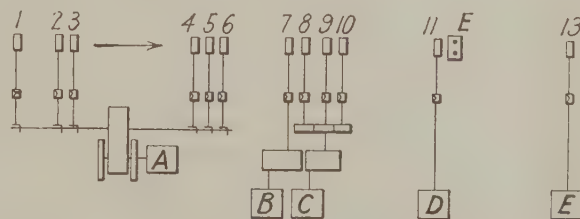


Fig. 2—Gear Drive with Multiple Motors, Applied to a 14-In. Continuous Skelp Mill, with Spacing Similar to That in Fig. 1. The motors include

	A	B	C	D	E
Hp.	1,500	1,000	2,000	1,000	1,250
R.p.m.	491	293	294	209	294

to apply a greater number of motors, to lessen the complications of the gearing. Fig. 2 is an example of a 14-in. continuous mill, designed to do practically the same work as the mill just described, and with a similar arrangement of the roll stands. With the greater number of driving motors, the diversity of load from the several stands is not so great, and installation of a greater total horsepower of motors is necessary than if the mill were driven by one or two large motors. It is noted that the total horse-

power of motors on the mill shown in Fig. 2 is 6750, as compared with 5000 on the mill shown in Fig. 1.

Compactness Has Several Advantages

"In other forms of skelp mills, the stands are all closely spaced in a continuous line, so that a single billet may be in all stands simultaneously. Such mills are very compact in their arrangement, require little labor to operate, and finish rolling at a fairly high temperature,

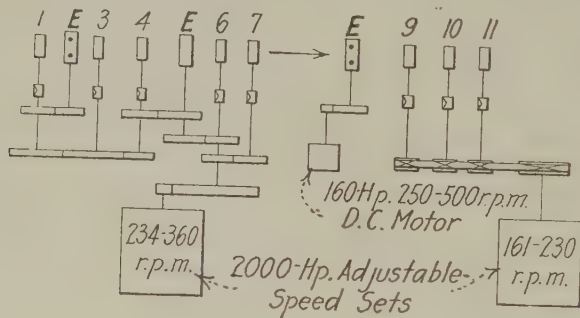


Fig. 3—Close Spacing of Stands in a 10-In. Continuous Skelp Mill Driven by Gearing and Belt from Three Motors. Compactness and low labor and power costs are features

so that the energy consumption for a given rolling schedule is usually less than for a mill where the steel runs out between passes. The 10-in. mill shown in Fig. 3 is so laid out. The seven roughing stands are driven by a 2000-hp., 234 to 360 r.p.m. rotary-converter type adjustable-speed set. The edger is separately driven by a small d.c. motor, and the three finishing stands are driven through belt by a second 2000-hp. adjustable-speed set. The maximum delivery speed is approximately 1100 ft. a minute.

"Two of the most recently installed skelp mills are driven entirely by direct current adjustable-speed motors. Adjustable-speed drives are almost a necessity for a mill rolling any great range of product sizes, and where the

motors are of small or medium size, and closely grouped together, direct current often works out to advantage. On two other large sheet bar and skelp mills the greatest economy in first cost and efficiency in operation were realized by a combination of alternating current drives on the roughing and intermediate sections and direct current drives on the finishing stands, where the maximum flexibility and ease of control are desired.

"Active demand for long lengths of 16-gage and lighter material up to widths of 16-in. or more, by the automotive, metal furniture and other industries, has caused the installation in recent years of a large number of mills especially designed to produce this wide, thin-gage strip. The thin strip cools very rapidly. Thus, to expedite rolling and permit the finishing of the process at a sufficiently high temperature, the stands are closely spaced in tandem, and the material is rolled at comparatively high speeds.

Anti-Friction Bearings Change Conditions

"The latest development in rolling thin, flat products is the use of four-high mills with the backing rolls supported by roller bearings. Such mills make it possible to roll the thin gages up to widths of 48 in. or more, and in lengths of several hundred feet.

"Roll neck friction in such mills is much lower than in mills with plain bearings, and a marked reduction in power requirements and energy consumption is to be expected. For instance, several conventional strip mills rolling 16-in. to 20-in. wide 16-gage strip, at delivery speeds of about 1200 ft. a minute, have 1800-hp. motors on the finishing stands, and these motors are at times operated above their ratings. Modern mills with roller bearings, rolling 30-in. to 36-in. wide 16-gage strip at delivery speeds of about 800 ft. a minute, impose loads on the finishing stand motors of about 1500 hp., indicating a saving in power requirements of about 40 per cent. On some mills roller bearings are used on the roughing as well as the finishing stands. But it should be noted that the greatest savings in energy consumption are to be made on the finishing stands, where the rolling pressures are very high."

Standardization of Skid Platforms

Possibilities of the application of a simplified schedule in the manufacture of skids or platforms for use with elevating trucks have been surveyed by the division of simplified practice of the Department of Commerce. At present these platforms are made in a great variety of sizes and shapes. They have been developed in most cases to meet the needs of individual users. While the necessity for special sizes and forms may always exist, a brief survey shows that a wide range of commodities may be loaded on platforms of standard width and height.

Among the main considerations to be taken up at a conference of truck and skid manufacturers, and of railroads and other users, which is to be arranged for by the division, will be cost of manufacture and convenience and conformity to needs of users. In considering dimensions for the platforms, one factor will be economical packing in freight cars. One railroad company has adopted a skid of such dimensions that 24 can be loaded into a standard 50-ft. box car, leaving room opposite the doors for the lift-truck to enter.

Using interchangeable skid and truck equipment, certain shops and consignees have found it possible to save over 75 per cent of the cost of packing and boxing materials and over 90 per cent of the labor cost of loading and unloading freight cars. One paper company now loads a freight car with flat paper stock on skids in 45 min., using

two men. Formerly it took seven men 3 hr. to load the same quantity of goods packed in boxes, and the boxes cost three times as much as the skids, for each carload of goods.

It has been estimated that approximately 9,000,000 skids are now in use in the United States. This gives an indication of the wide application which standardization might find. One railroad company alone, after certain changes are completed, expects to use about 100,000 skids and more than 3000 lift-trucks for handling and storing supplies and other materials.

What Trade Associations Must Do

There are four things every trade association must do, says E. St. Elmo Lewis, of National Services, Inc., Detroit, and they are:

- (a) It must have an aggressive, faithful and competent leadership and a membership loyal to the purpose and plan.
- (b) It must have a plan of action based on a competent, unbiased analysis of the trade's requirements.
- (c) It must have an adequate and competent staff to do the work.
- (d) It must have a program that realizes the necessary time, and a budget that fully covers the expense of putting the plan into execution.

Mass Production Begets Overproduction

Surplus of Goods Natural Result of Mass Methods

—Remedy Lies in Better Distribution and
Regulated Output, Says G. M. Verity

MASS production naturally begets overproduction, and this fact must be recognized by industrial executives if they hope to stay on the road to success, according to George M. Verity, president American Rolling Mill Co., Middletown, Ohio, who recently discussed fundamental economic problems with a member of THE IRON AGE staff. The interview centered in the present dilemma of industry, with mass output expanding as costs are lowered and with increased production, in turn, resulting in more intense competition.

The present era of quantity production is mainly accounted for by the invention of mechanical equipment and the introduction of better processing and fabricating designed to replace less efficient manufacturing methods. A disagreeable by-product of these changes, however, is the tendency of profits in many lines of manufacture to shrink as competition grows keener.

Economists and industrialists alike are perplexed and are trying to find new business principles that will guide manufacturers safely through their current difficulties. When Mr. Verity was asked to name policies he regards as essential to the successful conduct of a manufacturing industry, he pointed out that mass production methods normally tend to result in surplus output and that the remedy, in his opinion, lies in better distribution and effective measures to control production. Severe competition also places new emphasis on the importance of a satisfied and loyal employee personnel. His remarks follow:

"From a marketing standpoint, the successful corporation of the future must have its costs of production so sound that it will be prepared to sell its products at a price that will encourage an increased consumption and still make satisfactory earnings on its capital investment. It is economically impossible to get what might be termed a high price for a product manufactured on the basis of mass production, and industrial executives might as well make up their minds to accept that fact.

Must Find Legal Way to Control Output

"It is true that the rapid growth of mass production through better mechanical methods brings with it the problem of an output that may be in excess of the consuming capacity of the country, except in periods of a peak de-

mand. This is a factor, however, which has evolved from the laudable and necessary effort of every manufacturer within an industry to improve his manufacturing methods. Its presence brings before us for solution the still large problem of distribution, which has now become the most serious and the most important problem confronting industry. In this connection, it seems to me not unreasonable to suggest that in the interest of the public at large some legal way must sometime be found whereby industry can control its production within reasonable bounds.

"The successful corporation of the future must give a maximum of service, fairly and equitably distributed among its clients, its working organization and its stockholders, and it must, at the same time, fully respect the rights of the public at large. It must be efficient in a superlative degree and it must be a good and loyal citizen. The part that it can play in the life of the community in which it is situated has infinite possibilities for good.

"That the replacement of man power by machinery will be productive of serious unemployment is a theory which may well be heavily discounted. What it will do is to eliminate much of the less desirable kind of work, but in its place will be substituted jobs of a higher order which will tend to develop the best ability of the workmen. Furthermore, the heavy influx of labor into this country has been effectively curbed by the enforcement of the present immigration law. With the large natural growth of the United States, its normal industrial needs will increase from year to year, and,

while a temporary displacement of labor may result from mechanical progress at some particular time in one particular line of industry, the opening of new channels of commerce as well as the widening of old channels should more than take care of the number of available workmen.

Esprit de Corps Essential

"The successful industry of the future must be thoroughly integrated in its manufacturing processes and must be large enough to enjoy the lowest possible costs of production and distribution in line with the best practical and scientific standards of the day. One of the fundamental factors which it must possess is a fine spirit of cooperation and great efficiency in organization and in management. It must respect the highest standards of compensation.



"THE rapid growth of mass production through better mechanical methods brings with it the problem of an output that may be in excess of the consuming capacity of the country, except in periods of a peak demand."—

GEORGE M. VERITY

Yet wages and salaries are, in truth, only a secondary matter, for they in themselves will not create loyalty and the spirit of cooperation which must exist if the greatest results are to be accomplished. The minds and the hearts of all those a part of a working organization must be reached in order to get them to respond in behalf of the common good and to adapt themselves willingly to changing conditions. If this is not done, modern technical achievements in industry would in many cases be far less effective than they are and, in some cases, would be entirely impossible.

"Years ago companies paid slight attention to the working conditions of their employees. Gradually, however, a social consciousness was created and effort was put forth to provide better sanitation, more comfortable working quarters, safety devices and other means enabling men to do their work to better advantage. All these things were done within the four walls of the industrial plant.

Paternalistic Attitude Toward Employees to Be Avoided

"But it was not long until companies realized that what their men did outside the plant also was of great importance. Consequently, attention was given to the matter of

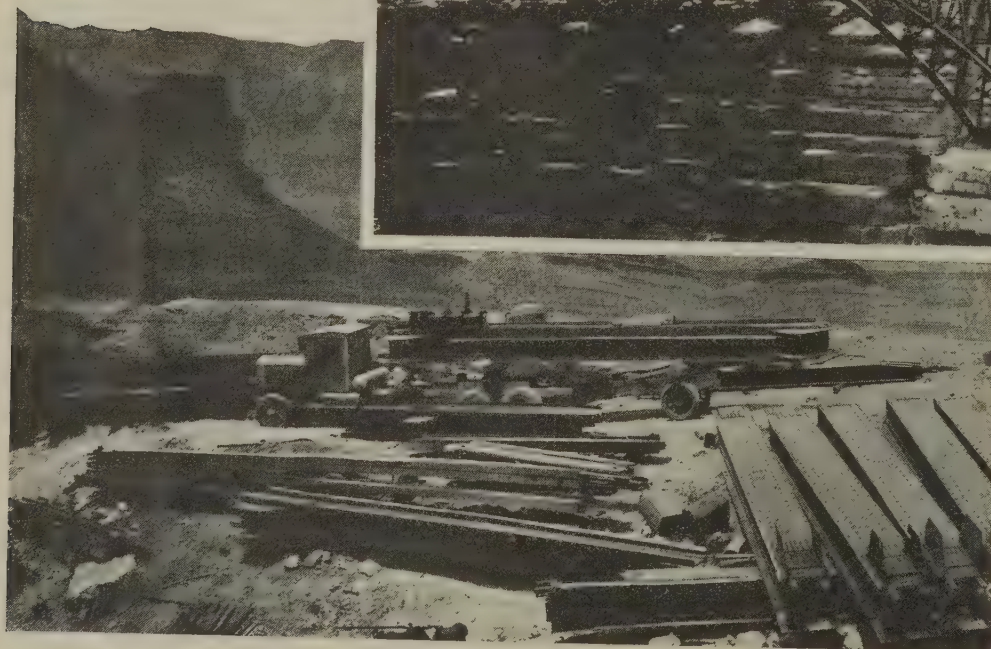
helping them acquire adequate and attractive homes and of helping to make the conditions surrounding their domestic life as happy as possible. Care necessarily had to be exercised to avoid assuming a paternalistic attitude, and the plan that has been supported by many companies has been one of mutual helpfulness rather than that which might bear the malodorous title of 'welfare activities.' In our own company, we have an example of what has been accomplished in that line, as the majority of our men are home owners.

"The importance of the human side of industry cannot be stressed too much, for upon its natural and healthy development depends not only the success of pioneering in mechanical, technical and metallurgical fields, but in solving of the daily problems of production and distribution. The creation of an esprit de corps, the feeling that all are working for a common cause, is the groundwork or setting back of important discoveries and of the solution of what is often regarded as an inexplicable problem. Selfish motives are effaced and the good of the organization becomes the major consideration. The strength of industry, as in an army, is in its organization. The right men, properly trained, properly placed and fully instructed and inspired, can often accomplish the seeming impossible."

Using Heavy Steel Beams in the Desert

SOME of the difficulties involved in building a bridge over the Grand Canyon of the Colorado River may be visualized in the two illustrations. This work is being done by the Kansas City Structural Steel Co. Every beam has to be hauled 150 miles by truck over exceedingly rugged country. It was necessary to build a temporary town to take care of the needs of the workmen, and to maintain a fleet of motor trucks to haul in their supplies from the nearest railroad point.

AT Right Appears One End of the Bridge Jutting Out from the Rugged, Stratified Wall of the Canyon

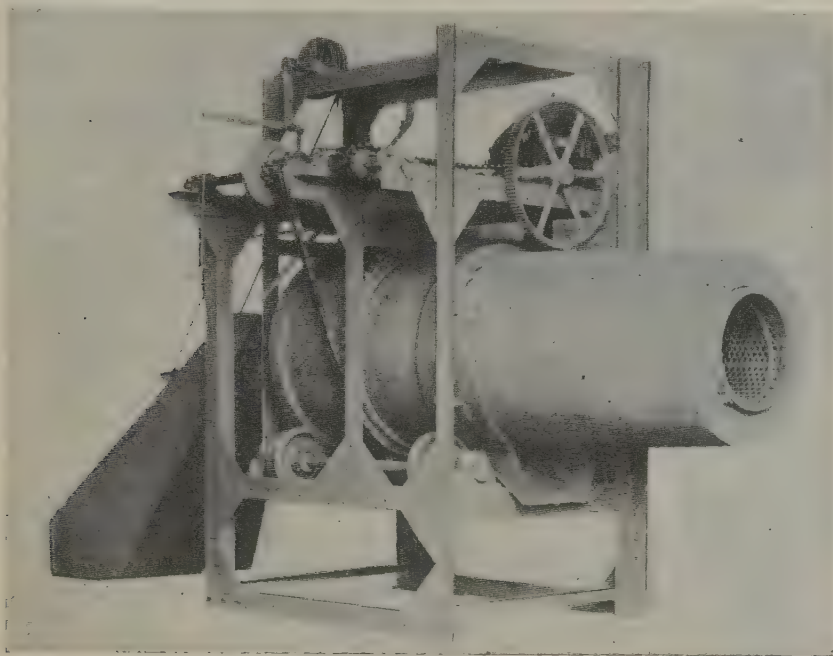


HAULING Heavy Steel Girders Over Rough Country by Means of Motor Trucks and Trailers on Roads Which, in Part, Had to Be Prepared for Their Use

Star Return Tumbling Barrel for Forgings, Stampings and Castings

IDEAL Industrial Machinery, Cincinnati, has developed a new star return tumbling barrel for tumbling drop forgings, heavy stampings and castings. The parts are tumbled with stars or slugs, together with flint shot,

silica sand or steel shot, the weight of stars being approximately equal to the weight of the parts to be tumbled. In this way the parts are prevented from touching each other, being floated in the stars. The re-



Work Is Charged By Means of a Power Loader and Is Discharged Automatically. The stars return to the tumbling compartment automatically

sults achieved, it is claimed, are not to be distinguished from a sand-blasted finish. It is stated that scale is removed even from alloy steel forgings without denting the work and without destroying the corners or designs on the parts.

Work is charged into the barrel by means of a power loader. In discharging, the rotation of the barrel is reversed, and the work automatically comes out at the end of the screen. The stars and sand are separated and fall into a cone-shaped jacket, which surrounds the screen. When the barrel is again rotated in the tumbling direction, the stars automatically return to the tumbling compartment. A minimum of labor is involved.

Transfer and separation of the stars is accomplished by means of a patented cup arrangement in the head between the tumbling compartment and the cone which surrounds the separating screen.

Machines are built in a range of sizes with tumbling compartments that measure from 18 x 24 in. to 48 x 60 in. Rigidity of construction for the hard usage they are intended for is a feature stressed by the manufacturer. Barrels are equipped with a hood for connection to the standard exhaust system. It is planned to show the equipment for the first time at the forthcoming International Steel Exposition, to be held in conjunction with the annual convention of the American Society for Steel Treating.

Diesel Generating Set Furnishes Direct Current for Crane Operation

WHILE alternating-current electrical energy is almost universally furnished by central-station companies, many plants require direct current in some phase of their manufacturing processes. Overhead traveling cranes, if the advantages of dynamic braking are to be gained, require direct current. Dynamic braking cannot be obtained with a. c. motors, because they cannot be automatically reversed. But d. c. motors can function as generators and provide effective and efficient means of braking. In addition, d. c. motors afford high starting torque and close speed regulation, both important considerations in crane operation.

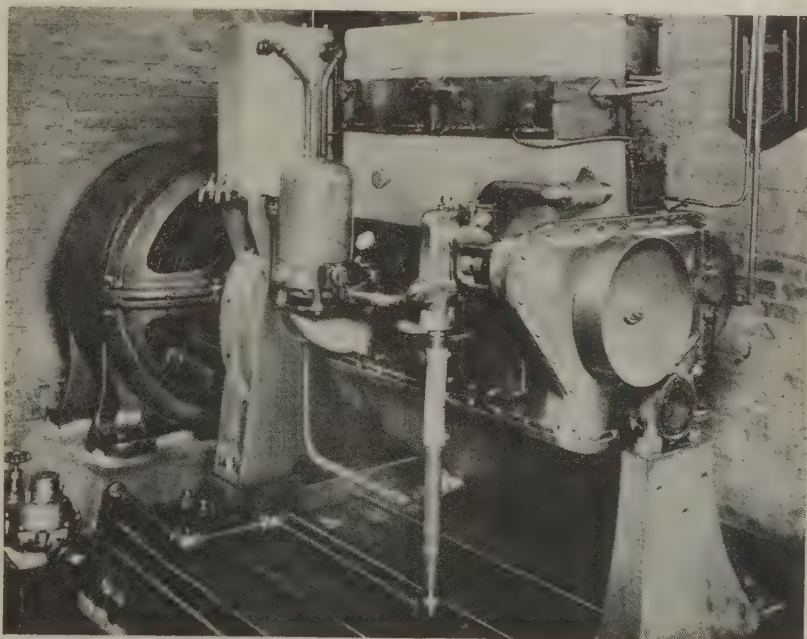
To provide a source of direct current for this purpose, an engine-driven generating set has been put out by the Buda Co., Harvey, Ill. The set illustrated consists of a Diesel engine direct-connected with a 65-kw., 900-r.p.m., 250-volt, 260-amp., d. c. generator. It furnishes power to three 5-ton cranes and one 3-ton crane, which are operated in a foundry and machine shop. The 5-ton cranes are equipped with 11-hp. motors on the hoist and bridge and 3-hp. motors on the trolley, while the 3-ton crane is equipped with 5-hp. motors on the hoist and bridge and a 2-hp. motor on the trolley.

As the cranes in the foundry operate on a 24-hr. schedule six days a

week, there is a continuous demand on the generating set. The load fluctuates from 1 to 300 amp., and often increases instantaneously from zero to maximum. This set is said to provide continuous service, and to withstand the wide variation in load, without greatly affecting the voltage regulation. The engine, built under li-

cense from the M. A. N. Co. of Germany, is of the four-stroke-cycle type, and fuel is injected without the use of an air compressor. It is provided with a self-starter, and no heating devices are required.

With low-priced fuel oil, electricity can be generated at as low as ½c. a kwhr. for fuel and lubricating oil.



Self-Contained Generating Set Consisting of a Diesel Engine Direct-Connected with a 65-Kw. 250-Volt Direct-Current Generator

Strainers for Fuel Oil and Other Fluid-Conveying Systems

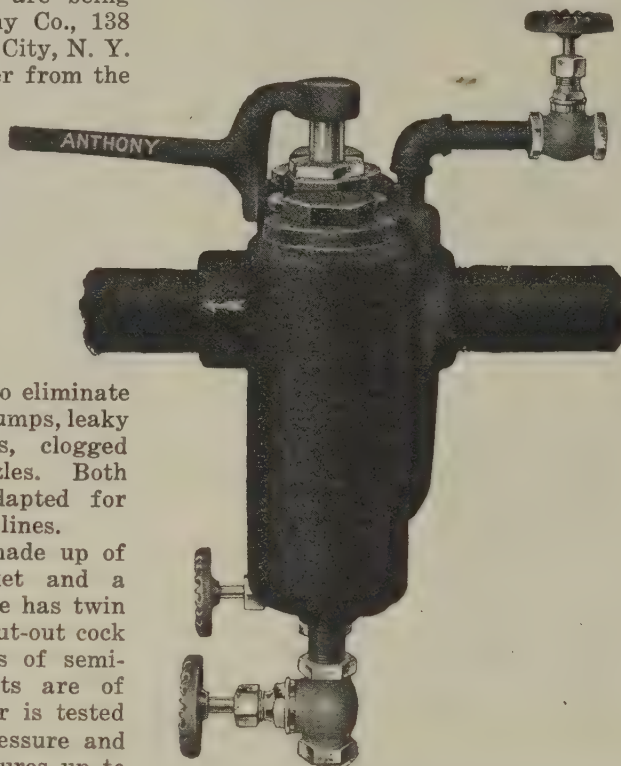
STRAINERS of single and duplex types, for use in connection with systems for conveying fuel oil or other fluids, such as water, tar, paint, chemicals, steam and air are being marketed by the Anthony Co., 138 West Avenue, Long Island City, N. Y. In removing foreign matter from the

the inside of the strainer basket so that sediment accumulates in the reservoir which surrounds the basket. A connection is provided at the bottom

The Blow-Out Arrangement Permits Purging the Baskets Without Interruption to Flow of Liquids in the System

liquids, the device is said to eliminate a common cause of worn pumps, leaky valves, inaccurate meters, clogged controls and clogged nozzles. Both types of strainer are adapted for either suction or pressure lines.

The single strainer is made up of a body, cap, basket, gasket and a drain plug; the duplex type has twin parts, and, in addition, a cut-out cock with handle. The body is of semi-steel and standard baskets are of sheet brass. Each strainer is tested under 500 lb. hydraulic pressure and is suitable for steam pressures up to 250 lb. The single strainers are for use with liquids which contain a small amount of foreign matter and for pipe lines that may be cut out of service temporarily for cleaning. The direction of flow is from the outside to



through which accumulated sediment can be drained or forced out under pressure. For viscous solids, the cap at the top can be removed and the basket cleaned with kerosene or other medium.

Strainers of the duplex type, illustrated herewith, are intended for liquids that contain an appreciable percentage of solids or a trace of viscous residuum and in pipe lines where even temporary interruption to the flow is objectionable. This device has two straining chambers in one body, each chamber being a complete unit within itself. The flow of liquid through both chambers is controlled by one cock, one movement of the handle of which cuts out either chamber, as desired. The direction of flow is from the outside to the inside of the baskets, as in the single pattern strainer. The cleaning operation is simple. The strainer need not be taken apart and tarry and sticky matter is removed from the clogged baskets without burning or washing with kerosene. Drain connections are provided at the bottom.

An outstanding feature of the device is the blow-out arrangement by which all chambers can be purged and the baskets blown free of obstructions without interruption of flow of the liquid. The blow-out connection is located at the top of the strainer, as shown, and when connected to a steam, compressed air or water line, either chamber of the strainer can be cleaned rapidly. Obstructions are blown from the mesh in the reverse direction to the normal flow, and forced with the sediment through the drain.

The duplex strainers are available in three standard sizes, $\frac{1}{2}$, 2 and 4 in., respectively, the nominal size being designated by the pipe size of the inlet and outlet connections.

Offers Tubular Inside Micrometers and New Micrometer Calipers

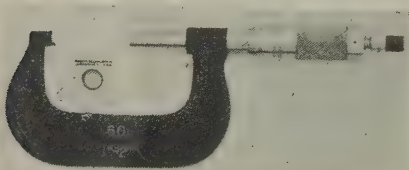
TUBULAR inside micrometers, in three sizes to measure from 12 to 22 in., 22 to 32 in. and 32 to 42 in., respectively, have been added to the line of the Brown & Sharpe Mfg. Co., Providence. Each tool is graduated in thousandths of an inch and the range of measurements of each tool is obtained with ten interchangeable anvils of different lengths. The micrometer head has a movement of 1 in.

The shoulders of the anvils fit against the shoulder of the micrometer head, assuring positive alinement and accurate measurements. The anvils are held in place by a clamp-

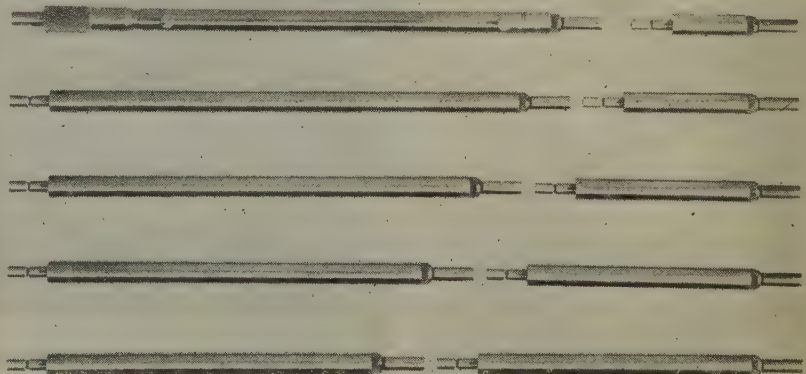
screw which fits into a V groove and may be changed conveniently. Adjustments may be made quickly and the micrometer locked at any reading. The measuring points are hardened and the faces are ground on a radius, which adapts them for measuring parallel or curved surfaces. Metric micrometers of this type are also available.

Two new micrometer calipers, designated as the Nos. 60 and 62, have also been announced by the com-

pany. These tools are similar to the company's Nos. 61 and 63, except that they do not have clamping rings. They are obtainable with graduations in either thousandths of an inch or thousandths of a millimeter. One tool measures from 1 to 2 in. and the other from 2 to 3 in. Both tools have solid anvils and simple adjustment for wear of the measuring surfaces. They are furnished with or without standards and with or without ratchet stops.



The Measurement Range of the Inside Micrometers Is Obtained with the Anvils Shown at the Right



Expansion of Bethlehem Shipbuilding Corporation in Boston Area

Announcement has been made of acquisition by the Bethlehem Shipbuilding Corporation of the Atlantic Works in East Boston. This plant, which has long been established as a ship repair unit, covers 15 acres and has equipment including 22 buildings and two dry-docks. It is located on the main ship channel, directly opposite the United States Navy Yard.

Together with the Simpson Works, also owned by the company, the repair facilities of the Bethlehem company in East Boston now include three steel floating dry-docks, ranging up to 10,000 tons capacity, three graving dry-docks, of which the longest is 465 ft., and three marine railroads, the largest being of 2000 tons. Both these works are located within 10 miles of the Fall River Shipbuilding plant of the Bethlehem organization at Quincy.

Shops at both the repair yards are completely equipped with tools and machines required for any kind of marine and miscellaneous machine and boiler work. The largest graving dock and the largest floating dry-dock are served by a 15-ton traveling crane. Smaller docks and the marine railroads are served by cranes also, of lighter capacity. One feature of the equipment available is a barge fitted with boiler and air compressor, together with welding sets, making it possible to carry out many repairs at steamship berths instead of requiring the ships to be taken to one of the yards.

Standards Approved for Pipe Nipples

WASHINGTON, July 10.—Commercial standards for steel and genuine wrought iron pipe nipples were approved here at a general conference on June 29 of manufacturers of pipe and pipe nipples, and distributors and users of pipe nipples. The meeting was held under the auspices of the commercial standards unit, Bureau of Standards. The approved commercial standards specify that pipe nipples shall be made only from tested new full or short lengths and full-weight steel pipe, free from buckles, bends, kinks, cracks, laminations, imperfect welds, rust, injurious sand marks or any other defects which might affect its strength or serviceability. For steel pipe nipples, the pipe shall otherwise conform in all respects to the American Society for Testing Materials tentative specification for welded and seamless steel pipe, while that for genuine wrought iron pipe nipples shall be in accordance with the A. S. T. M. specification for welded wrought iron pipe No. A72-27.

Effective date for new production and clearance of existing stocks, the conference agreed, should be Jan. 1, 1929. The commercial standards will be subject to annual review for re-

vision by the standing committees. The conference voted unanimously for the adoption of the certification plan of the Bureau of Standards. Under this procedure, the manufacturer of the nipples will, upon request, certify to the purchaser that his commodity is made in conformity with the approved commercial standards.

I. J. Fairchild, head of the commercial standards unit, stated that, before printing the standard, signed acceptances must be received from at least 65 per cent (by volume) of the annual production, as well as a majority of distributors and users.

Freight Rates to Charleston, W. Va., Upheld

WASHINGTON, July 10.—Rates on manufactured iron and steel products, in carloads, from Cambridge, Ohio, and from the Pittsburgh, Youngstown, Johnstown, Pa., and Wheeling, W. Va., groups, to Charleston and Dunbar, W. Va., are not unreasonable, according to a proposed report made last week to the Interstate Commerce Commission by Examiner Thurston B. Johnston, in recommending dismissal of a complaint made against the rates by the Fletcher Enamel Co. and other makers of enamel ware at Charleston and Dunbar. Except from Cambridge and Johnstown the rates are 28.5c. per 100 lb., while from Cambridge and Johnstown they are 25.5c. and 30c. respectively. The complainants had asked for application of the Jones & Laughlin scale, which over short-distance routes ranges from 1.5c. to 6.5c. per 100 lb. less than the rates that are applied.

Keeping Busy the Continuing Need

The biggest problem confronting the nation, and one that will probably confront it for a long time, is that of keeping busy, says F. C. Biggert, Jr., president United Engineering & Foundry Co., Pittsburgh. "The loss of production, the discomfort and downright hardship of our recurring periods of slack operations, amounts to a tremendous total," he believes.

"We still have before us the development of many new products as well as the wider distribution of many already developed," he argues, "and as these developments occur, they will provide jobs for many who are from time to time displaced by new productive methods.

"We still have need for much road building. The development of our navigable waterways is barely begun. Flood prevention should be undertaken in many districts. Water power development should be advanced more rapidly than is now occurring. The Government should be spending much more than it now is upon aviation. Landing fields should be procured and equipped by the Government, instead of leaving this important matter to

private and municipal enterprises. Air ways should be mapped and rights of way secured."

Heavier Freight Movement in Iron and Steel Forecast

WASHINGTON, July 10.—Transportation requirements for iron and steel traffic during the third quarter of the present year are estimated at 454,760 cars, or an increase of 4.8 per cent over the 433,823 cars required during the corresponding period of last year, according to reports received by the car service division of the American Railway Association from the 13 Shippers' Regional Advisory Boards. For the 29 principal commodities, 9,910,768 cars will be required, it is estimated, an increase of about 597,000 cars or 6.4 per cent above the third quarter of 1927. Of the 13 boards, only two, the Central Western and Ohio Valley, estimated decreased requirements. The total number of cars required for coal and coke is estimated at 2,820,897, an increase of 14.1 per cent; for ore and concentrates, 839,352, an increase of 2.7 per cent; for castings, machinery and boilers, 67,875, an increase of 3.2 per cent; for agricultural implements, 42,355, an increase of 8.7 per cent; for automobiles, trucks and parts, 244,510, an increase of 16 per cent, and for petroleum and petroleum products, 653,174, an increase of 10 per cent.

Chrysler Corporation Opens New Engineering Building

A new engineering building for the Chrysler Corporation was opened July 2 with an informal celebration attended by Detroit city officials, leaders in the automotive industry and others prominent in public, industrial and financial circles. The building, which is part of the Chrysler Highland Park plant group, was opened for public inspection on Wednesday, July 4.

Four stories high and containing 960,000 sq. ft. of floor space, the building is a complete motor car factory within itself, with facilities for every process of motor car designing, building and testing. In it the engineering department will design and build experimental cars and parts for all Chrysler products, which now comprise four lines of cars and a line of marine engines.

Civil service examinations are announced by the United States Civil Service Commission for associate and assistant civil engineers with initial salaries ranging from \$2,600 to \$3,700 a year. Applications must be on file with the commission at Washington not later than Aug. 15. Full information may be obtained from the commission or from the civil service board of examiners at the post office or custom house in any city.

Forecasts Large Manganese Ore Output This Year

The placing of calcined rhodochrosite on the market in 1927 indicates that the domestic production of manganese ore in 1928 will probably be materially increased, according to a statement issued by the United States Bureau of Mines, Washington, reporting on shipments of manganese for last year. Noting that there was relatively little change in the shipments of ore containing 35 per cent of manganese or more in 1927 compared with 1926, it was pointed out that a large part of the shipments from Montana, which showed an increase of 4400 gross tons, was calcined rhodochrosite. California, North Carolina and Washington, all of which shipped high-grade ore in 1926, made no shipments in 1927. Shipments of ore containing 35 per cent or more manganese totaled 44,741 tons in 1927, against 46,258 tons in 1926. Shipments of metallurgical ore totaled 27,730 tons. This was an increase of 1200 tons.

Shipments of ore containing 10 to 35 per cent of manganese were less than half as large as those in 1926, amounting to 148,291 tons, against 364,312 tons. The larger part of the decrease in shipments of this grade is accounted for by shipments in Michigan and Minnesota that were classed with ores containing over 10 per cent of manganese in 1926 and fell below 10 per cent in manganese content in 1927.

Shipments of ore containing 5 to 10 per cent of manganese amounted to 1,310,127 tons, valued at \$3,270,560, in 1927, compared with 835,412 tons, valued at \$1,934,381, in 1926, an increase in quantity of 474,715 tons.

Imports in 1927 totaled 622,067 tons, or 308,630 tons of contained manganese, valued at \$8,487,016, compared with 347,378 tons of manganese content, valued at \$11,071,131, in 1926, exclusive of 14,112 tons of ore imported from Cuba.

Coal Supplies for 36 Days

Coal stocks in industries in the United States on June 1 were estimated by the National Association of Purchasing Agents as equivalent to 36 days' supply. Industries varied widely in this respect, however. By-product coke plants had supplies for only 19 days, against 66 days for electric utilities and coal gas plants. The railroads were credited with 36 days' supply, steel mills with 39 days and other industries 35 days.

Tonnage on hand June 1 was estimated at 40,890,000, a drop of 2,780,000 tons from the May 1 figure. There has been a consistent decline in the total reported, ever since Oct. 1, when the aggregate was 60,154,000 tons. Consumption in industries in May is given as 34,844,000 tons, a slight drop from April and the smallest figure since last September.

Estimates of the National Coal Association place the amount of bi-

tuminous coal mined in the last week of June at 8,350,000 net tons. This is about equivalent to the average of the two preceding weeks, as reported by the United States Bureau of Mines.

Graphite Production Last Year

Sales of natural graphite by producers in 1927 amounted to 5207 net tons, valued at \$232,971, a decrease of 263 tons, or 5 per cent in quantity, and an increase of \$13,629, or 6 per cent, in value, compared with 1926, according to the Bureau of Mines, Department of Commerce. The bureau's statistics of production were collected in cooperation with the geological surveys of Alabama, Michigan and Texas.

The decrease in production last year was in the amorphous variety, the crystalline variety increasing both in quantity and value.

The manufacture of artificial graphite in New York decreased from 9448 net tons in 1926 to 5472 tons in 1927, or 42 per cent. Imports of graphite in 1927 amounted to 17,452 tons, valued at \$723,923, compared with 16,166 tons, valued at \$921,233 in 1926, an increase of 8 per cent in quantity, but a decrease of 21 per cent in value.

Sharp Drop in Shipments of Sheet-Metal Ware

WASHINGTON, July 9.—Shipments of galvanized sheet-metal ware in May are reported by the United States Department of Commerce at 190,704 dozens, valued at \$758,953, compared with 237,511 dozens in April, valued at \$875,442. The May total is the smallest since February. It compares with 163,287 dozens a year ago, with a value of \$665,808. For the five months there has been a gain—from 988,727 dozens and \$3,710,727 last year to 1,026,455 dozens, \$3,877,143, this year.

Largest June Building Construction Ever Recorded

Building construction contracts placed in June are reported by F. W. Dodge Corporation at \$650,466,000. This is the second largest total ever reported for one month, having been exceeded by about 2½ per cent in May of this year. It was 3 per cent ahead of the high record made in June, 1927, and far exceeds any other June. For the first six months of the year the total has been \$3,445,000,000. This is the largest first half-year on record, representing an increase of 8 per cent over the first half of last year.

Residential buildings in June accounted for \$258,084,000, or 40 per cent of the total. Public works and utilities amounted to \$130,852,000, commercial buildings to \$93,942,000 and industrial projects to \$63,537,000.

Contemplated new work reported in June amounted to \$1,030,095,000, being 17 per cent ahead of May and 41 per cent above a year ago.

June contracts in New York and northern New Jersey were the largest for the month ever recorded, but were lower than in May. The same is true of the Middle Atlantic States and of Texas. In the Southeastern States the June total ran ahead of May. In New England, the Pittsburgh district and the Central West June made the second highest showing ever reported for that month.

Estimates of the Associated General Contractors of America placed the June volume of construction at 244, on a basis of 100 as the average for 1913. The current figure is contrasted with 212 in June last year and with a previous high total of 238 in August last year. The figure for May was 185.

Gain in Locomotive Shipments

WASHINGTON, July 9.—Railroad locomotives to the number of 51 were shipped in June, against 41 in May, according to the Department of Commerce. Of the June shipments, 39 were steam and 11 were electric locomotives for domestic account. One steam unit was shipped abroad. For the six months ended with June 314 locomotives were shipped, compared with 570 for the corresponding period of last year. In June, 1927, the total number was 89.

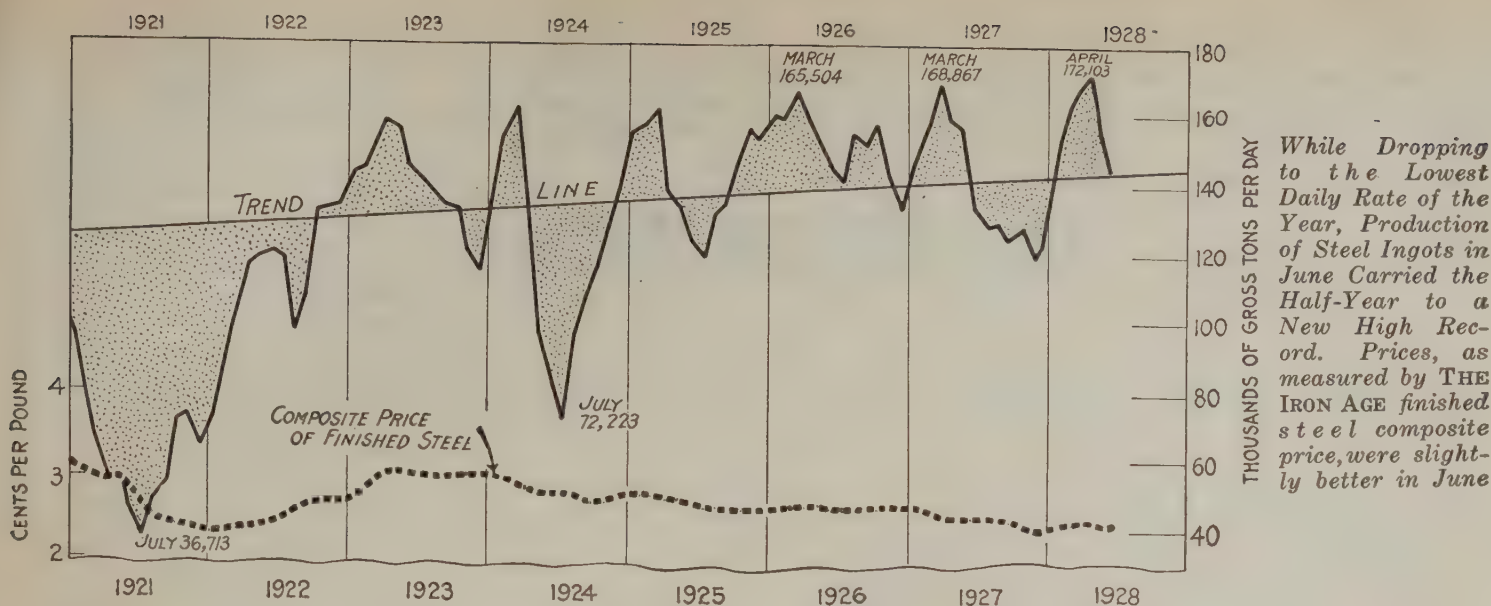
Unfilled orders July 1 called for 201 locomotives, compared with 220 on June 1 and with 400 a year ago. Of the current unfilled orders 161 are for steam and 40 for electric units. Foreign buyers account for 52 and three respectively.

Steel Works Employment Almost Stationary

Employment in 196 establishments making iron and steel total 265,197 in May, compared with 265,713 in the same establishments in April. The reduction was 0.2 per cent. There was an increase of 2.4 per cent in the total amount of payroll, the advance being from \$8,275,366 to \$8,471,115 for corresponding weeks in the two months.

Meantime 996 establishments in the foundry and machine shop group showed an advance from 233,951 on the payroll in April to 238,290 in May—an increase of 1.9 per cent. The amount on the payroll went up correspondingly from \$7,017,127 to \$7,205,634, or 2 per cent.

Machine tool plants to the number of 153 showed an increase of 2.7 per cent in number on payroll and 2.5 per cent in amount of payroll. Structural ironwork advanced 3.7 per cent in number on payroll and 6.1 per cent in amount of payroll, while cast iron pipe plants advanced 3.1 per cent under both heads.



Ingot Production Makes New Record

First Half 639,000 Tons Ahead of Previous Highest Half-Year—
Gain Over 1927 Almost 1,000,000 Tons

PRODUCTION of open-hearth and Bessemer steel ingots in the United States in June is calculated by the American Iron and Steel Institute at 3,742,964 gross tons. While this is the smallest total for any month of the year as yet, it is greater than the production of any month in 1927 subsequent to May. The six-month total is calculated at 24,792,883 tons, against 23,807,387 tons for the first half of 1927.

Previous to this year, the highest output for any half-year was that of the first half of 1926, at 24,153,809 tons. That figure included crucible and electric steel ingots, which are not included in the current figure. Hence, the apparent increase of 639,074 tons over the previous record becomes considerably greater if allowance be made for the tonnage no longer reported. As that class of ingots in 1927 aggregated 378,974 tons, it may be fair to allocate 190,000 tons

of crucible and electric steel ingots to the first half of this year, thus making the total about 24,983,000 tons, which is 829,000 tons (or 3½ per cent) higher than the previous record.

On the daily basis, the June production in 26 working days was 143,960 tons a day. This shows a drop of about 8 per cent from the figure for May and about 17 per cent from the high record figure of April. For the six months, the average for 156 working days was some 5300 tons greater than the average for the first six months of 1927, which had only 155 working days.

Practically the entire gain in six months over last year was in the open-hearth classification. Disregarding the tonnage of the small proportion of companies not reporting, the total was 20,213,141 tons, or close to 1,000,000 tons above the 19,226,735 tons of last year. Bessemer ingots, on the other hand, showed a drop of 50,000 tons, or 1½ per cent.

Estimating production in June of electric and crucible steel ingots at 1400 tons a day, the total for the month appears to have been about 145,360 tons for each working day.

Present Clock to Louvain University

Formal presentation to the University of Louvain of a clock and carillon for the tower of the new library was made July 4 by the War Memorial Committee of American Engineers. The ceremony took place in connection with the dedication of the library. The address of presentation was handed to the secretary of the university, Leon Van der Essen, by Dr. Edward Dean Adams, New York, committee chairman and representative of the Engineering Foundation.

The address recited in part: "To the glory of God and in memory of their fellow engineers who died in service during the Great War 1914-1918, the engineering societies of the United States of America present to the University of Louvain the carillon and the clock installed in the tower of the library of the university, the endowment fund of \$10,000 for their maintenance, the honor roll of those who died, and a record of the names of all those whose contributions have made this memorial possible."

Production of Steel Ingots*

Months	(Gross Tons)		Calculated Monthly Output All Companies	Approximate Daily Output All Companies
	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927			
1928	Open-Hearth	Bessemer		
Jan.	3,280,247	498,746	3,991,332	153,513
Feb.	3,308,728	521,366	4,045,304	161,812
March	3,700,411	567,309	4,507,520	166,945
April	3,509,637	564,039	4,802,573	172,103
May	3,397,631	581,949	4,203,190	155,674
June	3,016,487	527,351	3,742,964	143,960
6 Months....	20,213,141	3,260,760	24,792,883	158,929
1927				
Jan.	3,042,133	545,596	3,789,874	145,764
Feb.	3,043,492	565,226	3,812,046	158,835
March	3,702,660	590,709	4,535,272	167,973
April	3,341,750	565,440	4,127,335	158,744
May	3,273,593	557,785	4,047,251	155,663
June	2,823,107	486,053	3,495,609	134,446
6 Months....	19,226,735	3,310,809	23,807,387	153,596
July	2,596,349	436,883	3,204,135	128,165
Aug.	2,806,347	505,596	3,498,549	129,576
Sept.	2,622,977	471,548	3,268,881	125,726
Oct.	2,643,562	495,845	3,316,292	127,550
Nov.	2,478,627	481,599	3,127,015	120,270
Dec.	2,557,955	448,154	3,175,484	122,134
Total	34,932,552	6,150,434	43,397,743	139,543

*Excluding crucible and electric steel ingots.

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THE IRON AGE

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Managing Editor

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Testing the "Graham Idea"

IN a mechanical age the importance of the individual is overlooked. We give credit to mass production, to system, to scientific management, to standardization, or to some other abstract concept, but frequently forget our dependence, in the last resort, on human qualities.

As pointed out by Magnus W. Alexander in an address abstracted elsewhere in this issue, production is outstripping consumption in certain lines, and a distribution problem has arisen. Among makers of steel products distribution has been a topic of discussion for several years, but for the most part efforts to find a solution have stopped with general pleas for cooperation.

It remained for Charles J. Graham and other manufacturers of bolts, nuts and rivets to make the first systematic and sustained study of distribution in the steel industry. While their pioneer work has covered only a part of the iron and steel field, it has dealt with a branch having one of the most complex distributing organizations.

Mr. Graham and his associates have traveled from coast to coast at their own expense, and have done much to create a new conception of distribution and to bring about accord, where distrust and unintelligent competition had existed before. They have tried to instill into manufacturers and jobbers alike a sense of responsibility to each other, in the face of ingrained habits of individualism.

What they have attempted is not comparable with the purposes of the price pools of former days. The pools were frankly intended as a means of raising prices and thereby increasing profits. Today, mass production calls for mass demand, and it is realized that high prices mean idle plant and equipment. In fact, the present tendency to overproduce has created a new need—that of preventing prices from going to ruinously low levels.

It was to find a way, within the law, to throw the brakes on falling prices, and not to raise them, that the bolt, nut and rivet industry undertook to reorganize its distribution. If what has been done does not stand the test of time, it will be because the many independent business units involved are not yet capable of group thinking. It is obvious that the economic security of the individual depends on the stability of the entire industry; but a more short-sighted selfishness, taking into account immediate gain only, may prevail.

The plan adopted for bolts, nuts and rivets, which will be extended to other iron and steel products if the recent New York distribution conference bears fruit, is a test of men rather than of principles. It will succeed

only if those called upon to cooperate for the common good have the vision of those who initiated the movement.

A Record Half-Year

NOT only has the production of steel ingots made a new high record in the half-year just ended, but building construction has scaled new heights and the output of automobiles, after a slow start, has exceeded that of all half-years save the first half of 1926. Ingots, after making allowance for the crucible and electric steel tonnage, no longer reported by months, topped the 1926 record of 24,153,809 tons by about 850,000 tons, or 3½ per cent. New building construction, at \$3,445 millions, was 8 per cent ahead of last year, with June running up the highest total ever recorded. Automobile production (United States only) was about 2,200,000 cars and trucks. This is 150,000 less than in the first half of 1926, but 50,000 more than in any other half-year.

Railroad traffic does not hold up to some previous records. Car loadings and tonnage moved are not impressive, as compared with the figures for 1926. But the story of activity told by the figures for steel and automobile and building operations quite warrants the common observation that "business has been good," in spite of the qualification often made of the inadequacy of profits.

Bessemer Steel in the Market

THAT Bessemer steel is superior to open-hearth steel for a variety of purposes was pointed out in an article in last week's IRON AGE by Dr. G. B. Waterhouse, professor of metallurgy at the Massachusetts Institute of Technology and consulting engineer and metallurgist. The merits of the two steels were considered from the technical aspect, and it was pointed out that, in addition to the fact that Bessemer steel, as now made, is preferable for certain uses, there are opportunities to improve the quality further.

Two other phases of the subject may be considered—marketing and cost. Using for illustration Doctor Waterhouse's reference to the superiority of Bessemer steel for high-speed automatic screw stock, that is a specific use involving large tonnages, and the consumers call for Bessemer steel in making their purchases. A large tonnage of merchant bars is sold without the producer knowing just how the bars are going to be used. Some will be used one way, some another. In a general way open-hearth would cover all the uses,

while in some of them, perhaps only a small proportion, there would be objections to Bessemer. Accordingly the seller, when he is a maker of both Bessemer and open-hearth, elects to ship open-hearth. This is not theory, but citation of the practice under which much steel is being sold at the present time. Then, too, there are many buyers who have heard things about steel in a general way and have been moved to ask for open-hearth without definite knowledge that it would be more suitable for their purpose than Bessemer.

If the manufacturers wished to push Bessemer steel they would have much ground in which to work. There was a time, years ago, when open-hearth steel promised to be considerably cheaper to make than Bessemer. Events have worked out differently. Construction costs have mounted enormously and that falls more heavily upon open-hearth than upon Bessemer, and the increase in wages operates in the same direction. At one time there was an expectation that the relation of Bessemer and non-Bessemer ore supplies would become such as to make the former much the dearer; but additional discoveries of ore and the decline in consumption have made a condition today quite different from that expected a quarter century ago, when production of Bessemer steel was still showing increases.

It is true there is an argument in the other direction, scrap being cheaper now in relation to pig iron than it used to be. Using composites of THE IRON AGE for comparison, heavy melting steel against all descriptions of pig iron, scrap averaged \$2.12 under pig iron in 1912-13-14 and \$4.74 under in 1926-27. But scrap costs money to gather and transport while ore, coke and pig iron still have opportunities for cost reduction.

Steel makers have been making much progress in linking their various products with the services to which they will be put. It would seem that there is a good outlook for improving Bessemer steel and pushing it into the numerous uses for which it is particularly well fitted, with an advantage to the producer in the matter of cost.

Canada and American Steel

CANADIAN steel manufacturers continue to stress the existing regime of low or moderate duties on their products as a bar to the prosperity they have hoped for year by year but have not realized. President Robert Dodd of the Lake Superior Corporation, which has spent largely for plant extensions at Sault Ste Marie, Ont., in the past few years, complains that American steel companies, "protected by almost prohibitive duties on steel, can afford to sell their product in Canada at a price below production costs in this country" and adds that higher Canadian import duties would prevent this. To the suggestion that in case steel duties were raised American producers would build plants on the Canadian side, he replied that then they would be on a footing with Canadian steel works and their operations would benefit the Dominion in increased employment and in other ways.

It is quite improbable that American steel interests would build works in Canada, even though the Dominion Government raised steel tariff schedules. Canada is too largely agricultural and its urban population gives altogether too little promise of development in the American way to warrant any such move.

Also the hazard of a sudden electoral reversal of any policy of encouragement to steel manufacture is too great.

As THE IRON AGE has suggested on other occasions, no large part of the steel business our manufacturers have in Canada is done at the expense of the Canadian industry, and little if any of it at prices below production costs in Canada. The administration of Canada's anti-dumping laws is too efficient to permit this last, even if producers here ever reached such a degree of demoralization in their selling.

On the basis of last year's operations, Canadian steel works produced roundly 700,000 tons of rolled steel for their home market. Exports of American steel, finished and semi-finished, to Canada are also not far from 700,000 tons. While there is competition between works here and works yonder on certain products, a large part of the shipments from this side is in finished forms which Canadian mills are not equipped to manufacture. Canada, with her limited consumption of many rolled products, does not warrant the building of mills devoted to these lines or of mills equipped to roll the great variety of sizes and shapes which has been made available in this country only by investments running into hundreds of millions. Therefore, for years to come our Canadian neighbors will continue to avail themselves of the unparalleled facilities of American works and at prices which need neither threaten the prosperity of their own steel companies nor put the manufacturing consumer there at any disadvantage in comparison with his competitor on this side of the line.

British Blast Furnace Practice

BRITISH blast furnaces use considerably more iron ore and coke than American furnaces to make a ton of pig iron, but nevertheless they get along with a little less limestone, the native ores being somewhat self fluxing. Statistics of the consumption in 1926 are given in the annual report issued this year by the National Federation of Iron and Steel Manufacturers. A comparison with the blast furnaces of the United States, for the same year, is given below:

Materials Consumed per Ton of Pig Iron—1926

	Britain	United States
Iron ore, gross tons.....	2.3245	1.763
Cinder, scrap, etc.....	0.1715	0.165
Total, gross tons.....	2.4960	1.928
Limestone, pounds.....	878	889
Coke and coal, pounds....	2950	2061

The figures are closely comparable. While 1926 was an off year in British pig iron production, on account of the coal strike, the proportions of material did not vary materially from the average, except for a slight diminution in coal and coke consumption. The British average includes ferroalloys while the United States average excludes them.

It might be thought that the fact that the American industry has been a rapidly expanding one would in itself conduce to the making of improvements, there being so much opportunity in the designing of new plants. This does not apply with so much force to blast furnaces as to other things, for in both Great Britain and the United States the number of blast furnaces has been decreasing, for forty-seven years in the United States and for a longer time in Great Britain. In a British record beginning with 1874

that year is assigned the largest average number of furnaces in blast, 649, there being a substantially steady decrease to date. The United States record, which deals with the number of furnaces in existence, shows 716 in 1881, and decreasing numbers thereafter. At the end of 1927 there were 351 coke furnaces counted as capable of operation (though only 169 were then operating) and thirteen charcoal furnaces.

The early American blast furnaces had much less output per stack than the British. They were charcoal furnaces, but the nature of the fuel was not the reason. Rather it was a matter of geography and transportation, stacks being set up at numerous points where wood and iron ore were available. While American outputs have greatly outdistanced the British, the average being three or four times as great, there has been a certain increase in Great Britain, particularly in the last ten years. The following table shows the average number of British furnaces in blast at decennial periods, with the average annual output in gross tons.

British Blast Furnaces by Decades from 1877

	Number in Blast	Annual Output, Gross Tons
1877.....	541	12,200
1887.....	405	18,700
1897.....	380	23,200
1907.....	369	27,400
1917.....	318	29,400
1927.....	171	42,500

Of course it is chiefly a case of the fitter, and larger, stacks surviving and being in blast, and that is exactly the experience in the United States.

Export Information Developed by Research as an Aid to Foreign Business

Research as applied to export trade and the possibilities for expanding it can furnish information, definite and precise in many cases, along several lines of attack on the problem. As pointed out in a brochure prepared for the Research Committee of the New England Council by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York, some of these items are:

- What can be sold.
- Where it can be sold.
- Extent of the possible market.
- What it costs to do business.
- How many buyers there are.
- When they make their purchases.
- What are the best methods to use in getting business.

Personal investigation is urged as highly desirable in carrying on such a research. Sending to the country in question a representative—preferably from the factory—who can talk the language of the prospective customers is said to be the best means of obtaining a foothold in the desired market. Frequently such a trip is made, not with the hope of getting immediate business, but to secure first-hand knowledge of the far-away markets. Personal study of local conditions is thus utilized as a background in extending or inaugurating business connections.

All of this is, of course, in addition to the data and advice obtainable from the United States Department of Commerce. Many times this organization can tell a manufacturer whether it would be likely to be profitable for him to spend his time and money in looking carefully into the proposed outlet for his goods.

Foreign credit conditions often provide a stumbling block unless the subject is studied exhaustively, along the

RAILROAD buying gives little promise of amounting to much in the next few months, from all that came out of the railroad equipment show at Atlantic City. Disappointing as this situation is to those largely dependent on railroad business, the iron, steel and metal-working industries have been enjoying, on the whole, a surprisingly good volume of demand with so little help from the railroads. There is nothing in general conditions to suggest any marked revision of the steel buying schedules maintained lately, and business accordingly is now looking upon any expansion in the calls from the carriers as just so much to be added to a fairly satisfactory running total. Since the Atlantic City gathering, one reassuring development is the appearance this week of four inquiries for steel rails, on top of regular purchases long since closed, and some of the new rails will be put into track this fall.

THE New York Times, whose standard of accuracy, which it does not emphasize, is generally as high as its standard of cleanness, which it does emphasize, had this in an editorial a day or two ago:

Perhaps the phrase is not to be found in the work on agriculture which Secretary Hoover translated from the Latin. . . .

All the "agriculture" in *De Re Metallica*, which Mr. and Mrs. Hoover translated from the Latin, was in the name of its German author, Agricola. While eminently a "dirt" mining engineer, we believe the Secretary has made no claim to recognition as either a theoretical or a dirt agriculturist.

lines of local practices. With such a careful survey it is found that losses from this source may be held within 1 per cent, or even less. In some instances these losses prove lower than those from domestic customers.

Thoroughness, personal knowledge of the field, trust in the dealer abroad and complete sales information by classes of lines are four points stressed as essential to success in developing foreign markets. Complete dealer information, a branch of the fourth item, is needed, also, so that, while there is no effort to coerce dealers, the company is in a position to know what may reasonably be required of them.

To Further the Use of Slag

Manufacture and use of slag products are covered in a 56-page pamphlet issued by the National Slag Association, Leader Building, Cleveland. This is the fourth in a series of monographs, the others having been "Absorption in Slag and Slag Concrete," "Resistance of Blast Furnace Slag to Abrasion and Wear" and "Action of Slag Under High Temperatures and Fire." Primarily the present pamphlet discusses articles made of cement in which the slag is the principal ingredient. Concrete blocks and brick, monuments and a wide variety of other forms are treated, as well as similar articles made from slag-lime combinations, the hydrated lime acting as binder. This process has been employed more extensively in Europe than in the United States, as both the British and the Germans have experimented thoroughly with such products and their manufacture in France is being carried on on a large scale.

Construction costs in June are placed at 198 (1913 average at 100) by the Associated General Contractors of America. Comparing with 196 in May, this is the first rise since September.

This Issue in Brief

Some legal way must be found to control production within reasonable bounds, says G. M. Verity. Mass production methods normally tend to result in surplus output, which means shrinking profits. Industrial executives should make up their minds to accept the fact that it is economically impossible to get what might be termed a high price for a product manufactured on a mass-production basis.—Page 89.

* * *

Die casting may pay, even if the number of parts to be made does not exceed one thousand. It all depends on the amount of costly machining and finishing operations the die casting eliminates.—Page 82.

* * *

Human factor can be removed from reversing valves in open-hearth furnaces by using pyrometer controllers. Thermo-couples can be located at a relatively cool spot in the rear of the checker work, and when temperature reaches the mark at which the spotter on each controller is set, the draft is automatically reversed.—Page 77.

* * *

Arc welding operator's performance is checked by recording shunt ammeter. The character of curves shows the type of work done, when polarity has been reversed, if electrode has been grounded, whether the work has been rushed, etc.—Page 77.

* * *

Is the "Graham idea" the cure for ailing industries? If it fails it will be because the many independent business units involved are not yet capable of group thinking, says IRON AGE editorial writer.—Page 96.

* * *

Steel ingot output establishes new half-year record. Production for six months was 24,792,883 tons, exceeding by 639,000 tons the previous record, made in 1926. June daily output averaged 143,960 tons, 7.5 per cent under May.—Page 95.

Rusting of sheets in storage is prevented by use of recording psychrometer. If record shows atmospheric conditions are favorable to formation of dew, fans are started to circulate warm air throughout the warehouse, preventing moisture from collecting on the sheets.—Page 77.

* * *

Doubts that machinery will be a serious contributor to unemployment. While machinery eliminates much of the less desirable kinds of work, says steel manufacturer, it substitutes jobs of a higher order. Temporary displacements in some particular line will be compensated for by opening of new channels and widening of old ones.—Page 89.

* * *

Even distribution of heat in annealing furnace is obtained by means of "double pass" combustion chambers. Oil and air are mixed in the lower chamber; gases then travel to the upper pass and are admitted to the working chamber through ports dimensioned to provide for proper heat distribution.—Page 80.

* * *

Ford prefers electric furnaces for heat-treating. Low-cost power is plentiful and, though first cost of furnaces is high, ease of control, cleanliness, compactness and non-radiating qualities recommend them. Nickel-chromium in ribbon form is used as a resistor where temperature does not exceed 1500 deg. Fahr.—Page 73.

* * *

"Friction bite" hoist mechanism avoids the use of limit switches on electrode arms in melting furnace. Electrodes are counter-balanced and operating mechanism is equipped throughout with anti-friction bearings. Electrode arms are fastened to one end of a steel cable, which passes over sheaves and around a fiber sleeve on a winch drum and then up to a counterweight.—Page 79.

Insulating open-hearth regenerators will pay for itself within a few months, says insulator manufacturer. Calculates that heat saved equals \$53 per 100 sq. ft. a year. Where insulation is properly proportioned to conditions, highly desirable results are obtained, without detriment to the brickwork.—Page 86.

* * *

High cost of distribution is reflected in the lower percentage of wage earners engaged in productive, as distinguished from distribution, work. In 1870, 88 per cent of those gainfully employed were engaged in production, while now less than 70 per cent are so employed.—Page 83.

* * *

Denies post-war gain in world iron output is below pre-war average. Gains since 1919 will be found to approximate 12-year pre-war trend, says IRON AGE staff writer. "Nothing less than another devastating war will prevent the steady expansion in output called for by the post-war trend," he believes.—Page 81.

* * *

New record for June building construction was established last month. Contracts totaled over 650 million dollars, second largest month on record, and 3 per cent over those of June last year. First half-year was the highest ever reached.—Page 94.

* * *

"Keeping busy," says machinery builder, "is nation's biggest problem and will continue to be for a long time." Loss of production, discomfort and downright hardship in recurring periods of slack operation amount to a tremendous total.—Page 93.

* * *

If you injure another industry by selling below cost you yourself will be adversely affected eventually. Business is interdependent, says head of Industrial Conference Board, and selling part of output at a loss is bound to react disastrously upon the seller.—Page 83.

Pig Iron Output in June Declines

Actual Data Make the Daily Rate 3198 Tons or 3 Per Cent
Less Than May—Net Loss of Nine Furnaces

ACTUAL data covering the operations of blast furnaces in June show almost no change from the estimates published in THE IRON AGE, July 5. The June production was 102,733 tons per day or only 23 tons per day more than the estimate of 102,710 tons published last week.

Total June coke pig iron output was 3,082,000 gross tons or 102,733 tons per day for the 30 days in June compared with 3,283,856 tons or 105,931 tons per day for the 31 days in May. This is a decrease of 3198 tons or 3 per cent for June. In May there was a slight loss of only 0.25 per cent from April. The June production last year was 3,089,651 tons or 102,988 tons per day so that the two months show little variation. Output last month was the smallest for June since June, 1925, when it was 89,115 tons per day.

The Half Year's Production

Production for the half year to July 1 was 18,520,921 tons which is the smallest for that period since 1924 when the output to July 1 was 17,434,492 tons. The record for the first half year was 20,841,530 tons in 1923. An inter-

esting fact is that the merchant iron production, which was about 21,100 tons per day to July 1, this year, or close to 21 per cent of the total daily rate, compares with about 27,400 tons per day or nearly 24 per cent of the total daily rate for the first half of 1923, the record year.

Large Ferromanganese Output

Ferromanganese produced last month was 32,088 tons or the largest since separate records have been published.

Capacity Active on July 1

On July 1 there were 189 furnaces active having an estimated daily operating rate of 100,855 tons as compared with an operating rate of 106,145 tons per day for the 198 furnaces blowing on June 1. Six furnaces were blown in and 15 were shut down during June, a net loss of nine. Of the furnaces blown in two were Steel Corporation stacks, one belonged to an independent steel company and three were merchant furnaces. The Steel Corporation shut down seven furnaces and the independent steel companies blew

Daily Average Production of Coke Pig Iron in the United States
by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year....	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,973	95,199	.....
Aug.	60,875	87,241	103,241	95,073	.....
Sept.	68,442	90,873	104,543	92,498	.....
Oct.	79,907	97,528	107,553	89,810	.....
Nov.	83,656	100,767	107,890	88,279	.....
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107,043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York and Mass.	199,045	212,333	205,556	216,224
Lehigh Valley	60,640	77,195	81,140	80,058
Schuylkill Valley	52,434	53,162	60,062	51,325
Lower Susq. and Lebanon Valleys	29,207	32,019	31,522	33,301
Pittsburgh district	606,223	700,880	663,784	639,693
Shenango Valley	101,543	114,779	100,073	101,946
Western Pennsylvania ..	117,833	126,790	116,405	101,365
Maryland, Va. and Ky....	116,691	100,508	102,678	103,857
Wheeling district	145,717	124,948	115,284	133,764
Mahoning Valley	291,174	309,842	310,227	296,491
Central and North'n Ohio	349,952	357,900	336,200	330,176
Southern Ohio	40,810	26,380	25,548	25,729
Illinois and Indiana....	635,201	694,636	693,271	715,439
Mich., Minn., Mo., Wis.,	.....	.....	.....	.....
Colo. and Utah.....	127,085	137,987	134,163	139,101
Alabama	200,643	207,045	199,487	223,314
Tennessee	7,802	7,452	10,104	7,891
Total	3,082,000	3,283,856	3,185,504	3,199,674

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchants* Iron	Total
June, 1927.....	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928.....	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931
June	81,630	21,103	102,733

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

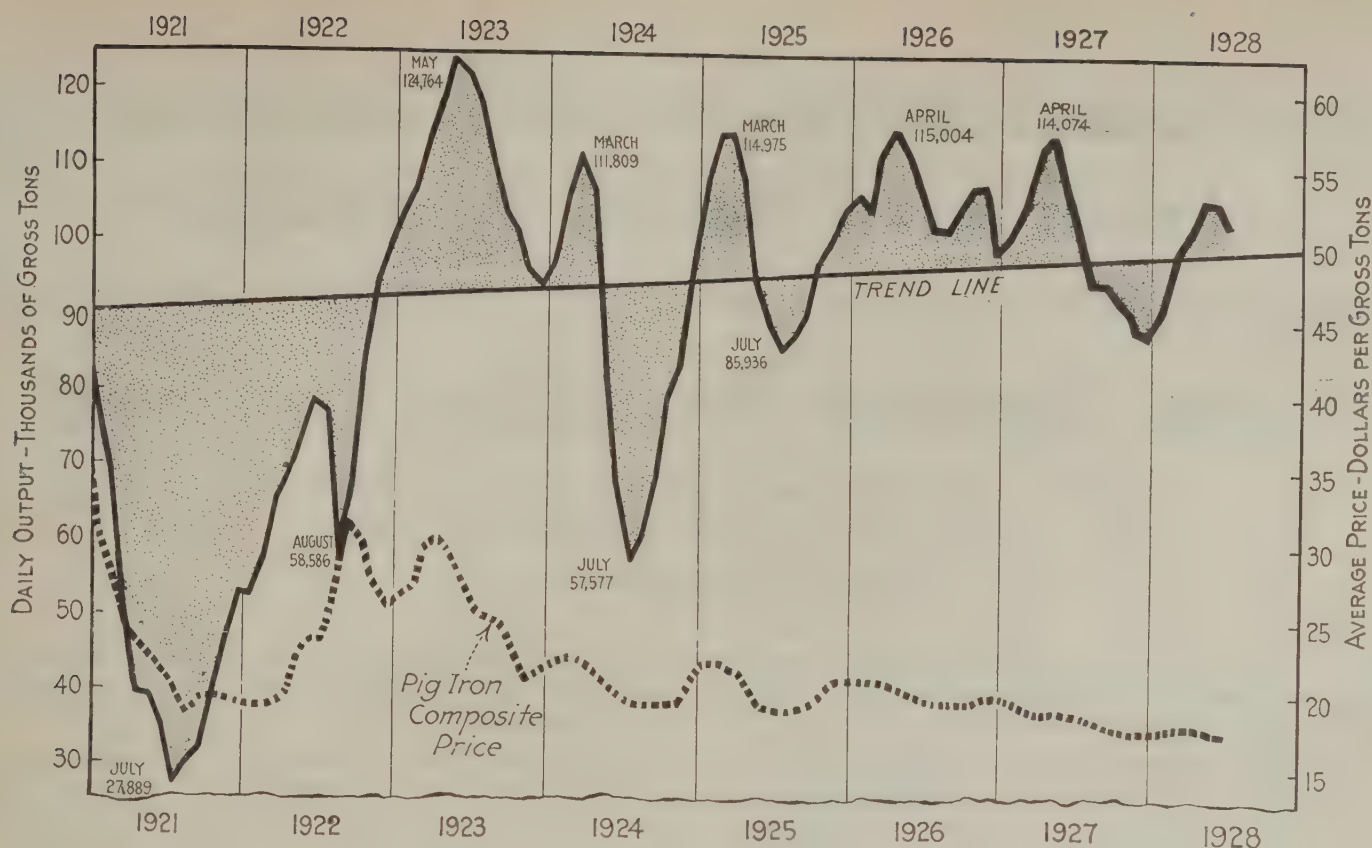
	July 1		June 1	
Furnaces	Number in Blast	Capacity per Day	Number in Blast	Capacity per Day
New York:				
Buffalo	11	5,580	12	5,700
Other N. Y. and Mass....	2	800	2	870
New Jersey .....	..	....	0	....
Pennsylvania:				
Lehigh Valley	5	1,930*	5	2,490*
Schuylkill Valley	4	1,750	4	1,710
Susquehanna Valley	2	975	2	1,020
Ferromanganese	0	....	0	....
Lebanon Valley .....	..	....	0	....
Ferromanganese	1	80	0	....
Pittsburgh District	31	19,485	36	22,000
Ferromanganese	3	500	3	530
Shenango Valley	6	3,300	7	3,700
Western Pennsylvania ..	6	3,530	6	3,795
Ferromanganese	2	390	2	290
Maryland	5	2,600	5	2,590
Wheeling District	8	4,860	8	4,400
Ohio:				
Mahoning Valley	17	9,700	17	9,735
Central and Northern....	20	12,300	19	11,500
Southern	4	1,360	4	1,200
Illinois and Indiana....	29	19,780	33	22,200
Mich., Wis. and Minn....	6	2,665	6	2,680
Colo., Mo. and Utah.....	4	1,575	4	1,765
The South:				
Virginia	1	230	1	230
Ferromanganese	1	80	1	80
Kentucky	2	725	1	345
Alabama	16	6,320	17	6,775
Ferromanganese	1	80	1	100
Tennessee	2	260	2	240
Total	189	100,855	198	106,145

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months,
Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	3,082,000
½ year.....	19,848,461	19,430,678	18,520,921
July	3,223,338	2,951,160	.....
Aug.	3,200,479	2,947,276	.....
Sept.	3,136,293	2,774,949	.....
Oct.	3,334,132	2,784,112	.....
Nov.	3,236,707	2,648,376	.....
Dec.	3,091,060	2,695,755	.....
Year*	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in June Was About 3 Per Cent Less Than in May; Composite Price Decreases Slightly
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

out four. There were also four merchant stacks shut down. These data show a net loss of eight steel-making furnaces and one merchant furnace.

Possibly Active Furnaces Reduced

The Musconetcong furnace of the Musconetcong Iron Works in New Jersey and the Allen's Creek stack of the Tennessee Products Corporation in Tennessee have been abandoned during the last month, while the Tennessee Coal, Iron & Railroad Co. has blown in its new No. 5 Fairfield furnace in Alabama. This reduces the number of possibly active blast furnaces in the United States from 343 to 342.

Furnaces Blown In and Out

Furnaces blown in during May were the following: No. 2 Palmerton furnace of the New Jersey Zinc Co. in the Lehigh Valley; the Sheridan stack of the Lavino Furnace Co. in the Lebanon Valley; one Sparrows Point furnace of the Bethlehem Steel Corporation in Maryland; the Norton furnace in Kentucky (blown in the previous month but not reported); one Lorain furnace of the National Tube Co. in northern Ohio, and the Fairfield furnace in Alabama.

During the month the following furnaces were blown out or banked: One Susquehanna stack of the Hanna Furnace Co. in the Buffalo district; one Bethlehem furnace of

the Bethlehem Steel Corporation in the Lehigh Valley; one Eliza furnace of the Jones & Laughlin Steel Corporation and one Carrie, one Clairton, one Duquesne and one Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; the Sharpsville furnace in the Shenango Valley; one Sparrows Point stack of the Bethlehem Steel Corporation in Maryland; one Granite City furnace of the St. Louis Gas & Coke Corporation in Illinois; one South Chicago and two Gary furnaces of the Illinois Steel Co. in the Chicago district; one Pioneer furnace of the Republic Iron & Steel Co. and the Alabama City furnace of the Gulf States Steel Co. in Alabama.

Roller Bearings in Four-High Mills

In a paper on four-high mills, read before the Engineers' Society of Western Pennsylvania, F. C. Biggert, Jr., United Engineering & Foundry Co., Pittsburgh, touched on the roller bearings in such mills. The following are extracts from the paper:

"The roller bearing is thus the crux of the situation. It operates substantially without heat or wear and is particularly adapted to high speed. The only difficulty is that its dimensions precluded its use in ordinary two or three-high mills except under comparatively light rolling loads.

"This difficulty has been removed by using four-high mills where roll diameters may be selected without regard to any factor except the space requirements of the roller bearing. It was the perfection of this combination that started the recent and remarkable change from the long established practice for producing wide thin metal products.

"In a cold mill and at the finishing end of a hot mill where the power requirement is greatest, the saving, due to the four-high roller bearing mill, is approximately 50 per cent, that is, equal tonnages of like sizes, rolled from like slabs, require about one-half the power in a four-high roller bearing mill as would be required in a two-high mill on ordinary bearings.

"At the roughing end of a hot mill, where the metal is thick, this ratio probably does not apply, but the saving in power is substantial there also."

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
	1927	1928	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,343,881	2,155,133	31,844	7,486	22,298	†....
Feb.	2,256,651	2,274,880	24,560	7,045	19,320	†....
Mar.	2,675,417	2,588,158	27,834	7,650	27,912	†....
Apr.	2,637,919	2,555,500	24,735	12,907	18,405	†....
May	2,619,078	2,652,872	28,734	9,788	29,940	†....
June	2,343,409	2,448,905	29,232	10,535	32,088	†....
½ year ..	14,876,355	14,675,448	166,939	55,411	149,963	†....
July	2,163,101	.....	26,394	9,350	.....	.....
Aug.	2,213,815	.....	21,279	9,104	.....	.....
Sept.	2,090,200	.....	20,675	6,037	.....	.....
Oct.	2,076,722	.....	17,710	6,129	.....	.....
Nov.	1,938,043	.....	17,851	6,521	.....	.....
Dec.	1,987,652	.....	20,992	6,816	.....	.....
Year ..	27,345,888	.....	291,840	99,363	.....	.....

*Includes output of merchant furnaces.

†Data not available for publication.

Iron and Steel Markets

Large Summer Production Indicated

Volume of Steel Business Keeps Up, Following Record Six
Months' Output—Prices on Wire Products
Reduced—Declines in Pig Iron

THE coming of summer, frequently a dull period in the iron and steel industry, has brought no sharp reduction in the volume of demand.

Production of steel last month was the largest for any June in 10 years, and, while a decline in output is expected in the current month, leading steel makers are confident that it will not exceed 10 per cent. In support of their forecast is the June increase of 220,187 tons in the unfilled orders of the Steel Corporation, the first gain since February. While part of this increase may have been due to recent pipe line orders and to tin plate contracting, it must also reflect more general covering in other products than recent reports indicated.

The buoyancy of demand is all the more noteworthy because it follows six months of record steel production. Output in that period not only exceeded production in the first half of last year, but was $3\frac{1}{2}$ per cent higher than the previous peak, reached in the first six months of 1926.

Although consumption remains high—and leaders in the trade expect it to be well sustained, even without any expansion in railroad equipment buying—the price situation shows fresh evidence of instability. Foundry grades of pig iron at Chicago and at Philadelphia have been reduced 50c. a ton, and the scrap market is generally weak.

Among some finished steel products, also, prices are giving ground. Makers of wire products have announced a reduction of \$2 a ton on nails, staples and plain wire and \$3 on barbed wire. On nails and staples, however, the new quotations are essentially a formal recognition of prices that certain mills have been naming for some time.

The test of the third quarter quotation of 1.90c., Pittsburgh, on plates, shapes and bars has been further delayed by the willingness of many producers to extend second quarter contracts carrying a price of 1.85c. That there will still be a determined effort to raise the market on these products is shown by advances for the fourth quarter named by Steel Corporation subsidiaries, following the receipt of inquiries for that period. The prices are 2c. at Pittsburgh, 2.10c. at Chicago and 2.15c. at Birmingham.

With considerable tonnage for the third quarter not yet definitely under contract, producers expect current prices on these products to show increasing firmness.

The customary seasonal variations in farm implement production are notably absent this year. Chicago reports that agricultural equipment plants, especially

those making tractors, continue to fall behind in deliveries notwithstanding that they are operating above rated capacity.

No summer lull has developed in the automobile industry. Steel is being ordered freely by manufacturers that are bringing out new models, as well as by builders of low-priced cars, among which the Ford company continues to expand production.

The large volume of steel being placed for construction work is again reflected in fabricating awards, which total 43,000 tons for the week. Included was 14,000 tons for a bridge at Louisville.

Increased steel business is expected in coming months from the oil industry, and steel exports show no signs of falling off. In addition to contracts for 225,000 tons of oil and gas pipe line placed in the last few weeks, there are now 1200 miles of such pipe actively under negotiation, including 435 miles of 10 $\frac{3}{4}$ -in., or 40,000 tons, for a Standard Oil subsidiary.

Business in tin plate is particularly good, supporting a mill operation of 90 per cent.

Rail production is still receding, at Chicago having reached a 60 per cent rate, but the beginnings of the fall buying movement are seen in four inquiries, among them 37,000 tons for the Norfolk & Western and 15,000 tons for the Northern Pacific. Domestic buying of railroad equipment is light, but the Argentine State Railroads have placed orders for 1100 freight cars with American shops.

Current steel output at Chicago ranges from 75 to 80 per cent, while the rate in the Greater Pittsburgh district is 70 to 75 per cent. Chicago production a year ago was 70 per cent of capacity and that of Pittsburgh 65 to 70 per cent. Two years ago, when steel capacity was smaller, the Chicago percentage was 85 and that of Pittsburgh 75.

Steel ingot output for the first half of this year, at 24,792,883 tons, exceeded that of the corresponding half of 1926 by 639,000 tons. Since crucible and electric steel ingots are no longer included in production reports, it is estimated that the gain was about 200,000 tons greater than a comparison of the available figures shows. Hence the increase over the previous record is placed at $3\frac{1}{2}$ per cent.

THE IRON AGE composite for pig iron has declined to \$17.09 a ton, the lowest figure in more than 12 years. The finished steel composite has dropped to 2.326c. a lb., but remains above the low point for the year, which was in January.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
No. 2, fdy., Philadelphia.....	\$20.26	\$20.76	\$20.76	\$21.26
No. 2, Valley furnace.....	16.75	16.75	16.75	18.00
No. 2, Southern, Cin'ti.....	19.19	19.19	19.69	20.94
No. 2, Birmingham.....	15.50	15.50	16.00	17.25
No. 2 foundry, Chicago*.....	17.50	18.00	18.00	20.00
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.75
Basic, Valley furnace.....	16.00	16.00	15.35	17.50
Valley Bessemer, del'd P'gh...	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	18.00	18.00	20.00
Malleable, Valley.....	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh.....	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	33.00	33.50
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp grvd. steel, P'gh, lb.....	1.85	1.85	1.85	1.80

Finished Iron and Steel,	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh.....	1.85	1.85	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17 1/2	2.17 1/2	2.17 1/2	2.09
Beams, Pittsburgh.....	1.85	1.85	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	2.00
Beams, New York.....	2.14 1/2	2.14 1/2	2.14 1/2	2.04
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, Pittsburgh	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.80	3.10
Sheets, galv., No. 24, Pittsburgh	3.50	3.50	3.50	3.85
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.70	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.40	2.50	2.50	2.40
Plain wire, Chicago dist. mill..	2.45	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.35	3.35	3.20
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
Heavy melting steel, P'gh....	\$14.00	\$14.00	\$14.75	\$15.00
Heavy melting steel, Phila....	13.00	13.00	13.50	13.50
Heavy melting steel, Ch'go....	12.25	12.25	12.75	12.00
Carwheels, Chicago.....	12.75	13.00	13.00	13.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	16.00	16.00
No. 1 cast, Ch'go (net ton)....	13.50	13.50	14.00	14.50
No. 1 RR. wrot. Phila.....	13.50	13.50	13.50	16.00
No. 1 RR. wrot. Ch'go (net)...	11.00	11.00	11.50	11.25

Coke, Connellsville, Per Net Ton at Oven:	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	July 10, 1928	July 2, 1928	June 12, 1928	July 12, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.87 1/2	14.87 1/2	12.62 1/2
Electrolytic copper, refinery...	14.50	14.50	14.50	12.37 1/2
Zinc, St. Louis.....	6.20	6.20	6.15	6.17 1/2
Zinc, New York.....	6.55	6.55	6.50	6.52 1/2
Lead, St. Louis.....	6.10	6.15	6.15	5.95
Lead, New York.....	6.20	6.30	6.30	6.20
Tin (Straits), New York.....	46.25	46.12 1/2	48.62 1/2	63.50
Antimony (Asiatic), N. Y.....	9.62 1/2	9.62 1/2	9.75	11.75

Pittsburgh

Steel Sales Surprisingly Good for July—Situation Considered Healthy Notwithstanding Some Price Weakness

PITTSBURGH, July 10.—General sales in the steel market in this district during the past week were surprisingly good when the season is considered, and were rather well spread out. Significance was seen in the fact that during the holiday period most mills were closed down for a minimum of time. Steel works operations are estimated at 70 to 75 per cent of capacity. Excepting a few lines, requirements for consumption are being well maintained and orders for third quarter, when aggregated, represent a good volume. Conditions generally are above the average for this time of the year. Tin plate is particularly strong and mills are operating at about 90 per cent of capacity, and strong pressure is being exerted for delivery. There is expectation of large packs of vegetables and fruit.

While there was a let-up in demand for oil country goods following the recent heavy orders, some large requirements for a pipe line are expected to develop and encouragement has been given by a stronger market for crude oil.

Demand for structural shapes, bars and plates is fair. On the larger tonnages some second quarter contracts have been extended at 1.85c.

Structural fabricators report good business, although most inquiries involve small jobs. The largest contract of the past week, placed with the

American Bridge Co. by the Louisville Bridge Commission for a bridge over the Ohio River between Louisville, Ky., and Jeffersonville, Ind., called for 14,000 tons. Demand from the automotive industry for sheets, cold-finished steel bars and strips is fair, but on the last named product there has been a slight recession, and the market is rather irregular.

The increased production of ingots during the first half and June of the current year, when compared with the corresponding periods of last year, together with the increase in the unfilled

tonnage of the United States Steel Corporation, are accepted as barometers showing the healthy tone of the steel market.

Inquiry for coke and pig iron is extremely dull and neither market has been given a test; meanwhile quotations are unchanged.

Ferroalloys.—There are still last half requirements to be placed, but most consumers of ferromanganese are rather well covered for this period. Inquiry is light. The market is reported to be firm at \$105, Atlantic seaboard, for both domestic and foreign material. Shipments are still being made, however, on old contracts at \$100. Only moderate specifications are being received against contracts for spiegeleisen. The standard grade continues to be quoted at \$31 to \$32, furnace. Consumers of 50 per cent ferrosilicon are covered for the year.

Pig Iron.—Extreme dullness prevails in the market for pig iron. While basic is quoted at \$16, Valley, it is believed to be easy at this figure and that a test might develop a somewhat lower price. Buyers generally are remaining out of the market for third quarter tonnages. No. 2 foundry iron is quoted at \$16.75, Valley. Bessemer

and malleable iron are quoted at \$17, with the former showing a little more strength than the latter. Low phosphorus iron continues to move in small lots at about \$28.25, delivered. While the iron being sold is in small lots, it has been observed that immediate shipment generally is required, and this is taken to indicate that stocks in the hands of consumers are small.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free...	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—The market for sheet bars has settled to a basis of \$32, Pittsburgh, and is quiet. Demand for slabs, which are quoted at \$32 to \$34, Pittsburgh, also is inactive, while light demand exists for billets, the base size of which takes a price of \$32, Pittsburgh, with \$1 differential over that figure for the small sizes. Forging billets are quoted at \$38, Pittsburgh. Demand for soft wire rods, which command \$42, base Pittsburgh, is slow.

Bars, Plates and Shapes.—From the standpoint of tonnage, the market for these hot-rolled products is fairly good, although some buyers still show some resistance to the price of 1.90c., base Pittsburgh. While on the one hand mills are trying to get 1.90c. from the small or occasional buyer, some have extended second quarter quotations to the larger buyers for third quarter. The rather general way in which this has been done leaves room for doubt as to whether the 1.90c. price will become effective in this quarter to important buyers. Fabricators, automobile manufacturers and bolt and nut makers are buying in fair volume. Railroad buying is light. The largest fabricating contract during the week, amounting to 14,000 tons, went to the American Bridge Co. and was awarded by the Louisville Bridge Commission for a bridge over the Ohio River between Louisville, Ky., and Jeffersonville, Ind. The American Bridge Co. also was awarded a contract for 2600

tons for a foundry building for the Chevrolet Motor Co. at Saginaw, Mich. Inquiries coming to fabricators are numerous, but for the most part involve only small lots. Demand for iron bars is only moderate and prices remain unchanged.

Rails and Track Supplies.—Only small orders are being placed for light rails, quoted at \$36, Pittsburgh, a small amount of the business coming from coal mines. Demand for both small and standard spikes is quiet. The Norfolk & Western Railroad has put out its annual inquiry for rails, which calls for 37,000 tons, for July-January delivery. This is a somewhat smaller tonnage than this railroad bought in each of the two previous years.

Wire Products.—The card just put out by the American Steel & Wire Co., naming third quarter prices for jobbers, puts into official effect prices that have been prevailing, although representing a 10c. per 100 lb. reduction under some quotations. The outstanding change from the former practice is to put in a 10c. per 100 lb. differential instead of the former 5c. differential as between jobbers and retailers. For this time of year, demand for wire nails and cement-coated nails, quoted at \$2.55 per 100 lb. keg, Pittsburgh or Cleveland, is fair and specifications in July so far have been better than they were in June. Inquiry for plain bright, hard fence wire, quoted at \$2.40 base, per 100 lb., is only moderate, while that for barbed wire is dull, as is generally the situation during the harvesting season. Operations of wire mills range from 50 to 60 per cent of capacity.

Tubular Goods.—New orders for standard pipe are being placed in fair-sized volume, while those for oil line pipe are light, but some good sized inquiries are current and the business is expected to be closed soon. Butt weld demand is fairly active, some of it coming from the building and construction industry. Specifications for mechanical seamless tubing, coming largely from the automotive industry, is satisfactory. Operations of pipe mills in this district range from 60 to 70 per cent of capacity.

Tin Plate.—The Fourth of July hol-

iday, as usual, saw a letup in operations, but the reduction in output was held to a minimum because of heavy requirements before makers. Probably not over an average of four turns was lost. The output generally is at about 90 per cent of capacity. The arrival of warm weather has been an influence in reducing the tonnage somewhat, but also is developing crops which have been backward. Tin plate production for the year to date has been very satisfactory, and present indications are that the output for the year will be relatively better than that of any other steel line. A few consumers, who had not adequately specified for first half contracts, have placed additional orders to cover their requirements.

Sheets.—Sheet makers report that the volume of business is surprisingly good for this season, which is generally the duller of the year. A number of automobile makers are in production on new models and are taking good-sized requirements. The volume of business for the first half was also good. Prices are neither better nor worse, but seem to be at the bottom. Black sheets are quoted at 2.65c.; galvanized sheets at 3.50c., and blue annealed at 2c., all f.o.b. Pittsburgh. A small amount of car business has been placed, but railroads generally are buying lightly.

Cold-Finished Steel Bars and Shafting.—Indications are that the cold-finished steel industry will produce a larger tonnage during the third quarter of the year than it did during the corresponding period of last year. This is partially due to the demand from the Ford Motor Co., which was not in the market one year ago. Automobile producers continue to place fair-sized orders for cold-finished steel bars, which are quoted at 2.10c., Pittsburgh. Implement manufacturers and jobbers are also taking moderate tonnage.

Hot-Rolled Flats.—Specifications during the past week showed a recession, although they continue to be fair. The letup was probably due to the Fourth of July holiday. Automobile makers are rather well covered for their third quarter requirements.

Cold-Rolled Strips.—As in the case

THE IRON AGE Composite Prices

Finished Steel

July 10, 1928, 2.326c. a Lb.

One week ago.....	2.341c.
One month ago.....	2.341c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

July 10, 1928, \$17.09 a Gross Ton

One week ago.....	\$17.25
One month ago.....	17.23
One year ago.....	18.59
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.75,	Feb. 14;	\$17.09,	July 10
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

of hot-rolled flats, demand for cold-rolled strips has shown a slight falling off, but not to the extent usual at this time of year. Operations vary, but are holding up well, and it is likely that the July rate will not be more than 10 per cent below that of June. Prices on some of the larger tonnages are somewhat easier. The bulk of business takes a minimum level of 3c., base, while for lots of 3 tons or more the going quotation is 2.75c.

Bolts, Nuts and Rivets.—Buyers of bolts, nuts and rivets continue to specify regularly, most of the buying being on a hand-to-mouth basis. There are a great many rush orders. Railroad buying is light. Operations are at about 60 per cent of capacity.

Coke and Coal.—The market for fuel continues to lag and prices are unchanged. Inquiry for coal is light, although there has been a slight improvement in the movement of Lake cargo tonnage. Consumers generally have good-sized stocks on hand and are not expected to come into the market actively in the immediate future. Demand for coke also is small, and the limited buying that is taking place covers only small lots for spot delivery of both furnace and foundry fuel. Only three merchant furnaces are operating in the Valley, which is reflected in the light inquiries for 48-hr. fuel. Foundry operations are estimated at about 50 per cent of capacity, and this has resulted in limiting activity in the market for foundry coke. Little third quarter contracting has been done, though some contracts have been quietly renewed and a number of negotiations are under way.

Old Material.—Further weakness has developed during the past week in the market for scrap. A number of grades are down 50c. a ton, while a drop of 25c. has been made on No. 2 railroad wrought. Heavy melting steel continues to take a range of

\$13.75 to \$14.25, and is easy at this spread. Buying is so limited that a real test of the market has not been made. The weak tone is due partly to the fact that dealers who were short on contracts appear to be practically covered, and also to the little interest shown by the mills. At the same time dealers seem to be not so willing to sell, which would indicate that they do not want to go short on a low market. Purchases that are being made for the most part are only to meet immediate requirements. Dealers who recently covered on heavy melting steel to fill contracts no longer are paying \$14.25. Considerable interest is shown in the Pennsylvania list of 51,000 tons of various grades, on which bids will be closed tomorrow (Wednesday). Some dealers believe that the offering will bring the maximum levels and that it will mean short covering rather than a stronger market. Included in the grades which have dropped 50c. are scrap rails, bundled sheets, heavy breakable cast, heavy steel axle turnings for the open-hearth furnace, shoveling steel turnings, mixed borings and turnings and rails 3 ft. and under. The Norfolk & Western Railroad will close bids on Thursday for approximately 7500 tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$13.75 to \$14.25
Scrap rails	13.25 to 13.50
Compressed sheet steel....	13.50 to 14.00
Bundled sheets, sides and ends	12.50 to 13.00
Cast iron carwheels.....	14.00 to 14.50
Sheets bar crops, ordinary	14.00 to 14.50
Heavy breakable cast.....	11.50 to 12.00
No. 2 railroad wrought....	13.75 to 14.00
Heavy steel axle turnings.	12.00 to 12.50
Machine shop turnings...	9.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers	15.00 to 15.50
Railr. coil and leaf springs	15.00 to 15.50
Rollled steel wheels.....	15.00 to 15.50
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate.....	17.50 to 18.00
Low phos., light grade....	16.50 to 17.00
Low phos. sheet bar crops.	17.50 to 18.00
Hvy. steel axle turnings..	12.50 to 13.00

Electric Furnace Grades:

Low phos. punchings.....	16.50 to 17.00
Hvy. steel axle turnings..	12.50 to 13.00

Blast Furnace Grades:

Short shov'l'g steel turnings	9.50
Short mixed borings and turnings	9.50
Cast iron borings.....	10.00
No. 2 busheling.....	8.50 to 9.00

Rolling Mill Grades:

Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought...	10.50 to 11.00
Sheet bar crops.....	16.00 to 16.50

Cupola Grades:

No. 1 cast.....	14.25 to 14.50
Rails 3 ft. and under....	15.00 to 15.50

Malleable Grades:

Railroad	13.75 to 14.00
Industrial	13.25 to 13.50
Agricultural	12.75 to 13.00

— The Employment and Vocational Guidance Section of the Welfare Council, 151 Fifth Avenue, New York, made up of the non-profit-making organizations, has compiled a list of the organizations which help seekers after employment or in the study of a suitable vocation.

Automobile Business Prospects Good

With production of cars and trucks in the United States and Canada in June approximating 440,000, the total for the first half of the year has gone well beyond the total in the first half of 1927. This gain over last year will be much larger in the last half, primarily because Ford Motor Co. was completely out of production in the last half last year and is now operating at better than 3000 cars daily. This rate is expected to rise to 5000 cars daily during the summer, according to *Automotive Industries*, and to remain at or above this figure throughout the last half.

Keener competition throughout the last half will probably be occasioned by the appearance of a considerable number of new models during July and August. Many cars which have enjoyed unusual sales records during the first half will be continued without change and will be compelled to meet the public interest in the newer models. The fact that the Ford company is still several months behind on orders helps to limit competition in the low priced field but in price fields above this group the sales effort will be much keener.

Export shipments are generally at a higher rate than in any preceding year and promise to continue high throughout the year.

Simplification of Shovels, Spades and Scoops

Preparatory to calling a conference of the standing committee on the simplified practice recommendation concerning shovels, spades and scoops, to consider the revision or reaffirmation of this recommendation, the division of simplified practice of the Department of Commerce, Washington, has been requested to initiate a survey among the acceptors of the simplification to ascertain certain information for the consideration of the committee.

In making announcement of the survey the division stated that past experience of the division with other industries has proved that periodic resurveys covering simplified practice recommendations are essential to keep abreast of current practice, promote greater adherence, insure a larger degree of application and provide the necessary material for the use of the standing committee concerned for an intelligent revision or reaffirmation of each recommendation. The questionnaire being sent out is intended to bring this situation about.

The Stout Metal Airplane Co., a division of Ford Motor Co., Dearborn, Mich., has increased production on its standard, all-metal, tri-motored transport plane so that schedule now calls for two planes a week. The tri-motored transport, of the type which now makes daily trips between Detroit and Cleveland, sells for \$49,000.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.55c.
Galv. sheets (No. 24), 25 or more bundles	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets	3.10c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100' count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1½-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	

Manganese ore, washed, 52% manganese, from the Caucasus.....	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.00 to \$11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens..	3.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens.....	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines...	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines.....	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey ...	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$3.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. 70	
Stove bolts in packages, Pittsburgh. 80, 10 and 2½	
Stove bolts in packages, Chicago. 75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago..75, 20, 10, 5 and 2½	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(¾-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	85 and 5
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread..	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Foundry Iron Reduced 50c. a Ton—Wire Products Lower, Cast Iron Pipe Up—Steel Demand Fairly Steady

CHICAGO, July 12.—Notwithstanding that iron and steel business is well ahead of the first 10 days of July last year and that the tapering in demand is much more gradual than in the early summer of 1927, there persists among buyers and sellers alike an uncertainty as to prices. Wire products have been marked off \$2 a ton at a time when output averages close to 60 per cent of mill capacity, or within about 5 points of what some believe represents the full consumptive capacity of the country. Chicago producers have cut pig iron 50c. a ton, not wholly as a stimulant to business but to limit boat shipments and to reach farther from the close confines of this immediate territory. The scrap market is dull, with a decided leaning toward lower prices. In contrast to these movements is the determination of some cast iron pipe manufacturers to ask \$2 a ton more for their products.

Two inquiries for 1928 rail requirements, totaling over 50,000 tons, are adding interest to the railroad track supply market. However, this business, even if placed at an early date, will not stem the decline of rail rolling schedules, which now have been reduced to less than 60 per cent of capacity.

The rate of ingot output remains between 75 and 80 per cent of capacity. The holiday last week served as a check to the flow of incoming business to local mills and recovery has been slow, with the result that new sales in plates, shapes and bars have fallen sharply below production. Specifications are about equal to 75 per cent of local mill capacity.

Pig Iron.—Local producers of foundry pig iron have announced price cuts of 50c. a ton, bringing the No. 2 foundry grade to \$17.50, f.o.b. local furnace. The effect of this move is looked for in the curtailment of boat shipments from Lake Erie and an expansion of the narrowed territory now served by local producers, rather than in a sharp stimulant to buying in and near Chicago. Some interest is being shown in third quarter and last half needs, but for the most part 30 to 60-day requirements are as far as buyers care to go. Unsteadiness on scattered sales of silvery is noted. Charcoal iron is being sold in some cases at bargain prices and in other instances at \$24, furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	18.00
Malleable, not over 2.25 sil.....	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	21.51
So'th'n No. 2 (barge and rail).....	21.01
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Although \$33, Hazard, Pa., is the price quoted on spiegeleisen, there have been no sales that can be considered as tests. Shipments of ferromanganese are light, following heavy releases against first half contracts at prices more favorable to buyers than those now in effect. It is reported that some users have stored enough of this material to meet re-

quirements for the remainder of the year and that in at least some instances second half contracts will be of little value to sellers.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Competition for oil storage tank materials is unusually keen and it appears that producers in the South and to the east have the edge on most of this business, much of which is for water shipment to Texas ports and fabrication near the place of erection. In view of this situation, there is little in the way of plate tonnage that is in sight either for local fabricators or Chicago steel mills. Specifications against old tank orders are well filled, and in the absence of heavy car purchases, the primary outlet for plate mill products is in the structural field. Highland Park, Ill., will need 200 tons for an elevated water tank. The Chicago Bridge & Iron Co. will build a water tank, requiring 150 tons, for Wilmette, Ill. Reports of prospective large railroad equipment purchases are going the rounds, but there is little tangible evidence of such a move on the part of the Western railroads. The grain movement is getting under way in western and southern Kansas and agencies there estimate that 5 to 10 per cent more cars will be needed this year than last. The Missouri-Kansas-Texas has closed with the American Car & Foundry Co. for 19 baggage and mail cars. Among locomotive inquiries is one for an experimental, high-pressure engine for the Delaware & Hudson and a 2-8-2 type locomotive for the Alaska Railroad. Buyers of plates are now able to obtain deliveries in two to three weeks. Prices, except for delivery to the southwest, remain at 2c., Chicago.

Mill prices on plates, per lb.: 2c., base Chicago.

Structural Material.—Interest in pending structural jobs is centering in the Fine Arts Building, Chicago, which will take 5000 tons, and the Patterson Estate Building, which was originally estimated to require about 2000 tons, but which will be built with a tower, thus increasing the tonnage of steel needed. Litigation over air rights above the Randolph Street terminal (Chicago) of the Illinois Cen-

tral has been terminated, clearing the way for further planning on the Apparel Mart, which engineers now estimate will require between 75,000 and 100,000 tons of structural steel. Miscellaneous inquiries throughout most of the Middle West are in good volume and the outlook is favorable for sustained shop operations during most of the summer. Small and large contracts in late weeks have been in good balance. Some shops are now subletting to other fabricators portions of large contracts, on which the builders are stressing delivery. Notwithstanding that shops are well supplied with work, there appears to be no lessening in the keenness of competition, nor any decided effort to get prices above the low levels reached in the late spring. Prices for structural material are steady at 2c., Chicago.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Reinforcing Bars.—Sales remain moderately active in a market which has been held back by adverse construction weather. Two Chicago public school buildings will require a total of 500 tons. Small contracts are numerous, indicating that where hesitancy in making awards is shown, it is on those jobs where large sums of money are involved. Further tests of prices for heavy tonnages are needed. For 100 tons and less, quotations are firm on both billet and rail bars.

Bolts, Nuts and Rivets.—Specifications from practically all manufacturers are lighter, the most marked decrease being from users of small rivets. Railroads continue to place orders at the rate of late June.

Bars.—Farm implement manufacturers, especially tractor builders, continue to fall behind in deliveries, in spite of the fact that many plants are operating well above their rated capacities. Specifications to mills from this source are fully maintained, and there is no lessening in the rate of steel used by the automobile trade, as judged by shipments from Chicago district mills. Orders from road machinery builders are smaller because the season has advanced to the point where contractors are more concerned with using equipment than in making purchases against work contemplated or on hand. Soft steel bar prices are unchanged at 2c., Chicago. Both new orders and specifications for iron bars have been heavier than at any time previously this year. Prices are steady at 2c., Chicago. Users of alloy steel bars continue to issue specifications at an undiminished rate and new purchases are keeping books well filled. Prices are firm and alloy differentials are being maintained. Specifications for rail steel bars, though lighter, still compare favorably with shipments. Production is being maintained at a high rate as producers bend their efforts to round out stocks. Barn equipment builders are busy. The bed trade is quiet, largely because of the Furniture Show, which is now in full swing. Brazen tubes, made from hard steel, cannot be had in less than five weeks.

Rail steel bar prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—Producers have announced price cuts of \$2 a ton on all wire products except barbed wire, which has been reduced \$3 a ton. Wire nails are now quoted at \$2.60 per keg, base Chicago, and plain wire is being quoted at \$2.45 per 100 lb., base, in the local market. Demand from all classes of users is lighter, but mill operations have been cut only a trifle to 60 per cent of capacity, as producers find it advisable to rebuild stocks after the June business, which was the best June in several years. Jobbers for the most part have cleared the heavy stocks of nails built up earlier in the year and again are ordering from producers. Distributors in the South report business as dull. The country trade in the Middle West is still of fair size and in the Northwest it holds above the average of a year ago. Weather conditions in the last week have been favorable to the farmers. Specifications from the manufacturing trade are being issued at an undiminished rate. Prices for wire and wire products are given on page 105.

Sheets.—Prices are holding, but consumer interest is slow. Schedules were not greatly improved following the shutdown over the holiday last week. Hot weather is now having its effect on production. In some quarters it is believed that users are showing more interest in the market and that present low prices will soon induce buying in larger quantities.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Coke.—Prices are firm at \$8, f.o.b. local ovens, as second half contracting comes to a close. Summer inventory periods, hot weather and a reported slackening in demand for foundry products have so far had only

a slight effect on the rate of coke shipments.

Old Material.—Cancellation of contracts and an unusually large number of rejections tell almost the whole story of the Chicago scrap market. Railroad shipments are heavy and there is a surplus of practically all grades. Steel mills are using less scrap and a larger portion of pig iron. Consumers throughout this district feel that there is an oversupply of scrap and that when they need additional tonnage they will buy it at least 50c. per ton below present levels. Dealers readily pay \$9.50 a gross ton for cast iron borings and \$12.50 for heavy melting steel.

Prices deliv'd consumers' yards, Chicago:
Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$12.25 to	\$12.75
Shoveling steel	12.25 to	12.75
Frogs, switches and guards, cut apart, and misc. rails	13.50 to	14.00
Hydraul. compressed sheets	11.00 to	11.50
Drop forge flashings.....	9.50 to	10.00
Forg'd, cast and r'l'd steel carwheels	15.25 to	15.75
Rail'd tires, charg. box size	15.50 to	16.00
Rail'd leaf springs, cut apart	15.50 to	16.00

Acid Open-Hearth Grades:		
Steel couplers and knuckles	13.75 to	14.25
Coil springs	15.75 to	16.25

Electric Furnace Grades:		
Axle turnings	12.50 to	13.00
Low phos. punchings.....	14.00 to	14.50
Low phos. plate, 12 in. and under	14.00 to	14.50

Blast Furnace Grades:		
Axle turnings	9.50 to	10.00
Cast iron borings.....	9.00 to	9.50
Short shoveling turnings..	9.00 to	9.50
Machine shop turnings....	6.00 to	6.50

Rolling Mill Grades:		
Iron rails	13.50 to	14.00
Rerolling rails	14.75 to	15.25

Cupola Grades:		
Steel rails less than 3 ft..	15.25 to	15.75
Angle bars, steel.....	14.25 to	14.75
Cast iron carwheels.....	12.75 to	13.25

Malleable Grades:		
Railroad	12.50 to	13.00
Agricultural	11.50 to	12.00

Miscellaneous:		
*Relay'g rails, 56 to 60 lb.	23.00 to	25.00
*Relay'g rails, 65 lb. and heav.	26.00 to	31.00

Per Net Ton		
Rolling Mill Grades:		
Iron angles and splice bars	13.50 to	14.00
Iron arch bars and transoms	19.50 to	20.00
Iron car axles	23.50 to	24.00
Steel car axles.....	15.50 to	16.00
No. 1 railroad wrought...	11.00 to	11.50
No. 2 railroad wrought...	11.00 to	11.50
No. 1 busheling.....	9.50 to	10.00
No. 2 busheling.....	5.75 to	6.25
Locomotive tires, smooth..	12.00 to	12.50
Pipes and flues.....	8.00 to	8.50

Cupola Grades:		
No. 1 machinery cast....	13.50 to	14.00
No. 1 railroad cast.....	13.00 to	13.50
No. 1 agricultural cast....	12.50 to	13.00
Stove plate	11.00 to	11.50
Grate bars	11.25 to	11.75
Brake shoes	10.50 to	11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Rails and Track Supplies.—The Norfolk & Western has inquired for 37,000 tons of rails and the Northern Pacific for 15,000 tons. These are the forerunner of the fall buying movement. The Northern Pacific tonnage is for early 1929 requirements, but is asked for now so that a part can be shipped by water before the close of

Lake navigation. Fully 3000 tons of track supplies will be needed with these rails, but this railroad will take close to 5000 tons to cover maintenance work. Users of light rails have ordered 1300 tons. Rail output in this district is at 60 per cent of capacity. Miscellaneous railroads have purchased a total of 1000 tons of track accessories in the week. The Cleveland, Cincinnati, Chicago & St. Louis has added 800 tons of rails to its contract.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cast Iron Pipe.—Prices for cast iron pipe at \$32, Birmingham, for 6 in. and larger diameters, are strong. In fact, some producers are naming \$34. The National Cast Iron Pipe Co. has taken 1600 tons of 6 and 8-in. pipe for Chicago at \$31.80, Birmingham, or \$40, delivered. This contract carries with it an option to double the tonnage. The United States Cast Iron Pipe & Foundry Co. is reported to be low bidder at St. Paul. The National company has taken 250 tons for Grosse Isle, Mich., and the American Cast Iron Pipe Co. has been awarded 100 tons by Waukesha, Wis. Saginaw, Mich., will buy 4000 ft. of 30 and 36-in. pipe.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$40.20 to \$41.20; 4-in., \$44.20 to \$45.20; Class A and gas pipe, \$4 extra.

Link-Belt Catalog and Engineering Data Book

General catalog 500 has been published by Link-Belt Co., Chicago, Indianapolis and Philadelphia. It consists of 1088 pages and not only covers, in engineering data and list prices, the complete chain, sprocket, power transmission, elevating and conveying and engineering divisions of that company's business, but contains considerable data for which the engineer has use.

In developing this book, it was evidently the purpose not only to make its contents of engineering information so ample that engineers might design plants with materials-handling equipment of a standard character, but also to supply price lists so complete as to enable the experienced buyer to determine net prices of his purchases.

The Gulf States Steel Co. has ordered nine thermal expansion goggle valves, built by the William M. Bailey Co., Pittsburgh, under the patents of F. R. McGee, chief engineer, Mingo, Ohio, works, Carnegie Steel Co. More than 80 of these valves, which are used on blast furnace main gas lines, have been installed in the past year. The valve now being sold is an improvement over one employing the same thermal expansion principle, developed and patented by Mr. McGee about three years ago.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg....	3.10

New York

Pipe Inquiry for 40,000 Tons—Building to Take 12,000 Tons of Steel

NEW YORK, July 10.—The pig iron market has shown relatively little activity so far this quarter. Inventory-taking among foundries is largely over, but operations in some plants have been adversely affected by the hot weather. It is estimated that 50 to 60 per cent of the melters in this district have covered their known pig iron needs for this quarter. Comparatively little second quarter pig iron remains unshipped, but in some cases melters overbought and accepted deliveries on all they purchased, with the result that they will have a carryover on their yards. Pig iron sales in this district during the week totaled about 7500 tons. The General Electric Co. has bought 500 tons of high-silicon malleable iron for its Elmira, N. Y., plant. The Crane Co., Bridgeport, Conn., is understood to have closed, in part, against an inquiry for 1200 tons of foundry iron. A New York district melter is in the market for 1000 tons of foundry iron. The Chapman Valve Mfg. Co., Indian Orchard, Mass., has divided an order for 1500 tons of foundry among the Mystic furnace, a Buffalo producer and a third interest. An inquiry for 2000 tons of ballast iron for delivery on the Pacific Coast is before the local trade. Buffalo foundry iron continues to range from \$16 to \$17, base furnace, but eastern Pennsylvania producers have announced a reduction of 50c. a ton to \$19.50, base furnace. For some time they have shaded the market to that extent on sales in this district.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91 to \$21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Bars, Shapes and Plates.—In a rather dull market, with activity displayed by sellers rather than buyers, little progress has been made in establishing 1.90c., Pittsburgh, or 2.05c. at Eastern plate and shape basing points as the third quarter prices on bars, shapes and plates. Nearly all mills are willing to extend 1.85c. plate contracts into the third quarter, and although there is some active solicitation of bar business at 1.90c., the common practice is to make this quotation tentatively on prospective business and await developments. The bar market, however, shows somewhat more strength than either plates or shapes, prices on the latter product usually being nominal on account of the difference in basing points of the two largest interests and the keen competition on large and desirable tonnages. Of particular interest in the structural market is the Western

Union Building in Manhattan, which will take about 12,000 tons of shapes. Another large job, for which inquiry will be made in the early fall, is the Kill Van Kull bridge connecting Staten Island and New

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger. Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.30c. to 3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes— Per 100 Ft.	
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Back	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal. per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Jersey, which will take from 30,000 to 40,000 tons. The Structural Steel Board of Trade reports June fabricated lettings in the metropolitan area as 38,100 tons, compared with 46,000 tons in May and 32,000 tons in June, 1927. These figures do not include bridges, subway work, etc. Lettings during the first half of 1928, amounting to 182,800 tons, registered a sharp decline from the 278,300 tons reported during the corresponding period last year.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Business so far this month is keeping up to the June rate, with activity fairly well distributed over all products. Sheets continue the weakest item, but there is nothing to indicate a further reduction in prices.

Reinforcing Bars.—About 1200 tons of bars will be required for a terminal warehouse in the Bronx for the Lehigh Valley Railroad. No other large pending projects have been reported, but reinforcing steel has not yet been purchased for a section of the subway, noted last week as about to be placed. The Long Island City post office, requiring 275 tons, has gone to the Kalman Steel Co. Most distributors are now quoting 1.90c., Pittsburgh mill, with 2c. occasionally obtainable on small tonnages. Warehouse prices are unchanged.

Pipe.—Interest is centered in a Western pipe line project, requiring approximately 435 miles of 10¾-in. o.d. oil pipe, or about 40,000 tons, which may be placed immediately by a Standard Oil subsidiary. Considerable tonnage of standard butt-weld pipe is being taken in this district, with prices apparently regular and the demand steady.

Sheets and Strips.—The sheet market seems to have become somewhat stabilized, but at levels which are far from satisfactory to the mills. The galvanized material is being sold to jobbers at 3.40c., Pittsburgh, with the general run of small orders at \$2 a ton higher. Black sheets are fairly steady at 2.65c., but concessions of \$1 a ton are occasionally to be had on attractive lots. On the blue annealed product, 2c., Pittsburgh, is representative of the market, with the mills not disposed to go lower under ordinary conditions. Consumers are not anxious to place orders and any irregularity in these prices on all sheet business can be traced to mill competition rather than the pressure of buyers. There is little demand for strip steel. The cold-rolled product is selling at a range from 2.75c. to 3c., Pittsburgh, and 1.85c. is the minimum on the hot-rolled material.

Wire Products.—Reductions by the leading producer of \$2 a ton on nails, staples and wire and \$3 on barbed wire have been followed by most makers and have done much to clarify the price structure on these products. In some respects the move merely amounts to a formal recognition of

Philadelphia

Foundry Iron Down 50c. a Ton—Extension of Second Quarter Steel Contracts Quite General

PHILADELPHIA, July 10.—A decline of 50c. a ton in the price of eastern Pennsylvania foundry pig iron is the first change in that grade since last February. Aside from the reductions of \$2 a ton on wire products, excepting woven wire fencing, and a decline of \$1 a ton on rerolling billets, the steel price situation is virtually unchanged. Steel mills in the East and in the Pittsburgh-Youngstown district have quite generally extended second quarter contracts and second quarter prices on plates, shapes and bars into this quarter, so that the \$1 a ton advance has not applied except to the occasional buyer or on very small lots. Scrap prices are so low as to afford little margin for the shippers, yet the quantities available seem to be sufficient for all needs.

Pig Iron.—With Buffalo foundry iron selling at \$21 or less, delivered in and around Philadelphia, eastern Pennsylvania furnaces have recently lost business at their very doorsteps, and to meet this situation they have reduced asking prices 50c. a ton, or to \$19.50 on the base grade, f.o.b. furnace. This means a delivered price in Philadelphia of \$20.26 for the No. 2 grade, \$20.76 for No. 2X and \$21.26 for No. 1X. Buffalo iron is being offered by one or two makers at \$16 to \$16.50 for No. 2 or No. 2X and at \$16.75, furnace, for No. 1X, though for carload lots higher prices are frequently quoted. Sales of foundry iron in this district have amounted only to a few thousand tons in the last week and carload lots have predominated. Many melters are still taking in iron on second quarter contracts. There has been little third quarter contracting. The largest inquiry is for 3000 to 5000 tons of low phosphorus iron for the Standard Steel Works Co., Burnham, Pa.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.	21.26
Basic (del'd east. Pa.)	\$19.00 to 19.50
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Small users of ferromanganese have quite generally covered their requirements for the last half, but most of the large consumers have made no contracts, and are amply taken care of by shipments against their first half commitments. The price for domestic and imported alloy continues at \$105, seaboard, for spot shipment or on contract.

Billets.—Some mills have reduced prices \$1 a ton on open-hearth rerolling billets for the more attractive lots, now quoting \$32, Pittsburgh. This reduction has not disturbed the price of forging billets so far as Eastern mills are concerned; it remains at \$38, Pittsburgh. Nor will some mills sell high-carbon billets at the \$32 base.

Plates.—Day - to - day orders for plates, mostly small, are sufficient to maintain operations of Eastern mills at 50 to 60 per cent. Plates are commonly selling at 2.10c., Philadelphia, which was the second quarter price, but on some small lots mills are obtaining 2.15c., Philadelphia, the figure at which third quarter contracts were to have been taken. However, the extension of second quarter contracts has been so general that none but the small or occasional buyer is paying more than 2.10c., delivered here. This price is based on 2c., Coatesville.

Structural Material.—Building work continues fairly active. Among the week's awards were a garage and office building in Philadelphia, 2200 tons; a bank building at Wilkes-Barre, Pa., 1100 tons, and a coal breaker at Plymouth, Pa., 1800 tons. The Bethlehem Steel Co. has been awarded the contract for a power house for the Haddon Hall-Chalfonte Hotel, Atlantic City, which is to be welded in the field; 600 tons of steel will be required. Current prices for plain material are usually based on 2c., Pencoyd, or 2.06c., Philadelphia, for carload lots, and 2.08c., Philadelphia, for less than carloads, but \$1 a ton below and above 2c., Pencoyd, have been done. Second quarter contracts have been extended in most

Warehouse Prices, f.o.b. Philadelphia

Base per Lb.

Plates, ¼-in. and heavier.	2.50c. to 2.60c.
Plates, ⅝-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅝-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

prices which some mills have been quoting for months. Wire is now quoted at 2.40c., Pittsburgh, wire nails at 2.55c., and galvanized barbed wire at 3.20c. Wire rods are unchanged at \$42 a ton, Pittsburgh base. Woven wire fencing remains at \$65 a ton to retailers.

Cast Iron Pipe.—The tendency toward a stiffening of prices is accentuated by an advance of \$2 a ton by one Southern maker, announced as effective Monday, July 9, on all new business. This company is now quoting \$33 to \$35, base Birmingham, compared to a previous schedule of \$32 to \$33. Northern foundries continue to quote a range of \$37.60 to \$38.60, delivered New York, practically closing the market to their Southern competitors. Business continues rather dull in municipal as well as private enterprises. Valhalla, N. Y., will take bids on July 18 for 1500 tons of 6 to 16-in., classes C and D pipe, and Washington will close July 11 on 3000 tons of 8 to 16-in. class B pipe.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—The market is very quiet, with prices unchanged at \$3.50 per ton, Connellsville, for standard foundry coke and \$2.50 to \$2.75 for the furnace grade. Special brands of foundry coke are quoted at \$4.85, f.o.b. ovens, and delivered prices are: To northern New Jersey, Jersey City and Newark, \$8.56 per net ton; to New York and Brooklyn, \$9.44 per net ton. By-product foundry coke is unchanged at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06 to \$10.29, New York or Brooklyn.

Old Material.—Weakness in buying prices has become more pronounced during the last week, particularly in iron and steel car axles and No. 1 heavy breakable cast, on which reductions of from 75c. to \$1.25 a ton have been made. No. 1 heavy melting steel is commanding \$12.50 per ton, delivered, and is somewhat more active than other grades in a very quiet market.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.50 to \$9.85
Heavy melting steel (yard)	6.25 to 7.00
No. 1 hvy. breakable cast.	10.50 to 11.00
Stove plate (steel works)	7.00 to 7.25
Locomotive grate bars	7.00 to 7.50
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.00 to 6.50
Cast borings (blast furn. or steel works)	6.00 to 6.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles	13.50 to 14.00
Iron car axles	23.00 to 23.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25
Forge fire	6.50 to 6.75
No. 1 railroad wrought	9.50 to 10.00
No. 1 yard wrot., long	8.00 to 8.50
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:
No. 1 machy. cast. \$14.00 to \$15.00
No. 1 hvy. cast (columns bldg. materials, etc.), cupola size. 12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.) 11.50 to 12.50

cases, so that the prices announced for third quarter have had little effect. Eastern shape mills are operating at 65 to 75 per cent.

Bars.—The asking price for steel bars is 1.90c., Pittsburgh, but current orders are being accepted by some mills at 1.85c., and second quarter contracts made at 1.85c. have been extended in so many cases that the 1.90c. price applies only on the occasional small lots. Bar iron is quoted usually at 1.80c., Pittsburgh, or 2.12c., Philadelphia, but concessions of \$1 a ton are given on the more attractive orders.

Sheets.—Blue annealed sheet sales are being made at 2c., 2.05c. and 2.10c., Pittsburgh, but the larger buyers are not paying above 2c. Black sheets remain at 2.60c. to 2.65c. and galvanized at 3.50c., Pittsburgh.

Warehouse Business.—Sales by local jobbers in June were fairly satisfactory. The price situation is more stable than at any time in months.

Imports.—The week's receipts from abroad included 6000 tons of iron ore from Algeria, 500 tons of manganese ore from Java, 314 tons of structural shapes from Germany, 92 tons of bars from Sweden, 21 tons of bands from Belgium and 19 tons of bands from Germany.

Old Material.—Notwithstanding the low prices at which many grades of scrap are being sold, there is a plentiful supply. There has been no recent buying of heavy melting steel, but one mill took in a small tonnage of scrap rails at \$13, delivered. A broker is paying \$12.50, delivered Bethlehem, for heavy melting steel against a \$13 order. Bundled sheets have been sold at \$9.50 and machine shop turnings at \$10. While the price tendency is downward, the changes in the past week have been slight.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00 to \$13.50
Scrap T rails	12.50 to 13.00
No. 2 heavy melting steel	10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	14.50 to 15.00
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	11.00
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast f'nace scrap	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	17.00 to 17.50
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Cast iron carwheels	15.50 to 16.00
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

The Concrete Reinforcing Steel Institute will hold its fall 1928 meeting at Buckwood Inn, Shawnee-On-Delaware, Pa., Oct. 1 to 3, inclusive.

Cleveland

Second Quarter Prices on Plates, Shapes and Bars Renamed —Wire Products Reduced \$2 a Ton

CLEVELAND, July 10.—The uncertainty of the price situation on steel bars, plates and structural material for the third quarter has been relieved by the rather common renaming of the second quarter price of 1.85c., Pittsburgh, after some of the producers had made an earnest effort to get prices on a basis \$1 a ton higher. Not many contracts had been taken at the advance and the 1.90c. price evidently will apply only to small-lot buyers. Cleveland bar mills are quoting 1.85c., f.o.b. Cleveland, for the quarter. Many consumers have withheld contracts, awaiting the definite establishment of the market, and considerable contracting is now expected.

There are increasing evidences in the market of a tendency toward price equalization and readjustment, which apparently is being brought about by the establishment of other producing centers than Pittsburgh as basing points. In this connection there is talk of an advance of the Cleveland base on steel bars to \$2 a ton above the Pittsburgh base. Cleveland bar mills have been using the Pittsburgh price f.o.b. Cleveland.

The price situation was further clarified during the week by the announcement of reductions on wire products and wire rods. With the new prices there is a real reduction on wire, but the new prices on nails have appeared on sales by some makers recently.

From the standpoint of demand, the most interesting feature of the market is the good volume of specifications that continues to come from the automotive industry and which exceeds expectations. Steel is being ordered quite freely by some of the automobile makers, who are bringing out new models, and by builders of low-priced cars, who are keeping up good production during a period when there is usually a marked seasonal decline.

New business was rather light during the week. Some of the plate mills took a moderate volume of small orders at 1.85c. In the structural field considerable bridge work is in prospect. The Cleveland Union Terminals Co. today took bids on 4000 tons, this being part of the steel recently inquired for grade crossing elimination work.

Pig Iron.—The market was somewhat less active the past week than during the few previous weeks, which

probably was partly owing to the holiday. Sales by Cleveland interests during the week amounted to 19,000 tons. A few fair-sized lots of foundry and malleable iron were placed in the Cleveland territory, including a purchase from Cleveland furnaces by the Westinghouse Electric & Mfg. Co., for its Cleveland plant. There is not much activity in Michigan. The automobile industry in that State has been rather slow in coming into the market for the third quarter. However, shipments to automobile foundries are holding up well, some of them against contracts carried over from the second quarter. There are virtually no changes in prices. While one local producer is holding at \$16.50 for foundry and malleable iron for outside shipment, Lake iron is still available at \$16.25 or lower for shipment to highly competitive points. Foundry iron can be had at \$16.50 in the Valley district, although one producer made several sales during the week at \$17. Some Valley iron is being sold at that price in Cleveland for mixture purposes, although the cost to the consumer is 76c. more a ton than on local iron. The market is firm in Michigan at \$17.50. The basic market is inactive. Shipments this month have started out in about the same volume as during June.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.00
S'th'n fdy., sil.	1.75 to 2.25	21.50
Malleable		18.00
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace		16.00
Stand. low phos., Valley furn.		26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-Finished Steel.—A price reduction of \$2 a ton to \$42, Cleveland, is announced on wire rods. There had been some shading recently to this price.

Sheets.—Prices are holding at recent levels, having reached a point below which producers are not inclined to go, and effort is being made to get quotations on a slightly higher basis. Some contract tonnage was taken during the week at 2.60c. for black sheets, although 2.65c. is the more common price. On galvanized sheets 3.50c., Pittsburgh, appears to be the top of the market, but some business is going at 3.40c., Pittsburgh, and 3.45c., Valley. Blue annealed sheets are steady at

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.75c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

1.90c. to 2c., Pittsburgh. Small lots in some cases bring 2.10c.

Strip Steel.—The demand for hot-rolled strip is holding up quite well, particularly for narrow material. Regular prices on narrow strip are well maintained, but large consumers of 6-in. and wider strip are getting shipments at net prices that figure back to 1.75c., Pittsburgh, or lower. Mills that have taken contracts at the regularly quoted prices complain that they are not getting specifications. Large consumers of cold-rolled strip are able to place orders at 2.65c., Cleveland, for 3 tons and over.

Wire Products.—Irregularities that have existed for some time in prices on wire nails have been recognized by a price reduction of 10c. per keg to \$2.55, Cleveland and Pittsburgh, which has recently been a common price. A similar reduction to 2.40c. per lb. has been made on plain wire, which has been holding fairly firm at the former price. Other wire products are correspondingly reduced. On barbed wire the reduction is \$3 a ton.

Reinforcing Bars.—The Cleveland Union Terminals Co. is inquiring for several hundred tons for buildings being erected in connection with the terminal development. Rail steel bars are unchanged at 1.75c., mill.

Iron Ore.—On July 1 there was 5,067,786 tons of Lake Superior ore on Lake Erie docks, compared with 5,050,692 tons on the same date a year ago.

Fluorspar.—The \$1 a ton advance on gravel fluorspar to \$17 mines has been generally adopted. While some small lots have been sold at the advance, not much activity is expected during the remainder of the year, as most consumers are under contract.

Semi-Finished Steel.—Specifications continue in good volume. The leading local producer is still operating its plant at 100 per cent of capacity. Local prices are unchanged at \$32.50 to \$33, Cleveland, for sheet bars, billets and slabs.

Coke.—Foundry coke shipments against contracts are fair, but there is little new demand. Buying is from hand to mouth. Connellsville foundry coke is available at as low as \$3.25 per ton, with quotations ranging up to \$4.85 for the base grades. Ohio by-product coke is quoted at \$7.75, Painesville, for July shipment.

Alloy Steel.—Orders have come out this month better than had been expected and better than during much of June. Some specifications are coming from automobile companies that are anxious for early delivery. Prices are being maintained.

Bolts, Nuts and Rivets.—Several of the automobile companies are ordering bolts and nuts freely and specifications on the whole are quite satisfactory. Rivets are moving in somewhat larger volume than recently. Most buyers have placed contracts at regular prices.

Old Material.—Activity during the week was confined to a limited amount of buying by dealers to cover against contracts. The market lacks strength. Machine shop turnings, which advanced recently when a purchase by a Cleveland mill created a local demand, have declined 25c. a ton, dealers making some purchases at \$7.25. Odd lots of No. 1 heavy melting steel are being picked up by dealers at \$13. Blast furnace grades are holding at the recently reduced prices. Cast scrap is weak.

Prices per gross ton, deliv'd consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$13.00 to \$13.25
No. 2 heavy melting steel.	12.50 to 12.75
Compressed sheet steel.	12.50 to 13.00
Light bundled sheet	
stamp'gs	11.50 to 11.75
Drop forge flashings.	11.50 to 11.75
Machine shop turnings.	7.00 to 7.25
No. 1 railroad wrought.	11.50 to 12.00
No. 2 railroad wrought.	13.50 to 13.75
No. 1 busheling.	11.00 to 11.25
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.	16.50 to 17.00
Low phos., billet, bloom and slab crops.	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap.	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings.	9.00 to 9.25
Mixed bor'gs and short turn'gs	9.00 to 9.25
No. 2 busheling.	9.00 to 9.25
Cupola Grades	
No. 1 cast.	16.00 to 16.50
Railroad grate bars.	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable.	15.00 to 15.50
Rails for rolling.	16.25 to 16.50

Steel Corporation's Orders Increased in June

Unfilled orders on the books of the United States Steel Corporation increased during June. The total on June 30 was 3,637,009 tons, compared with 3,416,822 tons on May 31—an increase for June of 220,187 tons. This compares with 3,053,246 tons on June 30, 1927. The table gives the reported figures for the past 18 months.

	1928	1927
Jan. 31.....	4,275,947	3,800,177
Feb. 28.....	4,398,189	3,597,119
Mar. 31.....	4,335,206	3,553,140
April 30.....	3,872,133	3,456,132
May 31.....	3,416,822	3,050,941
June 30.....	3,637,009	3,053,246
July 31.....		3,142,014
Aug. 31.....		3,196,037
Sept. 30.....		3,148,113
Oct. 31.....		3,341,040
Nov. 30.....		3,454,444
Dec. 31.....		3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

The Pratt & Whitney Aircraft Co., Hartford, Conn., has received an additional order for 72 airplane engines and numerous spare parts from the United States Army, deliveries to run into next spring. It is the largest individual order for motors received by the company from the Army and involves \$671,620.

Steel Corporation Sues for Over-Payment of Federal Taxes

The time limit within which the United States Steel Corporation and affiliated corporations could file suits for refunds of over-payments of Federal income and profits taxes paid for the year 1917, expired on July 8. The claims of the corporation and its affiliated corporations for refunds of such taxes have been pending for some time and have been under consideration by the Treasury Department, but due to the magnitude of the task of auditing the returns sufficient time to conclude them has not been available before the expiration of the statute of limitations, July 8. Hence, in order to fully protect its rights, the corporation and its affiliated corporations filed suits in the United States Court of Claims for the refunds they deem lawfully due.

The United States Steel Corporation and affiliated corporations paid approximately \$468,000,000 Federal income and profits taxes for 1917 and 1918. This sum, it is understood, amounts to approximately 8.8 per cent of the total corporate income and profits taxes paid to the United States for the two years stated.

Farm Implement Plant Purchased by Case Company

The J. I. Case Threshing Machine Co., Racine, Wis., has acquired the Emerson-Brantingham Corporation's Rockford, Ill., farm machinery plant and inventories, including widely distributed branch houses, and as noted elsewhere in this issue, takes over operation of this branch of the company Aug. 1, according to an announcement by Charles S. Brantingham, president of the corporation. The Emerson-Brantingham Corporation will continue and expand its industrial products division. The Case purchase rounds out that company's line of threshing machines, farm tractors and combines to include plow, tillage and harvesting machines. The Rockford plant is expected to be considerably expanded under the Case operation.

"On Land—On Water—In the Air," an attractive 24-page booklet issued recently by the Niles-Bement-Pond Co., 111 Broadway, New York, outlines in narrative form how the machine tools, cranes, measuring devices, small tools, gears and other equipment manufactured by the company have met the developing needs of the railroad, the automobile plant, the marine engine shop, the shipyard and the airplane engine shop. Photographs of several of the company's products, with appropriate captions, are reproduced on alternate pages.

Boston

More Active Export Demand for Scrap—Foundry Melt Affected by Inventory-Taking

BOSTON, July 10.—Interest in the pig iron market centers in an inquiry from a western Massachusetts foundry for 2500 tons of No. 2 plain, No. 2X and No. 1X for third and fourth quarter delivery, which probably will be placed this week. Current bookings are confined to car lots, with Buffalo stacks securing the bulk of business. No. 2X Buffalo iron is freely offered at \$16.50 a ton, on cars furnace, and producers east of Buffalo are meeting that price on a delivered basis. Some sales of Buffalo No. 2X were made during the week, however, at \$17 a ton, furnace, and No. 1X was sold at \$17.50, melters ignoring lower prices to obtain certain brands. A fair tonnage of Indian iron has been sold for deliveries running as far ahead as next October.

Foundry iron prices per gross ton deliv'd to most New England points:

Buffalo, sil. 1.75 to 2.25..	\$20.91 to \$21.91
Buffalo, sil. 2.25 to 2.75..	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	22.41 to 24.27
Ala., sil. 2.25 to 2.75.....	22.91 to 24.77

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.—With many New England foundries taking inventory and with the industry collectively operating at not more than 65 per cent of capacity, specifications against last half contracts for by-product foundry coke have grown fewer and New England ovens have caught up on deliveries. New England-made fuel is still \$11 a ton, delivered, within a \$3.10 freight rate zone. Since dealers are well stocked with domestic coke, both for

immediate and future requirements, the market is less active.

Imports.—June imports of pig iron at this port amounted to 800 tons, consisting of 700 tons Indian, 50 tons of Scotch and 51 tons of Dutch iron. This compares with 248 tons imported in May, this year; 1848 tons in June, last year; 4936 tons in June, 1926; and 7967 tons in June, 1925. Imports of ore in June totaled 18,731 tons, made up of 7000 tons from Bizerta, Tunis, 5981 tons from Huelva, Spain, and 5750 tons from Benisaf, Algiers, whereas May imports were 16,828 tons, and those for June, last year, 8300 tons.

Shapes and Plates.—While mills are still quoting 1.90c. per lb., base Pittsburgh, for shapes and plates, they are still protecting the largest New England consumers on third quarter deliveries at second quarter prices. Competition among fabricators is still keen, and they are making low bids on the most attractive tonnages offered. The current week should be a fairly active one in the fabricated steel market. Five Boston & Maine Railroad bridges, requiring 3000 tons of steel, will be awarded, while bids will go in on a number of fairly large tonnages.

Warehouse Business.—There has been a seasonal letdown in the movement of iron and steel out of warehouses, but the weekly turnover averages slightly more than a year ago. Warehouses generally are carrying well assorted but not large stocks, depending on the mills for replenishment. Prices are firm, reports of shading being fewer than they have been in months. It is stated that higher prices on cut nails are in the making.

Cast Iron Pipe.—The Warren Foundry & Pipe Co. has been awarded 100 tons of 6-in. and 8-in. pipe by Chelsea, Mass., and an equal tonnage by Marlboro, Mass. No other municipal let-

tings are reported, and private business is still quiet. Prices on small pipe are holding up well, but larger diameters can be purchased at concessions from regular prices. The market for 4-in. pipe is \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and for 6-in. to 12-in., \$41.10 to \$42.10. The usual \$5 differential is asked on class A and gas pipe.

Old Material.—With one steamer loading 4000 to 5000 tons of steel for Danzig delivery and another scheduled to load within a fortnight, the export market is more active. No. 1 export steel is being taken at \$9 to \$9.25 a ton on dock here, and No. 2 at \$8.75 to \$9. The American Steel & Wire Co. has taken additional lots of long bundled skeleton at \$9.50 a ton, Worcester, Mass. Steel turnings for Pennsylvania steel mill use have been sold at \$5 on cars, shipping point, and for blast furnace use at \$5 to \$5.50, while a Norwood, Mass., foundry has bought stove plate at \$10.50 a ton, delivered. One sale of forge flashings is reported at \$6.10 a ton on cars, shipping point, but the general market appears to be \$6.50 to \$7. The movement of chemical borings is holding up well, with prices somewhat lower than a week ago. No. 1 heavy melting steel shipments are light, with most transactions at \$8.10 on cars, shipping point.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$8.00 to \$8.50
Scrap T rails.....	8.00 to 8.50
Scrap girder rails.....	7.50 to 8.00
No. 1 railroad wrought....	9.00 to 9.50
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings....	5.00 to 5.50
Cast iron borings (steel works and rolling mill)...	5.10 to 5.60
Bundled skeleton, long....	6.50 to 7.00
Forge flashings.....	6.50 to 7.00
Blast furnace borings and turnings.....	5.00 to 5.50
Forge scrap.....	5.50 to 6.00
Shafting.....	12.00 to 12.50
Steel car axles.....	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$13.50 to \$14.00
No. 1 machinery cast.....	14.00 to 14.50
No. 2 machinery cast.....	12.50 to 13.50
Stove plate.....	10.00 to 10.50
Railroad malleable.....	13.50 to 14.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.865c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway round.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
	Per Cent Off List
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

Youngstown

Sheet and Tin Plate Mills Active This Week—July-August Ingot Output May Average 70 Per Cent

YOUNGSTOWN, July 10.—Following the holiday interruption, steel companies resumed production this week on a much broader basis, approaching in active steel sheet capacity the year's record scheduling, with 115 of 127 mills under power. Tin plate mills are active at a rate close to capacity, while there has been an appreciable gain in the rolling of hot-strip steel. Leading producers are inclined to believe that production with mid-West independents will average 70 per cent during July and August, comparing with dips in previous years during these two months to as low as 55 per cent. Current independent merchant bar schedules are not above 60 per cent, but represent a gain as compared with last year, when independent output did not top 35 per cent at this season.

One direct result of the proposal to build a 20-mile railroad spur linking the Youngstown industrial district with the Ohio River is expected to be a reduction in freight rates on coal

shipped into Youngstown and Campbell from the western Pennsylvania fields. Principal carriers are considering such a plan. One of the district's leading freight traffic managers

estimates that each year from 9,000,-000 to 10,000,000 tons of coal is shipped by rail into the Youngstown area. By utilizing the proposed 20-mile railroad, it would be possible to ship much of this fuel by barge down the Monongahela and Ohio Rivers, operating throughout the winter as well as during the warmer months. District steel companies are giving more attention to rate problems this year than ever before, in their efforts to reduce costs and place the district on a more advantageous competitive basis.

The Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. average 70 per cent this week. The former, which has been the recipient of two important pipe orders, involving line pipe in lapweld sizes of steel tubes, has not yet transferred such business to its operating departments. These two orders will materially help the company to maintain a better average operating rate in its tube mill department. Its No. 9 lapwell mill, rolling tubes up to 20-in., has again been placed in action, following idleness of several weeks.

Operations of the Republic company's tube mill department have been low. The Republic company has been making heavy shipments of butt-weld pipe for construction and to jobbing interests.

Youngstown district tube producers have been rather hard hit by curtailment in oil well drilling, and by the

drilling of heavy production wells, which has been responsible for curtailment in drilling operations.

In connection with its Brier Hill plate mills at Mosier, near Youngstown, the Sheet & Tube company has considered the installation of capacity for producing electrically welded pipe, utilizing steel plates.

This week 12 of 20 Valley tube mills are in action; 37 of 53 independent open-hearth furnaces are melting. The Newton Steel Co., producing highly finished sheets, has resumed at a near capacity rate after one week's suspension. High temperatures throughout the mid-West resulted in some loss of production in hot mills.

One of the district's leading fabricating concerns is working on a large order for brake drums for the new Ford car, and is also turning out heavy production of pressed steel parts for washing machines.

The General Pressed Steel Co. has about completed its plant at Newton Falls, and is planning to begin operations.

Earnings statements of district primary steel producers are expected to show up better for second quarter than for first quarter, contrary to expectations. The quarterly financial statement of the Sheet & Tube company will be released the latter part of July. Directors of the Republic Iron & Steel Co. will meet July 18 to consider the second quarter statement of earnings.

named by an Iron-ton producer should continue. In bars, structural shapes and plates there has been a fair amount of business placed in the last week. Quotations for the third quarter are steady at 1.90c., base Pittsburgh, for small miscellaneous lots, with large buyers obtaining material at 1.85c. Bookings of steel sheets by district mills have fallen off somewhat, partially on account of the lull incident to the Fourth of July holiday. Black sheets are selling at from 2.60c. to 2.65c., base Pittsburgh, while galvanized stock for roofing purposes continues at 3.40c., with a shading of \$2 a ton still prevalent for delivery to Southern points. Blue annealed sheets range from 1.90c. to 2c., and automobile body sheets are firm at 4c. Operations of mills remain at about 90 per cent of capacity.

Reinforcing Bars.—Bids are being taken on approximately 1000 tons of bars for a municipal reservoir at Portsmouth, Ohio. Awards in the past week have been in fair volume, but, without exception, have called for less than 100 tons each. Prices are regarded as firm, with new billet bars quoted at 1.85c. to 1.90c., base Pittsburgh, and rail steel bars at 1.80c., base mill.

Warehouse Business.—Local jobbers have announced a reduction of \$3 a ton on steel sheets, effective July 3. The new schedule is 3.90c. for No. 24 gage black, 4.75c. for No. 24 gage galvanized and 3.45c. for No. 10 gage blue annealed. Recent declines in mill prices of sheets are responsible for the downward revision of quotations.

Coke.—Foundries in this district are specifying fairly well against current contracts for by-product foundry coke, although shipments this month are expected to be slightly less than those in June. Demand for domestic grades has fallen off.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, \$9.02; Wise County coke, \$7.09 to \$7.59; New River coke, \$9.09 to \$9.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—The scrap market remains fairly firm, especially in view of the lack of interest shown by buyers. Steel plants are accepting normal shipments on current contracts, although the temporary shutdown of an important district mill has halted forward buying by that company. Railroad lists on which bids are being taken include the Southern, 7000 tons; Pennsylvania, 50,000 tons; and Norfolk & Western, 6800 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$10.75 to \$11.25
Scrap rails for melting....	10.75 to 11.25
Loose sheet clippings.....	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings.....	7.50 to 8.00
Machine shop turnings....	7.00 to 7.50
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	12.50 to 13.00
No. 1 locomotive tires....	12.75 to 13.25
No. 1 railroad wrought....	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels.....	11.50 to 12.00
No. 1 machinery cast....	15.25 to 15.75
No. 1 railroad cast.....	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable ...	11.00 to 11.50

Cincinnati

Pig Iron Prices Steady but Demand Light—Scrap Firm in View of Lack of Buying Interest

CINCINNATI, July 10. — Quietness still prevails in pig iron sales, which in the week have totaled less than 2500 tons. Shipments on contracts are going forward at a moderate rate, but inquiries are scarce. A Hamilton, Ohio, melter is expected to buy 5000 tons of foundry iron for delivery during the last half, with the privilege of extending deliveries into the first three months of 1929. There has been no change in prices. Southern iron is firm at \$15.50, base Birmingham, but the tonnage moving north of the Ohio River is negligible. Northern Ohio foundry ranges from \$16 to \$16.50, base furnace, while foundry iron from the Iron-ton district is quoted at \$18 to \$19, base Iron-ton.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable.....	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Iron-ton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Following closely on the heavy specifications placed against old contracts previous to the closing of the second quarter has come a lessened demand from consumers, a development not at all surprising to

producers, who are fairly well satisfied with the trend of business. Prices are the strongest in many weeks and the situation in this respect is a source of encouragement to the manufacturers. Eastern mills have announced that common wire nails have been advanced to a minimum of \$2.69 per keg, delivered in Cincinnati, which is equivalent to \$2.55 at Iron-ton plus a 14c. barge rate to this city. Plain wire is firm at \$2.40 per 100 lb., base Iron-ton. Representatives of Eastern companies declare that no concessions will be made from these schedules, even though irregularities in prices

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reforc. bars.....	3.15c.
Rail steel reforc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100.....	7.55
Net per 100 Ft.	
Lap-weld, steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel b'l'r tubes, 2-in....	19.00
4-in.	39.00

St. Louis

Foundry Coke Reduced—Pig Iron Market Quiet—Good Orders for Sheets and Tin Plate

St. Louis, July 10.—The beginning of the third quarter found the pig iron market quiet. Most melters in the district have bought only sparingly, and there is much iron to be bought for the next three months. Sales of the St. Louis Gas & Coke Corporation for the last week totaled 3300 tons, the largest order of which was 750 tons to an Illinois equipment manufacturer. Another Illinois melter took 600 tons, a local job foundry bought 500 tons; a local stove foundry took 600 tons, and 250 tons went to a Kansas City melter. The Independence Day holiday was, of course, a check to business. June shipments of the Granite City maker were about the same as in May.

Prices per gross ton at St. Louis:
No. 2 fdy., sil. 1.75 to 2.25, f.o.b.
Granite City, Ill. \$19.00
N'th'n No. 2 fdy., deliv'd St. Louis. 20.16
Southern No. 2 fdy., deliv'd. 19.92
Northern malleable, deliv'd. 20.16
Northern basic, deliv'd. 20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—The local by-product interest reduced its price on foundry coke \$1 a ton to \$8 f.o.b., ovens, for shipment out of town and 75c. a ton to \$9, delivered St. Louis. There is very little buying of foundry or domestic grades.

Finished Iron and Steel.—Because of the holiday, mills did not operate last week, except the Granite City plate mill. The Granite City company is, however, receiving orders in sufficient volume for running all of its sheet and tin mills. Tin plate specifications are quite satisfactory and that department will continue to run virtually 100 per cent. Incoming business and backlog tonnage of plates warrants 100 per cent production and next week the company will operate the galvanizing department 75 to 80 per cent of capacity. New prices of plates, shapes and bars for third quarter have brought forth a satisfactory volume of business and second-quarter specifications against

contracts have been gratifying to mills. The Texas & Pacific Railroad is in the market for 1000 kegs of track spikes for September and October delivery. The Terminal Railway Association bought 1200 kegs of track spikes.

Old Material.—The market for old material is very quiet. Consumers in the district have bought very little in several weeks, and given no indication that they will be in the market during July. Dealers have about covered on contracts, and they are merely marking time. No. 1 busheling, cast-iron borings, machine shop turnings, and No. 1 railroad wrought are 25c. lower. Railroad lists include: New York Central, 14,000 tons; Pennsylvania Lines, 49,885 tons; Baltimore & Ohio, 11,720 tons; Santa

Fe lines, 6195 tons; Wabash, 2730 tons; Missouri-Kansas-Texas, 1300 tons; Frisco Lines, 1000 tons; Ann Arbor, 670 tons; Great Northern, 67 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:
Heavy melting steel. \$10.75 to \$11.25
No. 1 locomotive tires. 12.00 to 12.50
Heavy shoveling steel. 10.75 to 11.25
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart. 12.25 to 12.75
Railroad springs. 13.25 to 13.75
Bundled sheets. 8.50 to 9.00
No. 2 railroad wrought. 11.00 to 11.50
No. 1 busheling. 9.25 to 9.75
Cast iron borings. 8.50 to 9.00
Iron rails. 13.00 to 13.50
Rails for rolling. 13.00 to 13.50
Machine shop turnings. 6.25 to 6.75
Steel car axles. 17.25 to 17.75
Iron car axles. 25.50 to 26.00
Wrot. iron bars and trans. 18.50 to 19.00
No. 1 railroad wrought. 9.50 to 10.00
Steel rails, less than 3 ft. 15.00 to 15.50
Steel angle bars. 11.50 to 12.00
Cast iron carwheels. 13.00 to 13.50
No. 1 machinery cast. 13.00 to 13.50
Railroad malleable. 11.25 to 11.75
No. 1 railroad cast. 13.00 to 13.50
Stove plate. 11.00 to 11.50
Agricuilt. malleable. 12.00 to 12.50
Relay. rails, 60 lb. and under. 20.50 to 23.50
Relay. rails, 70 lb. and over. 26.50 to 29.00

Birmingham

Improved Inquiries for Pig Iron—Steel Sales Continue Steady—Cast Pipe Advanced

BIRMINGHAM, July 10.—Pig iron sales last week were somewhat lighter than for the previous week. Quiet negotiations have brought about a fairly steady volume of sales since the price reduction on June 20, and a considerable portion of third quarter iron is under contract. Present inquiries indicate improved sales for the next few days. Shipments improved slightly during the past week. For foreign ports, 840 net tons of basic iron was shipped by river during the latter part of the week. The Alabama City furnace of the Gulf States Steel Co. has been blown out for rebuilding along improved lines. The No. 2 furnace of the Republic Iron & Steel Co. was blown out on June 30 for relining. The new No. 5 Fairfield furnace of the Tennessee company, blown in on June 25, was changed from foundry to basic on June 28. Eighteen furnaces are now in blast. Of this number nine are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil. \$15.50
No. 1 fdy., 2.25 to 2.75 sil. 16.00
Basic. \$15.00 to 16.00

Cast Iron Pipe.—Some improvement was noted last week, though all new business is still confined to small orders, coming largely from private consumers. Several good tonnages are known to be in prospect and will probably be up for figures within 30 to 60 days. Effective the first of this week, another increase of \$1 a ton was made. Quotations are now \$34 to \$35 on 6 in. and larger sizes. Shipments are active.

Coke.—Both sales and demand are unusually light. Second-half business is largely under contract and present activity is confined to a few spot sales in small lots. Specifications against contracts are improving. Prices are unchanged from the \$5 base.

Old Material.—The market is still in the dull period which has extended over the past several weeks. Only a few scattered sales are being made. A slightly better feeling is beginning to develop and dealers believe that the bottom has been reached. Prices have been the same for some time.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:
Heavy melting steel. \$8.50 to \$9.00
Scrap steel rails. 11.00 to 11.50
Short shoveling turnings. 7.50 to 8.00
Cast iron borings. 8.00
Stove plate. 13.50
Steel axles. 19.00 to 20.00
Iron axles. 20.00 to 21.00
No. 1 railroad wrought. 10.00 to 10.50
Rails for rolling. 13.00
No. 1 cast. 14.25
Tramcar wheels. 12.50 to 13.50
Cast iron carwheels. 12.00 to 13.00
Cast iron borings, chem. 13.50 to 14.00

Finished Steel.—New business continues to develop at a fairly satisfactory and steady rate. Weekly sales are running close to the average of the past month. Demand for the more important lines appears well sustained and the outlook for the first part of the quarter is favorable. The sheet market is expected to show improvement following the reduction of \$1 to \$2 a ton made last week. Other prices remain the same. The Ingalls Iron Works has orders for 225 tons of structural steel for a fruit packing plant at Tampa, Fla., and 150 tons

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struct. shapes.	3.25c.
Bars, soft steel or iron.	3.15c.
Cold-fin. rounds, shafting, screw stock.	3.75c.
Black sheets (No. 24).	4.45c.
Galv. sheets (No. 24).	5.25c.
Blue ann'l'd sheets (No. 10).	3.60c.
Black corrug. sheets (No. 24).	4.50c.
Galv. corrug. sheets.	5.30c.
Structural rivets.	3.75c.
Boiler rivets.	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.	70
Less than 100 lb.	65
Machine bolts.	60
Carriage bolts.	60
Lag screws.	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.	60
Less than 200 lb.	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.	60
Less than 200 lb.	50

for an airplane hangar at Miami. The Connors Steel Co. will furnish 300 tons of reinforcing steel for a power house at Mount Holly, N. C., for the Duke Power Co. The Tennessee com-

pany is operating seven open-hearth furnaces at Ensley and five at Fairfield. The Gulf States Steel Co. has reduced its operations at Alabama City from four to three.

further sales of electric steel melting scrap at \$13, delivered Seattle. Other grades are very quiet. We continue to quote electric steel melting scrap at \$13 per gross ton, selected heavy melting steel scrap at \$11 per gross ton, and No. 1 cast iron scrap at about \$12 per net ton, all these prices being for Seattle delivery.

Pacific Northwest

Large Building Prospects—Shading in Plate Prices— Nothing New in Steel Rate War

SEATTLE, July 7 (*By Air Mail*).—There have been no new developments lately in the threatened rate war between rail and water lines serving the Pacific Coast, due to the action of the Illinois Central and the Redwood Lines in putting in a rate of 61c. on articles of iron and steel from points in Illinois and Indiana to California. Other rail and water lines serving California points have not yet met this rate. Some conferences have been held between rail and water lines interested, but no definite action has resulted.

Local conditions in iron and steel are fairly active, but there is a tendency toward lower prices, plates having settled down to 2.25c., with reports that 2.20c. has been done. Jobbers say that June tonnage was only slightly under May, but the outlook is that July may show a larger drop.

New building conditions in Seattle are active, permits issued in June amounting to \$6,223,355, the largest in any one month in the history of the city. For the first half of 1928, total permits issued amounted to \$23,389,825, the largest in any half year period on record.

Pig Iron.—Sales are few and only for very small lots, prices being unchanged. We continue to quote No. 2 foundry and Utah basic at \$25 to \$26 gross tons, delivered Seattle.

Plates.—The only large work in sight is a new water line to serve the North End, which, if it goes through, will take several thousand tons of steel pipe. We quote tank plates at 2.25c., but one local interest, representing an Eastern mill, is naming 2.20c. on any desirable orders, c.i.f. Seattle.

Shapes.—New demand and inquiry is quieting down, and no large jobs are in sight. The Star Iron & Steel Co., Tacoma, has taken 400 tons for an addition to a salt and chemical plant at Tacoma. The Kettle Falls bridge at Kettle Falls, Wash., has been placed with an Eastern interest. Prices on shapes remain firm at 2.35c., c.i.f. Seattle.

Bars.—Demand for reinforcing steel is fairly active. The Northwest Rolling Mills, Inc., has taken 350 tons for the Benjamin Franklin apartments, while this company and the Pacific Coast Steel Co. have divided about 400 tons for a new warehouse for Frederick & Nelson. We quote reinforcing bars at 2.20c. in carload lots, and up to 3c. in small lots. Mild steel bars are firm at 2.35c., but demand is quiet.

Car Wheels.—The city of Seattle is to open bids on July 13 for 550 car wheels for the Seattle Municipal Street Railway.

Sheets.—Demand is quiet, and there is some unevenness in prices, some of the smaller Eastern mills apparently seeking orders. We quote galvanized

sheets, No. 24 gage, at 4.15c. to 4.25c., No. 24 black at 3.25c. to 3.35c., and No. 10 blue annealed at 2.62c. to 2.72c., all c.i.f. Seattle.

Old Material.—There have been

Warehouse Business.—Local jobbers report that June business was heavier than looked for, but it is expected that July will show some falling off. There have been no important changes in local jobbers' prices for some months.

Warehouse Prices, f.o.b. Seattle	
	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Tees, bar sizes.....	3.50c.
Reinforcing bars.....	3.00c.
Blue annealed sheets (No. 10)....	4.00c.
Black sheets (No. 24).....	5.00c.
Galvanized sheets (No. 24).....	5.75c.
Rivets, tank.....	.55 & 5% off

Buffalo

Pig Iron Inquiry Improves but Buying Is Slow—Steel Buying Fairly Good After Holiday

BUFFALO, July 10.—There is a little more inquiry for pig iron this week, but buying is lagging. The Crane Co. is taking prices on 2000 tons of iron. Two other lots of 1000 to 2000 tons, which came out for bids last week, await placement. Small-lot business has been improving. Buffalo district prices are firm at \$17 for No. 2 plain foundry and \$17.50 for malleable, but these prices are shaded for delivery outside this immediate district.

Prices per gross ton, f.o.b. furnace:	
No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic.....	\$16.50 to 17.00
Lake Superior charcoal....	27.28

Finished Steel.—Steel buying was renewed promptly after July 4, in some lines especially. Sheets show a revival after a brief dull period. Black sheet orders have been taken at 2.70c. Reinforcing bar sales are large, with prospect of capacity mill operation this month. Wire deliveries are fairly good. There is some large structural business to be placed here soon, including 6000 tons for the new Rand Building. Warehouse sales the early part of this month were an improvement over those of early May and June. Bars are at 1.95c., Buffalo base, under competition with reinforcing bars and shapes similarly priced.

Old Material.—Deliveries of heavy melting steel are being restricted closely here, with dealers cutting down their purchases to prevent yard accumulation. No. 1 heavy melting steel is nominally unchanged at \$14 to \$14.25, although some buyers have indicated willingness to make purchases at \$13.50 for future delivery. Little scrap of any kind is moving. Buffalo dealers are not anxious to get railroad material offered this week, and little of this tonnage is expected to come here. The Bethlehem Steel Co. continues to receive scrap by water, but is not accepting deliveries from local dealers.

Prices per gross ton, f.o.b. Buffalo consumers' plants:	
Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.00 to \$14.25
No. 2 heavy melting steel.....	12.25 to 12.75
Scrap rails.....	13.50 to 14.00
Hydraulic comp. sheets....	12.25 to 12.75
Hand bundled sheets.....	8.50 to 9.00
Drop forge flashings.....	12.00 to 12.50
No. 1 busheling.....	12.25 to 12.75
Hvy. steel axle turnings..	12.00 to 12.50
Machine shop turnings....	7.75 to 8.25
Acid Open-Hearth Grades	
R'l'r'd knuckles and couplers.....	15.00
R'l'r'd coil and leaf springs.....	15.00 to 16.00
Rolled steel wheels.....	15.00
Low phos. billet and bloom ends.....	16.00 to 16.50
Electric Furnace Grades	
Hvy. steel axle turnings..	12.00 to 12.50
Short shov. steel turnings..	10.00 to 10.50
Blast Furnace Grades	
Short shov. steel turnings..	10.00 to 10.50
Short mixed borings and turnings.....	9.50 to 10.00
Cast iron borings.....	9.50 to 10.00
No. 2 busheling.....	9.00 to 9.25
Rolling Mill Grades	
Steel car axles.....	15.50 to 16.00
Iron axles.....	12.00 to 12.50
No. 1 railroad wrought....	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast.....	14.25 to 14.75
Stove plate.....	13.00 to 13.25
Locomotive grate bars.....	11.50 to 12.00
Steel rails, 3 ft. and under.....	16.50
Cast iron carwheels.....	12.00 to 12.50
Malleable Grades	
Industrial.....	15.00
Railroad.....	15.00
Agricultural.....	15.00

Warehouse Prices, f.o.b. Buffalo	
	Base per Lb.
Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Canada

Large Structural Steel Inquiries—Lull Settles Over Pig Iron and Scrap Markets

TORONTO, ONT., July 9.—Interest in the Canadian pig iron market has slumped. The lull is attributed mainly to the beginning of the summer holiday season and the fact that July 2 was a general holiday in Canada. Advance buying of foundry and malleable iron has practically ceased, although a small number of melters are still expected to come forward with contracts to take care of needs up to the end of September. Current demand is for small tonnages for spot delivery, but even this business was off during the past few days. Local blast furnace representatives, however, believe that a strong spot demand will reappear shortly. Pig iron consumers are enjoying one of the best seasons since 1920, with present operations averaging about 75 per cent. Spot buyers are carrying limited stocks, and many will be forced into the market within the next couple of weeks to secure supplies for current needs. No change has been announced in pig iron prices either in the Toronto or Montreal markets.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25.	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25.	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Dealers' buying prices:

Structural Steel.—Demand for structural steel and reinforcing bars continues to improve. Each week

brings forth a steady flow of new orders, but despite this there is little or no decline in the prospective business in sight. Approximately 8000 tons of structural steel will be required for a new customs house to be erected in Toronto by the Dominion Government, for which tenders are expected to be called about Aug. 1. Fully 3000 tons of structural steel will be required for a proposed new Federal Government building at Ottawa, Ont., for which plans are now being prepared by the architectural department of the Department of Public Works.

Old Material.—A state of stagnation settled on the market during the week and both Toronto and Montreal dealers reported very little business. Some inquiries are appearing, however, and selling interests look for an early revival of business. Prices are unchanged.

Per Gross Ton

	Toronto	Montreal
Heavy melting steel....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00

Per Net Ton

No. 1 machinery cast....	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

for an apartment on Pacific Street, San Francisco. Los Angeles is calling for bids on 589 tons of reinforcing bars for Big Dalton Dam. Bids are being taken on 200 tons for a school in San Francisco.

Sales and inquiries for pig iron and coke are limited to small lots.

Detroit Scrap Prices Unchanged

DETROIT, July 10.—There have been no changes in prices on scrap in this district during the past week. Current orders are sufficient to cover the material being released.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$11.00 to \$11.50
Borings and short turnings	7.00 to 7.50
Long turnings	5.75 to 6.25
No. 1 machinery cast....	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets....	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling.....	8.50 to 9.00
Sheet clippings	6.00 to 6.50
Flashings	9.00 to 9.50

Lebanon-Scranton Merger Virtually Assured

Announcement is expected soon of the merger of the Lebanon Iron Co., Lebanon, Pa., and the Scranton Bolt & Nut Co., Scranton, Pa., both makers of bar iron, bolts, nuts, spikes, etc. A new financial structure will be worked out and a public offering of securities will probably be made soon through Philadelphia bankers.

Charles Hart, president Delaware River Steel Co., Chester, Pa., who is representing the interests of the late William C. Sproul in the management of the Lebanon Iron Co., is active in the formation of the merger. The plan contemplates the use of the Lebanon plant for making bars and the concentration of bolt, nut and rivet manufacturing at Scranton.

San Francisco

Steel Demand Slightly Improved with Greatest Activity in Structural Shapes and Reinforcing Bars

SAN FRANCISCO, July 12.—Demand for steel products is slightly improved, with structural shapes and reinforcing steel bars the most active. Little or no change is noted in the price structure.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00
**German fdy., sil. 2.75 to 3.25	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Awards include 275 tons shapes for A. M. Castle Co. warehouse, San Francisco, to Pacific Coast Engineering Co. and 175 tons for City Hall at Phoenix, Ariz., to Minneapolis Steel & Machinery Co. The Pacific Coast Steel Co. took 700 tons of reinforcing bars for the Lovejoy viaduct at Portland and 250 tons for the James Madison School at Seattle.

Burbank, Cal., placed 500 tons of cast iron pipe with the Grinnell Co., Pacific States Cast Iron Pipe Co. and American Cast Iron Pipe Co. Los Angeles opened bids on 2121 tons of 8 and 12-in. class 350 pipe.

Pending business includes 455 tons of shapes for a bridge at Saugus, Cal., 570 tons for the Bardsdale bridge at Ventura, Cal., and 600 tons

Warehouse Prices, f.o.b. San Francisco

Base per Lb.	
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{1}{2}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker....	5.00c.
Black sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.90c.
Galv. sheets (No. 24).....	5.50c.
Struc. rivets, $\frac{1}{2}$ -in. and larger.....	5.65c.
Com. wire nails, base per keg....	\$3.40
Cement c't'd nails, 100-lb. keg....	3.40

Work on a \$1,000,000 addition to the pressed steel division of the Motor Wheel Corporation, Lansing, Mich., will be begun at once and is expected to be completed Sept. 1. The new building will be 74 x 500 ft. and will parallel the present main building of the steel-working unit of the plant. The Motor Wheel Corporation, which now employs 2250 men in Lansing, reports sales for the first six months of 1928 to be 25 per cent greater than for the same period in 1927 and far greater than in any other six months' period in the history of the company.

Gisholt Machine Co., Madison, Wis., entertained the Chicago Superintendents' and Foremen's Club on Saturday, June 23. The Chicago group, numbering about 250, went to Madison on a special train and after an inspection of the Gisholt plant was taken on a bus tour through the city.

Non-Ferrous Metal Markets

All the Markets Quiet— Tin Sales Fairly Large— Prices Firm Except Lead, Which Is Lower

Copper.—Decided quietness pervades the entire market and sales to both foreign and domestic consumers have been of small proportions. Prices, however, continue exceedingly firm at 14.75c., delivered in the Connecticut Valley, for electrolytic copper and at 15c. c.i.f. European ports, for Copper Exporters, Inc. Such buying as there is is mostly for July, but it is admitted that both foreign and domestic consumers must still buy considerable metal for August delivery. Lake cop-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 10	July 9	July 7	July 6	July 5	July 3
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.87 1/2	14.87 1/2
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	46.25	46.25	46.25	46.12 1/2	46.07 1/2	46.12 1/2
Lead, New York.....	6.20	6.20	6.30	6.30	6.30	6.30
Lead, St. Louis.....	6.10	6.10	6.15	6.15	6.15	6.15
Zinc, New York.....	6.55	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis.....	6.20	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price 1/4 c. higher.

per is quoted at 14.75c. to 14.87 1/2c., delivered, in a quiet market.

Tin.—Considering the Fourth of July holiday, sales of 1000 tons for the week ended July 7 are considered fairly large. Yesterday, Monday, about 150 tons changed hands among dealers, but the interesting feature is that interest centers in August delivery and that futures are neglected. Previously demand has been for spot, July and August. This is pointed to as indicating that consumers have evidently let their supplies shrink. Otherwise the market has been exceedingly uninteresting. Today, Tuesday, spot Straits tin is quoted at 46.25c., New York, with demand very light. Quotations in London today

were lower than a week ago, with spot standard quoted at £209 2s. 6d., future standard at £206 12s. 6d. and spot Straits at £212 2s. 6d. The Singapore price today is £209 5s. Arrivals thus far this month have been 2485 tons, with 5485 tons reported afloat.

Lead.—Owing to lower prices in London and the possibility of importations, the American Smelting & Refining Co., late yesterday, Monday, reduced its quotation from 6.30c. to 6.20c., New York, as the regular contract price. Values naturally sagged in the outside market and today the metal is quoted at 6.10c. to 6.12 1/2c., St. Louis. A moderate business is reported, with activity a little more

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guar't'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, 1/2 and 1/2.....	31.50c. to 32.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c.
Tin, bar	56.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.75c.
Lead, American pig.....	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	55.50c.
Solder, 1/2 and 1/2.....	30.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12 1/2c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged and zinc sheets and lead full sheets are still being quoted at the advances of June 7 and May 29 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.25c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	24.12 1/2c.
Copper	25.00c.

Rods—	
High brass	17.00c.
Naval brass	19.75c.

Wire—	
Copper	16.75c.
High brass	19.75c.

Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.625c.	14.00c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.00c.	8.25c.
Brass, light	6.25c.	7.75c.
Hvy. machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. t'ngs	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.

Seamless Tubes—	
Brass	25.62 1/2c.
Copper	26.50c.

Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

pronounced in the West than in the East.

Zinc.—Consumer demand is reported to be fairly good each day and prices are exceedingly firm at 6.20c., East St. Louis, or 6.55c., New York, for prime Western zinc. A hand-to-mouth buying policy continues and producers are in no mood to force the market. Statistics for June showed a decrease in stocks of refined metal of about 750 tons, with production and shipments about balancing one another. Ore prices at Joplin are unchanged at \$40 per ton and production is very light, only about 3500 tons, owing to the holiday, with sales between 9500 and 10,000 tons. The statistical position of the market is decidedly favorable.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—The market is a little firmer with Chinese metal for spot delivery unobtainable at less than 9.62½c., and with futures at 9.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 10.—Sales are few in number and of moderate size. Copper and antimony are advanced and tin is lower in price. The old metal market is steady.

Prices, per lb., in carload lots: Lake copper, 14.87½c.; tin, 47.50c.; lead, 6.25c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11.25c. On old

metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.;

zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

THE Argentine State Railways have placed orders with United States makers for 1100 miscellaneous freight cars. Twenty electric locomotives have been placed by the Cleveland Union Terminals Co. Outstanding among the week's inquiries is one for 300 passenger train refrigerator cars from the Pennsylvania. Details of the week's business follow:

Chesapeake & Ohio will build 10 locomotive tenders in its own shops.

Chicago, West Pullman & Southern has ordered one six-wheel switching locomotive from Baldwin Locomotive Works.

Cleveland Union Terminals Co. has ordered 20 electric locomotives from General Electric Co.

Mexican Railway Co. has ordered two Pacific type locomotives from American Locomotive Co.

Missouri-Kansas-Texas has ordered 19 baggage and mail cars from American Car & Foundry Co.

Pennsylvania Railroad has revived its inquiry for 300 passenger train refrigerator cars.

Illinois Central is inquiring for 13 locomotive tenders.

Fruit Growers' Express has made inquiry for 150 steel underframes for refrigerator cars.

Jacob Dold Packing Co. is inquiring for 10 steel underframes for 30-ton refrigerator cars.

Argentine State Railways have placed orders for 1100 miscellaneous freight cars, the business having been divided between

Middletown Car Co. and American Car & Foundry Co.

Alaska Railroad will buy one 2-8-2 type locomotive.

Delaware & Hudson will buy one 2-10-0 type high-pressure experimental engine.

Chicago, St. Paul, Minneapolis & Omaha

An item was published on page 1405 of THE IRON AGE for May 17 to the effect that the Spanish Government had ordered textile machinery older than 40 years to be destroyed and had provided for partial compensation for the destruction of machinery purchased during that time. A reply from Madrid is this: "Although project has been discussed as much as two years ago, government officials inform us no action has been taken and no indications of any early intention to carry out project."

A company known as the Isothermos Corporation of America, 11 West Forty-second Street, New York, has been formed to manufacture, to American standards, the "Isothermos" journal box for use on railroad cars. This form of journal box is said to have become standard equipment on some European railroads and to be used also in Africa and in South America. Fitted with an automatic lubrication system, it is claimed that it will run for 100,000 miles without further attention or refilling.

Low-Built Crawler Crane for Rapid Handling of Bulk Materials

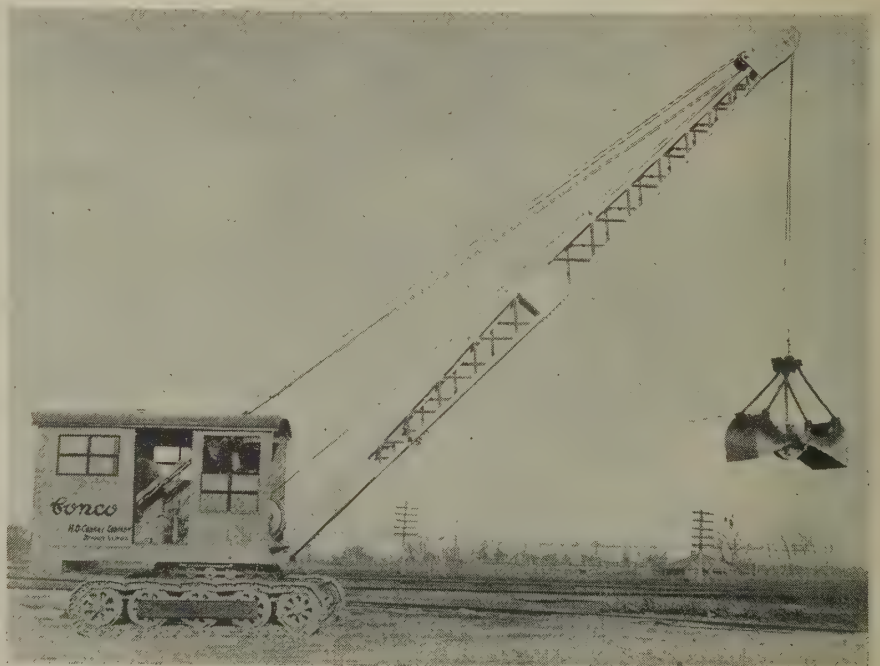
LOW center of gravity, speed, simplicity of operation, ruggedness and absence of friction clutches are features of a new crawler crane made by H. D. Conkey & Co., Mendoça, Ill. The crane is designed for either gasoline or electric drive. It is self-contained, swings through the full circle and runs on an endless tread traction. It is primarily a rapid material-handling unit for grab bucket, dragline bucket and hook-block work.

One man operates all functions—hoisting, raising and lowering boom, swinging, traveling and steering—from the operator's deck near the front of the cab. The traveling gear is arranged for two speeds under control of the operator, regardless of the position of the turntable. The swing brake is of such design that the turntable or machinery deck may be set in any position with relation to the car body.

A special feature is the method of engaging the hoisting and holding drums. A heavy ball thrust bearing in connection with a special thrust nut provides an efficient means of op-

eration and eliminates all thrust screws, washers, springs and cams. This feature brings about smoothness

of operation with increased working capacity. The new crawlers are being built in ½, ¾ and 1-cu. yd. capacities.



Fabricated Structural Steel

Ohio River Bridge Takes 14,000 Tons of 42,600 Tons Awarded—Office Building Calls for 12,000 Tons

INCLUDING 14,000 tons for a bridge across the Ohio River at Louisville, Ky., fabricated structural bookings in the last week amounted to 42,600 tons. New projects totaled 20,900 tons, the largest being a building in New York, which will require 12,000 tons. Awards follow:

HARTFORD, VT., 200 tons, State bridge, to American Bridge Co.
FITCHBURG, MASS., 175 tons, theater, to New England Structural Co.
BOSTON & MAINE RAILROAD, 200 tons, bridge at Somerville, Mass., to American Bridge Co.
MECHANICVILLE, N. Y., 1200 tons, pulp and paper mill, to Palmer Steel Co.
NEW YORK, 3500 tons in the following jobs as reported to the Structural Steel Board of Trade: Apartment building at Riverside Drive and 104th Street and 110 West Eighty-sixth Street, Madison House at Madison and Jefferson Streets, court house at Amsterdam Avenue and 151st Street and public school 148, Jackson Heights, to Harris Structural Steel Co.
NEW YORK, 3500 tons, extension to Fourteenth Street office building, to McClintic-Marshall Co.
NEW YORK, 600 tons, stockyard building on West Forty-first Street for New York Central Railroad, to McClintic-Marshall Co.
STATE OF NEW JERSEY, 400 tons, highway bridge, to American Bridge Co.
LEHIGH VALLEY RAILROAD, 800 tons, bridge, to American Bridge Co.
DELAWARE, LACKAWANNA & WESTERN RAILROAD, 250 tons, bridge, to Phoenix Bridge Co.
PENNSYLVANIA RAILROAD, 600 tons, transmission towers, to Shoemaker Bridge Co.
PENNSYLVANIA RAILROAD, 250 tons, bridges, to Bethlehem Steel Co.
PHILADELPHIA, 1700 tons, garage, to McClintic-Marshall Co.
PHILADELPHIA, 2200 tons, garage and office building at 1608 Walnut Street, to McClintic-Marshall Co.
ATLANTIC CITY, N. J., 600 tons, power house for Haddon Hall-Chalfonte Hotel, to Bethlehem Steel Co.; to be electrically welded.
PLYMOUTH, PA., 1800 tons, coal breaker for Lehigh & Wilkes-Barre Coal Co., to Fort Pitt Bridge Co.
TAMPA, FLA., 225 tons, fruit packing plant, to Ingalls Iron Works Co.
ORLANDO, FLA., 150 tons, airplane hangar, to Ingalls Iron Works Co.
LOUISVILLE, KY., 14,000 tons, bridge over Ohio River between Louisville and Jeffersonville, Ind., to American Bridge Co.
NEWARK, OHIO, 180 tons, telephone building, to Pittsburgh-Des Moines Steel Co.
CLEVELAND, 500 tons, Randolph exchange building for Ohio Bell Telephone Co., to H. Brooks Co.
CINCINNATI, 130 tons, Christ Hospital, to McClintic-Marshall Co.
TOLEDO, 500 tons, plant for Libbey-Owens Glass Co., to Bellefontaine Bridge Works.
KENMORE, OHIO, 140 tons, Twenty-seventh Street viaduct, to Burger Iron Works.
MICHIGAN CENTRAL RAILROAD, 300 tons, bridge work, to McClintic-Marshall Co.
SAGINAW, MICH., 2600 tons, foundry for Chevrolet Motor Co., to American Bridge Co.

BUFFALO, 2500 tons, Rand Building; from John W. Cowper Co., contractor, to Bethlehem Steel Co.
CHICAGO, 750 tons, building for Miehle Printing Press Co., to Illinois Steel Co.
CHICAGO, 900 tons, building for International Harvester Co., to Gage Structural Steel Co., local.
CHICAGO, 345 tons, Kresge store building, to Wendnagel & Co., local.
CHICAGO, 250 tons, building for Produce Terminal & Cold Storage Co., to Gage Structural Steel Co.
CHICAGO, 165 tons, building for Commonwealth Edison Co., to Hansell-Elcock Co., local.
WILMETTE, ILL., 150 tons, water tank, to Chicago Bridge & Iron Co.
EAST ST. LOUIS, 935 tons, foundry, to McClintic-Marshall Co.
TACOMA, WASH., 400 tons, addition to salt and chemical plant, to Star Iron & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

SPRINGFIELD, MASS., 100 tons, city bridge.
NEW YORK, 12,000 tons, Western Union Building in West Broadway.

REINFORCING STEEL

AWARDS reported during the last week included no jobs of outstanding size and amounted only to 3000 tons. Among the new projects totaling 4750 tons are two warehouses in New York and Chicago, requiring 1200 tons each, and a municipal reservoir at Portsmouth, Ohio, which will take 1000 tons. Awards follow:

WHITE PLAINS, N. Y., 150 tons, garage, to Concrete Steel Co.
NEW YORK, 110 tons, loft building at John, Cliff and Pearl Streets, to Carroll-McCreary Co., Inc.
LONG ISLAND CITY, N. Y., 275 tons, post office, to Kalman Steel Co.
STATE OF NEW JERSEY, 100 tons, road work, to Concrete Steel Co.
MOUNT HOLLY, N. C., 300 tons, power plant for Duke Power Co., to Connors Steel Co., Birmingham.
CLEVELAND, TENN., 100 tons, school, to Connors Steel Co.
CHICAGO, 200 tons of rail and billet steel bars, apartment building at Fifty-first Street and Kenwood Avenue, to Concrete Engineering Co.
CHICAGO, 185 tons, Sayre Public School, to Concrete Steel Co.
CHICAGO, 285 tons, Chicago Women's Club, to Concrete Steel Co.; previously reported to unnamed bidder.
CHICAGO, 400 tons, Glen Holmes garage, to an unnamed bidder.
CHICAGO, 220 tons, Austin High School, to an unnamed bidder.
MAYWOOD, ILL., 210 tons, for Public Service Co. of Northern Illinois, to an unnamed bidder.
SEATTLE, 350 tons, Benjamin Franklin apartments, to Northwest Steel Rolling Mills.
SEATTLE, 400 tons, warehouse for Frederick & Nelson; divided between North-

NEW YORK, 2000 tons, Sloan Memorial Y. M. C. A., Ninth Avenue and Thirty-fourth Street.
NEW CITY, N. Y., 300 tons, Rockland County Court House.
PHILADELPHIA, 600 tons, Girard Avenue Bridge.
PHILADELPHIA, 250 tons, morgue.
PHILADELPHIA, 875 tons, bridge for city of Philadelphia at Sixth Street and Allegheny Avenue; bids close July 11.
PENHURST, PA., 300 tons, normal school.
PENNSYLVANIA RAILROAD, 600 tons, electric transmission work; Shoemaker Bridge Co., low bidder.
READING RAILROAD, 300 tons, grade elimination work at Bridgeport, Pa.
TRENTON, N. J., 300 tons, State highway bridge; bids close July 23.
BURLINGTON COUNTY, N. J., 300 tons, Wading River bridge.
ATLANTA, GA., 800 tons, Mitchell Street viaduct.
SPRINGFIELD, ILL., tonnage not stated, highway bridges.
CHICAGO, 600 tons, two public schools.
CHICAGO, 150 tons, office building at Sixty-third Street and Maryland Avenue.
HIGHLAND PARK, ILL., 200 tons, elevated water tank.
MENASHA, WIS., 300 tons, Tayco Street bridge; general contract let to Greiling Engineering Co., Green Bay, Wis.
MILWAUKEE, 125 tons, municipal fire department repair shop; Milwaukee Structural Steel Co., low bidder.
OMAHA, NEB., 600 tons, Joslyn memorial building.

west Steel Rolling Mills and Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1200 tons, terminal warehouse for Lehigh Valley Railroad at 144th Street and Girard Avenue; Barney-Ahlers Construction Corporation, general contractor.
RAVENA, N. Y., 350 tons, work for city water department.
PORTSMOUTH, OHIO, 1000 tons, municipal reservoir.
CHICAGO, 1200 tons, building for Produce Terminal & Cold Storage Co.
CHICAGO, 500 tons, two public schools.
ST. LOUIS, 500 tons; hotel at Eighth and Market Streets, 300 tons; fruit house for Wabash Railway, 200 tons.

German Steam Boiler Business Poor

The business situation in the German steam boiler and apparatus industry, according to United States Trade Commissioner James E. Wallis, Jr., Berlin, was not generally prosperous during the first quarter of 1928. Boiler tube manufacturers report a decrease in orders both from at home and abroad, amounting to about 20 per cent, as compared with last year's average. The steam boiler apparatus makers appear to have been hit hardest, as the orders received during the first quarter of 1928 amount to only 50 per cent of those secured during the last quarter of 1927.

Exports of boiler apparatus have shown no improvement and there seems to be no indication of any immediate improvement as a whole.

PERSONAL

F. E. VIGOR has been appointed assistant works manager of the Ashland, Ky., division of the American Rolling Mill Co. For a number of years he has been assistant traffic manager, located at Middletown, Ohio.



F. E. VIGOR

D. S. MAIR, for 17 years manager of the Houston, Tex., office of Joseph T. Ryerson & Son, Inc., Chicago, has gone into business for himself under the name of the D. S. Mair Machinery Co., with offices at 505 Esperson Building, Houston. He will handle the complete line of bolt and pipe threading machines and Victor taps of the Landis Machine Co., Waynesboro, Pa., and the machine tool line of the Ryerson company.

EDWIN R. WEGENER has been appointed general manager of the Detroit Forging Co., Detroit, maker of drop forgings. For the last 16 years he has been identified with the steel and forging division of the Ford Motor Co.

JULIUS F. STONE has been named president; Julius F. Stone, Jr., vice-president; J. C. Dunn, vice-president and treasurer, and Frederick Mitchell, secretary, of the Chisholm-Moore Hoist Corporation, Cleveland, which was formed recently following the purchase of the Chisholm-Moore Mfg. Co. by the Columbus McKinnon Chain Co., Tonawanda, N. Y. These men and A. L. McKinnon will constitute the new corporation's board of directors, and John R. Mears will continue as sales manager.

FRANK C. NICHOLS, vice-president of the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has sailed for England on a business trip.

CHARLES M. POND, manager of the small tool and gage department of

the Pratt & Whitney Mfg. Co., Hartford, Conn., last week completed 25 years' service with the company.

H. W. FERNALD has severed his connection with the Boston office of Rogers, Brown & Crocker Brothers, Inc., and with Mrs. Fernald has started for the Pacific Coast for a 60-day trip. They will return via the Panama Canal. Donald R. Simonds has resigned as sales representative of the Eastern Malleable Iron Co., to succeed Mr. Fernald. Mr. Simonds formerly was associated with Read, Fears & Miller, Inc., and other Boston pig iron firms.

CARL F. WEIBLEN, formerly manager at Cleveland for the G. H. Williams Co., and previously a member of the home office organization at Erie, Pa., has been appointed Chicago manager. He replaces R. B. Randall, who is to be Pacific Coast manager for the Link-Belt Co., with headquarters at San Francisco.

CARL R. ENGLISH, formerly storekeeper and purchasing agent for the Todd Dry Docks, Inc., Seattle, has been appointed purchasing agent for the Pacific Coast Cement Co., Pacific Coast Coal Co., Pacific Coast Engineering Co., and Pacific Coast Steamship Co., all affiliated interests, with headquarters at Seattle.

JOHN C. WILLIAMS, vice-president and general manager Weirton Steel Co., Weirton, W. Va., accompanied by Mrs. Williams, will sail for Europe on the Berengaria, July 16.

JOHN L. COLLINS, who has been in charge of the coal and coke division, Pittsburgh office, M. A. Hanna Co., has been transferred to the company's general offices in Cleveland. He has been succeeded at Pittsburgh by Charles R. Keenan.

F. W. SAMPSON has been appointed engineer in charge of the shock absorber division of the Continental Motors Corporation, Detroit. He has been a member of the company's engineering staff for four years.

A. W. LEWIS has been appointed acting resident manager in charge of the Cleveland works and sales office of the United States Cast Iron Pipe & Foundry Co., Burlington, N. J.

IRA J. OWEN has established himself as a consulting mechanical engineer, specializing in industrial surveys, to stress the engineering viewpoint in place of relying upon the balance sheet. He has offices at 400 First National Bank Building, Chi-

cago. He is a graduate in mechanical engineering from Cornell University and is a member of the American Society of Mechanical Engineers and of the Western Society of Engineers.

JOHN S. LATTI, for many years manager of the Philadelphia branch of the Manhattan Rubber Mfg. Co., Passaic, N. J., has resigned and has been succeeded by David Newhall. Headquarters remain at 2132 Market Street.

MURRAY J. LAIRD has been made president of the Carpenter-Tew Gear Co., Inc., Brooklyn, succeeding W. H. Tew, who has resigned following a reorganization of the company. M. V. Tighe is now vice-president of the company, and J. L. Hannigan, secretary and treasurer.

C. S. PROUDFOOT, general manager Vanadium Corporation of America, Niagara Falls, N. Y., whose election as president of the Association of Iron and Steel Electrical Engineers was announced in THE IRON AGE last



C. S. PROUDFOOT

week, was one of the pioneers in steel mill electrification 35 years ago. He was largely responsible for the blast furnace bell-operated rig which later helped him in a large degree to make possible the automatic blast furnace now in operation at the Bethlehem Steel Co. plant at Johnstown, Pa. He was associated with A. C. Dinkey at Homestead, in the early nineties and with A. A. Corey at Johnstown in 1918 as electrical engineer of the Bethlehem Steel Co., from which position he resigned to become general manager of the Vanadium corporation. Mr. Proudfoot has been an active member of the Association of Iron and Steel Electrical Engineers for the past 20 years.

W. ROACH, for the last 10 years identified with the American Brass Co., most recently as manager of the sales promotion department at its Buffalo branch, has been appointed assistant sales manager of the mill products division, Mueller Brass Co.,

Port Huron, Mich. Before going with the American company, he was employed in the manufacturing departments of Dodge Brothers, Inc., Detroit.

JOHN S. SAMMONS, for the last two and a half years sales manager of the Beardsley & Piper Co., Chicago, has been appointed general manager of the American Foundry Equipment Co., Mishawaka, Ind. He was born at London, Ont., in 1890, and after attending grammar school at Rockford, Ill., began work with the Andrews Iron & Wire Works, Rockford. In recent years he has served several companies in sales and executive capacities.

E. R. ANDERSON, formerly identified with the Chicago office of the Hendey Machine Co., Torrington, Conn., has joined the sales organization of the Stocker-Rumely-Wachs Co., Chicago, dealer in machine tools.

F. H. LUCAS, formerly assistant manager in the Detroit office, American Bridge Co., has been appointed contracting engineer at Chicago for the McClintic-Marshall Co.

E. J. PAULUS has been appointed manager of the Chicago district for the McClintic-Marshall Co. Mr. Paulus was engineer of construction for the company of the Detroit River bridge.

E. N. MATTSON has been appointed sales manager in the Chicago office of the American Cast Iron Pipe Co., Birmingham, succeeding D. W. Wallace, who has taken charge of the Minneapolis office of that company.

J. J. SEAVER, formerly vice-president of Arthur G. McKee & Co., Cleveland, has become associated with H. A. Brassert & Co., Chicago engineers, as vice-president.

The Interstate Commerce Commission has postponed from July 8 to July 14 the effective date of its decision in the Consolidated Southwestern cases. On June 21 the commission issued an order denying a petition of the Southwestern Pipe Consumers' Committee to reopen the case so far as it related to the new rates provided on wrought iron and steel pipe. The committee has again petitioned the commission, asking that it reconsider the order.

The Aluminum Co. of America, Pittsburgh, has commenced the manufacture of barium and zinc fluorides, which find an increasing use in the enamel, glass, tile and brick trades. Charles Hardy, Inc., of 100 East Forty-second Street, New York, has been appointed distributing agent in the United States for these products.

OBITUARY

CHARLES MACDONALD, one of the country's best known bridge engineers, president of the American Society of Civil Engineers 20 years ago, and the second president of the Engineers Club, New York, died July 8, near Gananoque, Ont., aged 91 years. In 1890 he helped organize the American Bridge Co., of which he was vice-president until it was absorbed by the United States Steel Corporation.

FREDERICK P. REINHART, treasurer Standard Screw Products Co., Detroit, died at the Ford Hospital in that city on June 29 after a brief illness. He was born in Pittsburgh 45 years ago. Before going with the Standard company 14 years ago he was associated for a time with the Hamilton Iron & Steel Works, Hamilton, Ont.

HERBERT LLOYD, chairman Electric Storage Battery Co., Philadelphia, died in that city on July 3, aged 66 years. Prior to his partial retirement on account of ill health last year, he had been president of the Storage Battery company for 20 years. Mr. Lloyd was born in Wales and came to this country in early life

to take up post-graduate work in chemistry.

GERARD T. VAN SCHAICK, president of the Universal Railway Supply Co., Chicago, was killed, July 8, in an automobile accident near his summer home on Eagle River, Wis.

SAMUEL L. AYR, automotive engineer, died at his home in Detroit on July 4. He was born in Scotland 49 years ago and was graduated from the Glasgow Technical College as a mechanical engineer. When he was about 25 years old Mr. Ayr came to America and settled in Detroit, where he entered the employ of the Packard Motor Car Co. Leaving the Packard organization he went with the Automatic Transportation Co., Buffalo, and later had been an engineer on the Detroit staff of General Motors Corporation.

E. J. REMENSNYDER, who has been assistant purchasing agent of the Pennsylvania Railroad for many years, died at the Oliver Baird Hospital, Philadelphia, June 28, aged 44 years.

Standard Pound One Century Old

By act of Congress May 19, 1828, the Troy pound was adopted as standard by the United States Mint. To quote from the act: "The brass pound weight, procured by the Ministry of the United States at London in 1827, for the use of the Mint, and now in the custody of the Mint in Philadelphia, shall be the standard Troy pound of the Mint of the United States, conformably to which the coinage thereof shall be regulated."

Although that Troy pound was officially made the standard for coinage only, it became in effect the primary standard of the United States for all purposes, according to a statement in the Monthly News Bulletin of the Department of Commerce. The avoirdupois pound was derived from it through the relation of 7000 grains making a pound avoirdupois, against 5760 of the same size grains making a Troy pound. In 1911 the Troy pound of the Mint was superseded by the Troy pound of the Bureau of Standards, but this involved no change in value.

Bituminous coal raised in the first half of the year is reported by the United States Bureau of Mines at 234,280,000 net tons. This compares with 276,410,000 tons in the first half of 1927 and, with the exception of 1925, was the lowest total in the first half of any year since 1922.

Government Steel Industry in South Africa

The South African Iron & Steel Industrial Corporation, Ltd., was created by an act recently passed by the Parliament of the Union of South Africa. The authorized capital stock is £3,500,000, of which 500,000 "A" shares of £1 each will be subscribed by the Governor-General and 3,000,000 "B" shares of £1 are to be offered for subscription by the public. The A shares are to be paid for from funds to be appropriated by Parliament. The board of directors will consist of seven members, of which four will be appointed by the Governor-General and three by private shareholders. The Governor-General will designate the chairman of the board and the managing director.

The act also provides that the Railways and Harbours Administration shall contract with the new corporation for iron and steel that it may require.

Production of electric power by public utility power plants in the United States in May is reported by the Geological Survey at 7121 millions of kwhr. This compares with 6853 in April and with 7246 in March. The May total produced by water-power was considerably larger than in April or March, having aggregated nearly 45 per cent of the total output, against 39 per cent in March and 43 per cent in April.

Dullness Features European Markets

French Costs Rise with Franc Stabilization—Belgian Back-Logs Shrink—Russian Output Higher

(By Cable)

LONDON, ENGLAND, July 9.

PIG iron continues dull and output further has been restricted by damping one Midland furnace. Cleveland makers are seeking fresh orders, but consumers are not contracting for forward needs at present prices. Hematite iron is weak on continued absence of demand and heavy stocks despite limited output.

Foreign ore is quiet. Some non-union Swedish miners returned, but there are few signs of any definite end to the strike.

Finished steel is dull in the heavy lines, but moderately active in some other departments, particularly bolts, nuts and rivets.

Export demand for heavy material

is virtually idle, Scottish works closing for the Glasgow Fair at the end of the current week. Robert Hyde of Sheffield is moving works to Stoke, as being more convenient.

Continental iron and steel also is quiet, but the price position is unaffected by Antwerp dock strike, which, it was hoped, would terminate this week.

Tin plates are quiet on the recent fall in tin. Consumers are withholding, but makers are well sold. Forward business is done at 18s. 3d. and prompt at 18s. 6d., both on the basis of IC plates, base box, f.o.b. works port.

Galvanized sheets are moderately active in small parcels. Black sheets are quiet.

It will, however, permit greater security in transactions and should tend to reduce the rate of interest.

Pig Iron.—A total of 35,000 tons of phosphoric foundry iron has been placed at the disposal of domestic foundries for July, 3000 tons less than in June. The supply of hematite iron for domestic users in July has been reduced to 35,000 tons, a decline of 5000 tons from the June figure. To offset the reports that stabilization of the franc would result in higher pig iron prices, it has been announced that the price of foundry iron will be maintained unchanged for three months, until the end of September. Should this method of establishing a price for three-month periods prove satisfactory, it may be continued in the future. The present quotation is 440 fr. (\$17.25) per ton, f.o.b. Longwy, for No. 3 foundry grade. The entente of French, Belgian and Luxemburg producers of pig iron has decided to place 30,000 tons of phosphoric iron at the disposal of Belgium during August and September, and the association will maintain its export prices, except on shipments to Italy, which will carry an increase of 1s. (24c.) per ton.

Semi-Finished Material.—An advance in semi-finished material and beams of 20 to 25 fr. (78c. to 97c.) per ton is contemplated, but the Comptoir Siderurgique has announced that no change in prices will be made for the next month. In the domestic

Costs Up with Stable Franc

More Accurate Cost Figuring Expected—New Taxes Have Awaited Stabilization

PARIS, FRANCE, June 26.—Stabilization of the franc on the basis of one-fifth of its pre-war value has brought up the question of its influence on prices. It is expected that costs will increase to some extent, as, with the franc on a gold basis, French producers will more accurately determine depreciation, in proportion to the

new valuation of their plants. There will also be the additional cost of new social legislation, such as the insurance act, which had been postponed until stabilization of the currency was completed.

The valuation of the franc, as stabilized, is at practically the same level as during the past 12 to 18 months.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.87 per £ as follows:

	£0 17½s. to £0 18s.	\$4.27 to \$4.38
Durham coke, del'd.	1 2½	5.48
Bilbao Rubio ore	3 8½ to 3 9½	16.68 to 16.92
Cleveland No. 1 fdy.	3 6	16.07
Cleveland No. 3 fdy.	3 5	15.83
Cleveland No. 4 fdy.	3 4½	15.71
Cleveland No. 4 forge.	3 5	15.83
Cleveland basic (nom.)	3 8 to 3 9	16.56 to 16.80
East Coast mixed.	3 10½	17.17
East Coast hematite.	7 15 to 8 5	37.75 to 40.18
Rails, 60 lb. and up.	6 5 to 6 15	30.44 to 32.88
Billets	13 15	66.97
Ferromanganese	13 0 to 13 5	63.31 to 64.53
Ferromanganese (export)	6 0	29.22
Sheet and tin plate bars, Welsh	0 18¼ to 0 18½	4.44 to 4.50
Tin plate, base box.	13 7½	65.14
Black sheets, Japanese specifications		C. per Lb.
Ship plates	7 12½ to 8 2½	1.66 to 1.77
Boiler plates	9 0 to 10 10	1.95 to 2.28
Tees	8 2½ to 8 12½	1.77 to 1.99
Channels	7 7½ to 7 17½	1.60 to 1.71
Beams	7 2½ to 7 12½	1.55 to 1.66
Round bars, ¾ to 3 in.	7 5 to 7 15	1.58 to 1.69
Steel hoops	9 0 to 10 0	1.95 to 2.17
Black sheets, 24 gage.	9 15 to 10 0	2.12 to 2.17
Gal. sheets, 24 gage.	13 10	2.93
Cold rolled steel strip, 20 gage, nom.	16 0	3.48

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

	(Per Metric Ton)	
Foundry pig iron (a):		
Belgium	£3 3s. to £3 5s.	\$15.34 to \$15.83
France	3 3 to 3 5	15.34 to 15.83
Luxemburg	3 3 to 3 5	15.34 to 15.83
Basic pig iron (nom.):		
Belgium	3 1 to 3 2	14.85 to 15.09
France	3 1 to 3 2	14.85 to 15.09
Luxemburg	3 1 to 3 2	14.85 to 15.09
Coke	0 18	4.39
Billets:		
Belgium	4 15	23.14
France	4 15	23.14
Merchant bars:		
Belgium	5 13½ to 5 14	1.23 to 1.26
France	5 13½ to 5 14	1.23 to 1.26
Luxemburg	5 13½ to 5 14	1.23 to 1.26
Joists (beams):		
Belgium	4 17½ to 4 18	1.06 to 1.07
France	4 17½ to 4 18	1.06 to 1.07
Luxemburg	4 17½ to 4 18	1.06 to 1.07
Angles:		
Belgium	5 10 to 5 12½	1.21 to 1.23
½-in. plate:		
Belgium (a)	6 11	1.44
Germany (a)	6 11	1.44
¾-in. ship plate:		
Belgium	6 7	1.40
Luxemburg	6 7	1.40
Sheets, heavy:		
Belgium	6 1	1.34
Germany	6 1	1.34

(a) Nominal.

market blooms are quoted at 535 fr. (\$20.97) per ton, billets at 565 fr. (\$22.15) per ton and sheet bars at 600 fr. (\$23.52) per ton, all f.o.b. Thionville.

Finished Material.—Mills are still well booked with orders and in most cases are asking three to four months to make deliveries. Business from foreign markets and the French colonies is in good volume, and mills are expecting some sizable orders for Navy construction work and from the railroads. For export, steel bars have receded from the maximum of £5 15s. to £5 16s. per ton (1.27c. to 1.28c. per

lb.), the market a fortnight ago, to about £5 13s. 6d. per ton (1.25c. per lb.). Competition for hoop orders is keen, with quotations slightly higher than on other products. Sheet prices in the export market have begun to sag, but there is still a fair domestic demand. Deliveries range from two to three months. Prices of wire rods in the domestic market are to be advanced, Aug. 1, 25 fr. (97c.) per ton for both basic, Bessemer and open-hearth grades, the new quotations being 825 fr. (\$32.34) per ton for basic and 945 fr. (\$37.04) for open-hearth rods.

Belgian Market Weaker

Pressure by Exporters Has Brought Price Decline—Deliveries Shorten

ANTWERP, BELGIUM, June 22.—Following a period of decided firmness, the steel market has begun to show weakness. Mills are apparently well booked, but buyers are beginning to doubt that unfilled tonnages of most makers are as large as was previously believed. As a result, consumers are pressing for concessions and the market has a downward trend. Exporters have contributed to weakness of prices by accepting foreign business below mill prices and then offering firm orders at lower figures. Price instability has extended to domestic business. However, foreign trade continues fair and is improving, especially with southern China. At the same time, German mills are showing less interest in export business and some are practically out of the market.

A strike of dock workers at Antwerp has been an obstacle to the normal flow of export shipments, and sellers are having considerable difficulty in making deliveries, which are long overdue.

Pig Iron.—Domestic demand continues fair and there is a small volume of export business. No. 3 phosphoric foundry iron is quoted at about 580 fr. (\$16.40) per metric ton to domestic users and continues at about £3 2s. 6d. (\$15.40) per ton, f.o.b. Antwerp, for export. French competition in Thomas grade iron is keen, and prices are slightly weaker. Bessemer hematite iron is still in competition with the British product, and the market is about \$18.45 per ton, f.o.b. furnace.

Semi-Finished Material.—Blooms are still moderately firm and available supplies are small, but mills are seeking orders for billets and the market on sheet bars is depressed, with prices weak. Blooms range from £4 6s. (\$21.10) per ton for 8-in. to £4 12s. (\$22.55) for 4-in. Billets are quoted at £4 13s. (\$22.80) per ton for 3-in. and £4 15s. (\$23.30) for 2-in. Sheet bars are about £4 16s. (\$23.50) per ton, f.o.b. Antwerp.

Finished Material.—Buyers are beginning to doubt that mills have been

as well booked as previously reported, and pressure for concessions has been partially successful. Much earlier deliveries are being offered by makers than could be obtained a fortnight or more ago. Steel bars are offered quite freely at £5 14s. to £5 15s. per ton (1.26c. to 1.27c. per lb.), and as low as £5 13s. 6d. per ton (1.25c. per lb.) is obtainable on a desirable bar specification. Other steel products show the same tendency toward weakness, except wire rods, the price of which is unchanged. Beams are quoted at £4 18s. per ton (1.08c. per lb.), and corrugated bars at £5 17s. per ton (1.29c. per lb.). Hot-rolled steel hoops are £6 15s. per ton (1.49c. per lb.), all f.o.b. Antwerp. Sheet prices show slightly less weakness than other products, and French competition is still evident, but not as a serious factor.

Decline in French Exports, Increase in Imports

Exports of iron and steel products from France during the first quarter of 1928 totaled 1,441,477 metric tons, against 1,494,596 tons during the corresponding period of last year, while imports were 44,624 tons and 34,448 tons respectively, according to report received by the Department of Commerce from the assistant commercial attaché at Paris. In exports, pig iron showed a 20 per cent decline in the first quarter of this year, to 164,545 tons from 217,562 tons during the corresponding period of last year; blooms, billets and bars decreased 5 per cent, to 726,153 tons from 762,036 tons; structural material declined 30 per cent, to 48,659 tons from 65,517 tons; rails declined 7 per cent, to 85,248 tons from 91,161 tons. Cut sheets increased almost 85 per cent, to 32,806 tons from 17,997 tons; hot-rolled hoop iron and steel increased 45 per cent, to 35,600 tons from 22,849 tons, and machine iron or steel increased 30 per cent, to 60,515 tons from 46,982 tons. Iron ore exports increased 20 per cent, to 4,159,822 tons from 3,403,028 tons. The greatest increase in imports

during the first quarter of 1928 over the corresponding period of 1927 was made in pig iron, the totals being 12,140 tons and 5419 tons respectively.

Although the total iron and steel exports during the first quarter of 1928 were slightly less than in the corresponding period of the previous year, at the beginning of 1927 there was a heavy carry-over of orders accumulated in the fall of 1926 as a result of the British coal strike, which diverted many orders to the Continent. The fact that the sales abroad in the early part of 1928 nearly approximated the abnormal conditions in the first part of 1927 is taken to indicate that the French iron and steel industry is finding demand heavier, both at home and abroad.

Germany to Produce Aluminum Sheets Next Year

HAMBURG, GERMANY, June 23.—According to latest reports, the sheet mill being constructed by the Stahlwerke Hoesch of Dortmund at Stockheide will be ready for operation about January, 1929. The new mills will produce aluminum-plated sheets under the "Feran" process, which will be offered in competition with tin plate. Thus far the Hoesch interests have refused to give licenses for the use of the process in foreign countries.

Japan Places Cable Order in Germany

HAMBURG, GERMANY, June 23.—An order for 90 miles of deep sea cable has been booked by the German cable manufacturers, Felten & Guillaume of Cologne, from the Japanese Government. Other recent orders booked by these makers have included a cable from Denmark to Sweden, one from Sweden to Germany and a large order from Italy for a Mediterranean cable.

Brazilian Imports Increase Heavily in 1927

WASHINGTON, July 10.—Imports of iron and steel products into the Brazilian port of Santos in 1927 aggregated 206,805 metric tons as against 155,103 tons in 1926, a gain of 51,702 tons, according to the Department of Commerce. The principal suppliers of this trade were Belgium, with 42 per cent of the 1927 total, compared with 43.5 per cent of the 1926 imports; the United States, with 24.3 per cent against 22.9 per cent; Great Britain, with 17.9 per cent compared with 8.9 per cent; and Germany, with 4.6 per cent against 7.1 per cent. Countries not listed supplied 10.6 per cent of the 1927 total, against 17.6 per cent of the 1926 total.

Seven classes of commodities combined in 1927 to constitute nearly 75 per cent of the total imported, rails and accessories leading with 46,956

tons, against 51,602 tons in 1926. Other leading items of importation in 1927 were black sheets and plates, 29,192 tons; cast iron pipe, 22,996 tons; bars and bar mill shapes, 22,221 tons; barbed wire and staples, 15,279 tons; steel tubes, 12,465 tons, and galvanized and other wire, 10,049 tons.

The United States supplied 51.4 per cent of the total imports of rails and accessories, Great Britain supplied 74 per cent of the imports of black sheets and plates. Belgium was credited with 82 per cent of the imports of cast iron pipe, 72 per cent of the

bars and bar mill shapes, and nearly 52 per cent of the imports of barbed wire; the United States supplied 29.3 per cent and Germany 10.7 per cent of the last-named product.

Sources of Imports of Iron and Steel Products Through Santos, Brazil, in 1926 and 1927

Country	1926 Metric Tons	1927 Metric Tons
Belgium	67,600	88,237
Germany	10,926	9,515
Great Britain ...	13,715	36,937
United States ...	35,533	50,184
All other countries	27,329	21,932
Total	155,103	206,805

Russian Steel Output Expands

Large Part of Proposed Expenditures on Industry Are in Steel Plants—Volga Bridge Planned

MOSCOW, RUSSIA, June 22.—Although the program for iron and steel production in the fiscal year 1927 to 1928 was not in all cases fulfilled, Russia's output in the first half of the year was considerably larger than in the corresponding period of the fiscal year 1926 to 1927. From last Oct. 1 to March 31 of this year pig iron output totaled 1,851,100 metric tons, compared with 1,473,450 tons in the first half of the previous business year. Steel ingot production was 2,406,200 metric tons, compared with 1,766,500 tons in the same period of the previous business year, and output of rolled products was 1,908,700 metric tons, compared with 1,343,550 tons.

The program of the Soviet Government for the business year beginning in October, 1928, and ending in October, 1929, calls for a total capital investment in metallurgical development of 490,000,000 rubles, out of a total of 1,752,000,000 rubles to be expended in all industry. The Council of Economy complains of high prices for steel and, particularly, of increased costs of railroad rolling stock. Actually, metal prices are only 71 per cent higher than before the war, according to the official price index,

while the general index is 188. Steel prices are relatively dear, however, in view of the fact that German steel prices are only about 27 per cent higher than the pre-war level.

Construction work in prospect includes shortening and straightening a new central Asian railroad, which joins the Siberian with the old central Asian railroad. It has also been decided to build a new railroad bridge across the Volga River at Kostroma at a cost, including approaches, of about 8,000,000 rubles (\$4,000,000).

Coal production in the business half-year just completed showed a decline, according to Government reports, but continued about 15 per cent greater than in the corresponding previous half-year. The coal program for the current business year, 1927 to 1928, has been set at 37,000,000 metric tons, in keeping with a plan to gradually increase output to about 69,000,000 tons in 1932 to 1933. It is planned to sink 24 new mines, and existing mines are to be almost entirely electrified and equipped with modern machinery. The proposed total investment in the next five years is placed at 900,000,000 rubles, of which 210,000,000 rubles is for construction of miners' dwellings.

Export Trade in Fair Volume

Tin Plate and Rails Bought by Japan—Steel Importers Here Protest New Shape Duty

NEW YORK, July 10.—Export business is confined mainly to orders for small lots of material. Demand for barbed wire from South America continues good, and a fair tonnage of tin plate seconds is moving to Japanese and Chinese consumers. The Kioto Oil Co. in Japan, which inquired recently for about 12,000 base boxes of oil can tin plate and was reported to have closed on 3000 boxes a week ago, has also placed 4000 boxes of primes with a large Japanese export house and 1500 boxes of primes and 4000 boxes of seconds with another Japanese exporter, bringing the total purchase of primes and seconds to 12,500 base boxes.

There is very little business in the market for light-gage black sheets, except for occasional purchases by Japanese consumers willing to pay a premium for the American product. A large Japanese galvanizing plant, which produces a special brand of light-gage galvanized sheet, has placed its usual requirements of 5000 tons of black sheets, of which 3000 tons went to an American maker and 2000 tons to British and Continental mills. Export prices on light-gage black sheets continue at about \$76 per

ton for American sheets and \$73.50 per ton for the British product.

The only rail business that has been in the market from the Far East is about 9 miles of 91-lb. and 100-lb. sections for Tokio municipality, which has been awarded to a large American maker by one of the leading Japanese exporters.

Importers Want New Duty Postponed

A brief filed with the United States Treasury Department by importers of steel who are affected by the ruling that bar mill sizes of channels, angles and tees are dutiable as bars points out that they were not given an opportunity to present their case prior to the decision and, with only 30 days from the time of publication allowed before the new duty goes into effect, they are likely to suffer considerable loss on business taken on the basis of the former rate. The brief filed by the importers points out that the paragraph on structural shapes adequately covers the bar mill sizes of 3 in. and smaller. The further claim is made that larger than 3-in. shapes can be rolled on a bar mill and one domestic mill produces such shapes.

Time Extension Requested

In addition to the protest against any change in the classification of this material, the importers request an extension of four months in the time allowed before the application of the new duty, to permit the clearance of orders to which they were previously committed. The present strike of dock workers in Antwerp is given as one reason for a delay, as it is claimed that many shipments which would have normally been delivered by this time have been delayed by the strike.

Application of the bar classification to bar mill sizes of channels, angles and tees will particularly affect importers with orders for furring channels. Under the structural paragraph of the tariff the duty amounts to 20c. per 100 lb. regardless of cost, but under the bar paragraph the duty is 30c. per 100 lb. on material costing less than 1.50c. per lb. at the mill and 50c. per 100 lb. on material costing more than 1.50c. at the mill. Furring channels cost about \$36 per ton, f.o.b. mill, or about 1.60c. per lb., and would be subject to the duty of 50c. per 100 lb.

Germans Offer Corrugated Sheets for Export

HAMBURG, GERMANY, June 23.—Mills are renewing their efforts to establish an export trade in corrugated galvanized sheets, and a few orders have been booked for shipment to consumers in Mediterranean and northern European countries, to which water freight rates are in many cases cheaper than from British ports. This helps to offset the lower price of British sellers. The minimum quotation by German makers is about £13 12s. 6d. (\$66.36) per ton, f.o.b. port.

Machinery Markets and News of the Works

Implement Makers Continue Buying

Wright Aeronautical and General Electric Purchases Also Contribute
to Fair Rate of Activity—Louisville & Nashville Railroad
Preparing Sizable List

PURCHASES by farm implement makers and builders of tractors, and also by the Wright Aeronautical Corporation and the General Electric Co., were outstanding in the machine tool business the first ten days of July. Continued buying by the implement and tractor industries is expected, programs of machine tool needs for production schedules for the opening of 1929 being in progress.

Bookings in almost all territories have held up fairly well, with something of a spurt in the Cleveland district.

The combined purchases of the Wright and General Electric companies will total large. The Wright company, in preparing to occupy an addition to its plant, is planning for a production of 250 airplane engines per month, which is more than double its present output. Production of 500 engines a month is the plan in connection with the completion of a second addition to the plant. Purchases by the General Electric Co. are for its refrigerating machinery department and a number of machine tools have already been bought.

Buying by the automotive industry has been light, although there has been some demand from makers of parts in the Cleveland and Detroit districts.

Railroad inquiry includes a few machines for the Rock Island and the Chicago & North Western. The Louisville & Nashville is said to be preparing a sizable list for shops at Mobile, Ala. The Illinois Central is asking for prices on the rebuilding of a number of old lathes. The Boston & Albany has closed on most of its list of 25 or more tools.

The Timken Roller Bearing Co., Canton, Ohio, has issued a small list of machine tools for use in its maintenance department.

Some of the fair sized sales of the week were: 15 engine lathes to a Middle West manufacturer, 10 presses and drilling machines to the National Acme Co., Cleveland, 10 automatic screw machines to the Gairing Tool Co., Detroit, and seven turret lathes to the Fulton Syphon Co., Knoxville, Tenn.

New York

NEW YORK, July 10.

LARGE purchases by the General Electric Co., Schenectady, and the Wright Aeronautical Corporation, Paterson, N. J., featured machine tool business of the first 10 days of July. Otherwise the market was rather dull, presumably because of the mid-week holiday. June volume, however, was good; in the case of one important dealer it was the largest June business since 1920. The General Electric Co. is buying for its refrigerating machinery department, its orders to date covering a considerable number of Acme and Brown & Sharpe automatic screw machines and Bliss presses and other miscellaneous tools. Fresh inquiries from this company have also been sent out, the latest asking for prices on four turret lathes, three radial drills, an engine lathe and a threading machine.

Wright Aeronautical Corporation, which is about to occupy a new unit added to its plant, is buying a large lot of equipment to carry out a production program of 250 airplane engines a month, more than doubling its present capacity. Original plan was to equip for 500 engines a month, but the remainder of this expansion will be deferred pending completion of a second plant addition. Combined purchases of General Electric Co.

and Wright Aeronautical Corporation will run into hundreds of thousands of dollars. Railroad buying is at a minimum, but a sale of a locomotive axle journal turning lathe to a Western road is reported.

Plans have been approved by Union Bag & Paper Corporation, Woolworth Building, New York, for new mill at Vancouver, Wash., to cost approximately \$250,000 with equipment, scheduled for

completion in December. Columbia River Paper Mills, Vancouver, will furnish considerable paper stock for new plant and will carry out an expansion program to cost close to \$150,000, including additional machinery.

Sylvestre Oil Co., Inc., Mount Vernon, N. Y., has purchased property on Newton Creek, New York, and plans early construction of new storage and distributing plant with capacity of 2,500,000 gal. A stock issue to total \$250,000 is being sold, larger part of proceeds to be used for project.

Beam O'Lite Sign Co., New York, manufacturer of electric signs, etc., has leased space in building at 981 Eighth Avenue, for new local plant.

Levine & Wipkin, 11 West Forty-second Street, architects, have plans for a three-story automobile service, repair and garage building to cost in excess of \$150,000 with equipment.

Long Island Motor Corporation, Long Island City, has leased a new one-story building on Sunswick Street for a service, repair and garage unit, including machine and parts departments.

Edward Purvis & Son, York and Jay Streets, Brooklyn, manufacturers of mechanical equipment, have acquired plant of Bucyrus Road Machinery Co., Bucyrus, Ohio, bankrupt, which has been idle for about five years, for a price of \$52,500, and will take possession at once. Works will be remodeled for production of air compressors, engines and kindred equipment.

Ovens, power equipment, conveying machinery and other equipment will be installed in new three-story plant to be erected by Cushman's Sons, Inc., 1819 Broadway, New York, at White Plains, N. Y., to cost about \$350,000. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects.

J. F. Perrine, 31-35 Buell Street, East Elmhurst, L. I., architect, has plans for a one-story automobile service, repair and garage building, 100 x 200 ft., to cost \$100,000 with equipment.

Board of Education, Pelham, N. Y., contemplates installation of manual training equipment in addition to Memorial High School, Pelham Manor, to cost in excess of \$400,000. Charles M. Hart, Pelham Manor, is architect.

John A. Panzer, operating an automobile service and garage building at 1045 Bay Street, St. George, S. I., New York, has formed Lexington Garage & Auto Parts Co. New organization has acquired

The Crane Market

NEW inquiry for locomotive and overhead cranes has been light, but there is some good business pending, particularly in the export field. Bids have been submitted on overhead traveling cranes for South Africa and Turkey and on locomotive cranes and steam shovels for shipment to Argentina, Turkey, Persia and South America construction projects. Action on the list of locomotive cranes and steam shovels inquired for by Dwight

P. Robinson & Co., New York, for export to Buenos Aires, Argentina, is expected about Aug. 1. The Galion Iron Works & Mfg. Co., Gallon, Ohio, is in the market for a used 5 to 7-ton, 75 to 90-ft. span overhead crane for yard service.

Among recent purchases are:

New Jersey Zinc Co., New York, 10-ton crawl-tread locomotive crane from Orton Crane & Shovel Corporation.

E. I. du Pont de Nemours & Co., chemical products division, Parlin, N. J., 25-ton, 8-wheel, locomotive crane from Orton Crane & Shovel Corporation.

International Railway Co., Buffalo, N. Y., 25-ton standard locomotive crane from unnamed builder.

General Electric Co., 15-ton overhead traveling crane from Niles Crane Corporation.

property on Pleasant Plains Boulevard, Tottenville, and plans construction of new main works, including repair and parts departments, to cost more than \$80,000.

Hale Desk Co., 7 East Forty-fourth Street, New York, has leased seven-story and basement building at 531-35 West Thirty-seventh Street, totaling 110,000 sq. ft. floor space, for new plant and will remove to new location.

New York Dock Co., 44 Whitehall Street, New York, has awarded general contract to White Construction Co., 95 Madison Avenue, for new multi-story factory and distributing plant at Brooklyn, totaling about 900,000 sq. ft. of floor space, to cost more than \$2,000,000 with equipment.

Wright Aeronautical Corporation, Railway Avenue, Paterson, N. J., has awarded general contract to John W. Ferguson Co., 152 Market Street, for two four-story additions, each about 300 ft. long, to cost in excess of \$600,000 with equipment.

Radio Tube Corporation, 88 Eighth Avenue, Newark, has taken out a permit for a new three-story plant, to cost \$75,000 with equipment. Siegler & Greenberg, 164 Market Street, are architects.

Air Marine-Klemm Corporation, recently organized by Ingliis M. Uppercu; head of Uppercu-Cadillac Corporation, 536 Broad Street, Newark, will take over a portion of plant of Aeromarine Plane & Motor Co., Keyport, N. J., for a new works for manufacture of low-powered monoplanes, including parts and assembling divisions, to be known as Klemm-Daimler airplane. Hans Klemm, designer, will be an official of new company, in charge of production.

Austin Furnace Co., 105 Avenue L, Newark, has filed plans for new storage and distributing plant to cost about \$175,000 with equipment.

United States Aircraft Co. of New Jersey, Inc., care of Joseph H. Edgar, 5 Elm Row, New Brunswick, N. J., recently formed by Condit S. Atkinson, Jr., Highland Park, N. J., and associates, with capital of \$125,000, plans operation of plant in this section for production of airplanes.

Jersey City Cadillac Co., 2401 Boulevard, Jersey City, N. J., local representative for Cadillac automobile, has awarded general contract to Billington & Son, 198 Fairmount Avenue, for two-story service, repair and garage building at North Bergen, N. J., to cost about \$125,000 with equipment. C. G. Eicholz, Jr., State Theater Building, Union City, N. J., is architect.

Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York, has purchased American Schaeffer & Budenberg Corporation, with plants at Brooklyn and Worcester, Mass., manufacturer of industrial recording instruments, and will consolidate business with that of Consoli-

dated Ashcroft Co., Inc., manufacturer of valves, indicating and recording instruments, which is controlled by Manning, Maxwell & Moore. Change in operation will take place at once.

New England

BOSTON, July 9.—The machine tool market in the territory the past week has been inactive, due in part to a large number of New England industrial plants taking inventory. The Boston & Albany Railroad is reported to have practically finished its purchases of a list of some 25 tools. Other business was confined for the most part to a few used tools for shops in the Boston district. The city of Boston has not yet closed on its Hyde Park district school machinery requirements and no definite information is had as to when purchases will be made. New inquiries continue scarce. Small tools are selling freely.

A report issued by Associated Industries of Massachusetts shows that metal working companies operated at 100.1 per cent of capacity in May, contrasted with 90.9 per cent in April and 96.8 per cent in May, 1927. A Government department report covering June operations shows a falling off in that month but because of incomplete data upon which a basis was made exact figures, in percentages, are withheld.

Worcester Taper Pin Co., Worcester, Mass., which recently absorbed Christianson Screw Co., Newton, Mass., is located at 9 May Street, Worcester. Thomas Crabtree is president and treasurer. Frank Calverly is superintendent and O. A. Jones sales manager.

Providence, R. I., has plans for a repair shop for its fire department to cost, without equipment, \$80,000.

Plans have been filed by Hartford Gas Co., Hartford, Conn., for one-story machine equipment building to cost \$60,000.

Millbury Steel Foundry Co., Millbury, Mass., is planning one-story addition, 60 x 100 ft., to be used primarily for power plant service, to cost close to \$50,000 with equipment.

American Thermos Bottle Co., Norwich, Conn., is planning for new unit to total about 42,000 sq. ft. floor space, to double present capacity, to cost more than \$100,000 with equipment.

Fellows Brass & Iron Foundry, Waterville, Me., has acquired former factory of Bent Bed Co., Medford, Mass., for new main plant and will remove to new location. Capacity will be increased.

Beaudette Mfg. Co., Crescent Avenue, Chelsea, Mass., manufacturer of radio equipment, has plans for two-story ad-

dition, to cost in excess of \$40,000 with machinery. Schein & Levine, 448 Broadway, are architects.

Meisel Press Mfg. Co., 944 Dorchester Avenue, Dorchester, Boston, manufacturer of printing presses, has awarded general contract to W. H. Bailey Co., 88 Broad Street, Boston, for one and two-story addition, 100 x 220 ft., to cost close to \$150,000 with equipment.

Maine Steel Products Co., South Portland, Me., recently organized, has taken over local plant and business of Marine Hardware Equipment Co., and plant and assets of Union Iron Works, Bangor, Me. A general expansion program will be carried out at both plants for increased output of snow plows and other snow removal machinery, as well as marine and affiliated hardware products. George C. Soule is head of new company.

City Building Department, City Hall, Providence, R. I., T. J. H. Pierce, city architect, is having plans drawn for a municipal repair and equipment shop to cost close to \$60,000.

Pittsburgh

PITTSBURGH, July 9.—Following recent purchase of plant and business of Zenith Aircraft Co., Scottdale, Pa., by Charles Semans, Uniontown, Pa., and associates, arrangements are being made for immediate removal of works to a building at last-noted place, where increased production facilities will be provided.

Harbison-Walker Refractories Co., Farmers Bank Building, Pittsburgh, has abandoned plans for present for construction of new plant on large tract recently acquired on Patapsco Avenue, Baltimore, to cost more than \$500,000, and project will be held in abeyance.

Keystone Sand & Supply Co., 302 Penn Avenue, Pittsburgh, has work under way on new sand and gravel handling and storage plant on South Third Street, to include a battery of 10 elevated steel bins, ground bins, conveying and loading equipment, and other handling apparatus; a boiler plant will be installed. Entire project is reported to cost more than \$125,000.

W. L. Mack of Erie Engine Works, Erie, Pa., manufacturer of stationary engines, parts, etc., is at head of new company, to be known as Thermal Unit Corporation, to operate a plant in vicinity of New York for manufacture of heat transmission equipment, including piping, tubing, etc. Walter A. Curtzo, Erie, is also interested in new organization.

United States Aluminum Co., New Kensington, Pa., is planning a one-story addition, to cost in excess of \$40,000 with equipment. E. S. Fickes is chief engineer, in charge.

Board of Allegheny County Commissioners, City-County Building, Pittsburgh, R. G. Woodside, in charge, is considering establishment of a new airport to cost more than \$500,000, including hangars, repair shops, oil storage and distributing works and other mechanical units.

Duquesne Light Co., 436 Sixth Avenue, Pittsburgh, will make extensions and improvements in station and system at Midland, Pa., to cost about \$25,000.

C. H. Mussleman Co., Biglerville, Pa., has acquired property at Ranson, W. Va., and plans early construction of new canning and evaporating plant, reported to cost more than \$50,000 with equipment.

Philadelphia

PHILADELPHIA, July 9.—Bids will be received by Day & Zimmermann Engineering & Construction Co., 1600 Walnut Street, Philadelphia, acting for Board of Trustees, Eastern State Penitentiary, until July 16 for gasoline-driven concrete mixers, non-tilting type, with power loading attachment and water tank, mounted on steel wheels, for penitentiary near Graterford, Pa.

Columbia Steel Equipment Co., Third and Annsbury Streets, Philadelphia, manufacturer of steel filing equipment, has awarded contract to Harry H. Wehmeyer, 509 West Cumberland Street, for a second story addition to factory unit, 66 x 75 ft.

Simon Kaplan, 243 South Sixty-second Street, Philadelphia, has filed plans for a four-story automobile service, repair and garage building, to cost about \$90,000 with equipment.

York Ice Machinery Co., Belmont and Thompson Streets, Philadelphia, manufacturer of ice-making and refrigerating equipment, with headquarters at York, Pa., will soon begin erection of new three-story and basement factory unit, to cost close to \$100,000 with equipment.

Universal Service Motors Co., Broad and Pine Streets, Philadelphia, has taken over property at Second and Sansom Streets, totaling about 15,000 sq. ft. ground space, and plans erection of seven-story service, repair and garage building, to cost about \$175,000 with equipment.

Well-Bilt Furniture Co., Philadelphia, has leased four-story factory at 337 North Second Street, totaling about 50,000 sq. ft. floor space, for new plant.

Edward H. Reuss, Jr., Thirtieth and Race Streets, Philadelphia, manufacturer of pipe, heating equipment, etc., and associates, have organized Philadelphia Steam Co., for which application for State charter will be made, to construct and operate a central steam power plant for heating service. Walter B. Reed and J. Percy Bell, care of Frank M. Hunter, Gibson Building, Chester, Pa., are interested in new company.

City Council, Beach Haven, N. J., has awarded general contract to Floyd L. Cranmer, Beach Haven, for addition to municipal electric light and power plant, to cost about \$50,000 with equipment. William H. Boardman is engineer, in charge.

Board of Education, Pleasantville, N. J., plans installation of manual training equipment in new three-story high school to cost \$635,000, for which revised plans have been approved and bids will be asked at once on general contract. S. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., is architect.

City Council, Reading, Pa., plans installation of pumping machinery and other power equipment in connection with

a 40,000,000-gal. mechanical filtration plant, to cost more than \$650,000.

Oliver United Filters, Inc., has been formed to take over and consolidate United Filters Corporation, Hazleton, Pa., and Oliver Continuous Filter Co., Oakland, Cal., manufacturers of industrial filters and filtering machinery. Both plants will be continued in service. New company will dispose of stock issue to total about \$2,600,000, a portion of fund to be used for expansion and betterments. E. J. Sweetland, formerly president of United company, will be chairman of board, and Edwin L. Oliver, president.

Lehigh Valley Cold Storage Co., Bethlehem, Pa., will make extensions and improvements in cold storage plant, including installation of new ice-manufacturing division, to cost in excess of \$200,000 with machinery.

Board of Education, Altoona, Pa., plans installation of manual training equipment in new two and three-story and basement high school, to cost \$750,000, for which bids are being asked on general contract until July 20. Hersh & Sholler, Commerce Building, are architects.

E. D. Hawk, New Castle, Pa., and associates have taken over former plant of Slagstone Products Co., East New Castle, and will remodel for production of electric storage batteries and kindred products.

Natural Products Co., Inc., 46 West Chestnut Street, Reading, Pa., has been formed to operate warehouse for distribution of foundry supplies and operate sand banks. Warren S. Adams is president.

So. Atlantic States

BALTIMORE, July 9.—Contract has been let by Standard Fertilizer Co., Inc., Williamston, N. C., subsidiary of Standard Wholesale Phosphate Co., Continental Building, Baltimore, to S. S. Toler, Rocky Mount, N. C., for second unit of plant, to cost more than \$45,000 with equipment. Work will include a new wharf and shipping facilities.

City Council, Front Royal, Va., is completing surveys for new municipal airport on 40 acre site, to include hangar, repair shop, oil storage and distributing building, and other units.

Otto Equipment & Service Co., Thirty-third Street, Philadelphia, manufacturer of gas engine equipment, has leased space in building at Guilford Avenue and Saratoga Street, Baltimore, for factory branch and distributing plant.

Stribling Aircraft Co., Macon, Ga., care of W. L. Stribling, Macon, recently organized by Mr. Stribling and son, is negotiating for lease of Miller Field for establishment of aircraft works, including repair and parts shops, oil storage and distributing building and other structures. Company will also establish and operate a flying school; it will be capitalized at \$250,000.

Bedford Pulp & Paper Co., Bedford, Va., is planning construction of hydroelectric power plant on James River, near Snowden, Amherst County, for power supply for pulp and paper mill.

International Paint Co., 1828 West North Avenue, Baltimore, is said to be planning new three-story plant at Dundalk, to cost about \$75,000 with equipment. C. R. Sutter is general manager.

Tidewater Body & Fender Works, Inc., Norfolk, Va., recently formed by B. W. Woodard, 418 New York Avenue, and associates, with capital of \$50,000, plans operation of sheet metal works, for which details will soon be completed.

General purchasing officer, Panama Canal, Washington, will receive bids until July 27 for cranes, floor grinders, tool grinders, locomotive castings, metal cabinets, hacksaw blades, drills, wrenches, pumps, motor-generator set, electric rivet heaters and other mechanical and electrical equipment, Panama schedule 1887.

Lexington Water Power Co., Columbia, S. C., operated by General Gas & Electric Corporation, 50 Pine Street, New York, has work in progress on new hydroelectric generating plant on Saluda River, about 10 miles from Columbia, and is scheduling completion late in 1930. Miscellaneous equipment awards will be made soon.

Georgia Manganese & Iron Co., 201 Hurt Building, Atlanta, Ga., has engaged Perin & Marshall, 40 West Fortieth Street, New York, consulting engineers, to complete plans for its development of manganese ore properties near Cartersville, Ga., including installation of mining and refining equipment, with mechanical washing plant. Entire project is reported to cost close to \$1,500,000. Joel Hurt is head.

Peoples Ice & Storage Co., Wilson Street, Roanoke, Va., is planning erection of seven-story ice-manufacturing and cold storage plant, 150 x 160 ft., to cost in excess of \$100,000 with equipment.

Rose Clic Co., Waynesboro, Va., plans rebuilding machine shop recently destroyed by fire, with loss, including portion of packing plant, about \$30,000 with equipment.

Detroit

DETROIT, July 9.—Arrangements have been completed by Alloy Steel Spring & Axle Co., Jackson, Mich., for purchase of local plant and business of National Plating & Enameling Co., and will operate in future as a division of organization. Expansion in output is under consideration.

Consumers Power Co., Jackson, Mich., has approved plans for an addition to steam-operated electric power plant at Zilwaukee, near Saginaw, Mich., to include installation of new 35,000-kw. turbo-generator unit; four boilers, with economizers, air pre-heaters, and auxiliary equipment; pumping equipment, etc. Increase will also be made in transmission system. Entire project will cost in excess of \$2,000,000.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has awarded general contract to Kansas City Structural Steel Co., Kansas City, Mo., for new assembling plant at Leeds, Mo., 300 x 760 ft.; body building plant, 170 x 760 ft.; service and parts unit, 120 x 275 ft.; power house, 46 x 70 ft.; office and miscellaneous structures, all one-story, to cost in excess of \$1,000,000 with equipment. A loading dock, 40 x 220 ft., will also be built. Albert Kahn, Marquette Building, Detroit, is architect.

George Bachman, Flint P. Smith Building, Flint, Mich., architect, will soon take bids on general contract for three-story automobile service, repair and garage building, to cost about \$125,000 with equipment.

Forham Tool Co., Detroit, care of Lane, Davenport & Peterson, Charlevoix Building, architects, is having plans drawn for new two-story plant to cost about \$65,000 with equipment.

Pontiac Foundry & Machine Co., Pontiac, Mich., recently organized with capital of \$75,000, has taken over building

on Scott Lake Road, previously used by Howard Foundry Co., for new plant for production of brass, bronze and aluminum castings for automotive and aircraft industries; department will be established for manufacture of metal patterns, as well as dies, and kindred specialties. Robert Falstead, Birmingham, Mich., heads company.

Kalamazoo Stationery Co., Harrison Street, Kalamazoo, Mich., has plans under way for new power plant at factory to cost \$50,000 with equipment. Billingham & Cobb, 211 Woodward Avenue, are architects.

Jackson Screw Products Co., Jackson, Mich., will rebuild portion of plant destroyed by fire July 4, with loss reported at \$40,000 including equipment.

Motor Products Corporation, 11801 Mack Avenue, Detroit, manufacturer of metal stampings for automotive service, is said to be planning a one-story addition, to cost more than \$45,000 with equipment.

Cleveland

CLEVELAND, July 9.—Machine tool sales took quite a spurt the past week. There was a fair volume of activity in single machines well distributed among various industries and several orders were for good sized lots. Some new demand sprang up from makers of automobile parts in both the Cleveland and Detroit territories, although no buying is reported by automobile manufacturers. The National Acme Co., Cleveland, purchased 10 presses and drilling machines for extending its facilities for manufacturing shock absorbers. The Gairing Tool Co., Detroit, bought 10 automatic screw machines. The Fulton Syphon Co., Knoxville, Tenn., bought seven turret lathes. The Timken Roller Bearing Co., Canton, Ohio, has issued a small list of machinery requirements for its maintenance department, which includes lathes, bolt cutters and horizontal boring mills.

Thompson Products Co., Inc., Cleveland, maker of valves and other automobile parts, will spend \$750,000 on additions to plants. A two-story extension, 62 x 122 ft., will be built at its Cleveland plant and a two-story extension, 100 x 140 ft., to its Detroit plant. Plans also contemplate erection next year of two other units at Cleveland for machine shop and heat treating departments and another unit in Detroit for a forging department.

Merger of four leading manufacturers of rubber making machinery has been concluded. Companies comprise Akron Rubber Mold & Machine Co. and Quhlke Machine Co., Akron, Ohio; Banner Machine Co., Columbiana, Ohio, and DeMattia Brothers, Inc., operating a foundry and machine shop in New Jersey. Stanley Harris, president Akron Mold & Machine Co., is temporary president of new organization; Barthold DeMattia, vice-president, and M. D. Quhlke, secretary.

Eaton Axle & Spring Co., Cleveland, has acquired Easy-on-Cap Co., Cleveland, maker of gasoline tank, breather tube, radiator and crank shaft caps. Latter company will continue under present management in a new plant containing 50,000 sq. ft. of floor space, which will be erected on a site adjoining East 140th Street plant of Eaton Axle company. Hub caps will be added to present products.

Cleveland Duplex Machinery Co., Inc., Cleveland, has been appointed agent in northeastern Ohio for Grant Mfg. & Machine Co., Bridgeport, Conn., in sale of rivet spinners, vibrating riveters, double end threading and chamfering machines and special machinery.

Massillon Rivet & Mfg. Co., 614 Erie Street, South, Massillon, Ohio, has been formed to succeed Canton Bolt Co., Canton, Ohio, and has removed to plant at Massillon where facilities for manufacture of small rivets has been increased. Company is equipped to manufacture steel, brass, copper, aluminum and enduro metal rivets in following coatings and finishes: Galvanized, metallic tinned, tin plated, coppered, nickel plated, brass plated, copper plated and bright polished after annealing.

Contract has been let by Gears & Forgings, Inc., East Ninety-second Street, Cleveland, to R. S. Ursprung, Berea, Ohio, for a one-story addition, 50 x 135 ft., to cost about \$45,000, with equipment.

Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, has awarded general contract to A. Bentley & Sons Co., 201 Belmont Avenue, for new plant primarily for manufacture of laminated safety glass products, to cost \$1,500,000 with equipment. Lockwood, Greene & Co., 400 North Michigan Boulevard, Chicago, are architects and engineers.

Henry & Murphy, Second National Bank Building, Akron, Ohio, architects, have completed plans for two-story automobile service, repair and garage building on South High Street, reported to cost close to \$90,000, with equipment.

Ohio Foundry Co., 2469 East Seventy-first Street, Cleveland, has awarded general contract to H. B. Slatmyer & Son Construction Co., 203 Lakeside Avenue, for one-story addition to cost approximately \$100,000 with equipment.

Cincinnati

CINCINNATI, July 9.—While some machine tool builders report a recession in sales since the first of the month, bookings have held up fairly well. Agricultural implement makers have been the largest buyers of equipment, their purchases in this market having included engine lathes, drilling machines and special high production tools. Notable among the week's bookings has been a sale of 15 18-in. motor-driven engine lathes to a Middle West manufacturer. A local company has received an order for three engine lathes from a South American company and also will supply a gap lathe to a Canadian firm. The Boston & Albany has bought several tools and the Rock Island is said to be inquiring for a few machines.

Stanton Motors, Inc., 841 North High Street, Columbus, has plans for two-story and basement service, repair and garage building, to cost close to \$100,000 with equipment. Richards, McCarty & Bulford, Columbus, are architects.

Kentucky River Coal Co., Fayette National Bank Building, Lexington, Ky., W. S. Dudley, president, is reported planning construction of pipe line for natural gas supply from its coal mining properties to vicinity of Knoxville, Tenn., with compressor plants, etc.

Adrian Knitted Products Co., Dyersburg, Tenn., plans construction of steam power

house in connection with a new local mill, entire project to cost close to \$200,000. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers. Headquarters are at Adrian, Mich.

Van Buren Township Board of Education, Dayton, Ohio, care of Walker & Norwick, American Building, architects, plans installation of manual training equipment in new high school to cost about \$450,000, for which bids will be asked on general contract by architects noted.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until July 19 for runner assemblies, cable assemblies, cord assemblies, ski assemblies, and shock absorber assemblies, circular 33.

Dudney Tire Co., Nashville, Tenn., has leased building to be erected at 1217-21 Broadway, for new factory branch, service and distributing plant to cost \$100,000; general contract let to J. J. Dugger, Carmack Avenue.

Ovens, power equipment, conveying and other machinery will be installed in new two-story and basement plant, 60 x 200 ft., to be erected by Linker Brothers, 1129 West Market Street, Louisville, on adjoining site, to cost about \$115,000. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

Buffalo

BUFFALO, July 9.—Bids will soon be asked by International Casement Co., Hopkins Avenue, Jamestown, N. Y., manufacturer of steel casements, casement adjustments, etc., for a one-story addition, to cost close to \$40,000 with equipment. Beck & Tinkham, Bailey Building, are architects.

Hecker, Jones, Jewell Milling Co., St. Clair Avenue, Buffalo, has filed plans for a new mill unit to be equipped for mechanical washing and drying, to cost \$50,000.

Frank B. Floyd, 110, Eloise Terrace, Syracuse, N. Y., and associates, have organized Smith Trailer Corporation and plan early operation of plant for manufacture of trailers and other agricultural equipment. George G. Heidlauf, 126 Coleridge Avenue, is also interested in company.

City Council, City Hall, Lockport, N. Y., will receive bids until July 23 for motor-driven centrifugal pumping equipment for high and low service, standpipe addition, valves, and other equipment for filtration plant. J. N. Chester Engineers, Clark Building, Pittsburgh, are engineers.

Board of Education, Watertown, N. Y., is considering installation of manual training equipment in new South Side junior high school, to cost \$450,000, for which bids will soon be asked on general contract on revised plans. Lansing & Green, Sherman Trust Building, are architects.

Cortland County Traction Co., Cortland, N. Y., operating electric light and power utilities, has secured permission to make extensions in transmission lines and facilities for service at Virgil, N. Y., and vicinity.

Remington Rand, Inc., Buffalo, manufacturer of office equipment, has removed its general purchasing department from Ilion, N. Y., to Remington Rand Building, 465 Washington Street, Buffalo. L. Rayburn is director of purchases.

Chicago

OF special interest in this market is activity among farm implement manufacturers and builders of tractors in laying out programs for machine tool needs for production schedules at the opening of 1929. Meantime these industries continue to place orders in good volume for their immediate needs. This business, plus that which is coming from gasoline engine builders, has held the first week in July on a par with the closing seven-day period in June. The new month makes a good start when compared with July, 1927.

The Chicago & North Western is in the market for an axle lathe, pattern grinding and filing machine and a drill grinder. The Illinois Central is asking for prices on rebuilding a number of old lathes. The Louisville & Nashville is preparing a sizable list for its shops near the new State docks, Mobile, Ala. Used machinery is moving in good volume.

Emerson - Brantingham Corporation, Rockford, Ill., has announced sale of its farm machinery plant at Rockford and its farm machinery inventory at works and branches to J. I. Case Threshing Machine Co., Racine, Wis., effective Aug. 1.

Martin Machine Works, 220 Laflin Avenue, Chicago, will build a factory, 48 x 125 ft., to cost \$18,000.

Bids will be received by Board of Trustees, Springfield Sanitary District, City Hall, Springfield, Ill., until July 25 for equipment for municipal sewage plant, including centrifugal sump pumps, sludge pumps and hot water circulating pumps; two motor-driven air blowers, 2200 and 3300 cu. ft. per min., capacity, respectively; and electrical equipment, with seven-panel power switchboard. Pearce, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are engineers.

School District No. 45, 422 South Fairview Avenue, Elmhurst, Ill., I. A. Stone, secretary, is considering installation of manual training equipment in three-story addition to York high school to cost \$350,000, for which plans are being drawn by J. C. Llewellyn, 38 South Dearborn Street, Chicago, architect.

Chicago Metal Spinning Co., 1715 Walnut Street, Chicago, has work nearing completion on new two-story and basement plant unit, 38 x 53 ft.

American Wood Products Co., 258 S. E. Cecil Street, St. Paul, Minn., will soon take bids for new two-story plant, to cost about \$90,000 with equipment.

Produce Terminal Cold Storage Co., Chicago, care of Henschien & McLaren, 1637 Prairie Avenue, architects, will proceed with superstructure for a new eleven-story cold storage and refrigerating plant on West Fifteenth Place, 108 x 220 ft., to cost close to \$2,000,000 with machinery. Work is scheduled for completion by close of year when it is purposed to begin erection of a second unit adjoining.

Community Motor Co., Thirty-third Street and Prairie Avenue, Chicago, has taken out permit for a two-story service, repair and sales building, 128 x 177 ft., to cost close to \$90,000 with equipment. L. E. Russell, 140 South Dearborn Street, is architect.

Public Service Co. of Colorado, 900 Fifteenth Street, Denver, Colo., has filed plans for a one-story foundry and shop, 40 x 60 ft. and 20 x 32 ft.

Newton Mfg. Co., Newton, Iowa, manufacturer of advertising novelties, has approved plans for a two-story addition to cost about \$40,000 with equipment.

Caterpillar Tractor Co., East Peoria, Ill., is contemplating erection of new one-story foundry, to cost approximately \$50,000 with equipment. Headquarters are at Oakland, Cal.; M. M. Baker is local manager at East Peoria.

Northern Pacific Railroad Co., St. Paul, Minn., has plans for new one-story steel car construction and repair shops at Laurel, Mont., to cost upward of \$160,000 with equipment.

Albertson & Co., Sioux City, Iowa, manufacturers of tools and shop equipment, will build an addition to factory to cost \$100,000 for expansion of production facilities.

O. C. Keckly Co., Chicago, has acquired controlling interest in Lourie Mfg. Co., Harvard Park, Springfield, Ill., and offices at latter city are being transferred to Chicago. H. M. Alkire, vice-president in charge of manufacturing, states that expansion of Springfield unit is contemplated. Lourie line of hydraulic presses will be continued and in addition Keckly company will install equipment for manufacture of water gage specialties.

Indiana

INDIANAPOLIS, July 9.—Syracuse Electric & Telephone Co., Syracuse, has plans for a one-story equipment storage and distributing plant, with utility and repair department, 40 x 100 ft. Bradley & Babcock, 221 West Wayne Street, Fort Wayne, are architects.

Refrigerating equipment, conveying and other machinery will be installed in new plant to be built by Emge Packing Co., Fort Branch, to cost about \$100,000, for which building contract has been let to Scarborough & Davis, Old State Bank Building, Evansville.

Board of Park Commissioners, City Hall, Fort Wayne, has plans for hangars, with repair facilities, and other buildings at municipal airport, for which bids will soon be asked on general contract. Everett I. Brown, First National Bank Building, is architect.

Fame Canning Co., Shelbyville, Ind., is said to have plans for rebuilding portion of local plant recently destroyed by fire, to cost more than \$150,000 with machinery. Headquarters are at 58 East Washington Street, Chicago.

Board of Education, Muncie, will soon lay foundations for one-story vocational training school to cost \$150,000 with equipment, for which bids have been asked on general contract. Houck & Smenner, 108 East Washington Street, are architects.

Power equipment, cold storage and refrigerating machinery, conveying and other handling equipment will be installed in three-story addition, 110 x 256 ft., to be erected by Major Brothers Packing Co., South Logan Street, Mishawaka, to cost close to \$500,000. Packers Architectural & Engineering Co., 431 South Dearborn Street, Chicago, is architect and engineer.

Leader Specialty Co., Inc., 517 East Walnut Street, Indianapolis, has been formed to manufacture plumbing specialties, particularly iron pipe nipples. Company plans first to manufacture nipples from standard steel pipe in sizes ranging from 1/4 x 3/4 in. to 2 x 6 in.

Gulf States

BIRMINGHAM, July 9.—Moody Corporation, Galveston, Tex., operated by Moody-Seagraves Co., Esperson Building, Houston, Tex., has secured an interest in 480 acres of oil lands in Howard County, and plans immediate development. It is purposed to construct an oil refinery, in Big Springs, Tex., section, or in Galveston district, site still to be determined. Pipe line will be constructed from Howard oilfield to new refinery. Entire project is reported to cost in excess of \$1,000,000 with equipment.

Burford Oil Refining Co., Shreveport, La., operated by Crystal Oil Refining Corporation, Shreveport, F. W. Burford, general manager, has begun construction of new oil refinery at Pecos, Tex., with an initial capacity of 5000 bbl. per day. A cracking plant will also be installed for gasoline production and complete treating equipment; also a boiler plant and machine shop. Entire project will cost close to \$700,000 with machinery. J. J. Thomas is superintendent.

Tampa Union Terminal Co., 823 South Orleans Street, Tampa, Fla., has approved plans for a new cold storage and pre-cooling plant on 10-acre tract on Ybor Channel, to be eight stories, 150 x 152 ft.; with two story transit shed, 100 x 465 ft.; and one-story power plant, 50 x 80 ft. Entire project will cost in excess of \$700,000 with equipment. Parsons, Klapp, Brinckerhoff & Douglas, 84 Pine Street, New York, are engineers. Clyde Perry is president.

Transcontinental Oil Co., Fort Worth, Tex., is completing plans for construction of new pipe line from Pecos County oilfields to a point near Texas City, Tex., to cost more than \$200,000. Headquarters are in Benedum Trees Building, Pittsburgh.

F. S. Royster Guano Co., Royster Building, Norfolk, Va., has approved plans for rebuilding its branch fertilizer plant at Birmingham, recently destroyed by fire, to cost close to \$130,000 with equipment.

Duval Texas Sulphur Co., Second National Bank Building, Houston, Tex., is in market for two used steam-driven air compressors, 90 lb. steam pressure, 400 to 500 lb. air pressure, 350 to 500 cu. ft. per min.

Pan-American Airways, Inc., Miami, Fla., will proceed with construction of new airport on Thirty-sixth Street, where tract of about 130 acres recently was secured, to include hangars, 100 x 100 ft., with repair shops, parts and reconditioning units, and oil storage and distributing works, to cost in excess of \$85,000.

Southern United Ice Co., Crystal Springs, Miss., is planning an addition to local ice and cold storage plant to cost approximately \$50,000 with equipment. It is also proposed to build a new two-story unit at Jackson, Miss., to cost close to like sum. W. E. Wells, Inc., 100 West Monroe Street, Chicago, is engineer.

Firestone Tire & Rubber Co., Akron, Ohio, has purchased property at Jacksonville, Fla., and plans early construction of new factory branch and distributing plant, to cost approximately \$100,000 with equipment.

Southern Phosphate Co., Bartow, Fla., is considering plans for new works at Sanguily, vicinity of Tampa, Fla., for phosphate fertilizer manufacture, to cost close to \$50,000 with machinery. Headquarters are at 44 Wall Street, New York.

Cotton Concentration Co., Forty-second Street and Avenue A, Galveston, Tex., has completed plans for one-story com-

press mill, 315 x 340 ft., to cost about \$90,000 with machinery.

Texas Gulf Sulphur Co., Inc., Gulf, Tex., has awarded contract to J. G. White Engineering Corporation, New York, for initial units at local plant, including machine and other mechanical shops, steam power house of 7500 hp. capacity. Other units will be erected later. Headquarters are at 41 East Forty-second Street, New York.

Central Power & Light Co., Frost Building, San Antonio, Tex., has secured permission to proceed with a hydroelectric power project on Devils River, Val Verde County, with construction of power dam and installation of station, to cost more than \$400,000.

St. Louis

ST. LOUIS, July 9.—Bids have been asked on general contract by Century Electric Co., 1806 Pine Street, St. Louis, for one-story and basement foundry, 240 x 262 ft., to cost in excess of \$175,000 with equipment. Klipstein & Rathman, 316 North Eighth Street, are architects. J. L. Hamilton is company engineer and superintendent.

Pillsbury Flour Mills Co., Minneapolis, Minn., has work under way on a new milling plant and elevator, 75 x 300 ft., at Enid, Okla., to cost about \$700,000 with machinery. Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., is general contractor.

Wabash Railway Co., Railway Exchange Building, St. Louis, will soon begin work on one and three-story fruit and produce exchange building, 60 x 640 ft., with ice and cold storage facilities, mechanical handling equipment, etc., to cost \$800,000 with equipment. R. E. Mohr, address noted, is company architect; R. H. Howard is chief engineer.

Board of Education, Loomis, Neb., plans installation of manual training department in connection with rebuilding portion of high school recently destroyed by fire, with loss close to \$50,000. H. P. Helleberg, Masonic Building, Kearney, Neb., is architect.

Chandeyson Electric Co., 4092 Bingham Avenue, St. Louis, manufacturer of electrical equipment, has filed plans for a one-story addition, 32 x 100 ft., to cost close to \$25,000 with equipment. Widmer Engineering Co., Roosevelt Building, is engineer.

Spartan Aircraft Co., 902 North Wheeling Street, Tulsa, Okla., has awarded general contract to Austin Co., Cleveland, for a one-story and basement plant, 150 x 350 ft., to cost close to \$250,000 with equipment. New unit will be used largely for assembling and parts production.

Camden Furniture Co., Camden, Ark., is planning for additions to double, approximately, present capacity, to cost about \$50,000 with equipment.

Arkansas Natural Gas Corporation, Little Rock, Ark., is completing plans for construction of pipe line for natural gas supply from Clarksville, Johnson County, to Little Rock, about 100 miles, to cost in excess of \$1,000,000 with booster stations and other auxiliaries. George T. Koch, Shreveport, La., is chief engineer in charge.

Normandy Consolidated School District, Normandy, Mo., has broken ground for two-story and basement manual training school, 60 x 270 ft., to cost about \$120,000 with equipment. William B. Ittner, Board

of Education Building, St. Louis, is architect.

Mertz Auto Body & Radiator Co., 235 North Sixth Street, East St. Louis, Ill., has asked bids on general contract for new one-story plant unit to cost about \$32,000 with equipment. Seer-Ko Engineering Co., 1632 North Twenty-fifth Street, is architect and engineer.

Milwaukee

MILWAUKEE, July 9.—There has been no perceptible slackening in machine-tool business, and while orders are not of large volume, they are of fair number. Employment in industry, is gaining and a good demand for skilled men for the metal trades is officially reported. It is interesting to note that 44 shops had 36,922 people at work at the beginning of July, compared with 36,777 at work in 46 shops on June 1. The reduction in number of reporting shops is caused by the sale of the Northwestern Malleable Iron Co. and the closing of another shop formerly reporting. The July 1 figure of 36,922 at work compares with 34,542 working in 46 factories a year ago.

National Enameling & Stamping Co., 909 St. Paul Avenue, Milwaukee, is placing contracts through Siebert & Kegler, local architects, for construction of a new administration building, 56 x 135 ft., two stories and part basement. Present office building will be converted for manufacturing.

Klug & Smith Co., consulting engineer, 69 East Wisconsin Avenue, Milwaukee, has general contract to build a brick and steel shop bay addition, 28 x 134 ft., for Smith Engineering Works, manufacturer of ore, rock and gravel handling machinery, 78 Capitol Drive.

Wisconsin Cold Storage Co., 178 Florida Street, Milwaukee, is asking bids through C. F. Ringer & Son, architects, 432 Broadway, for erection and equipment of an eight-story cold storage warehouse to cost \$500,000. Henry C. Kuehn is secretary and treasurer.

J. D. Phillips, business manager Board of Regents, University of Wisconsin, Madison, will close bids July 28 for construction of a \$60,000 tank house at university pumping station. Arthur Peabody is State architect.

J. W. Turner, proprietor of Turner's Garage, Elkhorn, Wis., will begin work Aug. 1 on a two-story automotive sales and maintenance building, 60 x 100 ft., at Delavan, Wis. Second story will be given over to service and repairs.

Gillette Rubber Co., 799 Wisconsin Avenue, Eau Claire, Wis., is at work on a four-story addition, 74 x 160 ft., costing about \$75,000 complete. General contract for designing and erecting has been placed with Hoeppner & Bartlett Co., 414 East Grand Avenue, Eau Claire.

Armstrong Foundry Co., 1530 Junction Avenue, Racine, Wis., manufacturer of gray iron castings, has accepted bid of Nelson & Co., 408 Janes Building, for construction of an addition, 70 x 80 ft. Architect is J. Mandor Matson, Racine.

Young Radiator Co., Racine, Wis., manufacturer of radiators, cooling systems and heating units, has received year's contract from Chicago Pneumatic Tool Co., New York, for manufacture of radiators used on latter company's portable compressors.

Pacific Coast

SAN FRANCISCO, July 5.—An expansion and improvement program is being arranged by Holly Sugar Corporation, Tracy, Cal., at its beet sugar mill, including one-story wing addition to cost about \$85,000, of which approximately one-half will be expended for equipment. Headquarters are at Colorado Springs, Colo.

East Bay Municipal District, 1924 Broadway, Oakland, Cal., will receive bids until Aug. 17 for hydraulic and electric power equipment for its Pardee power plant, Mokelumne River project. John H. Kimball is secretary.

Inglewood Union High School District, Inglewood, Cal., has authorized plans for a new high school group, including one-story manual arts building. Bond issue of \$400,000 has been approved. T. C. Kistner & Co., Architects Building, Los Angeles, are architects.

Marconi Mfg. Co., Seattle, care of Hancock & Lockman, Walker Building, architects, has completed plans for new two-story radio equipment manufacturing factory, 50 x 160 ft., to cost about \$55,000 with machinery.

Whitehouse & Price, Hutton Building, Spokane, Wash., architects, have completed plans for a multi-story automobile service, repair and garage building for City Ramp Garage, Inc., Hutton Building, to cost \$200,000 with equipment.

Board of School Trustees, Pomona, Cal., has plans for a new junior high school group, with one-story manual arts unit, 50 x 160 ft. A bond issue of \$300,000 has been arranged for project. T. C. Kistner & Co., Architects Building, Los Angeles, are architects.

City Council, Idaho Falls, Idaho, has been authorized to issue bonds for \$100,000 for extensions and improvements in municipal hydroelectric power plant and completion of power dam on Snake River.

C. W. McCall, 1404 Franklin Street, Oakland, Cal., architect, has completed plans for one-story automobile service, repair and garage building, to cost close to \$100,000 with equipment.

Kinney Iron Works, 2724 Santa Fe Avenue, Vernon, Los Angeles, has awarded general contract to J. C. Flick, Huntington Park, Cal., for a one-story shop unit.

Southern California Edison Co., Third Street and Broadway, Los Angeles, has filed plans for one-story automobile service, repair and garage building for company trucks, 75 x 185 ft., to cost about \$70,000 with equipment.

Associated Oil Co., 79 New Montgomery Street, San Francisco, has applied for permission to construct three new pipe lines from its properties in Potrero field to Rosecrans, and from latter point, another pipe line to Wilmington, Los Angeles, to cost more than \$350,000.

F. & F. Six Wheel Co., 220 East Market Street, Los Angeles, has been formed to manufacture six wheel frame extensions for trucks, particularly applicable to Ford models. Work is being done under contract and manufacturing is being concentrated at Los Angeles.

Carter Steel Products Co., 1934 South San Fernando Road, Glendale, Cal., has been formed to manufacture novelty steel buildings. Company has purchased plant at above address, which is in operation, and will purchase light structural steel, sheets, windows, doors and other building products.

Van Dorn Electric Tool Co., Cleveland, has established warehouse and service station at 525 East Tenth Street, Oakland, Cal., to supplement sales branches in Los Angeles, San Francisco and Seattle and service branches at Los Angeles, Oakland and Seattle. Complete stocks of Van Dorn and Van Norman products will be carried and shipments made to Pacific Coast points directly from new warehouse. Sales branches will be operated at 857 South San Pedro Street, Los Angeles; 75 Fremont Street, San Francisco, and 514 Virginia Street, Seattle, in charge of Waldo H. Bair, Harry W. White and Roy Wise respectively.

Eugene Luckey, Inc., Portland, Ore., manufacturer of piston rings, will remove factory and sales room to Broadway and Flanders Street.

Hooker Electrochemical Co. has plans for a \$1,000,000 plant at Tacoma, Wash., construction to start immediately. This will be a main branch of company headquarters which are at Niagara Falls, N. Y.

L. G. Bradfield Co., located in central manufacturing district, Los Angeles, is erecting an addition to its factory to increase floor space 50 per cent and double production. Approximately \$30,000 will be spent for land, equipment and building. A considerable quantity of machine tools will be purchased. William P. Neil Co., Inc., have general contract.

Canada

TORONTO, July 9.—Machine tool business for June showed improvement over that for May and, according to builders and dealers, was one of the best months this year. During the first week of July, however, sales fell off sharply and interest was confined mostly to inquiry. New business in prospect is of diversified character and covers practically all industrial activities. Building programs by industrial companies are numerous with many new plants under construction or in prospect.

Robert Mitchell Co., Montreal, has leased an iron foundry near its plant, belonging to Thomas Davidson estate, to relieve congestion in its foundry. Company manufactures architectural bronze and wrought iron, metal fittings and fixtures for railroad passenger cars.

Queenston Quarries, Ltd., Queenston, Ont., will start work soon on an addition, 60 x 100 ft., to cost \$40,000.

Gardner Construction Co., Ltd., 22 Cross Street, Welland, Ont., has been awarded contract for construction of a one-story addition, 60 x 160 ft., to plant at Crowland Township, Ont., for Page-Hersey Tubes, Ltd., Church Street, Toronto.

Church Ross Co., 901 Keefer Building, Montreal, has general contract for building a four-story factory for Congoleum Co. of Canada, Ltd., 1170 St. Patrick Street, Montreal, to cost \$100,000. Architects are Hutchison & Wood, 86 Notre Dame Street West.

Bulk tenders are being received by E. Bamber, Kerr Street, Oakville, Ont., until July 16 for erection of a one-story factory, 60 x 300 ft., for General Metal Devices, Ltd. R. Card, 142 Chester Avenue, Toronto, is architect.

Brigham & Woolrich, 201 Fifth Avenue East, Owen Sound, Ont., has been awarded contract for one-story addition, 50 x 100 ft., to plant of Empire Stove & Furnace Co., Third Avenue East.

Church Ross Co., Ltd., Montreal, has been awarded contract for erection of a \$250,000 addition to plant of the American Can Co., 2065 Jeanne d'Arc Street. Building will be five stories, 120 x 200 ft., of reinforced concrete.

Arco Paint Co., Cleveland, has purchased five acres on Weston Road, York Township, Ont., for erection of a three-story factory, 80 x 100 ft., to cost \$100,000. Plans call for completion by Oct. 1.

Western Canada

Plans and specifications for terminal facilities and cold storage plant of Pacific Coast Terminals, Ltd., New Westminster, B. C., have been filed. Plans

call for a four-story cold storage warehouse, power house, ice manufacturing plant, wharf and warehouse trackage and timber and general storage docks. Project will cost approximately \$2,000,000.

Knox Brothers, Montreal, are reported to be arranging for erection of a sawmill, dry kilns and wharf at North Vancouver, B. C.

Imperial Oil Ltd., Calgary, Alta., has started work on a two-story addition, 120 x 200 ft., to its plant and offices at 2066-9th Avenue West.

General Motors of Canada, Ltd., head office, Oshawa, Ont., has awarded contract to Smith Bros. & Wilson, Ltd., Eighth avenue and Ottawa Streets, Regina, Sask., for an assembling plant at Regina to cost \$1,000,000. Hutton & Souter, 6 James Street South, Hamilton, Ont., are architects.

Foreign

PLANs have been approved by Continuous Coal Carbonization, Ltd., London, for first unit of new plant at Erith, on Thames River, to be equipped for ultimate capacity of 1000 tons of coal per day to cost in excess of \$500,000 with equipment.

Municipal Government, Poznan (Posen), Poland, has arranged financing in an amount of about \$1,000,000, fund to be used for construction of municipal electric light and power plant, for which plans will soon be drawn. It is scheduled for completion next year. Gilbert Redfern, American assistant trade commissioner, Warsaw, Poland, has information.

A company is being organized by Abelardo Rodriguez, La Paz, Mexico (Lower California), Governor of northern district of Lower California, to take over and expand Moni Works, a division of Aeronautic Construction Department, Ministry of War, Mexico City, with plant to be operated in future under private ownership. New company will be capitalized at \$1,500,000 and purposes development of works to include motor construction, as

A Giant Electric Telpher at the Leipzig Trade Fair



ONE of the conspicuous exhibits in the technical division of the Leipzig Trade Fair, Leipzig, Germany, this year was a giant electric telpher in actual operation. It formed one of numerous outdoor exhibits of machinery. The track took roughly the form of a long ellipse, to illustrate the transporting of goods on straightways and around curves. The fall exposition, according to the Leipzig Trade Fair, Inc., New York, will be held from Aug. 26 to Sept. 1.

well as general aircraft parts and assembling divisions.

Company at Ravensbourne, Dunedin, New Zealand, plans early construction of a new mill for manufacture of superphosphates, to cost close to \$1,000,000 with equipment. Julian B. Foster, American trade commissioner, Wellington, New Zealand, has information.

Plans are under way by Liverpool Corporation, Liverpool, England, for new steam-operated electric power plant at River Mersey Docks of Docks Board, for which negotiations are under way for purchase. Plant will have initial capacity of 100,000 kw., and ultimate output of 400,000 kw., divided into 50,000 kw. units. It is estimated to cost about \$7,500,000 and will be built in cooperation with Central Electricity Board of British Electricity Commission, London, which will purchase practically entire output.

Fox Brothers International Corporation, 33 Rector Street, New York, has secured contract from Compania Transerea Espagnola, Seville, Spain, for the construction of a local airport for a Zeppelin line to be operated from such point to

Buenos Aires, Argentina. It will include hangars, repair and construction shops, terminal buildings and other structures, with estimated cost of \$5,000,000.

Colon Oil Corporation, care of Lee, Higginson & Co., 43 Exchange Place, New York, bankers, recently formed under Delaware laws by Royal Dutch-Shell Oil Syndicate and Carib Syndicate, Ltd., London, England, will take over and expand Colon Development Co., Ltd., operating oil properties in Maracaibo Basin, Venezuela. New company is disposing of bond issue of \$10,000,000 in United States, proceeds to be used primarily for construction of new pipe line, drilling of additional wells and installation of equipment. Gen. Avery D. Andrews is president, with headquarters at 65 Broadway, New York.

A machinery and engineering works at Chelmsford, England, has plans under way for an addition to cost close to \$500,000 with equipment. Information at office of Bureau of Domestic and Foreign Commerce, Washington, reference England No. 68676; also London, William L. Cooper, American commercial attaché.

of eight pages describing electric light reflector with a lens designed to change yellow light into the equivalent of daylight. These are made in a wide variety of forms, with standards, etc., for various applications.

Bearings.—Sumet Corporation, 1547 Fillmore Avenue, Buffalo. Folder devoted to bronze bearings, particularly for use in overhead electric traveling cranes.

Spraying Air Brush.—Paasche Air Brush Co., 1927 Diversey Parkway, Chicago. Folder illustrating and describing spray painting units, including both the air brush of pistol form and a gasoline or electric-driven unit to supply the pressure. It is portable and may be used indoors or outdoors as needed.

Ball Bearings for Machine Tools.—New Departure Mfg. Co., Bristol, Conn. Booklet of 20 pages illustrating and describing various types of ball bearings for machine tool use, including those on pulleys, change-speed gear boxes, worm gear reducers, bevel gears, spindles, both horizontal and vertical, etc. Methods of lubrication are shown.

Markets for American Industrial Machinery

The United States exported more than \$183,000,000 worth of strictly industrial machinery in 1927, a gain of approximately one-fifth over the previous year, and representing a volume greater than at any time since the post-war expansion of 1921, according to S. R. March, Industrial Machinery Division, Department of Commerce, Washington.

Canada, the United Kingdom and Mexico continued to be the largest markets for American machinery, in the order named. Cuba was the fourth best customer of the United States, but in spite of large purchases of sugar mill machinery the trade volume of 1924 and 1925 has not as yet been regained. The Venezuelan market for industrial machinery exports of the United States has steadily increased. Exports to Germany have grown in six years to more than ten times the \$566,000 volume of 1922. Shipments to Soviet Russia in Europe have increased from \$64,000 in 1922 to ten times that amount in 1927. Exports to both Argentina and Brazil reached the largest volume in six years.

Shipments to Chile declined sharply from the peak total of 1926, but nevertheless remained in excess of any other year since 1922. In view of the prolonged political and military disturbances in China, trade with that country naturally declined.

Germany to Trade Machinery for Tobacco

HAMBURG, GERMANY, June 23.—A contract has been signed by the Bulgarian Government and the Association of Agricultural Machinery Manufacturers in Germany, under which Bulgaria will receive \$1,100,000 worth of agricultural machinery in exchange for tobacco of the same value.

New Trade Publications

Ball Bearings.—McGill Metal Co., Valparaiso, Ind. loose leaf catalog of 40 pages, 8½ x 11 in., describing Schubert ball bearings of radial, angular contact and thrust types. A feature of these bearings is that they are equipped with bronze retainers. Comprehensive load capacity tables are included and data are given on magneto type bearings and extra light and narrow type bearings. Information relating to mounting and to lubrication is included and pages are devoted to the properties and some of the uses of McGill metal, a special aluminum bronze.

Pipe Threading and Cutting Machinery.—Landis Machine Co., Waynesboro, Pa. Catalog No. 31, 64 pages, 6 x 9 in. In addition descriptive material and specifications of pipe threading and cutting machines which range in size from 2 to 20 in. and are arranged for either belt or motor drive, data are given on single and double-head pipe and nipple threading machines, and on various sizes of the Geist roller pipe cutter. The Landis chaser, chaser holder and stationary pipe die heads are illustrated and described at length, as well as the company's standard, internally tripped and Lanco pipe and nipple threading die heads. Useful information includes a table of Briggs and Whitworth standard pipe threads and a table of cutting speeds for pipe.

Lubricating Systems.—Madison-Kipp Corporation, Madison, Wis. Booklet of 56 pages, 10 x 14 in., of reprints of recent advertisements of the company's fresh oil lubricating system. A large number of applications to oil, gas and steam engines is illustrated and briefly described, as well as use of the lubricators on turret lathes, chucking machines, planers, punch presses, steam hammers, woodworking and other machinery. Several pages are devoted to general and special data relating to the construction of the lubricators.

Die Cushions for Power Presses.—Marquette Tool & Mfg. Co., 1900 North Kilbourn Avenue, Chicago. Catalog No. 4, 151 pages, 6½ x 9½ in., bound in

boards. More than 20 types of pneumatic die cushions, designed for use in connection with presses of various types and for a variety of work, are described and illustrated. Specifications and lists of parts are given for each type, and actual installations and samples of work are pictured. Pneumatic toggle links, pressure control and other pneumatic devices are also described, and a section is devoted to the company's hydropneumatic die cushions. Constructional sketches of various types of dies, showing the application of the pneumatic cushions are reproduced, and several pages are devoted to useful information. The latter includes weight tables, data relating to the width of strips for staggered cuts, areas of drawn shells, blank diameters, pressures required for punching and shearing steel and brass plate, and the approximate clearance between the punch and die on the diameter.

Shovels, Cranes and Drag Lines.—Northwest Engineering Co., 28 East Jackson Boulevard, Chicago. A 40-page catalog describing machines made by this company, and giving details of features of design. It is well illustrated with operation views.

Drop Pit Table.—Watson-Stillman Co., 75 West Street, New York. Bulletin C-30 of 12 pages illustrates and describes an electric drop pit table for railroad shops and similar uses, operated through the medium of four screws. This is designed to take certain parts from under a locomotive or car and remove them for repair or replacement. The equipment is made with capacity up to 50 tons.

Multi-Stage Centrifugal Pumps.—Ingersoll-Rand Co., 11 Broadway, New York. Bulletin 7158 of 32 pages describes the Cameron type of multi-stage centrifugal pumps and gives a large number of installation views. There are also several sections and detail views, showing parts of the pump and describing its construction.

Artificial Daylight.—O. C. White Co., 15 Hermon Street, Worcester. Bulletin

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Interconnected Conveying System

Materials-Handling Methods of Marmon Motor Car Co.
in Producing Cars from Parts—Several
Types of Equipment Used

BY BURNHAM FINNEY*

CHARACTERISTIC of the automobile industry has been the pioneering spirit which has given impetus to the development of new manufacturing methods and to the creation of what, for lack of a better term, has been called mass production. Especially in the past few years has the intense competition among automobile makers accentuated the need for finding new ways and means of lowering production costs and at the same time attaining the highest possible efficiency. As a result, new achievements in this direction constantly attract the attention of industry in general.

Introduction of new models is a serious problem, often calling for the rearrangement of production lines so that the available space can be utilized to the best advantage. Such was the problem of the Marmon Motor Car Co., Indianapolis, when it decided to put on the market its new "68" straight-eight car, for it was confronted with the necessity of revamping its plant No. 2 for this purpose. By adopting certain methods previously used successfully, and by installing a complete system of materials-handling equipment, the company has been able to turn out completed automobiles at a satisfactory cost.

Following its policy adopted several years ago,

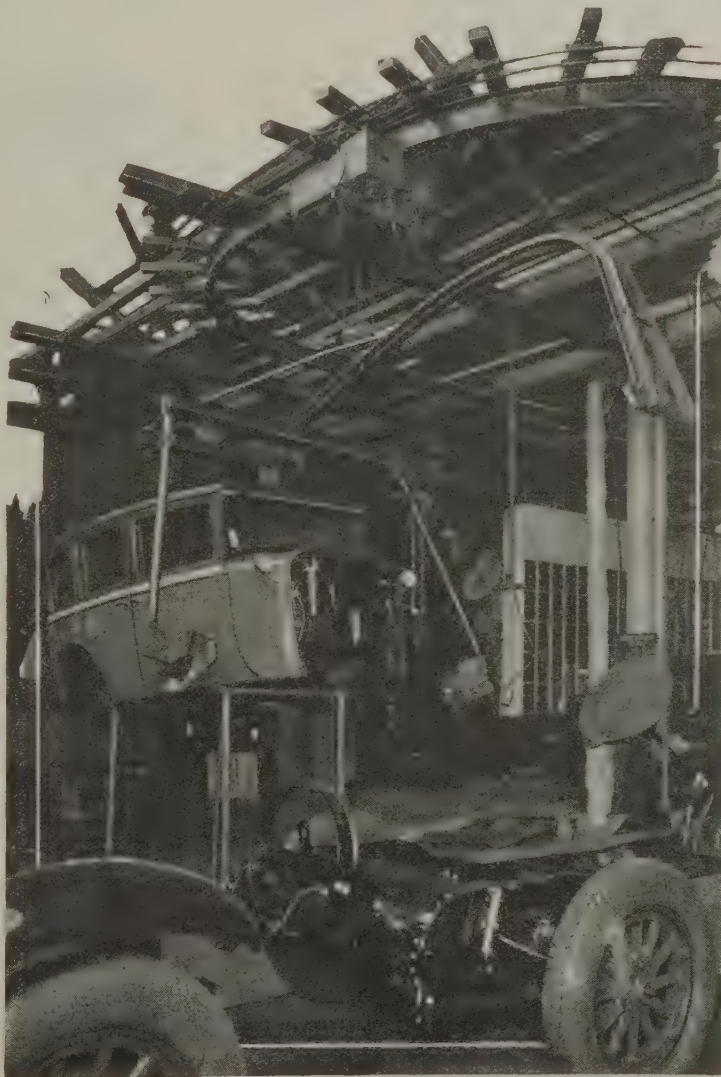
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of eliminating stock rooms, the company has made provision in plant No. 2 for delivery of materials to points where they are needed in the assembly lines. Wide aisles afford opportunity for motor trucks to drive into the

factory and unload parts at convenient locations, while spur tracks from the main line of the Pennsylvania Railroad extend into the building at its southeastern end. The floor of the freight cars is level with the concrete floor of the factory, so that loading and unloading are facilitated. By means of this arrangement, automobile frames, for example, can be brought into the plant in freight cars, removed and stored near the beginning of the frame assembly line. However, if frames are to be delivered by motor truck, the trucks can be driven along an aisle to a point immediately adjacent to the frame assembly line.

Adhering to the policy instituted in the Marmon plant No. 3, the company has so placed stock bins in plant No. 2 that workmen can get what they want without going to a centralized stockroom. For instance, along the body upfit assembly line are storage bins containing materials for local use.

Four divisions of the plant are served by mechanical conveying equipment: the frame assembly line, the body upfit line, the machine shop and the chassis main



Coming Off the Body Upfit Conveyor, the Body Is Mounted on the Chassis by Means of an Overhead Crane Operating on a Monorail (G in plan, page 138). The lifting frame has special clamps to hold the body

assembly line. Supplementing these is an automatic continuous enameling oven in which fenders, side shields and small parts are enameled.

Consisting of a motor-driven belt conveyor approximately 160 ft. in length, the frame assembly line has several interesting features. Frames stored near the beginning of the line are placed immediately adjoining the conveyor in a pile six or seven frames high. They are lifted on to the conveyor by means of a special carrier suspended from a hand crane. The carrier has four hooks which fit under the frame and hold it firmly while it is being moved on to the conveyor, the frame being placed in a crosswise position. Under normal conditions the conveyor operates at a speed of 15 in. a minute for 100 cars a day. The frame goes through a spray booth while upside down, receiving a coat of lacquer.

At right angle to the frame assembly line is the chassis main assembly line. When the chassis reaches the latter it is upside down, but it is put in the proper position on the main assembly line by means of an automatic turnover device designed by the company. The main assembly line comprises two parallel belt conveyors arranged so that the wheels of the car rest on them. The conveyors move 35 in. a minute for a production schedule of 100 cars daily. The conveyors, the speed of which may be adjusted to meet production demands, make possible the progress of the chassis without moving the wheels of the cars.

Each chassis starting down this line reaches the end, 480 ft. distant, a finished automobile [480 ft. ÷ 35 in. a minute = 145 min., or 2 hr. 25 min.]. After the chassis leaves the turnover, the motor and the battery are set into position. A short distance farther along the line the body, coming off the body upfit conveyor, is mounted on the chassis by means of an overhead crane operating on a monorail. The monorail forms a rectangle the length of which runs for 50 ft. parallel to and directly over the main assembly line. Suspended from the crane is a lifting frame with special clamps to hold the body.

The body upfit conveyor feeding the main assembly line is approximately 150 ft. long and consists of two roller chain conveyors, paralleling each other, 3 ft. apart. Bodies are placed on metal holding devices, moving along the line in a crosswise position at a speed of 14 in. a minute for a

production schedule planned to make 100 cars daily.

Since the acid fumes from the battery room would tend to rust the metal parts if placed in close proximity, that room is located a considerable distance from the main assembly line. Batteries move from this point to the far side of the assembly line, where they are installed on the chassis by means of a gravity roller conveyor.

From the point where the body is mounted on the chassis, the car progresses steadily to the final inspection pit, where it leaves the conveyor. En route the fenders, hood, rims, lamps, hub caps and step plates are added and the four-wheel brakes are adjusted. After the car has been thoroughly inspected, it is driven by its own power from the pit, the left wheels passing over a "trip" in the track, which automatically lowers and raises a screen for the purpose of focusing the head lights.

In the machine shop, where the parts making up the motor are machined, and where the motor is assembled and tested ready for installation in the chassis as it moves along the main assembly line, practically all materials are handled mechanically. Crankcases are delivered by the (outside) maker to a storage yard just outside the machine shop and adjoining the normalizing ovens. All-metal trucks are loaded with crankcases, are moved into the ovens, to remain for a stated period, and then are pushed into the machine shop. Here they are unloaded near the shot blast booth, where the crankcases are cleaned preparatory to starting their journey down the crankcase line.

From the shot blast booth the crankcases are carried on a roller conveyor through all of the machining operations

Crankcase Conveyor Line (Below) Dividing into Two Parts to Reach Two Milling Machines for First Machining Operations (See D in plan)



Straight-Eight Engine (Above) Leaving the Assembly Line (the Parallel Bars in Right Foreground) for Block Test (See E in plan). Numerous test stands appear in the background. The motor moves to the block test by means of an overhead monorail conveyor with a special carrier attached

to the motor assembly line. After leaving the shot blast booth, they pass through a small spray booth, where they are given a sealing coat on the inside of the case. A few feet farther along the line the conveyor track divides into two parts, so that the crankcases can pass under two Ingersoll milling machines for the first machining operation. The division of the track at this point permits two crankcases to be milled at the same time, delay in the movement of material down the conveyor line being thus avoided.

After the crankcases have been milled, the two tracks are merged again into one for continued progress along the line. For some machining operations it is necessary to remove the crankcases from the conveyor by means of an overhead hoist, to place them in the proper position to be machined.

The crankcase conveyor line is paralleled by other lines along which parts going into the motor are trans-



Freight Car on Depressed Track (Above) Showing Material Being Unloaded to Frame Assembly Line. Floor of freight car is level with floor of building. (See A in plan)

Chassis Assembly Line Looking Toward the Spray Booth (C in plan). Frame conveyor operates at a speed of 15 in. a minute for a production schedule of 100 cars a day. Frames (upside down) are lifted on to the conveyor by means of a special carrier suspended from a hand crane

ported. For instance, bearing caps, connecting rods, fly-wheels and pistons have separate roller conveyors along which they progress to a point where the connecting rods and pistons are assembled.

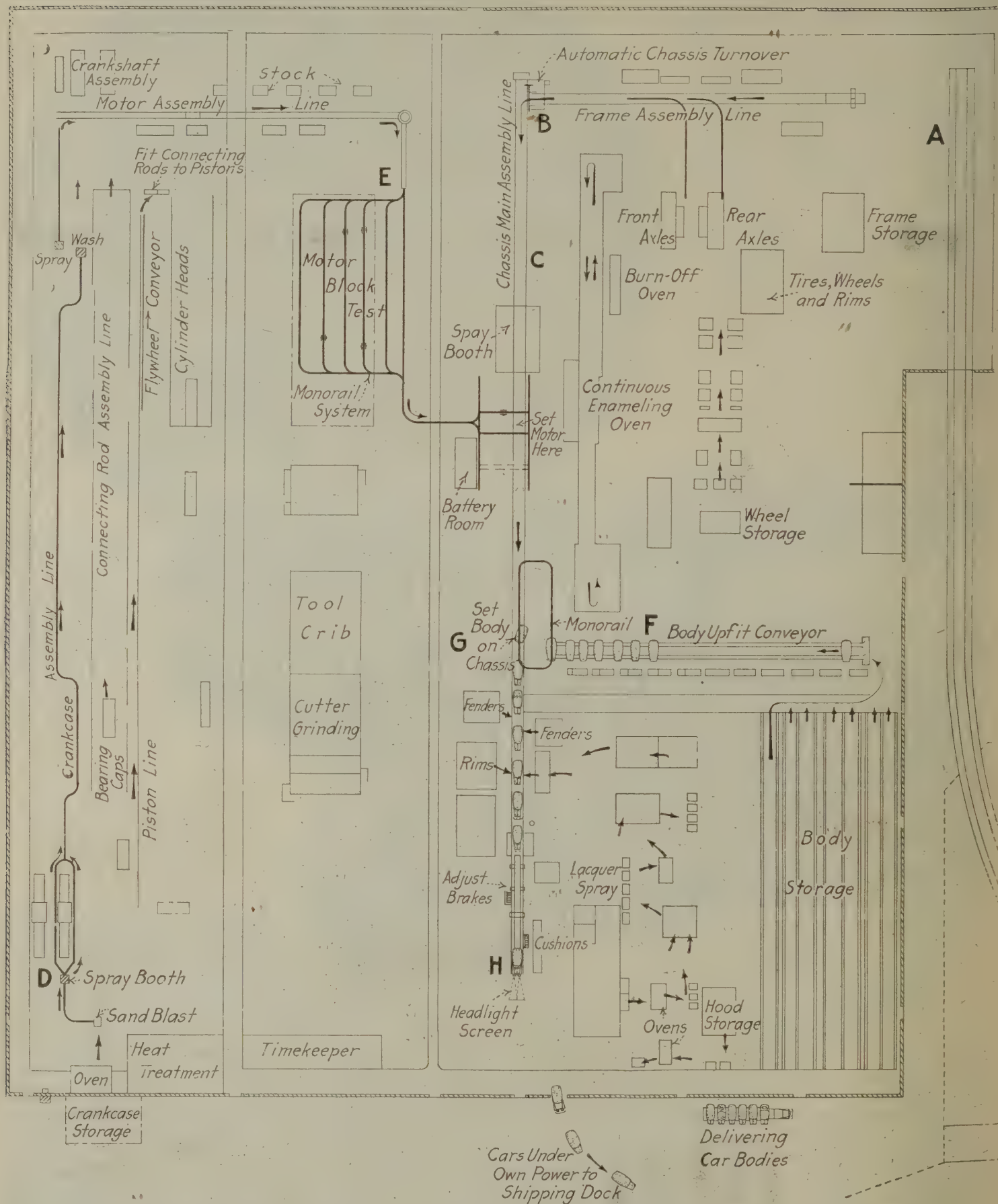
At right angle to the crankcase line is the motor assembly conveyor line. Approximately 175 ft. in length, this line consists of an iron framework supporting two parallel iron bars located at a convenient working height. Small special holders, which are attached to each of the four corners of the motor, rest and slide on the bars, thus permitting the motor to be suspended between the bars. In this position the motor can easily be moved by hand down the assembly line. When the motor starts its journey down the line it is upside down; it is righted at the proper place by a turnover fixture devised by the company.

Reaching the end of the assembly line, the motor is lifted

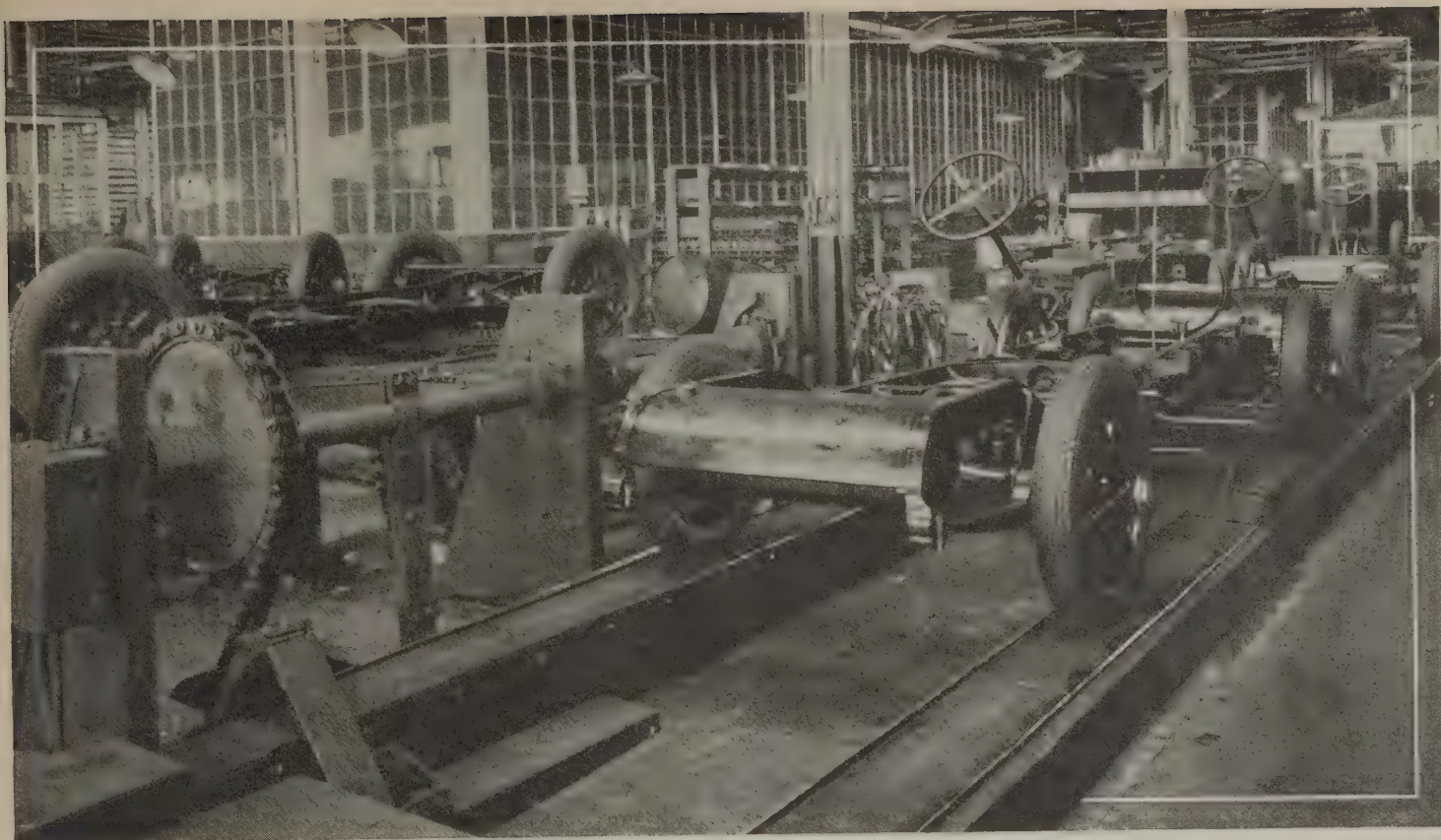
by a special carrier depending from an overhead monorail and is moved to the motor block test. This part of the shop is served by an extensive monorail system installed by the Loudon Machinery Co., Fairfield, Iowa. After the block test has been completed, the motor is taken by monorail to the main assembly line, where it is lowered into position in the chassis.

Fenders, running boards, side shields and small parts are run through a burn-off oven near the mechanical enameling oven, where they are thoroughly cleaned by burning. They are removed to stands and sanded and then delivered to a small dust-proof room, where they are dipped in a primer coat. A conveyor carries them along, draining as they go, through a continuous oven, where the priming coat is baked on. At the end of the oven the operation is repeated with a coat of enamel, after which the parts are

Assembling the Marmon Car in Plant No. 2



LAYOUT of the Assembling Portion of the Marmon Plant, Showing Flow of Materials and Parts from Points of Receipt into the Finished Car, Ready to Drive Away Under Its Own Power. Letters A to H refer to photographs showing how the various items are handled. It will be noted that the engine is assembled at left and the chassis at upper right. The body strikes across the center and all come together in the main line running from top to bottom of drawing



At Beginning of Car Assembly Line, Showing the Chassis Turnover Fixture (B in plan) in the Left Foreground and the Flat Traveling Conveyors Which Make It Possible for the Chassis to Be Moved Along the Assembly Line Without Moving the Wheels

inspected and delivered to the assembly line. After once being put on the conveyor, the parts are untouched by workmen until they are completely enameled and ready for use. The continuous enameling conveyor is 195 ft. long and travels at a speed of 18 in. a minute for a production schedule of 100 cars a day.

In addition to the various handling arrangements already described, the company uses electric lift trucks rather extensively for moving stock about the plant. For example, lift platforms are taken by electric trucks to the doors of freight cars which are to be unloaded. Here workmen remove the material from the cars by hand and place it on the platforms. When the platforms are loaded to capacity, they are carried by electric truck to the points in the assembly lines where the material is needed.

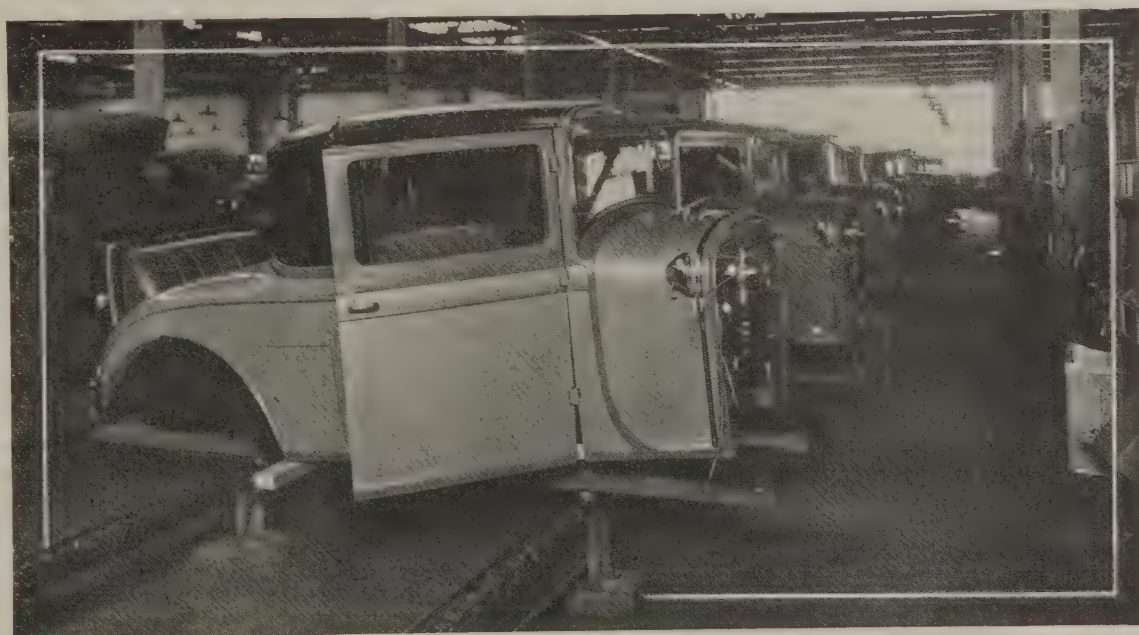
The roller conveying system in the machine shop was

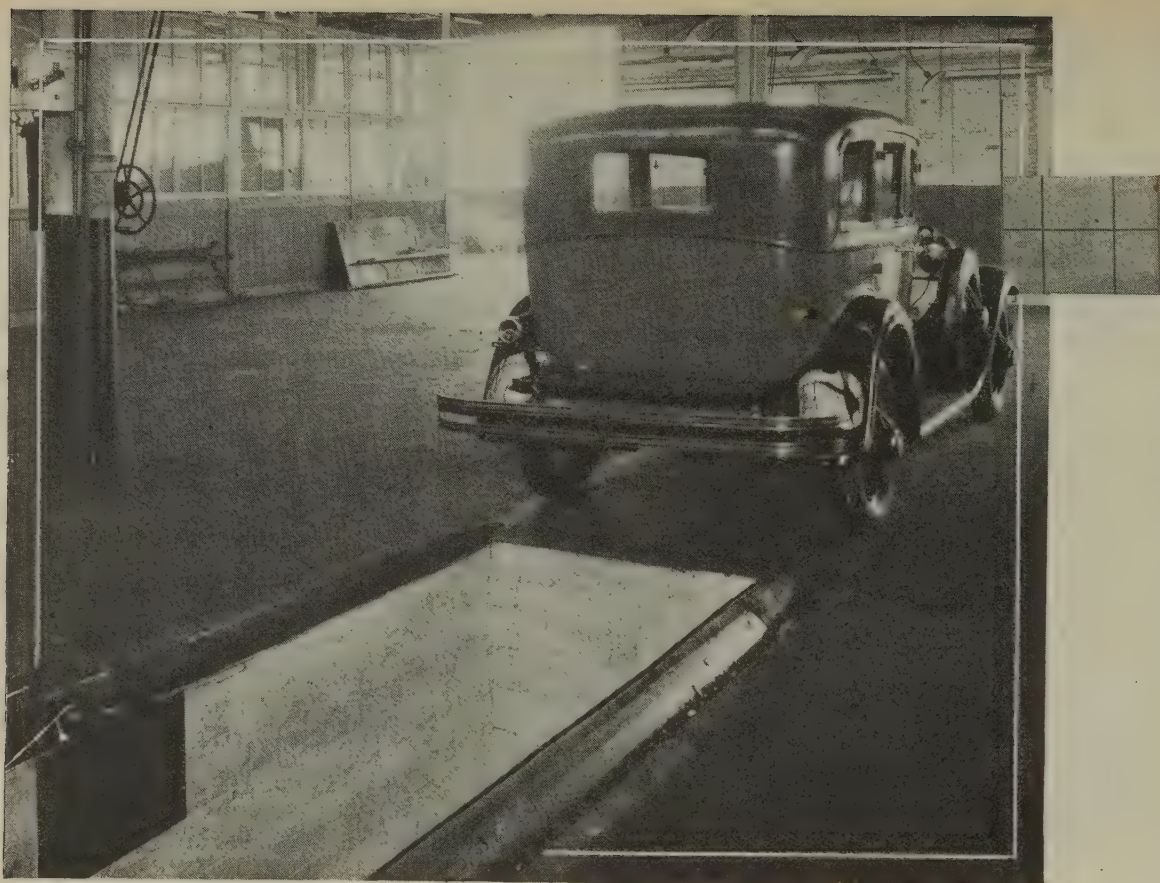
manufactured and installed by the Mathews Conveyor Co., Ellwood City, Pa. However, much of the mechanical handling equipment, especially along the assembly lines, was designed and installed by the Marmon company.

Study of the plan on the opposite page shows how well the entire series of assembling operations has been dovetailed into a completed whole. One entire section—the left side of drawing, and nearly half the total area—has been set aside for putting the engine together, and testing it as an assembled unit. It then passes to the main assembly line at almost the center of the picture.

Meantime two other operations, under way simultaneously with the first, have prepared the chassis to receive the engine and the body to be placed upon the chassis. In both cases the movement is from the right of the plan toward the left, the chassis progressing along the top and the body

Bodies on Conveyor (F in plan), Where Their Fitting Is Completed Before They Are Mounted on Chassis. The body up-fit conveyor consists of two roller chain conveyors paralleling each other, 3 ft. apart. Bodies move along this line at a speed of 14 in. a minute for a production schedule of 100 cars daily





End of Car Assembly Line Just Beyond the Inspection Pit, Showing at Extreme Left the "Trip" in the Track, Which Operates a Counter Device and Focuses the Screen for Headlights (See H in plan). This screen appears at right of illustration. From this point the car is driven under its own power to shipping dock

squarely across the middle. Speeds of conveyors are worked out to synchronize the various movements to such effect that there will be no waiting at any point along the line.

These speeds are task-setters for the men, whose motions fit in with those of the mechanical appliances in forming a completed car within an appointed time.

What Standards in Industry Mean; Some Limitations

THE May number of the *Annals* of the American Academy of Political and Social Science is given up completely to the subject of standardization in industry and what it means to manufacturer, distributor and consumer. There are 36 articles, each from an expert in some particular line of the work, and divided into four groups. Part I covers standardization programs in industry; part II, standardization programs of specific industries; part III, standardization programs outside of industry; part IV, standardization and the consumer. The latter includes the steps which are being taken by the Government to protect the consumer through certification of standard specifications.

In a foreword, Richard H. Lansburgh, professor of industry at the University of Pennsylvania, says, among other things: "That the development of standardization in industry has been one of the most significant phases of the new industrial management has come to be known to even those who have but a passing knowledge of modern industrial conditions. . . . That there are limitations to the extent of standardization is fully realized by all who have been associated in the work, and those articles which dwell on this phase should serve as a ready reference check on enthusiasms which carry a good cause to extremes."

One feature brought out in a discussion of simplification and standardization in Europe concerns British standardization. A considerable sum of money has been appropriated to have existing British standards translated into foreign languages. This has for its object the possibility of use of these standards by foreign purchasers, thus increasing the market for British goods.

One of the limitations on standardization is pointed out by K. H. Condit, editor *American Machinist*. It relates to the

early development stages of the automobile, 25 years ago. "Most of the designs were experimental and were subject to radical changes each year, and sometimes oftener. Any effort to standardize then would have resulted either in failure or in a retarding of development quite as bad."

Later on Mr. Condit says, regarding international standardization: "Size standardization is almost impossible because of variations in measuring units. The great bulk of the [world's] manufacturing is done in Great Britain and the United States, to English units, while the minor part is done in many other countries, to metric units. A little progress [toward standardization between the units] has been made with ball bearings and screw threads."

This standard size as between measuring units is brought out differently in another article devoted to filing equipment. Filing cards are now standardized in inches: 3 x 5, 4 x 6, 5 x 8, etc., in place of the metric system used in the early development of this phase of industrial control. Today the only metric cards in use, with few exceptions, in the United States are found in libraries or scientific institutions.

This question of filing equipment goes rather deeply into standards for steel filing cabinets and drawers. Standards are laid down for the various panels and dividing elements, both as to gage of steel and as to grade of sheets. A sample specification is given, with considerable discussion as to reasons for the adoption of each item.

Cross indexing in the rear of this 282-page volume occupies no less than 9 pages. This should be of great value to anyone consulting the volume, which is primarily one of reference.

Wear Testing of Various Metals

Steels and Bronzes Covered in Methods Detailed

By Research Men — Efforts to Make
Laboratory Simulate Service

SEVERAL papers presented before the thirty-first annual meeting of the American Society for Testing Materials at Atlantic City in the last week of June dealt with tests of metals or other materials, to determine their resistance to wear. Both steels and non-ferrous metals were included in the four papers, of which abstracts appear below.

Wear Testing of Various Types of Steels

IN this paper, which was presented by J. M. Blake, engineer of tests American Manganese Steel Co., Chicago Heights, Ill., apparatus was described which has been developed to test the resistance of metals to abrasion under so-called wet grinding conditions. In principle, the machine is an accurately controlled grinding machine in which all conditions as to abrasive, pressure, speed, time and moisture or other liquid content are under the operator's control.

It is possible to approximate any given set of practical requirements. The wear is measured by the amount of metal worn off in approximately 15,000 ft. of travel at a speed of 125 ft. a minute. A pressure of 50 lb. to the square inch is used on a testing face of approximately 3 sq. in. The wear thus determined is expressed as the ratio of wear loss compared with a standard (commercially pure iron) at 100. By varying the abrasive used it has been possible to develop alloys specifically adapted to particular field requirements.

How the Abrasive Is Held to Its Work

Pressure between specimen and abrading service can be adjusted from 0 to approximately 500 lb. to the square inch. The pressure can be set or read without stopping the machine. The specimen engages the abrasive coated copper surface at an angle of about 30 deg. This acute forward angle serves to funnel the powdered abrasive between the gliding surfaces. The abrasive is deeply indented into the soft copper ring which serves as the bond for holding and forcing the particles of abrasive across the surface of the specimen.

On the equipment described, which has a ring 4 ft. in diameter, over the periphery of which the specimen is run, the standard test is 1200 revolutions. This gives approximately 15,000 ft. of travel, as above. The amount of metal worn off during such a test may vary from 3 gm. for some exceptionally hard steels to 150 gm. or more for alloys with a high abrasion factor. This Fahrenwald abrasion factor against sand, for several well known materials together with several new very hard alloys, is as follows:

Standard specimen (commercially pure iron) ..	100
Merchant bar iron, annealed	92
White iron	88
Manganese steel	77
Tool steel, hardened	76
White iron, chilled	72
High-speed metal, hardened	57
Stellite (welded wearing face)	51
Amsco alloy No. 459 (welded wearing face) ...	31
Amsco alloy No. 459 (as cast)	10

Wearing Qualities of Tire Chains

TO study the wear-resisting properties of steel for automotive tire chains a wear test developed was described in a paper by W. H. Parker, research engineer American Chain Co., Bridgeport, Conn. Specimens may be of almost any shape, including chain links already formed. They are held at constant pressure against a rotating alundum grinding wheel of which the surface is kept continually dressed. Automatic record is obtained of the number of revolutions required to produce a given depth of wear.

As the service to which tire chains are subjected involves the relation between impact and wear resistance, a somewhat theoretical discussion is given of this relation as applied to the links of a tire cross chain. Some results of wear tests were reported. Comparison with service tests indicates that the laboratory test rates various materials in practically the same order as road tests, while giving a much greater distinction between them. The laboratory test furnishes a relatively quick means for comparing different materials and different heat treatments.

Relating Laboratory Tests to Road Tests

Making a comparison between a machine test and a service wear test in which the different materials were treated alike in each case, one material showed a loss in weight of 5 per cent in service and 14.4 per cent in the machine. A second material showed losses of 7.7 per cent and 19.6 per cent in service and machine. A third material showed 8.4 per cent and 26 per cent; a fourth, 8.6 per cent and 23.7 per cent; a fifth, 9.1 per cent and 27 per cent. Only in the cases of the third and fourth was the order of resistance varied as between the two kinds of tests.

As the relatively ideal conditions under which laboratory determinations are made do not obtain in service, it is somewhat difficult to check the results of the one with the other. For some materials certain other factors may have an influence upon the life of the cross chain, such as liability to failure under repeated impact or tendency of certain sections of the link to develop cracks under heat treatment. In general, however, it has been found that the correlated results of the laboratory tests give a reliable index of the service qualities of cross chains.

Wearing Tests of Manganese Steel

DEVELOPMENT of a test for the wearing properties of 12 per cent manganese steel was described in a paper by John Howe Hall, metallurgical engineer Taylor-Wharton Iron & Steel Co., High Bridge, N. J. It was endeavored to find a test which would give results comparable with service experience. A number of crude methods were abandoned after trial, usually because they were too slow or too clumsy or did not give a true indication of the wearing properties.

Finally it was concluded to adopt the method of crushing known amounts of hard stone in a small laboratory stone crusher, in which the jaws were made of the steels

to be tested. The loss in weight of the jaws was ascertained at regular intervals. More recently wear tests have been made in the Ansler and the Brinell abrasion machines. But it was found that these machines do not simulate the particular kind of wear which manganese steel successfully withstands in service: that is, abrasion associated with severe cold working, such as obtains with the pressure exerted by the crushing of hard material. Hence the tests went back to the tedious but reliable jaw crusher.

In the paper details are given of tests in such a crusher of manganese steel, plain carbon steel, nickel steel, chromium steel and nickel-chrome steel. It was found that manganese outwore carbon steel about 10 to 1. Chromium decreased the wear of the pearlitic steels very little, if at all, but nickel decreased that wear to a marked extent.

Considerable Work Needed for Dependable Results

Two types of crushers were used, one with fixed jaws and the other with moving jaws. They did not give exactly the same line-up of materials, so far as resistance to wear was concerned, but both showed the 12 per cent manganese steel far superior to any of the others tested. It was found that when the jaws were first put to work the wear was much more rapid than at a later period. This is attributed in all of the specimens to surface decarburization of the steel. In the case of the manganese steel, and perhaps in some of the others, it is attributed also to the fact that the surface later becomes work-hardened by the pressure of the stone being crushed, and then gives greater resistance.

For this reason no test is considered of any value whatever in which only a few hundred pounds of stone are crushed. It can easily happen that a steel which would give excellent results on extended tests wears rapidly at first on account of a decarburized skin. Another and an inferior steel, so treated as to be less decarburized at the surface, might at first appear to be better than the good steel whose surface was decarburized. It has been the practice in these tests to weigh the jaws after each 4000 lb. of stone crushed. The loss in weight in grams is recorded and the loss in grams per square inch of jaw surface to each 1000 lb. of stone crushed. No high degree of accuracy is claimed for the results, but they are regarded as a reliable indication.

Tests of Railroad Bearing Bronzes

RESULTS of tests of copper-tin-lead alloys, both chill-cast and sand-cast, were reported in a paper by H. J. French, senior metallurgist United States Bureau of Standards, Washington. These tests were made for wear and the alloys were tested under friction without lubrication at temperatures from 70 to 300 deg. Fahr., under friction with a lubricant at 70 deg. and under tension with single-blow impact and repeated pounding at temperatures from 70 to 600 deg.

Generally speaking, chill-cast bronzes were less resistant to wear and to notched-bar impact than sand-cast bronzes. They were, however, more resistant to pounding and tension.

Increase in the proportion of lead, particularly in the range between $\frac{1}{4}$ and 10 per cent, improved the wearing properties but lowered the resistance to pounding, impact and tension. Increase in the tin component was found to improve all these properties. Increase in the temperature at which the test was run generally decreased resistance to tension, impact, pounding and wear. The changes from this cause were most marked between 350 and 600 deg.

High-Lead Bronzes Without Lubrication

In practical applications there are decided advantages in the high-lead bronzes for service where lubrication can-

not be maintained. These bronzes containing about 12 to 25 per cent of lead did not wear so rapidly as the low-lead bronzes, nor assume so rough a surface, in tests without lubricant. If wear is the chief factor to be considered, and an approximately constant ratio is maintained between copper and tin, variations of lead within the range of 12 to 25 per cent seem unimportant.

Where it is important also to have a high resistance to pounding and a high static strength at both atmospheric and elevated temperatures, lead may advantageously be kept near the low limit of the range mentioned. Its strength and toughness to notched tests decrease as the proportion of lead increases. These differences, however, are relatively small, and for many purposes bronzes with from 15 to 25 per cent of lead are practically interchangeable.

When mechanical properties become of primary importance, and lubrication can be maintained so that wear is of secondary importance, there are advantages in low lead and high tin. Both these features favor high strength and resistance to pounding.

Tests Indicative, When Not Fully Conclusive

No one selected laboratory test yielded information adequate by itself for general comparisons. Each test, however, contributed valuable information in developing the characteristics of the different bronzes. In alloys, with practically constant ratio of copper to lead, an increase in tin from 0.7 to about 5 per cent resulted in a marked improvement in wearing properties in tests without lubricant. Further increase in the tin, however, up to 10 per cent did not materially modify the wearing properties, but resulted in improved tensile strength and resistance to pounding.

It has been shown that reproducible wear tests can be obtained in the laboratory. When combined with suitable mechanical tests, the results give comparisons consistent with practical experience.

Accuracy of Analysis for Oxygen and Hydrogen in Steel

In recent years much work has been done both here and abroad on the accurate determination of gas in metal. In order to compare the methods used in different steel-producing countries, the United States Bureau of Standards prepared a uniform sample of ingot iron, and distributed portions to various investigators. The iron contained 0.04 carbon, 0.03 manganese, 0.02 sulphur and 0.006 silicon. Analysis for gases gave the following results:

	Per Cent	
	Oxygen	Hydrogen
United States Bureau of Standards.....	0.058	0.0006
Institut für Eisenhüttenkunde.....	0.059	0.0008
University of Sheffield.....	0.051	.....

The first two laboratories use a vacuum fusion method, melting in a graphite crucible contained in a high frequency furnace. The American method weighs the evolved gases, while the German method measures their volume. Hydrogen reduction of a solid sample (to which is added an anti-mony-tin alloy) is used at Sheffield.

It may be concluded that the three methods are of the same order of accuracy, and give comparable results when carefully performed by skilled analysts.

Industrial Standards No. 206 and 212 of the Bureau of Foreign and Domestic Commerce have been prepared in Portuguese text, and are on sale by the Superintendent of Documents, Washington, for 5c. each. These are respectively translations of American Society for Testing Materials standard specifications for carbon steel locomotive forgings, and for carbon steel and alloy steel forgings for general purposes.

Building Industrial Stock Values

Prices at Which the Return Is Only That of a Good Bond Need
Not Be Called High If Management's Policy
Insures Continued Success

BY STERLING H. BUNNELL*

WHEN, as at the present time, the common stocks of large, well-managed industrials reach prices such that the rate of return on the investment is no more than bond interest, it is commonly said that the prices of these stocks are too high. This may be so, in the sense that when such a belief is generally held, slackening of demand is easily possible, and prices consequently may fall. The feeling is general among old and experienced investors, who gained their knowledge by owning and trading in Government and public utility securities, that industrial stocks are peculiarly hazardous investments, and that common stocks in particular should be bought only by speculators and then only on a basis of large dividend return.

Stocks and Bonds Hang Together

THIS reasoning is based on the idea that bonds and such preferred stocks as are secured by fixed assets can somehow be considered safe in any event against interruption of interest and loss of principal value, so that the rate of income paid, though low, is permanently assured. Bonds are frequently backed by mortgages on real estate, and the regular payment of interest is the first charge against earnings. But it is important to remember that, when a business ceases to earn a profit, the payment of interest must necessarily be suspended, and that it is not easy to liquidate the shrinking assets of an unprofitable concern so as to protect the bondholders' principal. In such an event, stockholders and bondholders alike lose their income, and the latter are only a degree less likely than the former to find their principal also lacking.

Only in the case of indispensable industries, like main-line railroads, is it generally possible for bondholders to exert their rights of foreclosure without fatal consequences or wiping out much of the value of the property. Industrials are combinations of plant, inventory and operating organization which can survive only if kept complete and in working order. The owners of a class of securities guaranteed by a mortgage on a part of such an inseparable combination hold Shylock's bond, which if collected would destroy the whole organization. Wise and upright judges have often intervened to prevent foreclosures likely to be

of little advantage to the bondholder and disastrous to the other interests concerned.

Every Form of Security Should Yield a Good Return

MANIFESTLY, successful operation of the corporation, so that a liberal percentage of profit is earned on the entire invested capital, is the only real assurance of security for the bonds, as well as for the stock. If the business earns just enough for bond interest and no more, the bonds cannot be given a high rating. If earnings just cover bond interest and stock dividends, neither bonds nor stock have an assured future; for well-equipped, successful industrials frequently are "depleting assets," just like mines, and productive efficiency and marketing methods are allowed to deteriorate with time, until only an idle factory adapted for making an unwanted product is left to be liquidated at its scrap value.

Depreciation tends to decrease the productive efficiency of plant and equipment, and obsolescence may even destroy the value of organization, product and business as well. If industrials are not to have, like mines, a limited term of useful existence, their life and energy must be continually renewed by methods of progressive development. Well-managed industrials ought not therefore to be expected to pay out substantially the whole of their earnings, by granting to their common stocks dividend rates two or three times the rate of income customarily paid on bonds.

Right Handling of Surplus

FROM the policy of paying a moderate regular dividend on the common stock and reserving a considerable part of the total net profit undistributed there results an accounting surplus which, if properly employed, will provide effective security for stocks and bonds alike. The scope and degree of security afforded depends, however, on the way in which the accumulated surplus is utilized; for surplus profits are not usually held in the form of cash or cash equivalents. This surplus may be invested in increases to the stock of materials on hand or work in progress, which may signify either its useful employment in increased business to earn additional profit, or its useless locking up in an idle excess of goods which better management would be able

*Consulting engineer, New York.

MR. BUNNELL elaborates an idea that has had more and more attention in financial circles, and one that is giving a new investment standing to common stocks of industrial companies. He points out that well-equipped industrials may be "depleting assets," as mines are and cites with approval examples of the policy of treating common stocks like preferred, maintaining moderate regular dividends with the highest assurance of being able to continue them because of the wise use of surplus profits in development

to move and turn into cash. Again, surplus may be invested in additions to plant and equipment, capable (or incapable) of earning profit in proportion to the investment. As money cannot be "tagged" to locate the particular destination of each particular dollar, the accumulated surplus of past undivided profits, however invested in the business, may be considered to be just as, and no more, efficiently used in earning profits as the rest of the invested funds.

By investing it in the intangible asset of industrial development work, surplus may be even more effective in promoting the continuance of steady earnings. Industrials can be permanently successful only through an unceasing process of growth. Better methods and results, the discovery or adaptation of new products, and most of all, ever-increasing effectiveness of personnel, are required to cope with new conditions as and when they occur. Every function of industrial engineering is required in the constant endeavor to maintain and improve the operating efficiency of the large industrials. Research and invention are constantly employed to anticipate future marketing requirements and prepare to supply them. Selecting, training, retaining, insuring and satisfactorily paying the workers, superintendents and managing heads of the plants involve the maintenance of personnel department organization on a liberal scale of expenditure. All this development work looks toward insuring future success, and so is properly provided for by appropriations from the undivided surplus profit of previous years; but if treated as an element of present cost, the net amount for dividends would remain the same.

Function of Depreciation Reserves

DEPRECIATION reserves also, set aside by factory accountants as an item of operating expense so as to be included in cost accounting figures, can and should be utilized to strengthen the future position of the securities. As the depreciation charges do not represent actual expenditure, depreciation reserves, like surplus, usually offset investments in operating assets of inventory or accounts receivable, or additions to plant equipment which are not regarded as replacements or mere betterments. In modern, progressive industrials, plant and equipment are constantly being improved, so that the depreciation of that which is in use is continually balanced by the addition of entirely new equipment. By following this practice, these industrials always have plants so up to date that new money could not possibly construct more efficient ones. It would, of course, be possible to treat an industrial as a depleting asset, and so to invest the depreciation reserve in securities to form a sinking fund to reimburse the owners of the plant and wind up the business at a fixed date. But self-extinction is not the contemplated purpose of industrials generally. There need be no fixed span of corporation existence, if life and activity are constantly renewed by intelligent use of a portion of the earnings in development.

The Right Building Up of Security Values

IN the last twenty years a great corporation, which started with hugely watered stock, has steadily built up its effective investment until its securities represent a value far above par, although the rate of return on the market value is little more than current interest. Its plants, with respect to productive efficiency, are equal to the best. Another large corporation, with an output once classified as a luxury, with a few thousand possible purchasers among the wealthy small fraction of the population, has constantly developed product and methods of construction until the wildest assumptions of former enthusiasts have been surpassed by the cold facts of its operations. Another, holding fast to the rarely adopted principle of one unchanged design through many years, was all the time preparing by unadvertised development and the accumulation of huge reserves so that when the market for the standard design should become surfeited, a complete new design should be ready for

prompt production. This was done at the proper moment without the slightest disturbance to the financial security of the corporation, and production and distribution of the new product proceeded on the previous enormous schedule. Many other American industrials might also be cited as examples of the success of the policy of treating common stocks like preferred securities, by maintaining moderate regular dividends with the highest assurance of continued ability to pay them, because of the wise use of surplus profits in development.

Surplus held in reserve by investment in current assets or income-paying securities is available for maintaining dividends in periods of earnings below average; and when such a reserve is provided for this purpose, common stock may be expected to pay an income quite as steady as preferred stock or bonds. But as a reserve cannot be inexhaustible, the important thing is to maintain an average rate of income sufficient for progressive renewal of the life and usefulness of the industrial, in addition to a reasonable rate of return on the invested capital used in the business.

Stock Values and Purchasing Power of Money

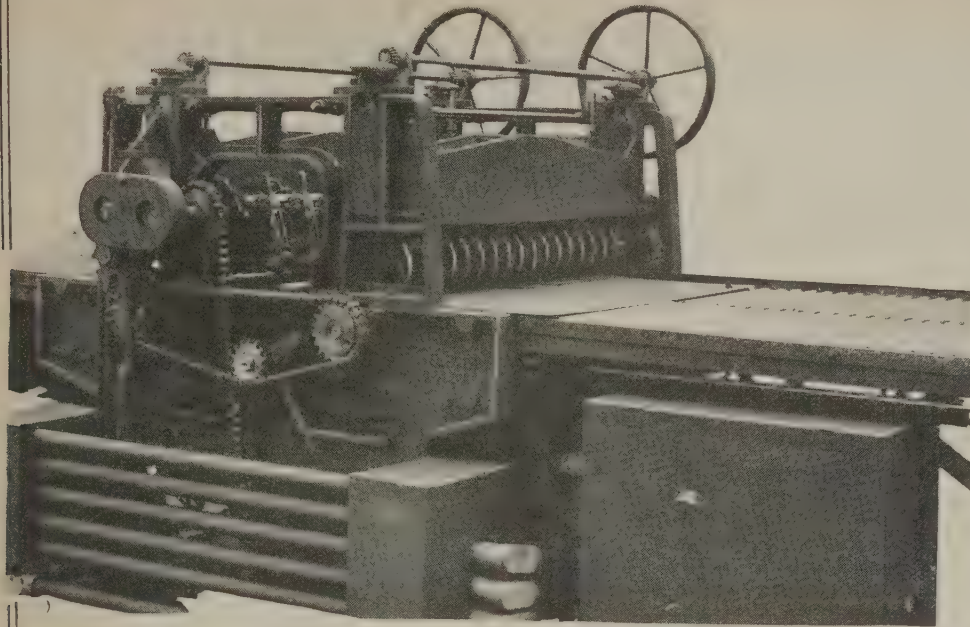
IT should be remembered that great changes in the purchasing power of money have taken place over a long period of years, and on the average the movement has gone a long way in the direction of reducing the value of the money unit. Owners of bonds and debentures have found that principal and fixed income alike have become less valuable in purchasing power, while standards of living have increased the demands on personal income. The owner of common stock possesses a fractional share in the value of the business, while the owner of bonds or debentures possesses only the equivalent of a certain number of dollars. The holder of common shares may reasonably expect that the prices of the securities will rise as affected by a general decrease in the purchasing power of money, and he may well prefer that accumulated surplus be used to develop further earning power, rather than held as a fund at interest and nothing else.

The policy of forward development, adopted by a large proportion of our industrials, has resulted in large increases in the market values of their shares. The common stocks of corporations so managed, paying steady, low rates of dividends from comparatively large surplus earnings, sometimes become known as "rich men's stocks," because they are bought and held by the wise and far-seeing investors who are generally found in the wealthy class, wherever they may have started in the process of accumulation of their savings. To these men, the steady increase of principal value is preferable to the receipt of high dividends which are uncertain of continuation, in the event of any severe disturbance to the accustomed routine of the business of the corporation.

Stock prices on the basis of returns little greater than for good bonds are not necessarily too high; certainly they are not to be so regarded if the shares represent participation in the assets of corporations which are managed so intelligently that permanently successful operation is virtually certain.

Notes on Molding Sand

Bulletin 266 of the U. S. Bureau of Mines ("Technology and Uses of Silica and Sand," by W. M. Weigel), includes a brief account of the properties of molding sand, a list of its principal sources, and a description of the quarrying, grading and washing methods used. Numerous footnotes referring to special writings on different phases of the subject are included. Other varieties of quartz used in the metal industries for furnace fettling, flux, grinding and polishing are given similar treatment. The bulletin may be secured from the Superintendent of Documents, Washington, for 40c.



Multiple Spot Welder for Making Fireproof Doors

A CORRUGATED reinforcing sheet is joined to an outside cover sheet in a number of places. This machine has 17 pairs of welding electrodes and nine transformers, to ensure adequate current to weld each spot. Sheets are gripped by feed rollers and driven forward in steps by a Geneva drive; at each halt the electrodes are lowered by cam motion, current is switched on, and a row of spots is welded simultaneously. A second set of driven rollers discharges the finished work. Capacity, 64 operations per minute, each making up to 17 welds, or 1088 welds per minute. (Agnew Electric Welder Co., Milford, Mich.)

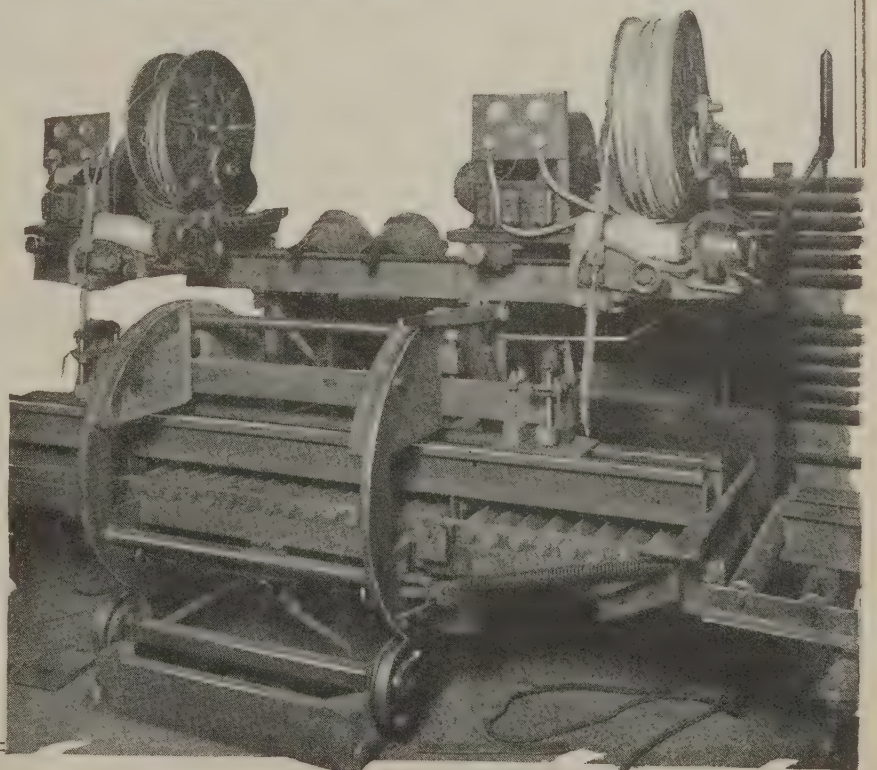
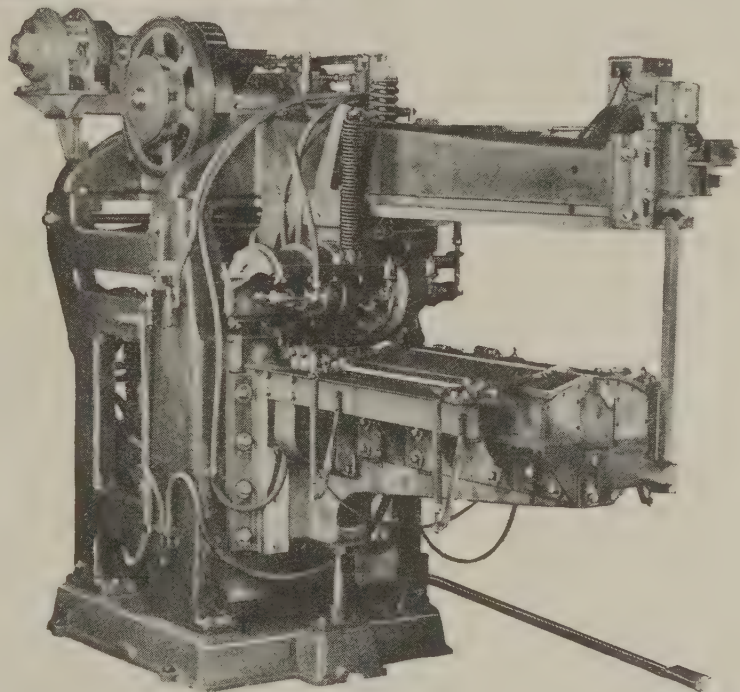
Welder for Side Seams on Steel Barrels

BENT sheets, up to No. 16 gage and 36 in. long, are placed on the lower horn and held down by magnetic clamps. The traveling roller die then moves over the seam at 20 ft. per min. Uniform current, notwithstanding the variable location of the roller die, is secured automatically by patented secondary lead construction and auxiliary choke. Heat is varied to conform to different thicknesses of metal and surface conditions by five transformer taps, change in roller speed (driven by rack and pinion through a Reeves variable speed drive), and change in tension of the pressure spring. Lower welding die is a $\frac{1}{2}$ -in. hard drawn copper bar, which can be filed and adjusted without removal. Roller die can be removed for dressing by loosening six cap screws. Dressing is necessary once a day, or after 3000 ft. of welds. (Thomson Electric Welding Co., Lynn, Mass.)

* * *

Machine for Making Railroad Ties Out of Scrap Rails

TIE plates are adjusted to exact position by jig and pneumatic clamp, and angle bars are held at ends with spring toggle clamps. Entire jig is rotated 45 deg. forward, and the far edges of the tie plates are welded to the rail tops by the two automatic heads; they are then rotated backward and the near edges are welded. The angle bars are welded on by hand-operated arc. Capacity, one tie every 5 min., using two workmen, a 1500-amp. motor-generator set with four welding circuits, and approach and delivery conveyors. (General Electric Co., Schenectady, N. Y.)



Passes for Hot-Metal Rolling

Calculations for Reduction of Height and of Area, Combined with Increase in Width, of Section Produced

BY H. A. SLATTENGREN*

IT is the purpose of hot rolling, generally, to reduce the cross-sectional area of the ingot or billet, and also in most cases at the same time to break up the crystalline structure of the ingot or billet and to refine the grain—in other words, “to make the metal.” This can be accomplished by means of various forms of passes, the choice depending upon how fast the metal can be worked. This consideration includes the size of the ingot or billet and the characteristics of the particular metal, and also upon what shape of product is desired.

We shall here discuss mainly the shapes and sizes of the various grooves which make up the passes used in hot rolling, and what relation they bear to each other. The ratio of reduction in height, and resulting reduction of area, is a certain measure of the efficiency of a pass, and this we shall use.

Material, size and speed of the rolls have certain and definite influences upon the behavior of the metal in the various forms of passes, and must be taken into consideration for accurate results. The larger roll forms the metal more gradually and with less shock, other things being equal, but tends to increase the spread (sideways), while an increase of speed increases the stretch (forward), which is in favor of efficiency.

However, the above effects are generally small enough to be within the limits of the adjustment provided by the space between the rolls, which should always be made as small as possible, consistent with the economical life of the pass. This life depends upon the amount of metal that can be passed through it before the grooves are worn so much that the rolls touch or “ride,” and cause the product to become oversize for subsequent passes.

Of course, the temperature of the ingot or billet generally determines the softness of the metal, and this is the main point of consideration in designing grooves. The comparative plasticity of the metals at the rolling temperatures, and not their hardness or other physical properties when cold, determines the relative sizes of the passes. For instance, a high-cobalt magnet steel at 2100 deg. Fahr. may be just as soft as pure iron at 1000 deg. Fahr., and would accordingly behave similarly in identical passes.

Shapes of Grooves

Rectangle into Rectangle—Plain Rolls

IF a 1-in. square of some metal at the right rolling temperature is passed between plain rolls set to give a reduction in height of 50 per cent, the height of the produced rectangle with rounded ends will be 0.5 in. The displaced area will be, of course, the same; some of this will spread sideways and some will stretch forward and disappear from the cross-sectional area. As this disappearance of area will be equal to the difference between the area of the original square and that of the product, it can be more or less readily determined by experiment, about which more later. The percentage of reduction of area is found from the area which stretches forward, divided by the original area.

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Let Rh equal the ratio of reduction in height; Ra , the ratio of reduction of area; W_o , the width of the original; and W_p , the width of the product. Then the general formulas for rectangle into rectangle, through plain rolls, are:

$$W_p = \frac{(1-Ra) W_o}{(1-Rh)} \dots (1) \text{ and } Ra = 1 - \frac{(1-Rh) W_p}{W_o} \dots (2)$$

It can be readily seen that W_p increases with W_o and Rh , but of course decreases as Ra increases. Similarly, Ra increases with W_o and Rh , but decreases as W_p increases. As an example, let us say that Rh is 40 per cent; Ra is 20 per cent and that W_o is equal to 3 in. Then, substituting in equation (1), we have:

$$W_p = \frac{(1-0.2) \times 3}{(1-0.4)} = \frac{0.8 \times 3}{0.6} = \frac{2.4}{0.6} = 4 \text{ in.}$$

If Ra is not known, by using W_p as above in equation (2) we get:

$$Ra = 1 - \frac{(1-0.4) \times 4}{3} = 1 - \frac{0.6 \times 4}{3} = 1 - \frac{2.4}{3} = 1 - 0.8 = 0.2 = 20 \text{ per cent}$$

This holds good very closely for any rectangle through plain rolls, after making a small allowance for the convex sides of the product, which is a comparatively easy matter to do.

Square Into Oval (Ellipse)

Pass a 1-in. square into an oval pass 0.5 in. high, which makes Rh equal to 50 per cent. The displaced area in this case will be somewhat more than 0.5 square inch. Because of the shape of an ellipse, the stretch will be more than it is for plain rolls, if the other factors are equal. It is well to note that the oval groove is always cut into the roll with a round tool which makes its outline an arc of a circle, but the discrepancy from that of an ellipse is so slight as to be negligible for our purpose. The area of an ellipse is equal to 3.1416 times the product of its half-axes.

If we again let W_p equal the width of the oval, the other symbols remaining the same, we get:

$$W_p = \frac{(1-Ra) W_o}{0.7854 (1-Rh)} \dots (3) \text{ and}$$

$$Ra = 1 - \frac{(1-Rh) \times 0.7854 W_p}{W_o} \dots (4)$$

Oval into Square or Diamond (Rhombus), with Major Axis of Oval Coinciding with Diagonal of Square or Diamond

$$W_p = \frac{(1-Ra) \times 1.5708 W_o}{1-Rh} \dots (5) \text{ and}$$

$$Ra = 1 - \frac{(1-Rh) W_p}{1.5708 W_o} \dots (6)$$

Side of square equals 0.70711 W_p ; and the area of a diamond or rhombus equals one-half of the product of its diagonals.

Square into Diamond—Side of Square Parallel to Diagonal of Diamond

$$W_p = \frac{(1-Ra) \times 2 W_o}{(1-Rh)} \dots (7) \text{ and}$$

$$Ra = 1 - \frac{(1-Rh) W_p}{2 W_o} \dots (8)$$

Diamond into Diamond—Diagonals Coinciding

$$Wp = \frac{(1-Ra) Wo}{(1-Rh)} \dots\dots(9) \quad \text{and}$$

$$Ra = 1 - \frac{(1-Rh) Wp}{Wo} \dots\dots(10)$$

Oval into Round

$$\text{Diameter of Round} = \frac{(1-Ra) \times 0.7854 Wo}{(1-Rh) \times 0.7854} \dots\dots(11) \quad \text{and}$$

$$Ra = 1 - \frac{(1-Rh) D}{Wo} \dots\dots(12)$$

Diameter of round—*D*—here corresponds to *Wp* in above equations.

Essential Information

WHEN designing a pass it is first of all necessary to decide upon the amount of *Rh* desired. This is governed by (1) the strength of the rolls; (2) the gripping angle, which is usually about 30 deg. from the vertical axis of the roll; and also (3) by the amount of reduction which the particular metal will endure without damage. Metal in the ingot form generally requires careful and easy rolling until its structure is sufficiently refined for the higher reductions. After this, reductions in height up to 50 per cent may be used with safety. It is in the interest of efficiency and economy, of course, to "hit the work" just as hard as it will stand, because, as shown by above equations, *Ra* always increases with *Rh* if other things are equal.

We may decide to use the same *Rh* throughout. But if we desire to keep the ratio of width to thickness of the oval more or less uniform, it will be necessary to decrease *Rh* as the billet gets smaller and cooler—in other words, when the spread sideways increases. It seems to be an invariable rule that the harder the metal is, at time of rolling, the more it spreads sideways, and vice-versa.

For convenience in illustrating, let us assume *Rh* to be 50 per cent throughout. Theoretically, *Ra* does not vary with the size of billet under the same *Rh* and shape of pass. But it does in practice, due to differences in rate of cooling and to the fact that the size of rolls is not changed proportionately.

Determining *Ra* and *Wp*

To proceed, we get sample lengths of the metal to be rolled in the following sizes of squares: 0.25 in., 0.5 in., 1 in., 2 in., 3 in., 4 in. and as many more as required, depending upon the sizes to be rolled. These are passed at an *Rh* of 50 per cent (as decided upon above) between plain rolls of a material, size and speed corresponding to what the actual rolling conditions will be.

From the round-ended rectangles produced, it is easy to compute the amount of *Ra* for the different sizes. They may be plotted on suitable cross-section paper, so that the *Ra* for intermediate sizes may be found from the curve. This done, *Wp* may be computed also for any size of rectangle into rectangle, and a curve again plotted for convenience, if desired, which may be checked by scaling the width of the rectangles rolled as above.

We know now the *Ra* and *Wp* for any size, within the range, of rectangle into rectangle for the metal in question. Let us compare the equations from above:

$$Wp = \frac{(1-Ra) Wo}{(1-Rh)} \dots\dots(1) \quad \text{and} \quad Ra = 1 -$$

$$\frac{(1-Rh) Wp}{Wo} \dots\dots(2) \quad \text{Rectangle into Rectangle.}$$

$$Wp = \frac{(1-Ra) Wo}{0.7854 (1-Rh)} \dots\dots(3) \quad \text{and} \quad Ra = 1 -$$

$$\frac{(1-Rh) \times 0.7854 Wp}{Wo} \dots\dots(4) \quad \text{Square into Oval.}$$

$$Wp = \frac{(1-Ra) \times 1.5708 Wo}{(1-Rh)} \dots\dots(5) \quad \text{and} \quad Ra = 1 -$$

$$\frac{(1-Rh) Wp}{1.5708 Wo} \dots\dots(6) \quad \text{Oval into Square or Diamond.}$$

$$Wp = \frac{(1-Ra) \times 2Wo}{(1-Rh)} \dots\dots(7) \quad \text{and} \quad Ra = 1 -$$

$$\frac{(1-Rh) Wp}{2 Wo} \dots\dots(8) \quad \text{Square into Diamond}$$

$$Wp = \frac{(1-Ra) Wo}{(1-Rh)} \dots\dots(9) \quad \text{and} \quad Ra = 1 -$$

$$\frac{(1-Rh) Wp}{Wo} \dots\dots(10) \quad \text{Diamond into Diamond.}$$

$$\text{Diameter of Round} = \frac{(1-Ra) Wo}{(1-Rh)} \dots\dots(11) \quad \text{and} \quad Ra = 1 -$$

$$\frac{(1-Rh) D}{Wo} \dots\dots(12) \quad \text{Oval into Round.}$$

Taking equation (1) as a basis for comparisons, it is

seen that the *Wp* for equation (3) is $\frac{1}{0.7854}$ or 1.273 times

the size of *Wp* for equation (1). Similarly, *Wp* in (5) is 1.5708 times the *Wp* in (1); the *Wp* in (7) is twice that of *Wp* in (1). The *Wp* in both (9) and (11) are the same as *Wp* in (1). The above is true only when *Rh*, *Ra* and *Wo* are the same in all cases, an unlikely condition, so the comparison is cited only for general information.

However, with the *Ra* it is possible to draw a considerably more definite relation between the different shapes of passes. For instance, it is plain that the *Ra* in equation (4) is larger than *Ra* in (2) for the same *Rh* and *Wo*. However, the numerical relation is not so simple to arrive at. For instance, if we divide (4) by (2), we get:

$$\frac{(1-0.7854) Wp}{(1-Wp)} = \frac{0.2146 Wp}{(1-Wp)}$$

This for our practical purpose does not mean so much. But it is possible to arrive at a comparative value by means of a direct example, as follows: Let *Rh* equal 50 per cent, *Wo* equal 1 and *Wp* equal 1.5 in equation (2). Substituting, we get:

$$Ra = 1 - \frac{(1-0.5) \times 1.5}{1} = 1 - (0.5 \times 1.5) = 1 - 0.75 = 0.25 = 25 \text{ per cent.}$$

For the same values in equation (4):

$$Ra = 1 - \frac{(1-0.5) \times 1.5 \times 0.7854}{1} = 1 - (0.5 \times 1.178) = 1 - 0.589 = 0.411 = 41.1 \text{ per cent.}$$

It is both interesting and instructive to draw comparisons between *Wp* and *Ra* for the different equations. But when we try to arrive at a direct relation, we find them so cumbersome that they have little practical value to roll pass designers. Several attempts have been made to make graphical comparisons and to evolve formulas, and with some success. The following is an equation which is supposed to apply only to steel, but will hold good for any metal with the same softness and characteristics as steel at the rolling temperature. It is of European origin, I believe:

$$B = 1.93C - 0.465H,$$

where *B* equals the width of the oval; *C* equals the side of square and *H* equals the height of the oval, which must be assumed according to the amount of reduction desired. A formula is not necessary to get the dimensions of the new square, as these can be determined by the ratio of reduction. There is little danger that the square will become over-filled, but if the smallest possible square is used, it is safer to make the angles of the square grooves from 91 deg. to 94 deg., to prevent forming a seam along the bar.

A process of manufacturing chromium plate has been placed on a commercial basis by the Apollo Metal Works, La Salle, Ill. It is offered as Apollo Chrome, "in sheets available for immediate fabrication without plating."

Cupola Operations Are Changing

Cooling of Reduction Zone Expected to Improve Thermal Economy—
Desulphurizing by Alkaline Slags

IMPROVEMENTS in cupola practice, principally of a thermotechnical nature, are attained by replacing coke with other fuels, chiefly in liquid or powdered form, by cutting down the formation of carbon monoxide in the reduction zone by a secondary air combustion of this gas, and by heating the air blast. Metallurgical improvements which are sought in the operation of cupolas are directed toward a reduction in the accumulation of sulphur and the production of a high-grade low-carbon and highly superheated cast iron.

The replacement of coke by other solid, liquid or gaseous fuels does not offer any advantage either from a technical or from an economical point of view. On the other hand, satisfactory operating results have been attained by the use of auxiliary oil firing, which, however, is uneconomical because of the high price of fuel oil. Similar advantages have been obtained with auxiliary pulverized coal firing, such as has been employed since 1921 at the Babcock works in Oberhausen.

Effect of Cooling Reduction Zone

The problem of diminishing the formation of carbon monoxide in the reduction zone, which is extremely detrimental to the thermal economy of the cupola, led to the introduction of a secondary air supply, but without obtaining satisfactory results. On the other hand, the method of Corsalli, which consists of making the coke more difficult to burn by drenching it with slacked lime, seems to offer some advantages. A question of great interest, from the theoretical as well as from the practical point of view, is whether it is possible to effect any physical or chemical reactions through a cooling of the reduction zone, which will make for thermal economy in operating the cupola. Attempts have been made to bring about such a cooling through the blowing in of cooled waste gases by a spray of steam or of water, or by strongly dampening the coke charges.

Water Spray Lowers Coke Consumption

The introduction of a water spray is favored by the Vulkan-Feuerungs A.G. in Cologne, which is said to have brought about a considerable reduction in coke charge consumption in the case of cupolas for continuous operation. After it had become evident that combustion of the carbon monoxide in the reduction zone by introducing a secondary air supply was not practicable, Greiner and Erpf in 1885 attempted, with good results, to bring about such combustion in the preheating zone of the cupola. The method of Greiner and Erpf has worked well but has required extremely high furnaces, which are seldom practicable on account of the lack of space in foundry buildings. The Poumay cupola, which originated in Belgium, is an improvement on this type. Data available on the operating results, however, do not warrant a conclusive opinion on the merits of the process.

Schuermann Cupola Passing Out

The most interesting cupola of special design is the Schuermann furnace, which made its appearance in 1922. [THE IRON AGE, Oct. 19, 1922, and Nov. 22, 1923.] In this type, part of the combustion gases is taken directly from the combustion zone and the reduction zone respectively and utilized for the heating of the air blast by means of

air heaters. The majority of the Schuermann cupolas that were in operation from 1922 to 1925 had been erected in plants which were cramped for space, and did not come up to expectations. In isolated instances, it is said, they have given a good account of themselves. In every case, however, these cupolas permit the use of cheaper grades of metal and a certain saving in coke; neither of these advantages is sufficiently important as yet to warrant the additional expense of this furnace equipment in the smaller foundries. The Schuermann cupola at the outset, before a familiarity with its construction had been acquired, was largely overestimated. At the present time, when it is possible to obtain excellent standard equipment and to operate it successfully, the Schuermann cupola is no longer seriously considered.

Alkaline Slags Are Strong Desulphurizers

Walter has focussed attention on the strong desulphurizing action of pure alkaline slags. The Walter desulphurizing method was at first carried out in crane pots or in special desulphurizing hearths. However, it was difficult and inconvenient, and at times even impossible, to desulphurize in this manner. Later, however, it was found possible, first to separate the fluid cast iron from its acid fusion slag upon its discharge from the cupola, and then to desulphurize it in the forehearth by means of a pure alkaline slag. Of the different designs of equipment used to make such a separation of the cast iron and the slag, those of Luyken, von Rein and of the Freier Grunder Eisen und Metallwerken deserve especial attention.

Characteristics of High-Test Iron

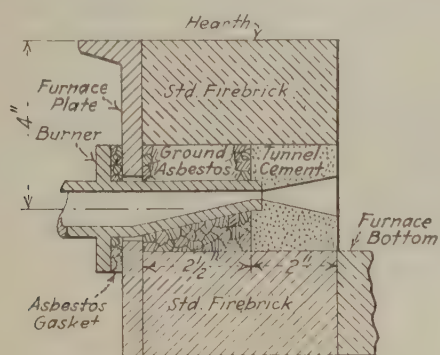
The endeavor to produce a so-called high-test cast iron in the cupola is of especial interest. The characteristics of this product are a low-carbon content and a fine and uniform distribution of the graphite flakes, which can be attained only by strongly superheating the iron. The production of such iron in the cupola is feasible only with the addition of large quantities of steel and with the maintenance of a powerful blast and a very high combustion zone. Following this method, it is difficult to obtain a uniform product in the cupola. The electric furnace, not the cupola, is the proper equipment for the production of a really high-test cast iron.

On a report that the materials for locomotive boilers, fire boxes and plates in connection with orders placed in Europe by railroads of South Africa must be supplied according to American standard specifications, the French publication *L'Usine* adds to the surprise expressed by the *Iron and Coal Trade Review*, of London, that such a requirement is the case. The British publication held that British steel works could produce plates of equal quality and the Paris publication adds that European steel plants are capable of producing material corresponding to the American specifications. The information of the European papers is that the plates had to come from any of seven American plants designated by the High Commission of the South African Union.

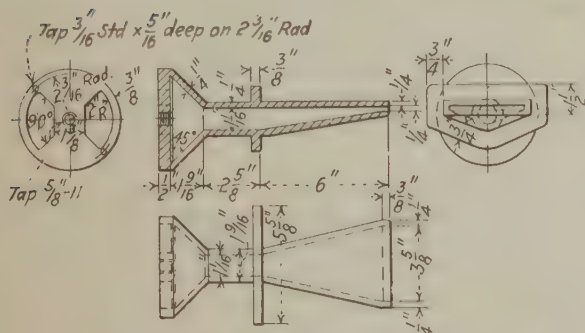
Standard Units for Forging Furnaces

Various Sizes Quickly Assembled at McCormick Works of International Harvester Co.—Use Gas Burners

IN the matter of heating furnaces for forging work, the McCormick works of the International Harvester Co., Chicago, has adopted a standard unit. From a few sizes of bed, side and end plates, furnaces of varying internal dimensions may be built up quickly. The unit design was made in accordance with the dimensions of standard refractory brick, and the whole is held together with



High Pressure Gas Burner Setting for Small Burner. The firebrick wall with the larger burner is 9 in. thick, against 4 1/2 in., as here shown



The Smaller Burner Is Built Along Lines of This, the Larger, Burner. Its orifice is 3 x 3/16 in.

tie rod construction. Arches are 9 in. deep and made up in sections clamped together in the conventional manner. The roof of a furnace is easily removed by simply lifting out these sections one at a time.

The individual furnaces are mounted on standards constructed of pipe with cross members for stiffening the legs. There is a clearance of 12 in. between the floor and these cross members so that the furnaces may be handled with standard elevating trucks. This not only promotes flexibility in layout, but also permits the removal of a furnace and the substitution of another in the minimum of time.

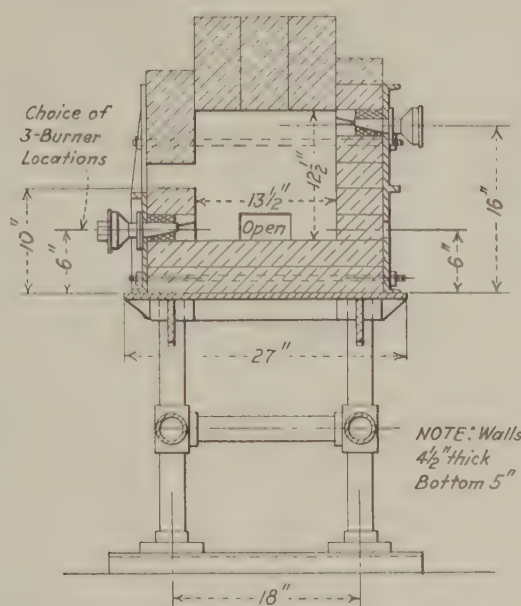
Some details of the furnaces, accompanied by drawings here reproduced in part, were obtained from J. B. Nealey of the American Gas Association. In substance they are as follows:

In this line of furnaces there are only two hearth widths, 30 and 40 in. respectively, while four depths are included, namely, 9, 13 1/2, 18 and 27 in. The heights of the furnace walls are regulated to maintain a certain ratio of gas consumption with combustion chamber area.

The furnace walls are 4 1/2 in. thick and are not insulated. In front of each furnace a hood is provided which

reaches down almost to the top of the opening through which the work is charged. Just below this opening is a long pipe running parallel to it with a series of holes in the top side. Air is blown through these holes and forces the escaping heat up under the hood, thus to provide good working conditions.

The burner design is an adaptation of the venturi inspirator principle whereby the high-pressure gas induces the flow of air for its combustion. Desired ratios of gas and air can be obtained and maintained continuously by



Typical Furnace May Be Carried by Truck When New Location Is Desired

simply adjusting a shutter, for reducing, neutral or oxidizing furnace atmospheres.

A feature of this design is the burner port which, instead of being round, is flat, to create a fanlike sheet of flame. These burners were designed for manufactured gas of 535 B.t.u. and specific gravity of 0.48 to 0.50. For perfect combustion this gas requires 4 1/2 cu. ft. of air, which the burners will readily handle.

The flat tip or slotted orifice at the discharge end of the burner throws the gas-air mixture in a thin sheet over the furnace refractories. The idea was to increase the width of the flame and reduce its length so that the size of the combustion chamber could be decreased. The most efficient forge furnace has a combustion chamber so reduced in size in proportion to the size of the work that the latter will be as near the refractories as possible, to obtain the maximum of heat absorption. As flame impingement is not desirable for some work this distance is partly controlled by the length of the flame. The refractories on all six sides of the work are brought up to incandescence.

These burners are cast with the inspirator as an integral part. The number of burners to a furnace is controlled by the size of the burners, the internal dimensions of the furnace and the temperatures desired. While these burners normally operate with gas at 15 lb. pressure, they can be turned down to as low as 1 lb. The arrangement depends upon the class of work and they fire from the

front, ends, above, below or any combination of these as necessary. Manifolds into which the burners are screwed are clamped to the walls of the furnaces, allowing for quick removal and replacement. The gas is piped direct to the manifolds which supply it to the burners.

There are two sizes of burners, one with a slotted opening 3 in. long and 3/16 in. wide and the other 3 7/16 in. long and 1/4 in. wide. The first is 6 7/16 in. long and the latter 10 15/16 in. in length. Brass spuds of three drillings, 44, 42 and 32, are used.

With gas at 12 lb. the larger burner will consume 160 cu. ft. of gas an hour with No. 44 spud, 260 cu. ft. with No. 42 and 340 cu. ft. with No. 32 spud. With the same pressure the gas consumption of the smaller burner is 70 cu. ft. an hour with a No. 44 spud, 110 cu. ft. with a No. 42 and 175 cu. ft. with a No. 32 spud. Burners are apportioned to the various sizes of furnaces in accordance with a predetermined ratio. This ratio is based upon a rate of gas consumption of 660 cu. ft. an hour for 1 cu. ft. of combustion chamber volume.

In the design of the burners precautions against overheating were taken by the following means: (1) insulation around burner in the form of ground asbestos, (2) large throat diameter compared with size of spud orifice, (3) smallness of end area of burner presented to heat of furnace, (4) minimum amount of metal in burner to retain heat, and (5) no change in flow of gases after leaving orifice, which permits a faster flame propagation.

The average life of the furnace hearths in this plant is only four months when used in conjunction with hammers, bulldozers, benders, upsetters, etc., while the walls and arch will stand up for a year at least. On high-temperatures high-production work hearth changes may be necessary as frequently as every few days, due to the limitations of the refractories.

In order to heat the stock to 1800 deg. Fahr. with the requisite speed it has been found that the hearth must be carried at 2200 deg., giving the furnace a thermal head of 400 deg. This gives heat penetration at the rate of 1/8 in. per min., which means that stock 1 in. in diameter or thickness requires 4 min. to be brought up to temperature. In order to determine the time element in bringing larger stock up to forging temperature, add approximately 25 per cent more time for each additional 1/2 in. in diameter or thickness. The gas at the time it is received at this plant is under a pressure of 4 lb., but is raised to 15 lb. in two compressors, each of which has a capacity of 2000 cu. ft. per min.

There are two forge shops at the McCormick plant, one 60 x 450 ft. for making bolts and nuts, and the other 90 x 650 ft. for miscellaneous forgings. In this latter shop are located approximately 125 forges and about the same number of upsetters, bulldozers, Bradley hammers, drop hammers, benders, etc. The other forge shop contains 54 forge furnaces and about the same number of hot press bolt headers and nut machines.

Germany Promoting Greater Use of Aluminum

THE recent aluminum price reduction in Germany of £10 per ton has been interpreted unofficially, says the United States Department of Commerce, as a move intended to promote a more extensive use of the metal. The European Aluminum Cartel, which has been in existence for more than a year and a half, was apparently organized primarily for that purpose. It is stated that the cartel would welcome even more radical downward revisions in the American prices, since they would mean a more rapid popularization of the metal. Further comment by the Department of Commerce in its "Foreign Trade Notes" is as follows:

"The recent action of the cartel coincided with the action of the International Copper Cartel effecting another advance in copper prices. Germany's interest in eliminating copper from its chief industrial applications for the sake of national self-sufficiency gives significance to the contrast in the price behavior of the two metals.

"It was expected that the price reduction on aluminum would affect only wire bars. It appears, however, to concern H-bars and blocks; while the only advantage gained by wire bars in competition with copper is in the advance of copper prices. The interest in electrical applications of aluminum is more pronounced in Germany than in other European countries. The latter are perhaps more interested in aluminum's chances to compete with steel and brass, especially in the form of aluminum alloys, on which extensive research and experiments are being conducted in all aluminum producing countries.

"The statement that the European cartel would welcome another price cut on the part of American producers is not without reservations, as it is stated that an immediate cut would not be desirable. Any sudden action with respect to prices might prove embarrassing at present to certain European countries whose output exceeds the domestic consumption to an extent making it imperative to preserve export markets. Germany appears to be in a position to view any such developments without apprehension, since its own domestic market takes care of the entire domestic pro-

duction. Concern is expressed on behalf of France, whose aluminum exports to the United States are of some importance. It is feared that the high import duty and cost of transportation might easily counterbalance such uncertain advantage as the lower prices of the French product, even though the American prices may never go as low as the European.

"It is stated that the German production of aluminum is much greater than is generally believed. The popular error that the recent price cut was due to the employment of the more economical Hagelund process has been explained by German authorities. It appears that the Hagelund process is not yet used to an extent to influence European prices. An experimental plant at Lautawerk is equipped on a comparatively large scale, but the only plant designed to use the process on a commercial basis is now under construction near Venice. There are also experimental plants in several other countries."

"An Investigation of Web Stresses in Reinforced Concrete Beams" is the subject of a 106-page bulletin, No. 166, of the Engineering Experiment Station of the University of Illinois, the price of which is 60c. Illustrations show graphically how beams fail under varying conditions of load. Tests were made with several types of reinforcing and with both concentrated and distributed loads. The author is Frank A. Richart, assistant professor of mechanics.

"Modern Methods in an Old Industry" is the title of a handsome booklet of 28 pages issued by the Belle City Malleable Iron Co., Racine, Wis. It shows how the company doubled its capacity to meet growing demands. Photographic illustrations are numerous, running all the way from action views in the plant to photomicrographs taken from some of the product. An electric furnace in the steel castings department comes in for its share of attention.



BOOK REVIEWS



Relation of Safety and Production

Safety and Production. Report by the American Engineering Council. Pages, 414, 6 x 9¼ in.; 283 charts, 31 tables. Published by Harper & Brothers, New York. Price, \$5.

The Manual of Industrial Safety. By Sidney J. Williams, C. E. Pages, 197, 5½ x 8 in. Published by the A. W. Shaw Co., Chicago. Price, \$2.50.

The inquiry, the subject of the first book, was intended to cover the following points: If industrial accidents under the conditions of increased production occasion increased frequency and severity, are these latter increases, if any, in greater or less proportion than that in production? If industrial accidents can be controlled under modern production conditions; how does safety interfere with production? If positive correlation exists between safety performance and efficiency of production, is the safety factor the efficient one? If safety is an executive responsibility, and if the key to the safety movement is executive, what degree of improvement can be attained in safety performance, and what reduction can be expected in the costs of industrial accidents?

The difficulty in making the investigation and in drawing conclusions therefrom lies in the fact that both production and safety are the integration of so many factors. But it has been possible to base the investigation on statistics, as average number of employees and of man-hours, annual production, and number of lost-time accidents per year, and number of days lost due thereto.

Three levels of performance have been considered: A high one, where production rate increased and the accident frequency rate decreased in 60 per cent or more of the year-to-year changes; a lower level, where the contrary was the case; and all the cases considered together as forming a mean-level group.

The question of cost of accidents is considered only accidentally, although costs are a factor in any accident experience; but this matter is taken up in a section devoted to individual accidents.

As a result of the findings we have:

- 1.—Industrial accidents can be controlled under modern conditions of highly efficient production; the rate of change in production per man-hour is greater than the rate of change in accident frequency or that in accident severity per man-hour. (Quantitatively, the production rate increased 14.4 per cent in three years while the accident frequency rate was 10.4 per cent lower and the accident severity rate 5 per cent higher.

- 2.—Wide experience shows that material reductions in accident rates can be had with greater production.

- 3.—Major executives are as much bound to initiate accident prevention as to effect greater production.

- 4.—Efforts to improve safety performance do not interfere with production.

- 5.—Ordinarily, greatest production comes only where accidents tend to the irreducible minimum.

- 6.—Tremendous improvements can be attained in production and accident prevention.

- 7.—Cost of industrial accidents must not be left unconsidered.

- 8.—Organized safety work is found in but few industrial plants.

- 9.—Many industrial establishments keep no accident records, and make no attempt to analyze their experience as the first step in reducing accidents.

As might be expected from this committee, it does not stop with statistics and conclusions, but goes on to make recommendations. These may be briefly stated as: (1) Giving the same executive direction and control to decreasing

ing accidents as to increasing production. (2) Adoption of a uniform terminology. (3) Those plants that have proportionately high accident rates should try to get down to the same rate as those having few and minor accidents. (4) Associations should impress on their members the necessity of cutting down the accident rates. (5) Associations should compile and analyze statistics, in order to determine the lowest accident rate possible in each industry. (6) Associations should influence their executives in their industry to get the lowest possible accident rate for each industry.

The various "graphs" in this interesting and useful volume show that by-product coke ovens, foundries, cement works, electric light and power plants, electric railroads, manufactories of explosives, lumber plants, paper, pulp and paper-products works, sheet-metal plants, and steam railroads (both freight and passenger), telephone and telegraph service, furniture factories, machine works, metal-working plants, mining concerns and quarries, bee-hive coke plants and the manufacture of boots and shoes, and of gas, the frequency and severity of accidents decreased at the same time as increased production. In men's clothing, and in the brass, bronze and copper products industries, the frequency increased slightly more rapidly than the production, but the severity decreased. In the automobile industry and in the manufacture of fine machinery and the production of forgings and that of valves and fittings, in making writing paper and wood products, and in textile manufacture, the severity increased very slightly more than the production, the frequency rate a trifle less rapidly. In bituminous coal mining the fatality rate increased slightly more rapidly than the production rate.

As might be expected from a report by the American Engineering Council, the work is a credit to its authors and to the publishers. The table of contents is clear and the alphabetical index full and satisfactory.

There have been a good many and a good many kinds of researches and experiments in industrial safety, by manufacturers, railroad managers and others, but until comparatively recently the practical results of their findings have not been collated and placed within the reach of those who are, or should be, interested. The volume by Mr. Williams, while not at all exhausting the subject, is a step in this direction.

It shows that the most desirable results of the movements and experiments in the direction of securing safety for industrial employees—and machinery and equipment—have been attained by cooperation rather than by authority or enforcement. The safety committee is emphasized as the mainstay of the "safety man"; but the importance of the foreman's attitude is pointed out. Inspections and reports of the safety committee are accorded due value.

Meetings for the consideration of the safety campaign are described and the functions and advantages of publicity by bulletin board, printed or other posters, serious or humorous.

Also included are company magazine, and premiums, bonuses and temporary signs. There is a rather good description of campaigns, competitions, and rewards; and the question of records is handled quite satisfactorily—for instance as to what records should be reported and tabulated, and the use of frequency and severity rates; the employment of statistics for the safety committee and the workmen is pointed out as desirable.

A special chapter is devoted to the fundamentals of

machine guarding and the matter of quick-stop devices, and to the danger caused by slippery floors. The safe guarding of the plant equipment by railroads, and construction and use of safety ladders and scaffoldings, is the theme of another chapter, in which, also, we find such topics as grinding-wheels, gas and electric welding and cutting, and the control of hand tools.

The effect of safety on morale is considered. An entire chapter is given up to fire prevention and protection, and of course it is necessary to go into the question of public accidents, such as those to trespassers and passers-by, to passengers or customers, and to employees in public places. Taking it by and large, this book should be in the hands of every foreman and department head in industrial service.

ROBERT GRIMSHAW.

Abrasives and Grinding

The Abrasive Handbook. By Fred B. Jacobs. Pages 547, 6 x 9 in., numerous illustrations and several tables. Published by the Penton Publishing Co., Cleveland. Price, \$5.

This compilation should be very useful to machine shops, in that it gives the results of the combined experience of many well known manufacturers and users of abrasive materials and grinding machines and appliances. Its arrangement differs from that of most technical works in that under each section—for instance, cylindrical grinding, or honing practice—the items are arranged alphabetically.

There is an immense amount of data covering machines, materials, and methods of practice obtained from about a hundred firms and individuals, to whom credit is given in a general way in an alphabetical list of contributors, although very often there is no means of knowing which of these is responsible for any particular chapter or statement.

As principal section heads or topics we find a description of the various abrasive materials, cylindrical and disk grinding machines, grinding wheels and practice, and honing practice, miscellaneous abrasive data, operations, polishing and buffing, and safe operation of wheels.

Management Matters Common to All Industrial Enterprises

Management in the Factory. By Glenn Lion Gardiner. Pages 225, 4 3/4 x 7 3/4 in. Published by the McGraw-Hill Book Co., New York. Price, \$2.

This work intends "to present an elementary consideration of the divisions and functions of management which are common to practically all industrial enterprises." This alone is no mean task; and by reason of the fact that production and inspection methods in every plant are more or less peculiar thereto, the author very wisely omits consideration thereof; and maintenance is left out, because it would require a volume in itself.

Passing over a general chapter on forms of industrial organization, we come unexpectedly to the importance of the sales department and the methods of selling. In this the organization and assignment of territory are well handled, but under the head of bonuses, the author might have mentioned the great failure of that system of remuneration of salesmen. Often after the bonuses have been accorded (say in January) for the amount of sales, returns are likely to come in in alarming quantities, where customers have been overloaded, perhaps with goods requiring checking, relabeling, etc.

The place of the purchasing department in the organization is laid down; but I do not agree with the author that the purchasing for a foundry, for instance, is simple. And sufficient attention is not paid to the matter of foresight as regards the possible trend of the market. Under "Stores" a little more attention might have been given to the importance of balancing the stock.

The chapter on traffic is admirably handled; that on welfare service well, although with a tinge of idealism. Under accounting sufficient attention is not paid to cost accounting, particularly that branch that predetermines production cost, and more especially its application to cost reduction.

The undoubted advantages of teamwork are given a special chapter, but in this the author states that there are only three factors in production—man, materials and equipment; whereas no business could get along without consideration of three others—a market to supply, money to start and run the business, and, above all, management; the omission of the latter being rather unexpected in a work on that topic.

To each chapter there is a short questionnaire. A good table of contents and an alphabetical index enhance the value of the book.

ROBERT GRIMSHAW.

Procedure in Taking Out a Patent

Patent Essentials. For the Executive, Engineer, Lawyer and Inventor. By John F. Robb. Pages 485, 5 3/8 x 8 3/8 in.; illustrations, 19. Published by Funk & Wagnalls Co., New York. Price, \$5.

In this inventive age and country everyone is directly or indirectly interested in the subject of patents; and a larger proportion of our people are actual or potential inventors than in any other land. Hence even to the layman—meaning him or her who is not a patent lawyer—a work treating of those matters concerning the law and practice before the United States Patent Office, that are essential for the executive, engineer, lawyer and inventor, should be of great value, not merely to refer to in case of need, but to study in order to ward off possible trouble in patent matters.

Mr. Robb and his associates have produced such a volume, of which this is the revised edition of the current year. The work, says the principal author, is intentionally rudimentary and practical, being intended to enable quick acquirement of a working knowledge about patents and things pertaining thereto. It is what I would call, coining an expression for the purpose, an "at elbow book," and is particularly valuable because it contains features hitherto lacking in any work on patents—namely, the treatment of the science of drafting patent claims, and complete illustrative cases, as well as complete forms rather than the mere skeletons usually given.

In the preface to this second edition the author pats himself on the back, probably with full justification, because the chapter on claims and their formulation had been especially well received, and many of the objections in the first edition, including changes in old law and practice that he had denounced, stand accomplished.

The first chapter is on the purpose and the personnel of our Patent Office, jurisdiction and procedure, the progress of an invention through the office (from application to patent) and brief definitions of patent terms; the second, on the utility of invention, patent infringement, the validity of patents, infringement, validity, and other investigations. This is followed by one on evaluation and depreciation, that patentees and intending patentees should study in order to save themselves much disappointment.

Chapter IV, a symposium by various members of that much abused class, patent examiners, covers invention and mechanical skill, combination vs. aggregation, mechanical processes and functional claims, practice relating to division, and new matter. Chapter V goes fully into details of the preparation of applications, clear through to the correction of drawings. Chapter VI divides and treats all patents as either accidental, abstract or complete, and considers claims as what they should be—word pictures.

The next chapter is very precise in its handling of the practical operation of important Patent Office rules; while

the eighth takes up that heart-breaking matter, appeals. The section on additional patents will open the eyes of many who think themselves covered by their claims. Other divisions of the book are devoted to assignments and contracts, interference; and in notable fullness, special forms of procedure, followed by a typical mechanical patent application as completely prosecuted, and a typical reissue patent application, file wrapper, contents and drawings, complete enough for the most meticulous.

The typography of the text is unusually clear; not so, that of the otherwise excellent index, which supplements the clearly laid down table of contents, and the table of 350 or so decisions cited.

It would seem impossible that a book on such broad lines, by a successful patent lawyer of nearly thirty years' experience in his specialty, aided by five patent examiners, would be other than both useful and reliable.

Savings Through Scientific Management in Swedish Iron Works

How a Swedish rolling mill employing over 1000 men was enabled to meet the problem of quick deliveries with a smaller force was described by Olaf Kaernekuhl, of Stockholm, to the Third International Congress of Scientific Management, held in Rome during September, and reported in *Engineer*, London.

By reorganizing the warehousing and shipping departments, the staff was reduced 27 per cent, notwithstanding an increase of 24 per cent in the volume of materials handled. In order to take care of the demand for quick deliveries, a budget of raw materials is prepared periodically based on the orders on the books. Actual consumption comes within 1 or 2 per cent of the budget. Metal stocks were reduced by 626 tons and economical use of material showed a saving during twelve months of 166 tons. All work was carefully planned, and the processes studied in detail with the aid of time studies. In the more complicated operations as many as 11,000 observations were made before the final working procedure was determined. The resulting control of the load on the machinery during different shifts and working days has reduced the number of workers employed in the rolling mills alone from 175 to 155 for the same output. In the tube works the output per man each week increased during the twelve months from 318 kilos. to 360 kilos.

Handbook of Labor Statistics

Many subjects of a wide variety of interest are comprised within the 828 pages of the "Handbook of Labor Statistics, 1924-1926," which has been issued as Bulletin No. 439 of the United States Bureau of Labor Statistics. Copies may be obtained at \$1 each from the Superintendent of Documents, Government Printing Office, Washington. Much of the volume naturally is taken up with the question of employee relationships, apprenticeship, arbitration and conciliation, cooperative societies, employment statistics, industrial accidents, disease and poisons, insurance and benefits, labor organizations, legal aid, minimum wage, old age pensions, physical examinations, strikes and lockouts, unemployment insurance, vocational education, workmen's compensation, and the like.

Among the items of particular interest may be mentioned the occupational distribution of the population of the United States. This has been studied over a long period of years and changes are traced in some of the more important lines of activity. Turnover of labor for a number of industries has been studied, showing month by month changes over a period of years and an analysis of turnover among a large number of types of employment in December, 1926, and January, 1927.

Wages and hours of labor occupy more than one-eighth

of the book. The subject is gone into in great detail, with index numbers of wages based on 1913 over a period of years, and for a large number of occupations, as one of the leading compilations. Hourly and weekly earnings are shown for many employees. In particular, there is a considerable study of wages and hours in the iron and steel industry, from 1913 to 1926 inclusive. Wholesale and retail prices are covered in one chapter of more than 30 pages.

Seamless Steel Tubing for Aircraft Industry

Practice followed in the manufacture and preparation for shipment of seamless steel tubing for the aircraft industry has been put in the form of a small pamphlet by the Summerill Tubing Co., Bridgeport, Pa. This company makes its finished product from purchased hot-rolled pierced tubes, of materials selected according to definite specifications. Following the practice employed by the company in its selection of this material are listed 12 operations performed in its own works.

Identification of the individual steel heats is one of the first requirements. Annealing and pickling in preparation for drawing are watched to avoid excessive scale, change in carbon content, and rough surfaces from over-pickling. Drawing may involve 12 or 15 cycles of operations.

After straightening, a final heat treatment is given the steel tubing. This is done in a gas-fired furnace with automatic control. An aircraft inspection department is maintained, independently of the commercial grades of steel. Tests for hardness and other requirements are made and record kept, by tubes numbered consecutively. Certified test reports are then furnished with each shipment and are attached to the invoice.

New Books Received

The Cost of Living in Twelve Industrial Cities. Pages 76, 6¼ x 9½ in. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$1.50.

The Economic Status of the Wage Earner in New York and Other States. Pages 125, 6¼ x 9½ in., illustrated. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$2.50.

The Cost of Living in the United States, 1914-1927. Pages 142, 6¼ x 9½ in., illustrated. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$2.50.

The Fiscal Problem in New York State. Pages 275, 6¼ x 9½ in., illustrated. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$3.

Annual Report of the Minister of Mines—1927. An account of mining operations for gold, coal, etc., in the Province of British Columbia. Pages 504, 7¼ x 10¼ in., illustrated.

Die Verwendbarkeit der Röntgenverfahren in der Technik. By C. Kantner and A. Herr. Pages 77, 5¾ x 8¼ in., illustrated. Published by Verein Deutscher Ingenieure, Berlin, N.W.7.

Der Kugelschlaghärteprüfer. By J. Class. Pages 20, 8¼ x 11½ in., illustrated. Published by Verein Deutscher Ingenieure, Berlin, N.W. 7.

Bergwirtschaftliche Arbeitsgemeinschaft. By Max Krahmann. Pages 184, 5½ x 8½ in. Published by Kurt Vowinkel, Hohenzollerndamm 83, Berlin-Grünwald, Germany. Price, 10 m.

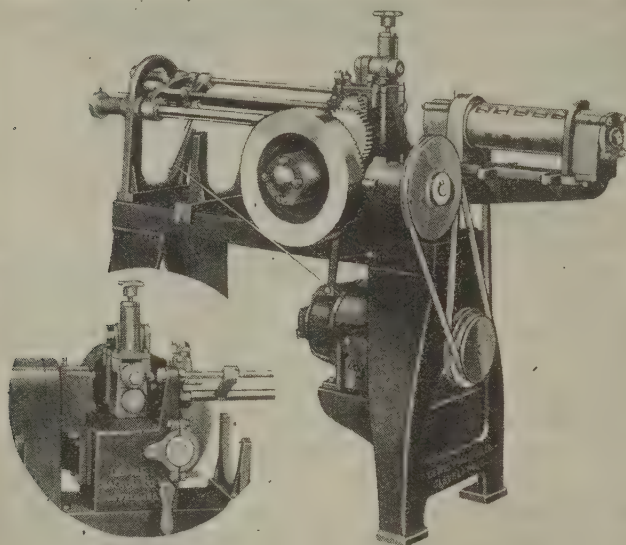
Riemenschlupf und Reibungszahl von Gummi und Leder-treibriemen. By Hans Nowsky. Pages 56, 8 x 11 in., illustrated. Published by R. Oldenbourg, Amalienstrasse 6, Munich 32, Germany.

Motor-Driven Wire Cutting and Straightening Machine

TO meet the demand for a medium-weight, motor-driven, wire cutting and straightening machine, the Lewis Machine Co., Cleveland, has brought out an automatic rotary-type machine for handling wire up to 3/16 in. in diameter. It has several new features, probably the most

speed gearing, oil housings and the noise and vibration that result from the use of gears. The motor is located underneath the machine, being mounted on a bracket bolted to the machine leg.

Bulky castings have been eliminated in the construction, though the



Operating Parts of This Straightening Machine Have Been Reduced to a Minimum. The motor is out of the way and the drive mechanism is claimed to avoid noise and vibration

important of which is a double direct motor drive known as the Texrope drive, made by the Allis-Chalmers Mfg. Co. The straightening arbor requires high-speed power transmission, and this drive eliminates high-

machine is rigidly built for hard service. The straightening arbor, main driveshaft and flywheel are mounted on Timken tapered roller bearings, a total of six to each machine. The arbor consists of five sets of dies,

which, it is claimed, assures perfect straightening of all sizes of wire. Either hard iron or bronze dies are used, depending on the finish of the wire to be straightened.

Operating parts have been reduced to a minimum, consisting only of a trip lever and clutch dog, which drives the flywheel shaft. This shaft, which revolves only when the wire is being cut off, is mounted on bronze bushings in the bed. The cutter bar is operated by a cam on the flywheel shaft. A ball bearing mounted in the cutter bar runs on the cam. The clutch is similar in general construction features to a standard punch press clutch.

The feed rolls are geared directly to the flywheel. The lower feed roll shaft runs in bronze bushings in the housing and the upper runs in a long sleeve which takes the pressure from the adjusting screws. An automatic feed roll release lever operated directly from the cut-off shaft releases the pressure from the feed rolls when the wire is being cut off. This, it is stated, prevents slipping of the feed rolls on the wire during the cutting off operation, prevents marking of the wire and increases the life of the rolls.

Designated as the Lewis No. 7-C, the machine can handle 1/16-in. to 3/16-in. wire. It is driven by a 1½ hp. motor at 1800 r.p.m. It occupies a floor space (not including reel) of 16½ in. wide by 3 ft. long for a 2-ft. machine and 4 ft. long for a 3-ft. machine. It is also built in a larger size, for handling wire up to ¼ in. in diameter.

Welded Steel Truck Body for Heavy Service

A SHOP truck, known as the "Weld-steel" truck, has been placed on the market by the Pittsburgh Producers Supply Co., Pittsburgh. It was designed for use in steel mills, particularly for handling wire in coils from wire or nail mills, or sheets, plates, and similar material from sheet mills, or any like service. It has been found suitable for use in other industrial plants also, where heavy loads are to be moved. The truck has a rated capacity of 3 tons, with a safe overload capacity of 100 per cent. It is compact, the dimensions being 5 ft. long, 3 ft. wide overall and 3½ ft. overall height.

It is made entirely from steel sections, welded together, no rivets being used. The body is made from four heavy channel sections, lap welded to the four angle sections forming the uprights. The uprights are braced by angle sections which are butt and lap welded to them, and the frame is given greater rigidity by gusset plates located at all four corners.

In the truck shown in the illustration V-ends are provided. When this form is loaded with wire coils set perpendicularly, a pipe or steel bar

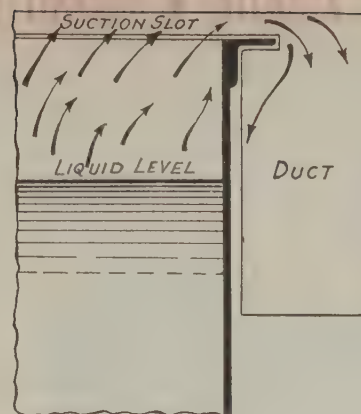
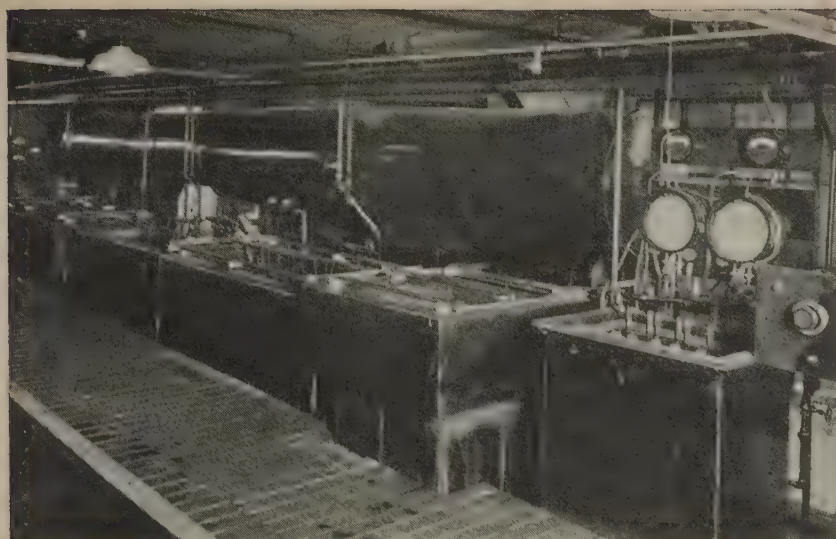
can be passed transversely through the load, to permit its being lifted as a unit by a crane. The V-ends are braced by gusset plates welded to the frame.

The main axle is supported by a cannon-box mounting, made of welded angle sections, and firmly braced by angle sections running to the pilot wheel supports. The wheels, also, are of welded construction, the tires and hubs consisting of flat sections, rolled to shape, and butt welded. The spokes are made of heavy flat sections welded to the hub

and tire. The wheels on the main axle are equipped with Timken bearings, the choice of which was determined by the service conditions which the truck must meet. They reduce the amount of power required to move the truck to a point where two men can handle it when fully loaded. Also they are said not to be affected by the expansion and contraction resulting from the wide variations in temperature to which the trucks are subjected in the course of their service, and which sometimes alternate frequently.

Several Forms of This Welded Steel Truck Are Available. It is fitted with roller bearings to reduce friction in handling





The Section Shows How It Works. The exhaust slot appears at the rear, in the photograph

Removing Fumes from Plating Tanks

AN exhaust system for removing fumes from plating tanks is being manufactured by the Cleveland Blow Pipe & Mfg. Co., Cleveland. A sheet metal duct, rectangular in form, surrounds the upper part of the tank, extending slightly above the top, and a narrow slot is provided around the side facing the liquid. An exhaust fan draws sufficient air through the slot at a definite high velocity, de-

pending upon the size of the tank, to form a suction blanket over the tank that prevents fumes from entering the room.

Thus the operator is completely protected, and the top of the tank is unobstructed by overhead exhaust hoods. The fumes are drawn through a header back of the tanks and out into the open air.

The illustration shows an installa-

tion of the system in a Cleveland plant, for the removal of fumes from chromium plating tanks. Complete removal is essential, as these fumes are particularly dangerous to the operator. A line drawing shows the way the fumes are drawn off the surface of the liquid and carried away through the duct to a point where they can do no damage either to the operators or to the equipment.

New 2-Yd. Excavating Shovel

ADDITION of a 2-cu. yd. capacity machine has been made to the line of crawler cranes, shovels and draglines built by Link-Belt Co., Chicago, Indianapolis and Philadelphia. Heretofore the largest machine built by this company was a 1½-yd. unit. The Link-Belt K-55, as the new machine is known, is a powerful, heavy-duty, all-purpose, 2-yd. machine, primarily designed for the following adaptations:

Shovel with 30-ft. boom and 18-ft. dipper stick, carrying a 2-yd. struck-measure-capacity all-manganese-steel dipper.

Dragline -to handle 2-yd. dragline bucket, for medium and medium-heavy excavating, on boom 50 ft. long; or a 1½-yd. dragline bucket on boom 60 ft. long.

Clam shell bucket of 2-yard capacity, for sand, gravel or materials of equal consistency and weight per cubic foot, on boom 50 ft. long; or a 1½-yd. bucket, for such materials, on boom 60 ft. long; or, of course, an equivalent weight of loaded bucket in heavier or lighter materials.

Trench shovel, 2-yd. capacity.

All attachments are interchangeable without removing or disturbing the mechanism of the machine proper. A special clearance-reducing arrangement contributes to making the machine a convenient one for the contractor, by making it possible to ship it from place to place without dismantling. The K-55 has a collapsible mast, and special shipping treads which may be quickly and easily substituted for the working treads, to

bring the machine within the railroad clearance requirements of 10 ft. 4 in. overall width and 16 ft. overall height above top of rail when loaded on flat car.

Specifications include unit cast steel construction of lower and upper frames, self-cleaning crawler treads and large bronze-bushed crawler rollers and inclosed cut gearing and bronze-bushed bearings throughout. There are internal expanding friction clutches of unusual size and power, the main drum clutches being 42 in. in diameter, and swing and travel clutches, 30 in. in diameter.

A 13½-in. diameter center pin, ad-

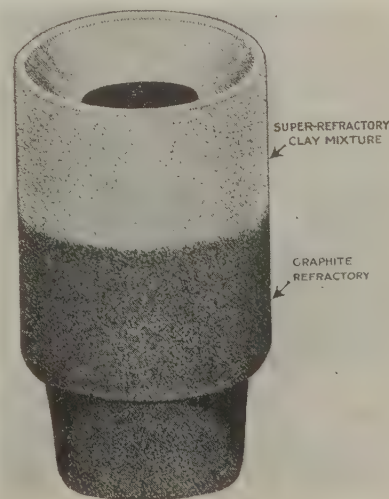
justable from above, can be removed as a unit with the vertical travel shaft assembly, without removing any other parts. The drums are large, with renewable cast steel shells, having air space between clutch and brake surfaces, for rapid cooling; with large, powerful drum brakes, 48 in. in diameter by 5 in. wide.

In working condition the machine is 12 ft. wide overall at the lower frame, which gives it ample stability for the work for which it is designed. Crawler treads are 36 in. wide. The K-55 is built to be driven with gasoline engine, electric motor or Diesel engine drive.

Ladle Nozzle Made of Two Materials

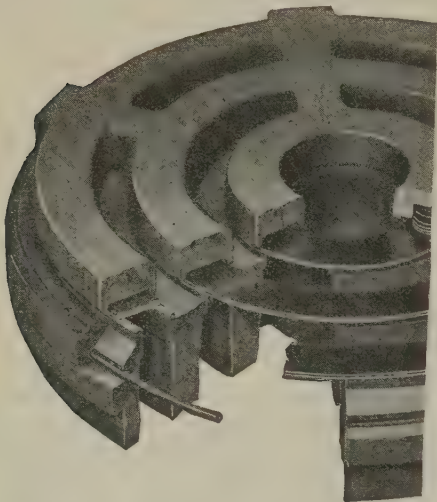
ANEW combination ladle nozzle is being put out by the Joseph Dixon Crucible Co., Jersey City, manufacturer of crucibles and graphite refractory products. The upper half is super-refractory clay and the lower half is graphite.

The advantage of this combination nozzle, it is stated, is that the metal can leave the ladle at a much lower temperature than is the practice generally, and so a more perfect ingot is poured. This is due to the heat-retaining qualities of the graphite in the lower half of the nozzle. The combination nozzle is made in any customary size and with flow hole as required.



Air-Cushioned Compressor Valve

AN air-cushioned air compressor valve has been developed by the Pennsylvania Pump & Compressor Co., Easton, Pa. There is an air cushion pocket in the guard. As the valve opens, the disks, instead of



Section of Valve, Showing How the Parts Are Assembled

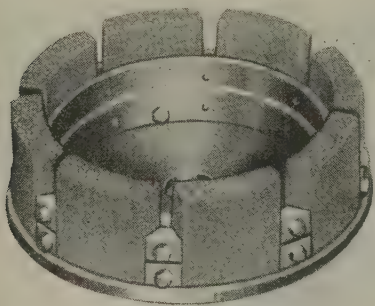
striking the guard, enter the air pocket. Air trapped in this pocket provides a cushion, which prevents the valve from striking the metal of the guard.

The valve assembly is held together by means of a retaining ring, which engages the valve guard and seat. The only function of the retaining ring is to hold the guard and seat together while the valve assembly is being placed in the cylinder chamber or removed from it. With the valve assembly in position, it is held firmly to its seat in the cylinder by the clamp, which is drawn up tight against the assembly by means of the valve cover set screw.

The air valves are mounted radially at each end of the cylinder. Each cover is held in place by four tap bolts, while a central set screw holds the complete valve assembly in place.

Segmental Grinding-Wheel Chuck of Simple Design

SAMUEL C. ROGERS & CO., Buffalo, have placed on the market the segment grinding-wheel chuck here il-



When Half Worn, the Upper Clamps Are Removed and the Wheel Used Further

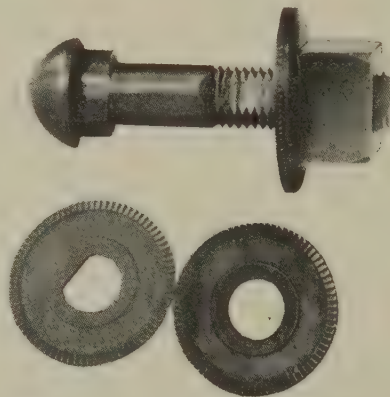
lustrated, which is offered for use on the company's new knife grinding machines and also on face and surface grinders of other manufacture. Simplicity of construction is a feature emphasized.

Five standard sizes of the chuck, from 12 to 22 in. are available, the chuck illustrated being the 14-in. size which carries eight 4 x 4 x 1 1/4-in. segments. The segments are mounted in a strong and accurately machined chuck having parts which are conveniently adjustable and are arranged for securely holding the segments. The weight of the chuck, with segments, is approximately 60 lb. Larger sizes can be furnished.

The chuck is made up of an inner ring and two sets of clamping wedges. When the segments are worn half way down the outer wedges and the inner ring are removed and use of the wheel continued until the segments are entirely used up. Butts of old segments are removed by loosening the last row of clamping wedges. New segments are then inserted and both rows of clamping wedges are replaced. The wheel is protected with a suitable guard arranged to conform with the wearing of the segments.

Lock Washer of Two Parts With Serrated Edges

CLOSER adjustment than is possible with the standard castelated nut and cotter pin is a feature claimed for the lock washer illus-



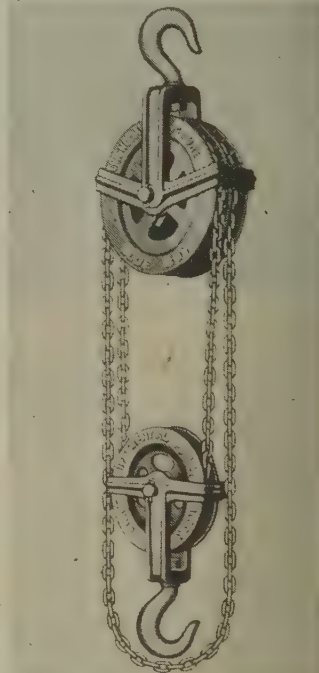
Serrations on the Two Washers Are Depended Upon for Locking

trated which is being placed on the market by Robert E. N. Marks, 4403 Sheridan Road, Chicago.

This device consists of two washers, one of which is formed with a center boss and a raised outer edge in which serrations or teeth are cut. This washer is placed over the bolt with the serrated face away from the head and a flat side is provided on the bolt to prevent this washer from turning. The second washer, also formed with a boss and an outer ring of teeth, is dropped over the bolt so that the serrations on both washers match. The second washer is recessed on its outer side, forming a seat for the nut so that the top washer and the nut turn together.

Differential Hoist Has Copper-Plated Chain

A NEW direct differential hoist being manufactured by the Chisholm-Moore Hoist Corporation, Cleveland, is called the "Blue Boy." It has been equipped with the Hercules



Inswell electric-welded load chain. The extra-heavy load sheaves, malleable iron yokes and drop-forged hook are painted blue, and the Inswell chain is copper plated.

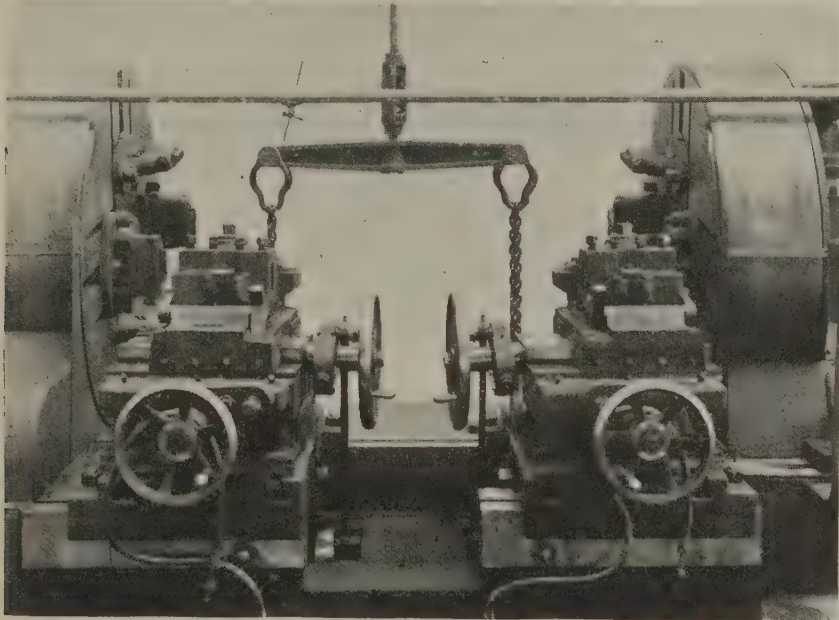
Standards for Lift Trucks and Skid Platforms

TWO standard dimensions, 8 in. and 12 in., for under clearance of skid platforms were adopted at a general conference of manufacturers and users, held June 28 at the Department of Commerce. It was agreed that the minimum clearance between runners or supports on the skids be not less than 29 in. The conference favored establishment of standard dimensions for over-all length and width of skid platforms. It was decided that there should be two width standards—one such that the skids could be placed three abreast in a freight car and the other the same length, but twice the width of the first skid. These recommendations, subject to acceptance on the part of interested parties, are to become effective Oct. 1.

Topping a 100-ft. fabricated steel tower on the roof of the new Penobscot Building, Detroit's tallest office building, what is said to be the world's largest and highest Neon aviation beacon was lighted for the first time on Thursday night, June 28. Resembling a red ball of flame when lighted, the beacon is 12 ft. in diameter, 655 ft. above the ground and can be seen 60 miles away on a clear night.

Carwheel Lathe Equipped to Handle Sets with Roller Bearing Journals

CHANGES have been made in the tool rests and bed of the No. 4 carwheel lathe of the Niles-Bement-Pond Co., 111 Broadway, New York,



Changes in the Tool Rests and Bed Adapt the Lathe for Chucking Either Plain Journal or Roller Bearing Wheel Sets

to adapt the machine for the chucking either of plain journal or roller bearing wheel sets for tire turning.

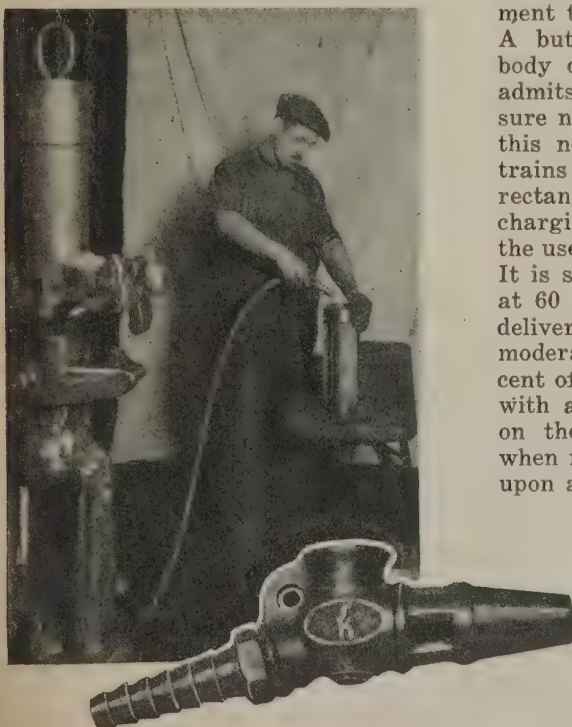
Inasmuch as it is impractical to remove the roller bearing housings from the journals, the wheels cannot be

chucked by split bushings, but are mounted on centers in the sliding spindles, it being necessary only to remove the cover plate of the housing to expose the centers in the axle. This method of chucking requires lateral adjustment of tool rests along the bed to bring the cutting tools opposite the wheel treads, owing to the

greater distance between the faceplates when axles are held on centers. Therefore each tool rest is mounted on a sub-base having a small amount of lateral adjustment by rack and pinion.

Blow Gun for Dusting Out Molds, Machine Tools and Motors

SAVINGS in compressed air are claimed for the blow gun illustrated which is being offered by the



Schutte & Koerting Co., Twelfth and Thompson Streets, Philadelphia, for blowing out castings, dusting out molds, removing dust and chips from machine tools and for other similar uses.

The device operates on the jet principle, and is designed for attachment to a $\frac{3}{8}$ -in. compressed air hose. A button in the small cup on the body of the gun opens a valve and admits the compressed air to the pressure nozzle. A jet of air issues from this nozzle at high velocity and entrains atmospheric air through the rectangular ports, the mixture discharging at pressure high enough for the uses for which the gun is intended. It is stated that with compressed air at 60 lb. pressure the blow gun will deliver a given quantity of air at a moderate pressure, using only 50 per cent of the high-pressure air required with a plain nozzle. A ring is cast on the body of the device so that when not in use the gun may be hung upon a conveniently located hook.

Compressed Air Issuing from the Nozzle Entrain Atmospheric Air, the Mixture Discharging at Ample Pressure for the Work

Long-Boom Motor Crane for Handling Construction Steel

MAKING use of a 52-ft. boom with 7½ tons capacity on a Mack truck of the same capacity, the McClintic-Marshall Co. has put into use a new crane unit furnished by the Universal Crane Co., Sweetland Building, Cleveland. This is being employed in suburban districts of New York for unloading and distributing steel, as well as on erection jobs.

To a standard 28-ft. boom has been added a demountable 8-ft. foot extension and a demountable 16-ft. head extension, making a total length of 28 ft. Both extensions are readily removable, so that the crane may be used with the 28-ft. boom where heavier lifts and not such high reaches are



Flexibility Is Provided by Having the Boom in Demountable Sections

necessary. The boom can be used in lengths of 28, 36, 44 and 52 ft.

A motor truck crawler is fitted on the rear end of the truck chassis, which consists altogether of a combination truck and crawler. This is convertible in 15 or 20 min. to a crawler rear end, capable of traveling through soft ground at truck speed.

June shipments of electric industrial trucks and tractors numbered 117, compared with 116 in May as reported by the Department of Commerce. The figures compare with 140 in June last year. Of the current total 14 vehicles were for export. Six of the domestic units were tractors and 97 of other types. In the first half, 732 units were shipped, compared with 695 last year.

Business Analysis and Forecast

No Over-production of Steel Indicated

Though Output Is Large, and Requirements Absorb Production, Prices Remain Weak—Situation Analyzed by Series of Questions

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

AS shown in the first chart, the broad statistical facts concerning the steel industry as it was in June are as follows: (1) Production of steel ingots was at a reduced rate, but was still considerably above "normal"; (2) unfilled orders of the Steel Corporation recovered from the slump of the preceding three months, but were still much below the monthly average for 1923-1927, even allowing for seasonal conditions; (3) the composite price of finished steel sagged slightly to the lowest monthly average since last January. In short, production is large, order books are low, and prices are naturally weak.

According to our estimate of normal, the average daily ingot output last month was 108.9 per cent, which compares with 110.3 per cent in May and 102.8 per cent a year ago. Thus, even after discounting a seasonal decline (from May to June) of over 6 per cent, there was left a net decrease; but production remained nearly 9 per cent above normal. In spite of seasonal influence the unfilled orders increased $6\frac{1}{2}$ per cent. Even so they were actually only 84 per cent of the monthly average for the past five years, or 90 per cent, if we make ad-

justment for seasonal conditions. At 2.341c., the June average price of finished steel was only 92.7 per cent of the average for 1923-1927.

One can find no month in any recent year which is analogous to June in the sense that all of the foregoing statements would apply. And the peculiarity of the situation is the more marked if we add that in no recent year has steel production, throughout the first half, been so much further above normal trend than pig iron production has been above its trend. As we figure it, the average daily pig iron production in June was 106.3 per cent of normal, which compares with 106.8 in May and 107.2 a year ago.

Production Below the Heavy Demand

WHILE steel production is above normal, May figures show that in that month it was below the level of the normal current requirements of the chief consuming industries. That is to say, a composite of the indexes of activity in the chief iron and steel consuming industries shows that their potential requirements were relatively high (see Fig. 2).

Railroad traffic gained more than usual for the season, and both automobile production and building activity showed an upward trend. Even manufacturing (excluding iron and steel and automobile industries) increased. Mining held about level, declines in coal production being offset by gains in copper. Domestic oil production and drilling activity both showed further small decreases. Machine tool orders declined, and agricultural purchasing power was a little lower. The net result is that the composite index of potential demand for steel for May increased to 119, as compared with 115 in April. This is not so high as in February, but, with that exception, is the highest since September, 1926.

As the chart shows, it is well above the usual relation with the curve of steel ingot output. This means that, in spite of the decline in forward buying which occurred in May, the chief customers of the steel industry were using up steel at a rapid rate and that the steel producers were either accumulating no stocks, or only such as the potential requirements of the country justified. In short, no over-production is indicated by the statistics.

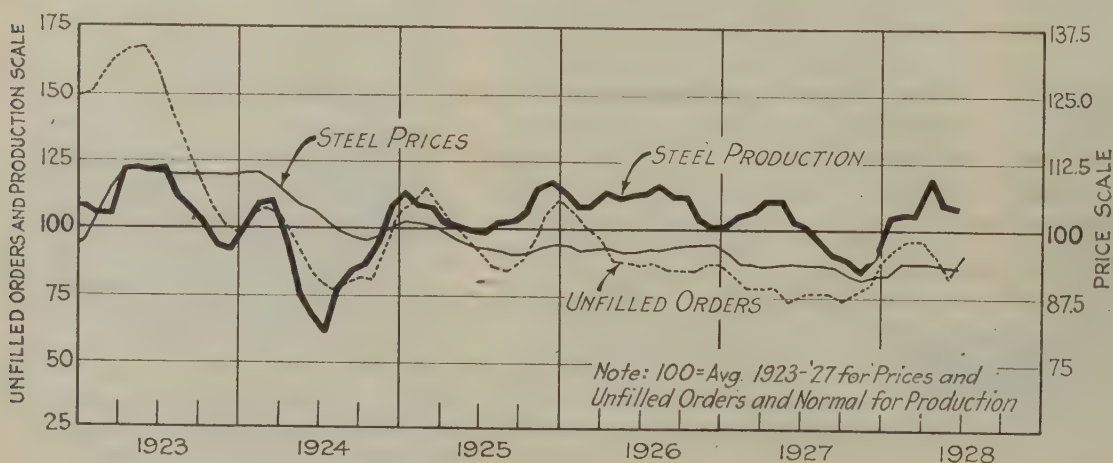


Fig. 1—Steel Production in June Was 9 Per Cent Above Normal Requirements. Prices have been sagging. Unfilled orders showed an upward movement at the end of June

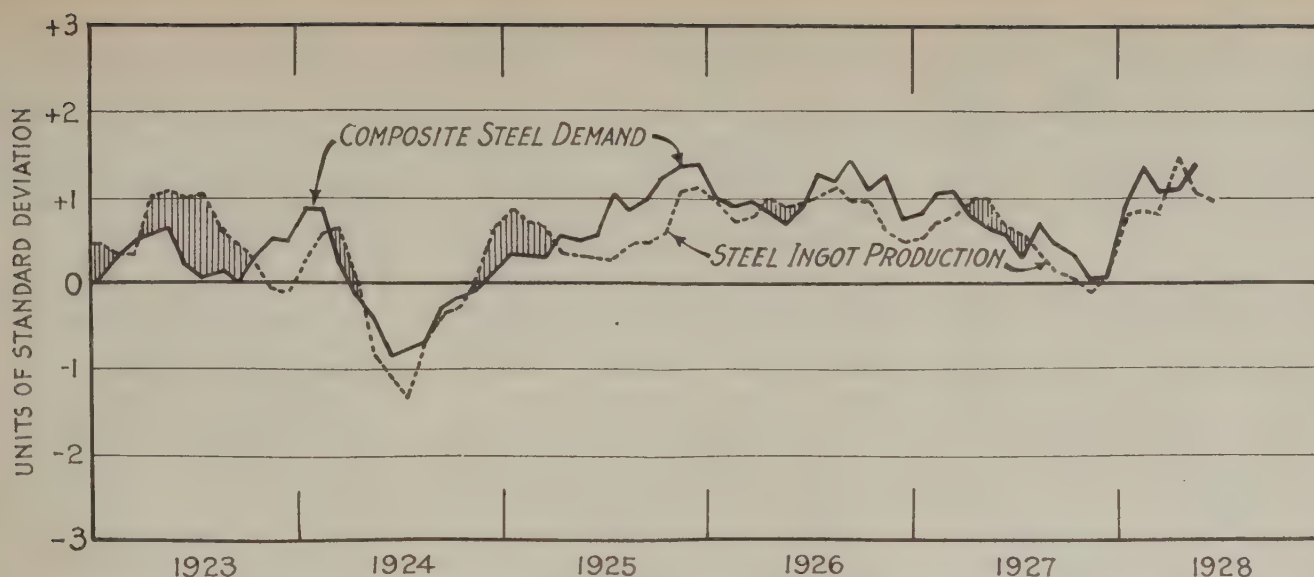


Fig. 2—Steel Production Has Again Fallen Below the Level of Composite Demand. This latter is higher than at the same season in previous years

June data show railroad freight traffic not up to the usual seasonal gain for the month, and indicate continued scanty buying on the part of the carriers. Orders for railroad cars and locomotives were the lowest since January. On the other hand, building activity did not show the usual June decrease, and the large volume of contracts awarded promises further good business in structural steel. Building permits showed an upward trend also. Trade reports indicate June awards of fabricated structural steel larger than in May, the weekly average being 42,000 tons, compared with 22,800 tons in the preceding month. Automobile production is tapering, but holds unusually well for the season. Apparently general manufacturing activity is well sustained.

Five-Month Total of Sales Highest Yet

CONFORMING to the indications of the composite demand line, our index of orders and sales, covering some of the chief items of finished steel, increased in May. This is the only one of the six years, shown in the third chart, in which sales increased in that month. The May figure is much above that for the same month in any of the preceding years. As a result, the total sales of finished steel for the first five months exceeded those for the same period, even in 1923.

Sales of steel sheets and plates fell off in May, which is usually a seasonal occurrence, while the sales of structural steel and steel castings increased

over April. All four of these items, which together totaled 3,448,000 tons, were much above May last year, when the total was 3,203,000 tons. It is to be remembered in this connection, however, that May this year had one more working day.

Why the Present Steel Situation

SO unusual is the steel situation at present that a number of queries are suggested:

(1) Is steel production in the first half of 1928 record-breaking?

Answer: Not in any true sense. If we allow for the slow, steady, normal growth of the requirements of the country, conservatively estimated, we find that steel production in the first six months was relatively smaller than in either 1923 or 1926. A carefully

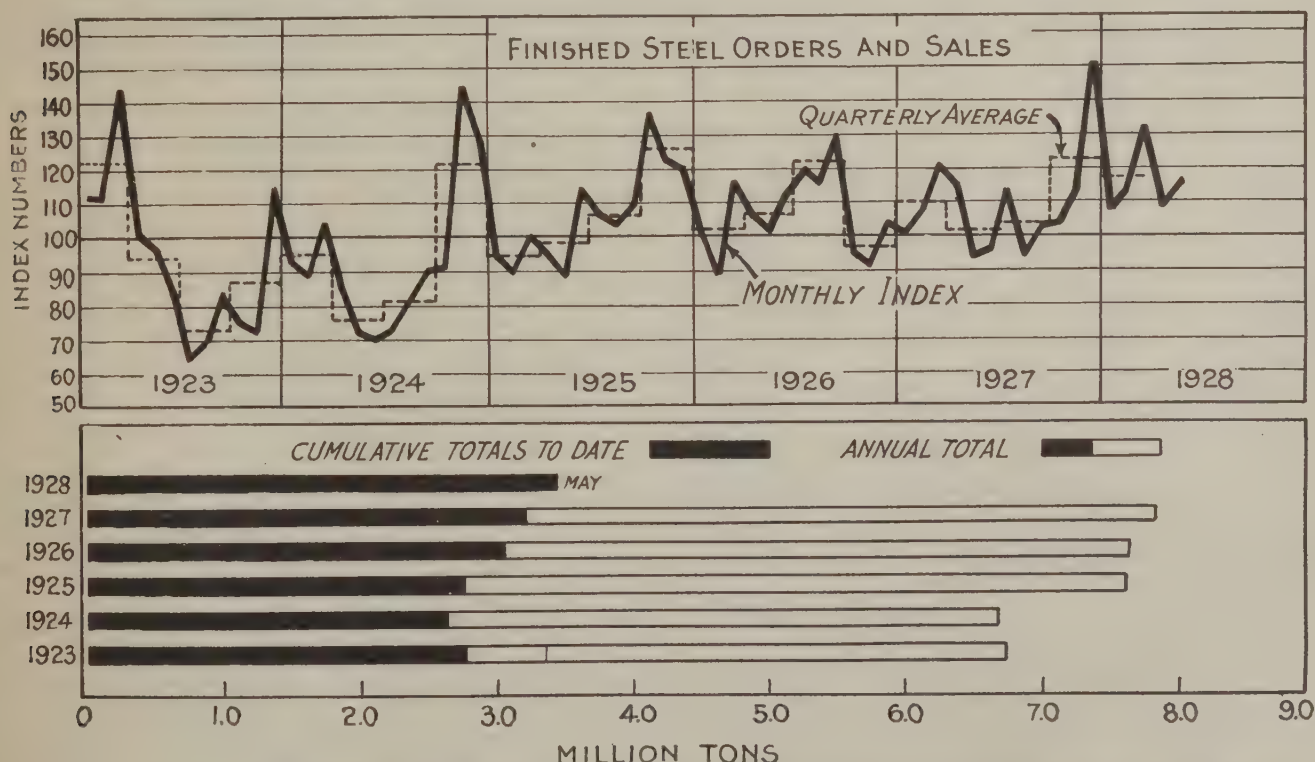


Fig. 3—Buying of Finished Steel Was Higher in May Than in That Month in Any Previous Year Shown. The cumulative total is the greatest for any year on the diagram

adjusted index, showing what percentage the average daily production of steel ingots is of normal, averaged 109.2 in the first half of 1928, 111.3 in the first half of 1926, and 113.9 in the first half of 1923. The index for April, 1928, which is the peak month of the year, is 119.1; for May, 1923, it is 122.5. Thus steel production is absolutely higher, but has not maintained its normal rate of growth.

(2) *Why is steel production so well maintained at around 8 to 10 per cent above normal, while prices are low, unfilled orders small, and railroad freight traffic and factory labor employment relatively low?*

Answer: In spite of small forward buying, the activity in the steel consuming industries is such as to make current requirements large enough to take care of an above-normal steel output. Steel production is below the level of our composite demand curve and orders for finished steel are well over 110 per cent of the average for the last five years. In spite of reduced railroad buying, the automobile, building, tin plate and agricultural implement businesses have been operating at above-normal rates.

(3) *Why then are steel prices so low?*

Answer: The production of steel is considerably below the capacity of the steel producers and is well up to current requirements. Competition among producers is keen in a good many directions, and there is no shortage of supply in prospect. At the same time, the general trend of commodity prices is downward, and competition among buyers is so keen that their margins of profit are low and they cannot afford to pay high prices. The automobile sheet business is a strong illustration. In a

sense, the low prices make possible the high production.

(4) *Why is pig iron so low in price?*

Answer: Pig iron is cheap compared with finished steel, about right compared with scrap, and about as low as it ever gets compared with coke. In comparison with their estimated normal levels of production, the output of pig iron is not too high, as judged by steel production. One almost infallible barometer of pig iron prices, however, is found in the ratio of pig iron production to steel ingot production, taking into consideration the level of steel prices. When this ratio turns upward and is high, pig iron is always weak in price. This condition has existed in most of the months since February, 1927, and during that time the general trend of pig iron prices has been downward.

Other reasons are as follows: Imports of pig iron, though lower in May, in the first five months of the year were 35 per cent greater than in the same period of 1927. Pig iron is weak in foreign markets and production in France and Belgium exceeds the output of crude steel. The domestic markets for pig iron are highly competitive, with water transportation playing an increased part. Low coke prices have facilitated the decline in pig iron.

(5) *Why the considerable increase in unfilled orders in June?*

Answer: In large part, the increase must have been due to three conditions: (1) additions to and extensions of second quarter contracts that had been made at lower than current prices; (2) declining shipments; (3) a few large orders for line pipe, tin plate and bridges, placed toward the end of June.

(6) *Does the increase in unfilled orders forecast an upturn in steel production and prices?*

Answer: No. In the first place, the nature of the causes of the increase deprives it of much of its significance. It will be noted that it did not occur at the same time with expanding production, as was the case in 1922 and in 1924; on the contrary, it occurred with steel production declining from a high point. In the second place, the significant rises in unfilled orders rarely come as such sharp reversals of trend as this one. Usually, making allowance for seasonal variation, significant increases come after the unfilled orders have tapered off in their decline and have then begun to rise gradually. In the third place, there is nothing in the general condition of industry to explain any such rush of forward buying as the upturn might seem to indicate.

(7) *With automobile production and building activity so great, and taking such quantities of sheets as would seem necessary, why are sheet prices so weak?*

Answer: According to returns from "independent" manufacturers of sheets (who produce probably upward of 75 per cent of the total output), production of sheets was very large and on the increase in May. It was above shipments. As a result, stocks increased. The sales of sheets do not show a rising trend, but the contrary. A three-month moving average has pointed downward steadily since December, and May sales were the lowest since last October. Evidently automobile makers are taking a smaller quantity of sheets as they near the period of seasonal decline. Residential building has increased only in New York, where apartment construction is the outstanding feature.

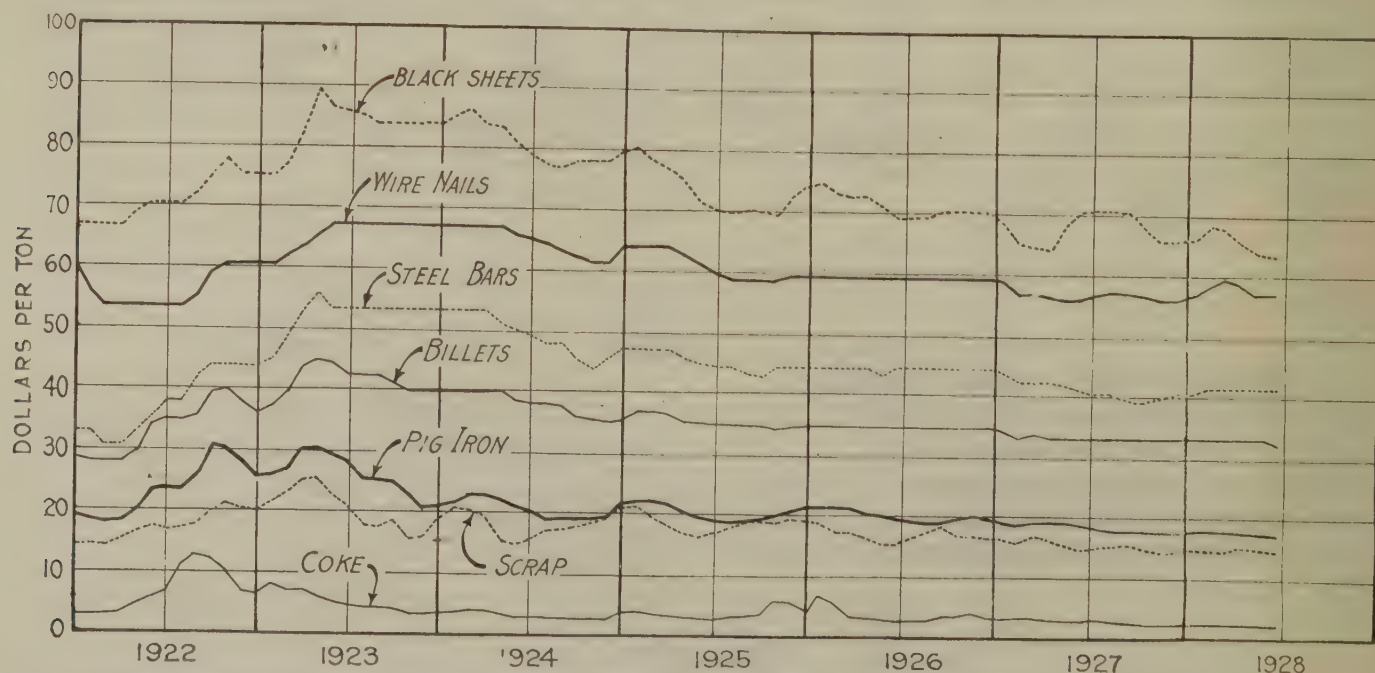


Fig. 4—Finished Steel Prices (in Particular, Sheets and Nails) Are Relatively Low, Compared with Semi-Finished and Raw Materials. But supplies are abundant and improvement is not indicated

No Improvement in European Markets

Holidays Hamper British Output—Lower Prices Hit German Steel Production—Consumption Active in Japan

(By Cable)

LONDON, ENGLAND, July 16.

IRON and steel markets are quiet, as the Glasgow Fair holidays have commenced. Normal resumption cannot be expected before the end of this month. The pig iron position is getting worse, as both domestic and export demand are poor; consumers are not making forward contracts. Cleveland producers are still well placed for a few weeks, on restricted output, but are desirous of putting new business on their books. Hematite is practically dormant, except for a few small export sales.

Foreign ore markets are idle, as consumers are well covered, but the Swedish strike continues. There is some tendency among German users to enter into two-year contracts at a flat rate.

Finished steel markets are quiet, in the heavy branches, and competition among makers is keen in non-association products. Plate mills, especially, are in need of orders, but the sheet mills and constructional and en-

gineering departments are moderately busy.

June exports of pig iron were 33,200 tons, of which 6500 tons went to the United States. Total iron and steel exports were 365,900 tons.

Tin plate markets are quiet and there is talk of reimposing the output restriction for October to December. Makers at present are well sold and the mills are running at well over 90 per cent of capacity. Consumers' demand has been affected by recent weakness in tin, but it is expected to revive when the tin situation is more settled. There is considerable inquiry still circulating. Over 54,000 tons of tin plate and terne plate was exported in June. Galvanized sheets are quiet and black sheets are dull.

On the Continent

Continental iron and steel markets are quiet, as regards consumers' demand, but the termination of the Antwerp dockers' strike caused some merchant covering. Prices generally are steady, with a slight upward tendency in semi-finished materials.

is the weakening of the Continental market, which had been active, with rising prices, since October, 1927. The general outlook for iron and steel is a gradual decline of production during the remainder of this year and it is almost certain that 1928 will not repeat the high production of 1927.

Comparative production figures for the last reported month and for the first five months of the year are:

	May, 1928	May, 1927
	Metric Tons	
Pig iron	1,044,046	1,129,802
Ingots	1,247,781	1,377,737
Rolled steel..	986,459	1,087,068
	Jan.-May, 1928 Jan.-May, 1927	
	Metric Tons	
Pig iron	5,565,030	5,297,474
Ingots	6,619,077	6,625,147
Rolled steel..	5,197,954	5,228,571

Output of Steel Falling

Average output per working day has been falling since March. The demand for steel from the building industry is lower than was expected. The demand from engineering and machinery-construction works has declined. Home shipbuilding is inactive and the Railroads Corporation is giving only very small orders for permanent way materials. June production returns will probably show further declines for pig iron, steel, and rolled goods.

Uncertainty in Export Market

The export market is uncertain. In the second and third weeks of

German Steel Output Declining

Weakening in Home Market and in Continental Prices—Cartel Uninfluenced by American Export Combine

BERLIN, June 30.—The slackening of home trade continues to react upon activity in iron and steel. Employment, owing to seasonal influ-

ences, is still improving and wages are rising; but the trade slackening is unmistakable. A further unfavorable influence on the steel industry

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

	£0 17½s. to £0 17¼s.	\$4.25 to \$4.31
Durham coke, del'd....	1 2½	5.48
Bilbao Rubio ore*.....	3 8½ to 3 9½	16.64 to 16.89
Cleveland No. 1 fdy....	3 6	16.04
Cleveland No. 3 fdy....	3 5	15.80
Cleveland No. 4 fdy....	3 4½	15.68
Cleveland No. 4 forge..	3 5	15.80
Cleveland basic (nom.)..	3 8 to 3 9	16.53 to 16.77
East Coast mixed.....	3 10½	17.13
East Coast hematite....	7 15 to 8 5	37.66 to 40.10
Rails, 60 lb. and up....	6 5 to 6 15	30.39 to 32.81
Billets	13 15	66.83
Ferromanganese	13 0 to 13 5	63.18 to 64.39
Ferromanganese (export)		
Sheet and tin plate bars, Welsh	6 0	29.16
Tin plate, base box....	0 18½	4.43
Black sheets, Japanese specifications	13 7½	65.00
	C. per Lb.	
Ship plates	7 12½ to 8 2½	1.63 to 1.74
Boiler plates	9 0 to 10 10	1.92 to 2.25
Tees	8 2½ to 8 12½	1.74 to 1.84
Channels	7 7½ to 7 17½	1.58 to 1.69
Beams	7 2½ to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 5 to 7 15	1.55 to 1.66
Steel hoops	9 0 to 10 0	1.92 to 2.14
Black sheets, 24 gage...	9 15 to 10 0	2.09 to 2.14
Galv. sheets, 24 gage...	13 7½	2.86
Cold rolled steel strip, 20 gage, nom.	16 0	3.42

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):	£3 3s. to £3 5s.	\$15.32 to \$15.80
Belgium	3 3 to 3 5	15.32 to 15.80
France	3 3 to 3 5	15.32 to 15.80
Luxemburg	3 3 to 3 5	15.32 to 15.80
Basic pig iron (nom.):	3 1 to 3 2	14.82 to 15.07
Belgium	3 1 to 3 2	14.82 to 15.07
France	3 1 to 3 2	14.82 to 15.07
Luxemburg	3 1 to 3 2	14.82 to 15.07
Coke	0 18	4.37
Billets:		
Belgium	4 15	23.09
France	4 15	23.09
Merchant bars:		
Belgium	5 13½ to 5 14	1.25 to 1.26
France	5 13½ to 5 14	1.25 to 1.26
Luxemburg	5 13½ to 5 14	1.25 to 1.26
Joints (beams):		
Belgium	4 17½ to 4 18	1.07 to 1.08
France	4 17½ to 4 18	1.07 to 1.08
Luxemburg	4 17½ to 4 18	1.07 to 1.08
Angles:		
Belgium	5 10 to 5 12½	1.21 to 1.24
½-in. plate:		
Belgium (a)	6 11	1.44
Germany (a)	6 11	1.44
¾-in. ship plate:		
Belgium	6 7	1.40
Luxemburg	6 7	1.40
Sheets, heavy:		
Belgium	6 1	1.33
Germany	6 1	1.33

(a) Nominal.

June export orders declined. This was followed by a brief revival, but toward the end of the month the Continental market again weakened. French and Belgian prices fell. German export prices were also slightly cut. The Stahlwerksverband, which had been exporting bars at £5 15s. (\$27.90) per ton cut its price to £5 14s. (\$27.65). Owing to big ship-building orders, the Continental sheet market has not shared in the new general weakening. German home prices of wire cables have been raised on an average 3 per cent. Wholesale prices of German iron and steel on June 27 averaged 28.3 per cent more than in 1913-14; wholesale prices of machinery, machine-tools, and other metal instruments of production 37.1 per cent more than in 1913-14.

No important measures were decided upon at the quarterly general meeting of the International Steel Cartel held at Düsseldorf on June 26. As president of the cartel, to replace the late M. Mayrisch, was elected Director-General Meyer, who had already succeeded M. Mayrisch as chief of the Arbed Corporation of Luxemburg. The effect of this election will be that Luxemburg will continue as headquarters of the cartel. No change was made in the cartel's production program for the third quarter of 1928 or in the quotas of the member countries. The existing system of mitigating Germany's penalties for exceeding its production quota will be retained. This system consists in exacting the full penalty of \$4 per ton only upon that part of Germany's over-quota production which is exported, while the part sold at home is penalized only to the extent of \$1 per ton.

Nothing was done to form the long-planned selling syndicates for the individual products controlled by the cartel, but the matter was discussed unofficially. The question of Poland's entry into the cartel did not come up. The Central European group, consisting of Czechoslovakia, Austria, and Hungary, which at present belongs to the cartel as an indivisible unit, applied to be dissolved into three national units. At present this three-country group has a combined production quota of about 2,100,000 metric tons. A commission was appointed to consider the application for dissolution.

Cartel Uninfluenced By American Action

The cartel's policy has not been influenced by the news of the foundation of the Steel Export Association of America, but the American move has made a considerable stir in West Germany steel circles. Düsseldorf experts express the view that an active American policy in the sense of the Steel Export Association would tend to stabilize world prices and European prices. But they affirm that no serious American invasion of the European market is likely, even if there is a decline in the

American home demand. This view is based upon the high land and water freight charges which American exporters would have to bear. The fact that Canada, South America, and the Far East, in which the freight advantage lies with the United States, have hitherto been the chief takers of American iron, is adduced as a further argument.

British Exports Up; Imports Down

WASHINGTON, July 17.—Continuing tendencies of previous recent months, exports of iron and steel from the United Kingdom increased and imports decreased in June. The outgoing movement was 365,890 gross tons, a gain of 6873 tons or 1.9 per cent when compared with May. Imports totaled 210,405 gross tons, a decline of 26,447 tons or 11.2 per cent, according to a radiogram received by the Department of Commerce from the American Commercial Attaché in London. The import tonnage was the lowest for any month since June, 1925.

Increase in the export shipments was reflected in 15 of the 22 classes into which the trade is divided. The net gain, however, was held down by the substantial losses in galvanized sheets, which dropped to 54,167 tons in June as against 61,061 tons in May, a decrease of 6894 tons; in pig iron, which declined to 39,284 tons from 45,084 tons, a loss of 5800 tons; in cast iron tubes, which decreased to 8560 tons from 12,097 tons, a drop of 3537 tons; and in wrought tubes, which declined to 22,478 tons from 24,923 tons, a drop of 2445 tons.

Some of the more important gains were made in tin plate, which rose to 54,615 tons from 47,358 tons, a gain of 7257 tons; in steel bars, which increased to 29,874 tons from 24,190 tons, a gain of 5684 tons; in rails, which increased to 25,388 tons from 22,206 tons, a gain of 3182 tons; in hoops, which totaled 6176 tons as against 3376 tons, an increase of 2800 tons; and in railroad material, amounting to 21,016 tons as compared with 18,971 tons, an increase of 2045 tons.

In the import list only four classes showed gains, while 15 reflected losses. Cast iron pipe was the only important item showing an increase, rising to 5935 tons from 3765 tons, a gain of 2170 tons. The largest decrease was in semi-finished steel, which dropped 8724 tons to 86,866 tons from 95,590 tons. Imports of hoops declined 6603 tons, to 8946 tons from 15,549 tons; of iron bars, 6076 tons, to 8769 tons from 14,845 tons; of pig iron, 2534 tons, to 7515 tons from 10,049 tons; and of wrought tubes, 1499 tons, to 5361 tons from 6860 tons.

Production of both pig iron and ingots decreased in June when compared with May. The blast furnace output was 563,700 tons, as against 590,500 tons, while steel works production was 709,500 tons as compared with 752,700 tons. At the end of June 141 blast furnaces were blowing, a

decrease of seven under the number in blast at the end of May. The number of open-hearth furnaces in operation increased by one, to 262.

Developments in Iron and Steel in Australia

Expansion and production of iron and steel plants are both reported on by United States Trade Commissioner E. C. Squire, Sydney, Australia, as follows:

Further steps looking toward the formation of the Australian Iron & Steel Co. have been taken by the calling of a meeting of the shareholders of the Hoskins Iron & Steel Co., Ltd., to pass the necessary resolutions for the sale and transfer of the assets of that company to the Australian company.

Extensions costing about £200,000 and consisting of five more rolling mills, a galvanizing plant, and certain other works are planned for the Newcastle Works of John Lysaght's (Australia), Ltd. The addition of this new equipment is expected to increase the productive capacity of this company by 50,000 tons of galvanized and black sheets a year.

Pig iron production by the Broken Hill company during April, the latest month for which returns are available, was considerably below that of the same month of the year previous—production during those two periods being 15,338 tons and 25,310 tons respectively. Steel production during this same month was also reduced by this comparison but to a less marked degree, 20,170 tons being produced in April, 1928, against 28,712 tons in April, 1927. Over the four months ended April 30, this company made 57,143 tons of pig iron (against 112,688 tons during January-April, 1927), and 85,635 tons of steel ingots (107,381 tons).

Hold Mass Production Insecure for Capital and Labor

CAMBRIDGE, ENGLAND, July 4.—That mass production is insecure for both labor and capital because of its dependence upon wide markets, and that social research and scientific management under the joint auspices of labor and employers are needed to give stability to industry and to protect wage earners against those effects of mechanization which are detrimental, was pointed out by speakers from the United States, Great Britain, Germany and other countries at the Congress of the International Industrial Relations Association (for the study and promotion of satisfactory human relations and conditions in industry) which has just completed its five days' discussion of the subject, "Fundamental Human Relationships in Industry," at Cambridge. The congress was attended by personnel managers and welfare

workers, employers, representatives of labor, factory inspectors and research workers from twenty countries. The speakers included: The Rt. Hon. Lord Askwith, K.C.B.; Victor Branford, Sociological Society, London; C. Delisle Burns, lecturer University of Glasgow; Miss Kerstin Hesselgren, inspector of factories and Member of Parliament, Sweden; Paul U. Kellogg, editor *Survey*, New York; Dr. Otto Lipmann, director Institute for Applied Psychology, Berlin; Hans Mars, executive officer, Chamber of Labor, Vienna, Austria; Dr. Charles S. Myers, director National Institute of Industrial Psychology, London;

Maj. L. Urwick, Management Research Groups, London; and Dr. Frieda Wunderlich, Bureau for Social Politics, Berlin. The officers of the International Industrial Relations Association elected for the ensuing three years were: President: C. H. van der Leeuw, partner of de erven de Wed. J. van Nelle, Holland; vice-presidents: Miss M. van Kleeck, Russell Sage Foundation, New York; Miss M. L. Fled-dérus, Holland, and Erich Lübbe, chairman of the works' council Siemens, Ltd., Berlin; treasurer, Charles E. Jacob, managing director, W. & R. Jacob & Co., Ltd., Dublin.

Large Exports of Metal-Working Machinery

Shipments in 1927 Greatest Since 1920—Europe Takes Over Half of Total

WASHINGTON, July 17.—Valued at \$25,379,000, exports of metal-working machinery from the United States in 1927 reached the largest volume in seven years, or since the abnormal year of 1920, according to a statement prepared by S. R. March, Industrial Machinery Division, Department of Commerce. The total of last year exceeded by 35 per cent the exports of 1926 and was greater than such shipments in 1925, which had marked an abrupt increase over previous years.

Mr. March pointed out that the marketing of this large volume of equipment is of especial interest, inasmuch as metal-working machinery is in demand only in those countries which enjoy a certain degree of industrial development. The principal markets for this class of machinery are therefore to be found among the most highly industrialized nations, and consequently among the countries which are the keenest competitors of the United States for the world's metal-working machinery trade.

The outstanding development in the foreign metal-working machinery trade was the gain of \$4,900,000, or 50 per cent, in shipments to Europe. The decline in these exports to Europe in 1926 was responsible for the poorer showing of that year as compared with 1925. This loss has now been more than offset. Europe in 1927 absorbed twice as much American metal-working machinery as in 1924,

and three times the total value of 1923. As a result of these gains, Europe imported last year 57.5 per cent of the total United States exports of this class of machinery, or 6.1 per cent more than in 1926. Latin America, on the other hand, imported only 10.4 per cent, or 4 per cent less than in 1926.

The United Kingdom and Canada continued to be the largest individual markets for United States exports of metal-working machinery. Shipments into these countries increased by more than \$1,000,000 in 1927. Germany, whose purchases fell off about 67 per cent in 1927 from the record purchases of 1925, still imported more than three times as much metal-working machinery in 1927 as in the previous year. Germany's imports, valued at \$3,175,000, compare strikingly with \$77,120 in 1922; \$209,474 in 1923 and \$545,315 in 1924. Imports into France showed a substantial gain over 1926, but did not quite equal those of 1925.

One of the most noteworthy developments in individual markets has taken place in shipments to Soviet Russia in Europe, which amounted to \$1,046,000 in 1927, as compared with \$538,000 in 1926 and only \$930 in 1922. Shipments to both Argentina and Brazil reached record volume and indicate the rapid industrial progress which is developing in those countries. The Philippine Islands likewise imported the largest volume of

metal-working machinery in recent years, exceeding the average for the preceding five years by more than 50 per cent. There were also a few sharp decreases in exports, notably in the cases of Mexico and Chile.

Active Steel Consumption in Japan

WASHINGTON, July 17.—Demand for steel throughout practically the whole of Japan is active, according to a report received by the Iron and Steel Division, Department of Commerce, from Assistant Commercial Attaché J. H. Ehlers, Tokio. The demand is attributed to reconstruction activities in and about Tokio and the general construction in progress in other leading Japanese cities. At the moment, the report said, a large part of the business is going to domestic producers, and is stimulating output. The demand for tin plate, black steel sheets, bars and rods, bolts and nuts and structural shapes was declared to be active with stocks on hand rated as normal, except for black steel sheets, of which the stocks are reported low.

British Iron and Steel Output Dropped in June

LONDON, ENGLAND, July 16 (By Cable).—Production of pig iron in June was 563,700 gross tons, and that of steel, including castings, was 709,500 tons. Both figures represent a decline compared with May output.

A comparison of the June output with that of the five preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	408,500	296,700
1927—Av. monthly..	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700
1928—June	563,700	709,500

United States Exports of Metal-Working Machinery
(In thousands of dollars)

Destination	1913	1919	1920	1921	1922	1923	1924	1925	1926	1927
Canada, Newfoundland	2,328	4,041	5,830	1,226	1,641	2,965	1,768	2,340	3,229	4,670
Europe (except Balkans).....	12,263	40,982	25,267	8,569	3,914	4,854	7,350	13,762	9,694	14,590
South America	572	2,033	1,952	1,764	857	853	941	1,628	1,623	1,831
Mexico and Central America.....	98	421	752	871	506	707	495	729	822	502
West Indies	129	808	1,364	725	284	433	408	409	273	303
Total Latin America.....	799	3,262	4,068	3,360	1,647	1,993	1,844	2,766	2,718	2,636
Asia (except Asia Minor).....	199	8,815	7,427	5,137	4,326	2,386	2,581	1,821	1,638	1,977
Australasia	463	801	1,090	615	483	726	747	931	1,163	1,096
Africa	37	545	400	400	93	158	248	313	372	349
Other countries	8	62	230	327	20	22	52	104	54	61
Total, all countries.....	16,097	58,508	44,312	19,636	12,124	13,105	14,590	22,037	18,868	25,379

Mechanical Engineers Meeting at St. Paul and Minneapolis

For the summer meeting of the American Society of Mechanical Engineers to be held at St. Paul and Minneapolis, Aug. 27 to 30, following a cruise of the Great Lakes beginning at Buffalo on Aug. 20, the papers to be read include the following:

The apprentice training program of the Tri-Cities manufacturers by S. M. Brah, and "Does Mass Production Lessen the Need for Trade Skill?" by H. A. Frommelt.

Mechanical engineering in the iron ore industry, by Anton Taneig, and the use of electric power in iron mining, by Allan C. Butterworth.

An investigation of insulated walls, by F. B. Rowley.

Low temperature distillation of low grade fuels, by Max Toltz, modern developments in the coke industry, by A. R. Powell, and mechanical engineering in coal mines, by E. McAuliffe.

Institute of Metals to Meet in Germany

The council of the Institute of Metals has accepted an invitation from the Verein Deutsche Ingenieure and the Deutsche Gesellschaft für Metallkunde to hold next year's autumn meeting of the institute in Germany. The meeting will take place in Düsseldorf. It is expected to prove very attractive not only to British members but also to members resident in Continental countries. The latter often find it difficult to attend meetings in the British Isles but, as was proved on the occasion of the institute's gatherings held in Ghent and Liège, they come freely to meetings held on the Continent. The meeting will be the first to be held in Germany by the Institute of Metals.

National Metal Exposition in October

The National Metal Exposition to be held in Philadelphia the week of Oct. 8 under the auspices of the American Society for Steel Treating promises to prove a fitting companion to the nine previous expositions, says W. H. Eisenman, secretary.

The Detroit Show last year marked a high water point as far as actual space used, which was in the neighborhood of 93,000 sq. ft., while the maximum capacity at Commercial Museum is approximately 80,000 sq. ft. The exposition will cover ferrous and non-ferrous field, heat treating equipment, small tools, machinery, forging equipment, inspection, handling and welding equipment.

Approximately 10,000 sq. ft. will be devoted to an exhibit of welding supplies and equipment. A definite portion of Commercial Museum has been set aside for this feature of the exhibit and is to be carried on in coop-

eration and under the auspices of the American Welding Society, which association will hold its annual fall meeting in Philadelphia the same week as the exposition.

The Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers will again hold its fall meeting at Philadelphia during the same week.

Meetings of New England Foundrymen

The New England Foundrymen's Association was the guest of the Worcester, Mass., members at the July 11 meeting at Edgemere Lodge, Lake Quinsigamond, Worcester. F. F. Newcomb, Pilling & Co., was general chairman of arrangements. H. A. Davis, Freemont Casting Co., Worcester, was in charge of reception arrangements; Harry H. Warner, Arcade Malleable Iron Co., Worcester, took charge of sports; while Richard Powers, R. P. Powers Foundry, Worcester, was in charge of the older members of the organization. Transportation problems were cared for by Harry MacDonald, Reed-Prentice Co., Worcester.

Informal announcement was made during dinner that the August meeting of the association will be held in Providence, R. I., where a shore dinner and sports will be enjoyed. Charles F. Miller, president, and Fred F. Stockwell, secretary, both stated that present plans call for an interesting business meeting at the Exchange Club, Boston, on Wednesday, Sept. 12.

To Study Metallurgy and Coal Mining

Fourteen research studies in coal mining and metallurgy will be carried on during the ensuing college year by the Carnegie Institute of Technology, Pittsburgh. They will be the work respectively, of 11 research fellows, a research engineer, an assistant research engineer and an analyst, all of whom have been appointed by the institute. The research fellows will be candidates for the degree of master of science.

Among the metallurgical subjects will be the cause and control of abnormality in case-carburized steel, formation and identification of inclusions, distribution ratio of iron oxide between slag and metal, method of determining inclusions, viscosity of open-hearth slags, and three studies in plant work relating to the physical chemistry of steel making.

Bituminous coal raised in the week ended July 7—a five-day week—is reported by the United States Bureau of Mines at 6,837,000 net tons. This was at the somewhat lower daily average than for the two preceding weeks. For the calendar year to July 7 the total was 241,126,000 tons, a loss of almost 15 per cent from the same period last year.

Smaller Shipments of Enameled Sheet-Metal Ware

Shipments of enameled sheet-metal ware in May are reported by the Department of Commerce at 384,501 dozens, valued at \$1,304,182. This is the lowest figure since January, comparing with 351,034 dozens in April, valued at \$1,329,929. It represents a considerable increase, however, from a year ago, when the total was 318,071 dozens, valued at \$1,103,693. The May total was greater than any month in 1927, except for February and March. The enameled ware included consists of cooking, household and hospital utensils, having a vitreous coat on a sheet steel or iron base. It does not include equipment such as stoves, heaters, signs, etc.

What the Railroads Did in 1927

Statistics of common carriers for the calendar year 1927 have been issued by the Interstate Commerce Commission in a 28-page pamphlet, going into a great variety of information. Operating revenues for all roads totaled \$5,985,857,014, almost 80 per cent of which was from carriage of freight. Miscellaneous revenues brought the grand total to \$6,134,537,524. Operating expenses aggregated \$4,572,632,285, to which taxes added \$376,090,250. Net operating income was \$1,067,915,340, which represents less than 4½ per cent on the reported investment of \$24,463,367,010.

Revenue freight carried aggregated 2,361,941,419 net tons, of which 97.22 per cent was in carload traffic and 2.78 per cent in less-than-carload freight. Revenue freight originated aggregated 1,281,064,954 tons, of which less-than-carload items accounted for about 3 per cent. The average loading of carload traffic was 35.13 tons to the car.

Paying Men for What They Do

Department heads of the A. O. Smith Corporation, Milwaukee, receive a bonus determined upon the efficiency of their departments. The bonus markings are based on the production, the cost, and the quality of the work. This is found to create a healthy competition among them and also makes the job of foreman a very desirable one.

The result is that all departments are run in an efficient and business-like manner.

The foremen hold monthly meetings at the plant at which addresses are delivered, generally on industrial subjects. A large moving picture machine is available for illustrated lectures. Special efforts are made to foster a friendly feeling among the foremen and between the foreman and the workmen.

To Appraise Obsolescence of Machinery

Department of Commerce to Study Conditions Affecting Cost-Accounting Allowance for This Factor

WASHINGTON, July 17.—Determination of the amount of obsolete industrial equipment, and its importance as a factor in the inability of firms manufacturing similar products to compete on an equally profitable basis, is one of the objectives of a requested survey to be undertaken by the Department of Commerce. It will be conducted under the immediate direction of H. C. Dunn. Replacement of machinery which in point of service may have many years of usefulness, but which in point of satisfying the latest fancies of the consumer market is obsolete, is an important matter for the manufacturers and one which is behind the request for the study, said Mr. Dunn. A sample survey will first be made to develop the plan of procedure and to learn what obstacles must be overcome.

Obsolescence merits a definite understanding, Mr. Dunn pointed out, especially that it may not be confused with depreciation. It was explained that the obsolescence of factory equipment is effected largely by style changes or by the new product of inventive genius, and not by wear and tear, which are factors in depreciation.

To distinguish between obsolescence and depreciation, and to explain the object and plans for the industrial equipment survey, Mr. Dunn made the following statement:

The practical value of this study would probably be a truer accounting for obsolescence as a hazard, rather than an arbitrary compromise with depreciation, as at present. Wear and tear, or depreciation, is a scientific measurement and can be determined accurately in cost accounting. Obsolescence is analogous to fire as a risk. It cannot be predetermined any more than the date a building will burn can be determined. An arbitrary basis of accounting for the two factors does justice to neither, and fails in adequately providing a fund for replacing machinery when its value has been destroyed by its being worn out or rendered obsolete.

If obsolescence is defined as representing the deadline beyond which a machine cannot compete profitably with another machine, none of the machine's value is destroyed until the deadline is reached; then the value is destroyed all at once. Depreciation approaches its deadline by gradual and constantly diminishing value. Therefore, the two cannot accurately be confused.

Natural caution and conservatism prompts us to hang on to methods and equipment long after the period of their greatest usefulness or profitableness is ended. Facts and information are probably the greatest factors for providing the assurance and courage necessary to discard the obsolete and inaugurate the new. At present, no facts or information seem available to the public generally.

Some of the more ingeniously managed concerns have data and policies concerning obsolescence, but this only accentuates the inability of others to continue

satisfactory profits. The market price established by the most efficient is a difficult goal for the less efficient to achieve. Probably the most stabilizing and most profitable competitive condition is when all are as efficient as the most efficient. Therefore, whatever can be done to approach this end should have practical value.

South America Large Buyer of Airplanes

WASHINGTON, July 17.—Almost one-third of the American exports of aeronautical products goes to South America, considered the most potential market for aviation sales by the Transportation Division, Department of Commerce. In the past three years South America has bought \$1,204,585 worth, or 32 per cent of the \$3,715,000 of United States aviation products shipped abroad. Argentina, one of the important markets for American aeronautical products, bought \$246,000 worth in the past three years, including 32 airplanes, valued at \$215,037. Peru, however, far exceeded Argentina's purchases in the past few years. From 1925 through 1927 it imported a total of \$468,871 worth of American aircraft products, including 15 planes, valued at \$280,196. Chile has imported \$278,518 worth of American aircraft products, including eight planes, valued at \$215,500. Brazil has bought \$90,628 worth the past three years, including 12 planes, valued at \$78,264, and Colombia has purchased \$114,275 worth, including four planes at \$97,769. Bolivia and Venezuela are other good South American markets.

Ore Shipments Low for Year but June Cargoes Gain

Shipments of iron ore from the Lake Superior region totaled 8,926,216 tons in June, a gain of 467,350 tons, or more than 5 per cent above the 8,458,866 tons shipped from upper Lake ports in June, 1927. However, the total for the season to July 1 fell off 3,476,298 tons, or nearly 20 per cent compared with the 17,-

771,423 tons shipped up to July 1, last year. Shipments by ports and for the season in 1928 and 1927 have been as shown below, in gross tons.

American Shipping Losing Ground

Net tonnage of American ships entering American ports with cargo in April is reported by the Department of Commerce at 1,611,729, a reduction of almost 20 per cent from April, 1927, when 1,979,195 tons entered. Practically all of this tonnage loss of American ships was made up by gains in foreign tonnage entering American ports with cargo. A year ago the figure was 2,515,588, which now has become 2,831,673, or an increase of 12 per cent. The foreign tonnage last year was less than 56 per cent of the total. This year it is 63½ per cent of the aggregate.

Metal-Working Plants Use More Electricity

Steel plants used 4.2 per cent more electric energy in June than a year earlier, and other metal-working plants reported an increase of 17.2 per cent, according to figures compiled by *Electric World*. Automobile manufacturing plants showed a gain of 31.4 per cent, the largeness of which was due in considerable measure to the fact that the Ford plant was practically out of operation a year ago. Textile and lumber plants, on the other hand, were operating below the figure of June, 1927, by 11.9 and 3.7 per cent respectively. Taken as a whole, manufacturing plants showed a gain of 3.5 per cent over June, 1927, but a reduction of 2.2 per cent under May, 1928.

For the first half of the year the index is given for all industrial groups at 119.8, compared with 116.5 in the first half of 1927. The metal industries group for the first half shows 124.2 against 116.3 last year; rolling mills and steel plants, 126.8 against 112.6 last year; other metal-working plants, both ferrous and non-ferrous, 121.7 against 109.6 last year. Automobile plants for the first half show 141.9 against 110.9, while shipbuilding plants record a heavy reduction, having only 88.5 this year against 127 last year.

MOVEMENT OF LAKE SUPERIOR ORE

Port	June, 1928	June, 1927	To July 1	
			1928	1927
Escanaba	831,478	928,471	1,468,202	1,862,299
Marquette	558,212	459,315	875,248	930,628
Ashland	1,235,019	1,113,151	1,868,775	2,309,186
Superior	2,423,990	2,325,965	3,953,793	4,822,434
Duluth	2,899,024	2,718,446	4,568,912	5,893,872
Two Harbors	978,493	913,518	1,560,195	1,953,004
Total	8,926,216	8,458,866	14,295,125	17,771,423
Increase	467,350	.....	.....	.....
Decrease .....	.....	.....	3,476,298	.....

Notable Activity in New England

The New Britain Machine Co., New Britain, Conn., is operating its special machine and machine tool departments on a day and night schedule. Practically 50 per cent of the plant is operating on such a basis. The company has a comfortable backlog of orders, largely from the automobile industry.

The Chapman Valve Mfg. Co., Springfield, Mass., reports more business the first five months of this year than in the last five months of 1927, and indications are 1928's turnover will be as large and probably larger than 1927's. Competition is more severe than it was in the immediate past, with no proportionate decrease in costs.

The Coburn Trolley Track Mfg. Co., Holyoke, Mass., is operating at about 50 per cent of capacity with business prospects somewhat better than they were the first four or five months of this year. Customers are buying conservatively. No material change in prices for their product is anticipated. A few items have advanced slightly, and a few are lower.

E. P. Bullard, president Bullard Machine Tool Co., Bridgeport, Conn., states that the company did more business during the first half of 1928 than in the whole of 1927. The company is pushing sales of new machines, and is buying new machine tool equipment. It has sufficient business on its books today to keep the plant running at capacity the remainder of 1928.

To Dismantle Four Blast Furnaces

YOUNGSTOWN, July 17. — To save taxes and reduce maintenance, the Youngstown Sheet & Tube Co. is to dismantle two blast furnaces and its by-product coke works at Mayville, Wis. The Tod blast furnace at the Brier Hill works, Youngstown, built in 1889 by the old Youngstown Steel Co., is to be torn down, while one of the blast furnaces in the South Chicago battery is also to be demolished, both because of obsolescence. This will leave the company two stacks at South Chicago and a total of 14 at all points. When the two blast furnaces at Mayville are operated, coke will be secured from nearby producers.

Last week, officials and directors of the company conducted a three-days inspection of the Sheet & Tube properties, headed by President James A. Campbell. Improvements now under way are progressing satisfactorily, it was ascertained, including the new by-product coke plant installation at South Chicago and the new boiler and power plant at the Campbell works.

President Campbell predicted increased operations and larger employment, following the trip. Those who participated included Vice-Presidents H. G. Dalton, Cleveland; W. C. Reilly, Walter E. Watson, C. S. Robinson and W. J. Morris, Youngstown;

Walter E. Meub, secretary-treasurer; and the following directors: Harry Coulby, Cleveland, A. E. Adams, Richard Garlick, John Tod and John W. Ford, Youngstown.

Recent steel buying has been satisfactory, making the fall outlook favorable, says President Campbell. Second-quarter earnings will be slightly better than those for first quarter. The company's tin mills at Indiana Harbor have been operating in full for some time and it is showing good earnings from its zinc properties.

Bin Improvements for Joliet Blast Furnaces

A new stock house and material handling system will be erected by the Illinois Steel Co. at its Nos. 3 and 4 blast furnaces at Joliet, Ill. The stock trestle and bin structure will be approximately 400 ft. long and will include two coke bins and 39 ore and stone bins of the Baker suspension type, equipped with McKee special continuous opening segmental hand operated gates. Three larry cars of late design will also be provided. The contract for the extensions and equipment has been awarded to Arthur G. McKee & Co., engineers and contractors, Cleveland.

Employment High in June in Ohio

With the one exception of March, 1928, employment in the iron and steel industries of Ohio during June was the greatest since November, 1926, the index figure standing at 102, with an average month in 1923 taken as 100. The number of wage earners increased 1 per cent from May and 6 per cent from June, 1927, the betterment being shared by 30 of the 58 reporting companies. In Cleveland employment was 10 per cent greater than in May and 38 per cent greater than in June, 1927. In the machinery group June employment was the highest since May, 1927, and was 2 per cent greater than in May. The increase was shared by 103 of the 190 reporting concerns. These figures are taken from the current issue of the bulletin published by the Bureau of Business Research of Ohio State University.

New General Electric Co. Protective Cream

The research laboratories of the General Electric Co. have developed a protective hand cream for hands and arms which are exposed to oil, grease, dirt, varnish, paint and other causes of skin discoloration and irritation encountered in industrial processes. It is applied before beginning work and forms an invisible film which quickly dries and is not slippery. Subsequent washing in warm water removes the film. The cream has been placed on the market by the merchandise department of the company at Bridgeport.

Disston Company to Consolidate Subsidiaries

Plans are being arranged by Henry Disston & Sons, Inc., Tacony, Philadelphia, for a consolidation of its manufacturing subsidiaries into one organization of enlarged proportions, under first noted name. The amalgamation will include Henry Disston & Sons Iron & Steel Works and Henry Disston & Sons File Co. The succeeding organization, Henry Disston & Sons, Inc., will carry out an increase in capital from \$6,000,000 to \$10,000,000, to provide in part for consolidation and expansion. A meeting of stockholders has been called for Sept. 14, to approve the proposition.

Heavier Production of Portland Cement

Portland cement production in June is reported by the United States Bureau of Mines at 17,469,000 bbl., a gain of 1 per cent over the May figure of 17,280,000 bbl. and a similar gain over June, 1927, when production was 17,224,000 bbl. While the June production was the highest for that month ever recorded, it falls short of the high figures of August and September of last year, standing third in all the months we have had.

Shipments in June fell 3 per cent below the preceding month, having been 18,421,000 bbl. against 18,986,000 bbl. in May. The current figure is 7 per cent lower than that for June last year, when shipments amounted to 19,761,000 bbl., and was lower also than the 19,134,000 bbl. of June, 1926. For the first half-year, production of cement has aggregated 77,005,000 bbl., compared with 75,058,000 bbl. last year. A new record has been made, therefore, as no previous half-year reached the totals now recorded.

Reduction in Trackwork Output

Production of trackwork for T-rail track of 60 lb. and up is reported for June by the American Iron and Steel Institute at 13,716 net tons. This represents a reduction of about 3 per cent from the total for May, at 14,141 tons, and it is nearly 6 per cent below the figure for June, 1927, at 14,557 tons. Except for May and March, however, the June total is the highest since June, 1927.

Aggregate production for the second quarter of the year was 41,368 tons. This is the largest total since the corresponding quarter of last year, at 48,406 tons. For the first quarter of this year the amount was 35,761 tons.

The J. M. Carpenter Tap & Die Co., Pawtucket, R. I., has passed out of existence, and a new corporation under the same name incorporated. The original company is now known as the Carpenter Holding Co. Elisha C. Mowry is president.

Fabricated Structural Steel

New York Subways Will Take 15,000 Tons—13,000 Tons Placed for Manhattan Office Building

FOR the third consecutive week awards of fabricated structural steel totaled more than 42,000 tons, lettings during the past seven days having just passed this figure. Outstanding awards were office buildings in New York and Baltimore, taking 13,000 and 7700 tons respectively, and a 3000-ton theater job in Atlantic City. Including 15,000 tons needed for two sections of the New York subway, new projects amounted to 36,700 tons. Other large projects reported were a Milwaukee office building calling for 4000 tons and a municipal drainage project at Oakland, Cal., requiring 4500 tons of plates. Awards follow:

BOSTON & MAINE RAILROAD, 2300 tons, bridges at Saco and Biddeford, Me., and Haverhill, Mass., to Phoenix Bridge Co.

BOSTON & MAINE RAILROAD, 800 tons, bridge at Salmon Falls, Me., to Boston Bridge Works.

PITTSFIELD, MASS., 125 tons, bridge, to Palmer Steel Co.

BOSTON, 165 tons, office building at 8 Newbury Street, to New England Structural Co.

NEW YORK, 13,000 tons, Western Union Building, to Post & McCord, Inc.

NEW YORK, 2300 tons, office building on John Street for New Amsterdam Casualty Co., to Taylor-Fichter Steel Construction Co.

NEW YORK, 500 tons, building in Bronx for Borden's Farm Products Co., to National Bridge Works.

PENNSYLVANIA RAILROAD, 700 tons, freight station at Trenton, N. J., to Belmont Iron Works.

PHILADELPHIA, 800 tons, St. Luke's Hospital, to Montgomery Iron & Steel Co.

PHILADELPHIA, 1000 tons, insurance building at Fourth and Walnut Streets, to American Bridge Co.

ATLANTIC CITY, N. J., 3000 tons, Embassy Theater, to an unnamed fabricator.

BALTIMORE, 7700 tons, building for Baltimore Trust Co., to McClintic-Marshall Co.

WASHINGTON, 250 tons, train shed for Pennsylvania Railroad, to unnamed local company.

WATERVILLE, N. C., 485 tons, Phoenix Utility Co., to Virginia Bridge & Iron Co.

BIRMINGHAM, 177 tons, Seaboard Air Line Railroad, to Virginia Bridge & Iron Co.

BIRMINGHAM, 168 tons, slag bin for Sloss-Sheffield Steel & Iron Co., to Virginia Bridge & Iron Co.

MIAMI, FLA., 100 tons, airplane hangar, to Ingalls Iron Works Co.

BATON ROUGE, LA., 700 tons, Standard Oil Co., to Virginia Bridge & Iron Co.

BUFFALO, 400 tons, Mayflower apartment building, to Kellogg Structural Steel Co.

NEW YORK CENTRAL RAILROAD, 300 tons, bridge at South Bend, Ind., to McClintic-Marshall Co.

CHICAGO, 150 tons, building for Dallas Copper & Brass Co., to Gage Structural Steel Co., local.

CHICAGO, 525 tons, building for Robert O. Law, to Mississippi Valley Structural Steel Co.

CHICAGO, 1000 tons, two public schools, to Eggers Schillow Co., local.

CHICAGO, 200 tons, Interstate Iron & Steel Co., plant addition, to American Bridge Co.

MARINETTE, WIS., 850 tons, Interstate bridge over Menominee River, to Wisconsin Bridge & Iron Co.

KOHLER, WIS., 500 tons, dry kiln addition to pottery plant of Kohler Co., to Worden-Allen Co.

KEWAUNEE, ILL., 500 tons, boiler house for Kewaunee Boiler Co., to Worden-Allen Co.

NEKOOSA, WIS., 125 tons, finishing room for Nekoosa-Edwards Paper Co., to Lakeside Bridge & Steel Co.

GREEN BAY, WIS., 750 tons for Northern Paper Mills, to Worden-Allen Co.

SAN FRANCISCO, 275 tons, A. M. Castle Co. warehouse, to Pacific Coast Engineering Co.

SAN FRANCISCO, 120 tons, apartment building on Pacific and Webster Streets, to McClintic-Marshall Co.

OAKLAND, CAL., 350 tons, apartment building on Lakeshore Boulevard, to Herrick Iron Works.

OROVILLE, CAL., 450 tons, Lincoln and Huntoon Street viaducts for Western Pacific Railroad Co., to unnamed Eastern fabricator.

ALAMEDA, CAL., 120 tons, hangars for Alameda Airport Co., to Herrick Iron Works.

SACRAMENTO, CAL., 100 tons plates, 24-in. riveted pipe line for city, to unnamed pipe fabricator.

SANTA BARBARA, CAL., 125 tons, church, to McClintic-Marshall Co.

SAN BERNARDINO, CAL., 125 tons, Pioneer Trust & Savings Bank Building, to Union Iron Works.

LOS ANGELES, 138 tons, apartment building at 840 South Hobart Street, to Philip Freidman & Son.

LOS ANGELES, 250 tons, apartment building at Franklin and Gramercy Place, to Pacific Iron & Steel Co.

RENO, NEV., 106 tons, Odd Fellows' lodge, to Schrader Iron Works.

PHOENIX, ARIZ., 175 tons, city hall, to Minneapolis Steel & Machinery Co.

MANILA, P. I., 120 tons, apartment building, to Judson-Pacific Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WEYMOUTH, MASS., 525 tons, power house addition.

CAMBRIDGE, MASS., 225 tons, hospital addition.

LAWRENCE, MASS., 150 tons, Champion International Co. power house.

NORTHFIELD, VT., 225 tons, Norwich University armory.

DURHAM, N. H., 250 tons, chemistry building.

PROVIDENCE, R. I., 1200 tons, Washington Bridge; Merritt-Chapman & Scott Corporation, New York, general contractor.

NEW YORK, 15,000 tons, subway work; 4000 tons for section 1-A, route 8 and 11,000 tons for section 1, route 108.

STATE OF NEW JERSEY, 400 tons, highway bridges.

PENNSYLVANIA RAILROAD, 300 tons, bridges.

AKRON, OHIO, 500 tons, East Center bridge, probably will be awarded to Burger Iron Co.

INDIANAPOLIS, 1200 tons, Methodist Hospital.

INDIANAPOLIS, 350 tons, plant building for Link-Belt Co.

CHICAGO, 1850 tons, five junior high schools for Board of Education.

MILWAUKEE, 2500 tons, A. O. Smith Corporation pipe shop; bids to be let this week.

MILWAUKEE, 200 tons, addition for International Harvester Co.; bids close July 23.

MILWAUKEE, 4000 tons, addition to building for Northwestern Mutual Life Insurance Co.

ST. LOUIS, 700 tons, plant for Century Electric Co.

LINCOLN, NEB., 200 tons, Nurses' home; bids in.

SAN FRANCISCO, 200 tons, shapes and rail steel for vault at United States mint; bids being taken.

SAN FRANCISCO, 600 tons, apartment building at 2160 Pacific Street; bids being taken.

OAKLAND, CAL., 4500 tons of plates for East Bay Municipal Utility District; bids Aug. 17.

SANTA CLARA, CAL., 140 tons, bridge at Sargent; bids Aug. 1.

SACRAMENTO, CAL., 455 tons, bridge at Saugus; bids Aug. 1.

VENTURA, CAL., 570 tons, Barsdale bridge; bids July 24.

SAN DIEGO, CAL., 253 tons, bridge over Sweetwater River; bids July 16.

SEATTLE, 195 tons, Second Avenue viaduct extension; bids July 27.

New Trade Publications

Boiler Return Trap.—Vapor Heating Co., York, Pa. Four-page bulletin, B-139, describing and illustrating the new Broomell direct boiler return trap for vapor pressure, vapor vacuum and one or two-pipe systems of steam heating on which the return ends of radiators are equipped with thermostatic traps, operating at 20 lb. boiler pressure or less. Simplicity of construction is a feature. The operating mechanism is inside the body of the trap, above the water line. Inlet and vent ports are non-corrosive, and are positioned so that they will not gather foreign matter. The device is entirely automatic and a pump is not required. It may be used in correcting defective straight steam jobs and in connection with pressure reducing valves when the boiler pressure does not exceed 20 lb.

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin No. 156, describing the sleeve bearing and the ball bearing construction used on Wagner motors. The sleeve bearings are completely sealed against dust and dirt and the ball bearing is of double cap type, to facilitate replacement and servicing.

Presses.—Niagara Machine & Tool Works, Buffalo, N. Y. Bulletin No. 64-C, 44 pages, devoted to the series No. 60 double crank power presses. Features of construction are described and illustrated and specifications on all types are given. A section is also devoted to modifications and special features of these machines. Foot presses and screw presses made by the company are described in bulletin No. 68, also recently issued.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Cross Currents in Steel

OUR next annual presentation of where steel went, in the year now half passed, is going to prove very interesting, for there have been various cross currents. It is a matter of statistical record that ingot production in the first half of this year ran 3 per cent above that in the corresponding period of 1926, the record year; but by no means does this indicate that the various consuming lines each made a similar showing. There were some substantial losses and there were some still larger gains. Passing lightly over 1927, which was badly off in its second half, though almost matching 1926 in its first half steel production, comparisons may be made between 1926 and this year to date.

There have been material decreases in consumption of steel by the railroads and in the oil and gas fields. The highest railroad percentage of total steel consumption in the six years covered by the diagram in THE IRON AGE, Jan. 5, 1928, page 6, was 28 per cent, in 1924, but the tonnage had been greater in 1923. Then there was 25 per cent in 1925, 23½ per cent in 1926 and 19 per cent in 1927. There are chances of the proportion running under 19 per cent this year.

Oil, gas, water and mining were shown at 9½ per cent for 1926 and 8½ per cent for 1927. There was much drilling in 1926 and little in 1927, but a great deal of line pipe work. There is little drilling this year and there was little line pipe business until a few weeks ago. The general proportion seems likely to drop somewhat.

Agriculture's consumption of steel has moved, broadly speaking, in the opposite direction from railroad consumption, for it was only 3 per cent of 1924's light production of steel, increasing to 3½ per cent and then 4 per cent in the next two years of increasing steel totals, while last year it was 5½ per cent. For this year we may expect a still larger percentage.

Automobile and truck production to date is only slightly behind 1926 and there are good chances of the difference being made up. The proportion will not differ greatly from the 14½ per cent reported for 1926.

Each year since 1922 has shown an increase in the proportion of steel passing into building construction, there being a slight backset in percentage though not in tonnage in 1925. The proportion was 15 per cent in 1922 and 22 per cent last year. All the indications are that this year's percentage will show a further increase. Undoubtedly the ratio of steel to total of building operations has been gaining in a very substantial way.

With changes in the distribution of steel to different consuming lines, the industry has no difficulty in putting its steel into the respective finished forms called for, despite the fact that mill equipment is highly specialized. Steel ingots were produced during the first half of this year at 84 per cent of rated capacity, which is a high proportion; but no finishing department was strained, for the sum total of finishing capacity well exceeds the total ingot capacity.

There is no likelihood of any individual finished steel product becoming scarce, but when such changes are seen in the relative requirements of different consuming lines one wonders what things would be like if all the consuming lines should chance to do their best in the same year. Competition makes the gap between total demand and total capacity seem large, but the statistics do not. A 16 per cent margin cannot be called large, generally speaking, yet it is sufficient to keep prices from working into a position that could fairly be described as firm, in the old-time sense.

From Servants to Services

POPULAR writers like to measure modern mechanical power in terms of millions of slaves. The days of slavery are over and, in this country, the era of cheap servants is past. Mass production, by providing at low cost devices which minister to personal comfort and pleasure, has eliminated to a large extent the need for a serving class.

Growing efficiency in manufacture reduces the number of workers required for a given output, creating "technological" unemployment. Employees released by industry are being absorbed in other pursuits, notably luxury industries and the purveying of personal services. In the new sense service consists essentially of organized or wholesale methods of satisfying wants, in contrast with the individual attention rendered by household servants. In the cities apartment hotels relieve their occupants of all the cares of housekeeping, supplying maid and valet service and restaurants. Laundries, hair-dressers' shops, tea rooms, delicatessen shops and cleaning and pressing services are all increasingly used as people become better able to rid themselves of household drudgery. Likewise automobile laundries, repair shops and service stations are doing for the motorist what he formerly did for himself.

A kindred development of the times is the demand for more service in the distribution of products. Packaging, quick delivery in small quantities and other demands made upon the retailer increase the

cost of distribution but add to the convenience or desirability of commodities. According to Magnus W. Alexander, president of the National Industrial Conference Board, this form of service becomes in essence a refinement of the product.

The growth of services, although in many cases resulting in higher costs, does not necessarily mean economic waste. It rather signifies greater specialization in occupations, allowing the individual more time for his own vocation or for leisure and avocations. While there may be disagreement as to what properly are services as distinguished from extravagances, there can be no doubt that they betoken a rising standard of living. Mass output has not only helped solve the servant problem, but it has also made possible a wider enjoyment of organized services and brought to increasing numbers of people some of the best material satisfactions of life.

"Go South, Young Man, Go South"

"COMPANY towns," "mill towns" and coal mining camps are all too frequently aggregations of unkempt shanties, and the inhabitants gradually acquire the same state of dishevelment. Of course there are exceptions and fortunately their number is growing. In all industries and in all States are model towns which must be the envy of their neighbors and undoubtedly attract the highest type of residents. In this way the practical philanthropy behind the town-planning scheme reaps handsome dividends in a decreased labor turnover, a better-than-average skill throughout the working force, and a cheerfulness and contentment which comes from good home surroundings.

Of course, the danger of paternalism must be avoided. But it is apparent to anyone who travels through the newly developing region in North Carolina that a safe middle course can be steered. Here are dozens of little communities, each containing several hundred cottages, clustering about a spinning or a weaving plant. Nature is kind, and only a little effort is needed to adorn the premises with flowers, shrubs and shady arbors. While some of the villages are so new the first coat of paint has hardly been weather-beaten, yet the general impression given by all of them is one of thrift, cleanliness and wholesome living.

A new name should be invented for them. They are so much different from the "mill towns" of New England that the term does not apply. It would be like putting a rose bud and a cockle burr in the same classification.

Freight Car Buying—When?

AT intervals in the years just after the war, car builders gave out estimates of the rate at which the railroads would need to place equipment orders if they were to make up for the running down of their properties under Government control. In the fall of 1924 the country was full of prophecies of prosperity, in view of the approval of the Coolidge administration at the national election. As their contribution to the favorable forecasts, the car companies at that time said that the railroads should buy not less than 200,000 cars a year in the next five years to bring their rolling stock up to standard in freight-moving capacity.

The 1924 prophecies of business activity on a large

scale have come true in the past four years, and in the expeditious handling of the large volume of freight the railroads have made a record to which their spokesmen have pointed with proper pride and on which business reviews have commented again and again. But far from making up for their under-buying in the years of Government operation, the railroads have been but poor patrons of the equipment companies.

In the three years following 1924 the total of freight cars built for domestic use was about 258,000, or an average of 86,000, little more than 40 per cent of the estimated annual requirement of 200,000 cars, and a trifle less than the average of 87,650 cars built in the five years preceding 1924. Among all the years since the war 1923, with a total of 175,748 freight cars built, stands alone in making any close approach to the 200,000-car average of the car builders' forecast of late 1924. Since 1923, as shown by the following figures of *Railway Age*, there has been a steady decline in freight car building, especially marked in 1926 and 1927:

Freight Cars Built for Domestic Lines

1919	94,981	1924	113,761
1920	60,955	1925	105,935
1921	40,292	1926	88,862
1922	66,289	1927	63,390
1923	175,748		

Somewhere an upward turn, in compensation for the lean buying of so many years, is to be looked for; but 1928 has been without any indication of it thus far. Roundly, new freight cars ordered in the past six months were 28,000, as against 42,000 in the first six months of 1927. The record of cars placed in service this year makes even a less favorable showing. For the five months ended May 31, this number was only 21,873, whereas the first five-months' average for the four years 1924-27, as given by *Railway Age*, was 48,800.

The steel industry has one satisfaction from such a showing: Having fared so well this year at the hands of buyers other than railroads, and on a scale that in these other lines gives better promise for the second half than existed a year ago, the inevitable change for the better in railroad demand, should it come this year, will make the round-up for 1928 appreciably better than the best predictions of six months ago.

Steel's Recuperative Powers

A CHARACTERISTIC of the steel industry is so familiar that it may not be identified—its power of recuperation. Often one has heard of a trade or a market going from bad to worse. Steel never does that for any length of time. Always it has recuperated. Its long history has been one of repeated recuperation. It has had its downs and ups, but the latter have always been the greater.

Steel producers themselves have always been noted for optimism. Perhaps that is due largely to the fact that the industry is of such a character as to attract to its ranks men born with sanguine temperament. One of the greatest of these was Andrew Carnegie, and it is no slight to his memory to point out an instance where even he apparently failed to make full allowance for steel's recuperative power. In 1898, on the eve of his departure for an Egyptian trip (his wont was

to talk about business on leaving the country rather than on arriving), he predicted a great tonnage future for steel because it could be sold three pounds for two cents, meaning \$15 billets, whereas in the next year billets sold for \$40 and scrap rails brought more than the cost of the new rails contracted for in the previous year. The steel industry had seemed overbuilt, promising success only to the lowest cost producers, for in the same interview Mr. Carnegie intimated that no concern with bonded indebtedness stood much chance. Afterward he became quite a bondholder himself.

We need not trace the ups and downs that have come since, in both tonnage and prices. Times change, and styles with them, but the power of recuperation in steel remains. What is to the point is to observe how the principle has been working out in recent months in a new way befitting these new times. In the last quarter of last year steel earnings were very poor. Tonnage was light and prices were too poor to yield an adequate return even on a reasonably full tonnage. Things seemed to be going from bad to worse; but promptly tonnage increased. Last year showed the poorest fourth quarter production of steel since 1921, and now this year has shown the largest first half production on record.

At the same time steel prices improved. The hasty opinion would be that they improved purely because tonnage had increased, and later, say on April 1, there were those who judged that the whole thing made a poor showing, by a reasoning that the price improvement was not commensurate with the tonnage improvement, from which it would seem to follow that when tonnage went the other way prices would go the other way still faster.

What the trade has since been permitted to see does not support that view. Steel prices have stood the test of seasonal decline in demand better than those observers expected. Sellers have shown greater ability to hold their prices than their conduct in fair weather had suggested. Confronted by a real emergency, the industry rises to the occasion. It does not secure in the long run what would seem to be a reasonable return on its investment; yet it is always fully capable of keeping out of serious trouble.

Bond Between Slag and Cements

In addition to the four pamphlets issued by the National Slag Association, 937 Leader Building, Cleveland, containing information on various properties of iron blast furnace slag, noted on page 98 of *THE IRON AGE* for July 12, a fifth has just appeared entitled "Bond in Slag and Slag Concrete." It contains 28 pages of quotations from published articles or addresses, each excerpt giving testimony about the way crushed or granulated slag unites with cement, tar, bitumen, or other road-making materials. The pamphlet will answer questions properly asked by engineers or constructors when first considering the use of slag for concrete aggregate or for road building.

Wholesale prices from 1890 to 1926 are covered in a 256-page publication (No. 440) of the United States Bureau of Labor Statistics. Copies may be obtained at 60c. from the Superintendent of Documents, Government Printing Office, Washington. Figures are given for a wide variety of products on an annual basis for the entire period, and month by month through 1925 and 1926. The principal items are shown also in graphic form over a number of years.

CORRESPONDENCE

Tracing Billets Through Marks on Ingots

To the Editor: Some time ago we made an effort to find a method of marking ingots which would carry through into a 4 x 4-in. billet in such manner that the mark would still be legible. It was important to have this result in identifying steel running through the mill. Various types of paint were used without satisfactory results; the mark was not sufficiently legible after the billet was rolled. A special composition crayon was developed which showed considerable improvement over the paint, but still was not entirely satisfactory.

Someone told me of a case where a small electrically-driven saw is used to make certain marks on the ingots. It was said that these marks are visible after the finished bar is on the hotbed. For steel which is subject to rigid surface inspection, however, I should think that these sawmarks would leave a flaw which could not be permitted. Also it would seem to me that there would be only a limited number of bars possible under this arrangement, because not very many sawmarks could be placed on successive ingots before the different kinds of sawmarks would run out. They might follow the Roman numerals to a certain extent, I suppose.

I wonder if any of your readers can tell of a satisfactory method by which the ingots can be marked so that the identification on the hotbed is positive and without detriment to the quality of the steel.

N. S. Y.

Bureau of Mines Studies Ferrous Oxide

Ferrous oxide (FeO) is assumed to be the constituent of so many smelting slags, and to have such important effects upon the quality of pig iron and steel that the Pacific Experiment Station of the United States Bureau of Mines has endeavored to prepare a quantity of it for more thorough examination. Previous experimenters apparently have secured no more than 0.1 gm. The oxide, which is stable at high temperatures, becomes unstable at 500 to 600 deg. C., and even though chilled rapidly through this range, does not retain the desired composition.

To date the best results have been secured by melting magnetite with pure iron in a specially designed vacuum furnace, and chilling rapidly out of contact with air. Even this treatment gives a mass which analyzes no more than 85 per cent FeO.

Index of Steel Treaters' Transactions

A 100-page index of Vol. 1 to 10 (1920 to 1926), of the Transactions of the American Society for Steel Treating, and including Vol. 1 and 2 of the Journal of the American Steel Treaters' Society, has been prepared by Frank T. Sisco of the Army Air Corps and published by the society. The subject matter of these 12 volumes is elaborately cross indexed into more than 12,000 entries. Copies may be obtained from the society, 4600 Prospect Avenue, Cleveland, for \$3.

The 1927 Yearbook of the Merchants' Association of New York has been issued in a volume of 343 pages. It covers not only the classified list of 6667 members arranged by type of product, and also in the regular alphabetical list, but features as well the activities of the year in a wide variety of lines. Committee reports cover about 100 pages and deal with such topics as banking, building laws, city planning and transit, street traffic, fire prevention, foreign trade and customs service, harbors and terminals, industrial relations, insurance, public utilities, and transportation.

This Issue in Brief

"A manufacturing concern can be successful only through an unceasing process of growth," says engineer. Well-managed firms are investing a relatively large portion of profits in improved methods, modern equipment and research, rather than paying high dividends.—Page 144.

* * *

Wide aisles permit motor trucks to drive into the factory and deliver parts directly to assembly lines. In this way automobile manufacturer, who has done away with stockrooms, avoids rehandling.—Page 135.

* * *

Abrasion test will enable you to determine how metal parts will stand up in service. By means of an accurately controlled grinding mechanism, in which all conditions as to abrasive, pressure, speed, time and moisture are under operator's control, laboratory tests are obtained which give a reliable index of service qualities.—Page 141.

* * *

From priming coat to completion, enameled parts are untouched by workmen. Continuous enameling conveyor carries automobile parts, from priming tank, through a continuous oven, where the priming coat is baked on. Operation is repeated with a coat of enamel, then parts are inspected and delivered to assembly line.—Page 138.

* * *

Accuracy of analyses for determination of gas in metal is proved by tests of same specimen in three different countries. Analyses of uniform samples of ingot iron, analyzed for oxygen and hydrogen, in United States, Germany and England, produce comparable results.—Page 142.

High operating efficiency and low accident rate go together. Investigator finds that material reductions in accident rates can be had with greater production. Accident rate can be controlled, and in fact it varies less than rate of production per man-hour.—Page 151.

* * *

In designing rolls, the main point of consideration is the temperature of the ingot or billet, as this determines the softness of the metal. Relative sizes of the passes are determined by the comparative plasticity of the metals at rolling temperatures, and not by their hardness or other physical properties when cold.—Page 146.

* * *

Can foundries reduce coke consumption by cooling the reduction zone in cupola? A German foundry claims a considerable reduction in fuel costs by introducing a water spray. This diminishes the formation of carbon monoxide, which is detrimental to economy.—Page 148.

* * *

Forging manufacturer assembles his own furnaces from standard units. From a few sizes of bed, side and end plates, furnaces of varying dimensions are quickly assembled, using tie rod construction and mounting on pipe standards. Instead of being round, burner port is flat, creating a fan-like sheet of flame.—Page 149.

* * *

Where manufacturers fail to obtain adequate profits, how great a factor is obsolete equipment? Department of Commerce will undertake a survey to answer this question. "Natural caution and conservatism prompts us to hang on to methods and equipment long after the period of their greatest usefulness or profitableness is ended," says Department executive.—Page 165.

Where lubrication cannot be maintained, high-lead bronzes show decided advantages. Bronzes with 12 to 25 per cent lead do not wear so rapidly as low-lead bronzes, without lubrication.—Page 142.

* * *

Almost infallible barometer of pig iron prices is described by Doctor Haney. Ratio of pig iron production to steel ingot production, taking into consideration the level of steel prices, reveals the condition of the pig iron market. When the ratio is high, as at present, pig iron is weak in price.—Page 160.

* * *

Demand for steel equals production. Though output is high, requirements of consuming industries keep in step. Steel prices are kept down by surplus producing capacity of the steel industry, says Doctor Haney.—Page 160.

* * *

In resistance to wear, manganese steel outlasts plain carbon steel 10 to 1, abrasion test reveals. Chromium increases wearability of pearlitic steels very little, but nickel increases it to a marked extent.—Page 142.

* * *

High-test cast iron should be made in the electric furnace, not in the cupola. When produced in the cupola, a large quantity of steel must be added, and a powerful blast maintained. Even then it is difficult to obtain a uniform product.—Page 148.

* * *

Have the days of high dividends on industrial common stocks passed? Well-managed concerns are paying dividends about equal to returns on a good bond and are plowing the remainder of earnings back into the business, to insure a continuation of adequate earnings.—Page 143.

Iron and Steel Markets

July Gives Unusual Promise

Bookings Have Taken a Spurt, Though Still Mostly for Immediate Needs—Makers Look to Increasing Tonnage to Help Prices

STEEL business developing in the past week promises to make the month the best July in years. The expansion in an ordinarily dull month, coming after production in the preceding half year had made a record, is broadly surprising. As buyers today still are taking only what they expect to use, the high rate of output so far this year proves there has been continued high consumption, and that accumulations from first-half shipments are negligible.

Producers have reappraised the outlook and, counting on a better volume than seemed likely a few weeks ago, depend on increasing tonnage to help in price betterment.

Meanwhile a movement is gaining favor among the makers to demand completion of specifications on present quarter commitments prior to Sept. 15. Recent laxity in accepting releases against contracts has permitted consumers to get the benefit of a given price well into the succeeding quarter, and the 1.90c., Pittsburgh, quotation on bars and other heavy tonnage products, for example, has only lately applied and on scattered buying. The \$2 a ton advance over present asking prices announced last week for fourth quarter business is another signal of the efforts to lift prices. A like advance is now under consideration for cold finished steel bars.

Operations for the industry as a whole are close to 75 per cent, a few points under June, which in turn was less than 10 per cent under the average of the record output of the first six months of the year. At the moment shipments are equal to bookings and in some cases higher, and while there was considerably more third quarter contracting than in this season in 1927, the buying has been in the main for the lighter products, with a dearth of the kind of specifications that make for rolling economies.

Of the major consuming industries, building construction continues highly active, with many of the fabricating shops almost fully scheduled for the rest of the year. The railroads, still silent on cars and locomotives, have made fresh purchases of 65,000 tons of rails, including the Northern Pacific for 25,000 tons and the Great Northern for 8000 tons, in part in both cases for early delivery.

Opinions are mixed that the automobile builders can keep up the present output after Aug. 1, but for the present their taking of alloy steel bars and cold finished steel is heavy and stamping and forge shops are well filled with automobile work. The oil industry is responsible for the large additions to pipe mill order books, with a number of long pipe lines yet to be placed.

The agricultural implement makers report the best business in ten years.

Price irregularities are now confined almost solely to sheets. Black sheets appear to be settling down to a rather common 2.60c., Pittsburgh basis, although this quotation only recently appeared. Blue annealed sheets have sold for both 1.90c. and 2c. On galvanized sheets 3.40c., Valley, and 3.50c., Chicago, have been the exception, in some cases explained as a concession of \$2 a ton to jobbers.

The reduction made last week in wire products caused a spurt of buying in some centers, but that of \$2 in nails, which was a meeting of an existing basis, brought only a moderate response, except that car lot buyers in consuming industries are trying for the jobber price of \$2.55 a keg.

Fabricated steel bookings in June represented 81 per cent of capacity, compared with 83 per cent in May, but except for May and July, 1927, they were the largest in several years.

Current fabricated structural steel orders were more than 42,000 tons for the third successive week. Included were office buildings in New York and Baltimore, which took 13,000 and 7700 tons, respectively. New projects call for 36,700 tons, the highest amount in recent weeks. New York subway work accounts for 15,000 tons, while 4500 tons of plates may be required for water mains for Oakland, Cal., though cast iron pipe to the amount of 22,000 tons may be substituted.

Reductions a week ago of 50c. a ton in foundry pig iron at Chicago and in eastern Pennsylvania have not stimulated buying. Foundries are content to cover for early requirements, except the case of an expected purchase of 5000 tons for last half by a sanitary ware manufacturer for its Louisville, Ky., plant.

Scrap is weak in all markets. At Pittsburgh further reductions of 25c. and 50c. a ton on a number of grades, including heavy melting steel, bring prices close to pre-war levels.

Export purchases again make up the bulk of railroad equipment buying. Following 1100 freight cars recently placed by an Argentine railroad with American car builders, a Brazilian carrier last week bought in this country 1000 freight cars. And the Argentine road is preparing to inquire for some 60 locomotives. The only important domestic business placed was 250 gondola bodies for the Chicago, Rock Island & Pacific.

Exports from the United States of metal-working machinery were the greatest, in 1927, for seven years.

While THE IRON AGE pig iron composite price remains for a second week at its low of \$17.09 a ton, that for finished steel is now 2.319c. a lb., against 2.326c. last week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
No. 2, foundry, Philadelphia...	\$20.26	\$20.26	\$20.76	\$20.76
No. 2, Valley furnace.....	16.75	16.75	16.75	18.00
No. 2, Southern, Cin'ti.....	19.19	19.19	19.69	20.94
No. 2, Birmingham.....	15.50	15.50	16.00	17.25
No. 2 foundry, Chicago*.....	17.50	17.50	18.00	20.00
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.75
Basic, Valley furnace.....	16.00	16.00	15.35	17.50
Valley Bessemer, del'd P'gh...	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	17.50	18.00	20.00
Malleable, Valley.....	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh.....	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
O.-H. rails, heavy, at mill....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
Skelp, grvd. steel, P'gh, lb....	1.85	1.85	1.85	1.80

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh.....	1.85	1.85	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.85	1.85	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	2.00
Beams, New York.....	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
Sheets, black, No. 24, P'gh....	2.60	2.65	2.65	3.00
Sheets, black, No. 24, Chicago dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, Pittsburgh	3.50	3.50	3.50	3.85
Sheets, galv., No. 24, Chicago dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill...	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill...	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.35	3.25
Barbed wire, galv., Chicago dist. mill.....	3.25	3.25	3.40	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
Heavy melting steel, P'gh....	\$14.00	\$14.00	\$14.50	\$15.00
Heavy melting steel, Phila....	13.00	13.00	13.50	13.00
Heavy melting steel, Ch'go....	12.25	12.25	12.50	12.00
Carwheels, Chicago.....	12.75	12.75	13.00	13.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	16.00	16.00
No. 1 cast, Ch'go (net ton)...	13.50	13.50	14.00	14.50
No. 1 RR. wrot. Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)...	10.75	11.00	11.25	11.50

Coke, Connellsville. Per Net Ton at Oven:	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.87½	12.75
Electrolytic copper, refinery...	14.50	14.50	14.50	12.50
Zinc, St. Louis.....	6.20	6.20	6.15	6.17½
Zinc, New York.....	6.55	6.55	6.50	6.52½
Lead, St. Louis.....	6.05	6.10	6.15	5.95
Lead, New York.....	6.20	6.20	6.30	6.20
Tin (Straits), New York.....	47.25	46.25	46.62½	63.75
Antimony (Asiatic), N. Y....	9.50	9.62½	9.62½	11.50

Pittsburgh

Carnegie Steel Co., Followed by Independents, Announces 2c. for Fourth Quarter Plates, Shapes and Bars

PITTSBURGH, July 17.—Steel producers in this district are taking a stronger position with regard to prices, and the past week has seen a somewhat firmer tone in heavy rolled lines. The quotations of 1.90c., Pittsburgh, for the third quarter, and 2c. for the fourth quarter on bars, plates and shapes give evidence of the apparently growing confidence of makers in the price situation. Further support is indicated by a contemplated increase of \$2 a ton to 2.20c. on cold-finished steel bars for fourth quarter shipment. While the three heavy rolled lines still are obtainable for the third quarter at 1.85c., this figure is not so common. The quotation of 1.90c. appears to be an increasing factor in the market and a small amount of business has been taken at this level, though it has not reached a dominating position.

The quotation of 2c. on bars, shapes and plates for the fourth quarter, announced officially Monday by the Carnegie Steel Co. and made effective at once, has been adopted by independent producers and is considered to have given strength to the third quarter quotation of 1.90c. It is not expected that fourth quarter business will be taken this early on the new basis, which represents an increase of \$2 a ton over the third quarter quotation. The activity in the heavy rolled

products has undoubtedly given a better tone to the market. These lines, along with such products as tin plate sheets and pipe, played an important part in the unfilled tonnage showing of the United States Steel Corporation. The proposed plan to increase fourth quarter prices on cold-finished steel bars is a reflection of the fair activity in that market, together with the stronger position of the market for hot-rolled bars.

Tin plate and sheet business is good.

Sheet mill operations are at the rate of about 75 per cent, while tin mills are engaged at over 90 per cent of capacity. Pipe mills are operating up to 75 per cent or more and showed an increase during the past week of about five points. Large tonnages of oil line pipe recently placed have been an important influence in stimulating production.

Steel works operations also have shown a further increase and now are at the rate of approximately 75 per cent of capacity. From a tonnage viewpoint, the trade is well satisfied with conditions for this season of the year.

The market for pig iron is dull, except for somewhat increased activity in demand for Bessemer tonnages. The market for fuel is extremely dull, and there has been further softening in the market for old material.

The Jones & Laughlin Steel Corporation on Monday blew in an additional furnace and now has 10 of its 12 stacks making iron. The Adrian Iron Co., it is understood, will blow in a stack at Dubois, Pa., on foundry iron on Aug. 1.

So far the hot weather has affected production very little.

Pig Iron.—Moderately increased buying of Bessemer iron has taken place during the past week, but on the other grades inquiry continues extremely dull, and sales have been insufficient to test the strength of prices, so quotations are unchanged. The largest sale of Bessemer iron was 1000 tons, bought by a steel castings producer from a Valley maker at \$17, furnace. Another sale of 750 tons of Bessemer iron by a Valley producer also was made. Car lots of foundry have been sold at \$16.75, Valley furnace. Basic iron is quoted at \$16, Valley furnace, but the market for this grade is so dull that, in the absence of any sizable movement, it is considered nominal at this level. The Westinghouse Electric & Mfg. Co. has not closed on its requirements for its Trafford, Pa., plant. The Jones & Laughlin Steel Corporation on Monday blew in one of the idle furnaces of the Eliza group at the South Side works. This interest is now operating 10 of its 12 blast furnaces. It is reported that the Adrian Iron Co. will blow in a furnace on foundry iron at Dubois, Pa., on Aug. 1.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—The market for semi-finished steel is only fair, with little third quarter contracting. Prospects for better commitments are in sight, however, particularly because of heavy rolling in such lines as sheets, and somewhat more activity in the market for bars, affecting demand for sheet bars and billets. While some makers continue to quote standard billets and sheet bars at \$33, the prevailing level is \$32, Pittsburgh, at which the market is firm. This is indicated by the fact that mills are no longer equalizing freight. Owing partially to the recent heavy orders for oil line pipe, the market for skelp is firmer at 1.85c., Pittsburgh or Youngstown. Demand for slabs is quiet, and the

market is quoted at \$32, Pittsburgh or Youngstown. Wire rods continue to be quoted at \$42, Pittsburgh, for third quarter shipment. No price has been named for this product for fourth quarter. Fourth quarter billets are quoted at \$33.

Bars, Plates and Shapes.—Third quarter business for bars, plates and shapes still is being taken by some mills at 1.85c., Pittsburgh, and the market is firm at this level. Some prominent makers, however, are quoting 1.90c. for third quarter business, and they are reported to have taken some tonnage at this figure. In all three lines improvement in demand has developed during the past week, with the market manifesting a rising tendency. That producers feel more confident of their position in quoting 1.90c. for third quarter delivery is indicated by the quotation of 2c. they have announced for fourth quarter shipment. The Carnegie Steel Co. yesterday officially announced the price of 2c. on fourth quarter business, effective at once, and independent producers have also adopted this figure, which is an increase of \$2 a ton over the quotation of 1.90c. on third quarter business. The small amount of railroad car buying is an unfavorable influence in the market, but taken as a whole activity is good and above the average for this season of the year. Inquiries coming to structural fabricators are numerous, but for the most part are for small lots.

Rails and Track Supplies.—No improvement has developed within the past week in the market for standard or small spikes, for which demand is rather dull. No standard rail requirements have come out during the past week, and it probably will be 30 to 60 days before such tonnages in volume come into the market. The Norfolk & Western Railroad has not closed on its inquiry for 37,000 tons for July-January shipment. A slight improvement exists in the market for light rails, which are quoted at \$36, Pittsburgh.

Wire Products.—All makers of wire and wire products are quoting on the basis of the card announced last week by the American Steel & Wire Co., listing prices for third quar-

ter shipment. Wire nails and cement coated nails are quoted at \$2.55 per 100-lb., keg, Pittsburgh or Cleveland, with fair specifications for the former, while demand for cement coated nails is quiet. Demand for plain bright, hard fence wire is somewhat better, though not markedly so. Operations of wire mills remain unchanged at approximately 55 per cent of capacity.

Tubular Goods.—Following recent large orders, aggregating perhaps 200,000 tons, active demand for oil line pipe has shown a recession. Some fair-sized inquiries are expected to come into the market soon, however. The large tonnages placed have stimulated production, and operations now are estimated at about 75 per cent or more of capacity. Demand for standard pipe continues good, a fair portion of it coming from the construction industry. The increased price of crude oil has given a better tone to the market, but overproduction still is a serious problem in the oil industry. The Okmulgee Oil & Gas Association, Okmulgee, Okla., has addressed a letter to the Secretary of the Interior at Washington, asking for his opinion as to the possible attitude of the public toward placing a duty on imports of crude oil. This, together with other activities of the oil industry, is interpreted to mean that a section of it, at least, will urge at the next session of Congress an impost on imports of crude oil. Such an effort has been made for the past decade but without success, and it is believed that domestic producers owning fields in Central America and other foreign countries will continue to combat the effort. It is argued that if imports were appreciably reduced, the domestic industry would be considerably stimulated and heavy orders would be placed for pipe.

Sheets.—Specifications for sheets last week were large. The hot weather affected output somewhat and production was on a basis of about 75 per cent of capacity. A large number of specifications call for rush shipments. Increased tonnages are being placed for car material, mostly for repair work. These requirements are largely for galvanized

THE IRON AGE Composite Prices

Finished Steel
July 17, 1928, 2.319c. a Lb.

One week ago.....	2.326c.
One month ago.....	2.341c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron
July 17, 1928, \$17.09 a Gross Ton

One week ago.....	\$17.09
One month ago.....	17.23
One year ago.....	18.50
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75, Feb. 14;	\$17.09, July 10	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland.....	2.04c. to 2.09c.
F.o.b. Cleveland.....	1.85c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Bethlehem.....	2.00c. to 2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.10c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland.....	2.15c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c.
No. 24, del'd Cleveland.....	2.79c. to 2.89c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.95c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$2.90
2100 (1½% Nickel).....	0.55	3.20
2300 (3½% Nickel).....	1.50	4.15
2500 (5% Nickel).....	2.25	4.90
3100 Nickel Chromium.....	0.55	3.20
3200 Nickel Chromium.....	1.85	4.00
3300 Nickel Chromium.....	3.80	6.45
3400 Nickel Chromium.....	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.10
5100 Chromium Spring Steel.....	0.20	2.85
6100 Chromium Vanadium Bars.....	1.20	3.85
6100 Chromium Vanadium Spring Steel.....	0.95	3.60
9250 Silicon Manganese Spring Steel.....	0.25	2.90
Chromium Nickel Vanadium.....	1.50	4.15
Carbon Vanadium.....	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ⅞ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Iron	Black	Galv.
1/8.....	45	19½	1/4 to 3/8..	+11	+39	
1/4.....	51	25½	3/8.....	22	2	
1/2.....	56	42½	3/4.....	28	11	
3/4.....	60	48½	1 to 1½..	30	13	
1 to 3.....	62	50½				

Lap Weld

2.....	55	43½	2.....	23	7
2½ to 6..	59	47½	2½.....	26	11
7 and 8..	56	43½	3 to 6....	28	13
9 and 10..	54	41½	7 to 12..	26	11
11 and 12.	53	40½			

Butt Weld, extra strong, plain ends

1/8.....	41	24½	1/4 to 3/8..	+19	+54
1/4 to 3/8..	47	30½	3/8.....	21	17
1/2.....	53	42½	3/4.....	23	12
3/4.....	58	47½	1 to 1½..	30	14
1 to 1½..	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 4..	57	46½	2½ to 4..	29	15
4½ to 6..	56	45½	4½ to 6..	23	14
7 to 8....	52	39½	7 to 8....	21	7
9 and 10..	45	32½	9 to 12..	16	2
11 and 12.	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	1½ in. ....+18
2½ to 3 in.....	1¾ to 1½ in. ....+8
3 in.....	2 to 2½ in.....-2
3¼ to 3¾ in.....	2½ to 3 in.....-7
4 to 13 in.....	3¾ to 4½ in.....-9

Beyond the above base discounts, the following extra discounts are given:

<i>Lap Weld Steel</i>		<i>Charcoal Iron</i>
Under 5000 lb..	4 Fives	1 Ten
5000 lb. to 12,000 lb.....	5 Fives	2 Tens
12,000 lb. to 21,000 lb.....	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5
<i>Standard Commercial Seamless Boiler Tubes</i>		

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1½ to 1¾ in..	55	3¼ to 3½ in..	50
1¾ in.....	39	4 in.....	53
2 to 2¼ in.....	34	4½, 5 and 6 in..	45
2½ to 2¾ in.....	42		

Hot Rolled

2 and 2½ in....	40	3¼ and 3½ in..	56
2½ and 2¾ in..	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in..	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

sheets for roofing and for refrigerating cars, and also blue annealed sheets for freight cars generally. Demand, however, comes from numerous sources. More activity has been shown by jobbers, although they are not contracting freely. Prices are firm, with blue annealed quoted at 2c., galvanized at 3.50c., and black at 2.65c., Pittsburgh.

Ferroalloys.—Inquiry for ferromanganese is light. Many consumers are covered for the last half. The market is unchanged at \$105, Atlantic seaboard, for both domestic and foreign material. Consumers of 50 per cent ferrosilicon are supplied for the last half, and the market for this product is dull. Specifications for speigeleisen are small. Quotations range from \$31 to \$32, furnace.

Tin Plate.—While hot weather during the past week slowed down production of tin mills in this district, the loss in output was comparatively small. Mills are receiving heavy specifications, but despite large commitments some producers are a little ahead on obligations and have even been able to fill some requirements which call for August delivery. The American Sheet & Tin Plate Co. operated 96 per cent of its tin mills last week, and probably will maintain that rate during the current week. Some independents also are producing at or near that rate.

Cold-Finished Steel.—Demand for cold-finished steel bars is regular and fair, and production is at the rate of 65 to 70 per cent. Automobile makers continue a prominent factor in the market, the tone of which is stronger at 2.10c. per lb., Pittsburgh. It has been given stimulus partially by the stronger position of merchant steel bars. Some makers of cold-finished bars are contemplating an increase of \$2 a ton for fourth quarter delivery, which would be in line with the policy adopted regarding soft steel bars.

Hot-Rolled Flats.—Recent slacken-

ing in demand for hot-rolled strips was followed during the past week by heavy requirements, and the tone of the market generally has improved. While there has been a slight let-up in demand from the automotive industry, it continues fair. Whatever falling off there has been in that quarter has been offset by placements by other industries. The price situation is steadier, although some buyers still show resistance to current quotations.

Cold-Rolled Strips.—Demand for this line has improved and it is somewhat more active than that for hot-rolled flats. Operations generally are rated at about 70 per cent of capacity, which is heavier than they were in the corresponding period a year ago. The leading source of specifications is the automotive industry, but they also come from miscellaneous lines.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets is fair. The automotive industry is buying in moderate volume, although demand from this source has tapered off somewhat. Prices are unchanged, and operations are at the rate of about 60 per cent of capacity.

Coal and Coke.—Extreme dullness prevails in the market for fuel. Small lots of Lake cargo coal are moving, but the market shows no improvement. Consumers in this district appear to have ample stocks on hand and are showing practically no interest in the market. Prices are unchanged. Only light tonnages of bee-hive coke are being bought, and inquiry for both the furnace and foundry grades is unusually limited. There is slightly more activity in the latter than in the former. Virtually no contracting has developed as yet. Prices vary, depending on the quality, but on spot shipments the levels of \$2.60 on furnace coke, and \$3.75 on foundry fuel at Connellsville ovens continue to be representative of the market.

Old Material.—Further softening has developed in the market for scrap. Heavy melting steel is down 25c. a ton; heavy breakable cast for the basic open-hearth furnace and low phosphorus punchings for the electric furnace have declined 50c. a ton, while a drop of 25c. has taken place on railroad knuckles and couplers, railroad coil and leaf springs, and rolled steel wheels for the acid open-hearth furnace. Recent sales have established \$14 as the maximum price on heavy melting steel. The Pennsylvania Railroad list, which closed last week, brought out prices as high as \$14.75, Steubenville, Ohio, and 10c. or 15c. less at Midland, Pa., on this grade, but, as is often the case, such tonnages commanded premium prices. Some of the material was taken by dealers to cover on contracts. Consumers generally are well supplied with scrap and are reported still to have sufficient stocks on hand to keep them out of the market for 30 days or more. Supplies in the hands of dealers, for the most part, appear to

be small, and caution is being shown by them in taking additional tonnages except as immediate requirements demand.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$13.75 to \$14.00
Scrap rails	13.25 to 13.50
Compressed sheet steel....	13.50 to 14.00
Bundled sheets, sides and ends	12.50 to 13.00
Cast iron carwheels.....	14.00 to 14.50
Sheet bar crops, ordinary....	14.00 to 14.50
Heavy breakable cast.....	11.00 to 11.50
No. 2 railroad wrought....	13.75 to 14.00
Heavy steel axle turnings....	12.00 to 12.50
Machine shop turnings....	9.00

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	14.75 to 15.25
Railr. coil and leaf springs	14.75 to 15.25
Rolled steel wheels.....	14.75 to 15.25
Low phos. billet and bloom ends	19.00 to 19.50
Low phos. mill plate....	17.50 to 18.00
Low phos., light grade....	16.50 to 17.00
Low phos. sheet bar crops....	17.50 to 18.00
Hvy. steel axle turnings....	12.50 to 13.00

Electric Furnace Grades:	
Low phos. punchings.....	16.00 to 16.50
Hvy. steel axle turnings....	12.50 to 13.00

Blast Furnace Grades:	
Short shov'l'g steel turnings	9.50
Short mixed borings and turnings	9.50
Cast iron borings.....	10.00
No. 2 busheling.....	8.50 to 9.00

Rolling Mill Grades:	
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought....	10.50 to 11.00
Sheet bar crops.....	16.00 to 16.50

Cupola Grades:	
No. 1 cast.....	14.25 to 14.50
Rails 3 ft. and under....	15.00 to 15.50

Malleable Grades:	
Railroad	13.75 to 14.00
Industrial	13.25 to 13.50
Agricultural	12.75 to 13.00

Carnegie to Build New Pittsburgh Warehouse

The Carnegie Steel Co. has filed plans for a new warehouse on Light-hill Street, Pittsburgh, to cost \$296,000, with equipment. The new warehouse is to replace the old one on Eleventh Street, which was taken over by the Pennsylvania Railroad in connection with its plans for a new freight yard in that section.

Mexico, said to be second to China as a producer of antimony, mined much less of that mineral last year, according to reports from American consuls at Mexico City, San Luis Potosi and Nogales, made public by the Department of Commerce. Official figures placed Mexico's antimony output in 1927 at 1894 tons, compared with 2573 tons the preceding year, which was a record year.

The blast furnace of the Temple Iron Co. at Reading Pa., has been sold at a public sale by Paul Brooks, receiver, for \$52,266 to Abraham Sofransky, Allentown, Pa., and Israel Liever, Reading, Pa., dealers in scrap iron and metal. The unit will be dismantled at once.

The Eastern Scrap Iron Association has appointed Benjamin Schwartz, a lawyer of Baltimore and Philadelphia, as director-general of its activities.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.55c.
Galv. sheets (No. 24), 25 or more bundles	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets	3.10c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1 3/4-in.....	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock.....	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.

Manganese ore, washed, 52% manganese, from the Caucasus.....39c.
Manganese ore, Brazilian, African or Indian, basis 50%38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates\$11.00 to \$11.25

Chrome ore, 45 to 50% Cr₂O₃, crude, c.i.f. Atlantic seaboard\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS₂, delivered.....50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens..	8.00
Foundry, by-product, New England, del'd.....	11.00
Foundry, by-product, Newark or Jersey city, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-products, St. Louis, f.o.b. ovens.....	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines..	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines....	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up. 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania . . .	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	-----
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.80, 10 and 2 1/2	
Stove bolts in packages, Chicago..75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago..75, 20, 10, 5 and 2 1/2	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(1/2-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00

Small Rivets

	Per Cent Off List
(7/8-In. and Smaller)	
F.o.b. Pittsburgh.....	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago.....	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread. 85 and 5	
Upset hex. cap screws, S.A.E. thread..85 and 5	
Upset set screws.....	80, 10 and 10
Milled studs.....	70 and 5

Chicago

Steel Backlogs Diminishing Though Current Bookings Are Large—Ingot Output Expected to Decline

CHICAGO, July 17.—Bookings in finished steel are larger than at this season a year ago, but backlogs are diminishing, especially in the heavier rolled products. While steel ingot output is unchanged at 75 to 80 per cent of capacity, present indications point to a decline of 10 points or more before the middle of next month. Specifications from the farm equipment and automotive industries, as well as from miscellaneous manufacturing lines, are well maintained, but heavy-tonnage orders for oil storage tanks and railroad cars are lacking. Fabricating awards are also light, although a large amount of structural work is still pending. Some of the larger building projects, however, are slow in maturing, being held back by delays in financing.

Business now being booked is mainly in lighter products, which, although they keep the mills busy, take proportionately smaller quantities of raw steel. There is a dearth of the kind of specifications that make for economical operations.

Rail orders placed by the Northern Pacific and the Great Northern added a total of 21,000 tons to the bookings of local mills. This is not sufficient, however, to have much effect on rail production in this district. One rail mill has virtually completed deliveries against its contracts, the other may be able to continue through this month at a 60 per cent rate.

In comparison with bookings in the first week of the month, which was characterized by the dullness that usually follows the completion of a quarter, business in the past week was good. Total sales were 50 per cent greater and specifications 100 per cent greater than in the previous week. There has been a fair volume of third quarter contracting, considerably more than at this season in 1927, but buyers are not obligating themselves for more steel than they expect to use.

Business in bars is much more active than in structural shapes or plates. Demand for sheets in this district continues to drag. In the absence of severe tests, mill prices appear to be holding. As low as 1.95c., Chicago, has been done on attractive tonnages of sheared plates, and 3.50c., Chicago mill, has been named on galvanized sheets, but such concessions are exceptional. In fact, local mills are apparently more determined than ever to hold prices at a stable level.

As announced in THE IRON AGE market summary a week ago, the Chicago subsidiary of the Steel Corporation is quoting 2.10c., Chicago, on bars, plates and shapes for fourth quarter shipment, or an advance of \$2 a ton over the current market. Thus far, however, little interest in fourth quarter requirements has been shown.

Another evidence of efforts by mills to stiffen the market is an announcement that no specifications against third quarter contracts will be accepted after Sept. 15. Of late, laxity in accepting specifications has permitted consumers to get the benefit of a given price well into the succeeding quarter.

Pig Iron.—The reduction last week of 50c. a ton on foundry and malleable grades to \$17.50, base, local furnace—the lowest price since November, 1915—has brought no unusual amount of buying. Many melters are covered through this quarter and others are in no hurry to buy. The attitude of buyers is no doubt explained by seasonal dullness, which is beginning to make itself felt in some directions. On the other hand, automobile companies that have brought out new models are placing larger orders for castings. Large inquiries for pig iron are lacking and there have been only a few sizable sales. Several lots of 500 to 1000 tons of foundry iron have been placed in Chicago, and a northern Illinois melter closed for 1000 tons of foundry for the remainder of the year. Opinion is divided on whether the recent reduction in Chicago pig iron will keep out shipments of iron by boat. It is agreed that little foundry iron in the base grade can be shipped in by water at the present market, but it is said that iron in higher silicon analysis may still succeed in penetrating this district. It is a matter of comment that local prices are now lower than delivered prices in Cleveland and are on a parity with the ruling furnace price at Detroit.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	21.51
So'th'n No. 2 (barge and rail)	21.01
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The market is inactive. Spiegeleisen remains at \$32, furnace, on contracts and at \$33, furnace, on spot business. Some interest is manifested in the possibility of shipping ferromanganese by ocean vessel from England to Chicago at a rate of \$5.60 per ton. If sellers should insist on a price of \$105, seaboard, there would be no advantage in shipping the material by this route.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Both sales and specifications showed a recovery following a

lull in bookings during the first week of the current quarter. Sales for the week were nearly twice as large as in the previous seven-day period. Mills are still able to operate at 80 per cent of capacity, but backlogs are diminishing and there is little heavy-tonnage business pending. No new oil storage tank work has appeared and little railroad car business is developing. Meanwhile railroad car builders are fast completing contracts in hand. A report that the Pennsylvania Railroad will enter the market for several thousand freight cars lacks verification. Current orders are mainly from miscellaneous manufacturers and structural fabricators. Prices are unchanged in the absence of a real test.

Mill prices on plates, per lb.: 2c., base Chicago.

Structural Material.—Fabricating awards are light and competition for pending business is keen. While there are several very large local projects in prospect, notably the Apparel Mart, 60,000 tons, and the Agricultural Mart, 80,000 tons, they are slow in maturing. Early action is expected on 2500 tons for a pipe shop to be built for the A. O. Smith Corporation, Milwaukee. The ruling price on plain material remains at 2c., Chicago.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Sheets.—Demand is light except from the automotive industry, which gets relatively little sheet tonnage from Chicago district mills. Sheet producers in this area are finding it difficult to maintain a 60 per cent rate of operations. Prices are holding as a rule, although in the Northwest as low as 3.50c., mill, a concession of \$2 a ton, has been done on galvanized in a few instances.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Bars.—Demand for bars is considerably heavier than a year ago. Shipments of mild steel bars to the automotive industry are in undiminished volume. The Nash Motors Co. has 30,000 cars on order and is trying to reach a maximum production rate, with a scheduled monthly output of 20,000 cars for July, August and September. The plants of the Studebaker Corporation, the Chrysler Corporation and the Willys-Overland Co. are reported to be operating at capacity. The Willys-Overland Co. is said to have sold more cars in the first six months of 1928 than in all of last year. Farm equipment manufacturers, optimistic on account of favorable crop prospects, are through with inventory-taking and are getting production up to capacity as rapidly as possible. They are reported to be enjoying the best business in ten years. Third-quarter contracting is in larger volume than a year ago, although buyers are obligating themselves only for known requirements. The leading interest has announced that it will accept no third-quarter specifications after Sept. 15. Demand

for alloy steel bars continues at a high rate, reflecting the activity of automobile plants that buy from Chicago mills. Seasonal dullness prevails in rail steel bars, although mill backlogs are large enough to insure double turn operations through July and well into August. Bed makers are expected to buy more actively with the conclusion of the furniture show. Specifications fall slightly short of shipments, but a reduction in output is being avoided by accumulating stocks of reinforcing bars and fence post steel. Rail steel bar prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—The recent general reduction in mill quotations failed to stimulate buying to any great extent. There has been some third-quarter contracting, but an increasing number of jobbers and consumers are showing a preference for open market buying. Manufacturers' wire is more active than common products. The sustained activity of the automotive industry has been reflected in a large consumption of wire. The market in common products is expected to remain quiet until mid-August, and the sales force of a leading wire products manufacturer is now on vacation. Shipping orders are sufficient to support mill operations at 65 per cent of capacity. For mill prices see page 175.

Cold-Rolled Strip.—Mill prices have now settled to a single price of 3c. per lb., Cleveland, for lots of 1 ton up to 3 tons, or 3.30c., Chicago. Specifications are still in good volume from the automotive trade. An estimate that the State of Michigan alone uses 250,000 tons of cold-rolled strip a year, or nearly 42 per cent of the entire country's consumption of 600,000 tons, indicates the importance of the automobile industry as a strip mill customer.

Warehouse Business.—Local warehouse prices are unchanged. Jobbers find the volume of trade about on a par with that of July, 1927.

Rails and Track Supplies.—The Northern Pacific has placed 15,000

tons of rails with the Illinois Steel Co. and 10,000 tons with the Bethlehem Steel Co. The Great Northern has bought 8000 tons, of which 4000 tons was placed with the Illinois Steel Co. and 2000 tons each went to the Inland and Bethlehem companies. The Great Northern wants early delivery on this tonnage and is expected to come in the market for additional requirements totaling close to 20,000 tons. Early shipment is also wanted on part of the Northern Pacific tonnage. This business, together with good-sized releases of contract tonnage, will keep one of the local rail mills going for the rest of the month at a 60 per cent rate. The other rail mill, however, has virtually reached the end of its backlog. Orders for tie plates, angle bars, spikes and bolts distributed by the Great Northern with the rail purchases total 2000 tons. The Northern Pacific, however, bought only 500 tons of track supplies, representing requirements for 2000 tons of rails on which prompt shipment was asked. In addition to these orders, about 2500 tons of track fastenings on contract was released for rolling. Production of tie plates is at 100 per cent of capacity at a leading plant, while the operating rate averages 40 per cent for bolts and ranges from 60 and 70 per cent for spikes and angle bars.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Outside of a fair run of small orders from contractors, new business is light. Prices, however, are stronger, ranging from \$32 to \$35, Birmingham, for 6-in. and larger diameters. In fact, several companies are quoting a minimum of \$35 on all business, while others are asking that price on lots of less than 200 tons. Milwaukee will close July 18 on 750 tons of 6-in., 950 tons of 8-in., 75 tons of 12-in. and 225 tons of 16-in. Class C. St. Clair Shores, Mich., will take bids July 24 on 45,000 ft. of 6-in. and 60,000 ft. of 8-in.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in., and over, \$40.20 to \$43.20; 4-in., \$44.20 to \$47.20; Class A and gas pipe, \$4 extra.

Reinforcing Bars.—This market shows greater activity in awards, though individual lettings usually run less than 300 tons each. The pending list is still of such size that it holds out fair promise to dealers. Fresh projects are scarce but estimators are busy and it is not unlikely that the next three or four weeks will find prices being asked on a number of new tonnages. The Chicago Rapid Transit Co. is elevating its track in North Evanston, Ill., and will require reinforcing bars for retaining walls. Opinions as to trends in prices are varied and it may be said that the market lacks the strength displayed two weeks ago. New contracts and fresh inquiries are given on page 190.

Cold-Finished Bars.—Current business is about on a par with that of a year ago. Some seasonal recession in specifications from the automobile in-

dustry, as well as from other lines, has developed.

Bolts, Nuts and Rivets.—Specifications are again coming in large volume from the farm equipment industry, although in previous years production of implements and tractors was rarely resumed on a broad scale before the middle of August. Business from the automotive industry also remains good. Bolt and nut plants are operating at a 65 per cent rate.

Old Material.—The market has a weak tone, but trade is so inactive that prices have undergone little change. The supply of scrap is large, and consumption is declining. Buyers are looking for still lower prices and expect to get them. The melt of steel foundries is lower, and there has been a marked decrease in activity among malleable plants. Meanwhile mill output is rather well maintained, although a more pronounced seasonal decline is expected to develop in August. Railroad lists include: Chicago & Alton, 1500 tons; Chicago, Milwaukee, St. Paul & Pacific, 200 tons; Chesapeake & Ohio, 17,500 tons.

Prices deliv'd consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.25 to \$12.75
Shoveling steel	12.25 to 12.75
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraulic compressed sheets	11.00 to 11.50
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'd steel carwheels	15.25 to 15.75
Railr'd tires, charg. box size	15.50 to 16.00
Railr'd leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	15.75 to 16.25
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phos. punchings.....	14.00 to 14.50
Low phos. plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings.....	9.00 to 9.50
Short shoveling turnings..	9.00 to 9.50
Machine shop turnings....	6.00 to 6.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft..	15.25 to 15.75
Angle bars, steel.....	14.25 to 14.75
Cast iron carwheels.....	12.75 to 13.00
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	19.50 to 20.00
Iron ear axles	23.50 to 24.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought..	10.75 to 11.25
No. 2 railroad wrought..	11.00 to 11.50
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast....	13.50 to 14.00
No. 1 railroad cast.....	12.75 to 13.25
No. 1 agricultural cast....	12.50 to 13.00
Stove plate	10.75 to 11.25
Grate bars	11.25 to 11.75
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand, railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List

Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap, or blank..	60
Hot-pressed nuts, hex., tap, or blank..	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg....	3.10

Philadelphia

Steel Buying Shows Further Gains in July's Second Week —Scrap Market Weaker

PHILADELPHIA, July 17.—Steel business, having shown unusual summer vitality in the first week or ten days of July, has made further gains in the last week. If the orders of the latter half of the month equal those of the first half, the month may be the best July in several years. Everything ordered is wanted in a hurry; mills which are unable to ship within a week are frequently unable to secure the order. A more liberal volume of orders from the Pennsylvania Railroad has helped the situation materially. Structural steel is one of the most active lines. New projects are not numerous, but fabricating shops have nearly full schedules and are drawing on the mills for a fairly large tonnage. The average operation of all Eastern mills is probably not less than 75 per cent. The Bethlehem Steel Co. averages 80 per cent in all departments. Other mills rolling shapes are running from 70 to 80 per cent, while plate mill operations range from 50 to 65 per cent. Steel prices are holding fairly steady. Foundry pig iron remains at the \$19.50 base, to which it declined a week or so ago. Scrap shows further weakness.

Pig Iron.—Foundry pig iron, which declined a week or so ago to \$19.50, base, at eastern Pennsylvania furnaces, is holding at that level, with some single carload sales at \$20. Business has been unimportant as to volume. A 400-ton inquiry for foundry iron brought sharp competition between eastern Pennsylvania and New York State furnaces, and the business is reported to have been placed with a New York maker at slightly under the quotations of furnaces in this district. Copper free low phosphorus iron is quoted by a nearby furnace at \$24, furnace, and copper bearing iron is available at \$23, furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.	21.26
Basic (del'd east. Pa.)	\$19.00 to 19.50
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Most of the larger users of ferromanganese are still getting shipments against \$100 first half contracts, or have sufficient stock piles to cover nearby requirements. Some of the smaller users have made second half contracts at \$105, seaboard, but the bulk of the second half contracting probably will not be done before August.

Billets.—Quotations on rerolling billets range from \$32 to \$33, Pittsburgh, with the higher figure generally used on high carbon grades. Forging billets remain at \$38, Pittsburgh.

Plates.—A steady flow of small, hurry-up orders for plates is keeping operations at Eastern mills on an even keel. One mill is operating at about 65 per cent, while others are at 50 to 60 per cent. On nearly all sales 2c., Coatesville, applies.

Structural Shapes.—Not many new structural steel projects have come out

for bids in the last week, but fabricators are extremely busy with work on their books and some are bidding only on those jobs which will fit in with their delivery promises. A number of shops can take small jobs to fill in, but cannot accommodate large jobs to their shop schedules if early deliveries are required. Prices of plain material have weakened again, sales having been made to some of the larger fabricators at 2.01c., Philadelphia, though most of the transactions are at 2.06c., Philadelphia. This is peculiarly a local condition, but even at some points where Pittsburgh freight rates are the governing factor Eastern mills are unable to obtain more than 1.75c., Pittsburgh, on competitive business.

Bars.—Some mills have extended second quarter contracts at 1.85c., Pittsburgh, so that consumers' requirements for all of third quarter will be provided for at this price; other mills, however, are insisting that all 1.85c. tonnage shall be specified by Sept. 10. The groundwork is being prepared for an advance to be effective on all fourth quarter business.

Sheets.—Makers of sheets are standing somewhat more firmly for

present prices, with the result that quotations are more nearly uniform than in some time. On galvanized sheets, 3.50c., Pittsburgh, to consumers and 3.40c. to jobbers are the usual quotations. Black sheets are at 2.65c., with occasional transactions at 2.60c., while blue annealed sheets remain at 2c., with some mills getting \$1 or \$2 a ton higher for small lots in widths greater than 40 in.

Imports.—Last week's receipts from abroad included 9710 tons of Algerian iron ore, 996 tons of pig iron from India, 100 tons of steel scrap from Germany, 50 tons of ferromanganese from England, 30 tons of steel bands from England, 69 tons of steel bars and 201 tons of structural shapes from Belgium.

Old Material.—Prices for various grades of scrap have gone so low that scrap dealers and brokers are expecting a rebound, but the demand from consumers which would make such a recovery possible fails to develop. Meanwhile, the amount of scrap that must be shipped seems sufficient to take care of all demands, and buyers have pushed prices still further downward in the past week, although the changes are slight. A nearby steel mill has been sounding out the market for heavy melting steel, and it is reported, is willing to pay \$12.50, delivered at its plant, but dealers and brokers are holding for \$13.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails.	12.50
No. 2 heavy melting steel.	10.50 to 11.00
No. 1 railroad wrought.	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.25
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	14.00 to 15.00
Railroad grate bars.	11.00 to 11.50
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under.	17.50 to 18.00
Couplers and knuckles.	14.50 to 15.00
Rolled steel wheels.	14.50 to 15.00
No. 1 blast fnace scrap.	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire.	11.00
Cast iron carwheels.	15.50
No. 1 cast.	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling.	14.50 to 15.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier.	2.50c. to 2.60c.
Plates, 1/8-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats.	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to 1/8-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
*Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
1/4-in.	5.30c.
1/8-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Navy Wants 1950 Tons of Plates and Bars

WASHINGTON, July 17.—The Bureau of Supplies and Accounts, Navy Department, will open bids on July 24 for approximately 1300 tons of plates and 650 tons of steel bars for delivery at various navy yards.

The Colonial Steel Co., Pittsburgh, has opened its new St. Louis warehouse at 712-14 Cass Avenue. High-speed, carbon tool and hollow and solid drill steels are carried in stock, and Charles V. Franklyn is district manager.

New York.

Pig Iron Sales Total About 12,000 Tons—15,000 Tons of Steel Needed for Additional Subway Work

NEW YORK, July 17.—With sales of about 12,000 tons during the past week, the pig iron market has shown more activity than has been in evidence for more than a month. This is due partly to increased foundry operations in western Connecticut and New Jersey and may also be attributed partly to the fact that consumers have been hesitant in making third quarter commitments. Recent buying however, has been largely for spot shipment to cover melters' immediate operating needs and does not indicate any desire on the part of consumers to take advantage of the present low price levels to anticipate future requirements. New inquiry is not in large volume and includes 1000 tons for the Pennsylvania Railroad and several lots of 100 to 300 tons. An inquiry for 2000 tons of ballast iron for delivery on the Pacific Coast has not been acted upon, and a New York district melter is still in the market for 1000 tons. The Crane Co., Bridgeport, Conn., has closed on its recent inquiry for 1200 tons of foundry iron, the order having been divided between a Buffalo furnace and the Massachusetts maker. The Worthington Pump & Machinery Corporation has also bought an additional 550 tons for Harrison, N. J., the order having been divided between a Buffalo furnace and an eastern Pennsylvania interest. Two merchant stacks in the Buffalo district have been blown out during the last three weeks and another is expected to follow the last of the month. However, following a reduction in freight rates effective Aug. 4, the Perry furnace at Erie, Pa., will be able to compete in the New York district on an equal basis with the Buffalo producers. Apparently in an effort to compete with the barge and rail rate from Buffalo to eastern Pennsylvania cities, the Delaware, Lackawanna & Western Railroad has reduced the freight rate between Buffalo district points and Philadelphia from \$4.91 a ton to \$4.66. The reduction applies only until Sept. 1. Prices have not changed materially in the last week, with Buffalo foundry iron ranging from \$16 to \$17, base furnace. In New England an instance of the waiving of the silicon differential is reported. Eastern Pennsylvania producers are quoting \$19.50, furnace, and one large interest is quoting \$19.51 to \$20.01, eastern New Jersey tidewater, to meet prices of Buffalo and New York State furnaces.

Prices per gross ton, deliv'd New York district:
 Buffalo No. 2 fdy., sil. 1.75 to 2.25 \$20.91 to \$21.91
 East. Pa. No. 2 fdy., sil. 1.75 to 2.25 20.89 to 22.02
 East. Pa. No. 2X fdy., sil. 2.25 to 2.75 21.39 to 22.52
 East. Pa. No. 1X fdy., sil. 2.75 to 3.25 21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Bars, Shapes and Plates.—Interest in the heavier products continues to center upon the efforts of mills to establish third quarter prices at 1.90c., Pittsburgh, for bars, 2.05c., Coatesville, Pa., for plates, and 2.05c., Bethlehem, Pa., for shapes. It now seems apparent, however, that too many

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ½ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10

Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10

Coach screws:	
½ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe		
Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+9
1-1½-in. butt	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)		
	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)		
IC—20-lb. coating.....	\$10.00 to	\$11.00
IC—30-lb. coating.....	12.00 to	13.00
IC—40-lb. coating.....	13.75 to	14.25

Sheets, Box Annealed—Black, C. R.		
	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to	3.80c.
No. 22.....	3.75c. to	3.95c.
No. 24.....	3.80c. to	4.00c.
No. 26.....	3.90c. to	4.10c.
No. 28*	4.05c. to	4.25c.
No. 30.....	4.30c. to	4.50c.

Sheets, Galvanized		
		Per Lb.
No. 14.....	4.15c. to	4.35c.
No. 16.....	4.00c. to	4.20c.
No. 18.....	4.15c. to	4.35c.
No. 20.....	4.30c. to	4.50c.
No. 22.....	4.35c. to	4.55c.
No. 24.....	4.50c. to	4.70c.
No. 26.....	4.75c. to	4.95c.
No. 28*	5.00c. to	5.20c.
No. 30.....	5.40c. to	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

contracts have already been made, allowing customers the advantage of prices current during the quarter just passed, to enable mills to get the \$1 a ton advance to any extent during July, August and September. On spot business the new prices seem to be regularly adhered to, but contracts at the higher levels, particularly on plates and shapes, are the exception rather than the rule. But mills find encouragement in the statement of the Steel Corporation that fourth quarter prices will be on a basis of 2c., Pittsburgh, and also in the action of a number of producers in naming Sept. 10 as the last day on which specifications on present contracts will be accepted. This practice coincides with the policy already followed by some makers in which contract periods are based upon shipments rather than specifications. This plan would prevent consumers from obtaining materials on old contracts for a month or more after the beginning of a new quarter and enable mills to begin a three-month period without a large tonnage of old orders at conflicting prices on their books. Encouragement is also found in the well sustained tonnage which has been specified during the last two weeks, and the month's aggregate promises to be very satisfactory. An office building let during the week in New York will take 13,000 tons of shapes, and 15,000 tons will be required for two sections of the subways, on which bids will close July 27. Eastern car builders have taken orders for more than 2000 freight cars for two South American roads, but the only outstanding domestic inquiry, that of the Seaboard Air Line for 1000 box cars, has not yet been acted upon.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets and Strips.—Business continues in fair volume and the firmer tendency in prices, which has been manifested during the last two weeks, has given the market a more optimistic outlook. On galvanized sheets, only the large jobbers are being given the benefit of the 3.40c. Pittsburgh price, with the general run of business being taken at 3.50c. Black sheets range from 2.60c. to 2.70c., with 2.65c. the ruling price. A 2c. minimum is being maintained on the blue annealed product. There is not enough demand for strip steel to bring out price irregularity and what business there is to be placed is taken without difficulty at the established levels.

Cast Iron Pipe.—In spite of recent price advances by Southern makers, bids submitted last week on a large tonnage at Washington indicate a somewhat weaker tone in the Eastern market. On 3000 tons of 8, 12 and 16-in. class B pipe and some fittings, R. D. Wood & Co. were low with a bid of \$34.67 for pipe and \$72.24 for fittings. Other bids ranged from \$37 for pipe and \$93.50 for fittings to \$41 and \$110 respectively. The Warren Foundry & Pipe Co., with a bid of

\$38.40, was low on 300 tons of 3 to 12-in. class B pipe for Newark, N. J. Taking into consideration the considerable tonnage of small-dimension pipe included in the job, this bid is well within the range of \$37.60 to \$38.60, delivered New York, which is being generally quoted by Northern foundries. Southern makers continue to quote \$34 to \$35, base Birmingham, on the general run of business, equivalent to \$43.25 to \$44.25, delivered New York.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Old Material.—The scrap market is weak and inactive, with buyers' prices of heavy melting yard steel and stove plate off 25c. per ton. Other grades are unchanged but lack strength. Dealers in this district are showing considerable interest in the appointment of a director general for the East Scrap Iron Association, which was accomplished at a recent meeting in New York, with a view toward improving conditions in the industry.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.50 to	\$9.85
Heavy melting steel (yard)	6.00 to	6.25
No. 1 hvy. breakable cast.	10.50 to	11.00
Stove plate (steel works)...	6.75 to	7.25
Locomotive grate bars....	7.00 to	7.50
Machine shop turnings....	6.00 to	6.50
Short shoveling turnings..	6.00 to	6.50
Cast borings (blast furn. or steel works).....	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles.....	13.50 to	14.00
Iron car axles.....	23.50 to	24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to	8.75
Forge fire	6.50 to	6.75
No. 1 railroad wrought....	9.50 to	10.00
No. 1 yard wrot., long....	8.00 to	8.50
Rails for rolling.....	10.00 to	10.50
Cast iron carwheels.....	11.00 to	11.50
Stove plate (foundry)....	8.50 to	9.00
Malleable cast (railroad)...		10.00
Cast borings (chemical)...	10.75 to	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.00 to	\$15.00
No. 1 hvy. cast (columns bldg. materials, etc.), cupola size	12.00 to	13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to	12.50

Reinforcing Bars.—More than 1700 tons of bars will be required for a railroad bridge at Providence, R. I., on which the Merritt-Chapman & Scott Corporation, New York, is general contractor. Lettings during the last few days have included scarcely any large tonnages and the volume of small orders has been low. Distributors generally are quoting 1.90c., Pittsburgh mill, but on large jobs, on which lump sum bids are submitted, concessions usually appear. The Youngstown warehouse price is unchanged at 2.20c. per lb., or 2.57½c. on cars at New York, and out of New York warehouse the common quotations are 2.80c. for lots of 5 tons or more, 2.95c., for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Warehouse Business.—Thus far in the month, business has generally been equal to, and in some cases has exceeded, that placed during the corresponding June period. Prices are unchanged in all lines, and sheets,

which have been the weakest item for some time, seem to be reflecting the somewhat firmer tone in mill prices.

Coke.—Most consumers who buy foundry coke over six-month or yearly periods have closed their contracts and spot buying is negligible. The price of foundry coke is unchanged at \$3.50, Connellsville, with the furnace grade quoted at \$2.50 to \$2.75.

Cleveland

July Steel Demand Holding Up Well—Some Automobile Plants Slowing Down Production

CLEVELAND, July 17.—The volume of business in finished steel is holding up well for July and the demand for some lines is better than for the same month last year. Specifications with some producers during the first half of July showed a slight gain over those of June. Orders from the automotive industry are holding up well on some products; for alloy steel particularly they show quite an increase over last month.

Some of the automobile manufacturers are slowing down production this month and by Aug. 1 they will be operating at considerably reduced schedules, compared with the peak of the spring season. Others that have brought out new models are still keeping up good production, but whether this will be maintained long depends on the extent to which the new models stimulate sales. Reports indicate a falling off in retail sales of cars, and there is some expectation that with the surprisingly large volume of business in the first half of the year there will be quite a curtailment in the demand for automobiles in the latter part of the year. Stamping plants and forge shops in this territory are still well filled with automobile work.

Sales during the week helped to clarify the price situation on steel bars, plates and structural material. While 1.90c., Pittsburgh, is still the asking price of several mills, most of the larger consumers are able to place orders at 1.85c., and the higher price is generally limited to small-lot buyers. Cleveland mills quote steel bars at 1.85c., mill.

A lull has developed in the building field, and there is no new structural inquiry for lots of any size.

Pig Iron.—Sales increased in the past week, during which Cleveland interests closed contracts for 32,000

tons of foundry and malleable iron either for early shipment or the third quarter. Shipments continue fairly heavy and show a gain over those of June, when there was some slowing down for the July 1 inventories. The automotive industry is taking about as much iron as in earlier months of the year, although a large part of that being shipped to automobile foundries this month has been carried over from second quarter contracts. Many consumers are following a hand-to-mouth policy of buying. Furnaces that are in operation still have good stocks, which they do not seem to reduce very much. Prices are holding steady at recent levels. The commonly quoted Cleveland price for outside shipment remains at \$16.50, but \$16.25 and probably lower has not disappeared in competitive sections. While \$16.75 is being quoted in the Valley district, a Lake furnace has taken some business at \$17 for shipment to a point having the same freight rate from both producing points. In Michigan, the market is firm at \$17.50. There is no activity in basic or low phosphorus iron.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.....	\$18.00
S'th'n fdy., sil. 1.75 to 2.25.....	21 50
Malleable	18.00
Ohio silvery, 8 per cent.....	23.00
Basic Valley furnace.....	16.00
Stand. low phos., Valley furn.....	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—The demand is rather spotty and slowing down, although it is good for this season of the year. Shipments exceed new business, and some of the mills that have had good backlogs are able to make quicker deliveries than recently. The only change in the price situation is the settling of black sheets to a rather common quotation of 2.60c., Pittsburgh. Although that price had appeared recently, it did not become common until the past week. Other sheet prices are unchanged. Blue annealed sheets range from 1.90c. to

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.75c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.40c. to 4.50c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

2c., Pittsburgh. The minimum on galvanized sheets is 3.40c. and 3.45c., Valley.

Strip Steel.—Demand for both hot and cold-rolled strip shows some tapering off. Most business in hot-rolled material is in specifications against contracts. Plate makers are feeling keenly the competition of hot strip mills on lighter gages. Prices on wide material continue very irregular. Net prices are rather commonly quoted, which in some cases figure below 1.75c., Pittsburgh, on cold-rolled strip, 2.65c., Cleveland, has become more general for 3 tons and over. Small lots are still bringing 2.75c. Fender stock is holding at 4.10c. for No. 20 gage.

Cold-Finished Steel.—Demand from the automotive industry continues fairly active. Some new business is coming from makers of Ford parts. The price is firm.

Old Material.—The market shows little life and a weak tone, although there is no change in prices. Activity during the week was confined to small purchases of heavy melting steel and blast furnace scrap, mostly for delivery to Cleveland mills against outstanding orders. These brought quoted prices, except on some No. 1 heavy melting steel scrap for a mill exacting in its requirements, for which dealers paid \$13.50. The market is weak in the Valley district. Dealers are paying \$14 for No. 1 heavy melting steel for Youngstown and Sharon deliveries.

Prices per gross ton, deliv'd consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$13.00 to \$13.25
No. 2 heavy melting steel.	12.50 to 12.75
Compressed sheet steel.	12.50 to 13.00
Light bundled sheet	
stamp'gs	11.50 to 11.75
Drop forge flashings.	11.50 to 11.75
Machine shop turnings.	7.00 to 7.25
No. 1 railroad wrought.	11.50 to 12.00
No. 2 railroad wrought.	13.50 to 13.75
No. 1 busheling.	11.00 to 11.25
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.	16.50 to 17.00
Low phos. billet, bloom and slab crops.	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap.	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings.	9.00 to 9.25
Mixed bor'gs and short turn'gs	9.00 to 9.25
No. 2 busheling.	9.00 to 9.25
Cupola Grades	
No. 1 cast.	16.00 to 16.50
Railroad grate bars.	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling.	16.25 to 16.50

Coke.—A large share of foundries are under contract and new demand for foundry coke is limited to car lots. Prices are unchanged at \$7.75, Painesville, for Ohio by-product foundry coke and \$3.25 to \$4.85 for Connellsville foundry coke. There is some activity in by-product coke for industrial uses. This is quoted at \$4.50, Ohio ovens, for both egg and nut grades.

Bolts, Nuts and Rivets.—The demand continues fair in specifications against contracts. The volume of or-

ders is about the same as last month.

Semi-Finished Steel.—Specifications are holding up well, but there is little new business. Quotations are unchanged at \$32.50 to \$33, Cleveland, for sheet bars, billets and slabs. The higher price evidently applies to orders for shipment to points where the seller has a freight advantage.

Wire Products.—A spurt in wire business has followed the recent \$2 a ton price reduction. Nails are only moderately active. Some pressure is being made by car lot buyers in con-

suming industries to obtain the \$2.55 per keg price that jobbers pay.

Warehouse Business.—Sales, which declined during the holiday week, have again picked up and are about the same in volume as during June. Prices are holding steadily except on black and galvanized sheets, which are reflecting the weakness of mill prices.

Reinforcing Bars.—Demand is slow, being limited to small lots. Prices are irregular. Rail steel bars are commonly quoted at 1.75c., mill.

Youngstown

Steel Production in Mahoning Valley Averages 75 Per Cent, a Gain of 5 Points

YOUNGSTOWN, July 17.—Iron and steel production schedules in the Mahoning Valley average fully 75 per cent this week, a gain of 5 points, compared with the production rate of recent weeks. The increased scheduling is directly attributable to enlarged business and affects steel ingots, pipe and plates in particular. Steel sheets, tin plate and hot strip mills are holding the gains of recent weeks.

Of 53 independent open-hearth furnaces, for example, 38 are scheduled this week, a gain of one over the preceding week and comparing with a recent low of 32 melting. Of 127 Valley sheet mills, 113 are under power, which approaches the high mark of the year. Tin mills are operating close to capacity, with a substantial backlog; a gain is seen in active pipe mills, with 14 of 20 under power.

The Youngstown Sheet & Tube Co.

this week blew out one of its two Hubbard blast furnaces, because of slack operations by the Valley Mould & Iron Corporation nearby. The Hubbard stacks supply hot metal to the Valley Mould company. This leaves 21 of 37 blast furnaces in the Youngstown district in action, producing about 68 per cent of the total rated capacity.

The Carnegie Steel Co. has five of six furnaces blowing at the Ohio works, one being down for overhauling and enlargement. The Sheet & Tube company is operating five of its nine stacks in the Youngstown district, while the Republic company has four furnaces in blast.

Independents will follow the lead of the Carnegie Steel Co. in advancing the price of merchant bars, plates and shapes \$2 per ton, to 2c. per lb. for fourth quarter delivery.

Worcester Manufacturers Working Full Time

Reports from 42 manufacturing plants in the Worcester, Mass., vicinity are regularly made to the local safety council, which not only records the number of lost-time accidents, but the number of employees and the hours worked. From these it may be determined that while the number of men employed is practically the same as a year ago, the number of hours worked almost doubled.

As summarized in a bulletin issued by the Worcester Bank & Trust Co., it appears that in May, 1928, 23,417 people employed in forty-two manufacturing plants of Worcester and vicinity worked 4,936,776 man hours. In May, 1927, 23,228 employees of the same plants worked 2,812,855 hours.

The number of employees increased but slightly, comparing the month this year and last. But the total number of hours worked by them increased tremendously. The gain of 2,123,921 hours was 80 per cent. Average daily employment per person increased from five hours to eight hours. The reporting plants include most of the large

establishments of the city; among them are the American Steel & Wire Co., Crompton & Knowles Loom Works, Norton Co., Reed & Prince Mfg. Co., Graton & Knight Mfg. Co., Wickwire-Spencer Steel Co., the Whitin Machine Works and the American Optical Co. There is no reason to doubt that local plants not included in the group of forty-two have averaged to have much the same experience.

Building permits have dropped very sharply. The city, therefore, has the conflicting experience of full-time employment in manufacturing and considerable unemployment in the building trades.

The satisfactory condition of dealer stocks of used automobiles makes possible the promotion of new car sales on a larger basis than usual during the summer months, says *Automotive Industries*. This year the new car sales records of the spring and early summer have been accompanied by a more even movement of used cars, resulting only in limited stocks at any time in the past two months.

San Francisco

Improved Steel Demand—Water Mains for Oakland —Heavy Concrete Bar Business

SAN FRANCISCO, July 14 (*By Air Mail*).—Third-quarter trading is getting well under way and demand has improved during the past two weeks. A number of new structural steel projects have come out for figures and architects and engineers report a good volume of business on the boards which should come forth for bids shortly. Reinforcing steel bars and shapes continue to be the most active products. Of more than usual interest is the call for bids by the East Bay Municipal Utility District, Oakland, for a water distributing system calling for 4500 tons of plates or 22,000 tons of cast iron pipe.

Building permits issued during June in Los Angeles totaled \$9,190,434, as compared with \$9,355,175 for the same month a year ago. Seattle had the biggest building month in the history of the city, as noted last week. Portland's permits totaled \$2,639,753, a gain of \$270,612 over June, 1927. Oakland was the third leading city on the Coast during June, with a total of \$4,209,512.

Pig Iron.—The foundry trade, with the exception of those classes of plants engaged in producing sanitary ware, stoves and other manufacturing specialties, continues to operate upon a limited basis, with only sufficient advance orders on hand to keep them running a day or two. The majority of the foundries on the Pacific Coast are classified as jobbing plants, and demand and sales have not been heavy. A shipment of Indian iron has just been unloaded on the Coast, 300 tons going to Bay district melters and 300 tons to users in the Los Angeles district. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars were the heaviest in over five weeks and totaled 1756 tons, as noted elsewhere. Outstanding among pending business is 2288 tons for a drainage improvement project at Los Angeles and 400 tons for highway in Ventura County, Cal. Prices on out-of-stock material in the San Francisco district have strengthened to some extent and while better than 2c. is being quoted occasionally, this figure now represents the general run.

Plates.—One of the largest plate inquiries that has come before plate

fabricators this year calls for 4500 tons for small water mains in Oakland for the East Bay Municipal Utility District, bids on which go in Aug. 17. Alternate bids will also be taken on steel lined concrete pipe, lock-bar, electric welded steel pipe and cast iron pipe. H. Gould of Sacramento secured the only award, which involved 100 tons of 24-in. riveted steel pipe for Sacramento. Prices continue to range from 2.25c. to 2.30c., though a large tonnage, it is believed, would probably bring forth 2.20c. c.i.f.

Shapes.—Demand for structural steel shapes continues active and awards recently totaled over 3300 tons. Included among the new pending projects are 455 tons for a bridge at Sausalito, Cal., 600 tons for an apartment in San Francisco, 570 tons for a bridge at Ventura, Cal., and 200 tons for a viaduct in Seattle. Plain material is firm at 2.35c. c.i.f.

Cast Iron Pipe.—A slight improvement in demand for cast iron pipe is noted, although sales this week were limited to one or two projects. Burbank, Cal., placed 109 tons of 4-in. Class B pipe with the Grinnell Co., 67 tons of 6-in. Class 250 with the Pacific States Cast Iron Pipe Co. and 87 tons of 8 and 10-in. Class 250 with the

American Cast Iron Pipe Co. San Diego awarded the Miracle Construction Co., San Diego, 102 tons of 4 and 6-in. Class B. The B. Nicoll Co. took 149 tons of 14-in. Class B for Puyallup, Wash., and I. L. Ryder, San Carlos, Cal., secured 109 tons of 3 to 6-in. Class 150 pipe for San Luis Obispo, Cal. The quantities involved in the East Bay Municipal Utility District project are as follows: 3600 tons of 44-in., 9000 tons of 30-in., 325 tons of 34-in., 6600 tons of 36-in. and 2800 tons of 24-in. Class C pipe. Bids on this material will be opened Aug. 17. The Pacific States Cast Iron Pipe Co. was low bidder on 202 tons of 2 to 6-in. Class B pipe for Phoenix, Ariz. Wells, Nev., which last month took figures on 224 tons of 4 to 10-in. Class C pipe, finally purchased Armco iron pipe through the Burnham Mfg. Co. at Cross, Utah. Bids have been opened on 2121 tons of 8 and 12-in. Class 350 pipe for Los Angeles and on 271 tons of 48-in. pipe for a sewer in Seattle, Wash. New inquiries include 133 tons of 6 to 10-in. Class B pipe for South Pasadena, Cal., bids opening July 25. Tracy, Cal., will open bids on Aug. 7 for 416 tons of 4 to 12-in. Class B.

Steel Pipe.—Little new business in standard pipe and oil country goods has been reported of late. John Strona, Pomona, Cal., secured 194 tons of 4-in. standard and 6-in. O. D. pipe for Chino, Cal. No large inquiries are pending.

Coke.—One large importer of English coke has just unloaded 3500 tons of beehive and by-product coke in San Francisco to apply against contracts placed some time ago. Approximately 1500 tons of this material will be reshipped to Portland and Seattle. English beehive coke is quoted at \$16 a net ton, delivered incoming dock, while by-product material ranges from \$11.50 to \$13 a net ton.

Canada

New Business Active and Operations Maintain Recent High Level—Strong Structural Demand

TORONTO, July 17.—New business and operating activities of the iron and steel and allied industries of Canada continue to hold the high position reached earlier in the year, and at the moment the various companies concerned believe the present rate of operations will continue for some months to come.

While rail mills have secured considerable orders from the Canadian railroads, rolling stock manufacturers have not been so fortunate, and the latter point out that the roads continue to hold their rolling stock purchases to a minimum, despite the fact that there is apparently a strong need for replacements. Most concerns producing rolling stock have entered into the manufacture of mining equipment or some other special line and it is to the latter that credit is given for the continued high rate of operations. The automotive industry of this country is also flourishing. Agricultural implement makers are experiencing one of their best years and sanitary ware and radiator manufacturing

companies also are optimistic in their statements regarding present and future activities.

Pig Iron.—Following the lull during the first week of July, business has again returned to the stronger position. Some advance buying has been done, totaling about 3000 tons for third-quarter delivery. The majority of consumers, however, have covered up to the end of September, and local blast furnace representatives do not expect much additional in the way of big tonnage forward contracts. Spot buying in lots of from one to two cars is the feature, and as orders of this nature are fairly numerous, total sales for the week reached a good level. A few inquiries

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.....	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker.....	5.00c.
Black sheets (No. 24).....	4.95c.
Blue ann'd sheets (No. 10).....	3.90c.
Galv. sheets (No. 24).....	5.50c.
Struc. rivets, $\frac{1}{2}$ -in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c'd nails, 100-lb. keg.....	3.40

are out for 200 to 300 tons for immediate delivery, which are expected to be closed within the next few days. Prices appear firm at the present level, with little prospect of an early change here. In the Montreal district, however, shading is being resorted to in order to meet outside competition, but the general list is unchanged.

Prices per gross ton:

Delivered Toronto			
No. 1 fdy., sil	2.25 to 2.75	\$23.10 to	\$23.60
No. 2 fdy., sil	1.75 to 2.25	23.10 to	23.60
Malleable		23.10 to	23.60
Delivered Montreal			
No. 1 fdy., sil	2.25 to 2.75	24.50 to	25.00
No. 2 fdy., sil	1.75 to 2.25	24.50 to	25.00
Malleable		24.50 to	25.00
Basic		23.50 to	24.00
Imported Iron, Montreal Warehouse			
Summerlee			33.50
Carron			33.00

Structural Steel.—While a few orders of 1000 tons and upward were closed during the week, the total volume of sales were somewhat below those of the three or four weeks previous. A few big orders are in prospect, but the bulk of current business is for small tonnages. It is expected that the T. Eaton Co., Toronto, will require perhaps 10,000 tons of steel for its new structure. Approximately 2000 tons of structural and 500 tons of reinforcing bars will be required for the Miller Court & Co., Ltd., Stock Exchange Building, Vancouver, and 600 tons of reinforcing bars will be purchased for the factory and stores on Mount Royal Avenue, Montreal, for the Canadian Waist Co. Numerous other orders are pending in which from 100 to 500 tons of steel will be required. Canadian structural steel fabricators

and producers of reinforcing bars report plant operations at capacity, with some working at double time to supply the demand.

Old Material.—Sales for the past few days showed general improvement. The seasonal decline in business has not been so striking as it was a year ago. With the majority of consumers who place advance contracts covered up to the end of September, current demand is mostly for small tonnages for immediate delivery. The consumption of old material throughout eastern Canada is from 15 to 20 per cent greater than a year ago, and scrap dealers are naturally securing a larger volume of business. The present price situation, however, is far from satisfactory. A general strengthening of the United States market is about the only possibility Canadian dealers have of a stronger market demand and higher prices here. Prices are unchanged.

Dealers' buying prices:

Per Gross Ton		
	Toronto	Montreal
Heavy melting steel....	\$9.00	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....		16.00
Stove plate.....		13.00
Standard carwheels.....		16.00
Malleable.....		13.00
Per Net Ton		
No. 1 machinery cast....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

St. Louis

Reduced Pig Iron Price to Stimulate Buying—Improvement in Steel Business

ST. LOUIS, July 17.—Although the St. Louis Gas & Coke Corporation has not formally reduced its price in line with the cut of 50 cents a ton made by Chicago makers, as reported in THE IRON AGE last week, the Granite City

concern has let it be known that it will meet all competition, and has been making sales on the basis of the new Chicago price when necessary. Its sales last week totaled 4500 tons, including 2000 tons of basic to an East Side melter and 2500 tons of foundry iron in lots tapering downward from 500 tons, which went to a St. Louis melter. The new Chicago price, the lowest since 1915, is expected to stimulate buying in this district, especially as there is considerable iron to be bought for the third quarter, and sellers look for a heavy movement this week. While there are no definite inquiries pending, a number of melters are said to be ready to buy.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd.....	19.92
Northern malleable, deliv'd.....	20.16
Northern basic, deliv'd.....	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Dealers in domestic grades of coke have shown very little interest so far in their requirements for next

fall, and it is not expected that they will do so until after Aug. 1. Buying of foundry grades is light.

Old Material.—About the only item on the old material list that is showing any life is rails for rerolling, the various rolling mills in the district showing greater activity than other consumers. Buying of other items is light, and neither dealers, who are about covered on contracts, nor consumers, who say they have sufficient stocks of old material for the present, are showing any interest in the market. Miscellaneous standard section rails, railroad springs, and cast iron car wheels are 25c. lower; steel car axles, wrought iron bars and transoms and No. 1 railroad wrought are 50c. lower. Railroad lists, which continue heavy, include the following: Southern Railway system, 6962 tons; Chesapeake & Ohio, 4262 tons; Terminal Railway Association of St. Louis, 3523 tons; Chicago, Milwaukee & St. Paul and Chicago & Alton, 1300 tons each; Chicago, Rock Island & Pacific, 1500 tons; Nickel Plate, 600 tons miscellaneous, and four carloads of rail; Texas & Pacific, 575 tons miscellaneous and 250 tons axles; International-Great Northern, 885 tons; Cotton Belt, 14 carloads; and Pullman Co., St. Louis, four carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$10.75 to \$11.25
No. 1 locomotive tires....	12.00 to 12.50
Heavy shoveling steel....	10.75 to 11.25
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart....	12.00 to 12.50
Railroad springs.....	13.00 to 13.50
Bundled sheets.....	8.50 to 9.00
No. 2 railroad wrought....	11.00 to 11.50
No. 1 busheling.....	9.25 to 9.75
Cast iron borings.....	8.50 to 9.00
Iron rails.....	13.00 to 13.50
Rails for rolling.....	13.00 to 13.50
Machine shop turnings....	6.25 to 6.75
Steel car axles.....	16.75 to 17.25
Iron car axles.....	25.50 to 26.00
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought....	9.00 to 9.50
Steel rails, less than 3 ft..	15.00 to 15.50
Steel angle bars.....	11.50 to 12.00
Cast iron carwheels.....	12.75 to 13.25
No. 1 machinery cast....	13.00 to 13.50
Railroad malleable.....	11.25 to 11.75
No. 1 railroad cast.....	13.00 to 13.50
Stove plate.....	11.00 to 11.50
Agricult. malleable.....	12.00 to 12.50
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Finished Iron and Steel.—The Granite City Steel Co., during its shutdown for the week of the Fourth, was able to book a very fair backlog tonnage, and all of its units are operating 100 per cent, except the galvanizing department, which is at about 80 per cent of capacity, as compared to 50 per cent two weeks ago. The last few days have shown a marked improvement in incoming business, which is slightly behind the corresponding period in June, but well up to the normal for this time of year. Demand is coming from a diversified line of consumers, and the volume is being maintained despite virtual inactivity of car builders and oil field operators, who ordinarily use large tonnages. Prices are considerably more stable than they were a few weeks ago, although still unsatisfactory, due to very low levels. Warehouse busi-

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struct. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	5.25c.
Blue ann'l'd sheets (No. 10).....	3.60c.
Black corrug. sheets (No. 24).....	4.50c.
Galv. corrug. sheets.....	5.30c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	70
Less than 100 lb.....	65
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

ness for June was better than May, and July so far has been fair, buying in the St. Louis industrial district holding its own, but with declines in the oil fields and other country sec-

tions. Railroads are expected to issue third-quarter requisitions for plates, shapes and bars during the week. Business with structural fabricators is quiet.

they are \$3.40 per keg, and for mill shipments, \$2.65 in car lots and \$2.90 in less than car lots. New extras have been issued on cut nails, which brings the average cost to buyer practically to the wire nail basis.

Boston

Structural Fabricators Well Filled Up With Orders—More Steel Scrap Exported

BOSTON, July 17.—The Chapman Valve Mfg. Co., Springfield, Mass., is now said to have bought 500 tons No. 2 plain New York State pig iron for third and fourth quarter delivery, 500 tons No. 2X Buffalo, and 500 tons No. 1X Buffalo iron, the latter from a steel mill, at prices above those quoted on other irons. The foundry's original inquiry was for 2500 tons. The major portion of iron sold in this territory the past fortnight has been bought on a basis of \$17 a ton, Buffalo furnace, for No. 2X, despite the fact that irons are still available at \$16 and \$16.50 a ton, base Buffalo furnace, or the equivalent. Aside from the Chapman Valve Mfg. Co. business, sales the past week were largely of car lots of more or less special analysis irons, for which full differentials were paid.

Foundry iron prices per gross ton deliv'd to most New England points:

Buffalo, sil. 1.75 to 2.25..	\$20.91 to \$21.91
Buffalo, sil. 2.25 to 2.75..	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	22.41 to 24.27
Ala., sil. 2.25 to 2.75.....	22.91 to 24.77

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.—July shipments of by-product foundry coke have been a little ahead of those in July, last year. New England melt of iron is not increasing, although certain foundries are busier than they have been. The New

England Coal & Coke Co. and the Providence Gas Co. are still making shipments on a basis of \$11 a ton within a \$3.10 freight rate zone.

Shapes and Plates.—New England steel fabricators have more unfilled business on their books than in a long time. Based on present operations, some of them are booked through the remainder of 1928, while the largest, with increased operations, are sold up through September. Prices named by fabricators are on a firmer basis. Mill deliveries are becoming uncertain, and mills are more often obtaining 1.90c. per lb., base Pittsburgh. Most of the large fabricators are protected through the third quarter at second quarter prices for both plates and shapes.

Warehouse Business.—The movement of iron and steel out of warehouse is holding up remarkably well for July. Small iron workers, although not as active as they were a month ago, continue to take good weekly tonnages from warehouses, mostly of round and square bars and angles. Warehouse stocks today are considerably smaller than they were a year ago, consequently there is more or less buying among the trade to fill orders. Wire nails have been cut 5c. to 10c. per 100 lb. From stock

Old Material.—A steamer with 4303 tons of scrap cleared Boston on July 10 for Danzig. This shipment included rails as well as No. 1 and No. 2 steel. Another steamer will load 4000 to 5000 tons for export within the next fortnight. Prices for material on this boat have been dropped about 25c. per ton, No. 1 steel now fetching \$9 a ton on cars dock, here, and No. 2, \$8.50 to \$8.75. Aside from the export demand, the old material market is quiet. Prices Pennsylvania mills are willing to pay for scrap are so low that shippers cannot do business except at a loss. To illustrate: the best a Weirton mill is offering for No. 1 heavy melting steel is \$6.70 to \$6.75 a ton on cars at shipping point. With a \$2 a ton cost for handling, plus the cost of other incidentals, shippers cannot profitably operate.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$8.00 to \$8.50
Scrap T rails.....	8.00 to 8.50
Scrap girder rails.....	7.50 to 8.00
No. 1 railroad wrought...	9.00 to 9.50
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings...	5.00 to 5.50
Cast iron borings (steel works and rolling mill)..	5.10 to 5.60
Bundled skeleton, long....	6.50 to 7.00
Forge flashings.....	6.50 to 7.00
Blast furnace borings and turnings.....	5.00 to 5.50
Forge scrap.....	5.50 to 6.00
Shafting.....	12.00 to 12.50
Steel car axles.....	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$13.50 to \$14.00
No. 1 machinery cast....	14.00 to 14.50
No. 2 machinery cast....	12.50 to 13.50
Stove plate.....	10.00 to 10.50
Railroad malleable.....	13.50 to 14.50

Birmingham

Steel Backlogs Being Maintained With Finishing Mills Active—Price Tendency Firm

BIRMINGHAM, July 16.—New sales by pig iron producers last week showed slight improvement over the previous week. Total bookings were ahead of production. Some consumers are covering their requirements through July and August and a few orders have been booked as needs are presented. Pressure pipe makers are among the heavy buyers. Soil pipe plants, stove foundries and machine shops generally are largely uncovered for the quarter's requirements. Shipments are active and ahead of the make. For the past several days the Tennessee company has been alternating its Ensley furnaces between basic and foundry iron with changes being made each day. The No. 2 Bessemer furnace of the company has been changed from recarburizing iron to foundry iron. Operations by the other

companies are the same as last week. Seventeen furnaces are in blast.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic.....	\$15.00 to 16.00

Finished Steel.—The volume of new business for the past week was close to that of the past several weeks. The finishing mills continue active and backlogs are being maintained so far. Prices show a firmer tendency than for several weeks. Bar quotations are now 2.05c. to 2.15c. New bookings of bar manufacturers and structural steel fabricators will easily support operations at the recent level. Structural steel orders booked by the Virginia Bridge & Iron Co. call for 1530 tons, as reported elsewhere. The Tennessee company has taken off all of its open-hearth furnaces at Ensley

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts.....	.50 and 5
Carriage bolts.....	.50 and 5
Lag screws.....	.50 and 5
Hot pressed nuts.....	.50 and 5
Cold-punched nuts.....	.50 and 5
Stove bolts.....	.70 and 10

*Including quantity differentials.

and increased its active open hearths at Fairfield from five to six. The Gulf States Steel Co. continues to work three at Alabama City.

Cast Iron Pipe.—New lettings have improved somewhat and are now holding up the unfilled tonnage at a satisfactory level. Inquiries are confined largely to private business. The pressure pipe plants in the district are operating at around 85 per cent capacity and shipments lately have been sufficient to take care of all pipe produced. The soil pipe business is still backward and plant operations are light. Quotations continue at \$34 to \$35 on 6 in. and larger sizes.

Coke.—Shipments are keeping up well, but there is little new contracting on foundry coke, as most consumers have already covered for the last half. A small amount of spot busi-

ness is being transacted. Quotations remain at \$5 for both spot and contract.

Old Material. — Practically no change can be detected in the market. The only activity is found in a few sales from time to time in carload lots. There has been no demand in several weeks. Prices are nominal and unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to	\$9.00
Scrap steel rails.....	11.00 to	11.50
Short shoveling turnings..	7.50 to	8.00
Cast iron borings.....		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought...	10.00 to	10.50
Rails for rolling.....		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels.....	12.00 to	13.00
Cast iron borings, chem..	13.50 to	14.00

Cincinnati

Revival of Interest in Pig Iron—Coke Prices Decline —Steel Prices Firmer

CINCINNATI, July 17.—Pig iron buyers are showing greater interest in requirements for the remainder of the year and consequently sales and inquiries are tending upward. Significance is attached to the fact that the Standard Sanitary Mfg. Co. is expected to purchase foundry iron for its Louisville, Ky., plant this week, while a large consumer at Hamilton, Ohio, probably will close in a few days for 5000 tons to be shipped during the last half. At Piqua, Ohio, the Favorite Stove & Range Co. is asking for bids on 600 tons of foundry. The amount of iron being taken by melters on current contracts is fairly satisfactory for the summer season. Competition for business is principally between Lake Erie furnaces and a southern Ohio producer.

In the case of the former, quotations ranging from \$16 to \$16.25, base furnace, have been successful in obtaining bookings, but the freight advantage to many points in southern Ohio is strongly in favor of the latter. Southern Ohio foundry iron remains nominally at \$18, base Ironton. However, the two merchant iron interests at Ironton have only a limited tonnage of iron, mostly in special grades, to offer. There is little likelihood of either company resuming operation of its blast furnaces in the near future. Tennessee and Alabama irons are firm at \$15.50, base Birmingham. There has been no change in Jackson County silvery, which is steady at \$25, base Jackson, for 8 per cent.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25.....	\$19.89
So. Ohio malleable.....	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25..	19.19
Ala. fdy., sil. 2.25 to 2.75..	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—There is an underlying tone of firmness to the market. Orders and specifications have called for small miscellaneous lots of material, but in the aggregate have attained somewhat liberal proportions. Bars, structural shapes and plates are in fair demand at 1.85c., base, Pittsburgh, for attractive tonnages and 1.90c. for the ordinary run of orders. In common wire nails there has been a firming up of prices. Some Eastern producers have announced that they will not sell nails under \$2.76 per keg, delivered in Cincinnati, which is equivalent to \$2.55, Pittsburgh, plus the full all-rail rate to this city. However, at least two makers are willing to accept business at \$2.69, figuring on a base price of \$2.55 and a 14c. barge rate from Ironton to Cincinnati. District sheet mills report that bookings are holding up well in the face of a slackening in operations among certain classes of consumers. The output of steel sheets continues at about 90 per cent of capacity, but backlogs have been re-

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld, steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

duced in the past few weeks so that the maintenance of present schedules will depend upon the amount of tonnage obtained in the next week or two. Quotations have not changed and indications are that the market is becoming stabilized at current prices of 2c., base Pittsburgh, for blue annealed, 3.50c. for galvanized, 2.65c. for black and 4c. for automobile body stock. Reinforcing bars are firm at 1.80c., base mill, for rail steel material and 1.85c. to 1.90c., base Pittsburgh, for new billet bars.

Warehouse Business. — Shipments out of local warehouses in the first half of July were slightly less than in the last two weeks of June, the lagging demand for structural steel having been responsible for the decline in volume. Prices are steady and unchanged.

Coke.—The coke market is rather sluggish and the downward trend of prices, especially in by-product grades, reflects the increasing severity of competition among makers. An Indianapolis company has cut its price of foundry coke \$1 a ton for delivery to points in Indiana. The decline was caused by low quotations made by a Birmingham producer and by a Terre Haute, Ind., maker. However, the schedule for delivery to this city remains unchanged at \$7 per net ton, f.o.b. ovens. Whether this price will be shaded depends upon the course taken in the next week or two by an Ashland, Ky., manufacturer. The Procter & Gamble Co., Cincinnati, is reported to have bought 5000 tons of by-product furnace coke from a southern Ohio seller. In recent years this business has gone to a Wise County producer of beehive coke. An Ohio River user of furnace coke is inquiring for 2500 tons for delivery in the first three months of 1929.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, \$9.02; Wise County coke, \$7.09 to \$7.59; New River coke, \$9.09 to \$9.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material. — There has been little activity in the scrap market. Railroads are reported to have got fairly good prices for the items on their July lists. Steel plants in this district are accepting moderate tonnages on present contracts. Blast furnace and foundry grades are quiet. Prices are unchanged.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$10.75 to \$11.25
Scrap rails for melting....	10.75 to 11.25
Loose sheet clippings.....	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings.....	7.50 to 8.00
Machine shop turnings....	7.00 to 7.50
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	12.50 to 13.00
No. 1 locomotive tires.....	12.75 to 13.25
No. 1 railroad wrought... ..	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels.....	11.50 to 12.00
No. 1 machinery cast.....	15.25 to 15.75
No. 1 railroad cast.....	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable ...	11.00 to 11.50

Detroit

June Automobile Production Records Considerably Ahead of June, 1927—Employment Gains

DETROIT, July 16.—Final figures for June indicate that automobile production is not undergoing the usual seasonal slump. Some individual companies are still making records and the industry as a whole is in very much better condition than it was at this time last year. It is apparent that Chevrolet production made a new record, with an output of approximately 130,000 cars and trucks, or better than 20,000 ahead of June, 1927, but 10,000 units less than the previous month of this year. The basic schedules for the next three months are set at 100,000 units a month. The Chevrolet company is about to begin construction on a new foundry unit at Saginaw, which will cost approximately \$4,000,000 and have a melting capacity of 1700 tons a day.

Dodge production since the first of the year is approximately 20 per cent ahead of the same period of 1927. June production of Graham-Paige Motors Corporation has for the fourth time broken records, with a total of 8829 units, showing an increase of 318 units over the previous month. The Hudson Motor Car Co. shows a June record of 31,160 units, which may be compared with 23,084 units for June of 1927. The first six months of the current year show a total of 183,065 as against 168,336 for the first six months of 1927. The Hupp Motor Car Corporation in the first six months of 1928 shipped 38,424 cars. This compares with 22,310 cars in the six months of 1927. Shipments to Canada reflect the same progress. June, 1928, is the largest June in this respect and 7 per cent ahead of June, 1927.

Marmon production for the first six months of this year totals approximately 13,900 cars compared with 7311 for the same period of 1927. The Oakland Motor Car Co., to July 1, shows a total sales of 161,548 units, or a gain of 62 per cent over the first half of 1927. The Packard Motor Car Co., after two weeks shut-down for vacations, has resumed operations at full capacity. A new record was made last month by Reo Motor Car Co., with 6133 units, compared with 6121 in the previous month and with 4479 in June of last year. The Studebaker Corporation shows a June total of 13,000 units as compared with 8600 for June a year ago.

The index for the Employers' Association shows an increase of 1822 for the past week, bringing the total to 264,473, which represents the combined payrolls of approximately two-thirds of the city's industries. The corresponding figure for a year ago was 194,704 persons or 69,769 less than at the present time.

President Kuhn of the Truscon Steel Co. states that all the company's plants are running at capacity and

with no immediate let down apparent.

The Motor Wheel Corporation sales for the first half of 1928 are somewhat more than \$13,000,000 or 25 per cent better than the sales for the same period of 1927. An addition to the pressed steel plant is to be started immediately and will be rushed to completion as early as possible this fall. This addition will be approximately 74 x 500 ft.

Auto body sheet stands at 4c., Pittsburgh, and blue annealed sheet at 2 to 2.10c., Pittsburgh. Cold finished bars remain at 2.10c., Pittsburgh, and hot rolled 3 in. and narrower 2.20 to 2.30c., 3 to 6 in., 1.85

to 2.10c., and 6 in. and wider 1.75 to 1.90c., Pittsburgh. Structural bars, shapes and plates remain at 1.85c. to 1.90c., Pittsburgh.

Shipments of pig iron in this district are considerably above the June figures. This is due to heavy production of automobile castings for new models. Melters generally have covered for the third quarter and they anticipate good production during this period.

Scrap prices are unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$11.00 to \$11.50
Borings and short turnings	7.00 to 7.50
Long turnings	5.75 to 6.25
No. 1 machinery cast.	14.00 to 15.00
Automobile cast.	19.00 to 20.50
Hydraul. comp. sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 6.50
Flashings	9.00 to 9.50

Buffalo

Steel Mill Operations Average 80 Per Cent—10,000-Ton Sale of Heavy Melting Steel at \$13.75

BUFFALO, July 17.—With very few sizable inquiries out, a fair tonnage of pig iron has been sold in 50 to 200-ton lots. The price realized on sales in the district was \$17, Buffalo. Most of the business placed at points to the east has been sold at a price which figures back to \$16.50, Buffalo, taking the barge rate into consideration. An inquiry is out for 1000 tons of malleable and another from Connecticut is for 600 tons of malleable and silvery iron.

In line with the Hanna Furnace Co.'s improvement program at Buffalo, its No. 1 stack, which is now operating on silvery iron, will be blown out about Aug. 1 and one of its larger furnaces, recently equipped to produce silvery iron, will then go onto that grade for regular production.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$17.00
No. 2X fdy., sil. 2.25 to 2.75	17.50
No. 1X fdy., sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation is at about 80 per cent, with bookings fair. Bars, shapes and plates are being quoted at 2c., Buffalo, for third quarter delivery. Considerable sheet business has been taken. On black sheets, prices range from 2.60c. to 2.70c. Shop operations are better,

with drop forging shops doing particularly well. The largest structural letting was 400 tons for the Mayflower apartments.

Old Material.—A local mill has bought 10,000 tons of heavy melting steel at \$13.75. A few small sales of No. 1 cast, malleable and short steel rails have been made, but otherwise the market has been very quiet. The restrictions and suspensions put into effect by the two largest consumers are still in effect. Most of the scrap yards are shut down.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$13.75 to \$14.25
No. 2 heavy melting steel	12.25 to 12.75
Scrap rails	13.00 to 13.50
Hydraulic comp. sheets	12.25 to 12.75
Hand bundled sheets	8.00 to 8.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.25 to 12.75
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50

Acid Open-Hearth Grades	
R'l'r'd knuckles and couplers	15.00
R'l'r'd coil and leaf springs	15.00 to 16.00
Rolled steel wheels	15.00
Low phos. billet and bloom ends	16.00 to 16.50

Electric Furnace Grades	
Hvy. steel axle turnings	12.00 to 12.50
Short shov. steel turnings	9.00 to 9.50

Blast Furnace Grades	
Short shov. steel turnings	9.00 to 9.50
Short mixed borings and turnings	9.00 to 9.50
Cast iron borings	9.00 to 9.50
No. 2 busheling	9.00 to 9.25

Rolling Mill Grades	
Steel car axles	15.50 to 16.00
Iron axles	19.50 to 20.00
No. 1 railroad wrought	12.00 to 12.50

Cupola Grades	
No. 1 machinery cast	14.25 to 14.75
Stove plate	13.00 to 13.25
Locomotive grate bars	11.25 to 11.75
Steel rails, 3 ft. and under	16.50
Cast iron carwheels	12.00 to 12.50

Malleable Grades	
Industrial	15.00
Railroad	15.00
Agricultural	15.00

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struct. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10)	3.70c.
Com. wire nails, base per keg	\$3.65
Black wire, base per 100 lb.	3.90

Non-Ferrous Metal Markets

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 17	July 16	July 14	July 13	July 12	July 11
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	47.25	46.25	...	46.25	46.00	46.25
Lead, New York.....	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis.....	6.05	6.05	6.05	6.05	6.05	6.05
Zinc, New York.....	6.55	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis.....	6.20	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price $\frac{1}{4}$ c. higher.

Tin Recovers in More Active Trading — Copper Position Strong — Lead and Zinc Steady

Copper.—Although current buying of copper is light, copper producers are in an unusually strong position, being sold up tightly for July and also almost completely for August. It is difficult for buyers to obtain even a carload for spot shipment, as refiners are reserving their output for contract customers. Some copper for August is still to be bought, while nearly all consumers are uncovered for September. Producers are well satisfied with the present price situation, which is

firm at 14.75c., delivered Connecticut Valley, for electrolytic, and there is no intimation of any intention to go above that level; in fact, producers would prefer to hold it there. Copper statistics for the first half reflect fully the present strong situation, with a reported decrease in refined stocks as of June 30 amounting to 7479 tons, although total stocks, including those in process, gained 2254 tons, the comparisons being made with the situation on the last day of May. Total domestic sales in the first half were 444,028 tons, more than half of the total of 824,844 tons sold in all of 1927, while foreign shipments were 352,088 tons in the six months, against 641,865 tons in the twelve months of 1927.

The foreign demand is not now active, but the price of Copper Producers, Inc., remains unchanged at 15c., c.i.f. European ports.

Tin.—Following several uneventful days, the tin market resumed activity today (Tuesday) with a fairly strong demand, mostly from dealers, for August and September delivery, and the price advanced at the close of the trading to 47.25c. per lb., a gain of 1c. over Monday's price. About 300 tons changed hands. Last week sales were not more than 750 tons at prices fluctuating between 46c. and 46.25c. Consumers have not taken much interest in the market recently, but it is believed that they must soon come in for supplies, as their stocks are not

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	48.50c. to 49.50c.
Tin, bar.....	50.50c. to 51.50c.
Copper, Lake.....	15.75c.
Copper, electrolytic.....	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	31.50c. to 32.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c.
Tin, bar.....	56.00c.
Copper, Lake.....	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting	14.00c.
Zinc, slab.....	7.75c.
Lead, American pig.....	7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	55.50c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	30.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12 $\frac{1}{2}$ c.
Copper	25.00c.
Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc, sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products continue to be quoted at the advances of May 25. Zinc sheets are unchanged at 9.25c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—

High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.25c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—

High brass.....	24.12 $\frac{1}{2}$ c.
Copper	25.00c.

Rods—

High brass.....	17.00c.
Naval brass	19.75c.

Wire—

Copper	16.75c.
High brass	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light	6.25c.	7.75c.
Hvy. Machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. t'ngs.....	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62 $\frac{1}{2}$ c.
Copper	26.50c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

reckoned as being large. During the dullness which prevailed in the local market last week, London almost completely disregarded the American situation, and the market there has been steady and stronger than here. London prices today were £213 for spot standard, £209 10s. for future standard, £216 for spot Straits, and the Singapore price was £210 15s.

Lead.—This metal has remained steady in price during the past week, with quotations of 6.05c., St. Louis, and 6.20c., New York, the latter being the price of the American Smelting & Refining Co., which is being generally followed in the outside market.

Zinc.—The day-to-day demand for zinc is fairly steady, but the market presents no new characteristics. Prices are firm at 6.20c. to 6.25c., East St. Louis, or 6.55c. to 6.60c., New York. The lower prices are for July shipment, a slight premium being asked for August and September. Ore production at Joplin jumped from 3500 tons in the first week of July to 12,000 tons last week; the ore price remains at \$40 a ton.

Antimony.—The market is quiet but firm, with the Chinese metal quoted at 9.50c. per lb., New York, duty paid, for spot delivery, and at 9.75c. for future.

REINFORCING STEEL

WITH a bridge at Providence, R. I., requiring 1700 tons and 1000 tons in five junior high schools at Chicago, new reinforcing projects announced during the last week amounted to 4900 tons. The following awards total about 2900 tons:

BRIDGEPORT, CONN., 150 tons, building for Post Publishing Co., to Concrete Steel Co.

SCRANTON, PA., 140 tons, Medical-Arts Building, to Kalman Steel Co.

WESTMORELAND AND FAYETTE COUNTIES, PA., 125 tons, road work, Gray Brothers, Youngstown, to Truscon Steel Co.

CHICAGO, 220 tons, Fargo Avenue apartments, to Kalman Steel Co.

CHICAGO, 300 tons, building for William J. Igoe, to Kalman Steel Co.

CHICAGO, 260 tons, garage at 343 South Wabash Avenue, to Joseph T. Ryerson & Sons.

CHICAGO, 225 tons, garage at 914 Fair Oaks Avenue, to Calumet Steel Co.

CHICAGO, 200 tons, Austin High School, to Olney J. Dean & Co.

MAYWOOD, ILL., 200 tons, building for Public Service Co. of Northern Illinois, to American System of Reinforcing; previously reported to an unnamed bidder.

STATE OF ILLINOIS, 120 tons of rail steel bars for road work, to Calumet Steel Co.

ST. LOUIS, 375 tons; hotel at Eighth and Market Streets, 275 tons, and apartment house at Grand Boulevard and Russell Avenue, 100 tons, to Laclede Steel Co.

HELENA, MONT., 156 tons, State bridge on Laurel West highway, to unnamed interest.

Nickel.—Ingot nickel in wholesale lots is unchanged at 35c.; shot nickel is 36c., and electrolytic nickel is 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 17.—Trade is light in all the metals. Copper has been held firmly for a number of weeks, even when demand has been light. Buyers are finding that they must pay the current price for their accumulating needs, but they decline to buy ahead. Lead has declined mainly because of a reduction of \$2 a ton by the leading producer. Even at the reduced price demand is light and buyers are looking for a further decline. Tin is also lower than a week ago. The old metals are unchanged.

Prices, per lb., in carload lots:
Lake copper, 14.87½c.; tin, 47.25c.; lead, 6.15c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

OLYMPIA, WASH., 250 tons, State highway work, to Northwest Steel Rolling Mills.

SEATTLE, 250 tons, James Madison School, to Pacific Coast Steel Co.

SEATTLE, 150 tons, store, Sixth Avenue and Spring Street, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 1700 tons, Washington Bridge; Merritt-Chapman & Scott Corporation, general contractor.

EVANSTON, ILL., tonnage not stated, track elevation work for Chicago Rapid Transit Co.

CHICAGO, 1000 tons, five junior high schools.

SACRAMENTO, CAL., 147 tons, bridge over Santa Clara River at Saugus; bids Aug. 1.

SACRAMENTO, 400 tons, paving in Ventura County; Jans & Bressi, Los Angeles, low bidders.

VENTURA, CAL., 118 tons, Bardsdale bridge; bids July 24.

LOS ANGELES, 250 tons, apartment building at 2100 North Vermont Street; bids being taken.

LOS ANGELES, 589 tons, Big Dalton Dam; bids July 30.

SEATTLE, 147 tons, Second Avenue viaduct extension; bids July 27.

ELLENSBURG, WASH., 105 tons, South branch canal, Kittitas division of Yakima project; bids Aug. 7.

SAN FRANCISCO, 200 tons, garage, Jones and Turk Streets; bids being taken.

SAN FRANCISCO, 200 tons, school, Fulton and Masonic Avenues; bids being taken.

RAILROAD EQUIPMENT

EXPORT business continues to feature the railroad equipment market. A Brazilian road has placed 1000 box cars with United States builders, while an Argentine carrier is soon to make inquiry in this country for about 60 locomotives. The Chicago, Rock Island & Pacific has purchased 250 gondola car bodies. Details of the week's business follow:

Chicago, Rock Island & Pacific has placed 250 gondola car bodies and repairs to trucks with Ryan Car Co. This road is also inquiring for 10 air-dump cars.

American Cyanamid Co. has placed 20 hopper cars with General American Car Co.

Argentine State Railways contemplate buying about 60 locomotives.

Central of Vermont is reported to have placed eight locomotives with American Locomotive Co.

Paulista Railway, Brazil, is reported to have placed orders for 1000 box cars with American builders.

Union Railroad is inquiring for two locomotive tenders.

Barrett Co. has ordered 16 tank cars from General American Tank Car Corporation.

Cities Service Co. has ordered four tank cars from General American Tank Car Corporation.

Chicago, St. Paul, Minneapolis & Omaha has made inquiry for four gas-electric rail motor cars.

Illinois Central has bought two air-dump cars from Western Wheeled Scraper Co.

Northern Pacific is inquiring for one steel business car.

Bethlehem Rolling 36-In. Wide-Flange Beams

The Bethlehem Steel Co., which recently added to its line of wide-flange structural shapes a series of 33-in. beams and girders, now announces the rolling within the past few weeks of a series of 36-in. wide-flange beams and girders at its Lackawanna plant, Lackawanna, N. Y. These new sections are the deepest and heaviest beam sections produced in the United States.

The 36-in. I-beams are rolled in weights of 147, 155, 164 and 173 lb. per ft., and the girder beams are rolled in weights of 231, 240, 250 and 260 lb. per ft.

The American Institute of Steel Construction, Inc., has established a Northwestern district office in Milwaukee at 529 Wells Building, 120 East Wisconsin Avenue, in charge of C. Curtis Tracy, formerly structural engineer with Densmore, LeClerc & Robbins, Boston. The district embraces the States of Wisconsin, Minnesota, North and South Dakota, Montana and Wyoming.

PERSONAL

FRANK D. CARNEY of Carney & Lindemuth, 40 Wall Street, New York, consulting engineers, sailed July 14 on the *Minnewaska*, for a three months' tour of Europe to visit British and Continental steel plants. His permanent address will be in care of the American Express Co., London.

WALTER H. WIEWEL, for the past three years New York district sales manager for the Standard Seamless Tube Co., Pittsburgh, has been appointed New York district manager of steel sales for the Timken Roller Bearing Co., Canton, Ohio, with headquarters at 16 West Sixtieth Street. His previous experience in the steel business includes four years in the Cleveland office of the Cambria Steel Co., Johnstown, Pa., and 11 years with the United Alloy Steel Corporation, Canton.

J. E. HALL, associated for 16 years with Hill, Clark & Co., Boston machinery dealers, and with their successors, Stedfast, Roulston & Co., has joined the machine tool sales department of the Triplex Machine Tool Co., 50 Church Street, New York.

J. R. LOVEJOY, George F. Morrison and B. G. Tremaine, directors and prominent in the management of the General Electric Co., Schenectady, N. Y., were elected honorary vice-presidents of the company, a newly created position, at a recent meeting of the board. Mr. Lovejoy has been associated with the company for 42 years, a vice-president since 1907 and most recently has served as president of the General Electric Employees Securities Corporation. Mr. Morrison, a vice-president since 1916, has been identified with the company for 45 years and has been particularly active in the development, manufacture and sale of incandescent lamps. Mr. Tremaine was one of the organizers of the National Lamp Division of the company and has long been associated with its incandescent lamp business. T. W. Frech, manager of the incandescent lamp department, has been appointed vice-president in charge of the incandescent lamp department. He has been identified with the company since 1901 and manager of the lamp department since 1927. Dr. Willis R. Whitney, who has been director of the General Electric research laboratory since 1900, has also been made a vice-president and will continue as director of research.

SAMUEL C. REBMAN has been appointed district sales manager in the anthracite district of Pennsylvania for the Sweet's Steel Co., Williamsport, Pa., and will have headquarters at 508 Miners Bank Building, Wilkes-Barre. He began his career in 1890 in the employ of the Mahoning Rolling

Mill, Youngstown, and in 1904 became manager of sales of the Danville Structural Tubing Co., Danville, Pa. When the company was purchased by Charles M. Schwab in 1915, Mr. Rebman became vice-president and treasurer, continuing in that position until 1926. For the last two years he has been district sales manager for Steel & Tubes, Inc., New York.

DONALD M. MACDONALD, formerly associated with the engineering department of Stone & Webster, Inc., Boston, has been placed in charge of an office which has been opened at 101 Tremont Street, Boston, by the Pittsburgh Testing Laboratory, Pittsburgh.

GRANT B. SHIPLEY, chairman and president of the American Mond Nickel Co., Century Building, Pittsburgh, United States branch of the Mond Nickel Co., Ltd., London, England, has been elected a director in the parent company.

R. W. HOYT, formerly of Alfred Gardner & Co., Chicago, has joined the sales organization of the Foote Brothers Gear & Machine Co., Chicago, and will cover the territory on the south side of Chicago extending from Roosevelt Road to Sixty-third Street.

W. C. GOODWIN, formerly section engineer of the control engineering department, has been appointed manager of the renewal parts engineering department of the Westinghouse Electric & Mfg. Co. In August, 1926, Mr. Goodwin went to England as liaison engineer for the Westinghouse company with European companies with which the Westinghouse company has relations. He represented the Westinghouse engineering department in Europe for almost two years, spending time in England, France, Italy, Norway, Germany and Czechoslovakia. Mr. Goodwin is a member of the American Institute of Electrical Engineers, a former secretary of the Pittsburgh section of that organization, and is also a member of the Engineering Society of Western Pennsylvania.

E. H. GERBERDING has been made assistant treasurer of the Westinghouse Electric & Mfg. Co., East Pittsburgh. He began work in the company's treasury department 28 years ago, and has been continuously employed in the same department since that time.

DR. EDWARD DEAN ADAMS, consulting engineer, New York, who was chairman of the committee on war memorials to American Engineers and represented the Engineering Foundation at the dedication of the library

and engineers' memorial carillon and clock at Louvain, Belgium, July 4, received an honorary doctorate from the University of Louvain and was made commander of the Order of the Crown by the Belgian Government.

BLAKE R. VANLEER, assistant professor of mechanical engineering at the University of California, Berkeley, has been appointed assistant secretary of the American Engineering Council, succeeding A. C. Oliphant, who has resigned.

LOUIS SCHLESINGER, president Bradley Wash-Fountain Co., 2203 Michigan Street, Milwaukee, manufacturer of sanitary equipment for industrial and institutional purposes, has disposed of his interest in that company to H. A. Mullett and associates and is retiring. Mr. Mullett has been elected president; G. W. Grossenbach, vice-president; E. S. Wetherell, secretary, and R. H. Weins, treasurer.

PAUL M. TYLER, identified with the Metals Section of the United States Tariff Commission, has resigned and has become associated with the economics branch of the Bureau of Mines, Department of Commerce.

LEYS A. FRANCE, Cleveland, has been appointed assistant trade commissioner at Montreal.

DR. R. H. PATCH, assistant to the president of E. F. Houghton & Co., Philadelphia, was elected chairman of the Philadelphia chapter of the American Society for Steel Treating at the annual meeting held recently at the plant of the Edward G. Budd Mfg. Co. H. E. Allen, metallurgist Henry Disston & Sons Co., Inc., was named vice-chairman, and Arthur W. F. Green, sales metallurgist John Illingworth Steel Co., secretary-treasurer. The following executive committee was chosen: Norman C. Einwechter, president Einwechter & Wyeth, for two years; Dr. H. C. Boynton, metallurgist John A. Roebbing's Sons Co., Trenton, N. J., for two years; C. C. Willitts, district sales manager Central Alloy Steel Corporation, for one year; M. M. Kennedy, metallurgist Philadelphia Navy Yard, for one year, and J. R. Adams, superintendent of research and special problems for Midvale Co., for two years.

SILAS M. HAIGHT, recently engineer for the Highway Products & Mfg. Co., Elmira, N. Y., has been appointed manager of the research department of the Sweet's Steel Co., Williamsport, Pa. He was graduated in civil engineering from Lafayette College, Easton, Pa., in 1908 and has been engaged in varied engineering practice.

JOHN D. TINSMAN, formerly superintendent of maintenance at Steubenville, Ohio, for the Wheeling Steel Corporation, has been appointed to a

similar position for the Republic Iron & Steel Co., serving in the Youngstown district, excluding the Trumbull works.

J. W. CLIFF, for the last five years shop superintendent of the Merco Nordstrom Valve Co., San Francisco, has been appointed production manager of the MacGregor Valve Co., St. Louis. His past engineering experience includes service with the Power Accounting Co., the Hyatt Roller Bearing Co., the Wright-Martin Aircraft Co. and the Weston Electrical Instrument Co.

DOUGLAS E. PRICE, recently in the contracting department of the Koppers Construction Co., Pittsburgh, has been appointed contract manager for the American Tar Products Co.

JOHN F. WILSON, auditor at the South works, Illinois Steel Co., retired from active duty on July 1, after 55 years of continuous service. He started to work for the Joliet Iron & Steel Co., March 15, 1873, remaining with this company and its successor, which was finally taken over by the Illinois Steel Co. He went to the South works as local auditor in 1900 and was one of two employees at the South works who were awarded the Gary medal for 50 years or more of service. H. S. Sylvester succeeds Mr. Wilson.

J. FRED MOWAT has been appointed chief engineer of the Illinois Steel Co.'s Joliet plant. He was graduated from Cornell University in 1904 and shortly after going with the Illinois company he was made steam engineer. In 1914 he was made master mechanic of the blast furnaces and in 1918 appointed assistant chief engineer.

P. C. SPRAGUE, for ten years traffic manager of the M. A. Hanna Co., Cleveland, has been appointed sales manager of the bituminous coal department of that company.

R. E. J. SUMMERS, chief contracting engineer of the H. K. Ferguson Co., Cleveland, engineer and builder, has been made a vice-president of that company in charge of contract work.

Orders received by the General Electric Co. for the three months ended June 30 amounted to \$90,431,957, compared with \$78,105,247 for the corresponding quarter of 1927, an increase of 16 per cent. President Gerard Swope has announced. For the six months ended June 30, orders received amounted to \$170,357,797, compared with \$155,655,828 last year, an increase of 9 per cent.

Sheffield Steel Corporation has given an order to Westinghouse Electric & Mfg. Co. for electrical equipment for a steel mill to be built in Kansas City with monthly capacity of 10,000 tons.

British Trade Is Unsatisfactory

Some Lighter Lines Doing Fairly Well, but Heavier Steel Products and Pig Iron Are in Slow Demand

LONDON, ENGLAND, July 6.—The position of the iron and steel trade generally continues very unsatisfactory. This is particularly true of the pig iron industry and of the heavy steel branches, there being a fair amount of activity in a number of the lighter lines.

In pig iron, the chief weakness lies in large stocks and poor demand, and although the production in various parts of the country has been subjected to drastic curtailment, Cleveland producers of pig iron are perhaps better off than those in other districts, as their stocks are small; they are busy on current contracts and their selling prices are governed by their own "ring," but they, too, are beginning to feel the necessity of looking for new business to replace the old. The whole iron and steel market is under the influence of holidays. Last week Tyne-side was on vacation. Next week the Glasgow Fair begins, to be followed later by the Black Country wakes and Stockton race week, so that August will be over before there can be any return to normal conditions.

In the steel trade, the heavy industries are in the worst plight. A few more ships are coming on the stocks, but the tonnage of steel therefrom is but a drop in the ocean. Steel makers have made repeated efforts to obtain government assistance, but without

success, and the trade must be left to work out its own salvation. Drastic reduction in costs and revisions in methods of disposal, etc., are needed; that is why there has been so much talk of a central selling agency, but the most favorably placed works, both economically and geographically, are not disposed to assist their less fortunate competitors, so that for the time being there is little prospect of such a plan being consummated.

Export buying of heavy materials is at low ebb. The closing of the Tata Iron & Steel Co.'s works in India, because of labor disturbances, has released a few orders for this country, and Japan is trying to place some contracts here, while locomotive builders have some useful South African contracts to execute; but apart from these the demand for export is exceptionally meager. In the home branches, engineering and construction departments keep some plants busy.

Trading in tin plate has continued good, although the confidence of consumers has been shaken by the fall in tin prices during the last month or two, but makers are very busy and the operations at the mills are running at well over 90 per cent, and some plants are assured of full capacity working for a number of weeks or months.

Orders for Fabricated Structural Steel Fall Off

WASHINGTON, July 17.—Tonnage of new orders reported by the principal manufacturers of fabricated structural steel for June are given by the Department of Commerce as 233,775 tons, representing 81 per cent of capacity. This is the total from 196 firms whose capacity is given at 289,430 tons. It compares with orders in May aggregating 251,488 tons, or 83 per cent of the 304,950 tons capacity of the 223 firms then reporting.

Computed tonnage in June is given as 303,750 tons, a reduction of about 2½ per cent from the 311,250 tons for May. Except for May and for July, 1927, however, this computed tonnage is the largest for several years. In July, last year, it was 345,000 tons, while in June it was 228,750 tons.

Shipments of the 229 identical firms carried in the computed tonnage lists were given as 270,000 tons in June, representing 72 per cent of capacity. This is the largest total since last September, when the same figure was reported. In August, last year, the total was 285,000 tons. That is the only case exceeding last month's total in several years.

For the half year, computed tonnage of new orders is given as 1,586,250, against 1,395,000 a year ago. This represents an increase of about 14 per cent. Similarly, shipments in the six months are computed at 1,455,500 tons this year against 1,342,500 tons last year, representing a gain of about 8½ per cent.

Standard Sample of Fluorspar

The Bureau of Standards at Washington has prepared a standard analyzed sample of fluorspar, which contains 94.9 per cent calcium fluoride, 1.9 per cent silica, 1.0 per cent carbon dioxide, 0.14 per cent sulphur, 0.34 per cent zinc and 0.25 per cent lead.

The price of this sample, which is No. 79 in the series, is \$2.50 for 60 grams. The sample may be paid for in advance with the order or be sent parcel post C.O.D. in the United States and its possessions. A complete list of standard samples and analyses is given in Bureau of Standards supplement to circular No. 25, which can be obtained upon application to the bureau.

OBITUARY

RUFUS C. PHILLIPS, secretary American Rolling Mill Co., Middletown, Ohio, and a brother-in-law of George M. Verity, president of that company, died in a hospital at that city on July 11, aged 63 years. He was born at Georgetown, Ohio, and early in life became acquainted with Mr. Verity, joining him in 1891 in the



RUFUS C. PHILLIPS

organization of a steel company in Cincinnati which developed into the present Rolling Mill Co. At that time he was placed in charge of the sales department, continuing in that work until illness forced him to withdraw from active interest. He was prominent in civic, educational and religious affairs at Middletown, having been the founder of the Y. M. C. A. in that city.

CHARLES A. CHEVRAUX, secretary and general manager of the Massillon Rivet & Mfg. Co., Massillon, Ohio, successor to the Canton Bolt Co., died on July 6, as a result of injuries sustained a few days before while inspecting machinery at the company's plant. He was born at Canton, Ohio, 51 years ago and was secretary of the Cleveland-Canton Spring Co. for 24 years. He then went to Richmond, Ind., as production manager of the Jenkins Vulcan Spring Co., but returned to Ohio as secretary of the Beans Spring Co., Massillon.

MAJ. JOSEPH A. STEINMETZ, founder and senior member of Janney, Steinmetz & Co., Philadelphia, died at his home in that city on July 11, aged 58 years. He attended Lehigh University, Bethlehem, Pa., and soon afterward became associated with Professor Langley in the development of airplane engines. Since that time he had been constantly active in

aviation work, particularly during the World War, when he was the inventor of many anti-aircraft devices. Mr. Steinmetz had been active in Janney, Steinmetz & Co. until his partial retirement six months ago on account of ill health. He was a member of the American Society of Automotive Engineers, the Franklin Institute, the American Electrochemical Society and the Engineers Club of Philadelphia.

ALEXANDER R. PEACOCK, one of the partners of Andrew Carnegie in the Carnegie Steel Co., Ltd., and, prior to the formation of the United States Steel Corporation, first vice-president and general sales manager of the Carnegie company, died on July 12 at St. Vincent's Hospital, New York, aged 66 years. Mr. Peacock and Mr. Carnegie were born in the same town, Dunfermline, Scotland, and the former began his career in the United States in the linen department of a Pittsburgh department store, where his work came to Mr. Carnegie's attention. He entered the credit department of the Homestead works of the Carnegie company but later was transferred to the sales department, subsequently becoming general sales agent. At the time of the changes in the management of the Carnegie Steel Co., Ltd., attending the election of Charles M. Schwab as president, April 1, 1897, Mr. Peacock was made first vice-president and placed in general charge of the selling department. He continued in this position after the reorganization of the company at the time of the Frick-Carnegie suit in 1899. At that time the official records showed that he was the holder of 2653 shares of stock and of \$2,707,000 in bonds of the new company. He retired from active participation in the steel industry at the formation of the Steel Corporation and had resided in recent years at the Hotel Broztell in New York.

FREDERICK WINTERS GRIFFITH, one of the founders and president, treasurer and a director of the Garlock Packing Co., Palmyra, N. Y., died July 11, at his home in Pasadena, Cal. He was born at Phelps, N. Y., in 1858, and was graduated from Hamilton College. His entire business career had been spent in the mechanical packing industry.

MICHAEL J. GOOLEY, senior member of Gooley & Edlund, Inc., Cortland, N. Y., manufacturer of jigs, fixtures and other machine shop products, was killed in an automobile accident near his home in Syracuse, N. Y., on July 14. He was 63 years of age and had been prominent in manufacturing circles of Syracuse and Cortland.

FRANK H. HAYES, president Hayes Pump & Machinery Co., Cambridge, Mass., died July 14 at the Cambridge Hospital. He was 79 years old and had been in the pump and machinery business 45 years, first with the Dean Steam Pump Co. He organized his own company in 1900.

THOMAS F. FLINN, engineer, for 37 years identified with Henry R. Worthington, now the Worthington Pump & Machinery Corporation, died July 9 at his home in Brooklyn, aged 87 years. He was born in Ireland and



THOMAS F. FLINN

came to this country just prior to the outbreak of the Civil War, in which he served, rising to the rank of lieutenant in the Union Army. In later years he had been interested in the development of motor cars, his experiments having resulted in the invention of a steam engine for automobile use. At the outbreak of the World War he offered his services to the Government and did experimental work in the development of aviation motors. He was a life member in the American Society of Mechanical Engineers.

EMIL EISELT, works manager for the Standard Steel Car Co., Hammond, Ind., died July 12 of pneumonia, aged 47 years.

JUSTIN D. CROSBY, head of the J. D. Crosby Co., Pawtucket, R. I., maker of cold rolled steel, died July 11 at the Memorial Hospital in that city, of pneumonia. He was born at Worcester, Mass., 66 years ago, where he was employed by the Washburn Woven Wire Co. and the American Steel & Wire Co. He established his Pawtucket business in 1910.

WILLIAM PESTELL, vice-president of the Riley Stoker Corporation, Worcester, Mass., died on July 10. He was born at Rutland, England, 56 years ago. He became a member of the Riley organization in 1914 and in recent years was manager of sales.

Machinery Markets and News of the Works

Slight Falling Off in Orders

Sizable Sales Include 11 Tools for Commonwealth Edison Co.—List of Tools for Hammond, Ind., Power Plant Expected

DEMAND for machine tools was slightly less during the past seven days than the average over the five or six preceding weeks. However, allowing for the season, the volume of orders is good, and is considerably higher than in the corresponding period last year. In the Cincinnati district operations are being well sustained, although the capacity of some machine tool plants is much more fully engaged than that of others. Fresh inquiry from scattered sources is of fair total.

The General Electric Co. and the Wright Aeronautical Corporation continue in the market and orders are still being received from agricultural implement makers. Except for the placing of an order for eight production lathes, demand from the Detroit territory has been quiet. Fresh inquiries from railroads in the Chicago district show more promise than for some time.

A list of tools is being prepared by the State Line Generating Co., Hammond, Ind., for a new power plant. Boston will close bids July 19 on six machine tools for the Hyde Park district school and it is expected that at least part of the first list for the same school will be closed within a week. Four large machines, including a $\frac{5}{8}$ x 102-in. gate shear, are to be ordered by A. M. Castle & Co., Chicago, for their San Francisco warehouse.

Sizable sales include 11 machine tools for the Fisk Street station of the Commonwealth Edison Co., Chicago. The Bethlehem Steel Co. purchased two large turret lathes and may buy a few other tools. A dealer in the Chicago district received orders for 11 power presses of small and medium size during the past week.

New York

NEW YORK, July 17.—Machine tool business in the first half of July ran considerably ahead of that in the corresponding period last year, but was slightly less than last month's average sales. Those who have participated in orders being distributed by the General Electric Co. and the Wright Aeronautical Corporation—and these orders are coming in every day—have fared somewhat better than is usually to be expected at this season of the year. Inquiries are in fairly good number, and machine tool sellers have plenty of prospects upon which to work, but vacation absences of executives of manufacturing companies tend in some cases to delay purchases. The Bethlehem Steel Co. recently purchased two large turret lathes and may buy a few other tools.

Sales by Niles-Bement-Pond Co. in the week included a 72-in. duplex-controlled horizontal boring machine, 27-in. Time-Saver lathe, 20-in. Niles-Acme shaper and a number of other tools. Pratt & Whitney

division sold four 5-in. production hand milling machines, three No. 2 jig borers, three 14-in. vertical surface grinders and two Sigourney drilling machines.

Bids will be asked within 60 days by Western Electric Co., 195 Broadway, New York, for a new five-story plant at Emeryville, Cal., to cost close to \$500,000 with machinery. Engineering department of company is in charge. Pacific Coast offices are at 680 Folsom Street, San Francisco.

George A. Bagge & Sons, 157 East Forty-fourth Street, New York, architects, have asked bids on general contract for a two-story automobile service, repair and garage building to cost \$150,000 with equipment.

American Radiator Co., 40 West Fortieth Street, New York, has purchased property at Radburn, a new industrial site near Paterson, N. J., and plans construction of factory branch and distributing plant to cost close to \$100,000 with equipment.

Consolidated Copper Mines Corporation, 120 Broadway, New York, has approved plans for additional buildings at

properties in Middle West, including one-story machine shop, steel head frame, hoist house, as well as steel storage bins with capacity of 5000 tons, and other expansion, to cost more than \$90,000. J. B. Haffner is general manager.

Ovens, power equipment, conveying and other machinery and apparatus will be installed in two-story plant to be erected by Dugan Brothers, Inc., 288 South Fifth Street, Brooklyn, at Queensville, N. Y., to cost upward of \$350,000 with equipment. Henry Holder, 242 Franklin Avenue, is architect.

Beacon Oil Co., Inc., 320 Freeman Street, Brooklyn, has plans for new oil storage and distributing plant to cost close to \$150,000, for which bids will be asked on general contract in about a month. Headquarters are at Everett, Mass. B. F. Fallon, 26 Auckland Street, Boston, is architect.

Shampan & Shampan, 188 Montague Street, Brooklyn, architects, have taken out a permit for a two-story automobile service, repair and garage building, 100 x 278 ft., to cost close to \$180,000 with equipment.

Yale Electric Corporation, 60 Tillary Street, Brooklyn, manufacturer of flashlights, flashlight batteries and kindred products, has completed erection of new plant at Jersey City, six-stories, totaling 40,000 sq. ft. floor space, and will concentrate production at this point in the future, discontinuing operations at Brooklyn works, which is being removed to the new location.

American Can Co., 120 Broadway, New York, is said to have plans for a new seven-story plant unit, 100 x 200 ft., at Jersey City, N. J., to cost close to \$300,000 with equipment. A. B. Heiser is company architect.

Charles Freshman Co., 240 West Fortieth Street, New York, manufacturer of radio equipment, has disposed of additional stock, totaling about \$1,000,000, and will use a portion of fund in developing increased output for all-electric radio equipment and sets. Factory is at 470 East 133rd Street.

Board of Trustees, Pratt Institute, 257 Ryerson Street, Brooklyn, has awarded general contract to Edward Corning Co., 145 East Forty-fifth Street, New York, for a four-story mechanical and technology building, 60 x 180 ft., to cost about \$200,000 with equipment. John M. Howells, 156 East Forty-sixth Street, New York, is architect.

Rainbow Light, Inc., Thirteenth Street, Long Island City, operating subsidiary of Rainbow Luminous Products, Inc., same address, manufacturer of electric tube lighting equipment and devices, is planning an expansion program at branch

The Crane Market

LITTLE new business has been placed, but the trade is still actively interested in pending business, both domestic and export. Considerable crane equipment is expected to be needed for a power plant at Deepwater, N. J., on which Stevens & Wood, Inc., New York, is engineer. McClellan & Junkersfeld, New York, are asking for bids on a 100-ton electric overhead crane for a power plant in California and early action is expected on a 60-ton overhead crane for a power house of the Phoenix Utility Co., New York. The Pennsylvania Railroad is in the market for four 10-ton electric overhead cranes, two for Kearny, N. J., and two for Philadelphia.

In the Chicago district Sargent & Lundy, consulting engineers, Chicago, will purchase a 20-ton power house crane for delivery at San Benita, Tex. A. M. Castle & Co., Chicago, are also in

the market for two electric traveling cranes for their San Francisco plant, one of 5 and one of 10 tons' capacity.

Among recent purchases are:

W. R. Grace & Co., New York, one 5 and one 15-ton hand power crane with 28 ft. 8 in. span, for export to Peru, from Box Crane & Hoist Corporation.

Dollar Bay Steel Co., Dollar Bay, Mich., 22-ton, 8-wheel steam operated locomotive crane, from Orton Crane & Shovel Co.

Link-Belt Co., Chicago, 5-ton, 3-motor electric crane, from Manning, Maxwell & Moore, Inc.

Missouri Pacific Railroad, 20-ton gantry crane for use at Wichita, Kan., from Whiting Corporation.

plant at Detroit, with installation of additional facilities for production of luminous tubes and kindred specialties.

John Waldron Co., 30 East Forty-second Street, New York, manufacturer of paper mill machinery, has awarded general contract to H. K. Ferguson Co., Cleveland, for one-story addition to plant at Highland Park, N. J., to cost about \$45,000 with equipment.

Board of Education, Roselle Park, N. J., is considering installation of manual training equipment in three-story and basement high school to cost \$480,000, for which bids are being asked on general contract. Fred A. Elsasser, Fall Building, Union, N. J., is architect. J. W. Graves is clerk.

Wickham Co., Church Street, Matawan, N. J., manufacturer of piano plates and other castings, is arranging for immediate removal of local plant to its branch works at Springfield, Ohio, where production will be concentrated. Matawan plant will be sold.

Board of City Commissioners, City Hall, Newark, will soon begin work on a new hangar, 120 x 120 ft., with repair and reconditioning shop, at municipal airport, Port Newark, to cost close to \$70,000 with equipment. City engineering department is in charge.

United Color & Pigment Co., Evergreen Avenue, Newark, will soon begin superstructure for a one-story and basement addition, 70 x 121 ft., for which general contract recently was let to Enstice Brothers, 111 Academy Street, to cost about \$40,000 with equipment.

Howard Buschman, Newark, has leased property at 49-51 East Bigelow Street, for a machine shop.

City Commission, Asbury Park, N. J., has authorized plans for a municipal incineration plant, cost not to exceed \$155,000, and will take bids soon.

Ensign-Reynolds, Inc., 408 East 111th Street, New York, has been formed to manufacture high pressure gas burners for industrial applications, inspirators, gas boosters and air blowers. Company has shop equipped and does not contemplate additional building or letting of manufacturing contracts.

W. L. Clayton, Inc., 901 Bergen Avenue, Jersey City, has been organized to manufacture heating specialties. Products are being manufactured by contract, but company will let additional contracts in near future.

Carrier Engineering Corporation, 750 Frelinghuysen Avenue, Newark, N. J., manufacturer of air conditioning, drying, processing and refrigerating equipment,

has purchased four-story factory and office building a 850 Frelinghuysen Avenue, formerly occupied by Edison Lamp Works Division, General Electric Co. Company will remove to new quarters before Aug. 1.

Allen Air Appliance Co., Inc., 452 Lexington Avenue, New York, has been organized to manufacture single and multi-stage centrifugal blowers and exhausters and portable and stationary vacuum sweeping systems of heavy-duty type. Company has taken over plant, including foundry, pattern and machine shop, formerly occupied by Northern New York Foundry & Machine Co., Glens Falls, N.Y. F. C. Allen, Jr., founder and former president of Allen & Billmyre Co., Inc., New York, is president.

Philadelphia

PHILADELPHIA, July 16.—Philadelphia Garage Co., Carlisle and Cherry Streets, Philadelphia, has acquired six-story building, 50 x 180 ft., on North Broad Street, formerly occupied by Cadillac Motor Car Co., and will remodel for a new service, repair and garage unit, to be operated in conjunction with present garage, which is directly in rear of acquired property. Work will cost upward of \$75,000.

Swain-Hickman Co., 3519 Lancaster Avenue, Philadelphia, manufacturer of automobile parts, has asked bids on general contract for an addition to cost more than \$23,000 with equipment.

William Steele & Sons Co., 219 North Broad Street, Philadelphia, engineer and contractor, has plans for a five-story automobile service, repair and garage building, 90 x 155 ft., with capacity of about 500 cars, to cost \$160,000.

Sun Oil Co., Finance Building, Philadelphia, is said to be planning early rebuilding of portion of storage and distributing plant at Syracuse, N. Y., recently destroyed by fire, with loss close to \$100,000 including equipment.

Victor Talking Machine Co., Camden, N. J., has acquired property at Hollywood, Cal., as site for new Pacific Coast plant for development and manufacture of talking machine apparatus in connection with motion pictures. A record-pressing unit will also be built. Entire project will cost about \$250,000 with equipment. E. R. Fenimore Johnson is executive vice-president.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, is considering construction of a new oil refinery on Neches River at Atreco, Tex., where a loading

station is now being operated, to cost more than \$12,000,000. Project will be carried out in conjunction with new 10-in. pipe line to be built by Atlantic Pipe Line Co., a subsidiary, from Midland, Tex., to Atreco, about 500 miles, for which surveys will be made at once. It will be provided with 12 booster stations and have capacity of about 30,000 bbl. of crude oil per day.

George D. Ellis & Sons, Inc., 309 North Third Street, Philadelphia, manufacturer of tin cans and metal containers, has acquired three and four-story building, 69 x 97 ft., at 220-24 Wood Street, for expansion.

Marwick Non-Skid Chain Mfg. Co., Falls, Pa., recently formed by Fred Marwick and James Bailey, both of Falls, plans early operation of local plant for manufacture of tire chains.

Hajoca Corporation, 1136 Ridge Avenue, Philadelphia, manufacturer of plumbing equipment and supplies, has acquired former foundry of Hazleton Iron Works, Hazleton, Pa., and will use site for new factory branch and distributing plant. Existing building will be razed and two-story structure, 50 x 190 ft., erected.

Sandusky Cement Co., Engineers' Building, Cleveland, has purchased tract of 50 acres in Hellam Township, vicinity of Hellam, Pa., adjoining tract acquired several months ago, and is reported considering a branch mill and distributing plant in this section.

Wilmington Gas Co., Wilmington, Del., has plans for a new equipment storage and distributing plant, 102 x 182 ft., to include shops for repair of meters, gas appliances, etc., and machine and repair shop for motor trucks. Cost is estimated at close to \$80,000 with equipment.

Board of Education, Tyrone, Pa., plans installation of manual training equipment in new two-story junior and senior high school to cost \$160,000, for which bids will soon be asked on general contract. Lawrie, Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Ornamental Iron Works, Mount Carmel, Pa., recently organized by R. J. Best and L. W. Brandlinger, both of Mount Carmel, has awarded general contract to Truscon Co., Youngstown, for a one-story plant to cost close to \$27,000 with equipment.

Horace T. Potts & Co., Philadelphia, have been appointed sales agents in eastern Pennsylvania, southern New Jersey and Delaware for patent non-splitting nail manufactured by Stronach Nail Co., Pittsburgh.

New England

BOSTON, July 16.—The city of Boston will close bids July 19 on an automatic screw machine, three milling machines, a shaper and a surface grinder. This completes the equipment wanted for the Hyde Park district school. It is expected that at least a part of the first-list on which bids were submitted will be closed within a week. Aside from this business the local machine tool market is inactive. There is also a noticeable lack of new inquiries. Dealers have a large number of what are considered active prospects, but there is little indication of their closing within the immediate future. Small tools continue in good demand with deferred deliveries on certain makes.

Griffin Wheel Co., 40 Gerrish Avenue, Chelsea, Mass., is making plans for new crane runways.

Androscoggin Foundry, 37 Washington Street, Auburn, Me., is building an addition. L. MacFadden is superintendent. Plans are private.

Funk & Wilcox, 26 Pemberton Square, Boston, architects, have completed plans for a one-story, 100 x 150 ft. ice-making plant for Ice Utilities, Inc., Lowell Street, Fall River, Mass.

C. T. Ashley, mayor, New Bedford, Mass., has awarded a general contract for a city vocational school to contain a machine shop. C. Hammond & Co., 179 North Water Street, New Bedford, are architects.

Plans are nearing completion for a two-story addition, 33 x 40 ft., for Beaudette Mfg. Co., Crescent Avenue, Chelsea, Mass., maker of loud speakers and other radio equipment.

Robertson Motor Co., School Street, Taunton, Mass., is considering a new one-story service, repair and garage building at Hyannis, Mass., to cost upward of \$75,000 with equipment.

LeBoeuf Fountain Pen Co., Inc., Springfield, Mass., has leased space in building at 4 Birnie Avenue, formerly occupied by Perkins Machine & Gear Co., totaling 5700 sq. ft., for new plant for production of desk sets, fountain pens and kindred products. Present works at 33 and 49 Arch Street will be removed to new location early in August.

Board of Education, 169 Church Street, New Haven, Conn., has authorized installation of metal-working, and other vocational shops in three-story addition to be erected at Fair Haven junior high school, for which bids are being asked on general contract until July 26. Brown & VonBeren, New Haven, are architects.

Automotive Standards, Inc., Newark, N. J., which recently established local plant for manufacture of automobile equipment on waterfront site and with main offices at 60 Park Place, Newark, has purchased Hartford Battery Mfg. Co., Hartford, Conn., and will operate as a unit of its business.

Winsted Insulated Wire Co., Winsted, Conn., will install considerable additional machinery for increased output.

Compressed Steel Shafting Co., 1587 Hyde Park Avenue, Hyde Park, Boston, has awarded general contract to Topham & Bates, 1209 Hyde Park Avenue, for a one-story addition, to cost more than \$30,000 with equipment.

City Water Department, Springfield, Mass., E. Lochridge, chief engineer, is completing plans for new power house on site of reservoir, Little River, with capacity of 23,000 kw., to cost about \$1,000,-

000. Station will be leased to Turners Falls Power & Electric Co., Turners Falls, Mass., which will build a transmission line for connection with its system.

Horton Mfg. Co., Bristol, Conn., manufacturer steel fishing rods and other fishing tackle, has awarded general contract to Torrington Building Co., Torrington, Conn., for an addition.

Plant and equipment of Stanford Steel Corporation, Buckingham Avenue, Milford, Conn., will be sold at public auction July 23. Property consists of one-story brick and steel manufacturing building containing 12,000 sq. ft. of floor space and other frame buildings with miscellaneous equipment. James B. Kelly Co., 42 Church Street, New Haven, Conn., is auctioneer.

Cincinnati

CINCINNATI, July 16.—Machine tool orders have fallen off slightly the past week, although the volume for the first half of July mounted to a surprisingly satisfactory level. Despite the summer season, operations in local shops are being well sustained and business on hand is sufficient to insure the continuation of production on the current scale for several weeks. The situation is somewhat spotty, however, some plants getting a proportionately large share of the business and others badly in need of orders, but the general average is good for this time of year.

An automobile company has bought eight high production lathes, but aside from this single transaction, purchases in the Detroit district have been meager. Local builders have continued to receive orders from agricultural implement makers. A sale of two engine lathes to a company in Russia is noted. The Southern Pacific has contracted for a 4000-lb. double frame steam hammer and the Manistee Iron Works, Manistee, Mich., has bought a 72-in. duplex control borer.

Board of Education, Oxford, Ohio is considering installation of manual training equipment in new junior and senior high school to cost about \$165,000, for which plans will be drawn by Ronen & Ingleson, 1614 North High Street, Columbus, Ohio, architects.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until July 23 for ammeters, voltmeters, etc., circular 35.

A substantial interest in Cincinnati Bell Crank Co., North Oakley, Cincinnati, manufacturer of automobile parts and equipment, has been acquired by Ludwig Kemper, 2996 Brighton Road, Cleveland, connected with local steel companies, and associates. Plans are under way for reorganization of company with expansion program.

Board of Putnam County Commissioners, Cookeville, Tenn., is planning extensions and improvements in hydroelectric power plant at Burgess Falls, to cost \$100,000 with equipment. Special election has been called Aug. 4 to approve bonds.

Four Hundred Seventy-Six Tire Co., 114 North St. Clair Street, Dayton, Ohio, is having plans drawn for a two-story service and repair works, 50 x 100 ft., to cost close to \$65,000 with equipment.

Radnor Water Co., Inc., Nashville, Tenn., plans installation of pumping machinery and other power equipment in waterworks station for service in Rad-

nor Heights and Flat Rock sections, to cost about \$200,000.

Portsmouth Auto Parts & Wrecking Co., 1121 Findlay Street, Portsmouth, Ohio, has plans for new one-story factory, 35 x 80 ft., to cost close to \$37,000 with equipment. Bids will soon be asked on general contract.

Stoll Oil Refining Co., Louisville, is planning an addition to oil storage and distributing plant at Elizabethtown, Ky., to cost more than \$45,000 with equipment. W. A. Stoll is treasurer.

Board of Education, Bowling Green, Ky., is considering installation of manual training equipment in a new junior high school to cost more than \$200,000, for which plans will be drawn by Marr & Holman, Nashville, Tenn., architects.

Board of Education, Newark, Ohio, will take bids at once on general contract for new two-story Roosevelt junior high school, to cost about \$225,000 with manual training facilities. Vernon Reading and Associates, Walpark Building, Mansfield, Ohio, are architects.

Chicago Pneumatic Tool Co., New York, announces appointment of W. S. Lynch, formerly district manager at Seattle, as district manager of Cincinnati office. Mr. Lynch succeeds T. G. Smallwood, who has been granted an indefinite leave of absence because of ill health.

St. Louis

ST. LOUIS, July 16.—Plans are being arranged by St. Louis Public Service Co., Park Avenue and Thirty-ninth Street, St. Louis, for remodeling portion of car barn for a general repair shop, with wash house unit, to cost about \$75,000.

Market Development Corporation, International Life Building, St. Louis, is planning new cold storage and refrigerating plant, to cost in excess of \$100,000 with equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Universal Cutter Co., 4567 Scott Avenue, St. Louis, has taken bids on general contract for new two-story and basement plant, 55 x 115 ft., L-shape, to cost approximately \$60,000 with equipment. Alfred H. Norris, 11 Dartford Place, Clayton, Mo., is architect.

L. J. Kent Boiler & Sheet Iron Works, 700 East Brower Street, Springfield, Mo., will soon begin work on new one-story plant, to cost about \$30,000 with equipment.

Tonkawa Petroleum Co., Tonkawa, Okla., and Globe Refining Co., Blackwell, Okla., lessee, are said to be planning to rebuild portion of oil refinery at Tonkawa, destroyed by fire July 4, with loss in excess of \$85,000 including equipment.

Meeker Advertising Co., Third and Michigan Streets, Joplin, Mo., manufacturer of advertising novelties, signs, etc., is said to be arranging early call for bids for new two-story plant, to cost close to \$100,000 with equipment. Smith & Van Pelt, National Bank Building, Joplin, are architects. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are engineers.

City Council, Kansas City, Mo., is planning establishment of municipal airport, with hangars, repair and reconditioning shops, oil storage and distributing buildings, etc., to cost about \$1,000,000 with land. City has called special election Aug. 7 to approve bond issue in amount noted. At same time a bond issue of \$3,000,000 will be voted upon, fund to be used for expansion and betterments.

Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, Okla., architects, have plans for six-story automobile service, repair and garage building, 100 x 100 ft., to cost in excess of \$175,000 including equipment.

Missouri-Kansas Pipe Line Co., Kansas City, Mo., is disposing of bond issue of \$1,500,000, a portion of proceeds to be used for extensions and improvements in pipe lines for natural gas supply, compressor stations, and other operating facilities. Frank P. Parish is president.

Union Pacific Railroad Co., Union Pacific Building, Omaha, Neb., has received low bid from Thomas J. Allen, Scottsbluff, Neb., and will begin work soon, including engine house, one-story machine shop, 27 x 75 ft., oil pumping station, boiler house, 85-ft. turntable, and other units. Entire project is estimated to cost more than \$150,000 with equipment. H. C. Mann is chief engineer.

Weinberg & Weinberg Realty Co., 809 Chestnut Street, St. Louis, is at head of project to build ten-story automobile service, repair and garage building, to cost approximately \$500,000 with equipment.

Cushing Refining & Gasoline Co., Cushing, Okla., is planning construction of two new gasoline refineries in St. Louis-Pearson district, to cost upward of \$100,000 with equipment.

Contract for a 5000-bbl. per pipe still for Okmulgee refinery of Independent Oil & Gas Co. has been awarded to Graver Corporation, East Chicago, Ind.

Paxton Mitchell Co., Omaha, Neb., will build a new foundry, 93 x 160 ft.

City Council, Kirksville, Mo., is considering erection of a municipal electric light plant.

Chicago

CHICAGO, July 16.—Sales of machine tools from miscellaneous sources are holding up well though indications are that July will not be as active as June. Fresh inquiry is coming from scattered sources and the bulk of requests for prices appears to be active. The Commonwealth Edison Co., Chicago, has purchased 11 tools, including one 36-in. lathe for its Fisk Street station. Users of small and medium sized presses are active buyers, one dealer having sold 11 of these machines in the past seven days.

New inquiries from the railroads show more promise than at any time since the closing of the Santa Fe list. The Chicago, Burlington & Quincy will buy an eye bolt machine. The Chicago & North Western is still inquiring for the tools mentioned last week. The Chicago, Rock Island & Pacific will take prices on a hydraulic sectional flanging press, a vertical spindle grinder, a swing frame wood saw and a 6-in. pipe and nipple threading machine. A. M. Castle & Co., Chicago, will buy for its San Francisco warehouse a 5/8-in. x 102-in. gate shear, a high-speed structural material cutting saw, a bulldozer and an angle bar and universal plate shear. A meter manufacturer in Illinois has purchased a 20-in. lathe, and a motor parts manufacturer in Indiana has closed for a 16-in. lathe.

Consolidation of seven manufacturers of dairy machinery and supplies to form Cherry-Burrell Corporation, with assets of approximately \$8,000,000, is indicated in announcement that directors have approved the merger. Companies which will be consolidated are J. G. Cherry Co., Cedar Rapids, Iowa; D. H. Burrell & Co.,

Little Falls, N. Y.; Milwaukee Dairy Supply Mfg. Co., Milwaukee; John W. Ladd Co., Detroit; Cherry-Bassett Co., Baltimore; Wright-Zeigler Co., Boston, and A. H. Barber-Goodhue Co., Chicago.

David Lupton's Sons Co., Philadelphia, manufacturer of steel windows, has purchased 6 1/2-acre tract in Clearing industrial district, Chicago, for erection of a manufacturing plant. Initial building will be 150 x 500 ft. with plans for ultimate expansion to 300 x 1000 ft.

Crown Rheostat & Supply Co., 1908 Maypole Avenue, Chicago, has awarded contract for an addition, 40 x 46 ft.

Tri-City Steel & Supply Co., Rock Island, Ill., has been capitalized at \$40,000 and will distribute steel products from its warehouse at 2123 Third Avenue.

H. Channon Co., Chicago, dealer in mill supplies, has purchased Machinists Supply Co., Chicago.

Bids have been asked on general contract by Anetsberger Brothers, machinists, 2725 Lincoln Avenue, Chicago, for new two-story machine shop, to cost about \$35,000 with equipment. B. J. Bruns, 1851 Irving Park Boulevard, is architect.

Mokrum-Kleinschmidt Corporation, Southport and Wrightwood Avenues, Chicago, manufacturer of automatic telegraphic machinery and parts, has acquired adjoining property for expansion. Plans for new unit will be drawn later.

Board of Education, Virginia, Minn., plans installation of manual training equipment in a new two-story senior high school to cost \$500,000, for which bids are being asked on general contract until July 24. J. A. Coddington, National Bank Building, is architect.

Waterworks Department, City Hall, Minneapolis, Minn., J. A. Jensen, supervisor, has plans for one-story equipment storage and repair plant, with department for repair of water meters, to cost \$38,000 with equipment.

Terminal Grain Corporation, Grain Exchange Building, Sioux City, Iowa, will take bids for an addition to grain elevator to cost approximately \$100,000 with elevating, conveying, screening and other equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Martin Machine Works, 228 Laflin Street, Chicago, has awarded general contract to Chicago Industrial Construction Co., 53 West Jackson Boulevard, for one-story machine shop, 48 x 125 ft., with foundations to provide for second story later, to cost close to \$30,000 with equipment.

Board of Education, Brainerd, Minn., is considering installation of manual training equipment in new three-story senior high school to cost \$425,000, for which plans will soon be completed by Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., architects.

City Council, Chicago, has authorized plans drawn by Department of Public Works for an island airport, near Grant Park, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, pumping station and other units, with complete facilities for night flying. A fund of \$5,000,000 will be arranged for project.

Altorfer Brothers Co., Peoria, Ill., manufacturer of mechanical washing equipment, is said to have plans for a one-story addition, to cost upward of \$40,000 with equipment. H. E. Todd is president.

Kewanee Boiler Corporation, Kewanee, Ill., will soon begin work on one-story unit, 80 x 280 ft., to cost close to \$150,000 with equipment.

Kelly Mfg. Co., Clinton, Iowa, manufacturer of furniture, has awarded general contract to William L. Yokum, 730 Main Street, Dubuque, Iowa, for a new three-story factory, 85 x 150 ft., to cost approximately \$80,000 with equipment. A. H. Morrell, Clinton, is architect.

Tract of 32 acres at East Chicago, Ind., has been purchased by United States Gypsum Co., 300 West Adams Street, Chicago, as site for new plant for production of rock wallboard, gypsum blocks, plasters, etc., to cost more than \$500,000 with machinery.

Detroit

DETROIT, July 16.—Michigan Boiler & Sheet Metal Works, 4120 West Jefferson Avenue, Detroit, is planning a one-story addition, to cost close to \$40,000 with equipment.

Consumers Power Co., Jackson, Mich., is planning new power substation at Saginaw, Mich., with capacity of 12,000 kva., to cost close to \$200,000 with equipment; later, output will be increased to 30,000 kva. at additional cost of approximately \$250,000.

Alloy Steel Spring & Axle Co., Jackson, Mich., has purchased National Plating & Enameling Co., with local plant, and will operate as a unit of its business. Purchasing company has arranged for a stock issue to total \$562,500, a portion of fund to be used for acquisition and for expansion in output.

Typographical error was made in this column last week in referring to Gorham Tool Co., 2206 Twelfth Street, Detroit, as Forham Tool Co. Bids will be asked this month for two-story addition on Woodrow Wilson Avenue, to cost about \$65,000. Lane, Davenport & Peterson, Charlevoix Building, are architects. L. C. Gorham is president.

Autorad Electric Corporation, Adrian, Mich., recently organized to manufacture radio equipment and parts, has leased space in local plant of Evans-Miller Cedar Products Co., and will install equipment at once.

Murray Corporation of America, Inc., Russell Street and Clay Avenue, Detroit, manufacturer of automobile bodies, plans early erection of new one-story plant, to cost about \$80,000 with equipment.

Airport Committee, Bay City, Mich., is arranging for purchase of tract of 175 acres of waterfront property as site for a municipal airport, and will soon begin construction of hangars, repair shops, oil storage and distributing buildings and other units. C. J. Gregory is member of committee.

Wayne County Board of Supervisors, Penobscot Building, Detroit, E. G. Ewald, chairman, has surveys under way for a new airport near city limits, for which a fund of about \$2,000,000 will be arranged, to include hangars, repair and construction shops, pumping station, oil storage and distributing buildings and other units.

Fruehoff Trailer Co., 10940 Harper Avenue, Detroit, has awarded general contract to E. Buchman, 3921 Moran Road, for a one-story assembling unit to cost about \$65,000 with equipment. H. P. Stihler, 2931 Gray Avenue, is architect.

Detroit Piston Pin & Mfg. Co., Grand Haven, Mich., maker of piston pins and other automotive parts, has changed name to Ottawa Steel Products Co., Inc.

Central Specialty Co., Detroit, manufacturer of automotive castings and plumbing fixtures, has merged with

Ypsilanti Foundry Co., Ypsilanti, Mich., maker of automobile parts. New company will be known as Central Specialty Co. and will have total assets of approximately \$750,000. Considerable equipment in Detroit plant will be moved to Ypsilanti and new equipment will be purchased for both plants.

Contract for erection of new \$2,500,000 press room addition to plant of Fisher Body Corporation, Pontiac, has been awarded to W. E. Wood & Co., Detroit.

Packard Motor Car Co., Detroit, has awarded to Everett Winters Co. general contract for an aluminum foundry to cost \$100,000.

Gulf States

BIRMINGHAM, July 16.—Work will be started by Nitrate Corporation of America, Inc., Marfa, Tex., A. A. Snell, general manager, recently organized with capital of \$500,000, on new plant for production of nitrate soda and potash. Company has tract of about 6000 acres and will install crushing and mining equipment for handling 500 tons of material daily. It is purposed to construct an electric power plant at properties at later date. A housing development will be carried out for plant operatives. Initial project is estimated to cost more than \$175,000.

Board of Education, Beaumont, Tex., has authorized purchase of 22 acres in Oaks section, western part of city, as site for new high school with manual training department, for which a fund of \$900,000 has been arranged. Bids will be asked on general contract soon.

Reed Roller Bit Co., Mack Avenue, Houston, Tex., manufacturer of oil well equipment, etc., has filed plans for one-story machine shop to cost close to \$30,000 with equipment.

Warren, Knight & Davis, Empire Building, Birmingham, architects, have plans for one-story automobile service, repair and garage building, 75 x 140 ft., to cost close to \$80,000 with equipment.

International Paper Co., 100 East Forty-second Street, New York, is said to be completing plans for new kraft paper mill at Mobile, Ala., where Chamber of Commerce has secured a fund of \$100,000 to insure project. Plant will have capacity of 175 tons per day, and will include power house and machine shop. It is estimated to cost more than \$3,500,000 with machinery. R. J. Cullen, vice-president, is in charge.

A. & K. Auto Top & Paint Co., 2604-8 Main Street, East Dallas, Tex., is planning to rebuild its automobile body works destroyed by fire July 6, with loss close to \$50,000 including equipment. F. Walter Asmussen is plant manager.

St. Petersburg Cold Storage Co., Times Building, St. Petersburg, Fla., has plans for a new four-story cold storage and refrigerating plant, 100 x 125 ft., and for similar one-story unit, 50 x 100 ft., at Clearwater, Fla., to cost close to \$275,000 with equipment. C. C. Whitaker, Bona Allen Building, Atlanta, Ga., is engineer. Elliott B. Hadley is company architect.

Board of City Commissioners, S. E. Moss, water commissioner, City Hall, Dallas, Tex., is asking bids until Aug. 8 for equipment for \$4,000,000 expansion and improvement program for municipal waterworks, including central pumping plant and machinery, \$800,000; complete filtration plant and machinery, \$1,200,000; and water distributing facilities, \$2,000,000. Fuller & McClintock, 170

Broadway, New York, are consulting engineers. J. B. Winder is chief engineer of Dallas water department.

Gerald E. Melliff, 628 Buena Vista Street, San Antonio, Tex., and associates have plans for a three-story automobile service, repair and garage building, totaling about 26,000 sq. ft. floor space, to cost close to \$200,000 with equipment. Work will begin in August.

Airport Committee, Chamber of Commerce, Laurel, Miss., has acquired a tract of 150 acres near city limits for a municipal airport, and plans early construction of hangar, repair and reconditioning shop, oil storage and distributing building, and other mechanical units.

Sewerage and Water Board, 526 Carondelet Street, New Orleans, will receive bids until Sept. 6 for a 15,000-kw. turbo-generator, pumps and accessory equipment for drainage system.

Buffalo

BUFFALO, July 16.—Bids have been asked on general contract by Great Lakes Portland Cement Co., Marine Bank Building, Buffalo, for new four-story mill on Cuyahoga River, near Cleveland, to cost more than \$350,000 with equipment.

Northern New York Utilities, Inc., Watertown, N. Y., has approved plans for a new hydroelectric power plant on Beaver River, vicinity of Beaver Lake, with capacity of 12,000 hp., with transmission line to connect with present system, to cost in excess of \$400,000.

Field Force Pump Co., Elmira Heights, Elmira, N. Y., has plans for a new two-story factory, to cost approximately \$40,000 with equipment. Haskell & Considine, Hulett Building, Elmira, are architects.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, will establish an airport on 20-acre tract, just outside of city limits, and will use also as testing ground for airplane units manufactured at plant. Hangars, with mechanical and repair shops, and other buildings will be erected.

Herbert T. Dyett, Harry W. Barnard and other officials of Rome Wire Co., Rome, N. Y., have organized Atlantic Insulated Wire & Cable Co., an affiliated interest, with capital of 100 shares of stock, no par value, to manufacture wire and cables for electric service, and kindred products.

Department of Correction, Capitol Building, Albany, N. Y., is said to have plans for a new mechanical shop at State prison, Auburn, for which bids will be asked in fall.

Firestone Tire & Rubber Co., Akron, Ohio, has plans under way for one-story factory branch and distributing plant at Syracuse, N. Y., to cost more than \$75,000 with equipment.

Pittsburgh

PITTSBURGH, July 16.—Contract has been let by Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, to V. L. Nicholson, 102 West Clinch Street, Knoxville, Tenn., for two-story and basement factory branch and distributing plant at Nashville, Tenn., 100 x 100 ft., to cost close to \$90,000. Marr & Holman, Stahlman Building, Knoxville, are architects.

Transcontinental Oil Co., Benedum Trees Building, Pittsburgh, operating refineries at Bristow and Boynton, Okla., and Fort Worth, Tex., with pipe lines, etc., is disposing of bond issue of \$12,000,000, a portion of proceeds to be used for expansion and improvements.

New Kanawha Power Co., Glen Ferris, W. Va., is planning a hydroelectric power development on New River, vicinity of Gauley Junction, W. Va., with two power dams and generating station, to cost more than \$400,000. Initial plant will have capacity of 75,000 hp. O. M. Jones, Glen Ferris, is engineer.

Pennsylvania Railroad Co., Pittsburgh, is said to be arranging for early electrification of its division from Rochester, Pa., to Baird, Ohio, about 60 miles.

Plant and property of Becker Steel Co., South Charleston, W. Va., have been acquired at a public sale by R. M. Venable, Charleston, W. Va., and associates, for a price of \$44,100. It is reported that a company will be organized to take over and operate plant.

Marvin Mfg. Co., Franklin, Pa., recently organized by George C. Miller and Grant Jones, both of Franklin, with capital of \$75,000, plans operation of local plant for oil compounding and lubricating oil production.

Boiler Tube Co. of America, Pittsburgh, has purchased assets of Johnson Peter Co., with plants at Pittsburgh and Brooklyn, distributor of Tyler lapweld steel, charcoal iron boiler tubes and seamless steel boiler tubes.

Milwaukee

MILWAUKEE, July 16.—Prospects for new business in the machine-tool trade are encouraging. The call for tools is holding up well, while inquiry is becoming more active as requirements for fall and winter production are being more or less settled. The dearth of industrial construction that has been noticeable in this locality is gradually being relieved, and the outlook is much brighter than it has been for a long time.

Milwaukee works of International Harvester Co., 784 Park Street, manufacturing tractors and cream separators, will be enlarged by erection of building No. 33, 108 x 301 ft., three stories. Plans have been completed by Worden-Allen Co., engineering department, 208 South La Salle Street, Chicago, which is taking bids until July 23. Work was started a short time ago on construction of a new power and heating plant at Milwaukee Harvester works, to cost about \$500,000.

American Metal Products Co., Thirty-fourth Avenue and Burnham Street, Milwaukee, has announced its intention of building a rolling mill this year. Work has just been completed on a foundry addition, 80 x 100 ft., doubling capacity. Company makes a wide variety of castings of a copper-aluminum alloy with a high iron content, for tools, bearings, bushings, packings, golf clubheads, etc. Carl J. Zaiser is president and general manager.

Geuder, Paeschke & Frey Co., 1500 St. Paul Avenue, Milwaukee, manufacturer of stamped and drawn ware, automobile mufflers, etc., will erect an addition affording 74,800 sq. ft. Building will cost \$90,000 without equipment.

Universal Foundry Co., Pine and Warren Streets, Oshkosh, Wis., has broken ground for a one-story addition, 55 x 100 ft., to cost \$30,000 equipped. General

contractors are Ben B. Gauthier & Co., local.

Esline Co., 610 Michigan Street, Milwaukee, manufacturer of sheet metal buildings, cottages, garages, etc., is considering sites in Milwaukee County manufacturing area with a view of erecting a complete new plant, it being impossible to expand its present factory further. Company is engaging in production of airplane hangars and plans to triple its present capacity. B. F. Eslien is president.

Minneapolis St. Paul & Sault Ste. Marie Railway has contracted with Peppard & Fulton, engineers, 217 Board of Trade Building, Superior, Wis., for rebuilding division roundhouse at Stevens Point, Wis., installing a new and larger turntable, and other improvements costing about \$75,000.

South Atlantic

BALTIMORE, July 16.—Plans have been approved by Central Foundry Co., Dundalk, Baltimore, for one-story addition, totaling about 40,000 sq. ft. floor space, to cost more than \$85,000 with equipment.

Continuing expansion program at local plant, Bethlehem Shipbuilding Corporation, Key Highway, Baltimore, has filed plans for another unit, for wood-working and metal-working service, to cost about \$100,000 with equipment.

Bids will be asked in August by United Railways Co., Continental Building, Baltimore, for one-story and basement motor bus service, repair and garage building, to cost close to \$200,000 with equipment. W. H. Emory, Jr., 18 East Lexington Street, is architect.

Old Dominion Power Co., St. Charles, Va., is said to be planning to rebuild portion of power plant in Pocket section, near St. Charles, recently destroyed by fire, with loss in excess of \$200,000 with machinery. Headquarters are at Louisville.

C. Billups Son & Co., Inc., Norfolk, Va., has been formed with capital of \$240,000 to take over and expand C. Billups & Son, with local plant for manufacture of agricultural and farm implements and equipment. Cecil Billups heads new organization.

Hudson Silk Hosiery Co., Charlotte, N. C., has approved plans for a new steam power plant at its mill in connection with expansion program to cost close to \$75,000.

Union Brothers, 37 West Cross Street, Baltimore, manufacturers of furniture, have asked bids on general contract for one-story addition, 52 x 300 ft., to cost more than \$75,000 with machinery. Benjamin Frank, 517 North Charles Street, is architect.

H. A. Dunham, 99 Nerrimon Avenue, Asheville, N. C., Carroll P. Rogers, Tryon, N. C., and associates have organized Feldspar Milling Co., with paid-in capital of \$150,000, to construct and operate a feldspar grinding mill in vicinity of Bowditch (Yancey County), N. C., where feldspar dikes have been secured, aggregating more than 1100 acres. Initial mill will have capacity for handling 100 tons of feldspar per day. Mr. Rogers will be president of company, and Mr. Dunham, secretary and treasurer.

Board of Education, Statesville, N. C., plans installation of manual training equipment in new three-story high school to cost \$300,000, for which bids will soon be asked on general contract by Martin L. Hampton, Statesville, architect.

United States Coast Guard Headquarters, Washington, is asking bids until Aug. 2 for construction of floating station for Louisville, consisting of steel hull, wood frame superstructure, equipment and appurtenances.

Consolidated Lumber & Milling Corporation, Norfolk, Va., care of R. T. Lipscombe, Norfolk, industrial engineer, is being organized by Mr. Lipscombe and associates to take over and operate eight lumber mills and wood-working plants in this vicinity. It is purposed to construct a central mill on tract of about 200 acres on Eastern Branch of Elizabeth River, with complete wood-working and finishing facilities, conveying and loading equipment for shipments by rail or water. Majority of equipment will be electrically operated. Entire project, including property purchases, is reported to cost upward of \$3,000,000.

Indiana

INDIANAPOLIS, July 16.—Allison Engineering Co., Speedway City, Indianapolis, has secured contract from Government for rebuilding 1500 Liberty airplane engines, totaling about \$1,000,000, and will develop complete facilities at its machine shops for work. Subcontracts will be let for machined parts, gears, transmissions, etc., including those to Indianapolis Tool & Mfg. Co., West South Street, and Link-Belt Co., North Holmes Street. N. H. Gilman is vice-president and general manager.

Board of Patoka Township School Trustees, Princeton, William E. Daugherty, trustee, in charge, will install manual training department in new two-story and basement junior high school in Baldwin Heights section, to cost about \$100,000, for which bids will soon be asked on general contract. Sutton & Routt, Citizens Trust Building, Vincennes, are architects.

Chicago & Eastern Illinois Railroad Co., 332 South Michigan Avenue, Chicago, is said to have plans nearing completion for new locomotive and car repair shops at Evansville, to cost approximately \$200,000 with equipment. L. C. Hartley, 6600 South Union Avenue, Chicago, is chief engineer.

Board of Education, Oakland City, is considering installation of manual training equipment in new two-story and basement high school to cost \$160,000, for which plans will soon be completed by H. E. Boyle & Co., Furniture Building, Evansville, architects.

Ball Brothers Co., Noblesville, manufacturer of jars, metal jar caps, corrugated containers, etc., has authorized rebuilding portion of plant recently damaged by storm, with loss of more than \$30,000.

Leader Specialty Co., 517 East Walnut Street, Indianapolis, contemplates engaging in manufacture of iron pipe nipples and is in market for equipment. C. J. Mick is secretary and treasurer.

State Line Generating Co., Hammond, an Insull interest, is preparing list of tools needed for its new power plant being built in that city.

Cleveland

CLEVELAND, July 16.—While machine business was not as lively the past week as during the previous week, dealers took a fair amount of orders for one or two machines and the volume of sales was about normal for this season of the

year. Turret lathes continue in good demand and a local manufacturer did as much business during the first half of July as in all of June, which was a good month. Orders taken by this manufacturer during the week include five or six machines for the General Electric Co. for its refrigerating machinery department at Schenectady, N. Y.

Business is well scattered among various consuming industries although not many orders are coming from automobile manufacturers. The Byers Machine Co., Ravenna, Ohio, purchased a 21-in. lathe during the week and is inquiring for a 72-in. planing machine. Some slowing down in the demand for machinery is expected during the next few weeks.

Plans are being drawn by Triplex Screw Co., 6112 Central Avenue, Cleveland, for a one-story addition, to cost about \$35,000 with equipment. A. F. Weber is head.

Federal Foundry Supply Co., 2639 East Seventy-ninth Street, Cleveland, has revised plans and will take bids at once for one and two-story addition, 90 x 255 ft., to cost about \$125,000 with equipment. F. A. Welland & Co., 2725 Pittsburgh Avenue, are architects.

American Ice Co., City Center Building, Philadelphia, has acquired Citizens' Necessities Co., Toledo, Ohio, operating ice-manufacturing, cold storage and kindred properties, for price of \$1,557,000. Same purchaser recently acquired similar plants at Youngstown, Canton and other cities in eastern Ohio, and has general expansion program in prospect, including enlargements in a number of Toledo units, with installation of additional ice-making machinery.

McKinney Tool Co., Arabella Road and Roseland Avenue, Cleveland, has plans for a one and two-story addition to cost about \$25,000. E. G. Hoefler, Keith Building, is architect.

City Council, Lorain, Ohio, is planning establishment of municipal airport on tract of 80 acres west of city, including construction of hangars, repair and reconditioning shops, oil storage and distributing buildings, etc. Mayor J. C. Standen is in charge.

Eaton Bumper & Spring Service Co., 6515 Carnegie Avenue, Cleveland, has awarded general contract to Dresser Co., Arcade Building, for one-story addition, 40 x 90 ft., to cost about \$25,000 with equipment.

Pacific Coast

SAN FRANCISCO, July 11.—Contract has been let by Simmons Co., Kenosha, Wis., manufacturer of brass and iron bedsteads, springs, etc., to Barrett & Hilp, 918 Harrison Street, San Francisco, for a three-story factory branch and distributing plant at San Francisco, to cost \$200,000 with equipment. Local headquarters are at 295 Bay Street. Ellison & Russell, Pacific Building, are architects.

Union Oil Co., Union Oil Building, Los Angeles, is planning a new storage and distributing plant at Oakland, Cal., to cost close to \$100,000 with equipment.

Arizona Magma & Mining Co., Kingman, Ariz., is planning installation of a new selective flotation plant at its Diana properties, to cost close to \$100,000. A second unit will be installed of approximately like size later.

Apple Growers' Cold Storage Co., Watsonville, Cal., has approved plans for immediate construction of one-story cold

storage and refrigerating plant, 300 x 500 ft., to cost approximately \$200,000 with machinery. Uttley & Kleindinst, 354 Hobart Street, Oakland, Cal., are engineers.

Mountain States Power Co., Tacoma, Wash., has authorized extensions in hydroelectric power plant at Big Fork, near Kalispell, Mont., with additions in transmission lines, to cost \$150,000.

Pacific Coast Cement Co., Smith Building, Seattle, has approved plans for a one-story grinding mill unit on East Marginal Way, 86 x 97 ft., to cost about \$30,000.

Mason Mfg. Co., Winston Street, Los Angeles, manufacturer of lamps and lighting specialties, cabinet products, etc., has awarded general contract to Austin Co. of California, Inc., for a one-story and basement plant, 120 x 224 ft., to cost about \$50,000 with equipment.

Henry Bittman, Securities Building, Seattle, architect, has filed plans for a six-story and basement automobile service, repair and garage building, 60 x 108 ft., to cost about \$125,000 with equipment.

National Paper Products Co., 562 Battery Street, San Francisco, has awarded general contract to Chris Kuppler Sons, Port Angeles, Wash., for construction of second unit at its kraft paper mill at Port Townsend, Wash., to cost in excess of \$350,000 with machinery. Completion is scheduled by Jan. 1. Barr & Cunningham, Spalding Building, Portland, are consulting engineers.

John Finn Metal Works, formerly at 323 Colman Building, Seattle, has removed to 1934 Railroad Avenue. Company deals in babbit metal, solders and type metals.

A. Bernth and F. W. Starkey have leased plant formerly operated by Oregon Boiler Works, Klickitat Street, Seattle, and will conduct a general business of repairing and manufacturing contractors' equipment, electric welding, blacksmithing and structural steel fabricating. Mr. Bernth is president of company and was formerly general superintendent of Isaacson Iron Works, Seattle.

Northwest Lead Co., Seattle, making lead pipe, bars, and other lead products, will build an addition at an estimated cost of \$25,000.

A. M. Andresen has been appointed acting district manager in Seattle of Chicago Pneumatic Tool Co., in place of W. S. Lynch who has been appointed district manager of Cincinnati territory. Mr. Andresen will be located at 1743 First Avenue South.

x 90 ft., to cost \$17,000, exclusive of equipment, which will be purchased later. Gustiana & Zettler, Sudbury, have been awarded contract.

Gustiana & Zettler, Sudbury, Ont., have contract for construction of a power house and heating plant to cost \$90,000 for St. Joseph's Hospital.

Erie Iron Works, Ltd., St. Thomas, Ont., has been reorganized and W. T. Greatrex, Toronto, appointed president and general manager. Premises will be enlarged and additional equipment installed.

New Brunswick Electric Power Commission, St. John, N. B., is awaiting approval of Provincial Government to proceed with erection of an auxiliary power plant to be erected at or near Salisbury, Westmorland County. Commission is also considering applications for further installation of service from Shediac to Buctouche. Hon. E. A. Reilly, Moncton, N. B., is chairman.

Fire July 8 destroyed planing mill and sash and door factory of Laidlaw-Belton Lumber Co., Sarnia, Ont., with loss estimated at \$150,000.

T. E. Bissell & Co., Ltd., Elora, Ont., has been formed to take over plant and business of Bissell & Co., manufacturers of farm implements, etc. New company is capitalized at \$300,000.

James Playfair and Frank M. Ross who control St. John Drydock & Shipbuilding Co., Ltd., have purchased plant of St. John Iron Works, St. John, N. B. Plant will be continued in operation with George H. Waring, manager, who at present is manager of Union Foundry & Machine Works, Ltd. Latter company will pass out of existence, as a consequence of property being taken over by St. John Board of Harbor Commissioners to provide harbor facilities. Playfair-Ross interests will concentrate their mill and industrial work in newly acquired iron works, and reserve drydock plant for marine and structural steel work.

Western Canada

Churchill River Power Co., Ltd., 405 McCallum-Hill Building, Regina, Sask., allied with Whitney interests in development of Flin Flon properties in northern Saskatchewan and Manitoba will install an initial power development plant of 39,000 hp., at Island Falls on Churchill River. Plant will supply power to the Flin Flon.

General Motors of Canada, Ltd., Oshawa, Ont., is having plans prepared by Hutton & Souter, 6 James Street South,

Hamilton, Ont., for construction of a power house and other buildings in connection with its \$1,000,000 plant at Regina, Sask. Tenders for additional buildings will be called about Aug. 1.

Foreign

ARRANGEMENTS have been completed by Central American Power Corporation, recently organized by W. B. Foshay Co., Minneapolis, Minn., operating public utilities, for purchase of plants and system of Nicaragua Electric Light & Ice Co., Managua, Nicaragua, Central America, for price of \$800,000. New owner plans expansion and betterment program.

American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has received an inquiry (F-3700) from a company at Paris interested in purchase of American machinery for metal corrugating service; also an inquiry (G-3699) from a firm at Charente-Inferieure, desiring to purchase a quantity of American confectionery machinery.

A company in Finland has authorized plans for a new sulphite cellulose plant and will arrange list of machinery in near future. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Finland No. 68,410; also Frederick E. Lyon, commercial attaché, Helsingfors, Finland.

In connection with new newsprint and wrapping paper mill of Central Paper Trust of Soviet Russian Union, now in progress near Balakhna, on Volga River, Nijni-Novgorod district to cost \$16,000,000, an engineer of the Trust is now in United States, with headquarters at offices of Amtorg Trading Corporation, 165 Broadway, New York, official buying agency of Soviet Russian Government, to make purchases of additional machinery and equipment. Plant is expected to be completed within a year.

Central Electricity Board, London, England, is developing plans for new construction, including new generating plants and additions to present power stations, steel tower transmission lines, power substations, and distributing systems.

Company at Ravensbourne, Dunedin, New Zealand, is considering plans for a new super-phosphate plant for fertilizer service, consisting of several units to cost about \$1,250,000, with machinery. Julian B. Foster, trade commissioner, Wellington, New Zealand, has information regarding project.

Canada

TORONTO, July 16.—Following the recent lull, local dealers and builders report a revival of activities in machine tool sales. While the market is far from brisk, orders for single tools total a good volume. A strong demand is reported from northern Ontario mining districts. The automotive industry is buying sparingly at present, purchases being almost entirely for replacement.

National Standard Co. of Canada, Ltd., 133 Woolwich Street, Guelph, Ont., manufacturer of wire braid, etc., will start work immediately on a one-story addition, 62 x 76 ft., to cost \$12,000, exclusive of equipment. M. Balconi, 23 Morris Street, has erection contract.

Smith & Travers, Walnut Street, Sudbury, Ont., will erect a machine shop, garage and office building, one story, 30

New Trade Publications

Insulating Materials.—Celite Products Co., Los Angeles. Bulletin 101 of 16 pages with 30 illustrations gives general description of all Sil-O-Cel insulating products, as well as Fraxite high-temperature cement and Celcote waterproofing. The illustrations show these materials in a wide variety of uses, including furnaces of various descriptions, annealing ovens, core ovens, japanning ovens, etc.

Rotary Blowers.—Connersville Blower Co., Connersville, Ind. Bulletin 17A of eight pages, illustrated, describes rotary positive blowers for foundry cupola and large furnace installation, pneumatic conveying, cooling sheet packs, and other blower service requiring large capacity at low and medium pressure or suction. The blowers described have capacities from

4500 to 17,000 cu. ft. a minute. Dimensions and clearance diagrams are given.

Centrifugal Pumps.—Kane & Roach, Inc., Syracuse. Bulletin 1100 of eight pages illustrates and describes a line of single-stage centrifugal pumps for a variety of purposes and of varying sizes, from as low as 10 gal. to a maximum of 5000 gal. a minute. Sand and dredging pumps shown have capacity from 16 to 125 cu. yd. an hour.

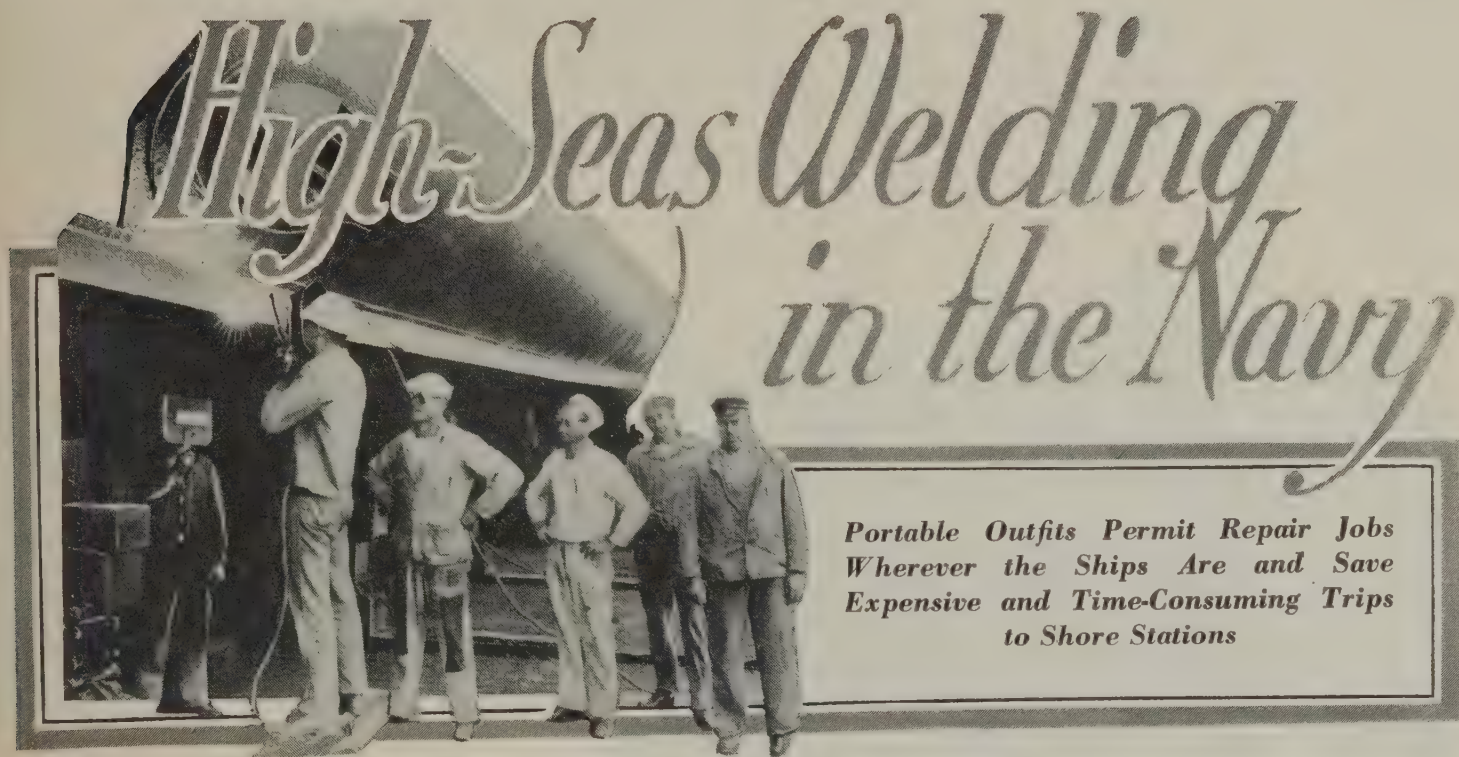
Universal Grinding Machines.—Thompson Grinder Co., Springfield, Ohio. Bulletin No. 18, 12 pages, devoted to standard and special features of the 12 x 36 in. universal grinder, which is available in separate countershaft or self-contained motor-driven styles. The countershaft set-up, and the erecting plans of both styles of machine are included.

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*Portable Outfits Permit Repair Jobs
Wherever the Ships Are and Save
Expensive and Time-Consuming Trips
to Shore Stations*

BY G. K. SPENCER*

DURING fleet maneuvers in the Pacific two United States destroyers came into glancing collision while emerging from a smoke screen. Boat davits and the end of a torpedo tube on one vessel were clipped off by the contact. Luckily the torpedo in the tube carried a practice head instead of a war head, or there might have been two destroyers less in the Navy.

Machinists' mates on the injured destroyer quickly swung inboard the remainder of the damaged davit and the injured torpedo tube. Later, the ship ran alongside the tender to the destroyer squadron, for emergency repairs. Within a few hours portable welders had completely repaired both the davit and the torpedo tube.

This was not an exceptional job. It was one of thousands performed every month aboard the ships of the fleet. The destroyers, being pressed for combat space, carry no portable welders, but every other ship in the fleet does. The larger vessels, such as battleships and train vessels, carry both electric and gas welding equipment.

Welding has now become one of the most important jobs done aboard

ship by the Navy. Seldom does a battleship call upon a navy yard for welding work. Welding is occasionally done by navy yard workmen upon battleships, but only when the ship is in the yard having new construction placed on her. All other welding is performed by the ship's company. So significant is this work considered, that special instruction in electric and gas welding is given the mechanical personnel at regular periods on the *Pennsylvania*, *Idaho*, *Mississippi*, *West Virginia*, *Maryland*, *California*, *Tennessee*, *New Mexico*, *Arizona*, *Arkansas*, *New York*, *Texas*, *Utah*, *Nevada*, *Florida*, *Saratoga*, *Lexington* and all the major vessels of the train, numbering some 30 in all.

To supplement this class instruction, written articles

are prepared and published in the principal journals read by enlisted personnel. So interesting have some of these naval welding articles proved that numerous requests have been received by the publishers and the Navy for copies of them for civilian shops.

Many of the heaviest welding jobs done in this country are done by the Navy. For instance, the welding of shanks to certain types of anchors involves bringing together pieces of metal as thick as



Welded Duralumin Tanks at the Naval Aircraft Factory in Philadelphia

(Top of page) Working on the bottom of a destroyer which has been raised from the water on a floating drydock at the San Diego base. A portable welder is employed in this work

*1643 Acacia Street, Los Angeles.

10 x 10 in. and larger. For a shipboard welding job, this is rather heavy.

And the mercantile marine, observing the success of the naval shipboard welding work, has now begun to carry portable welding equipment, and much good work is reported as a result. Ships' companies can be trained to this work, and considerable money saved by avoiding the cost of docking for the purpose.

Welding Below Water Level

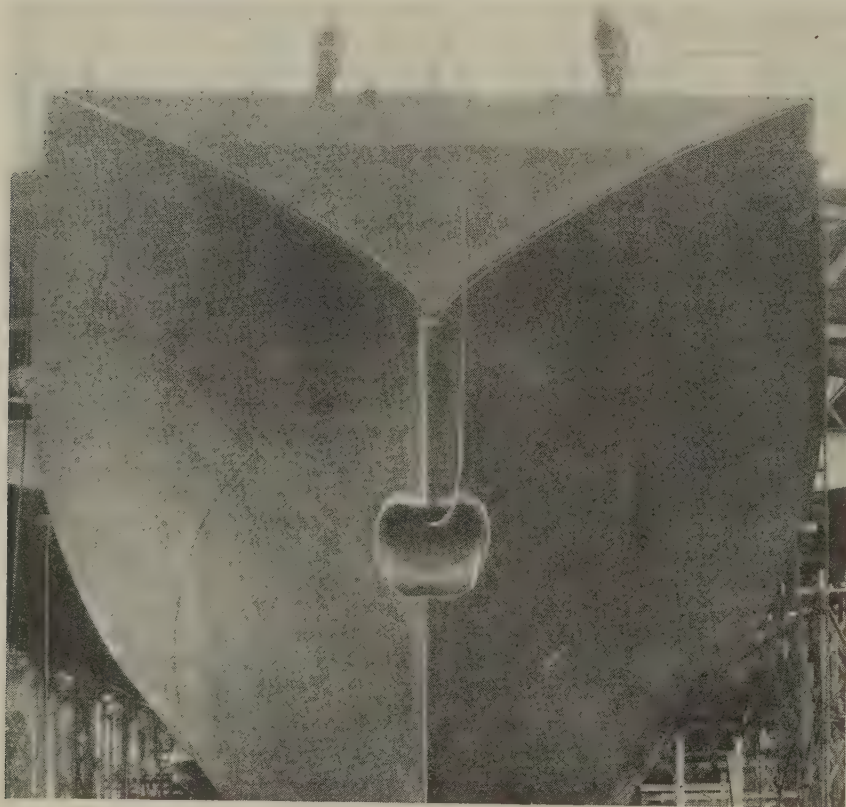
The size and importance of jobs which can be undertaken with the Navy's portable welding apparatus are constantly increasing. Several months ago it became necessary to repair the blades of a propeller on a destroyer. It would have cost some \$50,000 for the Navy to tow the ship from Culebra Island (West Indian group) to the nearest dock at Panama, and another \$20,000 to dock her and repair her at the yard there.

With a portable cofferdam thrown around the injured propeller and the water pumped out, the ship's own me-

can be eliminated. Thus, a breakdown some distance from a yard causes long towage at a heavy expense, even though naval vessels perform the towing. A portable welder on the spot avoids such expense.

At the San Diego naval destroyer base, both gas and electric welders of the portable type are in use, with the preference going to the electric welders, which are stationed at the marine railroads of the base for exterior valve work and direct work on the bottoms. Use of these welders has created a saving in the marine docks alone of more than \$300,000 in three years. They could not be dispensed with without resultant heavy expense and loss to the Government.

A welder crew has been organized to do nothing but welding, to learn welding and specialize in it until the men become so expert in joining metals that any work they do may be depended upon completely to endure the shocks of sea duty. The first inspection made on the bottoms of destroyers coming into dock is that for the decision regarding any necessary welding.



Welded Job on a Heavy Navy Anchor (Below)



Welded Construction on the United States Aircraft Carrier Saratoga (Left). The illustration shows the unusual shape of the bow with its hawse pipe, which projects far beyond the cutwater. Welding was used on longitudinal seams and on the joints between the squared-off triangular section above the flare of the ship's side

chanical personnel went down into the cofferdam, removed the propeller and brought it to the main deck. Here, with a portable welder from the *Altair*, tender to the twelfth destroyer division, the complete repair was made.

It is especially to be noted that in performing a great the Navy for portable welding equipment quickly translates itself into savings of hundreds of thousands of dollars within a short period. It is still somewhat less than 18 months that this widespread use of portable equipment has been in practice, but the saving alone in that time has been in excess of \$300,000. The cost of all the equipment used was under \$60,000, and it is still as good as new. This would represent a great saving in any industry.

It is especially to be noted that in performing a great part of its welding at sea, the Navy does not in reality take any significant business away from the civil industry, for the navy yards are maintained at a constant employed rate, anyhow. On the other hand, naval purchases in welding equipment for use at sea have been a real boon to the industry in several ways, not the least of which has been the investment in new equipment.

Savings created by the use of portable equipment at sea are mostly in the towage and incidental expense which

The same type of portable equipment is used at the marine railroads in the Hawaiian naval district, where the service on destroyers, fast mine-layers and district vessels is similar to that at San Diego. This equipment is in daily use, and practically every ship coming into the docks needs some kind of welding work done. Welding junctures are always made in cases of installation or repairs to the condenser intakes, the exterior fittings which protrude at the ships' bottoms being riveted and then welded, to insure watertight integrity.

The welded job has come into higher favor daily. Practically all naval aircraft fuselages today are welded tubing, and the desire for the welded construction by the naval service is now practically universal.

Union wages show an increase of 260 per cent over the hourly rates of 1913, according to figures developed by the United States of Labor Statistics. They cover 862,308 trade-union members employed at time rates in 66 leading cities. Because of a decrease of 7.6 per cent in hours of work a week, the increase in weekly income was only 229 per cent.

Blast Furnace Gas Indicates Conditions

Tells Operator Much About How Fast Sulphur Is Being Removed and Whether Iron Is Fluid

BY WALLACE G. IMHOFF*

[In the first instalment of this article it was pointed out that the color of the smoke and of the burning gases rising from the open-top blast furnaces indicates the character of the metal. For example, heavy, white smoke and burning flames of bright yellow are given off when a hot, limey furnace is making low-sulphur foundry iron. A particular cast (at 2 p. m.) was cited as a typical illustration of ideal conditions of lime combining with sulphur to form calcium sulphide.—Editor.]

RESULTS of the conditions present at this time (2 p. m.) are reflected in the iron and slag analyses. In percentages these are:

Iron				Slag	
Silicon	Sulphur	Phos.	Mang.	Silica	
3.00	0.016	...	...	29.06	
2.95	0.014	...	...	Alumina	14.52
2.55	0.038	0.58	0.72	Bases	51.42
2.97	0.029	...	...	Sulphur	2.60
3.03	0.027	...	...		

The 2 p. m. cast, with an analysis of 2.95 per cent silicon and 0.014 per cent sulphur, illustrates furnace conditions in which practically all of the sulphur going into the furnace is in the combined state in the form of CaS. This is shown by the low sulphur in the iron and the high sulphur in the slag.

When the iron was cast it was extremely hot. There was a large amount of graphite present and the iron had a tendency to be thick and mushy. A noticeable feature was the extreme heat of the iron. It also had a purple glow, due to the presence of manganese.

Since the kind of iron made is governed entirely by the slag characteristics, a moment will be devoted to a description of the slag. The first flush of cinder was very hot, with extremely heavy white clouds of fog, or smoke, rising from the slag runner. The cold slag samples had a tinge of greenish white on top. The second flush of cinder before casting was practically the same as the first. It was perhaps a little hotter, and heavy, dense white clouds of smoke rose from the slag runner. The third and last flush of cinder before casting was dazzling hot. Dense clouds of white smoke rose from the slag runner. The cold slag sample was between a hard, stony cinder and a grainy slag. It was greenish white on top, the green color being due to manganese.

Reactions Inside the Furnace

Details of the conditions which produce a heavy yellow flame accompanied by dense white smoke having been described, it now remains to explain the chemical and metallurgical reactions going on inside the furnace. The large amount of sulphur going into the furnace, derived from the coke and the pyrites cinder, requires a large amount of lime to combine with it and remove it in the form of calcium sulphide. The heavy lime calls for the great amount of heat referred to, since as a slag becomes

more basic in character a greater amount of heat is required to melt it and keep it fluid.

But the higher the hearth temperature, the more the reduction of silica from the slag to silicon, which goes into the iron. The silica gives fluidity to the slag; therefore, as the amount of silica in the slag is reduced, the slag either becomes thick and viscous, if it remains at the same temperature, or must be raised to a higher temperature, to be kept thin and fluid. Since the lime is not changed, its proportion automatically increases as the silica is reduced and goes into the iron. This, therefore, also has a tendency to raise the melting point of the slag, if it is to be kept in a fluid state. On a hot hearth there is thus the tendency to decrease the silica in the slag, which automatically increases the lime ratio.

Conditions for Removing Sulphur

Turning our attention for a moment to the sulphur present, we find that the ideal conditions to promote the formation of CaS are with a hot hearth, when the bonds of lime and silica are weakened and the silica is being reduced to silicon. The lime actively takes hold on the sulphur. A large amount of it is required to remove the sulphur. The slag body itself is made up of a highly complex lime-aluminum-silicate and the CaS is dissolved in this liquid body much the same as sugar is dissolved in water.

At the high temperature, however, the slag becomes supersaturated under the conditions of pressure and temperature inside the furnace. When the slag comes out into the air, and the conditions of temperature and pressure are radically changed, the slag being supersaturated, there is a tendency then for the CaS in solution to be thrown off as a heavy white fog, or smoke rising from the slag runner. The high degree of saturation of the slag with CaS is shown by the sulphur content in the slag, which is 2.60 per cent.

High silicon in the iron tends to promote the formation of graphitic carbon, often called "kish." Carbon imparts fluidity to the iron. Therefore, as the silicon increases in the iron there is a tendency to promote the formation of graphitic carbon, which, by removing carbon from the iron, reduces its fluidity and makes it thick and mushy.

When the iron is thick and mushy and without fluidity it will not absorb manganese. Therefore, even though the furnace is very hot, a large part of the manganese goes into the slag and imparts the yellow or olive green color to it. The formation of graphitic carbon has a tendency to open the grain of the iron and make it soft. This accounts for the open grain and softness of high-silicon, low-sulphur, foundry irons.

What Can Be Learned from the Gas

Turning our attention to the gas produced under these conditions, we note that we get some factors directly, and others we get indirectly. For example, the fact that the gas burns with a heavy, bright yellow flame shows the

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presence of a large amount of extremely finely divided carbon particles. This factor is proved indirectly by the large amount of excess carbon, in the form of graphite, floating about in the cast house air. By observation, also, the great quantity of gas is noted, showing that the conditions are such as to liberate large quantities of carbon for burning purposes.

There is a tendency for the molten iron to throw off carbon rather than to absorb it. This fact is shown in the thick, mushy state of the iron. Carbon gives fluidity to the iron and so much has been removed from it, in the form of graphite, that the iron is thick and pasty. The sulphur in the iron is low (0.014 per cent) while the sulphur in the slag is high (2.60 per cent). This fact shows that the gas contains very little sulphur, if any.

An important condition to take note of, from the standpoint of production, is the fact that the removal of too much carbon from the iron in the form of graphite has the tendency to build up the hearth and hold the iron in the furnace. This accounts for a large cast of iron when the iron again becomes more fluid. It simply dissolves up this accumulation of dry iron in the hearth. From the standpoint of production, vitally important commercially, it is not profitable to keep the furnace in this condition for any great length of time. Under these conditions production is low, and the furnace will eventually stick and slip violently, causing considerable trouble. The ultimate end is high lime, a cold hearth, "off iron" and low production.

This must not, however, be confused with conditions which give high production. The distinction is to be found in the fluidity of the iron and the slag. High production is obtained with the fusion zone in the hearth, a high hearth temperature, and enough carbon in the iron to keep it thin and fluid. Under these conditions the furnace will drive well, the gas will be in large volume, and enough carbon will be free to supply a large amount of heat to the gas. The gas will burn with a heavy, yellow flame.

Examples with heavy, hot yellow gas and good production are shown by the following analyses, in percentages:

Iron						Slag					
Silicon	1.00	0.99	1.00	1.39	1.68	Silica	33.14				
Sulphur	0.025	0.023	0.023	0.021	0.027	Alumina	12.64				
Phos.	...	...	0.232	...	...	Lime	44.20				
Mang.	...	...	1.11	...	...	Magnesia	7.23				
						Iron	0.49				
						Sulphur	2.12				
Silicon	1.12	0.86	0.83	0.90	0.78	Silica	31.70				
Sulphur	0.031	0.045	0.034	0.030	0.023	Alumina	12.66				
Phos.	...	...	0.241	...	...	Lime	45.10				
Mang.	...	...	1.06	...	...	Magnesia	7.32				
						Iron	0.26				
						Sulphur	2.17				

The fusion zone in both these examples was down in the hearth.

For high production and good, regular driving, the ideal condition is to have the fusion zone down in the hearth. This condition gives a strong, yellow gas carrying a high heating value. As the hearth becomes cold, reactions set in which tend to change the character and heating value of the gas. Gradually the volume of free sulphur increases, the amount of silica reduced decreases, the carbon has a tendency to be absorbed by the iron as combined carbon, the volume of gas produced diminishes, and the heating value becomes low. The change in color of the gas is first shown by the fact that the heavy, bright yellow gas gradually turns to orange, then to a deep blue, and finally it becomes a crimson red to violet. The volume of gas becomes much smaller, making it necessary to use coal at the boilers to keep up steam. There is also little heating value in the small volume of gas that is made.

Conditions Experienced in Practice

A few examples will show this gradual change taking place under practical conditions. The following example

illustrates the start. The gas at the boilers had slowly changed from the heavy, yellow gas to medium, light purple, carrying only a moderate heating value. The top flame was three-quarters blue and one-quarter red. The slag was limey and there was an exceedingly strong, choking smell of free sulphur rising from the slag runner. The furnace drove slowly. The top heat was 780 deg. Fahr. The bottom and hearth were cold.

The analyses show the decrease in silicon in the iron, with the corresponding increase in silica in the slag; and the drop in sulphur in the slag from 2.17 to 1.74 per cent, with the strong smell of free sulphur. The sulphur in the iron has risen from an average of 0.025 to an average of about 0.034 per cent and the gas has changed from yellow to mostly blue. The carbon, which formerly was free to burn, is now absorbed by the iron. Since carbon is the chemical element which imparts fluidity to iron, its removal in the form of graphite thickens the iron and makes it mushy. Vice versa, an increase in combined carbon makes the iron thin and fluid. The analyses of the iron and slag under conditions which furnish medium blue gas are below:

Iron						Slag	
Silicon	0.80	0.73	0.73	0.79	0.85	Silica	34.06
Sulphur	0.036	0.035	0.033	0.031	0.031	Alumina	11.76
						Lime	45.10
						Magnesia	6.73
						Iron	0.45
						Sulphur	1.74

Comparing these analyses with the previous ones for hot, yellow gas, we observe the lime is the same at 45.10 per cent. But the furnace is colder. This is shown by the rise in silica in the slag from 31.70 to 34.06 per cent and the fall of sulphur from 2.17 to 1.74 per cent. The fall of sulphur, and the high top heat, 780 deg. Fahr., show that the fusion zone is now no longer down in the hearth, but up in the middle of the furnace. The iron, which is the principal temperature indicator, has risen from 0.26 to 0.45 per cent, showing the hearth to be much colder. The slag indicates the hearth temperature.

(To be concluded)

How to Use Current Business Statistics

Almost all important business organizations now make use of statistical information for guidance of their respective activities, it is pointed out by Mortimer B. Lane of the Bureau of Census, in commenting on a study "How to Use Current Business Statistics," recently issued. Copies may be obtained at 15c. from the Government Printing Office, Washington. The meaning of the various statistical terms is explained, with examples of their interpretation, taken from the experience of business firms.

Practical application of current statistical information by American business has been, Mr. Lane said, one of the outstanding factors in the generally sustained prosperity of the country during the past five years. Previous periods of similar commercial and industrial activity have as a rule been characterized by more or less violent fluctuations. Nearly 300 instances of the use of statistics in business have been collected by Mr. Lane, who presents suggestions as to how the data may be used to the best advantage. The small business man has been particularly benefited by securing, through the use of current statistics, information he could not hope to obtain without collective action.

The rise of statistics from small beginnings to a position of such commanding importance, it was pointed out, has been a definite response to the growing needs of business. The business executive of today cannot have, either in his mind or in the possession of his own concern, all the facts necessary for intelligent business judgment. He must not only know how his firm is doing, but must compare his branch of industry with industry as a whole, and must know the buying conditions of his customers as well as the condition of his material markets.

Cost of Producing Electric Power

Consideration of Elements, Some of Which Vary
with Amount of Current Used While
Others Are Constant

BY W. B. SKINKLE*

EVIDENTLY the total cost of any product is represented by the sum of the fixed charges plus the operating costs. Fixed charges are constant and independent of amount of production. Operating costs are variable and largely dependent upon the output. There is, however, a large part of operating costs which is constant, regardless of the output. In addition there is the increment cost, which is directly proportional to the output.

Segregation of that part of the operating cost which is constant and determination of the increment cost form the major object of the paper. Careful consideration of many items, appearing at first thought to be variable in direct proportion to the load, fails to disclose a single item which does not have some constant element independent of the load. The cost of fuel is almost directly proportional to the load. There are, however, certain items, such as radiation losses, unburned fuel, etc., which will be constant, regardless of the load. This item, therefore, may be charged as 90 per cent variable and 10 per cent constant.

Working Out Costs for Hypothetical Plant

General practice indicates that steel works boilers operate at an average annual rate of about 133 per cent of rating. Consequently, in a hypothetical boiler house of 15,000 boiler hp. installed capacity, the output would average about 20,000 boiler hp. Estimates of the cost of a modern boiler house indicate that \$123 for each horsepower of rated capacity would be a fair price on which to base fixed charges. This shows an investment of \$1,850,000. Fixed charges at 13 per cent represent \$240,000 a year or \$20,000 a month. This 13 per cent is 6 per cent interest on investment, 5 per cent depreciation and 2 per cent insurance and taxes.

Constant cost of steam exclusive of fuel has been worked out at a total of 93.4c. per boiler hp.-month. As the production of steam is 20,000 boiler hp.-months each month, the constant cost chargeable against it is \$18,700 a month. This figure, which excludes fuel, is independent of the amount of steam actually produced.

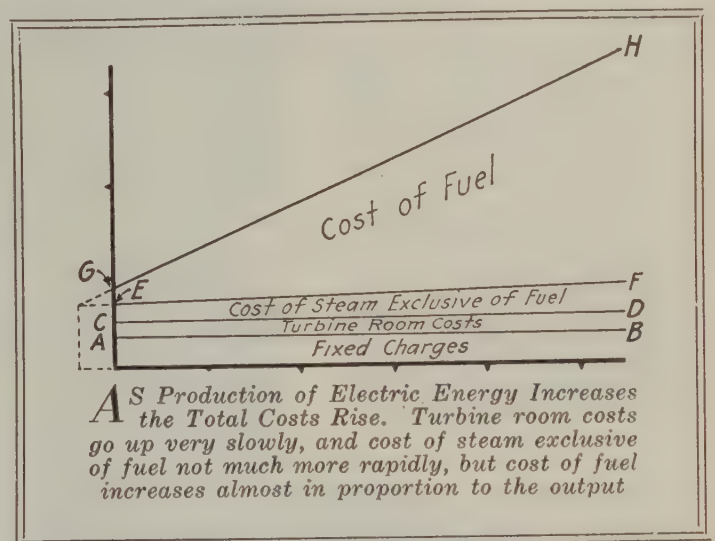
Including the fuel, the constant operating costs, regardless of the actual amount of steam produced, figure out at \$1.301 for each boiler hp.-month. This makes the constant cost of steam total \$26,000, independently of the steam produced. Variable operating costs, proportional to the steam production, have been worked out at about \$3.70 for each boiler hp.-month. If M is the amount of this steam, then the total month's operating cost for this boiler plant would be \$20,000 fixed charges, plus \$26,000 constant operating cost, plus \$3.70 M , for the variable cost of steam used.

Evaluating Generating Costs on Same Basis

Cost of producing electric energy is developed along lines similar to those followed in arriving at the cost of steam. Estimates on a modern 15,000-kw. turbo-generator

station complete show a total first cost of \$1,480,000. Fixed charges at 13 per cent represent \$192,000 a year, or \$16,000 a month. Detailed calculations for the constant cost of electric energy, exclusive of steam or fuel costs, show 65.2c. for each 1000 kwhr. This cost is based on an average load factor of 48 per cent and an average of 730 hr. operation each month. This results in production of 5,250,000 kwhr. a month and represents a constant turbine-room cost of \$3,425 a month. This is independent of the amount of electric energy produced. Similar calculations show that the variable cost of electricity exclusive of steam is 5.1c. for each 1000 kwhr.

Adding the cost of steam, exclusive of fuel, to the 65.2c. above reported, the total constant cost of electricity ex-



clusive of fuel is \$1.345 for each 1000 kwhr., or a total monthly charge of \$7,060. This is a constant expense, independent of the quantity of electric energy produced.

Similarly, the variable operating cost exclusive of fuel works out to 34.8c. for each 1000 kwhr. Hence, the total cost, exclusive of fuel, for the electric plant represents \$16,000 fixed charges, plus \$7,060 constant operating cost, plus \$0.348 E variable cost, where E equals the number of thousands of kwhr. produced.

Representation of these various factors on the diagram shows the fixed charges as the line AB above the base line. Turbine-room costs are represented by the space between AB and CD and the cost of steam, exclusive of fuel, is the space between CD and EF . The fixed charges are uniform, regardless of power production. The other two items below EF show a slight upward tendency, although the greater portion of the cost is independent of the amount of power produced. Adding the cost of fuel, however, in the line GH , produces a sharp upward slope, for the fuel depends to the extent of about 90 per cent on the amount of power sent. out.

[In the paper as presented these matters were all brought out in considerable detail, with the aid of numerous graphs to illustrate the points made.]

*Engineer Pittsburgh district power committee, subsidiary companies of United States Steel Corporation. This is an abstract of a paper presented before the Chicago convention of the Association of Iron and Steel Electrical Engineers.

Materials-Handling Problems Aably Met

BY C. A. MCGRODER

FAITH in the future of commercial motor transportation inspired the General Motors Truck Corporation to build at Pontiac, Mich., within the last 12 months, what is claimed to be the largest plant in the world devoted exclusively to the manufacture of commercial vehicles. Early in July, 1927, just before ground was broken for the foundations, a crop of hay was taken off the 156-acre farm on which the plant is located. On Jan. 3, 1928, finished vehicles were coming off the production line. More than 750,000 cu. ft. of earth had been excavated from the hilly ground of the farm. Approximately 9000 tons of structural steel, 80,000 cu. yd. of concrete, 4,500,000 bd. ft. of lumber, 93 miles of iron and steel pipe and 500,000 sq. ft. of glass had been brought in to establish new records for speed and size in industrial construction.

1500-Ft. Receiving Platform for Motor Truck Freight

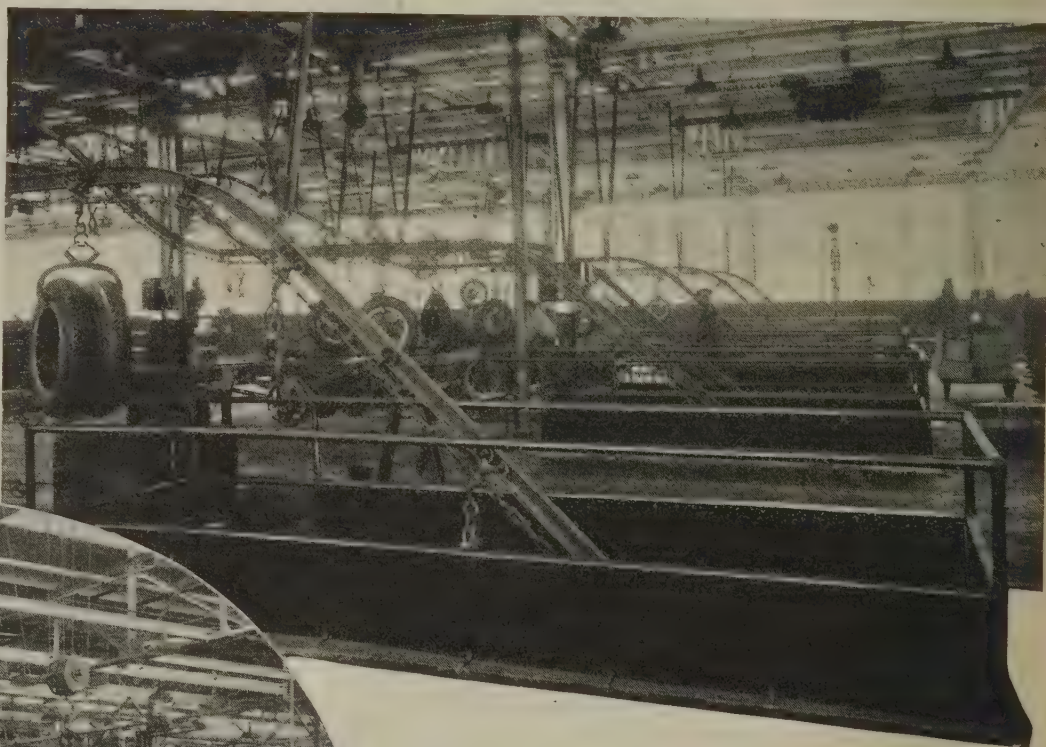
The same faith in the future of motor truck transportation that built the world's largest truck plant is evi-

denced in the facilities provided at the new plant for the delivery of materials and parts by motor truck. Running down one side of the main building for a distance of 1500 ft. is a receiving platform for incoming truck freight, exclusively. On the other side of this building, which is 240 ft. wide, is a similar platform of equal length, for receiving rail shipments. Such ample provision for rail freight is not unusual, but the setting aside of an equal amount of space for truck delivery of materials is something of an innovation.

Materials handling became a major problem in planning the layout of the new plant when it was decided that at least four distinct assembly lines would be required for the complete General Motors commercial line, embracing motor trucks, taxicabs and motor coaches in a diversity of sizes, models and tonnage. If these assembly lines had been located on the main floor of the building between the truck receiving dock and the rail receiving dock, great difficulties would have been encountered in moving materials to the two central assembly lines. Overhead conveyors would

THE Chain Escalators, at the Right, Bring Wheels and Tires and Other Minor Assemblies Up to the Chassis Assembly Line on the Second Floor of Main Plant

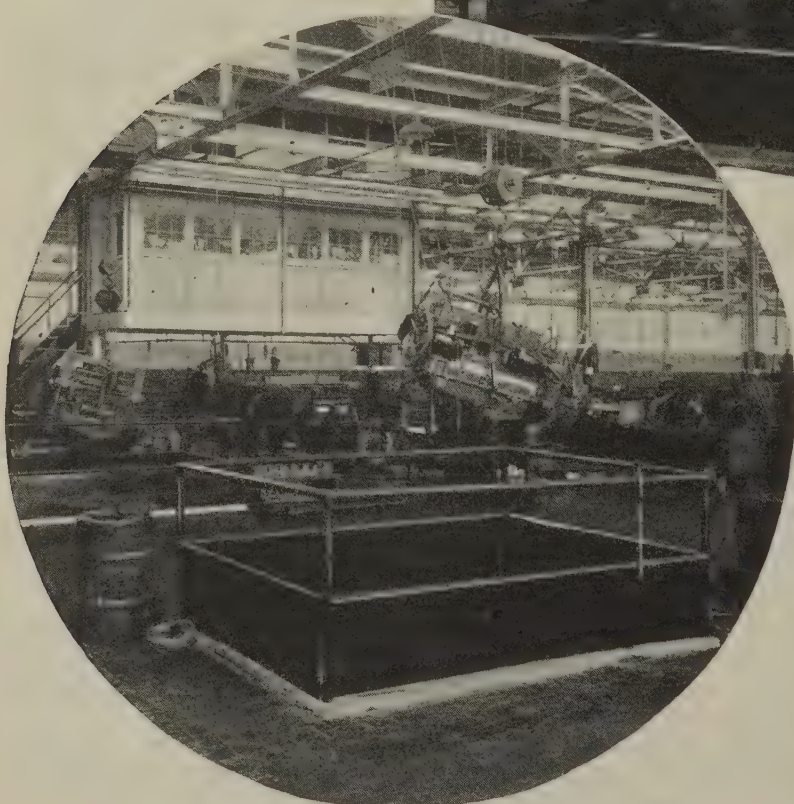
One of the Many Railed Hatchways on the Second Floor of the Chassis Assembly Plant Is Shown Below. The power plant pictured has been assembled on the ground floor and comes up to chassis assembly line on an electric hoist



have been required to lift materials over the outside lines and drop them near the central lines. Delay and confusion on the outside lines would have been the unavoidable result.

Two-Floor Arrangement of Chassis Assembly Plant Minimizes Cost

The difficulties were obviated and the cost of handling the materials was minimized by locating the chassis assembly plant on the second floor of the main building. This second floor terminates at the rear of the building in a hillside, where the heavy chassis frames are unloaded from freight cars on a railroad siding which is on a level with the second floor of the plant. Loaded upon storage and transfer cars, the frames are taken into the second floor to the beginning of the assembly lines. This leaves the entire ground



n Truck Plant

floor below the assembly lines available for the receiving, storing and sub-assembling of all the principal units and parts of the chassis except the frame.

Frames for the smaller units, such as light trucks and taxicabs, arrive at the plant completely assembled and ready for the chassis assembly lines. Larger frames, for 2-ton and larger trucks and for coaches, on which standardization of frame length is impossible because of the great variation in wheelbase length, are delivered unassembled. Space is provided between the freight car siding and the beginning of the chassis assembly lines on the second floor where the frame members are riveted to-



THE Receiving Dock For Truck Freight, Shown at the Left, Is 1500 Ft. Long. Many of the parts used in building General Motors trucks, coaches and taxicabs are shipped by truck from other plants in Pontiac, other Michigan cities, from Cleveland, Detroit and Chicago

All Rail Shipments Except Chassis Frames Are Unloaded From the Railroad Receiving Dock Shown in the Insert Above

gether before being placed on the lines. As there are always some chassis parts, such as frame brackets, which require machining, space for these operations is provided near the beginning of the assembly lines. The parts are brought up from the floor below on escalators and deposited near a battery of standard machines at this point.

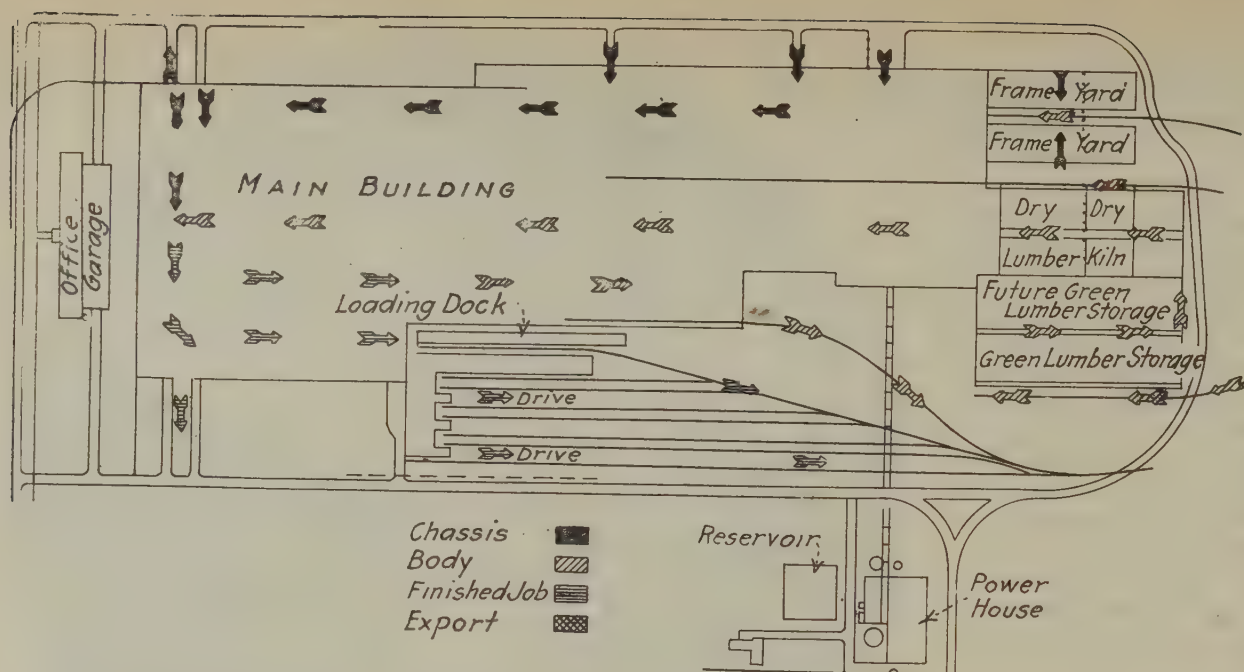
After the necessary fixtures and brackets are attached to the frames, which start their journey along the assembly lines bottom side up, axle and spring assemblies are brought up from the ground floor by electric hoists, through open, railed hatchways, and dropped into position on the frames by the same hoists. Continuous chain conveyors bring up wheel and tire assemblies and other parts that are to be attached to the lower side of the frame. This accomplished, the partially completed chassis is turned over on the assembly line and proceeds on its own wheels to subsequent assembling operations.

Materials and Parts Fed Into Assembly Lines from Sides of Building

Here can be noted the most economical feature of materials handling made possible by the two-floor construction of the chassis assembly plant. There is little or no movement of parts and materials on either floor in a direction parallel to the assembly lines. All the materials handling is across the width of the building, from the receiving platforms toward the center of the building and up through

the hatchways to the assembly lines on the second floor. This economy is effected by landing incoming materials at points on the receiving docks almost directly under the place where they will be required on the second-floor assembly lines. Each bay on the receiving docks is numbered. A motor truck arriving with a load of wheels or tires is assigned to a section of the truck receiving dock near the rear of the plant and almost directly under the hatchway nearest to the point on the assembly line above where wheels and tires are attached to the chassis frame, just before it is turned right side up to proceed on its own wheels.

An incoming freight car loaded with truck engines is spotted on the siding at the rail receiving dock at a point nearer to the front of the building where the power plants are assembled on the ground floor and sent up to the second floor through the hatchway nearest the point on the assembly lines where the power plants are put in place on the chassis. In the case of engines and other heavy parts the same electric hoists that bring them to the upper floor drop them into position on the slowly moving chassis in one handling operation. Sub-assembly lines on the first floor move across the width of the building toward the center, ending under the second floor assembly lines. Motor and transmission assembly, including electrical units, is accomplished on roller type conveyors, one for each type of power plant, each ending under the hatchway through



FLOW Plan of New General Motors Truck Plant. The routes of chassis and body assembly lines, which merge near the front of the plant and flow together toward shipping platform and storage space, are shown

which its engines pass to the floor above. Cowls and instrument boards are another separate sub-assembly line on the ground floor, ending under the point on the second floor where they are put in position on the moving chassis.

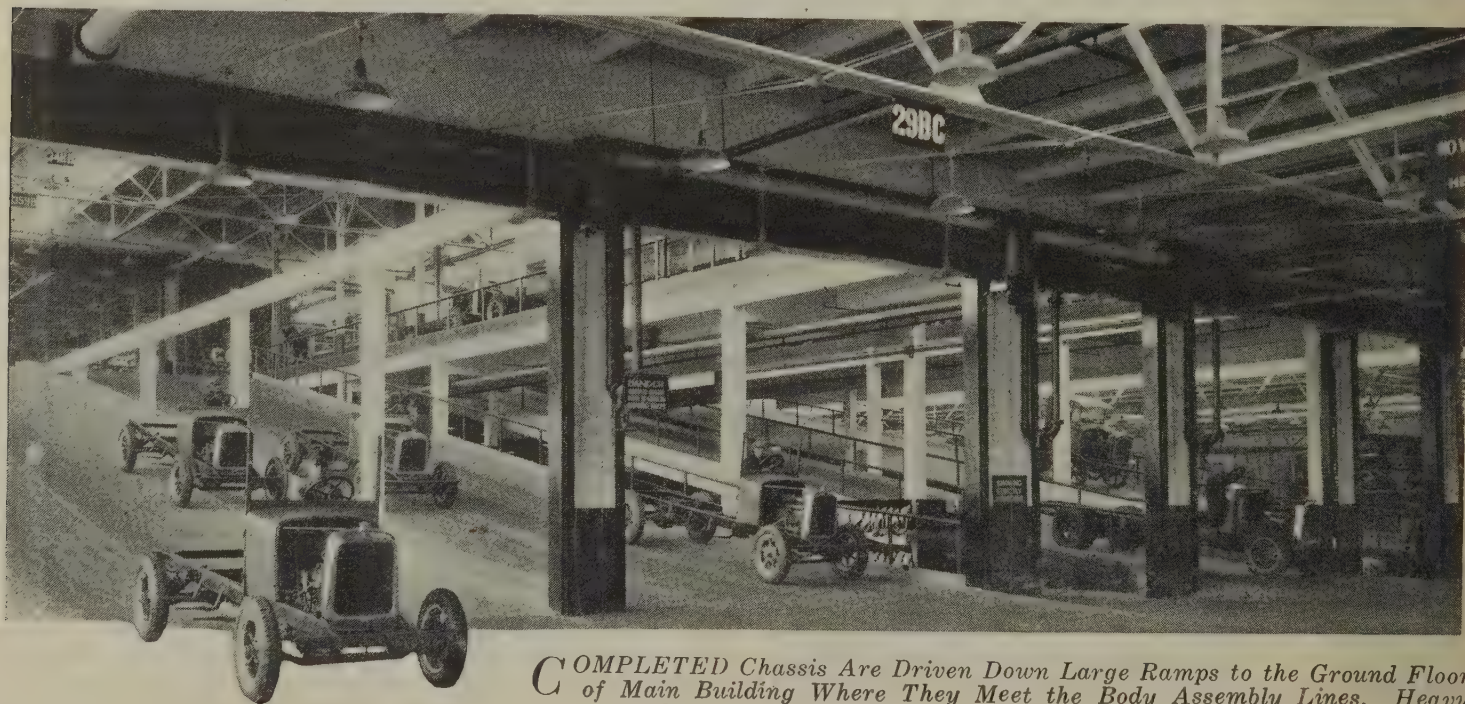
By the time the chassis reaches the end of the assembly conveyor line, near the front of the plant, all of the primary assembly operations have been completed and the unit is ready for dynamometer testing. Oil and gasoline have been provided through pipe lines which terminate over the ends of the assembly lines. The units are driven to the dynamometers on their own power. An unusually large battery of dynamometers, 20 in all, extends the full width of the second floor of the main building. They are provided with quickly adjustable jacks to meet the variations in wheel-base lengths. Each unit is subjected to a 90-min. test in all speeds and up to full throttle operation. Rollers under the rear wheels of the vehicle being tested absorb torque and operate electric generators mounted under the floor. There are mileage and speed recording speedometers as well as fuel metering tanks for fuel economy tests.

Second Series of Conveyors for Chassis Painting and Final Assembling

After testing, the vehicles are driven down long ramps that terminate on the first floor, where the units are at-

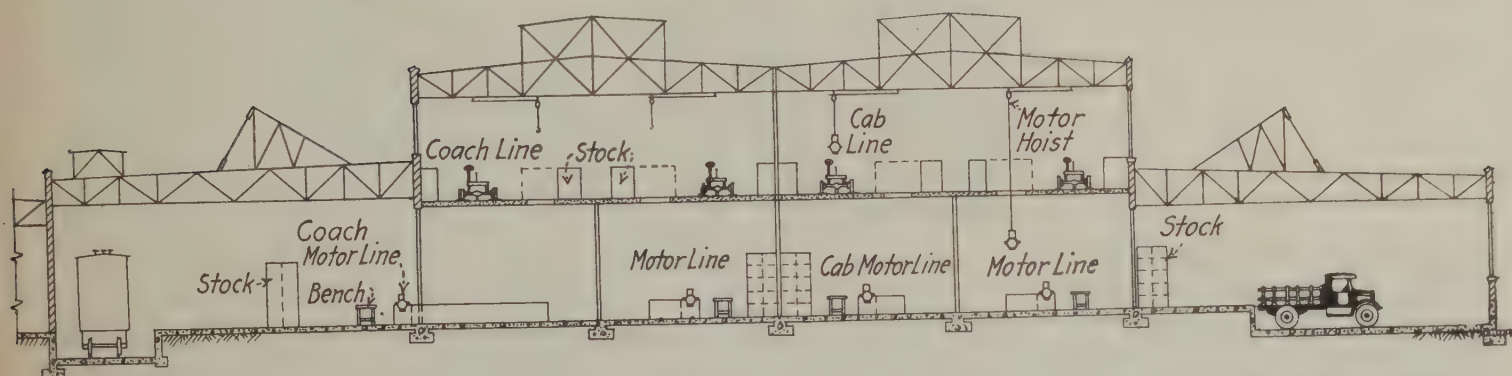
tached to a second series of conveyors for the chassis painting and final assembly. Here the chassis are cleaned by a gasoline spray and lacquered as they pass through spray booths. At this point on the final assembly lines enamelware, such as running boards, fenders, hoods, etc., are added to the chassis, brought from the huge storage rooms located under the ramps. After these operations are completed the vehicles are driven from the ends of the secondary assembly lines into a transverse section of the plant which runs at right angles to the chassis assembly conveyors. Here the bodies, brought from the adjoining body department by overhead electric cranes, are mounted on the chassis. The vehicles then make another right angle turn toward the rear of the plant, into the shipping warehouse. Across the rear end of this warehouse is a loading dock, 60 ft. long, which lies between the warehouse and the ends of the loading tracks. Vehicles can be loaded from this platform either into end-door or side-door box cars or they may be run down between the loading tracks and loaded into the cars, circus fashion, by use of skids.

Vehicles that are to be exported pass directly from the warehouse to the export loading dock, where they are disassembled and boxed. Export boxes are made in this department, the lumber being brought in on transfer cars from a lumber storage yard just outside. Completely boxed



COMPLETED Chassis Are Driven Down Large Ramps to the Ground Floor of Main Building Where They Meet the Body Assembly Lines. Heavy trucks and coaches can be driven down these ramps eight abreast

LARGEST Of the Four Chassis Assembly Lines Is That on Which the Yellow Coach, Gas-Electric Chassis Are Assembled. The view at right is of the end of the line where the last operations on the chassis are completed before the vehicle is driven down the ramps to the ground floor



FRONT elevation of the New General Motors Truck Plant at Pontiac, Mich., Showing Second Floor Chassis Assembly Lines and Facilities for Receiving Both Truck and Rail Freight. Materials and parts are moved toward the center of the plant by a network of overhead chain and electric hoists running on mono-rails. After sub-assembly operations are completed, the parts are lifted to chassis assembly lines through hatchways by electric hoists

View of Light Truck Assembly Line on Second Floor of Main Building. The vehicles proceed on their own wheels, drawn by chain conveyor



vehicles are picked up by a traveling crane and placed upon flat cars which are run into the building on an inclosed siding.

Wood Refuse from Body Plant Conveyed to Boiler Room

The initial department of the body plant is a battery of kilns which lies between the green lumber storage and the dry lumber storage. Material from the dry lumber storage is delivered to the wood mill by traveling cranes which distribute the lumber to the stock saws. Wood refuse from the wood mill is transferred, by means of an exhaust system which is connected with all woodworking machines, to the power plant where it is burned in a special boiler which is adapted to the burning of pulverized coal or sawdust. Refuse from the wood mill, other than chips and sawdust, is collected from the machines and ground into chips by a "hog," from which the chips are drawn into the exhaust system and conveyed to the boiler room.

Adjoining the body frame department is the sheet metal

department, located in the same crane bay which serves for handling export shipments at the other end of the building. Sheet steel is received in gondolas in 10-ton bales which are removed from the cars by the crane and stored near the sheet steel presses. From the crane bay the sheets progress through the sheet metal department toward the body assembly lines, undergoing various machine treatments. Truck, coach and taxicab bodies are manufactured here. Each type of body is handled upon one of four conveyor chains which move the bodies through their various assembling operations.

After being completely assembled the bodies move from the body assembly conveyors into the lacquer booths. Parallel to the lacquer rooms is a series of drying ovens for accelerating the drying of priming coats. The last operations upon the body take place under a crane bay, which makes it possible to mount the heavier body types with the help of the electric crane. The completed vehicle is now ready to be driven out of the plant.

Quenching in Hot Salt Baths Recommended

PROFESSOR K. HONDA and one of his associates, K. Tamaru, have heated a Swedish steel (0.89 per cent carbon) 15 min. at 800 deg. C., then quenched it in mercury or salt baths at various elevated temperatures, and investigated the resulting properties. It is well known that drastic water quenching (to be followed by a draw) is liable to cause cracks either large enough to cause instant rejection, or if undetected to cause rapid failure under alternating stress. Since the experimenters believe that austenite must pass through martensite before reaching a pearlitic condition, irrespective of the cooling velocity, they attempted to discover such a quenching rate that the expansion occurring during the austenite to martensite change would be counterbalanced by the contraction occurring in further decomposition of the martensite, taking place simultaneously in adjacent regions. Results are given in *Science Reports*, Imperial Tohoku University, January, 1928.

quenching bath is below 120 deg. C., for then the surface layers contain more arrested austenite than the core and consequently are under tension. When the quenching bath is from 150 to 200 deg. C., no arrested austenite is found near the surface and the inner portion is martensitic and contains only a very small amount of troostite; hence the shell is under compression. Although the specimen is very hard it seldom cracks. Such conditions are ideal for the preparation of sound steel parts.

Variations in tensile strength and impact resistance are also explained on the basis of observed microstructure. Sorbitic structures can be obtained by quenching in melted salt at about 500 deg. C., and give physical properties "not inferior to those after water quenching and tempering." Furthermore this is thought by the authors to be a simpler method of heat treatment and one which avoids the danger of quenching cracks.

BRINELL HARDNESS NUMBERS OF QUENCHED STEEL

Temperature of Bath or Draw. Deg. C.	Time in Hot Quenching Bath			Water Quenched and Tempered
	1 Min.	10 Min.	20 Min.	
100	664	664	640	685
200	589	620	615	600
250	582	583	484	540
300	507	501	435	505
350	400	430	385	480
400	375	395	370	410
500	364	370	350	325
550	358	360	...	290

Mercury was used for quenching temperatures up to 150 deg. C.; above that, a eutectic mixture (65:35) of potassium and lithium nitrates. Hardness tests are summarized in the table. It will be noted that, if the quenched steel is allowed to remain in the hot quenching bath a considerable time (20 min.), the hardness is somewhat reduced because the martensite has more opportunity to decompose further into the soft sorbite and even pearlite.

The table shows that the decomposition temperature of martensite also falls with increased time in the hot bath, as follows:

Water quenched..... 270 deg. C.
One minute in hot bath..... 280 deg. C.
Ten minutes in hot bath.... 250 deg. C.
Twenty minutes in hot bath. 230 deg. C.

A second elbow in the curve for water quenched steels, at about 430 deg. C., represents the hardening effect of recrystallization on reheating.

Cracking always takes place if the temperature of the

Curious Use of Pig Iron

In the days of sailing vessels much pig iron was used as ballast. The British Navy, in particular, had definite specifications for iron to be used for this purpose. Its contract called for iron which was to be "good, sound merchantable and not to break." Two sizes were specified, measuring respectively 6 in. square and 3 ft. long and 4½ x 6 in. in section and 18 in. long. It was stipulated that 5 cu. ft. of these pigs were to weigh 1 ton.

As sailing ships gradually went out of vogue (and out of commission) they landed their ballast at the dockyards, and the accumulation of pig iron from this source, reaching at one time nearly 40,000 tons, became a matter of embarrassment, according to the *Engineer* (London). Attempts to dispose of the material had little success, as the metal was found unsuitable for foundry purposes. It varied in characteristics, from pig to pig. In a period of 6 years only 1823 tons were sold, at a price averaging about 47s. (\$11.50) a ton. Ultimately, much of the iron remaining in stock was used in making roads, which in time were found to show very little deterioration.

In apportioning freight cars for their work the *American Railway Association* estimates that 454,760 cars will be loaded with iron and steel products in the third quarter of 1928. This is an increase of 4.8 per cent over the 433,823 carloads of the corresponding period in 1927.

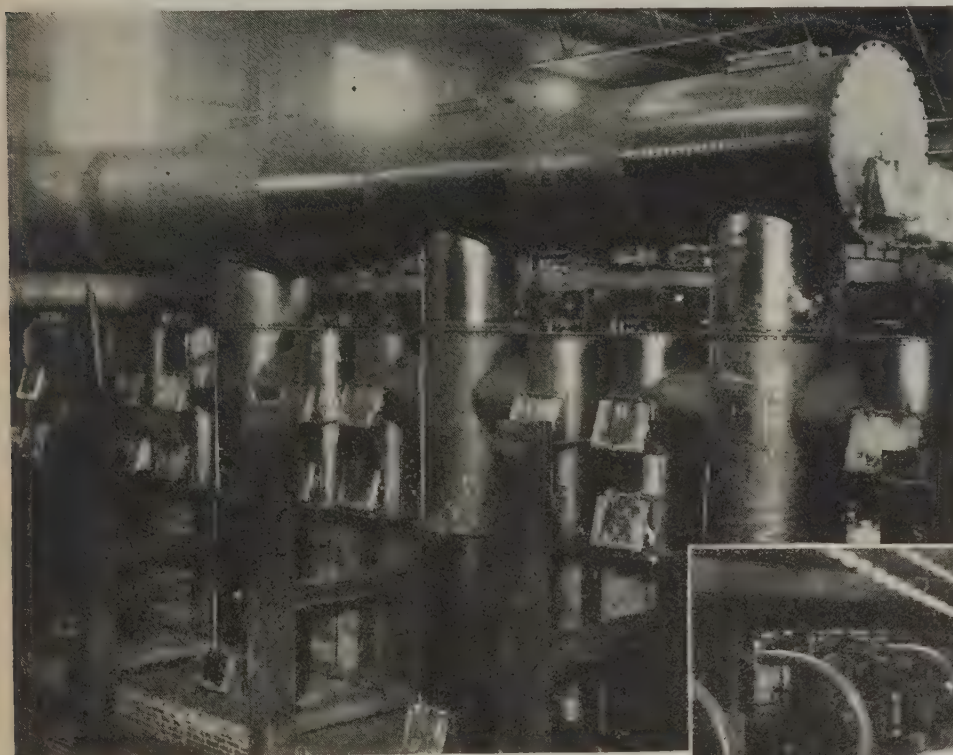
Top-Fired Annealing Furnaces

Arrangement for Controlling Gas Flow Through Manifold and
for Providing Uniform Temperature—Control
Located in Front of Furnace

BY OLIVER P. LUETSCHER*

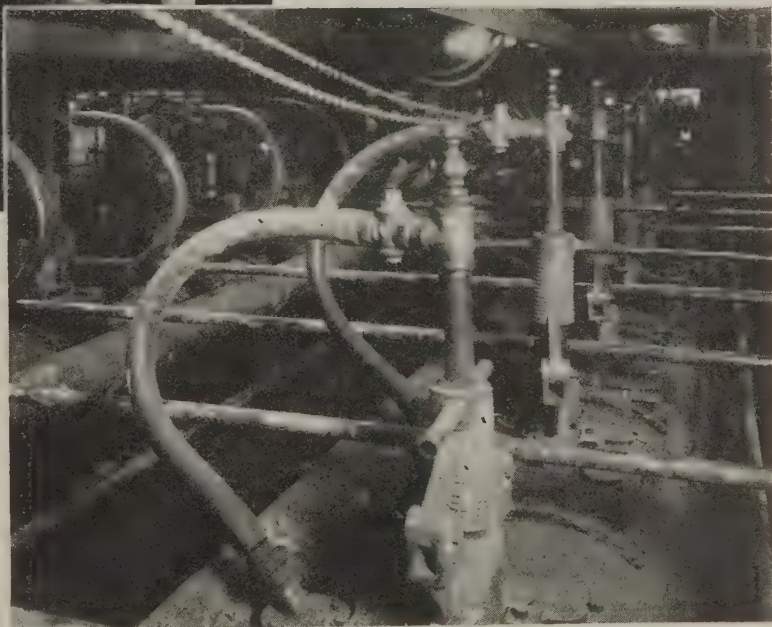
UNUSUAL features in applying the fuel supply have been incorporated in annealing furnaces in the plant of the Acme Steel Co., Riverdale, Ill. This installation, under the design of the writer, consists of a

into two valve casings, one at either side and at a level near the crown of the furnace. From the two valves the gas is led into two manifolds or headers along either side of the furnace and above the crown. The center lines of



AT Left Are Shown the Gas Connections Between the Main and the Furnace, Together With the Valve Casings Through Which Gas Passes from the Vertical Legs

AIR-CONTROL Mechanism Is Shown at Right as It Is Placed Above Each Furnace. The regulation valves serve to adjust the flow of air



set of furnaces used for annealing strip steel, both in nested coils and in flat, piled, cut lengths. The method of handling is the usual one for box annealing strips, sheets, tin plate and other similar products.

Raw producer gas from a mechanical producer is brought to the furnaces by steel plate flues lined with insulating brick. It is the method of applying the gas which is entirely new and was developed for this installation. Gas is brought from the main into a vertical leg in the center at the back of the furnace. From this leg gas passes

these manifolds are parallel to the side walls and slightly within the line of the inner surface of the walls. The arrangement, which may be seen clearly from the photographs, serves to settle out most of the soot or dust in the gas. This is removed periodically from the clean outdoors in the leg and casings.

From the two manifolds the gas passes into the furnace chamber through a series of ports. These are located below and in line with a series of cast iron saddles on the lower side of the manifold and resting on top of the furnace. The ports are lined with refractory burner blocks

*Mechanical and metallurgical engineer, Peru, Ill.

to maintain ignition and slow down the flame. Immediately above the ports and in line with them another series of saddles, resting on top of the manifolds, carries the air-regulating mechanism.

This consists essentially of a nozzle which combines the function of directing the air and regulating the proportional flow of gas to the port which it serves. Each nozzle is carried on the end of a long stem which projects beyond a stuffing box in the cover of the saddle. The stem has an enlarged portion which is grooved to engage a pair of pawls. This arrangement permits the nozzle to be set in any desired position to give the proper gas opening between the nozzle and the seat below it. At the top of



Front of One of the Group of Five Furnaces, Which Are Side by Side. Control chains hang before each door. Car bottoms roll in on balls in grooves

the stem is an air-regulation valve, which serves to adjust the flow of air to the nozzle in the desired amount.

A peep hole at this point permits the operator to view the flame from that particular port. There is also provision to allow the nozzle to be lowered on to its seat and to clean off any accumulated tar or soot by the rotation of cleaning vanes. Air is brought to the individual ports by manifolds located parallel to the gas manifolds. These

are carried in brackets on the upper saddles and a flexible connection brings the air to each nozzle stem.

Direct operating control of the furnace is obtained by the two main gas valves at the back and by two corresponding air valves in the air manifolds. The air and gas control at each port are for adjustment of the separate ports. The operating control is brought to the front of the furnace, where it is actuated by hand chains. This is arranged so that the operator can regulate the furnace while viewing the flame through the peep holes in the door.

It will be evident from the above that the flame enters the furnace through the roof and is projected vertically downward. Furthermore, the flame from each port can be made any desired proportion of the total. By this system the operators have found that any portion of the furnace—top, bottom, front, back or sides—can be controlled and the temperature of that particular section raised or lowered during the cycle.

Very little clogging has been encountered. On the few occasions when it has been a factor, it has been found that operation of the cleaner for a few seconds has cleared the ports. Adjustment of the individual nozzles is seldom changed, as in ordinary operation everything is managed from the floor in front of the furnace. One most desirable point is the possibility of securing smokeless operation under a slight pressure in the heating chamber, without excess air in the chamber. The closeness of control permits the operator to keep his temperature near the maximum without danger of overheating any portion of the charge. In consequence, this has reduced the time of the cycle from that required where such close control is not available.

From the mechanical standpoint the design offers the desirable feature of complete accessibility. There are no underground gas passages or small masonry ports to become clogged. All of these parts are on top of the furnace, where they can be inspected or repaired without difficulty. The entire nozzle mechanism is carried from the cover. It can be removed and a new one put in in less than 5 min. The port tiles are removable through the top of the manifold and, if necessary, can be replaced without cooling the furnace.

From the standpoint of the user, a matter of interest is the fact that the system can be applied to existing furnaces with little change. It is equally applicable to both intermittent and direct-fired tunnel kiln types of furnaces. It can be adapted also to other fuels, such as powdered coals or liquids, in combination with gas. These furnaces have been in operation about three months, but the initial experimental furnace was running for three months before that.

One Cause of Unemployment Difficult to Gage

Displacement of labor resulting from technical improvements is tending to create a perpetual problem in many of our factory industries—a problem which can be relieved only by the gradual absorption of such labor in new employments. Such absorption is continually going on, but is not reflected in the employment statistics, according to an analysis of unemployment made by the Harvard Economic Service.

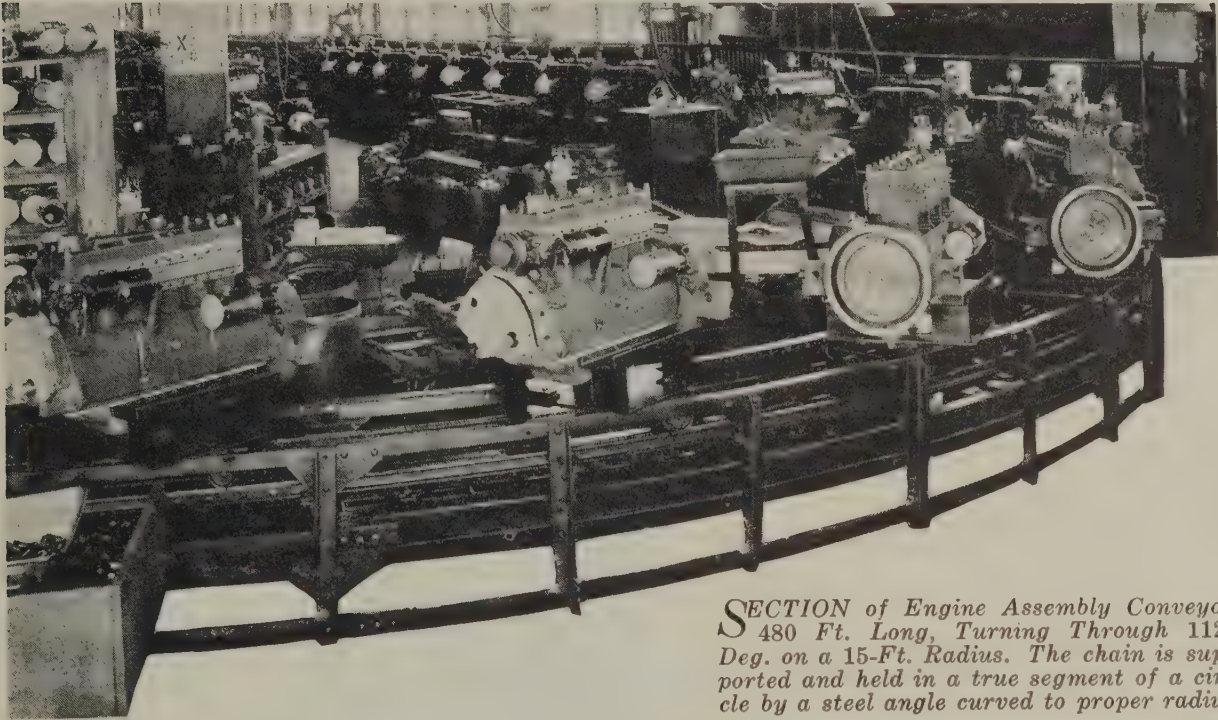
"Figures obtained by responsible governmental bureaus concerning factory employment fail to tell the whole story, not merely because they are confined to factory employment, but because, from the very nature of the case, the samples represent factories which report data regularly. Naturally these are more likely to be factories of the better

grade, in which the displacement of labor through improved machinery and shop practice tends to be greater than in the average establishment.

"It is likewise noteworthy that figures for an industry do not get into the Bureau of Labor Statistics index until the industry has become well established. The result is that new industries, which may take up labor displaced by increased efficiency in older industries, go unreported in the index. Influences such as this probably account for the fact that the Bureau of Labor Statistics index of factory employment shows a decline, from 1923 to 1925, which is much greater than the decrease in employment reported by the United States Census Bureau for all manufacturing industries."

Chain Conveyor Turns Through 112 Deg.

Gasoline Engines Assembled on 480-Ft. Unit Along Two Walls
—Dollies Return on Lower Side of Run



*SECTION of Engine Assembly Conveyor
480 Ft. Long, Turning Through 112-
Deg. on a 15-Ft. Radius. The chain is sup-
ported and held in a true segment of a cir-
cle by a steel angle curved to proper radius*

SPACE limitations in the engine assembly department of the Detroit plant of the Continental Motors Corporation are responsible for the rather unusual construction of an engine assembly line conveyor recently installed by the Detroit Conveyor & Machine Co., Detroit.

When it was determined that a conveyor nearly 500 ft. long would be required, to complete all of the assembly operations on the larger types of Continental motors, it was discovered that no such lengthy space was available unless it were found possible to utilize a rather wide aisle running along the front and down one side of the assembly department. Engineers were called in to make estimates on a conveyor running along this space. But most of the plans submitted called for two conveyors, running nearly at right angles to each other and almost joining at the corner of the building. These plans would have required that part of the assembly be done on one of the conveyors, leaving the remainder to be completed on the other. This would have made it necessary to transfer the partly completed engine from one conveyor to the other, with the help of electric hoists or overhead cranes.

By using one continuous conveyor which would turn the corner of the building on a 15-ft. radius, the plan submitted by the Conveyor company eliminated all of this waste of time, power and labor. The completed conveyor, now in successful operation, is 480 ft. long and 30 in. wide, with a turn more acute than a right angle in its center—leaving a 78-deg. angle—to conform with and parallel to the walls of the building. The change in direction is 112 deg. This turn is accomplished by using a No. 678 Keystone chain, supported and held in a true segment of a circle by a piece of 2½-in. steel angle, curved to the proper radius. There is a Reeves variable-speed changer in the drive unit, with ratio 3:1. The chain proceeds at the rate of 2 ft. a minute.

Engine carriers, or dollies, are spaced 5 ft. apart along

the chain. The great variety of engines produced at this plant made it necessary that these dollies be quickly adaptable to 16 types of engines. It was also necessary that the fixture supporting the engine should swivel, so that any part of the engine might be instantly accessible from either side of the conveyor. Each dolly is built of 4-in. channels riveted to a plate, which swivels on its 4-wheeled base, allowing its load to be turned around to any position.

Because of the limited width of the aisles in which the conveyor is located, it was required that these dollies be returned to the beginning end of the conveyor, underneath the top run. As the dollies are nearly the same width as the conveyor and of a greater length, they approach the end of the conveyor with corners protruding beyond the width of the conveyor at various angles, because of the varying positions in which they are left when the completed engines are lifted from them by an overhead crane. Before they can pass over the end sprockets and begin their return journey to the beginning end of the conveyor they must be righted into a position parallel with the tracks. This is accomplished automatically by loose and tight rollers about 2 ft. apart, which true up the dollies into the correct position.

At the beginning end of the conveyor the bare engine block is attached to a dolly which has just come up empty from the lower return run. When it is lifted from the other end of the conveyor it is a complete power plant. Crankshafts, pistons, connecting rods, valves, flywheel, sparkplugs, ignition cables, timing gears, distributors, coils—in short, everything—has been added in the course of the journey, by the workmen scattered along both sides of the conveyor. The complete engine, as lifted from the assembly conveyor, is ready to proceed through the testing department.

About 90 engines are on the conveyor at one time, averaging, when completely assembled, 700 lb. each.

Manganese Mined in United States in 1926

More Ore Imported to Satisfy Growing Domestic Production of Ferromanganese—Less Spiegeleisen Made That Year

A STATEMENT on manganese and its ores for the government publication, "Mineral Resources of the United States, 1926," has been prepared by J. W. Furness of the Bureau of Mines. American production of 35 per cent ore was lower than in 1925, and imports were very much higher. Lower imports of ferromanganese followed the entry of the Bethlehem Steel Co. into the market as a seller. Spiegeleisen also seemed to be used less extensively in steel making than in former years. Comparisons follow (the figures represent gross tons of ore or alloy):

<i>American Production and Imports</i>			
35 Per Cent Ore or Better:			
American production	1925	1926	
	98,324	46,258	
Imports	615,000	738,000	
Ferromanganese:			
American production	254,005	330,070	
Imports	78,713	59,710	
Spiegeleisen:			
American production	95,890	82,982	
Imports	1,090	8,783	

Notable changes in the American mining districts were mentioned as follows:

No shipments were made from Colorado in 1926. The Leadville area, from which much ore has come, contains large resources as compared to the known resources in other States, but apparently could not produce at a profit at prices then current.

In Montana, during 1925, the Emma mine in Butte shipped 47,469 tons of carbonate ore, but only 1263 tons in 1926. Reserves were maintained during the period of active mining, and it is believed by Mr. Furness that discontinuance was caused by low returns after the railroad freights were paid. It might be noted that a calcining plant has been erected to handle these ores within the last year. Philipsburg produced only chemical ore in 1926.

Nevada increased shipments from 850 tons in 1925 to 1607 tons in 1926; the blast furnace at Provo, Utah, absorbed this increased output.

Four shippers in Virginia produced 1998 tons of metallurgical ore in 1926; three mines shipped 1499 tons in 1925.

The Crescent Mine, on the Olympic Peninsula, Wash-

ington, was the largest single producer in the United States during 1926. Up to July it shipped 3162 tons of 51 per cent ore, but at that time its developed ore was exhausted. The total production of this mine from its discovery was 16,275 tons.

"Production of manganese ore in the United States," the author writes, "is rapidly approaching a point where materially higher prices will not, relatively speaking, increase production; the hope lies in solving the metallurgical problems of low-grade ores." Of the latter, large tonnages are in sight in the Cuyuna range, Minnesota; Leadville and Red Cliff, Colo.; Grant County, New Mexico; Phillipsburg and Butte, Mont.; Olympic Peninsula, Washington; Pioche district, Nevada; Batesville, Ark., and various places in the Appalachian Range.

India Was Largest Producer

Some of the outstanding features of the manganese industry of the world during 1926 were the increased production in India in spite of curtailed exports, the large shipments from Brazil, despite large export duties, the maintenance of production in the Gold Coast, the increased production and export to world markets of the Nikopol deposits in the Ukraine and Tchiaturi in Georgia (Russia), the heavier shipments from the Netherland East Indies, the development of Australian deposits, resumption of Chilean exports, and the prospective production of South Africa. The 1926 industrial depression in England doubtless affected the world's consumption. The price of manganese ore during that year was fairly constant except for a period of depression during the third quarter. Production of ore in gross tons follows:

	1925		1926	
	Production	Exports	Production	Exports
India	839,461	738,851	1,014,928	613,536
Brazil	326,585	302,305	256,034	311,253
Gold Coast	.....	338,657	.....	344,933
Nikopol, Ukraine	180,000	137,000	419,000	235,000
Tchiaturi, Georgia	.....	.....	750,000(a)	396,537
Dutch East Indies	.....	9,870	.....	11,047
Cuba	23,000	23,000	10,000	8,100(b)

(a) From August, 1925, to Jan. 1, 1927.

(b) None shipped since June, 1926.

One Effect of Mechanizing Industry

INDUSTRIALIZATION of the feeble-minded is reported by Ethelbert Stewart, United States Commissioner of Labor Statistics, to be resulting from the increasing use of machinery. Operation of automatic machinery which makes little demand on the intelligence has, he says, been an important factor in opening up means of employment for substandard individuals. Employment of such workers has a tendency to depress wage levels. While these workers are more docile, and thus more easily managed, than those higher in the mental scale, they are also more liable to industrial accident and when injured are less easy to rehabilitate.

Inasmuch as 45 per cent of the men given the Army intelligence tests during the World War were found with mentalities of 12 years and under, it may be estimated that nearly 26,000,000 persons in the United States of working

age are of low average or inferior intelligence. The entire number of wage earners employed in manufacturing industries in 1925 was less than 9,000,000. With these facts in mind, Mr. Stewart points out the serious economic and social effects which would follow a general movement to industrialize the feeble-minded.

A Pacific Coast oil company, according to *Oxy-Acetylene Tips*, overhauls its pumps by reboring the cylinders and building up the bronze pistons to suit the larger diameter. A ¼-in. layer of manganese bronze requiring 54 lb. of welding rod can be welded on an old piston 6 in. wide and 30 in. diameter in 8 hours. Skillfully done, the new surface after turning and grooving is equal to a new replacement.

Steel Casing Replaces Concrete Cells

Oil Circuit Breakers Built into Steel Cabinets and Mounted on Wheels Give Many Advantages Over Older Style of Permanent Mounting in Masonry Cells

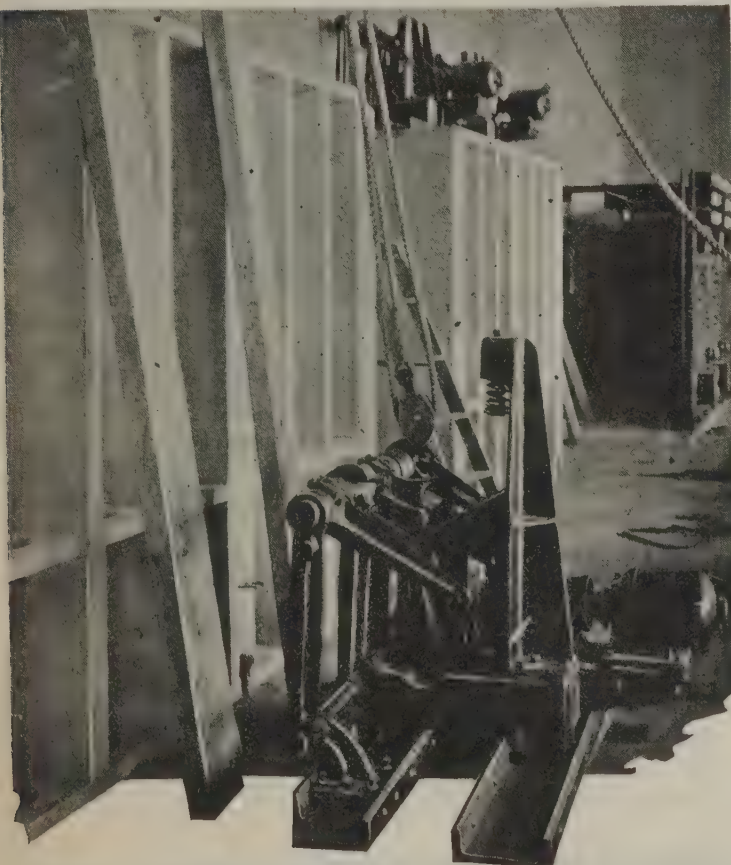
THIN steel plate is replacing more and more stone and cement in the manufacture of electrical switch gear. One item which has attracted much attention among electrical engineers and distribution men

in recent years is the automatic substation and switch house. It has become standard practice to house moderate sized switches and meters, used to connect high-voltage transmission lines with branch circuits leading to

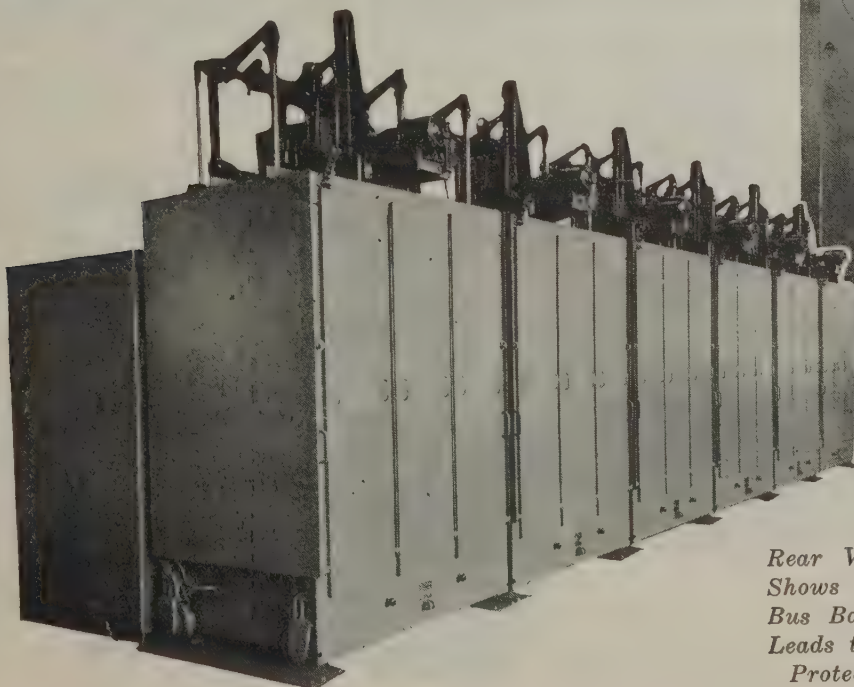
small users or communities, in a steel house entirely weather proof and middle proof. Such equipment is placed within the steel shed and completely tested by workmen in the factory, and shipped as a unit. Arriving at its destination, it is only necessary to unload the steel house upon a dry foundation, connect the incoming and outgoing lines, close the switches, lock the door and leave it alone. This switch gear automatically clears the line in case of trouble, and re-establishes the service once the fault has cleared itself, or when normal conditions of load are restored.

Lacquered steel sheets are also being built into switch board panels, replacing marble and slate, with notable advantages in lightness and ease in fabrication and erection. But the most recent and in many ways the most interesting invasion of a field preempted by brick and concrete is in the construction of cells and housings for bus bars and heavy-duty oil circuit breakers installed in electric

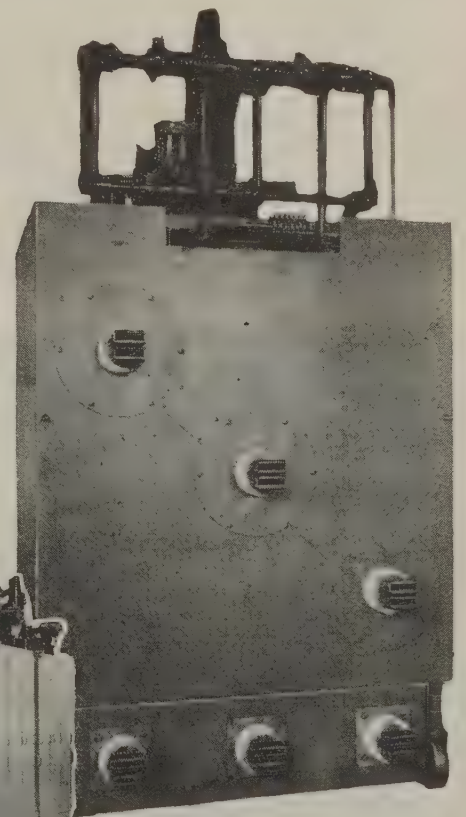
Concrete Cells Leave Cramped Room for Assembly or for Repairs or Adjustments



Truck-type Oil Circuit Breakers in Operating Position in Front of Steel Housing for Bus Bars



Rear View of Removable Truck Shows Contacts for Main Station Bus Bars in Diagonal Row, and Leads to the Three Phases of the Protected Circuit at the Bottom



generating stations, in the larger substations, or on lines serving consumers of considerable current.

It has formerly been the practice to place such devices in concrete cells, built into the main structure. This requires not only some expensive form work to mold the concrete, but several erecting operations on the switch gear itself. Insulators have to be carefully set, operating rods properly aligned, motor driven mechanism for opening and closing the switches precisely located in respect to the other parts, vent pipes for oil vapors connected, and all the secondary circuits for operating motors and signal lights installed. Such erection work is so intricate that the General Electric Co.'s instruction pamphlet for the installation of these oil circuit breakers is 48 pages long, and illustrates and describes no less than 21 construction operations, each of which must be performed in the powerhouse, in cramped, often dusty, surroundings, and usually by workmen unfamiliar with the work in hand.

All this equipment has now been sectionalized and built into self-contained sets, as shown in the accompanying reproductions of photographs. The removable truck is a steel-inclosed unit, constructed entirely of steel plates bent to form and welded together into a strong, rigid, self-supporting structure. Sheet steel bar-

riers, placed between the three circuit breakers (one on each phase) divide the truck into separate compartments. Into these compartments the circuit breaker is completely erected and tested in the factory, where the facilities for such work are of the best. The power station merely has to provide the necessary smooth floor space and connect the cabinets with the incoming and outgoing lines. The convenience to the purchaser is obvious. A material saving in floor space is also effected.

An even greater advantage of the steel truck panels is their safety. The new steel construction not only removes many grave risks of accident to the operating staff, but also reduces the frequency and liability of interruption to service. Should the breaker be damaged, or need a periodic inspection, it is unnecessary for the electrician to wriggle into a tight concrete cell, in close proximity to live circuits carrying heavy voltage and current. He merely rolls the truck out and replaces it with a spare, held in reserve.

Steel is also a material which lends itself excellently to interlocking devices for the safety of the workmen. When the breaker is closed and current is passing through it, a small hand lever operating the locks at the upper corner cannot be moved. When the breaker is open and no current

is passing through, the lever may be turned to the left, which opens a switch in the motor drive (the breaker cannot then be closed by another person at a distance) and raises an anchor holding the truck in service position. The truck may now be withdrawn, but the doors cannot be opened. When the truck is pulled out, sliding doors drop over the opening into the bus-bar cells, thus preventing accidental contact with live lines. The hand lever can then be thrown to the right, and the doors in front of the circuit breakers removed. When any door is opened, a spring latch locks the hand lever, so it cannot be moved until all doors are back in place.

Taken as a whole, the development of the steel-inclosed units for central station work has resulted in economies and conveniences to the manufacturer, the central station, the electrician and the current buyer. The manufacturer does all the erection in his shop with specially trained workmen. The purchaser thus gets a more compact, reliable and better adjusted device. The substation operator has a far safer place to work, and the ultimate consumer of electricity gets nearer the goal of absolutely uninterrupted current supply. All this is made possible by the substitution of light steel sheet as a construction material for the bulky immovable concrete.

Heating Forging Steel by Electricity

IN the illustration, which is from a photograph taken in the spring and upset building at the Fordson plant of the Ford Motor Co., are shown two types of typical electric forging furnaces such as are used for heating stock for the forging of gears and other work of this character. The heating elements in the one at the right are Global

resistors, while those in the other are of the trough resistor type—troughs of silica carbide containing granular graphite. There is a large electrode at each end. Both furnaces operate at a temperature of approximately 2350 deg. Fahr. There is a forging machine alongside each heating unit.



Improved Machines for Railroad Use

Two-Spindle Rod Borer Has Attachments for Wide Range of Work—
Motor-Actuated Table Provided for 100-Ton Bushing Press

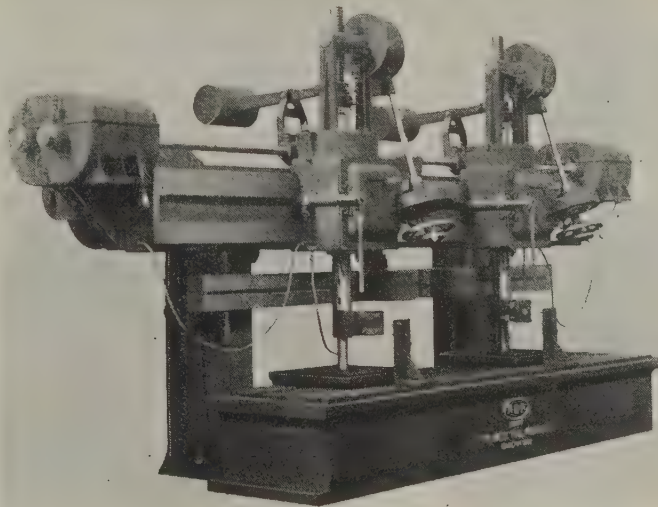
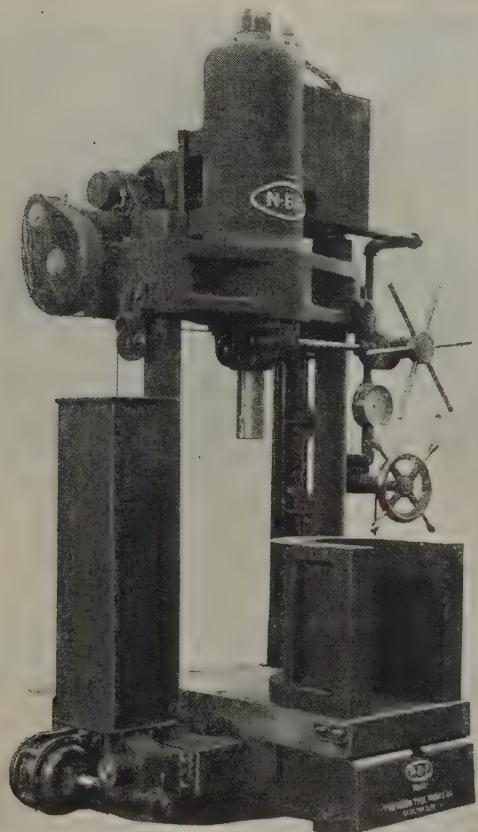
TWO machines built recently by the Niles Tool Works division of the Niles-Bement-Pond Co., 111 Broadway, New York, for use in railroad shops, are shown in the accompanying illustrations. One is a two-spindle heavy-type rod borer for a large Western railroad, and the other, a new 100-ton bushing press.

In addition to modern features of

provided. Spindle saddles are adjusted along the rail by rack and pinion. The minimum distance between spindle centers is 36 in. and the maximum distance is 14 ft. 2 in. The maximum distance from the top of the table to the end of the spindle is 30 in.

A lower rail support is bolted to the housings for steadying the ends

motor. On this table is a heavy cast-iron block or step with a U-shaped opening, on which the driving boxes would be supported when pressing out the brasses. This block may be removed when desired. It has three pins at the bottom that engage corresponding holes in the top of table for centering under the ram of press. The motor is controlled by push-button, and suitable limit switches are provided to prevent overtravel of the table in either direction. Power from the motor is transmitted to the table through worm gearing and rack and pinion.



EACH Spindle of the Rod Borer, Shown Above, Is Driven by a Separate 15-Hp. Variable-Speed Motor. A lower rail support is bolted to the housings for steadying the spindles when using trepanning cutters or box tools

The Bushing Press, at the Left, Has a Special Sliding Table, Which Is Traversed In and Out by Motor

design, the rod-borer is equipped with a number of attachments which adapt it for a wide range of boring and facing operations on locomotive connecting rods.

Each spindle is driven by individual variable-speed direct-current motor of 15 hp., which provides a range of spindle speeds from 8 to 140 r.p.m. The motors are mounted back of the crossrail, one on each end, and drive the spindles through gear boxes. The final drive is by worm and worm-wheel, the worms being provided with ball thrust bearings to assure a smooth drive suitable for heavy trepanning.

The spindles, 5½ in. in diameter in the driving gear and 8 in. at the lower end, are of hammered high-carbon steel. The vertical travel of the spindles is 22 in. In addition to rapid hand adjustment, fine hand feed and six automatic geared feeds, from 0.005 to 0.165 in. per revolution, are

of the spindles when using trepanning cutters or box tools. Spindle guides may be moved out of the way and the rail elevated so as not to interfere with the use of pilot bars. Two movable work tables with bushed holes in their surfaces are also provided for use in connection with boring bars with pilots at their lower ends. These tables are tongued and grooved to the main table and have facilities for clamping in position. For machining bosses on certain types of rods, each spindle is equipped with a facing head having a pilot bar which is guided by a bushing in the movable work table. The feed to the facing head is of the star type. Two independently driven pumps are provided for circulating the cutting fluid.

The 100-ton bushing press is motor driven and is equipped with a special sliding table, which is mounted directly on the baseplate and is traversed in and out by a 1-hp. reversible

Pressing in or out of brasses 20 in. long is within the capacity of the machine. The stroke of the ram is 24 in. The width between the tension bars is 34 in. and the maximum height between the top of the sliding table and the ram is 43½ in. The pump, of two plunger type, is driven by a direct geared 7½-hp. motor.

Nearly 400 acres will be covered by London's reconstructed Croydon airport which is nearing completion, according to reports received by the Department of Commerce from Trade Commissioner William M. Park, London. More than \$1,000,000 has been spent on improvements.

Rotary compressors are covered in a 40-page pamphlet of R. Planche & Co., Villefranche, France. The study, in English, takes up several methods of design and operation.

Brick Cleaning Machine for Rapid Operation

FOR reclaiming open-hearth checker brick, blast-furnace brick, soaking-pit brick, building brick and paving brick, the Rotor Air Tool Co., Cleveland, has put a new model machine on the market. It is claimed that the machine removes the scale from refractory and regenerative brick, clay from blast-furnace brick, and mortar and cement from paving and house brick. It may be used also for cleaning skewbacks and for the general shaping of brick.

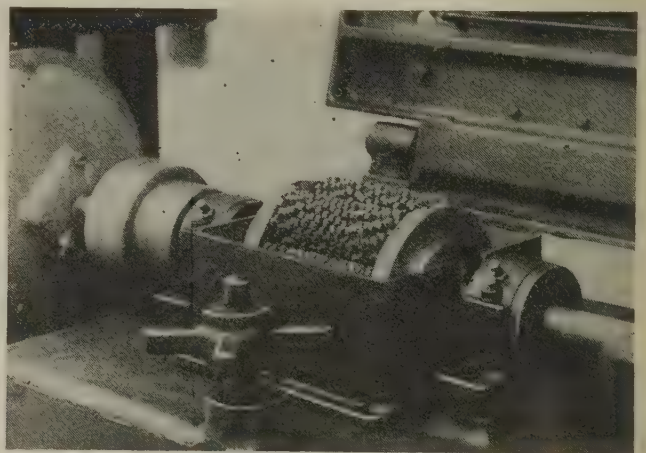
Below the main table is mounted a main shaft running in four Hyatt

of ample power, with variable-speed control and push-button starter, is provided. This motor is direct connected to the main shaft through a flexible coupling. The entire machine is mounted on a four-wheel truck arrangement with a heavy steel tongue, which makes it readily portable and permits it to be rolled from place to place, or to be pulled by a tractor.

It is claimed that with a crew of three men this machine will clean 3000 9-in. bricks in a 10-hr. day. Two men feed brick through the two halves of the machine, while the third man

the usual hand-chipping methods. Tests have shown that the cost is usually less than 1c. per brick, including interest on investment, cost of cutters, current consumption and direct labor cost.

Each head on the machine delivers 600,000 blows a minute. The surface of the finished brick is left entirely free from scale, and it is claimed the breakage is practically negligible, because of the lightness of the individual blows. The machine may be adjusted to perform satisfactorily on a great variety of sizes and types of



Cutter Guard Disks in General View Hide the Cutters, Shown in Detail Above

roller bearings. Two special cutting heads containing the cutting members are mounted on this shaft, with special provision for quick and convenient installation and removal of cutters. The two cutting heads project slightly through two slots or ports in the table. The table itself is hinged at the back end, with a positive screw adjustment to raise or lower its forward end. This adjustment gives the desired amount of contact and blow required for the brick being cleaned. The bricks are handled in exactly the same manner that a piece of wood is planed or shaped on a wood jointer.

The openings in the table are directly connected to an exhaust blower which drives to a convenient place the dust and lighter material removed. Immediately below the cutter heads two automatic dump doors are mounted. These are counterbalanced so as to trip and discharge waste material automatically as an accumulation is formed.

Four aluminum guards mounted with rubber tires appear above the tables. These guards open up as the brick passes over the cutters and then close automatically. They are controlled by a spring appearing in the detailed view, being so adjusted as to offer practically no resistance to opening for the brick. They do not act as guides, as the brick can be passed through them at any angle.

A fully inclosed, dust-proof motor

stacks the cleaned bricks. This compares with maximum production of 900 9-in. bricks for three men under

brick. Patents have been applied for in the United States and foreign countries, to cover the essential features.

Properties of Metals at High Temperatures

Progress in investigations of the effect of temperature on properties of metals is reported by G. W. Saathoff, chairman of the joint committee having the work in charge for the American Society for Testing Materials and the American Society of Mechanical Engineers. The committee's series of long and short-time tests on a variety of metals are being continued through the cooperation of some twenty industrial and government laboratories. As these tests must be fitted into the routine schedule of these concerns, results, it is emphasized, will necessarily be somewhat slow in developing.

With the financial support of a group of steam-turbine manufacturers fatigue tests on metals at elevated temperatures are about to be started at the University of Illinois Engineering Experiment Station under the direction of Prof. H. F. Moore. From a year to 18 months will be required to complete this investigation.

Arrangements are also being completed with another university for the conduct of a group of thermal conductivity tests on the five classes of metals now being investigated by the 20 laboratories mentioned above.

Of particular interest is the announcement by the committee that a large amount of service information on alloy metals at elevated temperatures has been collected from industry and tabulated. Publication of these data may be expected shortly.

Non-Technical Bulletins on Welding

An elementary discussion of the relation between carbon and the properties of welding rods and joints made therewith is contained in Bulletin No. 128 of the Fusion Welding Corporation, 103d and Torrence Avenues, Chicago. It is planned to issue an extended series of such pamphlets considering various phases of the art, and these publications will be sent to anyone interested on request.

Tumbling Barrel Avoids Handling of Stars and Sand

A NEW type of tumbling barrel has been brought out by the Ideal Industrial Machinery Division, Winton Place, Cincinnati. Known as the star return tumbling barrel, it was especially designed for cleaning drop forgings, heavy stampings and castings. The complete line includes machines of several sizes and capacities, ranging from those having an 18 by 24-in. tumbling compartment, and a load capacity of 150 lb., to those having a 48 by 60-in. compartment with a capacity of 4000 lb.

Essentially the machines consist of a tumbling barrel, driving motor and speed-reduction mechanism, mounted as a unit on a heavy structural steel frame. The frame is constructed of steel angles, strongly braced by stretcher members and gusset plates, which give it rigidity to withstand the shocks and continuous vibration encountered during operation.

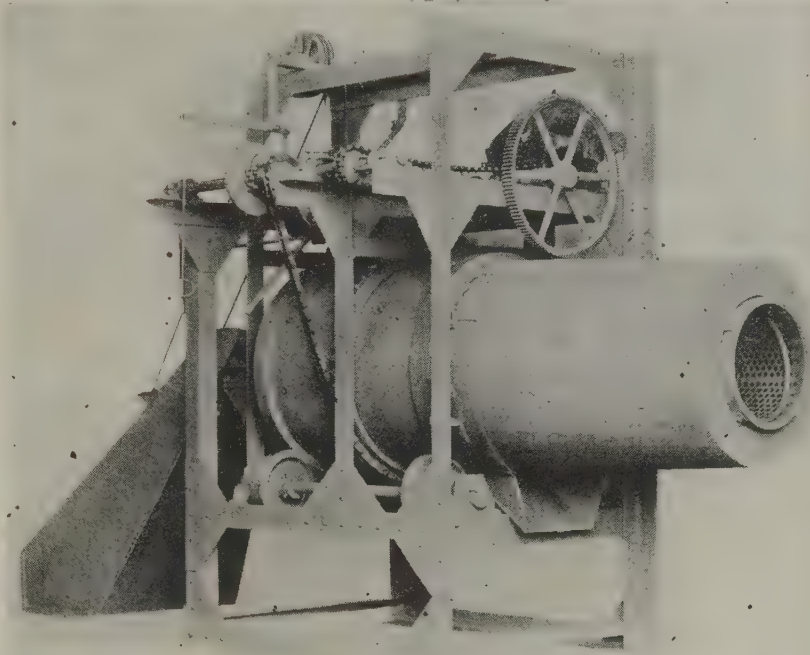
Both the barrel proper and the lifting and lowering motions of the loading scoop are chain driven from a common shaft. This in turn is driven through a gear and sprocket reduction train by a reversing motor. Control of the direction of rotation of the barrel is by reversal of the motor, and that of the lifting and lowering of the scoop by a friction hoist driven from the countershaft. The countershaft has a brake for control of the skip, during lowering.

The barrel is mounted on four trunnion rollers, the two on each side being mounted on a common shaft, supported in pillow blocks equipped with Timken bearings. The selection of the bearings was determined by their ability to withstand the heavy, fluctuating loads caused by the tendency of the contents of the barrel to climb part way up one side, and fall back against the direction of rotation. The housings are designed to hold a large reserve supply of

lubricant, and to exclude dust, sand and grit.

The barrel is divided vertically into two compartments, the tumbling or cleaning compartment and the separating screen compartment. The

work is discharged by reversing the direction of rotation of the barrel. This causes the mixture of sand, stars and work to pass into the screening compartment, where the stars and sand are screened and



Operation Includes Automatic Separation of the Work from the Sand and Stars, Without Need for Handling the Latter

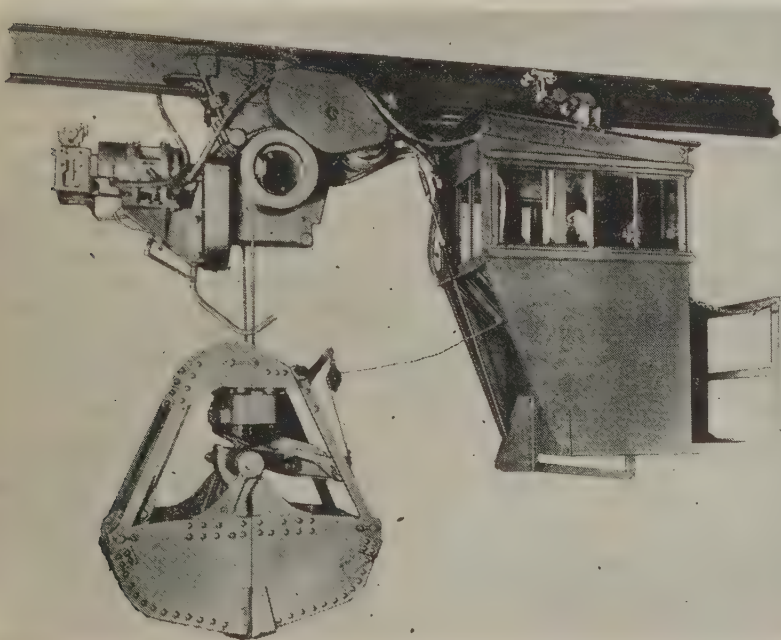
work is tumbled with stars, or sand, together with flint shot, silica sand or steel sheet, the stars being equal in weight to the work. The parts to be cleaned are prevented from touching each other, being floated among the stars and sand. Tough scale can be removed without denting or destroying the corners of the parts, or injuring designs cast or forged on them.

When the run is completed, the

cleaned work is delivered at the end of the screen.

The stars and sand fall into the cone shaped jacket surrounding the screen and, when the barrel is again rotated in the tumbling direction, are automatically returned to the tumbling compartment. The transfer is accomplished through a patented cup arrangement, located in the head between the tumbling compartment and the screen jacket.

Monorail Trolley Hoist With Bucket

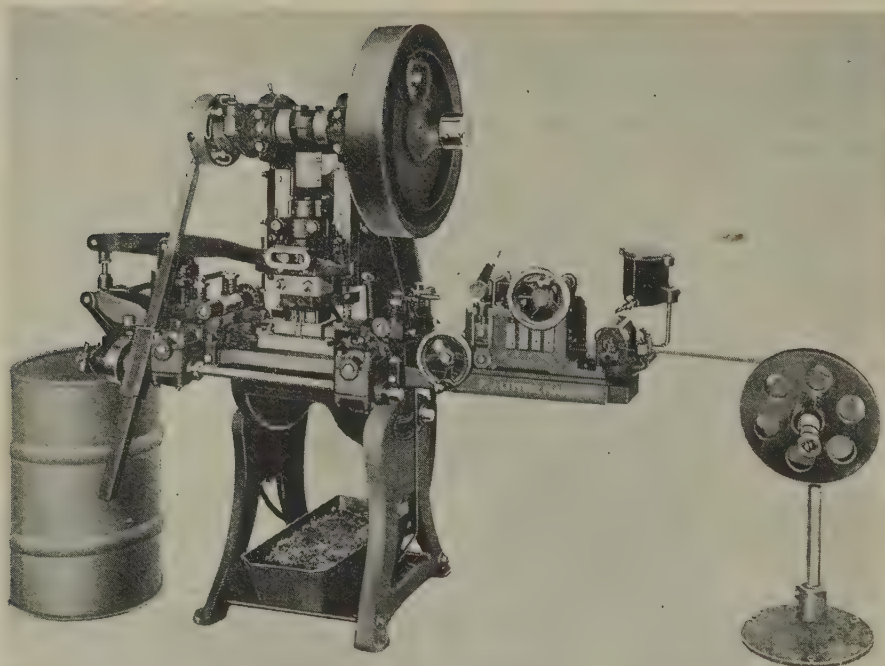


A MONORAIL trolley brought out by Edgar E. Brosius, Inc., Sharpsburg, Pa., is shown in the illustration. A number of the devices have been in service in steel plants for the past three or four years. They are of rugged construction and were designed for severe, continuous work, being built entirely of steel.

The hoist is equipped with a simple worm-gear drive. It is furnished with a hook block for handling the Brosius single-hook bucket, or the bucket can be reeved directly to the drum, as shown. The worm drive requires only a simple magnetic brake on the hoist motor for holding the load, in conjunction with dynamic braking control.

The hoist is equipped with Timken roller bearings. The trolley is simple in design, its drive being of the spur-gear type. Compactness is a feature which is emphasized.

Nine-Roll Straightener for Springy Stock



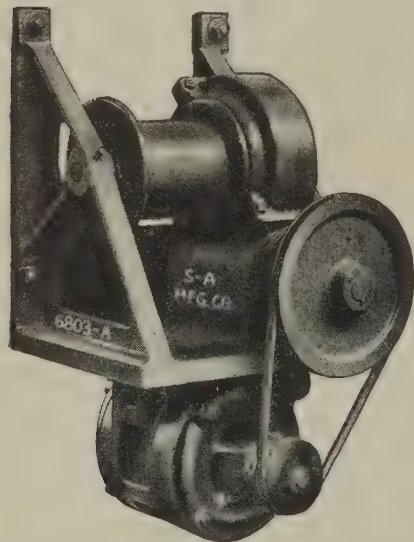
The Straightening Device Is for Light Springy Stock and Includes a Hand Feeding Mechanism

THE F. J. Littell Machine Co., 4125 Ravenswood Avenue, Chicago, has added to its line a new nine-roll straightener designed particularly for light and springy stock. This new unit, designated as the No. 2, is for material $3\frac{1}{2}$ in and less in width. A No. 3 size, with seven rolls and intended for stock up to 5 in. in width, is also available.

The device is arranged with a hand-driven feeding mechanism, so that it need not be used with a roll feed. Use of a hand feed of this type is stressed as of particular advantage when long strips have to be fed from coils and straightened. The device can be set on a table next to the power press and the stock fed to any desired length. The straightener may be used also in connection with a roll feed and can be supplied with an oiler if desired. The rolls are small and are set close together. The equipment illustrated includes a rack and pinion feed with the nine-roll hand feeding straightener and scrap cutter.

Motor-Driven Winches Arranged for Wall and Floor Use

TWO styles of reversible motor-driven winches, one arranged for wall mounting and the other for floor use, have been made available by the Stephens-Adamson Mfg. Co., Aurora,



Ill. The machines are compact and offered for a variety of applications, including the lifting of castings, light machinery, furnace doors, ventilators, walkways, counterweights, light elevators and small bridges.

The machines are equipped with worm gear reduction units which prevent accidental dropping of the load. Both the winch for wall mounting, designated as the style WK, and the machine for floor or pedestal mounting, the style K may be equipped

with 1, $1\frac{1}{2}$ or 2-hp. reversible electric motors. They are rated to pull 700-1100 and 1400 lb. respectively, at a rope speed of 25 ft. per min. Use of $\frac{1}{4}$ or $\frac{3}{8}$ in. cable is recommended, the drums being designed to accommodate 100 ft. of $\frac{1}{4}$ -in. and 60 ft. of $\frac{3}{8}$ -in. cable. All gears have cut teeth and operate in oil. The worm is fitted with ball thrust bearings which permit free operation in either direction.

Evening Course Offered in Diesel Engines

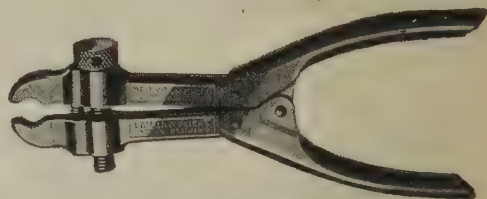
TO meet the demand for information concerning the particulars and operation of Diesel engines, an evening course is offered by the Polytechnic Institute, Brooklyn. This will be the fifth year of this course, about 400 men having taken advantage of it in the four years which have elapsed. The course is not part of the regular undergraduate work, but is designed solely for men interested in oil engines, regardless of previous education.

Twenty lectures, each of 2 hr., are given during the winter, on Tuesdays at 7.30 p. m. The first lecture will be on the last Tuesday in September, this being Sept. 25. Several varieties of oil engines are available in the laboratory for demonstration and testing.

A lecture course on Monday evenings will be given for those interested in operation, construction, selling or designing of oil engines. This class will alternate week by week between the laboratory and the classroom.

Pliers with Jaws That May Be Locked

PLIERS which take their name, Lok-Jaw, from the arrangement whereby the jaws may be locked to nuts, bolts and other objects in the manner of a hand vise, have been added to the line of the Lawson Mfg. Co., Cleveland. The device is arranged with an adjusting screw at the jaws and the compound leverage is said to provide a 1-ton grip at the jaws. The latter



are designed to fit round, square or hexagon objects.

The pliers may be clamped to a loose nut or bolt head in an inaccessible place, and will keep the nut or bolt from turning while it is being loosened or tightened with a screwdriver or a wrench. The jaws are of steel forgings, heat treated; the handles are of pressed steel and have knurled grips. In the size illustrated, the 8 in., the maximum jaw opening is $\frac{3}{4}$ in.

The General Electric Co. announces a new motor control switch suitable for reversing small alternating-current motors. The new switch is expected to find a wide application on general-purpose motors when either infrequent or frequent reversing is required.

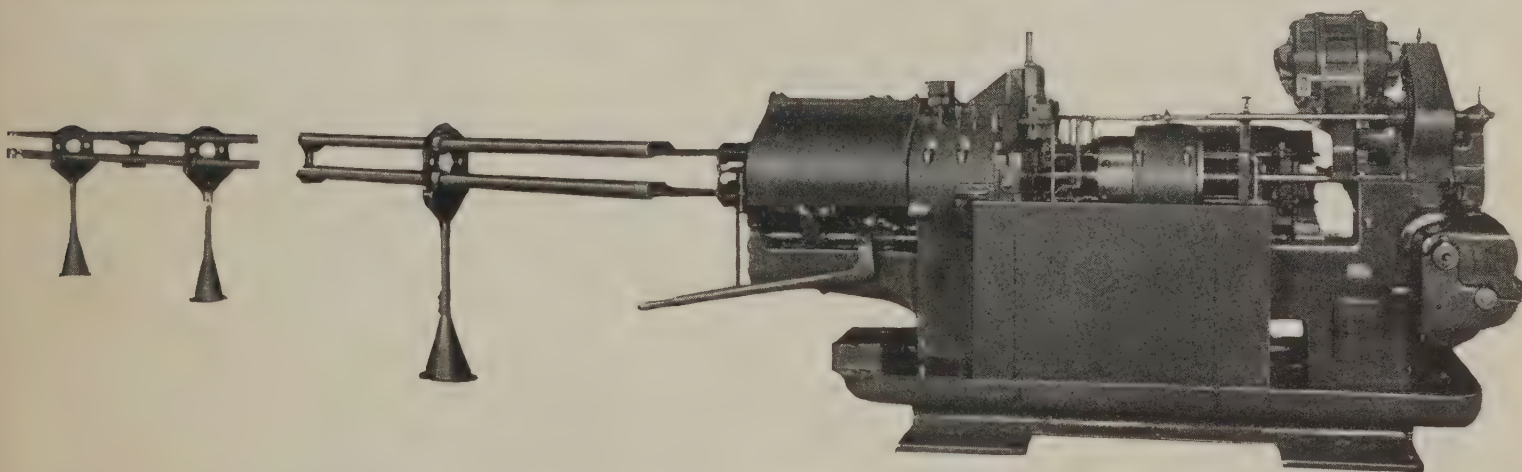
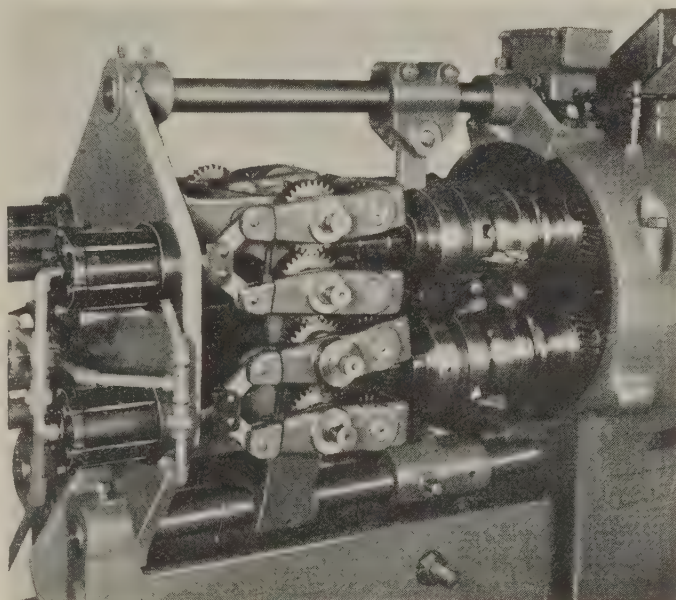
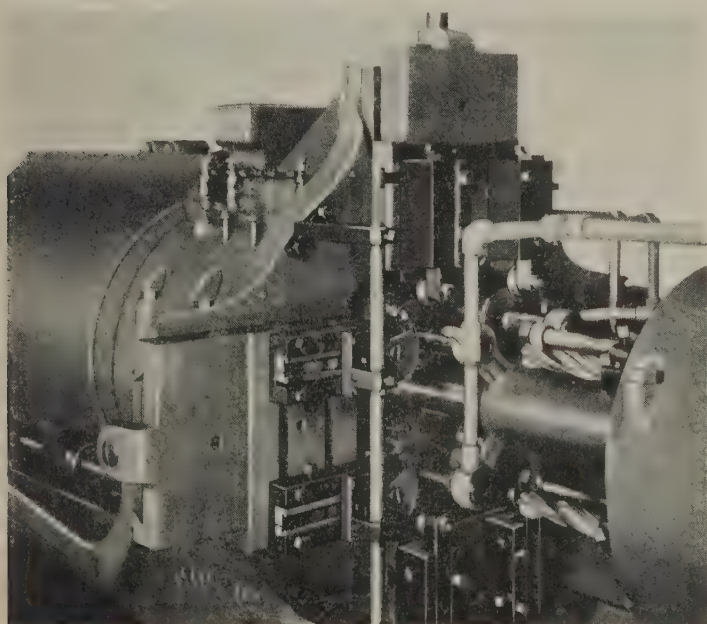
Automatic Stock-Feed Facilitates Production of Pipe Coupling Blanks

PIPE couplings are produced on a high-production basis on the machine illustrated, a feature of which is the automatic roll stock-feed mechanism employed. The machine is a modification of the 1½ and 2-in. four-spindle bar machine of the Cleveland Automatic Machine Co., Cleveland.

The pipe coupling blanks are produced from hot rolled stock rods

arms carrying the rolls. Each pair of arms closes on a bar independently of the others and therefore variation in the size of a bar does not affect the feeding of any other bar. The four bars of stock are gaged by four stops which are mounted on a central drive shaft sleeve and have longitudinal movement with the sleeve. After gaging the stock, the stops are with-

ously, tools mounted on four cross slides form the corners of the outside diameter and cut off the blanks. Stenciling is accomplished by a pivoted sector which advances with the slide and rolls the manufacturer's mark into the blank with the motion of the stock, being held out of position after one pass. Stripping four blanks and gaging stock for the next



ARRANGEMENT of the Automatic Roll Stock-Feed Mechanism, Used on the Cleveland Automatic for Machining Pipe Coupling Blanks, May Be Noted from the View at the Upper Right. The machining operations consist of drilling, forming the corner of the outside diameter, stenciling a mark and cutting off—all of which are performed simultaneously, so that four blanks are produced between each stock-feed

which are 1 9/16 in. in diameter and 35 ft. long. The machining operations, consisting of drilling, forming the corner of the outside diameter, stenciling the manufacturer's mark and cutting-off, are performed simultaneously, so that four blanks are produced at each stock feed.

The V-shaped feed rolls, mounted on toggle arms, are continuously driven by a system of gears actuated by chain and sprocket which is geared to the lower camshaft in the rear. Cams on the same shaft control the action of air cylinders, which govern the roll mechanism, and four pistons impart a jaw action to the toggle

drawn slightly for chip clearance, and simultaneously a sliding shoe, actuated by a cam and drum on the lower shaft, operates four thimbles which close the chucks. Compression springs back of the finger block compensate for any irregularity in the stock. The feed rolls release the stock by a reversal of the air current which reverses the jaw action of the toggle arms.

When the gage stops recede, the turret advances, bearing four drills which operate through openings in the gage stops, so that the latter act as tool guides and strippers. The turret is non-indexing. Simultane-

four is accomplished by a single forward motion of the gage stops. The installation includes a support for the 35-ft. rods, consisting of four tubular housings held at intervals by adjustable standards.

Subsequent beveling of the mouth of the hole is performed on a special model J double-end machine of the Cleveland Automatic Machine Co. design, after which the pieces are tapped.

A machine of the same design as the one described and illustrated above, but without the roll feed, has been designed for use in the manufacture of nuts.

Curtailment of Operations in Europe

British Holidays Interfere With Business—Germany Facing Shutdowns in Many Mills—Weak Markets in Belgium

(By Cable)

LONDON, ENGLAND, July 23.

DEMAND for Cleveland pig iron is at a very low ebb, owing to the holidays and to poor export demand, but prices are being maintained. Hematite is dull and stocks are heavy.

Foreign ore is quiet. Northeast Coast consumers have ceased buying, as prices are too high in comparison with what they can get for their pig iron. The Swedish strike continues, and Bilbao Rubio ore is firm.

Finished iron and steel markets are quiet. Some new shipbuilding orders have been placed, but makers are relying on domestic structural and engineering demand. Export markets are virtually idle. The prime minister is to receive this week another deputation from the iron and steel industry, urging that safeguarding remedies [protective tariff?] be applied.

Tin plate markets are quiet and prices are easing. Welsh makers having decided to reintroduce a restriction of output, all mills are to close for two weeks during the period Aug. 27 to Nov. 24. Some works are well sold, but others are ready to take orders specifying August shipment.

Galvanized sheets are moderately active in small parcels, but substantial demand is still lacking. Black sheet markets are quiet.

On the Continent of Europe

Continental markets are firm, especially on semi-finished products. On merchant bar covering, billets are reported unobtainable. British demand is poor.

Russian production in the fiscal year 1926-1927 was as follows:

	Metric Tons
Pig iron.....	2,963,000
Raw steel.....	3,586,000
Rolled steel.....	2,730,000

In 1927 the average monthly home consumption of iron and ingot steel was 1,484,000 metric tons; in 1926 only 883,000 tons; and after rising to a high point of 1,718,000 tons in January, this year, it fell to 1,315,000 tons in May, and probably fell further in June. Municipalities and other public bodies are trying to devise a system by which public construction, including communications, shall be so far as possible concentrated in bad trade periods, thus mitigating the production fluctuations and consequently equalizing employment.

Orders for steel are coming in very slowly, and the mills largely depend upon old orders given before prices were raised in May. The demand for structural steel has not fallen further, but large orders are not being received. The bar market is quieter, with shorter delivery terms. Sheets are dull. For semi-finished products the demand has declined.

The dullness in export is partly connected with the Antwerp dock strike. Meantime, competition is sharp, and prices are slightly depressed. French and Luxemburg works are maintaining their prices to European buyers, but are exporting overseas at a considerable sacrifice, bars being exported at £5 12s. f.o.b. (\$27.22). Until this new export dullness, which began in June, Germany's iron foreign trade balance was improving. In May the net export of heavy iron and steel (without machinery) was 212,000 tons, the highest

Germany Expects Steel Curtailment

Not Even Greatest Conceivable Increase in Exports Can Prevent Shutting Down of Numerous Mills

BERLIN, GERMANY, July 7.—The home market has further weakened since the beginning of the month, and export is developing less satisfactorily. Düsseldorf experts declare that the maintenance of production in the second half of the year will depend

largely upon export, but add that if a really bad trade condition arrives the greatest conceivable increase of exports will not prevent closing down of numerous mills, because the fluctuations of home consumption in good and bad trade periods are too great.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s. to £0 17¾s.	\$4.25 to \$4.31
Bilbao Rubio ore.....	1 2½	5.48
Cleveland No. 1 fdy.....	3 8½ to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy.....	3 6	16.04
Cleveland No. 4 fdy.....	3 5	15.80
Cleveland No. 4 forge...	3 4½	15.68
Cleveland basic (nom.)...	3 5	15.80
East Coast mixed.....	3 8 to 3 9	16.53 to 16.77
East Coast hematite....	3 10½	17.13
Rails, 60 lb. and up....	7 15 to 8 5	37.66 to 40.10
Billets.....	6 0 to 6 15	29.16 to 32.81
Ferromanganese.....	13 15	66.83
Ferromanganese (export)	13 0 to 13 5	63.18 to 64.39
Sheet and tin plate bars, Welsh.....	6 0	29.16
Tin plate, base box.....	0 18 to 0 18½	4.37 to 4.43
Black sheets, Japanese specifications.....	13 7½	65.00
Ship plates.....	7 12½ to 8 2½	1.63 to 1.74
Boiler plates.....	9 0 to 10 10	1.92 to 2.25
Tees.....	8 2½ to 8 12½	1.74 to 1.84
Channels.....	7 7½ to 7 17½	1.58 to 1.69
Beams.....	7 2½ to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 5 to 7 15	1.55 to 1.66
Steel hoops.....	9 0 to 10 0	1.92 to 2.14
Black sheets, 24 gage...	9 15 to 10 0	2.09 to 2.14
Galv. sheets, 24 gage....	13 7½	2.86
Cold rolled steel strip, 20 gage, nom.....	16 0	3.42

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):	£3 3s. to £3 5s.	\$15.32 to \$15.80
Belgium.....	3 3 to 3 5	15.32 to 15.80
France.....	3 3 to 3 5	15.32 to 15.80
Luxemburg.....	3 3 to 3 5	15.32 to 15.80
Basic pig iron (nom.):	3 1 to 3 2	14.82 to 15.07
Belgium.....	3 1 to 3 2	14.82 to 15.07
France.....	3 1 to 3 2	14.82 to 15.07
Luxemburg.....	3 1 to 3 2	14.82 to 15.07
Coke.....	0 18	4.37
Billets:		
Belgium.....	4 15½	23.21
France.....	4 15½	23.21
Merchant bars:		
Belgium.....	5 14	1.26
France.....	5 14	1.26
Luxemburg.....	5 14	1.26
Joists (beams):		
Belgium.....	4 17½ to 4 18	1.07 to 1.08
France.....	4 17½ to 4 18	1.07 to 1.08
Luxemburg.....	4 17½ to 4 18	1.07 to 1.08
Angles:		
Belgium.....	5 10 to 5 12½	1.21 to 1.24
½-in. plate:		
Belgium (a).....	6 11	1.44
Germany (a).....	6 11	1.44
¾-in. ship plate:		
Belgium.....	6 7	1.40
Luxemburg.....	6 7	1.40
Sheets, heavy:		
Belgium.....	6 1	1.33
Germany.....	6 1	1.33

(a) Nominal.

figure reached for more than a year. The average monthly net export in January-May was around 160,000 tons, as against 137,000 tons in 1927.

Reports from France and Belgium indicate that no material rise in iron and steel prices is expected for the present. The stabilization of the French franc will not, it is held, have any effect in restoring real gold prices for some time to come. This is deduced from the experience of Belgium, whose currency has been stable a long time, but whose price level and wages have not yet returned to a gold basis. The German *Stahl und Eisen* predicts that the devaluation of the French franc to about one-fifth of its old value will create permanently favorable competition conditions for France. This means that Germany will continue to export in competition at below her home prices and even below her production cost. Her financial ability to bear this strain seems beyond doubt. The *Frankfurter Zeitung* publishes a minute analysis of German corporation profits with the aim of disproving the contention of steel manufacturers that the recent industrial boom was a "quantity boom" and not a "profits boom." The amount paid in dividends by 85 leading corporations in different branches has moved as follows since the mark stabilization:

	Marks
1924.....	171,300,000
1925.....	218,600,000
1926.....	273,600,000
1927.....	357,900,000

The steel and coal corporations have done best of all, if not merely their dividends, but also the additions to their reserves, are taken into account. Their real earnings, without counting unrevealed additions to reserves, increased about five-fold in the three years 1924-26. Of the 85 corporations in all industrial branches, 29 paid no dividends in 1924, and only five in 1927; whereas 28 paid over 10 per cent in 1927, against only four in 1924. This analysis of corporation profits agrees with that of the official Trade Fluctuations Institute, which classes steel as one of the industries which is financially strong enough to export at a loss in times of bad home trade.

Belgian Market Tendencies Weak

ANTWERP, BELGIUM, July 6.—Market tendencies continue weak, but prices remain stationary. The general strike of dock workers in the harbor of Antwerp has made shipments impossible from this port and shipments by other ports are not easily arranged. Stocks are accumulating at steel plants, forecasting reductions in operations.

The decision of the Steel Cartel not to increase production during the quarter will support makers in their resistance to price reductions. Another factor, favorable to Belgian mills is the weak competition from Germany. Important orders have been taken by the Rail Syndicate in South America; Belgian railroads are

expected to make large purchases, and it is known that large requirements are pending in the East, where it is generally expected that buying may start very soon.

Steel bars show a narrow market on account of the limited production and owing to the fact that most makers are open only for a part of their program. German makers are entirely out of the market. The French and Luxemburg competition puts for-

ward the same prices that are quoted here. Angles are now offered freely and prices have been influenced. Structural rounds maintain a stronger position on account of lack of stock. Beams have strengthened. Rods remain scarce and firm.

Pig iron remains stationary in price. The export demand is not good. The lowest price, about \$15.40 f.o.b. Antwerp, seems to meet with strong foreign competition.

Canadian Iron and Steel Production June Considerably Ahead of June Last Year and Half-Year Output Highest in Ten Years

TORONTO, July 23.—The production of pig iron in Canada for the month of June totaled 97,379 gross tons, a gain of 11 per cent over the 87,811 tons produced in the previous month and 40 per cent higher than the 69,437 tons produced in June last year. The production of basic iron increased to 69,040 tons from 68,945 tons in May; foundry iron from 7667 tons in May to 25,968 tons in June; but malleable iron fell off to 2371 tons in June as compared with 11,199 tons in the previous month. For the first half of 1928 the cumulative production of pig iron is 468,013 gross tons as compared with 403,713 tons in the corresponding six months of 1927. This year's output included 355,802 tons of basic; 88,076 tons of foundry iron and 24,135 tons of malleable iron.

The production of ferroalloys in June totaled 4157 tons or about 3 per cent more than the output of 4049 tons of May.

The output of steel ingots and castings during June totaled 116,530 gross tons or slightly less than the 117,655 tons produced in May, but 94 per cent greater than the 59,940 tons made in June, 1927. The output of steel ingots amounted to 112,960 tons and of direct steel castings 3570 tons.

For the first half of this year the cumulative production of steel ingots and castings is 648,338 gross tons, an increase of 33 per cent over the 487,310 tons made in the corresponding period last year. This year's output to June included 625,493 tons of steel ingots and 22,845 tons of direct steel castings.

While the Canadian price of pig iron was unchanged during June, the price index of the Dominion Bureau of Statistics for iron and steel (1913=100) fell from 141.7 in May to 140.9 in June, owing to slight declines in the prices of steel bars and steel sheets.

During the month of June 8 blast furnaces were blowing as follows: three of Algoma Steel Corporation, Sault Ste. Marie, Ont.; two of Steel Co. of Canada, Ltd., Hamilton, Ont.; one of Canadian Furnace Co., Port Colborne, Ont., and two of Dominion Iron & Steel Co., Sydney, N. S.

The production of iron and steel in Canada for the first half of 1928 proceeded at a higher monthly average than either 1926 or 1927, and even passed the high average of 1923. Output was below that of 1913, however, and was only about half of the high record established in 1918 when 1,622,000 tons of ingots were produced.

Production figures from 1923 to the middle of 1928 are shown in the table at the bottom of the page.

German Tube Makers Feel American Competition

HAMBURG, GERMANY, July 6.—The German Tube Makers' Association reports that business in tubes for export to overseas countries has recently improved, but that prices are still very low because of the growing firmness of American competition, especially in the Latin American countries.

Germans Reduce Wire Rods to Regain Japanese Trade

HAMBURG, GERMANY, July 6.—A conflict has recently broken out in the German Wire Rod Cartel concerning the trade with Japan, which was taking from 5000 to 8000 tons of German rods a month until the price advance in May, when sales dropped to 3200 tons against 7300 tons in April. Growing competition of American and Canadian makers is given as the reason for the decline in German business.

Production of Iron and Steel in Canada
(In Gross Tons)

Year	Pig Iron	Ferroalloys	Steel Ingots	Steel Castings
1923	880,018	28,961	839,710	45,060
1924	593,024	26,400	625,175	25,515
1925	570,397	25,709	733,855	18,840
1926	737,503	57,416	743,550	33,338
1927	709,697	56,514	867,928	39,710
1928*	468,013	26,014	625,493	22,845

*Figures for the first six months ended with June 30.

Miners' Action an Admission of Defeat

Abandonment of Jacksonville Scale So Regarded in Pittsburgh—Union Has Lost Much Ground

PITTSBURGH, July 24.—Important coal producing interests, including the steel companies which operate their own mines, view passively the decision by the wage scale committee of the United Mine Workers of America withdrawing the Jacksonville wage scale as the sole basis of negotiations for working agreements between operators and the union. The prevailing opinion among coal producers is that the decision amounts merely to "locking the stable door after the horse has been stolen."

Southern Ohio operators, not long after the suspension resulting from the inability of the producers and union leaders to get together when the Jacksonville scale terminated by limitation, attempted to open negotiations on much the same terms that now are acceptable to the union leaders. The offer was rejected almost without consideration. In the Pittsburgh district it was the stand taken by the miners' union officials rather than animosity toward the union that prevented a renewal of the agreements. The abandonment of the demand that proved to be the stumbling block in continuance of the operation of many mines in the district under signed contracts with the union is looked upon as an admission of defeat by the union.

A Serious Blow to the Union

Close students of the situation, however, regard it as something more serious for the union than merely the loss of the strike which started April 1, 1927, because they see no disposition on the part of the operators who formerly worked their mines on a union basis to respond to what amounts to an invitation by the union to resume negotiations. The Pittsburgh Coal Co. and the Pittsburgh Terminal Coal Co., the two largest commercial producers in the Pittsburgh district, have publicly stated that they have no intention of resuming relations with the union, while the industrial mines, which have been operating for more than a year on an open shop basis, also are unresponsive to this attempt to get them back under union domination. The operators of southern Ohio, likewise, are adamant.

The common condition at the time of the expiration of the Jacksonville scale was that, since the union insisted on the scale established in Jacksonville as a primary premise and the operators could not pay that scale and compete with the open shop mines, a conference on wages would be futile. The feeling now is that there is no occasion for a conference, as the open shop has been established and with it there has been set up an equality of wages in the different producing districts that has settled a

very vexing problem for the national industry.

The coal industry could not exist half union and half non-union, since the half working union would have to pay higher labor charges than the half where the control of wages was in the hands of the employers, and the producers with the lowest labor costs naturally dominated the market, subject only to the limitation of freight charges to destinations. If the union had been successful in unionizing the open shop mines and had brought about a level scale of wages for all fields the story might have been different. Since it failed, it was only natural that the trend should be in the other direction and that union mine operators should place themselves in a position to meet the competition provided by the open shop producing districts. The union leaders took the position that, if they accepted lower wages for union miners, the non-union miners' wages would suffer correspondingly, and the situation would be as before, with a high scale in the union mines and a low one in the non-union operations.

Open Shop Miners Apparently Satisfied

Such reasoning did not recognize the changed attitude of employers toward employees that developed several years ago. It has long since ceased to be the fashion to get as

much out of labor as possible for the least amount of money and more the vogue to pay wages that enable the workman to live and put something aside. There is no evidence that the coal miners who have been working on the open shop scale of wages in this district are dissatisfied. The wage scales are fair and between steady work and the saving of union dues and assessments the pay envelopes generally are stouter than they were when the men were working on part-time schedules.

In the last previous strike, in 1922, the union lost northern West Virginia as a unionized district. While there may be some tonnage mined in the Pittsburgh district under union auspices, the preponderance of the tonnage will be of non-union coal and to a large degree the union will have lost this district. It also has probably lost ground in Ohio, Indiana and Illinois.

An uneconomic policy is responsible for the position in which the union now finds itself. If the leaders had taken the same attitude as the railroad brotherhoods, the position of the union would have been stronger. Recognition more promptly of changing market and industrial conditions would have promoted sustained relationships with the producers. And the steady flow of funds into the union treasury, as a result of the check-off or the company collection of union dues and assessments, would have made the miners' union even more powerful financially than the railroad brotherhoods. The miners' union has lost much more than the strike that started 15 months ago.

E. Arthur Tutein, Inc., Asks Extension from Creditors

E. Arthur Tutein, Inc., Boston and New York pig iron merchant, has asked creditors for an extension of six months for a settlement of claims. Approximately 95 per cent of the creditors have consented to such an extension, pending the outcome of the company's suit against the Hudson Valley Coke & Products Corporation, and a counter suit against E. Arthur Tutein, Inc., by the Troy, N. Y., company, the result of the termination of a selling agreement.

What course E. Arthur Tutein, Inc., takes within the immediate future will depend on action to be taken this week by creditors at a special meeting. Mr. Tutein has offered to serve as president of the company without compensation during the liquidation of the assets now available.

On Friday, July 20, the New York Court of Appeals ruled that Charles M. Schwab had previously and still has the right to appoint the third arbitrator in the controversy between E. Arthur Tutein, Inc., and the Hudson Valley Coke & Products Corporation. It was contended by the Hud-

son Valley company, Mr. Schwab's authority in the matter had lapsed, because the arbitrator he appointed declined to serve. It is probable that the third arbitrator will be named shortly and that hearings will be begun.

Purchases Ashland Steel Co.

Purchase of the Ashland Steel Co., Ashland, Ky., by the American Rolling Mill Co. has been announced by George M. Verity, president of the latter company. The plant of the Ashland Steel Co. adjoins that of the Norton Iron Works Co., which was bought by the American Rolling Mill Co. early in 1927. The property was acquired from the First National Bank of Ashland, which took it over when the steel company failed two years ago. The purchase price has not been revealed, nor what disposition is to be made of the plant. The Ashland and Norton companies, although owned independently, were originally operated jointly, the Norton blast furnace supplying hot metal to the Ashland mills for the manufacture of steel rods and wire.

National Fuels Meeting in Cleveland

The second national fuels meeting will be held at the Cleveland Hotel, Cleveland, Sept. 17 to 20. The technical contributions will include the following, presented under the auspices of the Fuels Division of the American Society of Mechanical Engineers:

Constitution and classification of coal, and fuels and their flame characteristics with reference to combustion values and furnace-space requirements; direct firing of boilers with producer gas; Texas lignite as fuel for power-plant boilers, and washing and preparation of coal; relative values of solid, liquid and gaseous fuels; industrial furnace efficiency; collecting dust from chimney gases in powdered-fuel installations; unit system of coal pulverizers, and boiler-furnace refractories, and stoker advantages and difficulties.

Mystic Furnace Complains of Pig Iron Freight Rates

The Mystic Iron Works, Everett, Mass., has filed with the Interstate Commerce Commission a complaint against New England railroads, which is directed primarily against the New York, New Haven & Hartford, although the Boston & Albany, Boston & Maine, Maine Central, Rutland and Central Vermont roads are also named as defendants.

It is claimed that freight rates on pig iron from the blast furnace at Everett are excessive and discriminatory, and the commission is asked to compel the carriers to put into effect reasonable rates and to pay the Everett company as reparation the difference between freight charges actually paid in the past and such rates as may be found reasonable, together with interest at the rate of 6 per cent.

It is the contention of the management that the Everett furnace was built with the assurance of the New York, New Haven & Hartford Railroad that freight rates would be reduced, and that in the absence of such assurance it would not have been built. The carrier, it is claimed, has not only failed to reduce rates on the Mystic product, but has established a rate of \$2 per gross ton on competitive pig iron ex-barge from Albany and Beacon, N. Y., to New England points, which is lower than rates paid by the Everett company.

Furthermore, it is contended that these ex-barge rates are unduly preferential to the company's competitors located at Buffalo and other New York State points, giving Buffalo furnaces an additional competitive advantage of \$1.13 a ton. The New York, New Haven & Hartford Railroad's \$2 rate from Beacon, N. Y., blankets its system as far east as the Phillipsdale, R. I.-Worcester, Mass., line. The complainant maintains that carrier's pig iron rates are high as compared with those asked by the

New York Central Railroad, and makes the following comparisons:

		N. Y., N. H. & H. Rates		N. Y. C.	
		Boston		Beacon, N. Y.	
		Ton		Ton	
		Car	Mile	Car	Mile
40...	5.0c.	\$2.55	...	...	3.5c.
70...	3.5	1.79	2.81c.	\$1.43	2.0
100...	2.5	1.28	2.00	1.02	1.75
135...	2.4	1.22	1.48	.755	1.4
180...	1.95	1.00	1.11	.577	1.1
215...	1.7	.867	...	...	0.9

Freight rates on competitive irons, despite the \$2 water freight rate, are not against the Mystic Iron Works in all instances. To illustrate this point, the following rates per ton are given for comparison, those from New York State being figured on the \$2 water freight rate:

To:	From		
	Everett	Buffalo	Port Henry
Providence, R. I....	*\$2.00	\$3.78	\$3.65
New Britain, Conn..	*2.90	3.78	3.65
Springfield, Mass....	2.27	3.78	3.00
Worcester, Mass....	1.89	3.78	3.15
Hartford, Conn.....	*2.90	3.78	3.65
New Haven, Conn..	*3.20	3.78	3.28

*Plus a \$5 per car transfer charge.

Steel Roof Reduces Hazards in Washington Fire Test

In a recent fire test conducted in Washington by the United States Bureau of Standards to determine primarily the fire-resistant qualities of various types of steel safes, a collateral test was made of a steel roof as a means of reducing hazards due to flying embers and sparks. The old building used by the Bureau of Standards for the fire test was covered with a material of such composition that it would readily catch fire from the heat generated by the burning of dry lumber purposely piled on floors below. The bureau invited the Sheet Steel Trade Extension Committee to cooperate in the test by placing a steel roof over the old roof. Double standing seam galvanized steel roofing was used.

Following the test the Bureau of Standards made the following observations regarding the roof:

"The framing carrying the elevator penthouse at the front of the building fell at 22 min. after the fire was started, carrying a portion of the roof with it. Further collapse of roof supports in this part of the building occurred during the next 5 min., leaving the front part of the metal roof unsupported. By 28 min. portions of the front wall fell and between 36 and 39 min. there was a collapse of the upper portions of the side walls. This would, of course, remove all support for any roofing.

"However, particularly with masonry walled buildings, the danger from hot blasts and brands is largely over when this stage is reached. The period of protection by the metal roof during this particular fire extended up to 30 min. after the fire started, which represents a portion of the most intense period of the fire. The metal roof for the time undoubtedly

helped to prevent a chimney effect, compelling the flames and hot gases to escape mainly through the front and rear of the building."

John A. Pierpoint, former president National Association of Sheet Metal Contractors, who laid the steel roof and who closely observed the fire test, said that the sheet steel roof continued to wave up and down, even though it was red hot from the heat below, and at the same time prevented all burning embers from going above the line of the roof. "As a fire blanket or retardant," said Mr. Pierpoint, "I feel that the sheet steel roof was a complete success. The test shows that the double locked cross seams and standing grooved seam will hold together until the metal gets to near the melting point."

British Welding Associations Reorganize

As the result of mutual conferences between committees from the British Acetylene and Welding Association and the Institution of Welding Engineers a plan of cooperation has been agreed upon whereby the former will act as a trade association only. Its name will be changed to "The British Acetylene Association" and its members restricted to firms and individuals trading in oxygen, acetylene, calcium carbide, or oxwelding equipment. The Institution of Welding Engineers is to maintain separate existence, and confine its attention to scientific and technical problems and to the promotion of welding in all its branches. Its membership is to be confined to individuals.

United Steel Works Plans Large Expansion

HAMBURG, GERMANY, July 6.—The United Steel Works of Germany has just issued details of its expansion program, which will cost 200 million marks. Improvements are to include a large open-hearth steel plant at Dortmund, modernization of plants at Mühlheim and construction of a new electric steel plant. Production of hoops and bands will be substantially increased. Two new blast furnaces of large capacity will be built and three furnaces, which were built in 1904, will be scrapped.

New Production Counter

A new counter for production machines, designated the "productimeter," has been brought out by the Durant Mfg. Co., Milwaukee. It is said to be particularly adapted to small drill presses, light-duty conveyors, printing presses and the like.

Among the new features are special bronze bushings to insure long wear. These require little oil and when worn can be replaced with new bushings. There is a new drive sleeve designed to prevent racing of the counter when operated at high speed.

More Than 2,200,000 Automobiles in First Half

Production of automobiles in the United States in June is reported by the Department of Commerce at 396,714 units, making a total for the first half of 2,201,880. This is the second largest production for any six months in the history of the United States. It was exceeded only by the first half of 1926, in which the total was 2,358,585 cars and trucks. It exceeded by 2½ per cent the 2,150,134 of the first half of 1925 and by more than 6½ per cent the 2,068,915 of the first half of 1927. The largest second half yet reported was in 1925, when the total was 2,115,570. No other second half has reached 2,000,000 cars.

Of the June total, passenger cars represented 356,439 and trucks 40,275. In May the year's maximum was reached, at 375,863 passenger cars and 50,233 trucks—a total of 426,096. Compared with 1927, June shows a larger gain in passenger cars, but a falling off in truck production. Passenger cars a year ago numbered 278,729 and trucks 43,238.

Comparing the two types of output for the first half-year, passenger cars this year at 1,965,727 showed an increase of 9 per cent over last year's 1,802,620. As to trucks, however, the output of 236,153 units this year was 11½ per cent below the 266,354 produced last year.

Commercial Aviation in Germany and England

According to a report on civil aviation issued by the English Government, by far the largest development in air transport has occurred in Germany, where the Deutsche Luft Hansa has 170 machines, 150 pilots, and 56 air engineers in active service. It operates over 70 routes in the summer and about half this number in the winter, and provides communication with most European countries, either alone or in conjunction with other concerns. In 1927 it carried 151,091 passengers, the mileage flown being 6,189,000. Another German firm operated a service between Berlin and Moscow, where a connection was made with the Junkers' service to Teheran. This concern carried 3700 passengers. The haulage of freight is rapidly becoming an important factor in German air transport.

In Great Britain, Imperial Airways, Ltd., concentrated its attention on the London to Zurich, London to Cologne and the Southampton-Guernsey routes. The mileage flown was 614,655 miles, compared with 840,000 miles in the previous year, though the passengers carried increased from 16,775 in 4777 flights to 18,874 in 4450 flights. The cargo carried fell from 679 tons to 593 tons. The British share of the foreign traffic fell from 61 per cent to 57 per cent., the total passengers carried on the cross-Channel services being 28,764. Traffic fell off much less

during the winter months than during the previous year. This movement was assisted by the introduction of second-class fares. Efficiency is also increasing, the percentage completed of flights actually commenced being 99 per cent. The chief cause of interruption was bad weather. The regular air services were free from accident for three years.

The notable technical developments during 1927 have been, according to *Engineering*, the substitution of metal construction for that of wood and fabric, leading to greater safety, lower maintenance, and less weight. Much progress was made in the development of apparatus for controlling airplanes at low speeds, of which the most successful is that known as the automatic slot, and experiments were continued in connection with the silencing of aircraft and engines. The Napier-Lion water-cooled engine has proved successful. During the year 100-hp. De Havilland and the Avro "Alpha" engines were produced for use on light airplanes.

Continued Heavy Production of Steel Castings

Production of commercial steel castings in June is reported by the United States Department of Commerce at 90,202 net tons. While this is a reduction of 8 per cent from the 92,948 tons of May, it is the third largest monthly tonnage in more than a year. It compares with 87,767 tons in June, 1927, and represents 63 per cent of capacity compared with 64 per cent in May and 61 per cent a year ago. Of the June total, 30,742 tons was railroad specialties, representing 46 per cent of capacity for that type, while 59,460 tons or 77 per cent of capacity was miscellaneous castings.

Production for the first six months has reached 523,745 tons. This is 4½ per cent less than the 548,223 tons of last year. The reduction was felt by both groups, for railroad specialties at 204,841 tons were nearly 7 per cent below the 219,612 tons of last year, while miscellaneous castings at 318,904 tons recorded a drop of 3 per cent from the 328,611 tons of the first half of 1927.

New orders in June showed a sharp shrinkage from preceding months and represented the lowest total since last November. Bookings were only 70,762 tons, compared with 86,414 tons in May and with 90,898 tons in June, 1927. They represented 49 per cent of capacity against 60 per cent in May and 63 per cent a year ago. Railroad specialties recorded the greater portion of this drop. At 22,597 tons, or 34 per cent of capacity, they were 35 per cent lower than the May total of 34,995 tons, which was 52 per cent of capacity. They were still further below the figure of last year, when June showed 39,455 tons, or 59 per cent of capacity. Miscellaneous castings booked in June were 48,165 tons, or 63 per cent of capacity. This represents a drop of more than 6 per cent

from the 51,419 tons of May and about the same amount from the 51,445 tons of June, 1927.

New bookings in the first six months were 505,947 tons, or 59 per cent of capacity. This is about 6 per cent lower than the 537,189 tons of the first six months of last year. Railroad specialties recorded the larger drop in the six months, the total having been 203,766 tons, or more than 11 per cent below the 230,176 tons of last year. Miscellaneous castings at 302,181 tons were less than 2 per cent down from the 307,013 tons of last year.

Reduction in Wholesale Prices of Commodities

Further reduction is reported by the United States Bureau of Labor Statistics in the general average of wholesale prices. The figure for June is given as 97.6, compared with 98.6 in May, on the weighted average of 550 series of prices based on 100 as the average of 1926.

Several of the 10 major groups showed decreases of about 3 per cent each, these being farming products, hides and leather products, and the miscellaneous group. Decreases of less than 1 per cent each were recorded by foods, textiles, chemicals and drugs and housefurnishing goods. Increases of a fraction of 1 per cent were reported for fuel and lighting, metals and metal products and building materials.

Metals and metal products at 98.7 compared with 98.6 in May and with 98.2 a year ago. There was a decrease in iron and steel from 94.8 to 94.2, but non-ferrous metals went up from 92 to 92.8. An increase is reported in automobiles from 104.7 to 105.1, while agricultural implements and other metal products remained practically unchanged.

Foundry Equipment Orders 49 Per Cent Above Average

Orders in June for foundry equipment are reported by the Foundry Equipment Manufacturers Association at 149.1, the base of 100 being average monthly shipments for 1922 to 1924. While the orders represent a sharp reduction from the preceding month, they were, with that exception, the greatest since February, 1927. Orders in May at 335.6 were the greatest ever recorded.

Shipments in June were 129.4, on the same base as orders. Unfilled orders at the end of the month represented 359.3, on the same base. This is close to three times the current monthly shipments.

The Service Steel Co., seamless and welded steel tubing, Detroit, is installing an office and warehouse at 216 North Alameda Street, Los Angeles, to supply seamless steel tubing in low carbon steel and in popular aircraft grades.

Pittsburgh River Shipments of Steel Double Those of 1927

The Ohio River movement of iron and steel products from the Pittsburgh district was smaller in June, the Pittsburgh office of United States Engineers Corps reports. The total was 96,156 net tons, which compares with 112,818 tons in May, and 110,356 tons in April. Shipments by the Ohio River measure accurately the delivery of iron and steel products at destinations sufficiently distant from the Pittsburgh district to effect a substantial saving in freight charges over all rail rates. In June, the Allegheny River was used in the movement of 2350 net tons of iron and steel products and on the Monongahela River, 75,422 tons were carried.

Figures for all three streams include some interplant shipments, and some waterborne deliveries to Pittsburgh district consumers, but essentially the Ohio River tonnages represent the movement to more distant destinations. For the six months ended June 30, the Ohio River tonnage amounted to 554,660 tons, as compared with 223,736 tons in the same period in 1927.

Machinery Exports in 1927

Industrial machinery exports of 1927, by principal classes of equipment, were roughly as follows: mining, oil-well and pumping machinery, \$35,583,000; metal-working machinery, \$25,379,000; construction and conveying machinery, \$19,127,000; textile, sewing (industrial) and shoe machinery, \$17,552,851; power-generating machinery, except electric and automotive, \$17,551,000; other industrial machinery, \$67,975,000.

American Industries by Geographical Sections

Study of the manufacturing output of the United States by major types of products and by geographical sections has been made by N. E. Petersen, industrial statistician of the First National Bank of Boston. The study apparently was undertaken largely because of persistent reports of the gradual decadence of New England as a manufacturing center.

The articles, which were published serially in the Boston *Herald*, have been put out in pamphlet form by the bank. Each is illustrated by graphic representation of the various quantities involved and the story is told, in each, of the changing character of the manufacturing output of each section of the country. The value of New England production is shown to have gained five-fold in a period of 45 years.

In the Middle Atlantic States, iron and steel in 1925 represented 8 per cent of the total manufactured output, with women's clothing in second position. In the North Central States,

motor vehicles stand first, with iron and steel second, motor vehicle parts third, slaughtering and meat packing fourth, and foundry products fifth. In the East South Central States, iron and steel stand second, after lumber products. In the remaining sections of the country, however, it is a comparatively small factor. Smelting of copper leads in the Mountain States, while lumber products and petroleum refining are the two principal items on the Pacific Coast.

Exports Help Maintain High Automobile Production

Sales of American-made automobiles abroad have increased by 425 per cent during the last five years and a further important gain is taking place this year. As a result of this large expansion, foreign buying of motor cars now ranks third in the list of the country's exports, according to President J. R. Nutt, of the Union Trust Co., Cleveland.

"Expanding markets abroad offer the most favorable solution for the full employment of the country's growing automotive productive capacity," says Mr. Nutt. "Whether or not the saturation point is near in this country, there is a vast potential demand for cars among other peoples. Tariff barriers are directed especially against assembled cars, with the result that in 1928 probably over 200,000 cars made of American parts will be assembled in plants abroad. The rate of growth of motor car exports is seen in the fact that while five years ago exports totaled 78,000 units, in 1928 it is estimated that 450,000 cars and trucks will be shipped abroad.

"At the present capacity of the automobile industry, an output of approximately 4,000,000 cars annually is needed for reasonable prosperity. Replacement demand is about 2,500,000 cars annually in the United States and Canada. New buying this year is running at the rate of over 1,000,000 cars, so that the estimated exports of 450,000 will bring the total demand up to, or above, 4,000,000 cars."

Production in Italy

WASHINGTON, July 24.—Production of pig iron in Italy during the first three months of the current year totaled 83,800 metric tons as against 134,800 tons during the corresponding period of last year, while raw steel output showed a contrary course and increased to 404,400 tons as against 333,100 tons, according to a statement prepared by the Iron and Steel Division, Department of Commerce, based on reports received from Assistant Commercial Attaché A. A. Osborne, Rome.

Imports and exports declined during the 1928 quarter, being 197,400 tons and 2572 tons as against 237,672 tons and 4265 tons, respectively. Of the total of 104,928 tons of scrap imported into Italy in the first quarter

of the present year, as against 132,664 tons for the corresponding period of last year, France supplied 70,668 tons while 11,828 tons came from Switzerland. The United States supplied only 377 tons.

Electrical Developments Increase Use of Copper

Generation and use of electricity in the United States now utilizes approximately three billion pounds of copper, according to the Copper and Brass Research Association in its July bulletin. This total does not include the use of copper for telephone and telegraph lines and for electrical manufactures shipped abroad.

The association bases its estimate on the fact that for every horsepower added to the nation's electric power rating since 1922 the electrical industry has taken about 84 lb. of copper for the generation, transmission and use of current. Electric light and power plants, both steam and water-power, in the United States at the beginning of 1928 had a total generating capacity of about 34,000,000 hp.

Hydroelectric power alone may some day utilize nearly seven billion pounds of copper, according to the association. It is pointed out that the hydroelectric power industry, with almost 12,300,000 hp., now represents about 36 per cent of the nation's generating capacity and has therefore already become an important user of copper.

Activities in New England

The Standard Screw Co., Hartford, Conn., reports production and new orders during the first half of 1928 as well ahead of the same period last year, with the outlook for the remainder of 1928 highly favorable.

The Indian Motorcycle Co., Springfield, Mass., bookings and shipments in July will exceed those for the corresponding month last year. The company is developing a four-cylinder motor car with a 70-in. wheel base, similar to foreign types noted for economy of operation.

The Thompson Products, Inc., Hartford, Conn., plants are operating day and night. The company's automobile business is not only running at a new high record, but there has been a large growth in its airplane engine valve business this year, as well as in the valve replacement business. The company has written off \$250,000 of machinery, replaced by labor saving devices.

Average weekly earnings in representative New York State factories are reported for May by the State Industrial Commissioner at \$29.19. This represents a gain of 40c. over April, but it is 45c. lower than the earlier and is 11c. lower than the average in March. It is 1c. above the corresponding figure of a year earlier.

Warren Iron & Steel Co. to Be Sold at Auction

The entire assets of the Warren Iron & Steel Co., Warren, Ohio, manufacturer of alloy steels and agricultural implement disks, will be sold at public auction on Aug. 15, following order of the court and the bondholders' protective committee. The company has been employing about 1500 men, and sale will include land and buildings, rolling mills, fabricating equipment, and other machinery and equipment. The Industrial Plants Corporation, 25 Church Street, New York, is auctioneer.

New Distributing Company Organized

Taylor-Davis, Inc., 4250 Wissahickon Avenue, Philadelphia, has been formed by a consolidation of the A. Taylor Co. and the reinforcing bar division of Davis Brothers, Inc., both Philadelphia companies. The company will maintain a warehouse in Philadelphia and warehouse connections in Pittsburgh and New York as distributors for the Jones & Laughlin Steel Corporation's Junior beams and reinforcing steel, American Steel & Wire Co.'s welded fabric, Seneca Wire Mfg. Co.'s wire specialties and George W. Prentiss & Co.'s high carbon wire.

Officers of the new company are: Arthur P. Goldsmith, president; Edward L. Davis, treasurer; M. L. Fitzgerald, secretary. Herbert E. Calves is manager of reinforcing steel sales, Joseph H. Calby, manager of road reinforcing sales, and H. C. Ormerod, manager of wire and specialties sales.

Second Quarter Steel Earnings Up

The Republic Iron & Steel Co. reports net profits applicable to dividends in the second quarter of \$1,053,855, equivalent to \$1.03 a share on common stock. This is the first quarterly report to include the operating results of the Trumbull Steel Co., recently acquired by the Republic company. The showing of the quarter just passed is considerably better than net profits of \$487,332 reported in the quarter ended March 31 and also a slight improvement over the \$988,115 earned in the second quarter of 1927. Profits in the first half of 1927, however, amounting to \$2,032,537, were more than 30 per cent higher than the 1928 earnings for the corresponding period, totaling \$1,541,186. The company's unfilled orders, as of June 30, 1928, amounted to 324,315 tons, as compared with 170,671 tons on March 31.

The Central Alloy Steel Corporation's profits in the June quarter of this year totaled \$1,265,230, as compared with \$1,108,100 in the preceding quarter and with \$1,244,670 in the corresponding quarter of 1927. Profits of this company during the first six months of 1928 totaled \$2,373,330, as against \$1,929,573.

The Otis Steel Co. had earnings of \$907,436 in the second quarter of 1928, compared with \$821,288 in the preceding quarter and with \$435,512 in the June quarter last year. These figures are after depreciation, interest, etc., but before Federal taxes.

Earnings of the Gulf States Steel Co., at \$203,953 in the quarter ended June 30, 1928, showed a decline from the \$337,849 earned in the previous quarter, but an improvement over the \$134,130 reported in the second quarter last year. Profits in the first half of 1928 totaled \$541,802, as against \$371,225 in the first six months of 1927.

The A. M. Byers Co., net profits amounted to \$484,232 in the June, 1928, quarter; \$335,249 in the March, 1928, period; \$395,579 in the June, 1927, quarter, and \$374,092 in the three months ended March 31, 1927.

Sheet & Tube Company Dismantling Blast Furnaces

The Youngstown Sheet & Tube Co. has partially dismantled one of its blast furnaces at South Chicago, and will soon begin tearing down the Tod furnace of the Brier Hill group in Youngstown. As mentioned in THE IRON AGE last week the by-product coke works at Mayville, Wis., are to be scrapped, but it is not the company's intention to tear down the blast furnaces of the Mayville Iron Co. at that place. When these furnaces are operated coke will be secured from nearby producers.

This will leave the Sheet & Tube company with eight furnaces in the Youngstown district, four at the Campbell works, two at Hubbard and two at Brier Hill. In the Chicago district three furnaces will remain at the South Chicago Works and two at Indiana Harbor. With the two Mayville furnaces the company will have fifteen possibly active blast furnace units.

Dr. Hatfield to Be Next Campbell Lecturer

Dr. W. H. Hatfield, who is director of the Brown-Firth Research Laboratories, Sheffield, England, will deliver the Campbell memorial lecture during the annual convention of the American Society for Steel Treating to be held in Philadelphia the week of Oct. 8 concurrently with the National Metal Exposition. The subject of Dr. Hatfield's paper will be "The Application of Science to the Steel Industry." He will deal with such topics as steel making problems, manipulation and treatment, special steels, corrosion and acid resisting steels, effect of heat and heat resisting steels and tool steels and cutlery.

Dr. Hatfield is recognized as one of the world's leading metallurgists and has been actively engaged in the steel industry since his graduation from Sheffield University. He has presented over fifty papers before various technical societies as well as being the

author of several books on metallurgical subjects. He has been invited to lecture at a number of American institutions after the Philadelphia convention, among which are Yale University, Massachusetts Institute of Technology, Carnegie Institute of Technology, and the University of Michigan. Dr. Hatfield's lecture will be the third since the establishment of the Campbell Memorial Lecture by the A.S.S.T. in honor of its late founder member. The first lecture was presented by Dr. Guertler of Germany, the second by Dr. Jeffries.

Aberdeen Munitions Demonstration Oct. 4

The tenth annual meeting of the Army Ordnance Association will be held at the Aberdeen Proving Ground, Maryland, Thursday, Oct. 4. With the approval of the Secretary of War and the cooperation of the various branches of the Army, guests at the meeting are permitted to witness current tests of modern munitions. The American Society of Mechanical Engineers is cooperating this year.

The program of demonstrations, beginning at 10 a. m., lasts throughout the day and concludes with anti-aircraft firings in early evening.

September Machine-Shop Practice Meeting

The Machine Shop Practice Division of the American Society of Mechanical Engineers is to have its next national meeting in Cincinnati on Sept. 24, 25 and 26, and in connection with this meeting the Cincinnati committee is planning a trip to Ashland, Ky., to visit the new continuous sheet mill of the American Rolling Mill Co. The group will leave Cincinnati by river steamer on Monday afternoon, Sept. 24, and will arrive at Ashland Tuesday morning, where they will spend the day at the mill as guests of the company. They will leave Ashland some time Tuesday evening and be back in Cincinnati Wednesday morning. On Monday and Tuesday evenings there will be technical sessions aboard the steamer. A third session held in Cincinnati will be a symposium on machine tools.

The total cost of the trip including meals and state room will be about \$20. From the nature of the trip it will not be possible to include ladies, but there will be room for men guests who are not members of the society.

Navy Asks Bids for Steel

WASHINGTON, July 24.—The Bureau of Supplies and Accounts of the Navy Department will open bids on July 31 for approximately 200 tons of angles. On Aug. 7 the bureau will open bids for approximately 500 tons of galvanized sheets, 75 tons of black sheets and 50 tons of plates. The material is for various navy yards and air stations.

Reduction in Fabricated Steel Plate Orders

New orders for fabricated steel plate in June are reported by the Department of Commerce at 34,278 net tons, or 42.9 per cent of the capacity of the 51 firms reporting. This shows a drop of about 19 per cent below the 42,376 tons reported for May, but is 19 per cent above the orders for June, 1927, which were 28,811 tons. The recent total is the smallest, except for last November, since a year ago. For the half-year the total has been 259,448 tons, which is 2 per cent below last year's 264,945 tons.

Of the June total 11,280 tons (smallest since January) was for oil storage tanks; 2227 tons (larger than May, but otherwise smallest since December) for refinery materials and equipment; 965 tons (smallest, except February, since last July) for tank cars; 3225 tons (smallest since March) for gas holders; 778 tons for blast furnaces and 15,803 tons for stacks and miscellaneous. Compared with 1927, the half-year shows a gain of 2345 tons in orders for oil tanks and 2589 tons for refinery materials, but a decline of nearly 7500 tons on tank cars and 4550 tons on gas holders.

Makes Acid-Resisting Refractory Brick

A new refractory brick has been developed by the General Refractories Co., Philadelphia, which is highly resistant to acid attack. It has been given the name Acido. It is intended particularly for use in copper, zinc and lead plants, sulphide paper plants, fertilizer works, etc. It is made from a clay specially selected for acid resistance.

Safety Congress in New York in October

The National Safety Council is planning to hold its seventeenth annual safety Congress in New York from Oct. 1 to 5.

European Steel Entente Modifies Fines

WASHINGTON, July 24.—It has been officially confirmed that the Continental Steel Entente has modified its original system of fines for over-production so that now a fine of \$1 per metric ton will be levied upon each ton of raw steel produced in excess of the specified quota of each individual country up to a tonnage amounting to 7.5 per cent of the allotted quota, says a radiogram received by the Iron and Steel Division, Department of Commerce, from Acting Commercial Attaché Daniel J. Reagan, Paris. From 7.5 per cent up to 10 per cent this fine becomes \$2 per ton and for all tonnages produced in excess of 10 per cent above the

allotted quota, the old fine of \$4 is to remain in force. Should this revision be retroactive to Jan. 1, 1928, the fines assessed against the German industry will amount to \$4,000,000 over the first five months of the year, an amount three times that actually paid by this industry. This situation is compensated for, however, by an increase made in the German quota of from 275,000 tons to 300,000 tons monthly.

Malleable Castings Business Off in June

WASHINGTON, July 24.—Showing a decrease of 2321 tons, orders for malleable castings in June amounted to 52,108 tons, against 54,429 tons in May, according to reports received from 133 identical manufacturers by the Department of Commerce. Production in June totaled 61,230 tons, or 64.6 per cent of the reported monthly capacity of 94,719 tons, against 61,458 tons, or 67.3 per cent of the reported monthly capacity of 91,296 tons in May. Shipments in June totaled 59,482 tons, against 58,264 tons in May.

For the first six months orders totaled 328,938 tons, compared with 314,616 tons for the corresponding period last year. Production amounted to 356,753 tons and shipments to 339,558 tons, against production last year of 351,096 tons and shipments of 342,097 tons.

Report on Mechanization of Industry

Economic and social progress in connection with the mechanization of industry are covered in the twelfth annual report of Magnus Alexander, president National Industrial Conference Board, New York. This forms a volume of 60 pages, of which the topic mentioned covers 18 pages. Part II details the Conference Board's contribution during the year to industrial economic knowledge, along a wide variety of topics. Part III describes the board's organization and method of operation, while part IV lists the officers, members and counsellors and the affiliated organizations and committees.

Treasury Upholds Small Shapes Decision

The request of steel importers that the United States Treasury Department, customs division, reverse its decision of June 2, changing the classification of bar size channels, angles and tees from paragraph 312 covering structural material to paragraph 304, which relates to bars, has been declined by the department. It is expected that the importers will now appeal to the Customs Court of Appeals.

The decision pointed out, as reported in THE IRON AGE, June 21, page 1762, that investigation showed that angles, channels and tees in sizes

less than 3 in. are distinguished in the trade from the larger sizes of the said articles and that the smaller sizes are known as angle bars or angles, bar size; as channel bars or channels, bar size; and as tee bars or tees, bar size. Classified under the bar paragraph of the tariff act this material is subject to a duty of 0.3c. per lb. instead of 0.2c. per lb., the duty under paragraph 312.

The increased duty on much of the material affected by this reclassification, however, is more than 10c. per 100 lb. as a sizable tonnage of furring channels has been coming into the United States, and as these are valued at more than 1.50c. per lb. they are subject to a duty of 0.5c. per lb. or 50c. per 100 lb., whereas under the former classification in paragraph 312, there was no increase in the duty because of higher valuation.

Variable Conditions Noted in General Industry

Industrial activity, as measured by electrical consumption, is reported by *Electrical World* as indicating a spotty situation. Reports are based on returns from about 3000 large manufacturers scattered throughout the country. Industrial operations for the country are estimated for the first half year at about 2.8 per cent above that of a year ago. June showed a drop of 2.2 per cent from May, which is less reduction than usual. The month closed on a rate of operation about 3½ per cent above that of a year earlier.

Steel Earnings Show Improvement

The Jones & Laughlin Steel Corporation, with net profits of \$4,241,091 in the quarter just passed, made a better showing than in any three-month period since 1926. In the March, 1928, quarter the company's profits were \$2,903,457 and in the June, 1927, quarter, they were \$3,576,079. First half earnings this year were \$7,144,548, as compared with \$7,234,803 last year.

The Youngstown Sheet & Tube Co. also reports increased profits, the figure for the three months ended June 30 having been \$2,491,891, as against \$1,663,516 in the preceding quarter and \$2,062,215 in the June quarter last year. Sheet & Tube's first half profits totaled \$4,155,407 as compared with \$4,318,258 in the first six months of 1927.

Second quarter earnings of the Donner Steel Co., Inc., amounted to \$307,345 this year and to only \$161,472 in 1927. The company's net for the first half of 1928 totaled \$391,218, as against \$229,733 last year.

The Superior Steel Corporation showed a profit for the first time since 1926, its net amounting to \$30,760 in the June quarter. Net loss in the preceding quarter was \$63,117 and \$46,000 in the second quarter of 1927.

Reinforcing Steel

Illinois Road Work Will Take 2500 Tons—Awards 5400 Tons

WITH 2500 tons needed for road work in Illinois and 1000 tons for similar purposes in Arkansas, new projects reported in the last week will require about 5900 tons. The following awards, totaling about 5400 tons, include no sizable jobs except a municipal reservoir at Portsmouth, Ohio, taking 1000 tons:

WESTCHESTER, COUNTY, N. Y., 150 tons, road work, to Truscon Steel Co.
NEW YORK, 700 tons, section of subway; from Rodgers & Hagerty, Inc., general contractor, to Day & Goater, Inc.
MONMOUTH COUNTY, N. J., 100 tons, road work, to Truscon Steel Co.
PORTSMOUTH, OHIO, 1000 tons, municipal reservoir, to West Virginia Rail Co.
DALLAS, TEX., 100 tons, warehouse for Crane Co., to Laclede Steel Co.
SPRINGFIELD, ILL., 250 tons, Illinois Highway Commission road work, to Laclede Steel Co.
CHICAGO, 500 tons, plant building, Miehle Printing Press & Mfg. Co., to Joseph T. Ryerson & Son.
CHICAGO, 275 tons, building for B.-A. Eckhart Milling Co., to Barton Spider-Web System, Inc.
CHICAGO, 150 tons, apartment building, 5511 West Washington Boulevard, to Concrete Engineering Co.
MAYWOOD, ILL., 100 tons, two public schools, to Concrete Engineering Co.
ST. LOUIS, 300 tons, fruit commission house for Wabash Railway, to Laclede Steel Co.
ST. LOUIS, 450 tons; Mercantile building at Eighteenth Street and Washington Avenue, 350 tons, and factory building for Waxite Paper Co., Newstead and Hunt Avenues, 100 tons, to Missouri Rolling Mills Corporation.
CHICAGO, 100 tons, Forty-third Street

viaduct, to Jones & Laughlin Steel Corporation.

CHICAGO, 180 tons, public school, Morgan and 105th Streets, to Barton Spider-Web System, Inc.

SACRAMENTO, CAL., 400 tons, paving in Ventura County, to unnamed interest.

OAKLAND, CAL., 170 tons, school administration building, to Pacific Coast Steel Co.

OAKLAND, 100 tons, automobile building, Twenty-ninth Street and Broadway, to Gunn, Carle & Co.

LOS ANGELES, 250 tons, apartment building, Rossmore and Rosewood Streets, to unnamed interest.

OLYMPIA, WASH., 100 tons, highway work, to Northwest Steel Rolling Mills.

SEATTLE, 350 tons, hotel, Fifth Avenue and Virginia Street, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 500 tons, produce terminal for New York, New Haven & Hartford Railroad.

WHITE PLAINS, N. Y., 500 tons, high school; bids July 25.

PITTSBURGH, 150 tons, McSorley Garage, to Carlem Engineering Co.

CINCINNATI, 300 tons, Walnut Garage.

CHICAGO, 500 tons, caissons for Mercantile Mart; general contract placed with John Griffiths & Son Co.

LITTLE ROCK, ARK., 750 to 1000 tons, road work for Arkansas Highway Commission.

SPRINGFIELD, ILL., 2500 tons, road work for Illinois Highway Commission.

SAN FRANCISCO, 114 tons, bakery, Alameda and Bryant Streets; bids being taken.

EVERETT, WASH., 300 tons, Rambaugh store; bids being taken.

Data Sheets for Motor-Truck Fleet Operators

To afford motor vehicle fleet operators a means for quickly checking changes made by manufacturers in the models of vehicles they operate, and for correctly ordering replacement parts, a standardized mechanical data sheet is proposed by J. F. Winchester of the Society of Automotive Engineers. This sheet lists all parts of the chassis, the body, and the equipment, and provides spaces for filling in such data regarding them as make, model, type, part number, serial number, size and the like.

Widespread use of this standardized sheet by leading motor truck and motor coach manufacturers, and the distribution of the data among service stations and fleet operators, would be an important factor in the more economical operation of such vehicles, by eliminating unnecessary delays for parts replacements and assuring more constant service from the vehicles. The proposed data-sheet form was printed in the July issue of *S.A.E. Journal*.

Adoption of such a form would involve practically no expense for any individual, according to Mr. Winchester. If the manufacturer adopts it in the right spirit, it can be used as a final inspection sheet and factory record, and can be coordinated with the factory instruction book supplied with the vehicle. This would simplify ordering of parts after a vehicle has become several years old, and would provide reliable reference records for the organization in furnishing parts for any model.

Railroads Cut Operating Expenses

Passenger business on the railroads in the first half of 1928 was the smallest in 18 years, according to *Railway Age*. Freight business was the smallest since 1925. In consequence, total earnings were the smallest since 1925.

The average wage paid per employee was the largest since 1921. In spite of this, total operating expenses were the smallest since 1922. There are numerous reasons why operating

expenses were the smallest in six years. An important one is the decline in traffic. To this has been partly due the reduction in employees to the smallest number since 1922. This reduction more than offset the effect of the advance in the average wage, and, in consequence, the total amount of wages paid was the smallest since 1922.

Economy of operation has been increased in many ways, in spite of improvements which have been effected in service. The average number of tons of freight loaded in each car was the smallest since before the war. Nevertheless, the amount of service rendered hourly by the average freight train was the greatest in history. This was because the number of cars handled in the average freight train was the largest ever reached and the average speed with which freight trains were moved was the greatest ever recorded.

Poland Importing British Scrap

LONDON, ENGLAND, July 13.—Britain's maintenance of an export trade with Poland in iron and steel scrap for remelting is one of the outstanding features of the scrap market. During recent months substantial quantities have been sent from Yorkshire, and the significance of the movement is reflected in the course of prices whenever there is a fair domestic demand. One reason given for Poland's scrap purchases is that the practical side of the rehabilitated steel industry of that country is largely in the hands of men trained in British steelworks. A large contingent of Sheffield steel smelters is there. According to scrap merchants, the material they sell is now used in the big open-hearth plants, 60 per cent, and even more, in some cases, being the proportion of the charge of a 60-ton furnace.

Less Shipping Under Construction

Total merchant shipping being constructed throughout the world represents 2,660,462 gross register tons, according to a statement of Lloyd's Register of Shipping. This is a reduction of 8 per cent from the March 31 figure of 2,893,251 tons. The reduction was accounted for by a shrinkage of 238,000 tons in British yards. The United States showed only 55,502 tons on June 30, compared with 56,049 tons three months earlier.

New York and Texas accounted for practically 30 per cent of the exports of the United States in 1927, according to the Department of Commerce. Totals were \$770 and \$647 millions for the two States, and \$4,759 millions for the nation. The figures relate, as nearly as may be, to origin of the goods and not merely to exporting points.

Fabricated Structural Steel

New York Newspaper Building Takes 13,000 Tons—Awards Total 33,000 Tons

AWARDS during the last week amounted to 33,000 tons, but included no outstanding jobs except a building in New York for the *Daily News*, requiring 13,000 tons. Among the new projects, totaling 28,300 tons, are 7000 tons for junior high schools at Chicago, 5000 tons for 12 oil storage tanks in Texas and 4500 tons for a college building at Pittsburgh. Awards follow:

PORTLAND, ME., 780 tons, theater and office building, to Lehigh Structural Steel Co.
NORTHFIELD, VT., 250 tons, Norwich University armory, to McClintic-Marshall Co.

LAWRENCE, MASS., 150 tons, Champion International Co. power house, to New England Structural Co.

WHYMOUTH, MASS., 750 tons, power house addition, to New England Structural Co.
NEW YORK, 13,000 tons, *Daily News* Building on East Forty-second Street, to Harris Structural Steel Co.

NEW YORK, 6000 tons, several apartment buildings for Julius Tishman & Sons, Inc., to Hay Foundry & Iron Works.

NEW YORK, 1200 tons, office building for Lee, Higginson & Co., at 49 Broad Street, to Taylor-Fichter Steel Construction Co.

BROOKLYN, 700 tons, addition to department store of Thalheimer Brothers, to Richmond Structural Steel Co.

WALKES-BARRE, PA., 1000 tons, building for Wilkes-Barre Savings Bank, to Anthracite Bridge Co.

NEW YORK CENTRAL RAILROAD, 300 tons, bridge at South Bend, Ind., to McClintic-Marshall Co.

PENNSYLVANIA RAILROAD, 200 tons, three plate girder spans in Indiana, to American Bridge Co.

CLEVELAND, 650 tons; 500 tons for extension to soaking pit building and 150 tons for shear building for Otis Steel Co., to Wellman-Seaver-Morgan Co.

HOCKING VALLEY RAILROAD, 450 tons, bridges in Ohio, to American Bridge Co.

ASHLAND, KY., 275 tons, warehouse for American Rolling Mill Co., to Jones & Laughlin Steel Corporation.

TUSCALOOSA, ALA., 510 tons, power house for Gulf States Paper Corporation, to Ingalls Iron Works Co.

NEW ORLEANS, 236 tons, two barges for United States Engineers Corps, to Howard Shipyard & Dry Dock Co., Jeffersonville, Ind.

WATSEKA, ILL., 200 tons, bridge span for Chicago & Eastern Illinois, to American Bridge Co.

OGLESBY, ILL., 300 tons, waste heat house for Marquette Portland Cement Co., to Worden-Allen Co.

CHICAGO HEIGHTS, ILL., 300 tons, mill building for Calumet Steel Co., to Worden-Allen Co.

BURR OAK, ILL., 418 tons, car repair shop for Chicago, Rock Island & Pacific, to American Bridge Co.

ROCK COUNTY, WIS., 300 tons, State bridge, to Continental Bridge Co.

KOHLER, WIS., 200 tons, supplementing 500 tons, pottery kiln for Kohler Co., to Worden-Allen Co.

MILWAUKEE, 2500 tons, addition to welded pipe shop of A. O. Smith Corporation, to Wisconsin Bridge & Iron Co.

WAUKESHA, WIS., 300 tons, addition for Waukesha Motor Co., to Wisconsin Bridge & Iron Co.

ST. LOUIS, 350 tons, fruit commission house for Wabash Railway, to Mississippi Valley Structural Steel Co.

OMAHA, NEB., 700 tons, addition to Union Pacific building, to American Bridge Co.

TACOMA, WASH., 400 tons, addition to

salt and chemical works, to Star Iron & Steel Co.

OAKLAND, CAL., 170 tons, bridge over Alameda Creek, to Herrick Iron Works.

OAKLAND, 180 tons, automobile building, Twenty-ninth Street and Broadway, to California Steel Co.

SAN DIEGO, CAL., 253 tons, bridge over Sweetwater River, to Robert T. Dawson, San Diego.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 500 tons, produce terminal.

BOSTON, 200 tons, Simmons College administration building.

BOSTON, 150 tons, Lafayette Theater on Tremont Street.

NEW YORK, 2500 tons, Seward Park High School on Ludlow Street.

KEARNY, N. J., 700 tons, factory building for Western Electric Co., Inc.

STATE OF NEW JERSEY, 250 tons, highway bridge.

PHILADELPHIA, 590 tons, highway bridges for city; Sixth Street and Alleghany

Avenue, 375 tons; Ashdale Street, 100 tons; Leverington Avenue, 115 tons, bids opened July 25.

PENNSYLVANIA RAILROAD, 200 tons, bridges.

BALTIMORE, 500 tons, highway bridge for Maryland State Highway Department.

PITTSBURGH, 4500 tons, Cathedral of Learning, University of Pittsburgh.

ALTOONA, PA., 1000 tons, high school; bids taken.

DETROIT, 150 tons, plant addition for Thompson Products, Inc.

CLEVELAND, 150 tons, plant addition for Eaton Axle & Spring Co.

CLEVELAND, 130 tons, plant addition for Willard Storage Battery Co.

NEWARK, OHIO, 150 tons, Pennsylvania freight station.

STATE OF TEXAS, 5000 tons, 12 80,000-bbl. oil storage tanks for Texas & Pacific Oil Co.

STATE OF LOUISIANA, 2815 tons, two bridges.

MARSEILLES, ILL., 600 tons, highway bridges.

CHICAGO, 7000 tons, junior high school buildings.

EDGERTON, WIS., 150 tons, Newville bridge over Rock River; general contract let to P. J. Dunlap, Mount Horeb, Wis.

GREAT FALLS, MONT., 450 tons, high school building.

OAKLAND, CAL., 250 tons, hangar No. 4 for Port Commission; bids taken July 23.

GLENDAL, CAL., 400 tons, bridge over Los Angeles River; bids soon by Pacific Electric Railway Co.

OLYMPIA, WASH., 119 tons, bridge over Cle Elum River; general contract awarded to R. A. Geary, Yakima, Wash.

Plant Operation Averages 96 Per Cent of Full Time

Part-time operation of manufacturing plants has been studied by the National Industrial Conference Board, New York. The latest figures are for May, but as the change has been slight over the past 18 or 20 months they may be substantially accurate today. At that time about 78 per cent of the plants were operating on full time and 21 per cent on part time, the remainder being idle. Average operation of the part-time plants was at 81 per cent of full time, indicating that many of this group of plants must have been shut down more than one day each week. Percentage of full-time operation, averaged for all plants, was 96.

July Automobile Sales Unusually Large

Retail buying of automobiles holds at a point very considerably above the normal movement for this season, according to *Automotive Industries*, and gives indication of making the present summer the most active in recent years. Though the new cars are the center of interest, there continues to be good selling in earlier cars. Low-priced cars in particular show only seasonal reduction from earlier in the year.

Maintenance of price as reflected in the new car offerings gives indication

of the strength of car demand, and the intention of manufacturers to base sales effort upon improvements and refinements. Some of the largest gains in the first half of the year were scored by companies whose cars were priced to permit including special engineering and refinement features.

July output of United States factories will be considerably under the June total of 396,714, not so much because of let-up in sales as to allow inventory at many leading factories. This will aid further in bringing dealer stocks, already at a low seasonal level, to a point warranting extensive manufacturing operations through the rest of the summer.

Fewer Cars in Need of Repair

Freight cars in need of repair on July 1 totaled 145,210, or 6.5 per cent of the number on line, according to reports just filed by the carriers with the Car Service Division of the American Railway Association. This was a decrease of 2780 under the number reported on June 15, at which time there were 147,990, or 6.6 per cent.

Freight cars in need of heavy repairs on July 1 totaled 107,265, or 4.8 per cent, a decrease of 183 compared with June 15, while freight cars in need of light repairs totaled 37,945, or 1.7 per cent, a decrease of 2597 compared with June 15.

A. I. FINDLEY
Editor

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W. W. MACON
Managing Editor

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Selling Copper in Europe

OUR British contemporaries have been having a good deal to say about what they consider to be a control of copper by the American Export Association that is unfavorable to the British manufacturers. Yet all that the American producers have done—and in this they have had the cooperation of the principal foreign producers—is to focus the copper market in New York and eradicate some trade evils, especially outside speculation.

The objectives have been to establish direct distribution of copper from producers to consumers, to eliminate speculative intermediation, and to extinguish competition among the producers in the foreign trade. The existence of large stocks of crude copper in Great Britain was formerly the basis for active trading on the London Metal Exchange and a speculative market was created that had its repercussions, commonly disliked, upon New York. American refiners have absorbed nearly all of that copper during the last year or two, fetching it hither for refining (copper refining in Great Britain having become a lost art). Consequently there is no respectable basis for buying and selling warrants in London and quotations from its exchange have ceased to be of influence.

In Europe the copper business has now been put upon the same terms as have prevailed for decades in the United States, i. e., a direct distribution from producers to consumers, with exclusion of the group of middlemen who formerly got their living out of the industry. The excluded group is naturally resentful, just as once it was in New York, and some consumers are doubtless vexed over the curtailment of their ability to play the market, which they ought not to want to do, anyway. Their complaint of being rationed in their supplies is obviously frivolous, for of course producers want to sell all the copper they can. Naturally there may be bilateral ideas as to price.

It is a soundly economic situation, even if it be not of the nature of *laissez faire*; and it cannot be otherwise, lest producers at least would become involved in difficulties such as resulted from the Secretan corner and the Amalgamated umbrella, which are still vividly remembered, although they happened long ago. During the last two years the world's consumption of copper has been increasing and in consequence there has been this year a very moderate increase of price. The situation and the prospects are kept constantly illuminated by the admirable statistics that are available.

The price of copper in Europe is the New York price plus freight and expenses. There is occasionally a slight differential in the published quotations that is misunderstood abroad. In periods of slack buying those smelters who take in ore on quotations may have to

shade the price in the domestic market in order to dispose of the supplies they are constrained to accept, while the producers from their own mines continue to hold at a previous price, biding the time of advent of customers. In such a situation the Export Association now presents a united front. Although the shaded price is then a true market quotation, it is not a discrimination against the European buyer, for if the latter wanted copper in any quantity there would not be any shaded price. Likewise as to American buyers in the aggregate.

Two Superstitions Ruined

BANG! Bang! There go two pet beliefs, all in one day, ruthlessly slain by cold-blooded scientists. The remains will be regretfully interred alongside all that is mortal of such other defunct items as beta iron, solid atoms and a pancake-like earth.

We had always thought that type metal was type metal principally because it expanded on solidification and hence filled the mold sharply. But some Japanese with an iconoclastic bent has actually measured the volume of several alloys which printers use, and he finds that they contract during freezing!

Another statement, made by some forgotten writer, has been repeated so often that it is almost heresy to question it; namely, that the temperature of the oxy-acetylene flame is 6300 degrees Fahrenheit. This "fact" and the melting points of the common metals are always placed before welders as essential scientific data for the workman. Now some inquiring German expert in optical pyrometry announces that the maximum temperature he was able to measure was 3100 degrees Centigrade.

"What's a few hundred degrees, more or less, among fiends?" one might ask, without receiving any answer other than that it is well that an attempt has been made to measure the temperature with scientific equipment. The 6300 figure probably came from a class-room exercise in metallurgical calculations: given the specific heats, the heats of formation, and the chemical equation, to calculate the maximum flame temperature. The obvious error in such computations is the implicit assumption that data collected at moderate temperatures remain correct at intensely high heats.

That type-metal matter is not so simple. Gulliver's "Metallic Alloys," a standard text, says "Lead-antimony alloys are used in type metal, an alloy which . . . should expand on solidifying so as to take the finest design on the mold." Other books on metals and alloys make similar statements. Vickers in his "Metals and Their Alloys" apparently comes nearer the facts when he says: "Lead-antimony alloys containing less than 22 per cent of antimony contract on cooling; only richer

mixtures reproduce the finest impressions of the mold." He then quotes a number of standard type-metal compositions. The highest contains 18 per cent antimony. Looking back in a curious book dated 1869 and entitled "The Useful Metals" we find that bismuth (a metal which undoubtedly expands on solidification) was then used as a constituent of "letter type." Stereotype metal of that day was said to be composed of "3 lead, 2 tin, and 5 bismuth," but the various type metals quoted range from 9 lead 1 antimony to 3 lead 1 antimony.

Perhaps the statement that type metals expand on cooling is a relic of bygone days when some bismuth or high-antimony alloys were used which really did expand slightly on freezing. At any rate it is one of those statements which have been repeated, uncritically, because some former authority said so and so, and despite the fact that passing years may have entirely altered the circumstances for which the original statement was true.

Strip and Sheet Competition

A YEAR and a half back the sheet mills were a good deal concerned over the prospect of competition by strip mills. The sheet mills feared that large inroads upon their trade would be attempted. Apparently they had greater expectations than strip producers themselves as to what could be accomplished within a short time in the manufacture of a large tonnage of wide strips of relatively light gages. At any rate there has not been anything like as large increase as was expected. Comparing 1926 and 1927 there was a decrease of only 258,442 tons in sheet production, with an increase of 96,330 tons in strip production, a net change of 354,772 tons, which was only 6.5 per cent of the combined sheet and strip production of 1926, 5,459,568 tons. (Sheets 4,237,479 tons, strips 1,222,089 tons).

It would not be safe, moreover, to assume that this change involved a swing by consumers adopting strips in place of sheets for identical use, for when we compare 1925 and 1927 we find only 117,795 tons decrease in sheets and 69,784 tons increase in strips, the change of 187,579 tons being but 3.5 per cent of the combined production, certainly a small swing in two years. Also we have the fact that in the first half of this year independent sheet mills reported 10 per cent greater production than in the first half of last year.

It was feared that strips would be competitive in the market with sheets over quite a range of gages and widths. Such a situation has not developed. Prices show that the strip market has more competition within itself than it has with the sheet market, for a large tonnage of strips is being sold at prices far below figures that sheet mills would think of naming.

It is simply a case of the products being quite different. There is not anything like the similarity between them that many sheet mills feared a year and a half ago would develop before the present time. But that is not strange. Strips are wide hoops. Bands (12 gage and heavier) and hoops (13 gage and lighter) were produced in large quantity long before the word "strip" entered into trade usage. But there is no official definition indicating where bands and hoops stop and strips begin.

It will help one to get his bearings to refer to the production statistics of 1905, when after a lapse of years sheet production statistics were gathered, though only

of 13 gage and lighter. Such production was 1,491,024 tons, while in the same year, 1905, production of bands and hoops was 445,527 tons, or about 30 per cent as much. Last year band, hoop and strip production was 33 per cent as large as total sheet production, all gages. Tin mill product of course is not reckoned. The various commodities are developing largely along their own lines. The contact in competition is relatively small.

Exit the Jacksonville Scale

TECHNICALLY the bituminous coal miners who belong to the United Mine Workers had been on strike for several years owing to the refusal of mine operators to pay a wage of \$7.50 per day, the Jacksonville scale. Practically most persons had forgotten that there was a strike. For a long time mines that do not recognize any union have been producing all the coal that is needful through the labor of non-union miners and such members of the United Mine Workers as surreptitiously went to work. The fictions of the strike and the Jacksonville scale were maintained by the union officials in order to preserve a semblance of organization and authority, also payment of members' dues.

Last week John L. Lewis and his assisting committee abandoned the Jacksonville scale and authorized negotiations for district wage scale to be based on existing wages. This is a recognition that the market price must prevail in labor as well as in commodities. It is pitiful that Mr. Lewis so long deluded his followers into the belief that anything else could happen.

When labor unions come into conflict with economic law operating in freedom they are defeated every time. The recent collision must have been as disastrous to the United Mine Workers as was the recent general strike of labor unions in Great Britain. Probably it will cease to be a power in the bituminous coal fields. For a labor union to be successfully dictatorial it must be protected by restrictive legislation, as are the anthracite miners of Pennsylvania, or by restrictive membership (together with blackjacks and boycotts), as are the artisans of our seaboard, and some interior, cities. Why a long suffering public permits their strangling methods is one of the mysteries that has not been fathomed.

The Unemployment Issue

AS was to be expected, unemployment statistics are being given even more of a partisan twist as the lines of the Presidential contest are being drawn. Secretary Davis, in a report of March 24, this year, to the United States Senate, estimated that 1,874,050 persons were unemployed in the United States, taking as his basis a shrinkage of 753,107 between 1925 and 1928 in manufacturing and Class I railroad labor, or 7.43 per cent in those groups. Then he applied the same percentage to the total of 25,000,000 persons who were working for wages or salaries in 1925.

Probably the Secretary erred on the favorable side, in view of the heavy percentage of idleness in coal mining, with no conspicuous compensating increase. But certainly there will be distrust of an estimate of upward of 5,000,000 made in connection with a political attack on Secretary Davis's figure, and a large measure of reserve in respect to the figure of 4,000,000 put out

in February on behalf of the Labor Bureau, Inc., even after allowance for the seasonal increase in following months. The main fault is to be found with all high appraisals of idleness in industry in their assumption that persons who have left employment in a given line have taken up work in no other.

That, as we have pointed out heretofore, is also the weak point in many attempts to appraise the economic effect of the recent more rapid displacement of men by machines, as well as of that "new thought" in production engineering that has been so effectively at work since the depression of 1921.

Already in campaign discussion the question has been asked, what does this party or that party propose to do about unemployment. It seems to matter nothing that the issue is non-political and economic, just as the problem of a better living for the farmer is economic. There is ahead of us—more's the pity—a season in which the facts concerning momentous changes in industry are to be wrested for partisan advantage and in which appeals to prejudice will take the place of honest effort to meet new situations with new measures. Labor will be assured by political orators that much of the existing unemployment can be cured by legislation, whereas in fact the adjustments that must be made will require time and cannot be hurried by legislative make-shifts.

It could well be wished that the labor unions themselves would sense the opportunity of the present situation in industry. The millions the United Mine Workers have spent in a hopeless warfare to set aside economic law would have gone far toward solving the problem of relocating thousands of men who will never again get a livelihood from the mining of bituminous coal.

Good Showing by Structural Steel

PORTLAND cement is showing smaller gains in movement than formerly. Last year's increase in shipments was 6 per cent, while in the first half of this year there was a loss of 1 per cent from the first half of last year. Fabricated structural steel on the other hand has shown a sharp gain this year.

In this department of THE IRON AGE of Jan. 26, 1928, a 15-year comparison was made between fabricated structural steel and Portland cement. In 1913 the showing was 70.3 barrels of cement to one net ton of fabricated structural steel and in 1914 it was 68.2 barrels, while in the last five years, 1923-7, there was an average of 60 barrels. For the first half of this year the relationship was 50.8 barrels. Yet in the period covered by the comparison there developed a very large use of cement for road construction, which would help consumption of other forms of steel, chiefly in reinforcements. The fears of long ago that concrete would tend to supplant fabricated structural steel, or at least provide a very active competitor, have proved to be much exaggerated.

Fabricated structural steel has also gained in proportion to total steel made. In 1913-4-5 it averaged 102 pounds per gross ton of all steel ingots produced. In the first six months of this year the proportion was 116 pounds.

A few weeks ago we made reference to this being an active presidential year, citing steel production, freight car loadings, Portland cement and building contracts as evidence that this had been in no sense an

"off" year to date. Now the fabricated structural steel statistics for the half year have become available, and they make a particularly favorable showing, just the sort needed to oppose the notion that politics tend to curtail trade and particularly the inception of long term investments.

Fabricated structural steel lettings in the first half of this year, computed by the Department of Commerce on the basis of actual returns from more than 80 per cent of the industry, were 1,586,250 net tons. Previously the best first half had been 1926, with 1,432,800 tons, and thus the record was passed by 10.7 per cent and the first half of 1927 by 13.7 per cent.

Another new record has been made. The second half of last year was the best second half. Twelve-month totals of lettings, through June 30, have been as follows: 1926, 3,035,940 tons; 1927, 2,853,000 tons; 1928, 3,254,750 tons. Shipments of the fabricating shops are reported separately, and are given at 3,008,000 tons in the 12 months through June 30. Subtracting this from bookings reported for the same period, it appears that the shops had 246,750 tons more business on books July 1 than on that date last year. Thus the steel industry has quite a backlog of business in that line of consumption.

Correspondence

Are Lower or Higher Iron and Steel Outputs Just Ahead?

To the Editor:—Ordinarily there is little to be gained by restating one's position, but the article by Mr. Thum in your July 12 issue is so clear and fair that it does seem worth while pointing out just how widely we differ.

We both agree, of course, in admitting that the world met with unexpected disaster in 1914, and that that calamity of itself accounts for a good deal of industrial irregularity. We agree that from an extreme low point in 1921 the world output of iron has risen to a high in 1927-28. We differ sharply as to what all this means, so far as the probabilities of the future are concerned.

Mr. Thum looks upon the 1921-28 rise as the beginning of a new cycle of progress; and feels that the World War simply caused a drag of twelve years in the normal industrial growth. If we accept his theory, we should look for new high records in world iron output in the years immediately to come.

I, on the contrary, feel that the World War came just at a time to accentuate a change in trend which was already visible; and that the rise of 1921-28 is merely a natural temporary recovery from sheer collapse. If I am right, we will not have to wait longer than 1929 or 1930 to see new low world iron records made—low, that is, for a number of years past. They may not reach the depths of 1921, but they may easily be closer to those than to the 1927-28 altitudes.

The two thoroughly ominous factors which will precipitate the next depression are in clear sight today; but, of course, no one can say which will act first. We have obviously a dangerous speculative position in America primarily. Security prices parted company with realities two years ago, and the final correction, however long delayed, is inevitable and may be spectacular. But we have also a far more serious factor which may bring about European trade collapse even before our own local conditions turn bad. I refer, of course, to the German reparations payments—or, rather, to the apparent impossibility of their being made.

EDWIN C. ECKEL.

Washington, July 19.

This Issue in Brief

In blast furnace operation, heavy white fog or smoke rising from slag runner indicates satisfactory reduction of sulphur. This condition is noticed when slag is highly saturated with calcium sulphide, in which form sulphur is removed.—Page 203.

* * *

Sheet steel roof proves excellent fire retardant. In test conducted by Bureau of Standards, galvanized steel roof with double locked cross seams and standing grooved seam held tight, even though red hot, preventing spread of flying embers and sparks, and eliminating "chimney effect."—Page 225.

* * *

In producing electric energy, fuel cost rises almost in proportion to output. Turbine room costs go up very slowly, and cost of steam exclusive of fuel not much more rapidly.—Page 205.

* * *

Statistics concerning only your own business are not sufficient. You must know not only what your own firm is doing, but must compare your company's performance with the industry as a whole, says Census Bureau official, in telling how business statistics should be used.—Page 204.

* * *

Recommends hot salt baths as a means of avoiding quenching cracks. Sorbitic structures can be obtained by quenching in melted salt at about 500 deg. C., giving physical properties "not inferior to those after water quenching and tempering," says Japanese metallurgist.—Page 210.

* * *

New low world iron output record, for recent years, is prophesied. E. C. Eckel says that ominous factors which will precipitate the next depression, as early as 1929 or 1930, are in clear sight today.—Page 234.

Sailor-welders are saving Government hundreds of thousands of dollars, says engineer. Every battleship has its own portable welding equipment, with competent welders among enlisted personnel.—Page 202.

* * *

Cuts costs by two-floor assembly system. First floor of motor truck plant is used for sub-assemblies, which are hoisted through hatchways and dropped on truck frames. Materials are received on first floor almost directly under the place where they will be required on second floor main assembly lines.—Page 206.

* * *

Fabricated structural steel is gaining over concrete. Production of Portland cement for first half of year was one per cent below same period of last year, while fabricated steel gained sharply. In the last five years, 1923 to 1927, ratio of output was 60 bbl. of cement to one net ton of fabricated structural steel. The ratio for first half of 1928 was 50.8 to 1.—Page 234.

* * *

Annealing furnace fired from top provides uniform temperature. Gas passes into furnace chamber through a series of ports located below and in line with a series of cast iron saddles on manifold. Flame is projected vertically downward. Close control has reduced the time of the cycle.—Page 212.

* * *

Solves moving assembly problem by installing chain conveyor which turns a corner. Otherwise, automobile engine builder would have had to use two conveyors, with the attendant expense of transferring engines from one conveyor to the other. The conveyor makes a 112-deg. turn.—Page 213.

Future of American manganese industry depends on solving the problem of using low-grade ores, Bureau of Mines official declares. Production of manganese ore in this country, he says, is rapidly approaching a point where materially higher prices will not, relatively speaking, increase production.—Page 214.

* * *

Steel is displacing concrete for automatic substation and switch-house use. Steel housings containing completely assembled electrical equipment are placed where wanted. Steel housings cost less than concrete, are more easily and quickly erected, and are safer. Sheet steel is also replacing marble and slate for switchboard use.—Page 215.

* * *

Automotive output for first half of year approaches record. Production totaled 2,201,880 cars and trucks, which was 6½ per cent below the record of 2,358,585 units established in first half of 1926, but above every other half-year.—Page 226.

* * *

Healthy demand for machine tools reflects good business in metal trades. Even with subnormal buying in the two most important fields, railroad and automotive, machine tool purchases are holding at a high rate.—Page 258.

* * *

Wholesale average commodity price falls. June index figure was 97.6, compared with 98.6 in May, with 1926 average as 100.—Page 226.

* * *

See coal union's defeat in withdrawing demand for Jacksonville wage scale. Operators do not seem anxious to resume negotiations, as many mines are operating under open-shop conditions.—Page 224.

Iron and Steel Markets

July Improvement Maintained

Output Increased Slightly But New Orders Grow Individually
Smaller and Outlook Is Dimmed by
Buying Conservatism

STEEL making has stepped up slightly from a little under 75 per cent of capacity a week ago to a full 75 per cent rate. Against this, new business and fresh specifications on contracts fell off in the week, and orders appear to be growing individually smaller. The increasing conservatism in buying thus indicated makes it difficult to forecast more than a week or two. Yet none of the important channels of steel outlet has narrowed to any definite degree.

From the railroads there has been a normal steady consumption of bars, plates and shapes; but, if anything, improvement is looked for from this quarter in view of better earnings of important lines and good crop prospects. However, car buying, not now in evidence, would not immediately increase steel rollings, even if it were on a large scale, because of the time element in assembling car specialties prior to getting under production. Freight car shops are fast reaching the point where shutdowns are imminent.

The automotive and farm implement industries show little, if any, recession. The seasonal lull which has overtaken some automobile builders seems to be offset by greater activity of those bringing out new models. Output of the first half of the year, 2,201,880 passenger cars and trucks, was exceeded only by the production of the first half of 1926.

Further large line-pipe requirements are promised in plans of the Sinclair Pipe Line Co. to supply Chicago from the Southwest, taking 8 and 12-in. pipe, and in a line, which may come earlier, from Louisiana to Kansas City. One of the largest inquiries for oil storage tanks in some time, for 12 tanks in western Texas, will take 5000 tons of plates.

A firmer price stand is being taken by producers, with the result that more sales at the level being sought for the current quarter on the heavy tonnage products, 1.90c., Pittsburgh, have come to light. The 1.85c. base still obtains in cases on steel bars and is fairly common on plates.

Strip steel remains weak, and neither this form of steel nor cold finished bars are moving as freely as last month. Compared with other years at this season the showing remains favorable.

Tin plate contract releases have been sufficient to keep the American Sheet & Tin Plate Co. at a 90 per cent of capacity output through September.

Manufacturers of electric refrigerators and stoves have helped bring an upswing in sheet mill production. Prices appear less irregular, with efforts to hold a minimum of 3.40c., Pittsburgh, or 3.45c., Valley, for galvanized sheets, 2c., Valley, for blue annealed, and 2.60c., Pittsburgh, or 2.65c., Valley, for black. After some hot weather checks, the industry is back to nearly 85 per cent of capacity operations.

Sales of sheets showed a sharp gain in June, the records of the independent producers being 318,902 tons in June against 250,316 tons in May. Shipments were only 10,000 tons less than sales and unfilled orders at the end of the month remained substantially equal to those at the end of May.

Alloy steel bar mills continue at an 85 to 90 per cent rate, or only a few points below their peak.

Included in rail sales reported last week were 40,000 tons for the Norfolk & Western. Chicago reported purchases in the week of 6000 tons of track supplies and specifications for 7000 tons. The Hocking Valley bought 1400 tons of tie plates.

Pig iron prices show no strength. In addition to the decline of 50c. a ton on No. 2 foundry in the Valley, lower prices have appeared in New England, especially on the higher silicon grades. An eastern Pennsylvania steel company will probably buy 20,000 tons or more of basic iron this week.

Heavy melting steel scrap has strengthened at Pittsburgh, following many weeks of such low prices that many shippers have withheld supplies from the market. At Chicago, arrangements are being made to ship scrap by water to Lake Erie steel plants.

Canadian production of iron and steel in June was ahead of June last year and the output for the half year was the highest in ten years.

Welsh makers of tin plate, facing an uncertain market and easing prices, have decided to reintroduce a restriction of output, all mills to close for two weeks during the period of Aug. 27 to Nov. 24.

THE IRON AGE pig iron composite price has dropped to \$17.04 a gross ton, from \$17.09 of the two preceding weeks. The finished steel composite price remains at 2.319c. a lb. for the second week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 24, 1928	July 17, 1928	June 26, 1928	July 26, 1927
No. 2 foundry, Philadelphia....	\$20.26	\$20.26	\$20.76	\$20.76
No. 2, Valley furnace.....	16.50	16.75	16.75	18.00
No. 2, Southern, Cin'ti.....	19.19	19.19	19.19	20.94
No. 2, Birmingham.....	15.50	15.50	15.50	17.25
No. 2 foundry, Chicago*.....	17.50	17.50	18.00	20.00
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.75
Basic, Valley furnace.....	16.00	16.00	15.75	17.50
Valley Bessemer, del'd P'gh....	18.76	18.76	18.76	29.26
Malleable, Chicago*.....	17.50	17.50	18.00	20.00
Malleable, Valley.....	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh.....	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	July 24, 1928	July 17, 1928	June 26, 1928	July 26, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.85	1.85	1.85	1.80

Finished Iron and Steel,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....		2.12	2.12	2.12	2.12
Iron bars, Chicago.....		2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....		1.85	1.85	1.85	1.80
Steel bars, Chicago.....		2.00	2.00	2.00	2.00
Steel bars, New York.....		2.19	2.19	2.19	2.14
Tank plates, Pittsburgh.....		1.85	1.85	1.85	1.80
Tank plates, Chicago.....		2.00	2.00	2.00	2.00
Tank plates, New York.....		2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....		1.85	1.85	1.85	1.80
Beams, Chicago.....		2.00	2.00	2.00	2.00
Beams, New York.....		2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh.....		2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, on domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	July 24, 1928	July 17, 1928	June 26, 1928	July 26, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.60	2.60	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, Pittsburgh	3.40	3.50	3.50	3.85
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.35	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.40	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	July 24, 1928	July 17, 1928	June 26, 1928	July 26, 1927
Heavy melting steel, P'gh....	\$14.25	\$14.00	\$14.25	\$15.25
Heavy melting steel, Phila....	13.00	13.00	13.00	13.00
Heavy melting steel, Ch'go....	12.25	12.25	12.50	12.25
Carwheels, Chicago.....	12.75	12.75	13.00	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	16.00	16.00
No. 1 cast, Ch'go (net ton)...	13.50	13.50	13.50	14.50
No. 1 RR. wrot. Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)...	10.75	10.75	11.00	11.75

Coke, Connellsville. Per Net Ton at Oven:	July 24, 1928	July 17, 1928	June 26, 1928	July 26, 1927
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....		14.75	14.75	14.87½	13.00
Electrolytic copper, refinery...		14.50	14.50	14.50	12.75
Zinc, St. Louis.....		6.20	6.20	6.15	6.35
Zinc, New York.....		6.55	6.55	6.50	6.70
Lead, St. Louis.....		6.00	6.05	6.15	6.35
Lead, New York.....		6.20	6.20	6.30	6.50
Tin (Straits), New York.....	48.00	47.25	46.25	63.75	
Antimony (Asiatic), N. Y. ...	9.37½	9.50	9.62½	12.50	

Pittsburgh

Steel Business Sufficient to Maintain 75 Per Cent Ingot Output—Usual Summer Slump Not Expected

PITTSBURGH, July 24.—With business in finished steel products sufficient to sustain an ingot production at 75 per cent of capacity, this rate representing a slight upturn, the idea is being dissipated that there will be the usual summer slump in output. The past week has been the best, with one exception, the American Sheet & Tin Plate Co. has had in sheets this year. The high rate of operation by independent sheet producers suggests that they, too, have been doing well. Leading tin plate manufacturers have specifications on contracts that support strongly the statement that no considerable amount of new business is necessary to insure mill operations of 90 per cent or higher well up to the end of September.

Good specifications are reported for steel bars, and while only a moderate amount of fabricated steel business is developing in this immediate area, the national prospect has rarely been brighter. A fair-sized order for standard-section rails came to the local producer in the past week. Line pipe orders are the principal prop to pipe mill operations, but at the same time producers are generally reporting an improved demand for oil well pipe. Wire products are dull. Cold-finished

steel bars and strip steel are not moving with quite as much freedom this month as they did in June. The loss of tonnage, however, is slight and the showing is favorable when comparison is made with other years at this season.

None of the important channels of steel outlet has narrowed materially. Much surprise is expressed that the demand from the automobile builders is holding up so well; one explanation is that the used car problem is

less serious than usual, owing to the fact that not a few of the better cars taken in trade for new cars are being reconditioned and exported to South American countries and sales of new cars are less hampered than usual by bargains in used cars.

As to steel prices, it is noticed that strips still are weak and that the effort to establish bars, plates and shapes upon a higher basis is not gaining rapid headway. There is little question that some companies covered their customers fully for this quarter at 1.85c., base Pittsburgh, and there was no other course open to others but to keep the doors ajar for their patrons. Possibly a little difficulty might be encountered now in entering new business at less than 1.90c., base, but there has been such wide coverage as to preclude the occasion for much new buying. The sheet market appears stronger here than in some other markets and there are suggestions that the decline must be checked soon if there is to be any possibility of more satisfactory returns on fourth quarter business.

Foundry iron is easier and the pig iron market as a whole is little more

than nominal, since demands are very limited. The scrap market, on the other hand, is slightly firmer; there is a considerable short interest in heavy melting steel and some of the dealers who sold short probably are nervous as offerings are very light at present prices. The situation in the fuels is dull and depressed.

Ferroalloys.—While the steel industry is operating at a high rate for the time of year, it is below full capacity and consumption of all primary materials is well under the rate of the early months of the year. Liberal takings last month against expiring first half ferromanganese contracts have given users enough of this alloy to carry them through this month, and accordingly there is not much specifying on second half commitments. Spiegeleisen is not being ordered out as freely as was the case a few weeks ago, but there is little complaint as to the movement of high grade ferro-silicon. Spot demands for all three alloys are few and small. Prices are unchanged.

Pig Iron.—Foundry iron is weaker in this market. While most producers continue to quote \$16.75, Valley furnace, for No. 2 grade—and small lots are being moved at that price—the more important tonnages are going at \$16.50. The Westinghouse Electric & Mfg. Co., which recently closed for its requirements over the remainder of this year, is believed to have secured its supplies at the latter price, although the iron is somewhat special in analysis. Other sales of more than carload lots having been made at that price, the market now is clearly quotable at \$16.50 to \$16.75. No corresponding decline is noted in the foundry irons of lower silicon content. There seems to be some scarcity of No. 3 and gray forge iron, and instead of being at a discount of 50c. a ton from the base grade, the difference is measured by 25c. One sale of 300 tons of Bessemer iron is reported at the full quotation of \$17, Valley furnace. Malleable iron is quoted at the same price as Bessemer, but only scattering small sales are being made. Interest in basic iron is low, and while this grade is commonly quoted at \$16, Valley furnace, the price is merely

nominal as there are no sales. The Standard Sanitary Mfg. Co. was a buyer within the week of about 2500 tons of foundry iron for shipment in this quarter to its Louisville, Ky., works. It bought Southern iron, paying \$15.50, Birmingham, for the base grade. This was merely fill-in buying, none of which will be necessary for the local plants, which are carrying over enough first half iron to supply this quarter's needs. Carnegie Steel Co. has put on a furnace which has been down for repairs and now has 27 of its 49 stacks in production. The Adrian furnace, Dubois, Pa., will be blown in Aug. 1 for a brief campaign to liquidate its ore pile.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry.....	16.50 to 16.75
No. 3 foundry.....	16.25 to 16.50
Malleable	17.00
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Billets, slabs and sheet bars are all at \$32, Pittsburgh or Youngstown, for delivery on third quarter contracts, but on spot tonnages of large billets and slabs the usual quotation is \$33, and producers already are mentioning \$33 as the fourth quarter contract price on sheet bars. Specifications are fairly heavy. Improving welded pipe mill operations are responsible for heavier releases of pipe skelp. Wire rods are only moderately active; the regular quotation is \$42, base Pittsburgh or Cleveland, and reports that less is being done, makers assert, refer to deliveries against some old contracts which were not cancelled. Forging quality billets still are priced at \$38, base Pittsburgh.

Bars, Plates and Shapes.—While the price of 1.85c., base Pittsburgh, has not disappeared, there being considerable pending tonnage on which that price was quoted, buyers are experiencing difficulty in finding producers willing to take on new business for shipment during the remainder of this quarter at less than 1.90c. On the other hand, there was so much covering by the mills of customers for this period at 1.85c., base, that there is

left only the small spot tonnages, which as often as not command a slight premium over the contract price. Announcement of the fourth quarter price so long in advance of the opening of that period still occasions wonderment among fabricators and distributors, since there is no evidence of the sold-up condition of steel mills that in former years led to announcements of price advances well in advance of their application. But there is no lack of seriousness among the steel manufacturers in the effort to bolster prices, and it is believed that in giving the users an opportunity to revise secondary prices there is a good chance that the 2c. price will become effective on last quarter tonnages.

Rails and Track Supplies.—The Norfolk & Western Railroad has placed 40,000 tons of standard-section rails, 29,000 tons going to the Carnegie Steel Co. and the remainder to the Bethlehem Steel Co. This road's orders are fully one-third smaller than the average of the past few years. A local mill recently booked 2400 kegs of spikes and about 1400 tons of tie-plates for the Hocking Valley Railroad. Except for these awards, rail and track accessory business has been rather slack.

Wire Products.—The recent downward revision in prices has produced a steady market. Business, taken as a whole, however, has not increased materially; probably because the movement into consumption has not been heavy enough to overcome the large mill shipments early in the year, which were stimulated by the desire to avoid price advances.

Tubular Goods.—Mills are well supplied with pipe line business, and while backlogs are small in other classes of tubular goods, it is noticed that there is a very steady demand for pipe for building and construction work and oil country pipe is selling with more freedom than it did early in the year. Mill operations are fully 70 per cent of capacity, a good showing compared with that of a month or six weeks ago.

Sheets.—There is no occasion for complaint as to the volume of sheet

THE IRON AGE Composite Prices

Finished Steel
July 24, 1928, 2.319c. a Lb.

One week ago.....	2.319c.
One month ago.....	2.341c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron
July 24, 1928, \$17.04 a Gross Ton

One week ago.....	\$17.09
One month ago.....	17.21
One year ago.....	18.42
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.75,	Feb. 14;	\$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland	2.15c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.60c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c.
No. 24, del'd Cleveland.....	2.74c. to 2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.95c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.79c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.55c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$2.90
2100 (1½% Nickel)	0.55	3.20
2300 (3½% Nickel)	1.50	4.15
2500 (5% Nickel)	2.25	4.90
3100 Nickel Chromium	0.55	3.20
3200 Nickel Chromium	1.35	4.00
3300 Nickel Chromium	3.80	6.45
3400 Nickel Chromium	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100 Chromium Spring Steel	0.20	2.85
6100 Chromium Vanadium Bars	1.20	3.85
6100 Chromium Vanadium Spring Steel	0.95	3.60
9250 Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium.....	1.50	4.15
Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel	Galv.	Iron	Black	Galv.
Inches		Inches		
1/8	45	1/4 to 3/8...+11	+39	
1/4 to 3/8..	51	1/2	22	2
1/2	56	3/4	28	11
3/4	60	1 to 1 1/2..	30	13
1 to 3....	62	50 1/2		
2	55	Lap Weld		
2 1/2 to 6..	59	2	23	7
7 and 8....	56	2 1/2	26	11
9 and 10..	54	3 to 6....	28	13
11 and 12..	53	7 to 12....	26	11

Butt Weld, extra strong, plain ends

1/8	41	24 1/2	1/4 to 3/8...+19	+54
1/4 to 3/8..	47	30 1/2	1/2	21
1/2	53	42 1/2	3/4	28
3/4	58	47 1/2	1 to 1 1/2..	30
1 to 1 1/2..	60	49 1/2		
2 to 3....	61	50 1/2		

Lap Weld, extra strong, plain ends

2	53	42 1/2	2	23	9
2 1/2 to 4..	57	46 1/2	2 1/2 to 4..	29	15
4 1/2 to 6..	56	45 1/2	4 1/2 to 6..	28	14
7 to 8....	52	39 1/2	7 to 8....	21	7
9 and 10..	45	32 1/2	9 to 12....	16	2
11 and 12..	44	31 1/2			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in.	27
2 1/2 to 2 3/4 in.	37
3 in.	40
3 1/4 to 3 3/4 in.	42 1/2
4 to 13 in.	46
1 1/2 in.	11 1/2
1 3/4 to 1 1/2 in.	8
2 to 2 1/4 in.	2
2 1/2 to 3 in.	7
3 1/4 to 4 1/2 in.	9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb.	5 Fives
12,000 lb. to 21,000 lb.	6 Fives
21,000 lb. and over	7 Fives
	2 Tens & 2 1/2
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1 1/4 to 1 1/2 in.	55	3 1/4 to 3 1/2 in.	50
1 3/4 in.	39	4 in.	53
2 to 2 1/4 in.	34	4 1/2, 5 and 6 in.	45
2 1/2 to 2 3/4 in.	42		

Hot Rolled

2 and 2 1/4 in.	40	3 1/4 and 3 1/2 in.	56
2 1/2 and 2 3/4 in.	48	4 in.	59
3 in.	54	4 1/2, 5 and 6 in.	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads) ..	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

business, nor of the rate of mill operations, which in the past week have taken an upward swing. Because of some liberal releases by the automotive industry, the orders of the American Sheet & Tin Plate Co. in the past week were the largest, with one exception, of any week this year. This company's business this month has been equal to 90 per cent of its productive capacity. Independent companies also have fared well and the industry at large is averaging close to 85 per cent of capacity, the American Sheet & Tin Plate Co. having moved to an 81 per cent rate. Prices appear to be a little firmer. While lower prices have been noted in some markets, 2.65c., base, Pittsburgh, still is regarded as the minimum here on black sheets. Galvanized sheets are readily obtainable at 3.50c., base, Pittsburgh, but there are some small sales at 5c. per 100 lb. higher. On blue annealed, 2c., base, is the prevailing price, despite lower prices on this grade by manufacturers of strips and light plates. Generally, however, there is less pressure to sell, as few mills lack orders.

Tin Plate.—Leading producers are well sold up for the next 60 days on specified contract commitments; mill operations continue at 90 per cent or more of capacity. Current demand does not amount to much and makers are well satisfied, as the weather is against efficient mill operations.

Cold-Finished Steel Bars and Shafting.—Demand, particularly from the makers of automobile parts, is steady. July bookings and specifications average well up to those of last month, which is a pleasant surprise in view of the fact that July ordinarily brings a recession. Prices are steady at 2.10c., base, but some makers say that if the price of hot-rolled bars is fully established on fourth quarter busi-

ness at 2c., base, they must get more than an advance of 10c. per 100 lb. on fourth quarter tonnages.

Hot-Rolled Flats.—Orders and specifications for hot-rolled strips so far this month are below those for the corresponding period in June. Wide strips are weak because of the stronger desire among producers for orders and the competition of other flat-rolled products. Narrow material is fairly steady in price, and hoops and bands are firm at 2.20c., base. Narrow strips range from 2.10c. to 2.20c.; 3 to 6-in., 2c., and 6-in. and wider, 1.80c. to 1.90c.

Cold-Rolled Strips.—This month's business has been slightly smaller than in the same period last month. Prices still are rather soft, but with 2.75c., base, Pittsburgh, for lots of 3 tons or more of one size and temper for shipment at one time ruling on most of the business. In a few cases embracing particularly desirable business as low as 2.65c. has been done, but on the other hand material for typewriters, adding machines and cash registers, tonnages of which are small and the specifications exacting, has been going at 2.85c. to 2.90c., base, or 3.10c. to 3.15c., base, for lots of 1 to 3 tons.

Bolts, Nuts and Rivets.—Business is only moderately active, but prices are holding firmly.

Coke and Coal.—The action of the policy committee of the United Mine Workers of America in withdrawing the Jacksonville scale as a basis of wage scale negotiations has been without effect, marketwise, except possibly to strengthen the idea of buyers that they have nothing to fear in the way of shortages. Demand for coal is duller, if that is possible, than it has been and prices are as much as ever in buyers' favor. There is no well defined spot market for beehive coke. Occasional cars of furnace and foundry grade are moved at quoted prices.

Old Material.—The market here is a shade firmer. One mill has purchased a fair-sized lot of heavy melting steel at \$14.50, while dealers who recently went short of good-sized lots

at two consuming points in the district are finding it rather difficult to cover at much under \$14, the price at which they sold. While small lots are being picked up at \$13.50 and \$13.75 by dealers, there are no sizable offerings at such prices, and if the mills that bought were to press for deliveries, some active and competitive bidding might be expected. The short interest in this grade is heavy, and it is reasonably safe to say that prices have struck a bottom in view of this shortage. There have been sales of compressed sheets at \$14 and of bundled sheets at \$13 and \$13.25, while scrap rails have been moved at \$14, these prices being slightly more than could have been obtained previously. There is little activity in other directions and no material change in prices.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.00 to \$14.50
Scrap rails	13.50 to 14.00
Compressed sheet steel....	13.75 to 14.00
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels.....	14.00 to 14.50
Sheet bar crops, ordinary.	14.50 to 15.00
Heavy breakable cast....	11.50 to 12.00
No. 2 railroad wrought....	14.00 to 14.50
Heavy steel axle turnings.	13.00 to 13.50
Machine shop turnings....	9.00

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	14.75 to 15.25
Railr. coil and leaf springs	14.75 to 15.25
Rolled steel wheels.....	14.75 to 15.25
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate....	17.50 to 18.00
Low phos., light grade....	16.50 to 17.00
Low phos. sheet bar crops.	17.50 to 18.00
Hvy. steel axle turnings..	13.00 to 13.50

Electric Furnace Grades:	
Low phos. punchings.....	16.00 to 16.50
Hvy. steel axle turnings..	13.00 to 13.50

Blast Furnace Grades:	
Short show'lg steel turnings	9.50
Short mixed borings and turnings	9.50
Cast iron borings.....	10.00
No. 2 busheling.....	8.50 to 9.00

Rolling Mill Grades:	
Steel car axles.....	18.00 to 18.50
No. 1 railroad wrought....	10.50 to 11.00
Sheet bar crops.....	16.00 to 16.50

Cupola Grades:	
No. 1 cast.....	14.25 to 14.50
Rails 3 ft. and under....	15.00 to 15.50

Malleable Grades:	
Railroad	13.75 to 14.50
Industrial	13.25 to 13.75
Agricultural	12.75 to 13.25

Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.	
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.55c.
Galv. sheets (No. 24), 25 or more bundles	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets	3.10c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Locomotives in Much Better Repair

Fewer locomotives were in need of repair on the Class I railroads on July 1 than at any time since the compilation of these reports began, according to reports filed by the carriers with the Car Service Division of the American Railway Association.

The number on July 1 was 8006 locomotives, or 13.4 per cent of the number on line. This was a reduction of 251 locomotives compared with the best previous record, which was established on Jan. 1 last. At that time there were 8257 locomotives awaiting

repairs, or 13.6 per cent. The number on July 1 showed a reduction of 753 compared with the same date in 1927, when there were 8759, or 14.3 per cent.

Production of bituminous coal in the United States in the week ended July 14 is reported at a daily average of 1,435,000 net tons. This is higher than in either of the two preceding weeks and is nearly 5 per cent above the figure for a year ago. For the calendar year to date a total of 249,726,000 tons has been mined, compared with 291,233,000 last year to the same date.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1½-in.....	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock.....	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.

Manganese ore, washed, 52% manganese, from the Caucasus.....	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.00 to \$11.25
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	Per Lb
Molybdenum ore, 85% concentrates of MoS ₂ , delivered.....	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens..	8.00
Foundry, by-product, New England, del'd.....	11.00
Foundry, by-product, Newark or Jersey city, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-products, St. Louis, f.o.b. ovens.....	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines...	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines...	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Aniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey.....	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton.....	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. 70	
Stove bolts in packages, Pittsburgh.....	80, 10 and 2½
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(½-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh.....	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago.....	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread.....	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs.....	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Chicago

Steel Demand Steady, Though Orders Are Individually Smaller—Mill Operations Continue at 75 Per Cent

CHICAGO, July 24.—Local mills are still able to operate at 75 per cent of capacity, but both specifications and orders are growing individually smaller, reflecting increasing conservatism on the part of buyers. Total bookings of producers show surprisingly little change, but the character of current business is such as to make it difficult to forecast operations for more than a week or two ahead. Sales and specifications in the past seven days were nearly as large as in the previous week and considerably heavier than in the first week of July. New commitments in bars and track materials exceeded those in other products. Specifications from the automotive and farm equipment industries show little, if any, recession, and heavier releases have come from makers of cold-drawn steel bars and manufacturers of bolts, nuts and rivets, who had permitted stocks to run below their normal requirements.

A steady flow of specifications for bars, shapes and plates is coming from the railroads. The carriers also account for the good volume of business in track supplies, sales of these products for the week having totaled 6000 tons and specifications 7000 tons. Improved earnings by Northwestern roads, as well as good crop prospects, are expected to result in more liberal purchases of steel in coming months. Meanwhile, railroad car buying shows no indications of reviving on a broad scale and the shops of freight car builders are fast reaching the point where they must shut down. Such a suspension of operations cannot be avoided even if large car orders are placed this month because it takes fully 60 days to assemble materials before work on a car order can be started.

An inquiry for 5000 tons of steel for 12 storage tanks to be built in western Texas is particularly opportune in view of the growing shortage of heavy tonnage orders. Another promising development in the oil industry is the announcement that the Sinclair Pipe Line Co., jointly owned by the Standard Oil Co. of Indiana and the Sinclair Consolidated Oil Corporation, plans to spend \$15,000,000 on an 8 to 12-in. pipe line from the Southwest to Chicago. No figures have been taken on this project and no doubt some time will elapse before orders for the steel are actually placed. A proposed pipe line from Louisiana to Kansas City is expected to mature earlier.

Lettings of fabricated steel are lighter and few new projects are coming out for figures. Fabricators are still fairly well engaged, particularly on smaller jobs, but the trend of the situation is reflected in the fact that the larger structural mills are not operating so well as those rolling smaller sections.

Mill prices are unchanged. The determination of producers to strengthen the market is seen in an announcement by the leading local independent that it has followed the Steel Corporation subsidiary in advancing plates, shapes and bars to 2.10c., Chicago, for fourth quarter deliveries. On new business for the current quarter, 2c., Chicago, is the ruling price, and that was also the governing quotation on

most third quarter contracts. Some of the tonnage buyers who usually get a preferential price because of quantities they take in desirable specifications were able to close contracts for this quarter at 1.95c.

Blast furnace operations in this district are unchanged. While some of the steel mill stacks are piling pig iron and using a larger proportion of pig metal in their open-hearth furnaces, the scrap market appears to be holding its own. A local independent steel producer bought several thousand tons of steel scrap at recently ruling prices, including heavy melting steel at \$12.75, and another interest bought several small lots at \$13.

The local scrap trade is investigating the possibility of shipping scrap by water to Lake Erie ports and, if present negotiations are successful, a cargo will be moved from Chicago within the next few weeks.

Ferroalloys.—It is understood that several large buyers of ferromanganese did not contract for their second half requirements and a large Michigan consumer claims to have bought within the past few weeks at less than the ruling quotation of \$105, seaboard. A number of users still have large stocks and those with contracts for this half are not yet actively specifying. There are a few car lot inquiries for spiegeleisen, which continues to range from \$32 to \$33, furnace, for 19 to 21 per cent material.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Pig Iron.—A local consumer is in the market for 2000 tons of foundry iron for shipment over the remainder of the year. No other large inquiries are reported, but a fair amount of spot buying has developed during the week. The fact that no concessions are being offered at the new price level is tending to increase confidence in the stability of the market. Foundry operations are spotty, but in some directions melt is improving, as evidenced by the fact that a large Milwaukee plant and several Michigan shops are advertising for molders. Several motor car companies that have brought out new models are increasing production, and this has re-

sulted in heavier specifications for silvery iron. Shipments of pig iron from Chicago district furnaces are about on a par with those of June. Sales in this market in the first seven months of this year kept pace with those of the same period in 1926, a year which broke all previous records in both sales and shipments. An inquiry for 500 tons of low phosphorus is before the trade.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	18.00
Malleable, not over 2.25 sil.....	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	21.51
So'th'n No. 2 (barge and rail).....	21.01
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Bolts, Nuts and Rivets.—Specifications are a trifle lighter than in June, but better than usual for this season.

Plates.—The Texas & Pacific Oil Co. is in the market for 12 80,000 bbl. oil storage tanks for western Texas, calling for a total of 5000 tons of plates. This is the first inquiry for storage tanks in some time. Local plate mills could use heavy-tonnage orders to advantage at this juncture, but they are still able to operate at a 65 per cent rate, despite the miscellaneous character of current business. Orders and specifications in the past seven days were not quite so heavy as in the previous week, although larger than in the first week of the month. Mill prices are steady at 2c., Chicago, on new business, and the majority of third quarter contracts carry that price, although some preferential buyers who take large tonnages in attractive specifications were able to cover at 1.95c.

Mill prices on plates, per lb.: 2c., base Chicago.

Structural Material.—The A. O. Smith Corporation, Milwaukee, has placed from 2500 to 3000 tons for a pipe shop with the Wisconsin Bridge & Iron Co. Other fabricating awards in Wisconsin total more than 1200 tons, but lettings in this city and vicinity are light. A number of large tonnages are pending here, including 7000 tons for junior high school buildings. Meanwhile, the larger structural mills are feeling the lack of new business. Nevertheless, production of plain material as a whole remains at a higher rate than plate mill operations. Mill prices are holding to 2c., Chicago.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Bars.—Bar mill products continue to lead other forms of finished steel in both sales and specifications. Business from the automobile and farm equipment industries shows little, if any, recession. Mill prices on soft steel bars are steady at 2c., Chicago. Mills rolling alloy steel bars, which are more largely dependent on the automotive industry, are operating at 85 to 90 per cent of capacity, or only a

few points below their peak. Bookings in bar iron, particularly from the railroads, are keeping up well, and mill prices are consistently 2c., Chicago. Rail steel bar producers find production, specifications and shipments are ahead of those in July, 1927. Bed makers, who have experienced dull times for nearly a year, made heavy sales at the recent Furniture Exposition and are more liberal in specifying for rail steel. Farm equipment makers continue to take a steady flow of tonnage. Rail steel bars are unchanged at 1.85c., Chicago Heights mill.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Sheets.—Business shows no improvement, but prices are unchanged. Because of uneven specifications and hot weather, Chicago district mills operated at less than 60 per cent of capacity last week.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Reinforcing Bars.—There continues to be a good run of lettings of less than 100 tons each, but large awards are less numerous. Action on pending work is being delayed more than usual, possibly on account of the vacation season. Bending shops are still able to operate at 75 to 80 per cent of capacity. Awards and fresh inquiries are shown on page 230.

Tin Plate.—Mills have excellent bookings and are now insisting on a minimum of \$5.35 per base box, Gary, on standard coke plate from all buyers in this territory.

Wire Products.—Mills continue to operate at 65 per cent of capacity, and specifications are the best for any July in a number of years. Much of the current tonnage, however, is coming from the manufacturing trade rather than from jobbers. Nail demand in the Chicago metropolitan area has been adversely affected by the trend of residential construction, which for the year to date has declined about 40 per cent compared

with the same period in 1927. The outlook in the agricultural sections is promising, but actual buying by the farmers will be held back until their heavy field work is completed. Mill salesmen are again on the road, however, and improved business in certain lines, such as fencing, is expected to manifest itself by the middle of next month. For mill prices see page 239.

Rails and Track Supplies.—The Norfolk & Western has placed 29,000 tons of rails with the Carnegie Steel Co. and 11,000 tons with the Bethlehem Steel Co. New rail bookings by local mills were confined to three small orders totaling 1200 tons. Rail production of the leading mill continues at 60 per cent of capacity. Sales of track fastenings during the week totaled 6000 tons, while specifications aggregated about 7000 tons. Light rail business is restricted to scattered car lot sales, but bookings in June were about twice the recent monthly average.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Bids taken by Milwaukee July 18 on 2000 tons brought out prices ranging from \$33 to \$34.30, Birmingham. Only one bid, that of the United States Cast Iron Pipe & Foundry Co. on 750 tons of 6-in., was as low as \$33. Most quotations on current business range from \$34 to \$35, Birmingham, for 6-in. and larger diameters. St. Paul, Minn., has awarded 1100 tons of 6 to 16-in. pipe to the United States Cast Iron Pipe & Foundry Co.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$41.20 to \$43.20; 4-in., \$45.20 to \$47.20; Class A and gas pipe, \$4 extra.

Old Material.—A local mill has bought several thousand tons of heavy melting steel, compressed sheets and borings at prices in line with those quoted below. The fact that these orders did not develop new weakness in the market indicates a steadier situation than some traders had looked for. While some mills are using more pig iron and less scrap, there are no heavy accumulations in dealers' hands. Dealers have been doing little speculating and are shipping out material,

as a rule, as fast as it is prepared. Prices have shown no marked change during the week and apparently will not be disturbed greatly unless heavy railroad offerings come on the market. A further possible decline in mill operations, of course, is also a factor that must be considered. Foundry operations are spotty. In Michigan, however, the melt is improving, especially among malleable foundries serving the automobile industry. The Chicago, Burlington & Quincy takes bids today on 500 tons of scrap.

Prices deliv'd consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.25 to \$12.75
Shoveling steel.....	12.25 to 12.75
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'd steel carwheels.....	15.50 to 16.00
Railr'd tires, charg. box size.....	15.50 to 16.00
Railr'd leaf springs, cut apart.....	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs.....	15.75 to 16.25
Electric Furnace Grades:	
Axle turnings.....	12.50 to 13.00
Low phos. punchings.....	14.00 to 14.50
Low phos. plate, 12 in. and under.....	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings.....	9.50 to 10.00
Cast iron borings.....	9.00 to 9.50
Short shoveling turnings..	9.00 to 9.50
Machine shop turnings....	6.00 to 6.50
Rolling Mill Grades:	
Iron rails.....	13.50 to 14.00
Rerolling rails.....	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft..	15.25 to 15.75
Angle bars, steel.....	14.25 to 14.75
Cast iron carwheels.....	12.75 to 13.00
Malleable Grades:	
Railroad.....	12.50 to 13.00
Agricultural.....	11.50 to 12.00
Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms.....	19.50 to 20.00
Iron car axles.....	24.00 to 24.50
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought..	10.75 to 11.25
No. 2 railroad wrought..	11.00 to 11.50
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast....	13.50 to 14.00
No. 1 railroad cast.....	12.75 to 13.25
No. 1 agricultural cast....	12.50 to 13.00
Stove plate.....	10.75 to 11.25
Grate bars.....	11.25 to 11.75
Brake shoes.....	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg....	3.10

Railroad Equipment

PURCHASE of 150 box cars by the International Railways of Central America and an inquiry from the Missouri Pacific for 100 automobile cars are the only features of a dull market. Details follow:

International Railways of Central America have purchased 150 box cars from Gregg Co.

United States Navy Department has ordered one tank car for carrying helium gas from General American Tank Car

Corporation and is inquiring for two gondola cars.

Cities Service Co. is inquiring for 10 tank cars in addition to four reported ordered last week.

Chicago Great Western has ordered three mail and baggage cars from Pullman Car & Mfg. Corporation.

Carnegie Steel Co. has ordered repairs to 16 hopper cars from Greenville Steel Car Co.

Canadian National has ordered three mail and baggage cars from American Car & Foundry Co.

Missouri Pacific is inquiring for 100 50-ton single-sheathed automobile cars.

New York

Pig Iron Buying Fairly Well Sustained—Newspaper Building Takes 13,000 Tons of Steel

NEW YORK, July 24.—Following a week of rather heavy buying for this season of the year, pig iron sales during the last week have kept up at a fair rate, totaling about 7500 tons. In some cases this tonnage represents extensions of second quarter contracts which have just now run out, and the bulk is for delivery during July and August. There is evidence that many melters have not yet covered fully for their third quarter requirements, but they find no difficulty in arranging immediate shipments and are thus able to maintain extremely low reserves. Many large consumers are carrying stocks of iron hardly sufficient for a week's operations. The week's sales, which consisted mostly of small lots, also give further indication of the increased melt of foundries in this district. New inquiry is not large, but melters are often buying without the usual delays, indicating their immediate need of supplies. Interest in fourth quarter requirements is evidenced by an inquiry for that period from the A. P. Smith Mfg. Co., East Orange, N. J., for 750 tons of No. 2 plain and No. 2X. Another New Jersey melter is said to be in the market for 1000 tons and a user served by this district is negotiating for the purchase of 2500 tons, both of these prospective purchases being for August and September delivery. The recent inquiry for 2000 tons of ballast iron for shipment to the Pacific Coast is still pending, but may not be acted upon, at least not in full. A large manufacturer of heating equipment in western Massachusetts is expected to come into the market for a round tonnage next week. There is little change in the price situation, with Buffalo foundry iron offered at \$16 to \$17, furnace, and the ruling price tending more toward the lower than the higher figure. Eastern Pennsylvania producers are quoting \$19.50, furnace, for the base foundry grade, and since the recent 50c. reduction have been showing more interest than before in meeting the competition of Buffalo makers in New Jersey.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$20.91 to \$21.91
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Bars, Shapes and Plates.—Some sales of steel bars, one or two of 100 tons, have been made at the new price of 1.90c., Pittsburgh, to consumers who did not sign third quarter contracts. Small lots of plates and shapes have also been sold at the \$1 a ton advance, or 2.22½c., New York, for plates, and 2.19½c., New York,

for shapes. However, so many buyers are covered by extensions of second quarter prices that the higher prices have appeared so far on only a small part of the steel shipped this month.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.
No. 22.....	3.75c. to 3.95c.
No. 24.....	3.80c. to 4.00c.
No. 26.....	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30.....	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

There is no mistaking, however, the firmer attitude of producers, which extends to the fourth quarter price of 2c., Pittsburgh, on these products. Demand for bars continues fairly active for this time of year, while the specifying of structural steel for building construction now under way gives structural mills a fairly high rate of operation. Plate demand is less active, but Eastern mills are running at about the same rate as in recent weeks. The outstanding structural steel award of the week was 13,000 tons for the *Daily News* building on East Forty-second Street, New York, which was taken by the Harris Structural Steel Co.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets.—Some of the larger producers of sheets are taking a firmer stand on prices. In several instances mills have declined business in black sheets offered at 2.60c., Pittsburgh, and have insisted on a minimum of 2.65c. On galvanized sheets, 3.40c., Pittsburgh, has been reaffirmed by these mills as their minimum, notwithstanding that a few sales had been made at 3.35c. The 3.40c. price generally applies to orders from jobbers and most consumers are being asked to pay 3.50c. Sales of the blue annealed sheets have been made at 1.90c. and 1.95c., Pittsburgh, but these concessions are not general and the bulk of current business is at not less than 2c., Pittsburgh. The volume of sheet buying is fairly satisfactory, but it is nearly all spot business, few consumers or jobbers having made contracts for this quarter.

Reinforcing Bars.—Bids will close July 25 on a high school at White Plains, N. Y., which will require about 500 tons of bars. This is the largest new project reported recently, but there is still a fair volume of pending tonnage, including a warehouse in the Bronx for the Lehigh Valley Railroad, which will take 1200 tons. Day & Goater, Inc., is reported to have secured the contract for a section of the subway in New York, on which Rodgers & Hagerty, Inc., is general contractor, calling for approximately 700 tons. On the general run of small orders, 1.90c., Pittsburgh mill, is the ruling price, but on some recent larger jobs concessions of at least \$1 a ton have been reported. Warehouse prices are unchanged.

Warehouse Business.—Jobbers report that orders are slightly larger in size than during June and the total July tonnage is expected to be greater than for several months. There is a moderate demand for blue annealed sheets, on which the quoted price of 3.90c. per lb., base, is being maintained. Black and galvanized sheets, however, are being shaded in the metropolitan district and concessions from 3.80c. per lb. on black and 4.50c. per lb. on galvanized are not unusual on desirable orders.

Cast Iron Pipe.—Quotations of

Birmingham makers of pressure pipe continue in excess of the prices of Northern foundries, but business in this district is small and operations of makers in the North are still rather limited. Delivered prices continue to range from \$37.60 to \$38.60 per ton, New York. The American Construction & Securities Co., New York, is reported to have closed on about 800 tons of water pipe with two Birmingham makers, half for use near Birmingham and half for delivery to Pittsburgh. Newark, N. J., has closed on 300 tons of water pipe with the Warren Foundry & Pipe Co., and the Department of Water Supply, Gas and Electricity, New York, has awarded 300 tons of 8 and 12-in. pipe to the same company.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Conditions in this market have not changed materially during July except for a slight increase in consumption of foundry coke. Demand for the special brands is keeping up and ovens report steady specifications which do not allow the accumulation of stocks. Foundry coke is unchanged at \$3.50 per net ton, Connellsville, with the furnace grade quoted at \$2.50 to \$2.75. Special brands of foundry coke are offered at \$4.85, f.o.b. ovens, and delivered prices are \$8.56 per net ton to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke is unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06 to \$10.29, New York or Brooklyn.

Old Material.—Dealers' buying prices on most grades show further slight reductions, based on recent sales to eastern Pennsylvania consumers. No. 1 heavy melting steel is being bought at \$12.50 per ton, delivered eastern Pennsylvania, and yard grade is quoted at about \$10 per ton, delivered. Stove plate for local foundries is being bought at \$10.25 per ton, delivered on a \$2.02 per ton freight rate, and \$10.50 per ton, delivered on a \$1.89 per ton freight rate.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.00 to \$9.85
Heavy melting steel (yard)	6.00 to 6.25
No. 1 hvy. breakable cast.	10.50 to 11.00
Stove plate (steel works)...	6.75 to 7.25
Locomotive grate bars....	6.75 to 7.25
Machine shop turnings...	6.00 to 6.50
Short shoveling turnings..	6.00 to 6.50
Cast borings (blast furn. or steel works).....	6.00 to 6.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles.....	13.50 to 14.00
Iron car axles.....	23.50 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to 8.75
Forge fire	6.50 to 6.75
No. 1 railroad wrought....	9.00 to 9.50
No. 1 yard wrot., long....	7.50 to 8.00
Rails for rolling.....	10.00 to 10.50
Cast iron carwheels.....	11.00 to 11.50
Stove plate (foundry)....	8.25 to 8.75
Malleable cast (railroad)...	10.00
Cast borings (chemical)...	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.00 to \$15.00
No. 1 hvy. cast (columns bldg. materials, etc.), cupola size	12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.50

Philadelphia

New Bar, Plate and Shape Prices Not Yet Fully Established —Large Basic Iron Inquiry

PHILADELPHIA, July 24.—The advance of \$1 a ton on plates, shapes and bars for this quarter has not yet been fully established. On small orders for prompt shipment, plates are bringing 2.05c., Coatesville, and bars 1.90c., Pittsburgh, but with contracts for this quarter at prices \$1 a ton lower and some extensions of second quarter contracts, desirable new business is still being placed at the old quotations, particularly in the case of preferred buyers, such as large fabricators and distributors. Shape prices continue depressed, with competition keen among eastern Pennsylvania producers. Delivered prices range from 2.06c. to 2.13c. per lb., Philadelphia, and the minimum quotation, which is quoted on delivery from Pencoyd, Pa., is reported slightly firmer than was the case recently, when as low as 2.01c., Philadelphia, was quoted on desirable orders. Sheet prices are unchanged, but concessions of \$1 a ton are apparently becoming less common, except to preferred buyers such as jobbers and the automobile body builders.

Mill operations in eastern Pennsylvania continue at a good rate in most cases. On the basis of the volume of business that has been coming in during July, most mills estimate that the month will compare favorably with March and April, the best months in the first half of the year. The leading eastern Pennsylvania interest has already booked more bar business this month than in April and at the present rate the total may exceed the March tonnage.

Pig Iron.—No concessions from \$19.50 per ton, base furnace, are reported to have been made on sales of the foundry grade, but at present no sizable tonnages are under consideration, so that a real test of the market has not been provided. Reduction of the freight rate from Buffalo to Philadelphia and nearby points from \$4.91 to \$4.66, effective until September, is not expected by sellers here to have much influence on the market, as the difference is small and the period short. The American Radiator Co. closed on 200 tons of foundry iron for its Gloucester, N. J., plant. Low phosphorus iron has been in fair demand, the Standard Steel Works Co., Burnham, Pa., having closed on about 3000 tons of the copper-bearing grade. Other consumers have purchased lots ranging from 200 to 500 tons. The Worth Steel Co. has bought 2000 to 2500 tons of basic and the Lukens Steel Co. is expected to place about 20,000 tons within the next week. Prices on this grade range from \$19 to \$19.25 per ton, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.....	21.26
Basic (del'd east. Pa.)...	\$19.00 to \$19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)...	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Consumers are apparently well covered for the second half and their contracts seem to be sufficient for current requirements as only occasional carload lots of new business are coming out. The price continues at \$105 per ton, seaboard.

Bars.—Mills are seeking to establish 1.90c., Pittsburgh, or 2.24c., delivered Philadelphia, on all new business, but with contracts outstanding for this quarter and extensions of second quarter contracts at 1.85c., Pittsburgh, desirable business is still being placed at the lower price. Demand for bars is good. A large eastern Pennsylvania interest has booked tonnage in July in excess of that in April and at the present rate may exceed its March total, the largest in the first half.

Shapes.—Fabricators are well booked with contracts, but fabricated steel prices continue at a low level. Mill quotations on shapes range from 2.06c. to 2.13c. per lb., delivered Philadelphia, the lower price being on the basis of 2c. per lb., Pencoyd, Pa. Only the smaller lots of material for prompt shipment bring 2c. per lb., Bethlehem, or 2.13c., Philadelphia, but lower than 2c., Pencoyd, is less common than a few weeks ago.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier..	2.50c. to 2.60c.
Plates, 3/8-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands).....	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex....	3.35c.
Cold-fin. steel, sq. and flats.....	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to 3/8-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24).....	3.85c.
†Galvanized sheets (No. 24).....	4.60c.
Blue ann'd sheets (No. 10).....	3.15c.
Diam. pat. floor plates—	
1/4-in.	5.30c.
3/8-in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Plates.—The volume of orders has increased, so that there is a good total tonnage moving, but individual purchases are small and usually for prompt shipment. On such business 2.05c., Coatesville, or 2.15c., Philadelphia, is not uncommon, but desirable specifications still bring out 2c., Coatesville, or 2.10c., Philadelphia.

Sheets.—A decided effort to stiffen prices on blue annealed, black and galvanized sheets is evident. Blue annealed sheets are 2c., Pittsburgh, or 2.32c., Philadelphia, but preferred buyers apparently can obtain some concession from this price. Black sheets are quoted at 2.65c., Pittsburgh, or 2.97c., Philadelphia, but 2.60c., Pittsburgh, has been done, such concessions being in most cases to distributors rather than consumers. Galvanized sheets are fairly firm at 3.50c., Pittsburgh, or 3.82c., Philadelphia, and concessions of \$1 a ton or more are only occasional.

Warehouse Business.—A larger tonnage of material is moving from stock than in June and prices are reported to be much firmer, with quantity differentials strictly maintained. While July business is not expected to be so large as that in March or April, it probably will exceed the total for June.

Old Material.—Prices of all grades still show a tendency to weakness. Buying is light. A consumer at Har-

risburg, Pa., has closed on yard grade of heavy melting steel at \$10.50 per ton, delivered, and machine shop turnings have brought \$10.25 per ton, delivered, on a recent sale to a Phoenixville, Pa., consumer. Dealers report a slightly smaller volume of scrap coming into the market and are inclined to hold available material for higher prices, but the supply is apparently more than sufficient for present consuming requirements.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails.	12.50
No. 2 heavy melting steel.	10.50 to 11.00
No. 1 railroad wrought.	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.25
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	14.00 to 15.00
Railroad grate bars.	11.00 to 11.50
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under.	17.50 to 18.00
Couplers and knuckles.	14.50 to 15.00
Rolled steel wheels.	14.50 to 15.00
No. 1 blast fnace scrap.	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting.	16.50 to 17.00
Steel axles.	19.00 to 20.00
No. 1 forge fire.	11.00
Cast iron carwheels.	15.50
No. 1 cast.	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling.	14.50 to 15.00

Orders booked by Cleveland interests during the week aggregated 26,000 tons, all in foundry and malleable iron. While this included quite a few contracts for the third quarter, many foundries are buying from hand to mouth. Shipments continue very good, being fully equal to those in June, the latter month not showing up quite as well as May. Shipments of most producers are slightly in excess of production. Prices are holding closely to recent levels. While one local producer claims to be adhering to \$16.50 for foundry and malleable grades, Cleveland iron is being offered at \$16.25 for delivery to northern Ohio points and evidently can still be had at \$16 for shipment to competitive points in southern Ohio and Indiana. One Lake furnace interest is holding to a \$16.75 minimum. In Michigan, the market is firm at \$17.50 and Lake furnaces are able to get \$18 for shipment to some points.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.	\$18.00
S'th'n fdy., sil. 1.75 to 2.25.	21 50
Malleable	18.00
Ohio silvery, 8 per cent.	28.00
Basic Valley furnace.	16.00
Stand. low phos., Valley furn.	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—The consumption of Lake Superior ore during June amounted to 4,667,493 tons, or a decrease of 280,275 tons from May. In June last year 4,530,565 tons was used. The amount on hand at furnaces July 1 was 17,912,817 tons. The amount at furnaces and Lake Erie docks on the same date was 22,980,603 tons, compared with 26,972,594 tons on the same date a year ago. Central district furnaces in June consumed 2,305,249 tons, a decrease of 169,076 tons. Lake front furnaces used 2,191,025 tons, a decrease of 81,197 tons. Consumption by all-rail furnaces amounting to 98,375 tons showed a decrease of 24,584 tons. Eastern furnaces used 72,844 tons, a loss of 5418 tons. There were 163 furnaces using Lake ore in blast June 30, decrease of 10 for the month.

Bolts, Nuts and Rivets.—Specifications continue to come out in fair volume. New buying is rather light. Bolt and nut prices are firm. While large rivets are holding fairly steady at \$2.90 per 100 lb., a few consumers are still able to get the former \$2.75 price.

Sheets.—While orders are not as plentiful as they were a few weeks ago, new demand is fair for this season of the year, although in this immediate territory sales are very slow. A good volume of business is coming from manufacturers of electrical refrigerators and stoves. A Cleveland manufacturer purchased 500 tons for making mail boxes. Weakness is still in evidence in black sheets, on which as low as 2.65c., Valley, is being quoted. A 2.60c. Pittsburgh price is commonly quoted by mills that adhere to a Pittsburgh base. Blue annealed sheets are

Cleveland

Firmer Tone in Plates, Shapes and Bars as Business Gains—Automotive Demand Continues Good

CLEVELAND, July 24.—The volume of business in steel bars, shapes and plates gained somewhat the past week. The number of orders was large, but the average size was small, as consumers are ordering only for early needs. The tonnage entered is heavier than in July last year and this month is slightly ahead of June. The market shows a slightly firmer tone, following efforts by leading producers to get prices on a higher basis. The announcement of a \$2 a ton advance to 2c., Pittsburgh, for the fourth quarter apparently has had some sentimental effect on the current price situation. However, large consumers have been able to contract at 1.85c., Pittsburgh, for steel bars, shapes and plates for the current quarter.

On new business mills are now holding rather firmly to 1.90c., Pittsburgh, for shapes, but 1.85c. can still be done on steel bars. Plates, the weakest of the three items, are still

commonly quoted at 1.85c., Pittsburgh. The local mill base on steel bars is unchanged at 1.85c., Cleveland.

Demand for steel from the automotive industry continues unusually good. While the seasonal lull is reflected by reduced production by some of the motor car builders, this is partially offset by the increased output by some other car makers, who have brought out new models. Activity in the building field has slowed down, but fabricators are making efforts to secure better prices than have prevailed for some time. The Lake shipbuilding industry shows no life.

Pig Iron.—Sales are holding up well in some sections, although there is not much activity in the immediate Cleveland territory and in Michigan.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.	3.00c.
Soft steel bars.	3.00c.
Reinforc. steel bars.	2.25c. to 2.75c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands.	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg.	2.85

*Net base, including boxing and cutting to length.

rather steady at 1.90c., Pittsburgh, and 2c., Valley, as minimum prices. Galvanized sheets appear plentiful at 3.40c., Pittsburgh, and 3.45c., Valley.

Strip Steel.—The demand is low, both in new business and in specifications against contracts. Net prices are being generally quoted on hot strip and these usually figure back to the 1.75c., Pittsburgh, or a lower base on wide material. On cold-rolled strip, 2.65c., Cleveland, is the commonly recognized price for all round-lot users. The usual differential, or 2.90c., is maintained for 1 to 3 tons. Fender stock is firm at 4.10c.

Semi-Finished Steel.—Specifications for sheet bars continue good, but there is virtually no new business, as consumers generally are under contract. The market is represented by a price range of \$32 to \$33, Cleveland, on sheet bars, billets and slabs, the point of delivery largely determining the price.

Wire Products.—The market is holding fairly steady at the recently reduced mill prices, although there is some irregularity in cement-coated nails. Demand is not very active.

Cold-Finished Steel.—Demand continues fair from the automotive and other consuming industries. The price is firm at 2.15c., Cleveland.

Reinforcing Bars.—Two Cleveland jobs requiring 750 tons have been awarded to a local mill. Union Terminal work requiring 400 tons is still pending. Prices are irregular. Some effort has been made to sell rail steel bars in Cleveland in competition with the product of local mills, but without success. Rail steel bars are quoted at 1.75c., mill.

Warehouse Business.—The usual summer lull is in evidence. Orders for all products are light. Prices are well maintained.

Coke.—The demand for foundry coke has slowed down somewhat this month, this evidently being due to the shutting down of foundries for a week or two at the first of the month. Buying is almost wholly of a hand-to-mouth character. The present price of \$7.75, Painesville, for Ohio by-product foundry coke will probably be reestablished for August. Connellsville foundry coke is unchanged at \$3.50 to \$4.85, ovens.

Old Material.—Prices are slightly lower on heavy melting steel scrap and on compressed bundles. The market has a weak tone. No. 1 heavy melting steel now carries only one price, \$13. Dealers so far have been unable to buy at a lower price. There is no new consumer demand. Local mills are taking shipments at about the recent volume and activity is limited to purchases by dealers to fill these orders. Sales to dealers during the week were at quoted prices. There is no local demand for compressed sheet steel and this is going

to the Valley district, where \$13.75 is being paid. Unusually large August scrap lists have been issued by some of the Michigan automobile companies. These include: Buick, 6000 tons; Chevrolet, 5000 tons; Chrysler, 4000 tons, and Dodge Brothers, 3500 tons.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.		\$13.00
No. 2 heavy melting steel.	\$12.25 to	12.50
Compressed sheet steel....	12.00 to	12.50
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	11.25 to	11.50
Machine shop turnings....	7.00 to	7.25
No. 1 railroad wrought....	11.50 to	12.00
No. 2 railroad wrought....	13.50 to	13.75
No. 1 busheling.....	11.00 to	11.25
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops...	16.50 to	17.00
Low phos., billet, bloom and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops	16.50 to	17.00
Low phos. plate scrap....	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings.....	9.00 to	9.25
Mixed bor'gs and short turn'gs	9.00 to	9.25
No. 2 busheling.....	9.00 to	9.25
Cupola Grades		
No. 1 cast.....	16.00 to	16.50
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling.....	16.25 to	16.50

Water-Cooled Engines for Huge Airplanes

Some of the reasons lying back of the development of the new X-type water-cooled aeronautic engine built by the Packard Motor Car Co. were explained recently by L. M. Woolson, aeronautic and research engineer of the company, at a meeting of the New England section of the Society of Automotive Engineers. The engine, which has 24 cylinders disposed in four longitudinal rows, resembles two V-type engines, one inverted below the other.

Speaking of the desirability of water-cooled aviation engines of the X type, Mr. Woolson said:

"I have heard of three separate projects contemplating the use of 10,000 hp. in a single airplane. I regard such designs as indicative of what we may expect in the future. The designs of these large planes are all of the thick-wing cantilever monoplane type, with cabins and engine rooms inclosed in the wings. The designs include multiple powerplants, in some cases with tractor propellers mounted in front of the leading edge and in other cases with pusher propellers aft of the trailing edge.

"We need airplanes capable of crossing the Atlantic with at least 100 passengers. Such planes will demand powerful engines, and it is inconceivable that the great parasitic resistance of many externally mounted air-cooled power plants can be permitted. Further, the need for convenient access to the engine for minor

repairs and adjustments during flight will require that the engines be suitably housed within the wing. This leads naturally to the conclusion that the engines should be water cooled."

The new engine weighs about 1500 lb. and develops approximately 1500 hp. or about 160 hp. per square foot of frontal area. It was used by Lieut. Alford J. Williams in the special Navy racing airplane with which he tried to win the world's speed record. Although it was unsupercharged, it developed 1250 hp. The addition of a supercharger will add about 100 lb. of weight and add 300 hp.

Steel Barrel Production Sets High Record

WASHINGTON, July 20.—Steel barrels to the number of 712,779 were produced in June, against 696,281 in May, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. This makes a new high monthly record, as was that of May. The output in June was at the rate of 61.4 per cent of capacity, compared with 59.8 per cent in May. Shipments in June represented 717,496 barrels, against 694,843 in May, and stocks at the ends of the two months numbered 53,868 barrels and 58,585 respectively. Unfilled orders at the end of June for delivery within 30 days were 319,443 barrels, compared with 324,549 barrels at the end of May, while orders for delivery beyond 30 days totaled 840,313 barrels at the end of June, compared with 932,568 at the end of May.

Production of steel barrels during the first half of 1928 totaled 3,708,592, against 3,391,751 for the corresponding period of last year. The gain was 9.3 per cent. Shipments each year were within a small fraction of 1 per cent of the production figures.

Electrical Controller Boxes

A new dinkey controller, which was shown for the first time at the iron and steel convention in Chicago in June, has been brought out by the Electric Controller & Mfg. Co., Cleveland. Among the features of this controller are the following: Ebony asbestos is used in place of slate. Ventilated contacts are raised 9/16 in. from the dial face. Lugs supporting the contacts are attached to the front of the dial and are removable from the front. The contact lug has a single square-head set screw for clamping the lead wire tightly.

The Corrigan, McKinney Steel Co., Cleveland, announces that it has appointed Hickman, Williams & Co., Union Trust Building, Cleveland, its agent for the sale of its Cor-Kin domestic by-product coke.

Cincinnati

Pig Iron Sales Increase—Alabama Price Holds on 2000-Ton Transaction—Scrap Is Weaker

CINCINNATI, July 24.—Pig iron sales in the past week totaled more than 8000 tons and inquiries now before the trade indicate a fair amount of buying during the remainder of the month. The Standard Sanitary Mfg. Co. has purchased 2000 tons of No. 2 Southern foundry iron for its Louisville, Ky., plant, paying \$15.50 base Birmingham. This transaction constituted the first real test of Southern prices in the last month. A Hamilton, Ohio, melter has bought 3500 tons of foundry iron from a Lake Erie maker for about \$16, base furnace. The Norfolk & Western has placed 700 tons of foundry and malleable iron with a central Ohio producer. A company at Fort Wayne, Ind., is expected to close for 500 tons of foundry. Jackson County silvery furnaces are shipping iron at a normal rate on third quarter contracts. Prices have not changed.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Buyers are placing third quarter specifications somewhat more freely and prices are showing a tendency toward greater stability. The announcement of producers that quotations on bars, shapes and plates for the last quarter will be 2c., base Pittsburgh, has served to strengthen the schedule of 1.90c. for current business. While there still is a dearth of sizable structural jobs, several fabricators report that the number of small lettings has been sufficient to keep their shops running at a rate approaching normal. The West Virginia Rail Co. will supply 1000 tons of rail steel reinforcing bars for a municipal reservoir at Portsmouth, Ohio, the material to be shipped by water. The largest in-

quiry is for 300 tons of bars for the Walnut garage, this city. Bar prices are steady, with new billet bars at 1.85c., base Pittsburgh, and rail steel stock at 1.80c., base, mill. Sheet mills have been booking liberal tonnages, so that from the standpoint of unfilled orders the sheet situation is eminently satisfactory, but the depressed price structure is causing anxiety. Blue annealed sheets are fairly firm at 1.90c. to 2c., base Pittsburgh, while black sheets range from 2.65c. to 2.75c. Auto body sheets remain at 4c. Irregularities are principally in galvanized sheets for roofing purposes, which are selling as low as 3.30c., although 3.40c. to 3.50c. is more representative of the market. Buying of wire products has fallen off considerably in the past two weeks. Common wire nails are quoted at \$2.55 per keg, Ironton, plus a barge rate for delivery to Ohio River points. For shipment to consumers who must rely upon all-rail delivery, however, the full all-rail rate is applied.

Warehouse Business.—There has been an improvement in sales, which are paralleling those in June. Bars are leading from the standpoint of volume, while the demand for structural steel and for sheets is lagging. Quotations are unchanged.

Coke.—Specifications for by-product foundry coke are running slightly behind those in June, while domestic grades also are moving in lessened volume. A beehive coke maker has sold 1500 tons of foundry coke to a consumer in southern Illinois for delivery during the remainder of the year. Prices are unchanged.

Old Material.—The scrap market shows signs of weakness. Many buyers have accumulated liberal stocks and consequently are refusing to consider the purchase of more material. While heavy melting steel is being fairly well maintained at \$10.75 to \$11.25, cast iron grades, sheet clips and bundled sheets have declined 25c. a ton. Agricultural malleable has dropped 50c. a ton.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, \$9.02; Wise County coke, \$7.09 to \$7.59; New River coke, \$9.09 to \$9.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens. Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	\$10.75 to \$11.25
Scrap rails for melting	 10.75 to 11.25
Loose sheet clippings	 8.00 to 8.50
Bundled sheets	 9.00 to 9.50
Cast iron borings	 7.25 to 7.75
Machine shop turnings	 6.75 to 7.25
No. 1 busheling	 10.00 to 10.50
No. 2 busheling	 6.00 to 6.50
Rails for rolling	 12.50 to 13.00
No. 1 locomotive tires	 12.75 to 13.25
No. 1 railroad wrought	 10.00 to 10.50
Short rails	 15.75 to 16.25
Cast iron carwheels	 11.00 to 11.50
No. 1 machinery cast	 15.00 to 15.50
No. 1 railroad cast	 12.75 to 13.25
Burnt cast	 7.50 to 8.00
Stove plate	 8.25 to 8.75
Brake shoes	 9.50 to 10.25
Railroad malleable	 11.50 to 12.00
Agricultural malleable	 10.50 to 11.00

Birmingham

Pig Iron Shipments Increase—Steel Prices Firmer—Scrap Market Continues Dull and Weak

BIRMINGHAM, July 24.—Pig iron sales during the past week were moderate, but there is a little less tendency on the part of some melters to defer purchases until the iron actually is needed. Stove foundry buying has improved. The probable iron make for August is largely under contract. Shipments have increased some in the last few days. Furnace interests are predicting a good improvement in the market within the next few weeks. Quotations remain at \$15.50 for No. 2 foundry iron. The Tennessee company has changed its No. 2 Bessemer furnace from foundry to recarburizing iron. All six of the Ensley furnaces of the company are on basic iron. Seventeen furnaces are in operation; of this number eight are on foundry, seven on basic, one on recarburizing iron and one on ferro-manganese.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	\$15.00 to 16.00

Finished Steel.—Inquiries last week

were the heaviest for any week this month. Bookings of bars, plates, shapes and some other lines are ahead of those of two months ago. Mill operations were increased last week, following a slight let up in the previous week. Prices are unchanged but show more firmness than for some time. Structural steel fabricators and reinforcing bar manufacturers are fairly busy. The Ingalls Iron Works Co. has an order for 510 tons for a new power house at Tuscaloosa for the Gulf States Paper Corporation. The Tennessee company is again operating six open-hearth furnaces at Ensley, following a shutdown of a few days. Six are also in operation at Fairfield. The Gulf States Steel Co. continues with three at Alabama City.

Cast Iron Pipe.—Pressure pipe makers have experienced another quiet week in sales. The National Cast Iron Pipe Co. has an order for 250 tons for Grosse Isle, Mich., and the American Cast Iron Pipe Co. will make shipments of 100 tons each to Burbank, Cal., and Waukesha, Wis.

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinfrc. bars	3.15c.
Rail steel reinfrc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

All new business up for figures lately has been in small tonnages. Shipments are going forward at a good rate. Quotations are unchanged from a base of \$34 to \$35 on 6-in. and larger sizes.

Coke.—The coke situation shows little change. Spot sales are being made from day to day, but the volume is not large. Quotations continue at \$5 for both spot and contract.

Old Material.—The market continues dormant. A few sales are being made in small tonnages. Owing

to the lack of activity, prices have undergone very little change. Scrap steel rail and No. 1 cast are the main items in demand.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to	\$9.00
Scrap steel rails.....	11.00 to	11.50
Short shoveling turnings...	7.50 to	8.00
Cast iron borings.....		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought....	10.00 to	10.50
Rails for rolling.....		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels.....	12.00 to	13.00
Cast iron borings, chem..	13.50 to	14.00

on old contracts, with other mills at \$14.25 to \$14.50, as shipments have been stopped by some of these buyers and restricted by others. Dealers are inclined to revamp their entire price list in line with the lower price on heavy melting steel, but have not made actual sales at the new quotations. Other material has not been sold in tonnage during the week.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades

No. 1 heavy melting steel..	\$13.50 to	\$14.00
No. 2 heavy melting steel..	12.00 to	12.50
Scrap rails	13.00 to	13.50
Hydraulic comp. sheets...	12.00 to	12.50
Hand bundled sheets.....	8.00 to	8.50
Drop forge flashings.....	12.00 to	12.50
No. 1 busheling.....	12.00 to	12.50
Hvy. steel axle turnings..	12.00 to	12.50
Machine shop turnings....	7.00 to	7.50

Acid Open-Hearth Grades

R'l'r'd knuckles and couplers .	15.00
R'l'r'd coil and leaf springs	15.00 to 16.00
Rolled steel wheels.....	15.00
Low phos. billet and bloom ends	16.00 to 16.50

Electric Furnace Grades

Hvy. steel axle turnings..	12.00 to 12.50
Short shov. steel turnings..	9.00 to 9.50

Blast Furnace Grades

Short shov. steel turnings..	9.00 to 9.50
Short mixed borings and turnings	9.00 to 9.50
Cast iron borings.....	9.00 to 9.50
No. 2 busheling	9.00 to 9.25

Rolling Mill Grades

Steel car axles	15.50 to 16.00
Iron axles	19.50 to 20.00
No. 1 railroad wrought...	12.00 to 12.50

Cupola Grades

No. 1 machinery cast.....	14.25 to 14.75
Stove plate	13.00 to 13.25
Locomotive grate bars...	11.25 to 11.75
Steel rails, 3 ft. and under.	16.50
Cast iron carwheels.....	12.00 to 12.50

Malleable Grades

Industrial	15.00
Railroad	15.00
Agricultural	15.00

Buffalo

Heavy Pig Iron Shipments by Barge Canal—July Sales Exceed Expectations—Scrap Market Easier

BUFFALO, July 24.—July sales of pig iron have exceeded predictions by a substantial margin. Most business has been in lots of less than 1000 tons, but the aggregate of the many small orders has kept the month's output moving steadily. Canal shipments have been heavy and more tonnage is offered to barge operators for August. One 1000-ton lot was sold down State last week. Buffalo prices are a shade stronger; \$17 is the district price on low silicon foundry and \$17.50 on malleable. A maximum shading of 50c. in each case is said to be the lowest quotation. Operation is unchanged.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic	\$16.50 to 17.00
Lake Superior charcoal...	27.28

Finished Steel.—Steel mill operations, which were reduced during the first half of July, show an increase for the last half of the month, now running a little better than 75 per cent of capacity. Forward bookings are fair in some lines, particularly for full finished sheets and structural shapes, but in other lines shipments are about equal to orders. The day-to-day volume of business is taking full production of mills in the territory. Bethlehem Steel Co. has started production of nearly 7000 tons of structural for the new Rand Building

here, and its subsidiary will fabricate the tonnage. Reinforcing bar sales have been good this month, with the price a little lower and occasionally touching 1.90c., Buffalo. Bar demand is fair. Wire is quieter after two very good months, but operation of mills is on the old scale. Sheet prices are a little steadier, with dips below 2.70c. on black less frequent.

Old Material.—Two Buffalo jobbers are reported as having sold 20,000 tons of No. 1 heavy melting steel for district delivery at \$13.75. This is 50c. under the last sale to the same buyer. There is large tonnage of heavy melting steel still to be shipped

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Canada

Toronto Building Takes 10,000 Tons of Steel—Structural Demand Active—Pig Iron Business Steady

TORONTO, ONT., July 24.—While foundry and malleable pig iron sales in the Canadian markets have failed to gain over those of the week preceding, they were much better than those of the first week or 10 days of this month. Business is 10 to 15 per cent better than that of a year ago. Advance buying is practically at a standstill, but inquiries are coming out, and about 1000 tons was sold during the week for delivery up to the end of September. With foundries, sanitary ware and radiator manufacturing concerns and various other pig iron consuming interests operating their plants at between 70 and 100 per cent, prospects are good for a continued demand for foundry and malleable iron for some time to come. Local blast furnace representatives do not look for stronger prices here un-

til those in the United States markets tend to stiffen.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75..	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25..	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75..	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25..	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Canadian building trades are experiencing one of the best years in their history and as a result the demand for steel is also a record one. The Dominion Bridge Co. has received a contract for about 10,000 tons of structural steel for the new building at College and Yonge Streets, Toronto, for the T. Eaton Co.; the

Disher Steel Construction Co. has a contract for 2000 tons of steel for the new Evening Telegram Building, Toronto; contracts for 400 tons for a hotel at Brockville, Ont., and 200 tons for garage for Connaught Motor Sales, Hamilton, Ont., have been awarded. Approximately 2000 tons of structural steel will be required for new factory building on Coxwell Avenue, Toronto, Ont., for Service Station Equipment Co.; 400 tons will be needed for a theater and office building at Outremont, Que., for F. Trudeau.

Old Material.—Business in this market is slow. Consumers are showing interest in immediate needs only. Trading between dealers has dropped off owing to the slump in resale demand, but yards are well supplied for present needs. In the Montreal market dealers report a good demand for

wrought iron and steel axles and are offering \$22 and \$20 per gross ton respectively for these materials, but little is coming out. Other materials are moving slowly. Prices are unchanged at Toronto and Montreal.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	16.00	16.00
Stove plate.....	13.00	13.00
Standard carwheels.....	16.00	16.00
Malleable.....	13.00	13.00

Per Net Ton

No. 1 machinery cast....	15.00	.....
Stove plate.....	9.00	.....
Standard carwheels.....	13.00	.....
Malleable scrap.....	13.00	.....

inquiry of importance is, before the trade for figures. This involves 4500 tons of material for water main transmission lines in Oakland for the East Bay Municipal Utility District. Quotations range from 2.20c. to 2.30c., c.i.f.

Shapes.—Structural steel shapes continue in active demand and awards this week exceeded 1000 tons. The California Steel Co. took 180 tons for an automobile service building in Oakland and the Herrick Iron Works took 170 tons for a bridge over Alameda Creek in Oakland. Bids are being taken on another hangar for the Port Commission in Oakland, involving 250 tons. Pending business totals well over 11,000 tons. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards of cast iron pipe this week were heavier than usual and totaled over 3000 tons. Los Angeles placed 844 tons of 8-in. class 350 pipe with the Pacific States Cast Iron Pipe Co., 422 tons of 8-in. class 350 pipe with Jones, Lyman & Co., and 855 tons of 12-in. class 350 pipe with the American Cast Iron Pipe Co. C. H. Merrill, Santa Monica, Cal., took 294 tons of 4 to 12-in. class B pipe for street improvements in Huntington Park, Cal.. Pending business is confined to one or two projects totaling less than 1000 tons, with the exception of 22,000 tons for the East Bay Municipal Utility District, bids on which will be opened Aug. 17.

Standard Pipe.—Movement of standard pipe and oil country goods of late has been limited to unimportant lots. Los Angeles opened bids this week on 110 tons of 1-in. galvanized pipe and 75,000 ft. of 1¼-in. galvanized pipe. Inquiries for line pipe involve only small tonnages.

San Francisco

Steel Demand Well Sustained—Water Line Calls for 4500 Tons of Plates

SAN FRANCISCO, July 21 (By Air Mail).—Demand for steel products is well sustained and bookings during the week included some fair-sized tonnages. Among the more important awards were 400 tons of shapes for a chemical plant addition at Tacoma, placed with the Star Iron & Steel Co. and 400 tons of reinforcing bars for highway work in Ventura County, Cal., placed with an unnamed interest. Considerable new work has come up for figures during the past 10 days and the outlook for the rest of the year is good. Structural steel shapes and reinforcing bars continue the most active products.

Pig Iron.—Movement of foundry iron has been confined to unimportant lots and new inquiries involve small tonnages only. Operations among the jobbing foundries continue on a limited scale. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25.....	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards during the past week totaled over 1800 tons and included 400 tons for a warehouse in Seattle for Frederick & Nelson, divided between the Pacific Coast Steel Co. and the Northwest Steel Rolling Mills, and 170 tons for a school administration building in Oakland, placed with the Pacific Coast Steel Co. Bids were opened this week on 2288 tons for a drainage improvement project in Los Angeles and on

300 tons for a department store at Everett, Wash.

Plates.—The plate market on the coast has been exceptionally quiet during the past month and only one

Pacific Northwest

Prices of Plates, Sheets and Wire Products Weaker—Coast Business Quieter

SEATTLE, July 21 (By Air Mail).—Developments of the past week indicate that the threatened war in rail and water freight rates from Eastern to Pacific Coast points will soon be terminated. It is understood that the Illinois Central Railroad and the Redwood Lines, which made a rail and water rate of 61c. per 100 lb. from points in Illinois and Indiana to California points, have petitioned the Interstate Commerce Commission for permission to withdraw this rate, and it is very likely it will be granted. Strong pressure from other rail and water lines, with threats that if the low rate was not withdrawn a general war in rates would be started, has had its effect.

Steel business is quiet, with prices showing signs of weakness in practically all lines. This is particularly true of plates, sheets and wire products.

The Alaska salmon pack this year

will be the heaviest in any one year since 1926, and this is also true of berries and other fruits. This means a heavy consumption of tin plate on the coast, and greater activity among the can making plants than for several years.

Pig Iron.—Demand is for small lots only, with prices in this territory unchanged. Not enough iron is being sold here to establish a market. No. 2 foundry and Utah basic are quoted at \$24 to \$25 gross tons, Seattle.

Shapes.—The local market is quiet, but prices seem to be holding. A

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, ½-in. and over.....	3.15c.
Small angles, under ½-in.....	3.55c.
Small channels and tees, ¾-in. to 2 ¾-in.....	3.75c.
Spring steel, ¼-in. and thicker....	5.00c.
Black sheets (No. 24).....	4.95c.
Blue ann'd sheets (No. 10).....	3.90c.
Galv. sheets (No. 24).....	5.50c.
Struc. rivets, ½-in. and larger....	5.65c.
Com. wire nails, base per keg....	\$3.40
Cement c'd nails, 100-lb. keg....	3.40

Warehouse Prices, f.o.b. Seattle

Base per Lb.

Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Tees, bar sizes.....	3.50c.
Reinforcing bars.....	3.00c.
Blue annealed sheets (No. 10)....	3.90c.
Black sheets (No. 24).....	4.90c.
Galvanized sheets (No. 24).....	5.65c.
Rivets, tank.....	.55 & 5% off

bridge at Nisqually was taken by the Pacific Car & Foundry Co. A railroad span at Cle Elum went to an Eastern fabricator. Bids are to be opened on July 27 for about 190 tons for the local Second Avenue extension, and on Aug. 14 for about 700 to 1000 tons of State bridge work. The local Olympic Hotel is to add 400 rooms, and bids will be asked shortly for the steel, the tonnage for which has not been estimated. Shapes are quoted at 2.35c., Seattle.

Plates.—These are the quietest items on the whole steel list. No large contracts have been placed for some time, and no large work is in sight. Tank quality plates are quoted at 2.20c. to 2.25c., but the lower price is not general.

Reinforcing Bars.—Only a fair amount of new work is being placed. The Northwest Rolling Mills, Inc., has taken 150 tons for the local Grimshaw

garage, 350 tons for the Benjamin Franklin apartments, also 250 tons of wooden pipe bands. Reinforcing steel bars are quoted at 2.20c. to 3c., Seattle.

Railroad Spikes.—The Pacific Coast Forge Co., Seattle, has taken 2000 kegs of standard spikes for the Great Northern Railway and 1000 kegs for the Northern Pacific. Standard spikes are \$2.90 to \$3 per 100 lb., Seattle.

Sheets.—Local prices on sheets are weak, and very little new business is coming out. Galvanized sheets, 24 gage, are 4.10c. to 4.15c., No. 24 black are 3.20c. to 3.25c., and No. 10 blue annealed are 2.57c. to 2.67c. at Seattle.

Wire Products.—The local market on wire products is somewhat disturbed and prices are lower, wire nails being about 25c. lower. Wire nails are now obtainable at \$3.25 per keg, base, and bright plain wire at \$3 per 100 lb., base, at Seattle.

Boston

6500 Tons of Scrap Being Exported to Italy—Pig Iron Prices Weak

BOSTON, July 24.—The feature of the pig iron market is the weakness of New York State furnace prices. Some Buffalo interests still report a base price of \$17 a ton, furnace, but it is evident that no sales of No. 2 plain have been made in New England recently at more than \$16.50 a ton, furnace, and there have been numerous sales at \$16, while No. 2X has been sold at \$16 and \$16.50. It is equally certain that other New York State interests are offering and have accepted business within the past 10 days on a delivered basis equivalent to \$16.50 a ton, Buffalo, for No. 2X and \$17 for No. 1X, for delivery over the remainder of the year. Another feature of the market is that quite a little western Pennsylvania iron is selling at prices higher than the prevailing Buf-

falo equivalent for delivery on and after Aug. 4, when a new rate, \$4.91, equivalent to the Buffalo all-rail freight rate, goes into effect. Eastern Pennsylvania, Virginia and Alabama irons, despite the higher delivered cost, are more in demand by foundries having trouble with mixtures. Sales the past week aggregated slightly better than 4000 tons, of which the Mystic Iron Works took 2200 tons.

Foundry iron prices per gross ton deliv'd to most New England points:
*Buffalo, sil. 1.75 to 2.25.. \$20.91 to \$21.41
*Buffalo, sil. 2.25 to 2.75.. 21.41 to 21.91
†Buffalo, sil. 1.75 to 2.25.. 19.78 to 20.28
†Buffalo, sil. 2.25 to 2.75.. 20.28 to 20.78
East. Penn., sil. 1.75 to 2.25 23.15 to 23.65
East. Penn., sil. 2.25 to 2.75 23.65 to 24.15
Va., sil. 1.75 to 2.25..... 25.71
Va., sil. 2.25 to 2.75..... 26.21
Ala., sil. 1.75 to 2.25..... 22.41 to 24.27
Ala., sil. 2.25 to 2.75..... 22.91 to 24.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.
*All rail rate. †Rail and water rate.

Coke.—Indications are the New England Coal & Coke Co. and the Providence Gas Co. will make no change Aug. 1 in their price on by-product foundry coke, which is \$11 a ton, delivered within a \$3.10 freight rate zone. Both companies report July shipments will be better than those of last July, but below the average for a period of years. Most of the New England foundries continue to order in small tonnages, but are ordering more often, indicating some improvement in the melt of iron.

Shapes and Plates.—The fabricated steel situation remains in a firm position. Most fabricators have sufficient business on their books to maintain present operations for several months, and indications are that sufficient tonnage will be available this fall to carry them into the first quarter of 1929. The market for standard shapes

and plates is 1.90c., base Pittsburgh, but some of the largest consumers are still protected on third quarter business at 1.85c.

Cast Iron Pipe.—Lynn, Mass., has awarded 250 tons of 6-in. and 8-in. pipe to the Warren Foundry & Pipe Co, Lowell, Mass., closed bids July 23 on 100 tons of 12-in. pipe. No other open municipal business is reported. Private bookings of tonnages are good for this time of the year. Prices on small pipe are firm, but on large diameters prices are easy. The range for 4-in. pipe is \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and for 6-in. to 12-in. \$41.10 to \$42.10. The usual \$5 differential is asked on class A and gas pipe.

Warehouse Business.—As July draws to a close, some seasonal falling off in the movement of iron and steel out of warehouses is reported. Business, however, continues ahead of last year. The last advance by mills in prices of bars, shapes and plates has checked warehouse price cutting. There is some talk of a possible advance in warehouse prices before the close of this quarter.

Old Material.—Quotations here for old material tend downward because of the prices steel mills are willing to pay. Shafting, T and girder rails, cast iron borings for steel mill use and railroad wrought are actually lower, while inside prices are paid more often than outside prices for other kinds of scrap. Local dealers report difficulty in securing material, prices being unattractive to owners. Some long bundled skeleton for New England consumption is moving at \$6.50 a ton on cars and for Pennsylvania consumption at \$5 to \$5.50. One sale of girder rails is reported at \$7.10 a ton on cars, but the general range of prices is \$7.25 to \$7.50. Heavy melting steel is in lighter supply than it has been in months. There is quite a little activity in the local export market. Exporters are paying around \$9.25 a ton on dock here for No. 1 steel, and around \$8.50 for No. 2 steel. A boat will shortly call here for 3500 to 4000 tons of scrap for shipment to Italy, the first consignment to that country in a long time. The boat's total cargo will be around 6500 tons, 3000 tons to be taken on at another port.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$8.00 to \$8.50
Scrap T rails.....	7.50 to 8.00
Scrap girder rails.....	7.25 to 7.50
No. 1 railroad wrought....	8.50 to 9.00
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings.....	5.00 to 5.50
Cast iron borings (steel works and rolling mill).....	5.00 to 5.50
Bundled skeleton, long....	6.50 to 7.00
Forge flashings.....	6.50 to 7.00
Blast furnace borings and turnings.....	5.00 to 5.50
Forge scrap.....	5.50 to 6.00
Shafting.....	11.50 to 12.00
Steel car axles.....	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long).....	7.00 to 7.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical.....	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$13.50 to \$14.00
No. 1 machinery cast.....	14.00 to 14.50
No. 2 machinery cast.....	12.50 to 13.50
Stove plate.....	10.00 to 10.50
Railroad malleable.....	13.50 to 14.50

Warehouse Prices, f.o.b. Boston	
	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

St. Louis

Pig Iron Buying Light as Uncertainty Over Prices Continues—Scrap Market Is Weaker

ST. LOUIS, July 24.—Buying of pig iron continues light. Sales of the St. Louis Gas & Coke Corporation totaled about 2000 tons, the largest lot of which was 400 tons to a St. Louis melter. Most of the business was in carload lots. Melters are demanding immediate shipment, which makers regard as an indication of light stocks and an early resumption of quantity buying. The unsettled price situation is believed to be causing melters to withhold buying except for immediate needs, as they seem to be uncertain whether there will be further price reduction as a result of competition from Lake shippers in the Chicago market. The local maker has made no formal reduction in price, but is meeting all competition.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	19.66
Southern No. 2 fdy., deliv'd.	19.92
Northern malleable, deliv'd.	19.66
Northern basic, deliv'd.	19.66

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel.—The Granite City Steel Co. continues to operate all of its rolling mill units at practically 100 per cent of capacity, except that galvanized sheets are at a rate of about 80 per cent. Tin plate is by far the most active of all products. Tank plate demand shows slight falling off owing to limited lettings of cars and oil storage tanks.

Coke.—The usual July dullness marks the coke market. Dealers have shown only slight interest in taking on fall supplies of domestic grades. The demand for industrial grades in this district is very light. Prices are unchanged.

Old Material.—The old material market is weaker and some items are

lower as a result of lack of buying by consumers who are curtailing operations. About the only activity is in rails for rolling, as mills making reinforcing bars are enjoying a satisfactory trade, but even the price of this item is 25c. a ton lower. Heavy melting steel, heavy shoveling steel, No. 2 railroad wrought and cast iron borings are 25c. a ton less than in the preceding week; stove plate is 50c. less. Iron car axles, for which the demand, although small, is greater than the supply, are 25c. a ton higher. Dealers are buying virtually nothing except items needed to fill contracts. Railroad lists include: Chicago, Burlington & Quincy, 5690 tons; Atchison, Topeka & Santa Fe, 4000 tons; Nickel

Plate, 950 tons, and Standard Oil Co. of Indiana (Woodriver, Ill.), 100 tons.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$10.50 to \$11.00
No. 1 locomotive tires....	12.00 to 12.50
Heavy shoveling steel....	10.50 to 11.00
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart..	12.00 to 12.50
Railroad springs.....	13.00 to 13.50
Bundled sheets.....	8.50 to 9.00
No. 2 railroad wrought....	10.75 to 11.25
No. 1 busheling.....	9.25 to 9.75
Cast iron borings.....	8.25 to 8.75
Iron rails.....	13.00 to 13.50
Rails for rolling.....	12.75 to 13.25
Machine shop turnings....	6.25 to 6.75
Steel car axles.....	16.75 to 17.25
Iron car axles.....	25.75 to 26.25
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought....	9.00 to 9.50
Steel rails, less than 3 ft..	15.00 to 15.50
Steel angle bars.....	11.50 to 12.00
Cast iron carwheels.....	12.75 to 13.25
No. 1 machinery cast....	13.00 to 13.50
Railroad malleable.....	11.25 to 11.75
No. 1 railroad cast.....	13.00 to 13.50
Stove plate.....	10.50 to 11.00
Agricuit. malleable.....	12.00 to 12.50
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Youngstown

Steel Makers Encouraged by July Developments—Strip and Tin Plate Capacity Very Active

YOUNGSTOWN, July 24.—Continued favorable reports feature the iron and steel market situation in northeastern Ohio. The Republic Iron & Steel Co. has advanced its average production in the Youngstown district to 80 per cent by reason of the near-capacity operating rate of its Warren plant, which produces sheets, strips and tin plate. In this area strip and tin plate capacity is active, averaging above 90 per cent. Makers of full-finished automobile sheets are obliged to work extra turns because of sustained demands from the automobile trade and reduction in output, caused by excessive humidity. Open-hearth furnace schedules have gained to 39, an increase of one from last week. There is a temporary loss this week of two pipe mills, with 12 of 20 under power, but new business now going through sales departments will produce an increase in such scheduling.

Steel makers in this area are encouraged by developments of recent weeks and look for maintenance of production at the current rate or close thereto through the summer months. During the past two weeks there has been some curtailment in output of hot mills because of the intense humidity.

It is expected that the price structure will strengthen in the fall, as the general business situation improves. In the meantime, the market in flat-rolled steel is irregular, especially in steel sheets, with minimum prices at 2.60 to 2.65c for black sheets; 2c for blue annealed and 3.50c for galvanized, base gages. New business is being taken in merchant steel bars and plates at 1.85c per lb.

Improvement in line pipe demand

within recent weeks constitutes one of the features of the market, with the Republic Iron & Steel Co. and the Sheet & Tube company among the principal beneficiaries. The Republic company is reported to have taken 50 miles of lapweld pipe for a Southwestern company. In addition to the business which has actually been placed, other important inquiries are before the trade and it is expected they will be translated into orders this year.

Less Ore Consumed in June

Iron ore consumed in June is reported by the Lake Superior Iron Ore Association at 4,667,493 gross tons, compared with 4,947,768 tons in May. The decrease of 280,275 tons was nearly 6 per cent. The consumption compares with 4,530,565 tons in June, 1927. Figures represent a total of 271 furnaces, of which 173 were in blast on the last day of May and 163 on the last day of June.

Ore on hand at furnaces on July 1 is reported at 17,912,817 tons. Ore at Lake Erie docks at the same date is given as 5,067,786 tons, making a total available stock of 22,980,603 tons. This compares with 26,972,594 tons of ore on hand July 1, 1927.

Apparent consumption of babbitt metal in June is reported by the Department of Commerce at 4,731,023 lb. This is an increase of 3 per cent over the May total of 4,606,899 lb., but a decrease of 2½ per cent from the 4,854,653 lb. of June, 1927. For the first half-year the total was 28,507,097 lb., a decline of 8½ per cent from the 31,130,692 lb. of last year.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struct. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	5.25c.
Blue ann'l'd sheets (No. 10).....	3.60c.
Black corrug. sheets (No. 24).....	4.50c.
Galv. corrug. sheets.....	5.30c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	70
Less than 100 lb.....	65
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Non-Ferrous Metal Markets

**Tin Advances to 48c.—
Copper Quiet but Firm—
Lead and Zinc Steady—
Antimony Weaker**

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 24	July 23	July 21	July 20	July 19	July 18
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.....	48.00	47.62½		47.45	47.62½	47.37½
Lead, New York.....	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York.....	6.55	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis.....	6.20	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price ¼c. higher.

Copper.—A small amount of buying for spot and August delivery has been done in the past week at unchanged prices, namely 14.75c. per lb., delivered Connecticut Valley, for electrolytic or Lake copper. Consumers are showing almost no interest in supplies for September, a situation not pleasing to the larger producers, who fear a last-minute rush to buy, which in the present firm

market might have a tendency to advance prices. Present prices are quite satisfactory to the producers, who prefer a steady rather than an advancing market. Shipments are being made at an undiminished rate both to domestic and foreign users.

Tin.—Although spot tin was sold today at 48c. per lb., an advance of ¼c. in the week since July 17, the strength was more attributable to a stronger market in London and in the Far East than to activity here. Sales in the last calendar week in this market did not exceed 1000 tons, while the total for Monday and today was little more than 600 tons.

The stronger situation in London is ascribed to the fact that options on a large tonnage are due in August and September. In the London market the advance in the week has been about £4, and a like advance has occurred in the Singapore price. Today's London prices were £217 10s. for spot standard, £214 10s. for future standard, £220 10s. for spot Straits. The Singapore price today was £219 15s.

Lead.—There is a moderately active demand for lead, with July and August deliveries mainly called for. Some inquiry for September has developed, but not much business has

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.00c. to 51.00c.
Tin, bar.....	52.00c. to 53.00c.
Copper, Lake.....	15.75c.
Copper, electrolytic.....	15.50c.
Copper, castings.....	14.75c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	12.00c. to 12.50c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.00c.
Tin, bar.....	57.00c.
Copper, Lake.....	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting.....	14.00c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c.
Antimony, Asiatic.....	16.00c.
Lead, bar.....	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	56.50c.
Solder, ½ and ½.....	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier.....	25.75c.
Seamless Tubes—	
Brass.....	24.12½c.
Copper.....	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods.....	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed in more than two months. Zinc sheets have been quoted at 9.25c., base, since June 7, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	23.50c.
Zinc.....	9.25c.
Lead (full sheets).....	10.00c. to 10.25c.
Seamless Tubes—	
High brass.....	24.12½c.
Copper.....	25.00c.

Rods—	
High brass.....	17.00c.
Naval brass.....	19.75c.

Wire—	
Copper.....	16.75c.
High brass.....	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.625c.	14.00c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms.....	10.75c.	12.00c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light.....	6.00c.	7.50c.
Hvy. Machine composition.....	9.75c.	11.00c.
No. 1 yel. brass turnings.....	8.75c.	9.50c.
No. 1 red brass or compos. t'ngs.....	9.00c.	10.00c.
Lead, heavy.....	5.00c.	5.375c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.00c.	3.50c.
Sheet aluminum.....	12.75c.	14.50c.
Cast aluminum.....	12.00c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass.....	19.25c.
Copper, hot rolled.....	23.50c.
Copper, cold rolled, 14 oz. and heavier.....	25.75c.
Zinc.....	10.00c.
Lead, wide.....	9.75c.

Seamless Tubes—	
Brass.....	25.62½c.
Copper.....	26.50c.
Brazed Brass Tubes.....	27.25c.
Brass Rods.....	17.00c.

been closed. The St. Louis price is 6c., with slight premiums being asked in some instances. The New York market continues at 6.20c., which is the contract price of the American Smelting & Refining Co.

Zinc.—For prompt shipment, 6.20c., East St. Louis, is asked for prime Western zinc, but 6.25c. has been paid for August. The market has been rather quiet during the last week. The price of ore at Joplin remains unchanged at \$40 per ton. Production last week was 12,000 tons, the same as the week before.

Antimony.—Sales of parcels on dock here brought weakness in the antimony market within the past few days. The market declined to 9.37½c. per lb., New York, duty paid. Futures are freely offered at 9.62½c., duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent, is offered at 23.90c. per lb., delivered.

Nickel.—Ingot nickel is quoted at 35c. per lb., shot nickel at 36c. and electrolytic at 37c.

Non-Ferrous Metals at Chicago

CHICAGO, July 24.—Tin has advanced and lead has declined. There has been considerable business in tin in this country, but the advance in price is attributed largely to speculation in London. Copper and zinc are being bought for nearby delivery only. Old metal prices are unchanged.

Prices, per lb., in carload lots:
Lake copper, 14.87½c.; tin, 48.75c.; lead, 6.10c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

Menominee Range Meeting

The Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers will meet jointly with the Lake Superior Mining Institute, Sept. 7 and 8. The meeting will be largely social and will include visits to mines and works but a brief technical session will be held.

On the morning of Sept. 7 the party will leave the Crystal Inn, Crystal Falls, Mich., for Alpha and Caspion, visiting mines and meeting for lunch at the Caspion Club. After lunch mines in the vicinity of Iron River will be visited. There will be a barbecue supper at Fortune Lake and a business session of the Lake Superior Mining Institute with a short technical session.

On Sept. 8 the party will meet at Iron Mountain for visit to mines and power plants.

The conduct of the meeting will be in the hands of the Lake Superior

Mining Institute, as host, with C. H. Baxter, president, and A. J. Yungbluth, secretary. On arrival the members will be given a specially prepared guide book to the field.

Philadelphia Meeting of Institute of Metals

The Institute of Metals Division (American Institute of Mining and Metallurgical Engineers) will hold its fall meeting at Philadelphia in the same week that the American Society for Steel Treating and the American Welding Society meet. The institute sessions will be held Oct. 9-10-11 at Hotel Benjamin, which will be headquarters.

The program includes the following papers:

Gases in Casting Copper—by O. W. Ellis.

Diffusion of Zinc into Copper—by S. L. Hoyt.

Less Common Elements in the Electrical Industry—by T. S. Fuller.

Papers on temperature coefficient of Brinell measurements and hardenable copper and silver alloys.

Treatment and Structure of Magnesium Alloys—by John A. Gann.

Notes on Smoothing and Etching—by H. B. Pulsifer.

X-Ray Study of Cold Work and Annealing—by Ancel St. John.

Tempering of Steel—by F. F. Lucas.

Neumann Bands in Ferrite—by C. H. Mathewson.

Dr. F. M. Becket, vice-president Union Carbide Co., will speak at the institute's dinner on chromium alloys.

Effect of Cold Rolling and Heat Treatment upon the Physical Properties of Britannic Metal—by B. Egberg and H. B. Smith.

High Strength Gold Alloys for Jewelry—by E. M. Wise. Stability of Aluminum and Magnesium Copper Alloys—by A. J. Lyon.

Papers on Permanent Mold Casting and Vacuum Method for the Casting Metal.

Research Fellowship on Low-Temperature Tar

To determine the composition of tar produced in the low-temperature carbonization of Eastern coals, Kenneth M. Irey, Monmouth, Ill., has been appointed to the National Coal Association research Fellowship at the Carnegie Institute of Technology and the United States Bureau of Mines. The work will be along lines similar to those developed by preceding Coal Association fellowships, working on low-temperature tar from a Western coal. It is recognized that the success of low-temperature carbonization of any coal depends upon profitable disposal of the smokeless fuel and the by-products.

Industrial utilization of low-tem-

perature tar cannot be developed without knowledge of its composition. Three successive National Coal Association fellowships working under Dr. R. L. Brown, organic chemist, Bureau of Mines, have succeeded in determining the amount of motor fuel and its character in the coal tar from Utah coal. They have, likewise, worked out the proportion of tar acids and acid resins, which are valuable constituents for timber preservatives.

Results of the 1927 fellowship have shown that considerable percentages of heavy oils and waxes can be isolated from the Utah coal tar. These present interesting possibilities for technical utilization. Due to the present interest in the construction of several large-scale low-temperature carbonization plants in the Eastern United States, it was deemed important to make a similar thorough examination of the composition of low-temperature tar from eastern coals.

Germany Leading Seller of Electrical Machinery

Of the five largest machinery exporting countries, Germany was by far the leader in 1913, according to figures in a recent copy of the London *Economist*. Rapid strides have been made by that country in recent years in overcoming the setback occasioned by the World War, with the result that in 1927 Germany took second position from the United States and exported within 2½ per cent of as much as Great Britain, which recently has stood first. The figures given in the table are in thousands of pounds sterling and show that each of the three leading countries provided about 30 per cent in 1927 of the total exports of the five countries shown.

MACHINERY EXPORTS, IN THOUSANDS OF POUNDS STERLING

	1913	1926	1927
Great Britain...	7,656	18,174	18,800
United States...	5,790	17,600	17,600
Germany	15,888	17,300	18,350
France	2,185	3,880	2,760
Switzerland ...	1,240	2,180	2,850
Total	32,759	59,134	60,360

American ships carried 35 per cent of the exports and 33.2 per cent of the imports entering into our waterborne commerce in 1927, according to a statement of the Department of Commerce. In both cases there was an increase over the proportion carried by American ships in the preceding year, which was 34.6 per cent of the exports and 30.7 per cent of the imports.

Average weekly earnings in New York State factories in January are reported by the Industrial Commissioner at \$29.22. With the exception of last November, this is the lowest figure since July. It is 8c. below the average for the 12 months of 1927 and compares with \$29.57 in December and \$29.52 in January of that year.

PERSONAL

DR. JOHN JOHNSTON, director of research and technology for the United States Steel Corporation; C. A. REINHARDT, chief metallurgist Youngstown Sheet & Tube Co.; DR. J. S. UNGER, manager of the research bureau of the Carnegie Steel Co., and HOMER D. WILLIAMS, president Pittsburgh Steel Co., have been invited by President THOMAS S. BAKER of the Carnegie Institute of Technology, Pittsburgh, to become members of the advisory board of the department of metallurgical engineering at that institution. The board is made up of about 25 steel company executives and metallurgists and is concerned primarily with the development of metallurgical research now carried on jointly by the Carnegie Institute and the Bureau of Mines. T. D. LYNCH, consulting metallurgical engineer for the Westinghouse Electric & Mfg. Co., East Pittsburgh, is chairman of the board for the coming year, and for this period the board has selected a program of five investigations in ferrous metallurgy to be made by research fellows under the auspices of the Institute and the Bureau of Mines. An advisory board of coal mine operators and engineers, which occupies a similar relationship to the department of mining engineering, has selected six problems in fuel chemistry for investigation by six research fellows during the same time.

W. O. RENKIN has been appointed manager of the industrial furnace department of the Combustion Engineering Corporation, 200 Madison Avenue, New York, and will assume his new duties Aug. 1. He is considered a pioneer in the application of pulverized fuel to metallurgical and industrial furnaces, having devoted the past 15 years to this particular field of engineering.

MURRAY N. BILLINGS, assistant traffic manager Illinois Steel Co., Chicago, has been appointed traffic manager, succeeding F. T. BENTLEY, who has retired from active service and has been made consultant traffic manager.

H. V. BARR, formerly associated with the Heald Machine Co., Worcester, Mass., is now Connecticut representative of Stedfast & Roulston, Inc., Boston.

CHARLES N. TEETOR has been elected president of the Perfect Circle Co., Hagerstown, Ind., following consolidation of that company with the General Piston Ring Co., Tipton, Ind. Other officers of the company are RALPH TEETOR, first vice-president; LOTNAIR TEETOR, second vice-president; LEWIS S. BOWMAN, secretary, and RAY TEETOR, treasurer.

JOHN J. LOUGHRAN has resigned as chief engineer of the Adriance Machine Works, Brooklyn, to become chief engineer at the Pottstown, Pa., plant of the Doehler Die Castings Co.

HAROLD E. BUTCHER, recently vice-president Champion Spark Plug Co., has been elected second vice-president of the Edward G. Budd Mfg. Co., Philadelphia. This office was recently created by a change in the company's by-laws which were amended at the same time to increase the membership of the board of directors from 12 to 15.

W. R. STRICKLAND, assistant chief engineer of the Cadillac Motor Car Co., Detroit, was nominated for the presidency of the Society of Automotive Engineers at a meeting held recently in Quebec.

LAWRENCE M. BRILE, who has been vice-president in charge of sales for the Fairmont Mfg. Co., Fairmont, W. Va., was elected president of the company at a recent board meeting, to succeed W. J. ADAM, who has resigned. DR. ROBERT J. ANDERSON has been elected vice-president and is in charge of production at the company's aluminum rolling mills at Fairmont. JOHN N. BRANZA, who has been manager of the Cleveland office, has been named sales manager and T. A. LYNCH has been appointed assistant to the president. WILLIAM J. LANGE, metallurgist, has been made technical supervisor.

J. B. HAMILTON, formerly associated with Wickes Brothers, Jersey City, has purchased an interest in and been elected vice-president of the Bertolette Machine Tool Co., Jersey City, dealer in new and used machine tools. The company has established a department to handle air compressors and contractors' equipment.

JOHN W. DAVIS, JR., Galveston, Tex., has been appointed assistant trade commissioner and assigned to Buenos Aires, Argentina.

FRANK MESSENGER, Paterson, N. J., has been appointed assistant trade commissioner at London, England.

SAM TOUR has resigned as metallurgist of the Doehler Die Casting Co., Batavia, N. Y., and has been succeeded by W. G. JOHNSTON.

HERBERT HOOVER, Republican nominee for President of the United States, has been awarded the Louis Livingston Seaman medal of the American Museum of Safety, New York, awarded for the best record in

the saving of life in the field of sanitation and accidents, for "great public service from the standpoint of human values," and particularly for "conspicuous work in the Mississippi flood relief." The latest previous recipient was the late Judge E. H. Gary, in 1922.

FRED JOHNSON, who has been manager of the St. Louis district sales office of the Wagner Electric Corporation, St. Louis, for 21 years, has been transferred to Los Angeles and is now manager of the company's office in that city. He has been connected with the electrical industry since 1898, having started out in the sales department of the Martin J. In-sull Co., Chicago. In 1899 he became associated with the General Incandescent Arc Light Co., New York, and the following year became manager of the Chicago office, retaining this position until he went with the Wagner corporation. He has been succeeded at St. Louis by ALEX L. MILTENBERGER, heretofore the company's Pacific Coast manager, with headquarters at San Francisco. Mr. Miltenberger was graduated from Columbia University in 1909 and has been connected with the Wagner organization ever since, first in the St. Louis sales department and since 1920 as Pacific Coast manager.

L. E. GRIFFITH, New York district manager for the Riley Stoker Corporation, Worcester, Mass., has been appointed sales manager of the company, succeeding the late WILLIAM PESTEL. Mr. Griffith was graduated from Lafayette College, Easton, Pa., in 1912, and his first business connection was with the Thompson-Starrett Co., first at New York and later at Chicago. After a short affiliation with the Babcock & Wilcox Co., New York, he became identified with the United Machine & Mfg. Co. and was president of that company when it was absorbed by the Riley corporation. W. L. SCHULTZ, for the past few years sales representative in the Riley New York office, has been appointed district manager to succeed Mr. Griffith.

C. M. RUTLEDGE, for the last nine years identified with the Columbia Tool Steel Co., first as sales representative and later as assistant Chicago district manager, has become associated with the Chicago office of the Vanadium-Alloys Steel Corporation, Latrobe, Pa.

AVERY C. ADAMS, formerly assistant general sales manager for the Trumbull Steel Co., Warren, Ohio, and more recently associated with the Republic Iron & Steel Co., has been appointed assistant to the president of the General Fireproofing Co., Youngstown.

W. G. EDMONDSON, recently assistant engineer of motive power of the Reading Co., has been appointed

works manager for the American Abrasive Metals Co., Irvington, N. J.

J. M. RANKIN, associated with the Bessemer Gas Engine Co., Baltimore, has been transferred to Washington, where the company has opened an engineering sales office.

J. E. ROWE, who has been director of extension and head of the department of mathematics at the College of William and Mary, Williamsburg, Va., has resigned to become president of the Clarkson Memorial Institute of Technology, Potsdam, N. Y.

J. W. BARRITT, formerly supervisor of apprentices at the South Philadelphia works of the Westinghouse Electric & Mfg. Co., will open a private engineering school at 1003 Lafayette Avenue, Moore, Pa., on Oct. 1, to be known as the Central Technical Institute.

WILLIAM F. MERRILL, vice-president and general manager of Remington-Rand, Inc., Buffalo, has been elected president of that company, succeeding JAMES H. RAND, JR., who becomes chairman of the board. B. L. WINCHELL, who was formerly president of the Remington Typewriter Co., has been named chairman of the executive committee. F. W. YOUNGS, continues as general manager of plants, with headquarters at Utica, N. Y.

F. E. MOSKOVICS, president Stutz Motor Car Co., Indianapolis, and HAROLD C. STROTZ, manager of the F. B. Keech Co., Chicago, have been elected officers of the Faries Mfg. Co., Decatur, Ill., manufacturer of brass, bronze and aluminum castings, spinings and stampings and plating work, following a reorganization of the company. At that time, W. J. GRADY, president of the company, and associates acquired a large part of the original Faries family holdings, and Mr. Grady was re-elected president; Mr. Moskovics, vice-president; W. W. ELLISON, secretary, and G. S. FOSTER, assistant secretary and assistant treasurer.

C. C. HENDERSON, vice-president and treasurer Allegheny Steel Co., Breckenridge, Pa., sailed July 15 for Europe to be gone until early in September.

H. W. GRAHAM, recently appointed general metallurgist in charge of metallurgical, inspection and quality matters for the Jones & Laughlin Steel Corporation, Pittsburgh, has been with that organization since his graduation from Lehigh University in 1914. He started in the cold finishing department at the South Side works, subsequently going to the engineering department and the open-hearth department, and for three years was attached to the Eliza furnaces.

Appoint Secretary-Manager for Gray Iron Institute

At a meeting of the executive committee of the Gray Iron Institute, held in Cleveland, July 17, Arthur J. Tuscany was chosen secretary-manager. The institute was formally launched at a meeting held in Philadelphia, May 18, following a conference of the leaders of the industry, who met in Pittsburgh in March. The executive committee of the institute consists of the president, Walter L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland; vice-presi-



A. J. TUSCANY

dents, B. H. Johnson, Cresson-Morris Co., Philadelphia, and A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.; treasurer, H. S. Chafee, Builders' Iron Foundry, Providence; and John L. Carter, Barlow Foundry Co., Newark, N. J.

For the past six years Mr. Tuscany has been secretary-manager of the Ohio State Foundrymen's Association. Previous to that time he was treasurer, director of purchases and a member of the board of the Whitney Tractor Co., Cleveland. He joined the latter organization at the time of its consolidation with the Post Tractor Co., for which organization he had been sales manager and a director. He achieved his early experience with the Johns-Manville Co., first as secretary to the branch manager and later as purchasing officer, salesman and field manager.

Ottawa Sands Corporation, recently organized with \$500,000 capital stock as a division of Material Service Corporation, Conway Building, Chicago, is building a large steel molding sand plant at Ottawa, Ill. The new company will have a daily capacity of 45 cars when it starts operations. Henry Crown, president, Material Service Corporation, also heads the new company. A. B. Hewson, formerly vice-president, Ottawa Silica Molding Sand Co., will be in charge of sales for the new corporation. Sales agencies will be appointed in various parts of the country.

Ohio Foundrymen Meet Aug. 16 and 17

The annual convention of the Ohio State Foundrymen's Association will be held at Cedar Point, Ohio, Aug. 16 and 17. The program as so far arranged is as follows:

"The Required Foundry Knowledge on Foundry Sand," by H. W. Dietert, chief industrial research engineer, United States Radiator Corporation, Detroit.

"Merchandising Foundry Products," name of speaker not announced.

"Taxation and Public Expenditures and Their Relation to Ohio Business," by George B. Chandler, secretary Ohio Chamber of Commerce, Columbus.

"How the Industrial Insurance Rates Affect the Industry and the Individual Employer," by T. M. Merri-man, Columbus.

"What You Should Know About Industrial Claims," by H. P. Sutherland, Columbus.

"A Safety Program for Ohio Foundries," by Fred G. Lange, division of safety and hygiene, Industrial Commission of Ohio.

Increase in Boiler Orders

New orders for 1609 steel boilers, with 1,467,281 sq. ft. of heating surface, were placed in June, as reported to the Department of Commerce by 72 manufacturers. This is the highest total for several months. It compares with 1571 boilers and 1,456,278 sq. ft. in May and with 1542 boilers and 1,366,486 sq. ft. in June, 1927.

For the first half-year the total was 7780 boilers and 7,592,628 sq. ft. of heating surface, comparing with 8042 units and 8,272,957 sq. ft. last year. The decline, based on square feet, was 8 1/4 per cent.

David Lupton's Sons Co. Building Chicago Plant

Construction work is proceeding on the first unit of the new Chicago plant of the David Lupton's Sons Co., Philadelphia, manufacturer of steel windows. The first unit will be 150 x 500 ft. When other units are built the Chicago plant will be 500 x 1000 ft. The Chicago plant will include a fabricating shop and warehouse, giving the company two branches in addition to the main plant and warehouse in Philadelphia, the other plant being in Cleveland.

More than two-thirds of the American cutlery exports in 1927 consisted of safety razor blades, according to the Department of Commerce. Total shipments of blades made \$7,020,995, of \$10,232,632 total cutlery exports. The total showed a gain of 9 per cent over 1926, while safety razor blades gained 19 per cent.

OBITUARY

JUSTIN DAVID CROSBY, founder, president and treasurer of the J. D. Crosby Co., Pawtucket, R. I., whose death in that city on July 10 was mentioned in *THE IRON AGE* last week, had spent his entire business life in the steel and wire industry. He was born at Worcester, Mass., in 1862 and, after attending high school and business college in that city, he



J. D. CROSBY

was employed as a clerk in the plant of the Washburn Woven Wire Mfg. Co., with which company his father was associated at the time. He was identified with the Washburn organization for 23 years, serving in nearly every department and finally becoming superintendent. Upon leaving the company he was engaged in business on his own account for a short time. Later he became superintendent of the Carpenter Steel Co., Reading, Pa., and afterward served in a similar capacity at the Jersey City plant of the Crucible Steel Co. of America. He founded the Pawtucket company bearing his own name in 1910 and remained its active head until his death. He had been prominent in the civic and industrial life of his city and State, having served as president of the Pawtucket Chamber of Commerce and also having been a member of the New England Council, which has been active in promoting the business interests of the New England States.

ARTHUR E. DANFORTH, a director of Oglebay, Norton & Co., Cleveland, and for the past 15 years affiliated with the sales organization of that company, died July 18, aged 43 years. He had been connected with the company for 24 years. His sales work in the firm's iron ore business brought him in close contact with the iron and steel industry, in which he had a wide acquaintance. Mr. Danforth was born in 1884 and attended

the East Cleveland schools and Oberlin College.

JOHN MAXWELL, president Maxwell Steel Vault Co., Oneida, N. Y., died at his home in that city on July 19, following a stroke of apoplexy. He was 83 years of age, but had been active until his death in the company, which he had founded in 1904.

WILLIAM T. KENNEDY, until his retirement two years ago superintendent of the Watertown, N. Y., foundry of the New York Air Brake Co., died at his home in that city on July 16, aged 65 years.

CHARLES WALTZ, editor of the *Iron, Bronze and Wire News*, Cincinnati, died at Dolgeville, N. Y., on July 18, as the result of injuries sustained in an automobile accident at Caroga Lake, N. Y. He was commissioner of the Ornamental Iron and Bronze Manufacturers Association.

DR. JAMES EDGAR DENTON, professor emeritus of mechanical en-

gineering at the Stevens Institute of Technology, Hoboken, N. J., died on July 22 at Maplewood, N. J., aged 73 years. He was born at Piermont, N. Y., and after graduation from Stevens in 1875 he served for a time as an instructor. He became professor of experimental mechanics in 1886 and professor of mechanical engineering and shop practice in 1898. From 1882 until 1886 he was engaged in the manufacture of rock drilling machinery.

DAVID T. ADAMS, pioneer of the Minnesota iron mines, died in Chicago, July 22, aged 69 years. In the fall of 1883 he discovered the Mesabi Range, and he was one of the earliest mining men on the Cuyuna Range. The Adams mine, named for him, and the Fayal mine, which he also discovered, are now properties of the United States Steel Corporation. At the time of his death he still owned mining properties that were leased to operating companies. He was born at Rockford, Ill.

THOMAS G. SMALLWOOD, during the past 14 years district manager at Cincinnati for the Chicago Pneumatic Tool Co., died July 20 after a lingering illness. He was 65 years of age.

Canadian Automobile Output Smaller

WASHINGTON, July 23.—June production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, was as follows: Passenger cars, 25,341; trucks, 3058. This compares with 29,764 passenger cars and 4178 trucks in May and with 16,470 passenger cars and 2738 trucks in June, 1927.

Smaller Orders for Steel Furniture

WASHINGTON, July 24.—Orders for steel furniture in the business group in June were valued at \$2,763,900, compared with \$3,085,365 in May, according to reports received by the Department of Commerce from 33 manufacturers. Orders in the shelving group in June were valued at \$737,060, against \$732,921 in May.

Shipments of steel furniture in the business group last month were valued at \$3,009,054, compared with \$3,213,018 in May, while unfilled orders were valued at \$1,992,665 on June 30 and \$2,232,594 on May 31. Shipments of shelving furniture in June were valued at \$720,253, against \$768,562 in May, while unfilled orders at the end of June were valued at \$729,310, compared with \$752,512 at the end of May.

For the six months ended June 30 orders for steel furniture in the business group were valued at \$18,591,964, against \$16,181,697 for the cor-

responding period of last year. The gain was 15 per cent. Orders for shelving furniture in the first half-year were valued at \$4,561,795, against \$3,870,691 for the corresponding period of 1927. Here the increase was nearly 18 per cent.

Heavy Sheet Sales in June

Sales of sheet steel showed a sharp gain in June, being 318,902 tons or 68,586 tons over the previous month and larger than any previous month of the year except during March, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. Production, which was 311,629 tons, fell off considerably, being the smallest of any month of the year, and shipments also declined, but to a less extent. Shipments were 308,741 tons or 3000 tons less than production. May shipments were 326,324 tons. Unfilled orders on July 1 amounted to 526,798 tons or about 1000 tons less than on May 1. The June report and comparisons follow:

	June	May	April
Total number of mills	721	721	721
Capacity per month	471,350	506,000	464,422
Percentage reporting	70.1	72.2	72.2
Sales	318,902	250,316	284,070
Production	311,629	349,367	327,909
Shipments	308,741	326,324	327,674
Unfilled orders	526,798	527,477	571,761
Unshipped orders	100,904	112,664	109,200
Unsold stocks	50,702	54,047	53,853
Percentages of Capacity			
Sales	96.5	68.5	84.7
Production	94.3	95.6	97.8
Shipments	93.4	89.3	97.7
Unfilled orders	159.4	170.4	170.4
Unshipped orders	30.5	30.8	32.6
Unsold stocks	15.3	14.8	16.0

Machinery Markets and News of the Works

July Sales Holding Up Well

Wright Aeronautical Corporation, General Electric Co. and Implement and Tractor Companies Are Large Buyers
—Miscellaneous Demand in Good Volume

MACHINE tool buying is holding at a high rate for July and the total for the month, it is now assured, will fall little, if any, short of that in June. The past week has been featured by large buying by the Wright Aeronautical Corporation and the General Electric Co.

It is estimated in the trade that the expenditures of the Wright Aeronautical Corporation for equipping a new unit of its plant at Paterson, N. J., will total \$500,000 or more. The General Electric Co. is buying heavily for its refrigerator departments at the Schenectady and Erie plants. Twenty large presses were among its purchases.

At Chicago, orders from the implement and tractor industry continue to make up a goodly proportion of current business. It is estimated that the J. I. Case Threshing Machine Co. and the John Deere Tractor Co. have each spent \$225,000 for machine tools since the first of the year, and other farm equipment manufacturers have also been steady buyers. The Ludlow Typograph Co., Chicago, has bought about \$15,000 worth of tools.

The present healthy demand for machine tools has greater significance from the fact that neither the railroads nor the automobile companies, which normally contribute a good share of such business, are important buyers. Automobile parts manufacturers are buying some machinery, but there is little demand from the Michigan automobile manufacturers. Railroad buying is almost negligible.

New York

NEW YORK, July 24.—Orders from the Wright Aeronautical Corporation, Paterson, N. J., which have been distributed among a number of sellers, have helped materially in raising July sales records to a point which will make the month compare fairly well with June. Moreover, July this year will run considerably ahead of the same month last year. Purchases of the Wright company, it is stated in the trade, will total \$500,000 or more. The General Electric Co. still has requirements to be covered for its refrigerating machinery department, but has not been buying so actively in the last week. Scattered orders for tools are in fairly good volume. A notable exception is in the railroad field, where the demand is exceedingly quiet.

Included in the week's sales of the Niles-Bement-Pond Co. were a 90-in. journal turning lathe, a 3500-lb. double-frame steam hammer and an 18-in. slotter. This company also sold on the Pacific Coast three Brown & Sharpe machines. The Pratt & Whitney division sold a duplex hobbing machine, a 13 x 30-in. and a 16 x 36-in. lathe, two No. 3 universal bench milling machines, three No.

1 9½-in. deep-hole drilling machines, a No. 1 13-ft. deep-hole driller, a 6-in. and a 12-in. vertical shaper, two No. 2 jig boring machines, a bench lathe and a Sigourney drilling machine.

Bids are being asked by Department of Mental Hygiene, Capitol Building, Albany, N. Y., Lewis M. Farrington, secretary, until Aug. 1 for two double-end steel Diesel electric ferryboats, and until Aug. 15 for complete machinery for the two ferryboats for Manhattan State Hospital, Wards Island, New York. Plans and specifications at office noted and at office of Department of Public Works, Division of Architecture, Flatiron Building, New York, and 353 Broadway, Albany.

Elevating machinery, conveying equipment, factory trucks and tractors, and other handling equipment will be installed in ten-story warehouse and distributing building to be erected by Lehigh Valley Railroad Co., 143 Liberty Street, New York, at Gerard Avenue and 144th Street, to cost approximately \$1,000,000. E. E. Loomis is chief engineer.

Brooklyn Parking Terminal, Inc., 250 Park Avenue, New York, has filed plans for a six-story automobile service, repair and garage building to cost \$300,000 with equipment. J. B. Peterkin, 285 Madison Avenue, New York, is architect.

Mitchell-Vance Co., 503 West Twenty-fourth Street, New York, manufacturer of lighting fixtures, has leased space in building at 70 Washington Street, Brooklyn, and will remove to that location.

Superintendent of Lighthouses, Staten Island, N. Y., will receive bids until Aug. 6 for 74 pieces cast steel stud link lightship chain, 130 cast steel shackles, and 75 cast steel swivels for lightship chain, proposal 27574; until Aug. 8 for wrought iron stud link lightship chain, open link wrought iron buoy chain in 15-fathom lengths, bridle chains for bell buoys, iron buoy swivels, split key steel buoy shackles, riveted pin steel buoy shackles, and cast steel mushroom anchors, proposal 27599.

Charles Goodman, 375 Fulton Street, Brooklyn, architect, has plans for one-story automobile service, repair and garage building to cost close to \$100,000 with equipment.

Board of Education, White Plains, N. Y., plans installation of manual training equipment in new three-story high school to cost \$1,000,000, for which bids are being asked on general contract. Starrett & Van Vleck, 393 Seventh Avenue, New York, are architects.

Trinity Iron Works, Inc., New York, has acquired four four-story buildings, 100 x 100 ft., at 311-17 East Twenty-first Street, and adjoining five-story building, 40 x 98 ft., at 316-18 East Twenty-second Street, for a local plant.

Officials of Staten Island Shipbuilding Co., Port Richmond, S. I., have organized Heat Transfer Products, Inc., to operate as a division of parent company. It is understood that new organization will occupy a section of shipyard for manufacture of special heating equipment. New York offices will be at 90 West Street. George T. Jacocks, formerly vice-president of Whitlock Coil Pipe Co., Hartford, Conn., will be president and general manager; W. S. Ogilvy is vice-president, in charge of production.

Mutual Metal Craft Co., 306 East Fortieth Street, New York, has leased space in building at 388-90 Second Avenue for expansion.

Union School District No. 28, Long Beach, N. Y., is considering installation of manual training equipment in a three-story high and grade school, to cost about \$300,000. H. L. Smith, 100 East Forty-second Street, New York, is architect.

Benjamin Driesler, Jr., 153 Remsen Street, Brooklyn, architect, has taken out a permit for a three-story automobile service, repair and garage building, 108 x 200 ft., to cost \$350,000 with equipment.

Plans are being arranged by Great Atlantic & Pacific Tea Co., 420 Lexington Avenue, New York, for a new coffee-roasting plant at Toledo, Ohio, with ovens, conveying machinery and other equipment, to cost close to \$200,000 with equipment.

The Crane Market

A fair seasonal amount of new business has been placed during the present month and pending, while not all that might be desired, is considered satisfactory. No action has been reported on the considerable amount of prospective export business, but developments on some of these inquiries are expected early in August. Stevens & Wood, Inc., New York, has changed the requirements on a power house crane which will be bought for Deepwater, N. J., and the Reading Iron Co., Reading, Pa., is expecting to purchase a used 7½, 10 or 15-ton electric overhead crane.

Among recent purchases are:

Wilcox & Stultz, Inc., Brooklyn, crawler crane, from Har-nischfeger Corporation.

F. G. Schaefer Iron Works, Edgewater, N. J., two 3-ton electric hoists, from Box Crane & Hoist Corporation.

George H. Flinn Corporation, New York, reported to have purchased caterpillar crane from Industrial Brownhoist Corporation.

Gulf Refining Co., New York, one 5-ton, one motor electric overhead crane, with 37-ft. 8-in. span, from Box Crane & Hoist Corporation.

Philadelphia

PHILADELPHIA, July 23.—Plant and business of Federal Container Co., Fifty-sixth Street and Paschall Avenue, Philadelphia, manufacturer of corrugated paper products, has been acquired by Fiber Board Products, Inc., San Francisco, operated jointly by Zellerbach Corporation and Paraffine Companies, Inc., same city. New owner will operate as subsidiary and use as Eastern branch plant.

West Philadelphia Stock Yards Co., Thirtieth Street, Philadelphia, plans installation of conveying machinery, overhead trolley system, refrigerating equipment and other apparatus in proposed abattoir to cost more than \$650,000. J. M. Harlan is president.

Atlantic Gas Co., Lewis Building, Philadelphia, is completing plans for new gas plant at Lexington, N. C., installation to include high pressure tanks, oil tanks, generating sets, purifiers, compression equipment, blowers and accessory equipment. Company also plans to install about 20 miles of steel pipe for distribution.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has acquired through its subsidiary, Transit Land Co., property at Second and Third Streets and Chelton Avenue, totaling 220 building lots, and will use portion of site for new repair and maintenance shops.

Philadelphia Fibre Box Board Mill, Inc., Delaware Avenue and Tasker Street, Philadelphia, has awarded general contract to L. Rosengarten, Otis Building, for three-story and basement addition, 50 x 120 ft., to cost about \$35,000.

Edmund H. Poggi, Philadelphia, architect, has plans for a new airport and seaplane port on Pettys Island, for a company now being organized by local interests, to include hangars, repair and reconditioning shops, oil storage and distributing building and other units, to cost in excess of \$100,000 with bulkheading of site, etc.

Sunbury Converting Works, Inc., Sunbury, Pa., is having plans drawn for a power house in connection with a new textile mill at Belvidere, N. J., entire project to cost in excess of \$90,000, for which bids will be asked on general contract early in August. Company will also build addition to power plant at its Sunbury mill. W. E. S. Dyer, Land Title Building, Philadelphia, is architect and engineer.

Roller Bearing Corporation of America, Inc., is completing removal of its plant from Newark, N. J., to former plant of Mercer Automobile Co., Whitehead Road, Trenton, N. J., where operations will be concentrated in future. It is purposed to increase production at new location.

T. Arthur Karno, Broad Street Bank Building, Trenton, N. J., a member of Karno-Smith Co., Inc., same address, building contractor, has acquired plant of Bordentown Steel & Tube Co., near Bordentown, N. J., at trustee's sale in bankruptcy. New owner plans to continue operations for manufacture of steel tubing and kindred products, and will remodel and improve works. It is understood that new company will be formed to operate mill.

New Jersey Cannery Corporation, care of Edwards & Green, 548 Federal Street, Camden, N. J., architects, plans installation of cold storage and refrigerating plant in new factory at Hammonton, N. J., 100 x 450 ft., to cost more than \$100,000.

Pennsylvania Power & Light Co., Allentown, Pa., an interest of Electric Bond & Share Co., 2 Rector Street, New York, has acquired property in vicinity of Frackville, Pa., and is reported planning new steam-operated electric power plant, to cost more than \$450,000, to be used largely for service in connection with proposed electrification of Mahanoy Plane division of Reading Railway.

City Council, Bethlehem, Pa., has leased a tract of 78 acres on Hellertown Road, held by Bethlehem Steel Realty Co., as site for new municipal airport, and will develop property at early date, with erection of hangars, repair and reconditioning shops and other structures.

Superior Anthracite Coal Co., Carbon-dale, Pa., is considering early rebuilding of coal breaker at its local colliery, destroyed by fire July 19, with loss close to \$80,000 with equipment.

Board of Trustees, Pennsylvania State College, State College, Pa., has asked bids on general contract for a new engineering building for mechanical and other engineering work, to cost more than \$100,000. Charles Z. Klauder, Franklin Bank Building, Philadelphia, Pa., is architect.

Pittsburgh

PITTSBURGH, July 23.—Machine tool business has shown some improvement the past two weeks in sales and inquiries. The Westinghouse Electric & Mfg. Co. has made a few purchases against its third quarter list and is expected to close for several of the important items before the end of the month. Single item orders are fairly numerous. The trade gets its chief encouragement, however, from increased inquiries.

A company is being organized by C. P. Mayer, head of Mayer Aircraft Corporation, Bridgeville, Pa., to establish and operate a local plant for manufacture of cabin-type monoplanes, including parts

F. L. Smidth & Co., 50 Church Street, New York, engineers, and manufacturers of cement mill machinery, will soon begin work on a one-story foundry addition at Elizabeth, N. J., to cost about \$25,000. A crane runway will be installed. John S. Branne, Grand Central Terminal, New York, is consulting engineer.

Borough Council, Fairlawn, N. J., is asking bids until Aug. 14 for equipment for municipal waterworks, including pumping machinery, electrical equipment, elevated tank and tower. McClave & McClave, Cliffside, N. J., are borough engineers. Jasper Van Hook, Jr., is borough clerk.

Humphreys Shipyard Corporation, 347 Madison Avenue, New York, Frederic P. Humphreys, president, has plans for extensions and improvements in its recently acquired plant at Keyport, N. J., to cost close to \$50,000 with equipment. Plant will be devoted to production of Diesel engine-driven yachts.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has secured a franchise from Township Committee, Montville, N. J., providing for construction of local gas-generating and storage plant.

American Metal Moulding Co., 146 Coit Street, Irvington, N. J., has awarded general contract to Eustice Brothers, Inc., 111 Academy Street, Newark, for a new plant unit, 52 x 200 ft., largely for pipe manufacture, to cost in excess of \$50,000.

Pioneer Iron Works, Inc., Newark, Louis J. Siegler, president, has leased about one-half acre at rear of 317-21 Freylinghuysen Avenue, as site for new plant for structural steel and ornamental iron working, for which plans will be drawn soon, to cost close to \$45,000 with equipment.

General Tube Co., 49 Empire Street, Newark, manufacturer of metal tubing, etc., is having plans drawn for a one-story addition, to cost about \$25,000. Simon Cohen, 130 Branford Place, is architect.

Commissioner of Correction, Department of Correction, 11 North Pearl Street, Albany, N. Y., will receive bids until Aug. 16 for mechanical stokers, feed water heater, etc., for Sing Sing Prison, Ossining, N. Y. Plans and specifications at office of Department of Public Works, Division of Architecture, 353 Broadway, Albany.

M. E. Bernhardt Co., Inc., 127 West Thirtieth Street, New York, has purchased high temperature electric furnace for special operation from Steinmetz Heating Co., Inc., 30 Church Street, New York.

Yale Electric Corporation, Brooklyn, has moved into its new building at 257 Cornelison Avenue, Jersey City.

and assembling works. Company will also develop a local landing field, with hangars, repair shop, etc.

Board of Education, Apollo, Pa., is said to be planning installation of manual training department in new two-story high school to cost close to \$200,000, for which plans are being drawn by A. L. Thayer, Greer Building, New Castle, Pa.

Yelloway Bus Co., Pittsburgh, operating a motor bus system, has leased building of Manchester Auto & Machine Co., 816-26 Manchester Boulevard, for establishment of new service, repair and garage building.

Hammermill Paper Co., Erie, Pa., has plans under way for new mill at Hoquiam, Wash., adjoining plant of Gray's Harbor Pulp Co., now in course of construction at that place. New unit is reported to cost in excess of \$400,000.

City Council, Follansbee, W. Va., is asking bids until July 31 for a 25-ton incinerator plant.

Board of Trustees, Carnegie Institute of Technology, Pittsburgh, is arranging for establishment of new course in aeronautical engineering beginning with fall term, and will install equipment for instruction, testing, and construction of airplanes, engines, parts and aircraft instruments. Prof. A. H. Blaisdell will be in charge.

Chicago

CHICAGO, July 23.—Sales of machine tools are holding up much better than was expected. Bookings of local machinery houses this month will not be as large as in June, but that month for some sellers was the best in orders entered since 1920. The J. I. Case Threshing Machine Co., Racine, Wis., has placed orders for several special boring and drilling machines, and the John Deere Tractor Co., Waterloo, Iowa, has purchased a number of grinders, special drilling machines and other tools. In recent months there has been a steady stream of machine tool orders from the farm equipment industry, particularly from builders of tractors. It is estimated that the J. I. Case Threshing Machine Co. and the John Deere Tractor Co. have each spent close to \$225,000 for machine tools in the past six months.

Demand from miscellaneous sources is still in good volume. Ludlow Typograph Co., Chicago, has bought about \$15,000 worth of tools, including two milling machines, a surface grinder, a turret lathe and a drill press. There is little railroad buying, but the Burlington is expected to take early action on a small standing list. Chicago & North Western is inquiring for a motor-driven axle lathe with 25-hp. motor, 440 volts, 60 cycle, 3 phase; also for a motor-driven metal pattern grinding and filing machine with set of tools, No. M. P. 5 Strand or equal, 110 volts, 60 cycle, single phase. There continues to be a fair call for second-hand tools.

Chicago Board of Education will close bids July 26 on a motor-driven No. 3, or equivalent, Ryerson serpentine shear, a 36-in. band saw, a Yates American, or equivalent, 48 x 6-in. grinder and a 12-in. hand jointer with a 7 ft. table.

Contract has been let by Austin Millwork Co., 933 North Cicero Avenue, Chicago, to John Duff, Oak Park, Ill., for one story and basement addition, 125 x 125 ft., to cost close to \$50,000 with equipment.

George E. Pearson, 4000 West North Avenue, is architect.

Reynold S. Brandt, 6971 Greenview Avenue, Chicago, manufacturer of metal goods, has acquired one-story building, 50 x 100 ft., for expansion.

General Electric Co., Schenectady, and 230 South Clark Street, Chicago, is asking bids until July 31 for new factory branch and distributing plant at Pershing Road and Ashland Avenue, Chicago, to cost in excess of \$100,000. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

Common Council, Atlantic, Iowa, is asking bids until Aug. 1 for one boiler, stoker and auxiliary equipment for municipal power plant. T. E. Nichols is city clerk.

Northwestern Cabinet Co., Burlington, Iowa, is considering rebuilding portion of plant destroyed by fire July 15, with loss estimated at \$150,000, including equipment and stock.

Waterworks Department, Waterloo, Iowa, George Shoemaker, general manager, is having plans drawn for one-story and basement equipment storage and distributing plant, with repair facilities, including garage for motor trucks and cars, 75 x 120 ft. John S. Bartley, Pioneer National Bank Building, is architect.

Des Moines Casket Co., 405 Southwest Eighth Street, Des Moines, Iowa, has awarded general contract to Garmer & Stiles, 519 Fourteenth Street, for new one-story plant, 100 x 135 ft., to cost about \$40,000 with equipment.

Board of Education, Mattoon, Ill., is considering installation of manual training equipment in new three-story high school to cost \$275,000. Berger & Kelley, Lincoln Building, Champaign, Ill., are architects.

Conveying equipment, motors and other mechanical apparatus will be installed in new one-story printing plant, 310 x 500 ft., to be built by Robert O. Law Co., 633 Plymouth Place, Chicago, to cost \$400,000. Frank Chase, Inc., 720 North Michigan Boulevard, is engineer.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, is said to be planning new two-story branch assembling plant, 115 x 250 ft., at Fargo, N. D., to cost in excess of \$125,000 with equipment.

Montana-Dakota Power Co., Marmarth, N. D., is planning one-story addition to local steam-operated electric power plant, including installation of additional equipment, to cost in excess of \$45,000.

Northern Pacific Railroad Co., St. Paul, Minn., will erect an addition to its power plant to cost \$50,000.

Butler Brothers Mining Co., Nashwauk, Minn., is constructing a machine shop and warehouse, 44 x 100 ft.

New England

BOSTON, July 23.—The city of Boston is reported to have purchased some grinding tools for its Hyde Park district school, and one machine tool house has sold some heavy and expensive tools, details of which are withheld. The new tool market otherwise was dull the past week and comparatively little used equipment was sold. New inquiries have also fallen off.

Unless the city of Boston buys additional equipment for its Hyde Park school within the next few days, July will be a lean month for a majority of machinery houses. Two or three companies, however, will have had the best month this year.

The failure of users, particularly in Massachusetts, Connecticut and Rhode Island, to purchase new tools is all the more noteworthy in view that a high level of activity is maintained in metal-working plants, and a real shortage of highly skilled men is reported.

Permission has been granted George B. Torngren, 712 Broadway, Everett, Mass., tinsmith, to erect a new plant. Plans are private.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has awarded contract for a plant at Canton, Mass. French & Hubbard, 210 South Street, Boston, are engineers.

Henry & Richmond, 112 West Street, Boston, architects, have completed plans for a one-story 60 x 45 ft. power plant, at Massachusetts Normal School, Bridgewater, Mass. J. B. Worcester Co., 72 Milk Street, Boston, is structural engineer.

D. T. Cormier, 15 Herbert Street, Somerville, Mass., architect, is preparing plans for a one-story shop, 40 x 60 ft., to be built by A. Belanger & Son, Dudley Street, Cambridge, Mass., on Brookford Street, that city.

Fred T. Lay Co., Inc., 1215 Main Street, Springfield, Mass., was the bidder on a new pumping station to cost, with equipment, \$170,000 in Brightwood district, to be built by city of Springfield. McClintock & Craig, 456 Bridge Street, Springfield, are the architects.

Alden Mfg. Co., Campello, Mass., radio accessories, has merged with Johnson Tool & Molding Co., East Weymouth, Mass. Machinery and business of East Weymouth company will be moved to Campello.

Packard Motor Car Co., East Grand Boulevard, Detroit, has asked bids on general contract for four-story service, repair and sales building on Commonwealth Avenue, Boston, 116 x 230 ft., to cost more than \$160,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

Froiland Chain & Mfg. Co., Albany Street, Springfield, Mass., Paul Froiland, head, has filed plans for one-story plant unit, to cost about \$25,000 with equipment.

Burns Brothers, Inc., 260 Huyshope Avenue, Hartford, Conn., has taken out a permit for new one-story central repair and machine shop at its new coal and coke distributing plant in Parkville district, to cost approximately \$25,000 with tools.

New England Transportation Co., Fall River, Mass., is considering plans for new motor bus terminal with garage, service and repair facilities, to cost close to \$200,000 with equipment.

Metal Craftsmen, Inc., 141 Georgia Avenue, Manucentre district, Providence, R. I., manufacturer of window ventilators, etc., has work under way on one-story, L-shaped addition, 50 x 125 ft., to cost more than \$40,000.

American Writing Paper Co., Main Street, Holyoke, Mass., has awarded general contract to Casper Ranger Construction Co., 20 Bond Street, for three-story addition, and one-story boiler plant, to cost about \$60,000 with equipment.

Charles Street Garage Co., Boston, has awarded general contract to Aberthaw Co., 80 Federal Street, for two-story service, repair, and garage building, 85 x 130 ft., to cost approximately \$100,000 with equipment.

Saco-Lowell Shops, Lowell, Mass., manufacturer of textile machinery and parts, is arranging for early removal of final

operating unit of local plant to Newton Upper Falls, Mass., where production will be concentrated. Lowell shop will be placed on market.

Blanchard Mfg. & Canning Co., Eastport, Me., is said to have plans for new factory unit to cost about \$50,000. It will replace a portion of plant recently destroyed by fire.

Cavanagh Engineering Co., 131 Washington Street, Providence, R. I., has been formed to manufacture automobile accessories and devices. Company has placed Solite trouble lamp on market and is having parts made to specifications and doing its own assembly work. Metal stampings, fiber parts, screw machine products, miniature automobile lamps and wire are being purchased.

Contract for construction of power plant for Underwood, Elliott-Fisher Co., Hartford, Conn., has been let to Aberthaw Co., Boston.

Cleveland

CLEVELAND, July 24.—Machine tool sales were fairly good the past week and the July volume promises to show a gain over June. The majority of orders during the week were for single machines. The General Electric Co. is buying considerable press equipment for its Erie, Pa., works, for making electric refrigerators. It has purchased about 20 large presses and has another inquiry out for five large machines. This company is also buying complete die equipment for its presses. It is stated that its purchase of press equipment and machines now pending will aggregate \$225,000.

Byers Machine Co., Ravenna, Ohio, during the week purchased a 48-in. open-side planer and is inquiring for a horizontal boring machine. A Warren, Ohio, manufacturer also bought a planer of same type. Single tool orders for turret lathes continue good. Board of Education, Toledo, Ohio, is inquiring for eight or 10 metal-working machines, including lathes, grinders and one milling machine. Press manufacturers report a better volume of sales in this territory this month than in June and a 25 per cent gain over July last year. Automobile parts manufacturers are buying some machinery, but little business is coming at present from automobile manufacturers in the Michigan territory.

Plans are being arranged by Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, for two-story power substation, to cost approximately \$100,000 with equipment.

Snappy Radiator & Battery Service Co., 736 Cleveland Avenue, S. W., Canton, Ohio, has asked bids on general contract for one-story addition, to cost about \$42,000 with equipment.

Diller Mfg. Co., Bluffton, Ohio, manufacturer of electrical products and radio equipment, has plans for new one-story plant, 85 x 118 ft., to cost about \$45,000 with equipment.

City Council, Canton, Ohio, has approved fund of \$100,000 for purchase of property for a municipal airport and erection of hangars, repair and reconditioning shops, oil storage and distributing building, and other mechanical units.

G. & C. Foundry Co., West Monroe Street, Sandusky, Ohio, manufacturer of rough gray iron castings, has plans for a one-story addition, 30 x 280 ft., and will soon begin superstructure.

Board of Education, Akron, Ohio, plans

installation of manual training equipment in new two-story and basement high school to cost about \$250,000, for which superstructure will soon begin.

Hocking Valley Railroad Co., Marion, Ohio, plans extensions in local water system to cost about \$250,000, including installation of pumping machinery and auxiliary power equipment, and water-softening equipment.

Superior Screw & Bolt Co., 3650 East Ninety-third Street, Cleveland, has filed plans for one-story machine shop, 100 x 150 ft., to cost close to \$70,000 with equipment.

Cleveland Railway Harbor Co., Williamson Building, Cleveland, will install elevating, conveying and other handling equipment, factory trucks and tractors, etc., in proposed eight-story warehouse and terminal building, to cost in excess of \$10,000,000. Moores & Dunford, Inc., 110 West Forty-second Street, New York, is engineer.

Buffalo

BUFFALO, July 23.—Arrangements have been made by Arcadia Truck Body Corporation, Newark, N. Y., for purchase of plant and business of H. H. Babcock Equipment Corporation, Watertown, N. Y., manufacturer of automobile bodies, and will consolidate with its organization. It is understood that new owner will discontinue operations at Watertown, and will remove equipment and concentrate production at Newark.

George W. Holt, 1374 Delaware Avenue, Buffalo, and associates have organized European Art Metal Corporation, with capital of \$25,000, and plans early operation of plant for manufacture of ornamental metal products. E. W. Holt, 70 Barkley Place, is also interested in new company.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, has purchased controlling interest in Acheson Graphite Corporation, with plant at Niagara Falls, N. Y., for manufacture of graphite in powdered and electrode form. New owner will operate Acheson plant as a division.

Board of Education, Syracuse, N. Y., is said to be planning installation of manual training equipment at central high school, in connection with new three-story addition and improvements in present building to cost about \$400,000. Bids will be asked in about 30 days. A. L. Brockway, Third National Bank Building, is architect.

General Gas Furnace Co., Inc., Rochester, N. Y., care of Frederick W. Armbruster, Sr., 4476 St. Paul Boulevard, recently formed by Mr. Armbruster and associates, plans operation of local plant for manufacture of gas-fired furnaces, parts, and other heating equipment. Lewis S. Edgerton, 84 Briarcliffe Road, Irondequoit, N. Y., is also interested in new company.

Oswego Falls Corporation, Fulton, N. Y., operating pulp and paper mills, has awarded general contract to Austin Co., for a two-story addition to cost close to \$100,000 with equipment.

Indiana

INDIANAPOLIS, July 23.—Plans have been approved by Southern Indiana Gas & Electric Co., Evansville, for new steam-operated electric power plant to cost in excess of \$1,250,000 with equipment. Extensions will also be made in transmission lines.

Board of Education, Columbus, is said to be planning installation of manual training equipment in two-story addition to junior high school to cost about \$100,000, for which bids will soon be asked on general contract. Norman H. Hill, Jr., 1050 North Delaware Avenue, Indianapolis, is architect.

Leueham & Dunphy, Vincennes, architects, have asked bids on general contract for automobile service, repair and garage building, to cost close to \$100,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in four-story and basement warehouse to be built by Kroger Grocery & Baking Co., 815 Main Street, Cincinnati, at Indianapolis, to cost in excess of \$750,000. Emil H. Nieman, 3816 Shaw Avenue, St. Louis, is architect. A refrigerating and cold storage plant will be installed in separate unit; and automobile repair shop and garage built on adjoining site.

City Council, Muncie, is planning establishment of municipal airport and is arranging appropriation of \$75,000, to include hangars, repair and reconditioning shops, oil storage and distributing building.

Board of Public Works, Evansville, has plans under way for establishment of municipal airport, for which fund of about \$100,000 has been arranged, including hangars, repair shops, oil storage and distributing building and other units. B. Russell Shaw, Inc., 810 Olive Street, St. Louis, is architect.

Board of School Commissioners, 150 North Meridian Street, Indianapolis, has awarded general contract to W. P. Jungclauss, 825 Massachusetts Avenue, for Arsenal technical high school, with manual training department, to cost about \$200,000.

Bedford Foundry & Machine Co., Bedford, has completed a plant addition, 135 x 300 ft.

Property of Brazil Machine & Foundry Co., Brazil, will be offered at public auction soon at a receiver's sale.

Chamber of Commerce, Plymouth, Ind., is promoting the sale of \$30,000 worth of stock in Plymouth Body Works to finance an increase in its capacity. The company builds school hacks.

St. Louis

ST. LOUIS, July 23.—Bids have been asked on general contract by Central Hardware Co., 811 North Sixth Street, St. Louis, for two-story and basement storage and distributing plant, 90 x 195 ft., to cost about \$100,000 with equipment. Leo F. Abrams, Chemical Building, is architect.

Conveying machinery, refrigerating, and other equipment will be installed in new one-story meat-packing plant to be erected by Fred Dold Packing Co., 426 North Belmont Street, Wichita, Kan., to cost \$145,000 for which bids will be asked on general contract early in August. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Corn Products Refining Co., Kansas City, Mo., has filed plans for one-story addition at North Kansas City, to cost close to \$140,000. Headquarters are at 17 Battery Place, New York.

Board of Managers, Missouri School for Deaf, Fulton, Mo., has taken bids on revised plans for two-story manual training building, 51 x 101 ft., to cost more than \$45,000 with equipment. C. A. Smith,

Finance Building, Kansas City, Mo., is architect.

Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., will take bids about middle of August for four-story automobile service, repair and garage building, 125 x 140 ft., with foundations for six additional stories later, to cost close to \$200,000. H. G. Freshman is company architect.

Red Bird Aircraft Corporation, 1513 North Fonshill Street, Oklahoma City, Okla., E. S. Keller, president, has taken over building formerly used for motor truck manufacture, and will remodel for new airplane works, with parts and assembling departments. Present factory at Bern, Kan., will be removed to new location.

Board of Public Service, City Hall, St. Louis, is said to be arranging fund of \$2,000,000 for establishment of municipal airport, and purposes to take over Lambert-St. Louis flying field at Bridgeton, Mo., and build hangars, repair shops and other units. B. Russell Shaw Co., 4616 Lindell Boulevard, is consulting engineer for project.

International Harvester Co., 606 South Michigan Avenue, Chicago, and 316 North Santa Fe Street, Salina, Kan., has awarded general contract to Fred Hartley, 121 North Second Street, Salina, for three-story factory branch and distributing plant, 50 x 120 ft., at Salina, to cost upward of \$85,000 with equipment.

City Council, Kansas City, Mo., has called special election on Aug. 7 to approve bonds for \$1,000,000 for a municipal airport, including land purchase and erection of hangars, repair and reconditioning units, and other buildings; also bonds for \$3,000,000 for extensions and improvements in municipal waterworks, including installation of pumping machinery and other power equipment.

Missouri-Kansas Zinc Co., 74 Trinity Place, New York, is planning extensions and improvements in plant of Kansas Zinc Mills Corporation in Missouri, including addition to flotation mill, conveying and transportation facilities, etc., to cost more than \$100,000.

Board of Education, Kearney, Neb., plans extensions and betterments in one-story manual training building to cost about \$35,000. H. M. McClure, Kearney, is architect.

Quick Motors Corporation, Union National Bank Building, Wichita, Kan., has plans for one-story plant, 50 x 150 ft., to cost about \$35,000 with equipment.

Reed & Duecker, Inc., 171 North Main Street, Memphis, Tenn., has been appointed representative in that territory for National Flue Cleaner Co., Groveville, N. J.

Detroit

DETROIT, July 23.—Contract has been let by Keeler Brass Co., Grand Rapids, Mich., to Owen-Ames-Kimball Co., Grand Rapids, for one-story addition, to cost close to \$40,000 with equipment.

Washtenaw County Board of Education, Ypsilanti, Mich., is planning construction of one-story mechanical arts and manual training building at school at South Ypsilanti, to cost in excess of \$100,000 with equipment.

Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, is arranging for bond issue of \$2,155,700, proceeds to be used primarily for purchase of plant and business of Michigan Smelting & Refining Co., 7885 Joseph Campeau Avenue, and for expansion.

City Council, Pontiac, Mich., has authorized fund of \$180,000 for construction of municipal airport, including hangars, repair and reconditioning shops, oil storage and distributing building and other units.

Federal Screw Works, Inc., 3401 Martin Avenue, Detroit, has awarded general contract to Hazelton & Clark, Michigan Theater Building, for one-story addition, 95 x 120 ft., to cost close to \$60,000 with equipment.

Consumers Power Co., Jackson, Mich., is arranging for increase in capital from \$75,000,000 to \$100,000,000, a portion of proceeds to be used for extensions and improvements in plants and system, including new hydroelectric generating plant units, transmission lines and power substations.

Evans Auto Loading Co., Dime Bank Building, Detroit, is arranging for increase in capital from \$700,000 to \$1,000,000, a portion of proceeds to be used for expansion, including new Pacific Coast branch at Eureka, Cal., for production of battery separators and kindred products. Company also specializes in manufacture of automobile loading equipment and devices.

Milwaukee

MILWAUKEE, July 23.—Continued improvement is noticeable, both in current machine tool business and prospects for the remainder of the year, especially with respect to local industries. It has been a long time since new projects in the foundry and machine shop group have been so numerous or of such proportions as those that have developed in the last two to three weeks. Inquiry for tools of all kinds is active and some shops are working overtime to make prompt deliveries.

One of the largest industrial construction undertakings in Milwaukee in more than a year is the erection of a \$500,000 addition, 280 x 720 ft., to works of A. O. Smith Corporation for fabrication of electrically welded pipe for lines in Southwestern oil fields. E. W. Burgess is construction engineer.

Kearney & Trecker Corporation, 5924 National Avenue, Milwaukee, manufacturer of milling machines, will again enlarge its capacity and has placed general contract with Joseph Sausen, 352 Greenfield Avenue, Wauwatosa, for a two-story addition, 72 x 75 ft. Plans are by Kirchhoff & Rose, architects, 196 West Water Street.

Austin Co., Cleveland, has general contract for a one-story manufacturing and storage building, 190 x 405 ft., for Geuder, Paeschke & Frey Co., 38 Fifteenth Street, Milwaukee, manufacturer of metal stampings, enameled ware, etc. Cost is estimated at \$100,000.

Chain Belt Co., 736 Park Street, Milwaukee, has placed general contract with Klug & Smith Co., consulting engineer, 69 East Wisconsin Avenue, for a manufacturing building, 104 x 150 ft., at its Orchard Street works, to be ready Sept. 15.

Waukesha Motor Co., Waukesha, Wis., which recently decided upon a \$600,000 works extension program, has engaged Wisconsin Bridge & Iron Co., Milwaukee, to design and erect first unit, 176 x 308 ft., to cost \$100,000. Equipment purchases are now being made. Harry L. Horning is president and chief engineer.

Van Brunt Mfg. Co., Horicon, Wis., division of Deere & Co., Moline, Ill., and manufacturing grain drills and seeding

machines, is preparing for plant extensions costing about \$200,000. Contracts will be placed through general offices at Moline for a forge shop, 145 x 180 ft.; three-story warehouse, 96 x 125 ft., and three-story addition for elevator shaft, 20 x 40 ft. Plans are by O. A. Eckerman, company engineer, Moline.

MacWhyte Co., 2906 Fourteenth Avenue, Kenosha, Wis., manufacturer of wire rope, cable, etc., is erecting an addition to its plant. George S. Whyte is president and general manager.

Spring City Foundry Co., 901 West St. Paul Avenue, Waukesha, Wis., manufacturer of gray iron castings, has work under way on a shop addition costing about \$25,000.

Kohn Mfg. Co., 1375 Thirtieth Street, Milwaukee, manufacturer of domestic garbage incinerators, is awarding contracts for a one-story addition, 59 x 105 ft.

Richland Center, Wis., is asking bids until Aug. 7 for one high-pressure steam turbine generator unit with auxiliaries, including one cooling tower, for city water and light plant. Guy C. Luckey is city clerk.

Gugler Lithographic Co., 687 Milwaukee Street, Milwaukee, is asking bids for erection of six additional stories on its two-story manufacturing building, 60 x 128 ft.

Cincinnati

CINCINNATI, July 23.—While the machine tool market is devoid of feature, current business placed with local builders has fallen only a little short of that in June. Almost without exception, orders have been for one or two tools and have come from all parts of the country. Fresh inquiries have been fairly good and indicate that any serious diminution in buying is not likely in the near future. Manufacturers naturally anticipate a temporary lull in sales during the next 30 to 60 days on account of the vacation season, but the decline in business is expected to be less than usual.

The New York Central is reported to have bought three or four engine lathes, and several carriers in the Chicago district are considering the purchase of single machines. The Jackson Steel Products Corporation, Jackson, Mich., has closed for a 5-ft. Right Line radial drill.

General contract has been let by Steel Products Engineering Co., Springfield, Ohio, to Knowlton-Wortman Co., local, for one-story addition, 90 x 195 ft., to cost close to \$70,000 with equipment. Lloyd Zeller, Springfield, is architect.

Bids will be asked about middle of August by Franciscan Fathers of Cincinnati, care of J. F. Shebley, Twelfth and Republic Streets, Cincinnati, architect for three-story Roger Bacon High School for Boys, with manual training facilities, to cost about \$750,000.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Aug. 2 for 599 propellers, circular 43; until July 30 for 588 wheel assemblies, 800 hub bushings and 1624 streamlines, circular 42.

Carnation Milk Products Co., Oconomowoc, Wis., is said to be planning construction of can-manufacturing unit in connection with proposed milk condensary at Maysville, Ky. A power house and machine shop are planned also. Entire project is reported to cost close to \$500,000.

United States Engineer Office, Louis-

ville, will receive bids until Aug. 9 for machinery for power house at lock and dam No. 51, Ohio River, including pumping equipment and gate and valve-operating machinery.

Sevierville Power & Light Co., Sevier-ville, Tenn., has plans for addition to electric light and power house, including installation of additional equipment. L. M. Dow is engineer.

Board of Education, Hamilton, Ohio, plans installation of manual training equipment in new two-story junior high school to cost \$500,000, for which bids will soon be asked on general contract. F. J. Mueller, Rentschler Building, is architect.

Eastbourne Garage Co., Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Cincinnati, for four-story service, repair and garage building to cost in excess of \$500,000. Harry Hake, Telephone Building, is architect.

Safety Automatic Gate Co., box 382, Ashland, Ky., has been incorporated to manufacture patented safety automatic gate for railroad crossings. Company expects to locate plants at Ashland and Chicago.

South Atlantic

BALTIMORE, July 23.—Plans are being arranged by Burns Bottling Machine Works, Inc., 2329 Kirk Avenue, Baltimore, for extensions and installation of new equipment; an electric trolley hoist about 2000-lb. capacity, with accessory apparatus will be purchased.

Davison Chemical Co., Garrett Building, Baltimore, manufacturer of fertilizer products, etc., has plans for addition to plant in Curtis Bay section, to cost more than \$375,000 with machinery. A. Benson is company engineer.

William H. Swartz, 205 West Camden Street, Baltimore, vice-president, Columbia Wholesale Aircraft Corporation, is at head of new company being organized to establish a plant for production of small commercial airplanes to sell at popular price. Factory property will be secured at once and equipment installed. Allen Davis, Baltimore, will also be connected with new company, as well as Harvey W. Doyle, formerly with Detroit Aircraft Corporation, Detroit.

Board of Aldermen, Rocky Mount, N. C., will receive bids until July 31 for equipment for municipal power plant, including one 5000-kw. turbo-generator, with direct-connected exciter; one turbo-generator air cooler; one surface condenser for turbo-generator, complete with motor-driven condensing water circulating pump; dry vacuum pumps; motor-driven hot well pump; steam turbine-driven hot well pump; automatic atmospheric exhaust relief valve and accessory equipment. William C. Olsen, Inc., Raleigh, N. C., is engineer.

United States Leather Co., 17 Battery Place, New York, is reported planning one-story paper mill unit, 100 x 400 ft., in conjunction with tannery at Big Stone Gap, Va., for production of coarse paper pulp materials as used in leather industry. It is estimated to cost more than \$350,000 with machinery.

In connection with expansion and improvement program to cost \$21,144,724, authorized by Chesapeake & Ohio Railroad Co., Richmond, Va., it is planned to make additions in present locomotive and car repair shops, and to build new units of this kind to cost more than \$1,000,000 of sum noted.

Roanoke River Power Co., Richmond, Va., is planning early construction of hydroelectric power plant on Roanoke River, near Bugg's Island, vicinity of Weldon, N. C., with initial capacity of 80,000 hp., estimated to cost more than \$5,000,000 with power dam and steel tower transmission system.

General purchasing officer, Panama Canal, Washington, is asking bids until Aug. 13 for drilling machines, concrete mixers, wire cloth, wire lath, cable, insulated wire, soldering irons, copper rail conductor, and other mechanical equipment, Panama circular No. 1891.

Albany Crystal Ice Co., Albany, Ga., has approved construction of new ice-manufacturing plant to cost about \$50,000.

Hiner Supply Co., Raleigh, N. C., is rebuilding machine shop and foundry recently destroyed by fire, to cost close to \$40,000 with equipment.

Eastern Silica & Chemical Corporation, care of John F. Penrose, Winchester, Va., president, recently formed by Mr. Penrose and associates, plans development of glass sand deposits in western part of Winchester County, where tract of more than 150 acres has been acquired, including installation of mining machinery, mill, power equipment, etc., to cost more than \$45,000.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date stated) for power plant equipment for naval station at Quantico, Va., including watertube boiler, coal pulverizers, burners, turbine and motor-driven forced-draft fans, feed water heater, storage tanks; boiler feed, vacuum and condensate pumps, electric pyrometer; equipment for conveying and storing coal and ashes; refrigerating and ice-making machinery; switchboard and accessory equipment, specification 5602.

American Peanut Corporation, Norfolk, Va., plans installation of two 100-hp. oil engine units, with auxiliary equipment, for power service at mill, and will soon make purchase.

Virginia-Carolina Power Co., Mutual Building, Richmond, Va., is said to be planning new hydroelectric generating plant on Roanoke River, with initial capacity of 50,000 hp., to cost more than \$3,500,000 with transmission system.

A. S. Furtwangler, 4 South Broad Street, Charleston, S. C., has been appointed representative for National Flue Cleaner Co., Inc., Groveville, N. J.

Gulf States

BIRMINGHAM, July 23.—Plans are being considered by Fort Worth & Denver City Railway, Fort Worth, Tex., for a new coach shop at Childress, Tex., for car repair and construction work, to cost about \$150,000.

J. S. Cosden & Co., Tulsa, Okla., have approved plans for a new oil refinery at Big Springs, Tex., with capacity of 10,000 bbl. per day in skimming and cracking units, to cost more than \$850,000 with machinery. Company will also build 12-mile pipe line from oil wells to refinery.

Parkersburg Rig & Steel Co., Parkersburg, W. Va., manufacturer of oil well equipment, plans new branch plant in Esperson industrial tract, Houston, Tex., to cost close to \$23,000.

Crane Co., 836 South Michigan Avenue, Chicago, has filed plans for one-story and basement factory branch and distributing plant at Dallas, Tex., to cost \$70,000 with equipment.

Abilene Cottonseed Oil Co., Abilene,

Tex., has plans for a new one-story cottonseed oil mill, 90 x 350 ft., to cost about \$75,000 with equipment, and will soon begin superstructure.

Anticich Packing Co., Biloxi, Miss., has approved plans for one-story ice-manufacturing plant, 45 x 100 ft., to cost \$70,000.

Yount-Lee Co., Beaumont, Tex., has awarded general contract to Reeves Brothers, Birmingham, for addition to oil storage and distributing plant at Spindleton, to cost more than \$500,000 with equipment.

Following recent acquisition of mill of L. H. Gilmer Co., Inc., Shreveport, La., manufacturer of belting, etc., by new interests, headed by Chester Tharp, George Beveridge, and associates, plans are being arranged for extensions and improvements, including installation of new machinery.

Beebe Ice Co., South Grandview Avenue, Daytona Beach, Fla., is planning construction of new ice-manufacturing plant at Pensacola, Fla., to cost about \$75,000.

E. A. George, 1146 Kings Highway, Shreveport, La., architect, has filed plans for a three-story automobile service, repair and garage building, to cost about \$130,000.

Rome Electric Range Co., Huntsville, Ala., will proceed with erection of new one-story plant, 50 x 165 ft., and will soon purchase equipment, including battery of small presses and other tools.

C. M. Ayres, Tuscaloosa, Ala., architect, will soon begin work on two-story and basement automobile service, repair and garage building, 110 x 132 ft., to cost close to \$85,000 with equipment.

A. & K. Auto Top & Paint Co., Dallas, Tex., manufacturer of automobile tops, frames, etc., plans rebuilding portion of plant recently destroyed by fire, with loss reported at \$50,000 including equipment.

Board of Education, Montgomery, Ala., will build one-story vocational shop at new Lanier High School, for which appropriation of \$1,000,000 has been made. Bids on general contract are being asked until July 31. Frederick Ausfeld, Shepherd Building, is architect.

Fuel Efficiency Engineering Co., American Trust Building, Birmingham; Buckmaster-Luck-Malochée, Inc., Industrial Homestead Building, New Orleans, and Henry Eggelhof, Construction Industries Building, Dallas, Tex., have been appointed representatives in their various districts for National Flue Cleaner Co., Inc., Groveville, N. J.

Pacific Coast

SAN FRANCISCO, July 18.—Plans are under way by Pacific Coast Pulp & Paper Co., Los Angeles, care of D. M. Thomas, Santa Monica, Cal., recently formed by Mr. Thomas and associates with capital of \$1,500,000, for new mill at Richvale, Cal., for production of paper from rice straw, consisting of main unit, 66 x 225 ft., and four smaller buildings, with power house, 50 x 80 ft., to cost in excess of \$400,000, with machinery. Wesley S. Martin, Los Angeles, is secretary and treasurer, and Mr. Thomas, president. C. A. Kieren is superintendent and engineer.

Board of Education, Burbank, Cal., has awarded general contract to A. D. Paschall, 1661 Forest Street, Pasadena, Cal., for new junior high school with manual training unit, to cost about \$200,000, to be known as New Valley Junior

High School. Francis H. Rutherford, Mills-Fraser Building, Santa Monica, Cal., is architect.

Victor Talking Machine Co., Camden, N. J., has engaged William A. Knowles, 1214 Webster Street, Oakland, Cal., architect, to prepare plans for its plant at Hollywood, Los Angeles, for development and manufacture of equipment for talking motion pictures. Initial unit will approximate 30,000 sq. ft. of floor space and will cost in excess of \$200,000 with equipment.

Marconi Mfg. Co., Seattle, manufacturer of radio equipment and devices, has awarded general contract to Hoard Engineering Co., Pantages Building, for new plant, to cost approximately \$55,000 with equipment. Hancock & Lockman, Walker Building, are architects.

Conveying machinery, loading equipment, motors and other power equipment, will be installed in new packing plant to be constructed by Irvine Valencia Growers Association, Tustin, Cal., to cost about \$85,000.

Yellow Cab Co., 1290 Bush Street, San Francisco, has awarded general contract to Cahill Brothers, Inc., 206 Sansome Street, for three-story service, repair and garage building to cost \$350,000 with equipment. Powers & Ahnden, 605 Market Street, are architects.

Fir-Tex Insulating Board Co., Portland, Ore., is considering plans for new insulating board mill in St. Helens, Ore., district, using sawmill waste as raw material. It will include power house, machine shop and other buildings, to cost more than \$1,000,000 with machinery. A. E. Millington, Portland, is vice-president and general manager.

Edwards Mfg. Co., Spokane, Wash., and Cincinnati, manufacturer of sheet metal specialties, has awarded general contract to P. J. Young, West Cleveland Street, Spokane, for one-story plant to cost about \$45,000 with equipment.

W. S. Ray Mfg. Co., Milton and Bosworth Streets, San Francisco, manufacturer of ranges, oil burners and kindred heating equipment, is having plans drawn for one and two-story addition, to cost about \$75,000 with equipment. Irvine & Ebbets, Call Building, are architects.

Alameda Airport, Inc., 550 Howard Street, San Francisco, is having plans drawn for a new airport at Alameda, Cal., comprising nine hangars, repair and reconditioning shops and other units, to cost more than \$65,000. E. G. Burr, address noted, is engineer.

H. D. Carter and Robert C. Oliphant have formed Carter Specialties Co., with headquarters in Hobart Building, San Francisco. It has recently been appointed northern California distributor for Leadclad products manufactured by Wheeling Metal & Mfg. Co., Wheeling, W. Va. A stock of flat and corrugated sheets is being carried by the company.

Plant and property of the Republic Steel Co., 733 Brannan Street, San Francisco, has been purchased by George R. Bormann Steel Co., Oakland, which will continue operations under latter name. Approximately 1200 tons of material has been taken over and the company is now one of the largest distributors of steel products on the Pacific Coast.

St. Helens Iron & Marine Works, St. Helens, Ore., has been sold to H. W. Clark, Kelso, Wash. New company will be known as St. Helens Welding & Machine Works, and will be operated by Mr. Clark, who also owns Clark Welding Works, Kelso and Longview.

Canada

TORONTO, July 23.—In addition to a steady flow of single tool orders, several orders were closed the past week for lists of from six to a dozen tools, and inquiries are out for other lists which will be placed before the end of the month. Business so far this month shows general improvement over that in July last year.

General Motor Corporation of Canada will shortly be in the market for tools and equipment for its new western Canada plant under construction. Purchases are being made for Point St. Charles shops of Canadian National Railways. Link-Belt, Ltd., Toronto, is preparing lists for equipment for a proposed machine shop. Canadian General Electric Co. has still to purchase tools, etc., for an addition to its Peterborough, Ont., plant now under construction. Public Utilities Committee, Winnipeg, will soon call for bids for power development machinery.

International Nickel Co., Sudbury, Ont., has started excavation work for a new smelter, construction to be started in about a month or six weeks. It will have a capacity of 3000 tons daily. A concentrator mill will also be erected.

Township Council, Scarboro, Ont., has purchased site on Massey Creek for a sewage disposal plant. Bids for equipment and construction are being received by W. D. Annis, town clerk, 1683 Kingston Road, Toronto.

Canadian Paper Board Co., Commissioner Street, Toronto, has taken out a permit for erection of a power plant to cost \$70,000.

In connection with a one-story plant, 100 x 400 ft., for Service Station Equipment Co., Ltd., 510 King Street East, Toronto, separate tenders are being received by D. Brouse, architect, care of company, for construction work, excavation, masonry, structural steel, steel sash, sheet metal, etc.

General Motors of Canada, Ltd., Oshawa, Ont., is having plans prepared by Hutton & Souter, 6 James Street, Hamilton, for an assembly building and power plant in connection with its plant at Walkerville, Ont.

Galt Art Metal Co., 385 Dundas Street, Galt, Ont., has awarded contract to A. Schnarr, 48 William Street, Waterloo, Ont., for a one story addition, 50 x 125 ft., mill and brick construction. B. A. Jones, 14 Ontario Street, Kitchener, Ont., is architect.

Western Canada

Harold A. Brown, secretary-treasurer, of town of Drumheller, Alta., will receive bids until Aug. 6, for one 1000 Imperial gal. per min. centrifugal pump and motor and other equipment for waterworks plant.

Foreign

PLANS are being arranged by El Aguila Petroleum Co., Minatitlan, Mexico, for extensions and improvements in oil refinery to double approximately present capacity, to cost more than \$2,500,000 with equipment. Company also purposes to build a new pipe line from recently established oil wells on Isthmus of Tehuantepec to refinery.

Department of Public Works, Government of Austria, Vienna, is considering construction of hydroelectric power plants on Danube River, and three sites for such number of individual plants are under advisement. Information at office of Bureau of Foreign and Domestic Com-

merce, Washington, reference Austria No. 281897.

Marioupol Iron Works, Marioupol, Russia, understood to be an interest of Soviet Russian Government, Petrograd, has plans for new plant for production of iron pipe, for oil field and other service. Initial project is estimated to cost \$4,000,000, and ultimate works about three times that sum. American Russian Chamber of Commerce, 145 West Fifty-seventh Street, New York, has information of project.

Department of Public Works, State of Sao Paulo, Sao Paulo, Brazil, is arranging for early sale of bonds in United States, totaling about \$15,000,000, proceeds to be used for extensions and improvements in water system of City of Sao Paulo, including installation of pumping machinery and other power equipment, pipe lines, etc., and for extension of Sorocabana Railway to Port of Santos, with terminal and shop facilities.

Government of Netherlands, Rotterdam, is considering establishment of new plant near State mine Maurits, Lutterdau, Province of Limburg, for manufacture of synthetic ammonia. Initial project is estimated to cost \$5,037,000 with machinery. Netherlands Parliament has authorized initial appropriation of \$1,007,000 for work, and additional funds will be voted later. Information at office of American Consulate, Rotterdam, Eugene W. Nabel, vice-consul.

Ulen & Co., 120 Broadway, New York, contractors, affiliated with a group of international contractors at London, England, and other points, have secured a contract from Persian Government, Teheran, for construction of railroad from Khor Musa, on Persian Gulf, to point on Caspian Sea, about 1000 miles, to cost \$125,000,000 with rolling stock, repair and construction shops, division yards, etc. Contract calls for completion of first 100 miles within 18 months. Road will pass through Teheran and Hamadan.

New Trade Publications

Carbic Lights and Carbide Generator.—Oxweld Acetylene Co., 30 East Forty-second Street, New York. Booklets, 3½ x 6¼ in., describing the use of cylindrical cakes of compressed calcium carbide in special portable generators for producing acetylene at low pressure for cutting and welding operations, and the various styles of burners and reflectors suitable for flood-lighting construction work.

Truck-Type Tractor.—Monarch Tractors Corporation, Springfield, Ill. Folder of eight pages devoted to a tractor capable of producing 78 drawbar hp. and weighing 22,500 lb. Illustrations show the equipment in use.

Jig Boring Machines.—R. Y. Ferner Co., Washington. Novel 11-page booklet bearing the title "Questions to Ask Before Buying a Jig Boring Machine." Features of the jig borers of the Societe Genevoise d'Instruments de Physique, Geneva, Switzerland, of which the Ferner company is representative, are dealt with in answer to some 80 questions in the booklet.

Pure Iron Plates.—American Rolling Mill Co., Middletown, Ohio. Twenty-page pamphlet, 8½ x 11 in., describes the pure iron plates which the company rolls for water supply and other engineering projects in which resistance to corrosion is a main consideration. Illustrations show Armco plates used for fusion welding, for stacks and breeching, gas coolers, standpipes, tanks and other long service work.

THE IRON AGE

New York, August 2, 1928

ESTABLISHED 1855

VOL. 122, No. 5

Web of Conveyors Serves Factory

Unusual Combination of Straight Runs, Curves, Spirals
and Heavy Grades—Upper and Lower
Runs of Belt Both Utilized

BY BURNHAM FINNEY*

ONE of the foremost factors in reducing costs in plants operating on a basis of mass production is an efficient system for handling materials. The kind of equipment best suited to this purpose is apt to vary according to the specific requirements of each company. In many cases a combination of standard conveying machinery and specially designed apparatus, adapted to local conditions, secures the best results.

At the new plant of the Kelvinator Corporation, Detroit, manufacturer of Kelvinator electric refrigerating units and of Nizer ice cream cabinets, provision has been made in practically every department for transporting materials mechanically. In fact, the plant resembles a large web woven of various transportation lines. Although this system has been in operation only a short time, it has already effected substantial economies.

It is no exaggeration to say that materials are carried through the entire plant without hand labor, from the time they reach the receiving department until finished refrigerating units are shipped to customers. Conveyors even extend the length of the stockrooms, so that materials, moving from this central point to any department in the plant, are transported by mechanical methods.

Units of Several Types Employed

WHILE roller and motor-driven belt conveyors predominate, materials are not handled exclusively in that manner. An overhead monorail system and electric lift trucks are utilized for certain types of work. Whenever materials must be sent from one floor to another, they are taken on spiral gravity conveyors, on "booster" inclined motor-driven conveyors or on automatic pendant-type vertical elevators.

The manufacture of electric refrigerating units lends

UNUSUAL flexibility features the conveyor system in the Kelvinator plant. Tote boxes, sent up or down the system as need be, are emptied of their products at proper points and placed back in the system, so that they do not pile up anywhere. Trays for special materials are designed to fit the boxes. Thus the loading and unloading, as the boxes pass a given point, are simple matters. At certain points electric lift-trucks and other equipment are used, but mainly the manufacturing process relies upon the conveyors, which are booster or belt or roller gravity, as immediate circumstances require.

itself well to straight-line production. Arrangement of operations is much like that in automobile factories, with sub-assembly lines feeding main assembly lines, which in turn supply a final assembly line. In practically all departments in which there is a sub-assembly or final assembly of parts, the work is done along motor-driven belt conveyors the movement of which is timed to conform to the necessity of the various operations. In the compressor assembly department, for example, the action of the belt conveyor is regulated so that the crankshaft, valves and pistons can be fitted to the cylinder block by workmen stationed at points along the conveyor. The same is true of the thermostat assembly department and of the

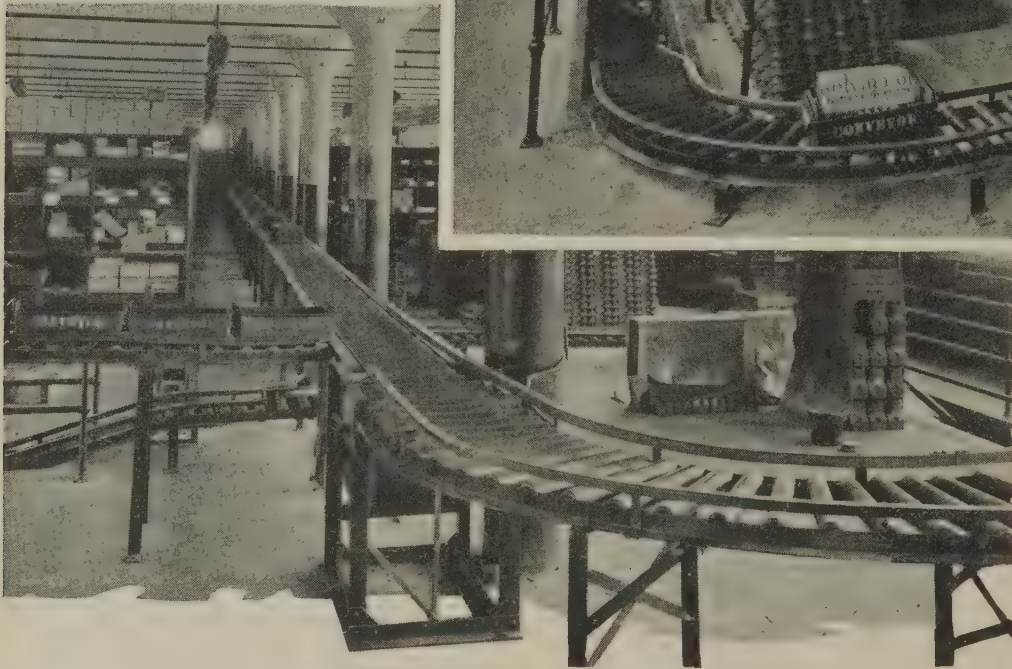
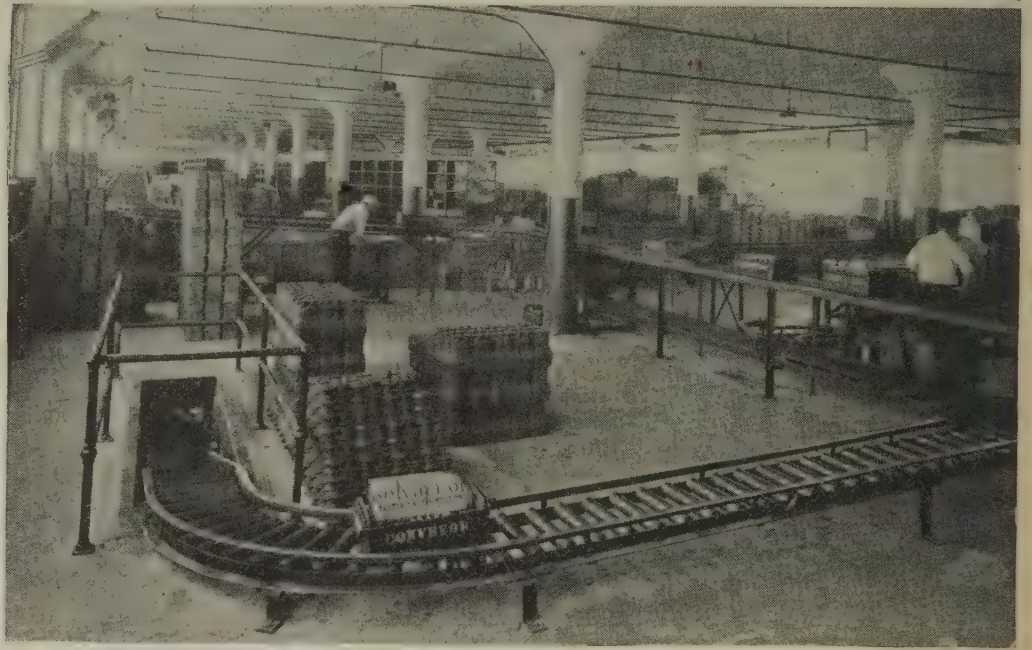
departments in which pressure controls, water valves, shut-off valves, expansion valves and float valves are assembled.

In the production of refrigerating units it is necessary to move from department to department hundreds of small parts. One of the most difficult problems confronting the management of the company was to find the most economical means of transportation for them. The plan finally adopted provided for standard all-steel tote pans, each measuring 14 in. in width, 19 in. in length and 11 in. in depth, and capable of carrying a maximum weight of 200 lb.

These pans, when once placed in service on the conveying system, remain in constant use and are not removed except at the end of the conveyor in the stockroom, where, after being emptied, they are transferred by hand to the lower run of the conveyor to move immediately back into the various departments of the plant. In many cases they are loaded with stock to go to assembly operations before being placed on the lower run of the belt. Holders, fitting snugly into the tote pans, are provided for each kind of part to be transported. The workmen remove these holders,

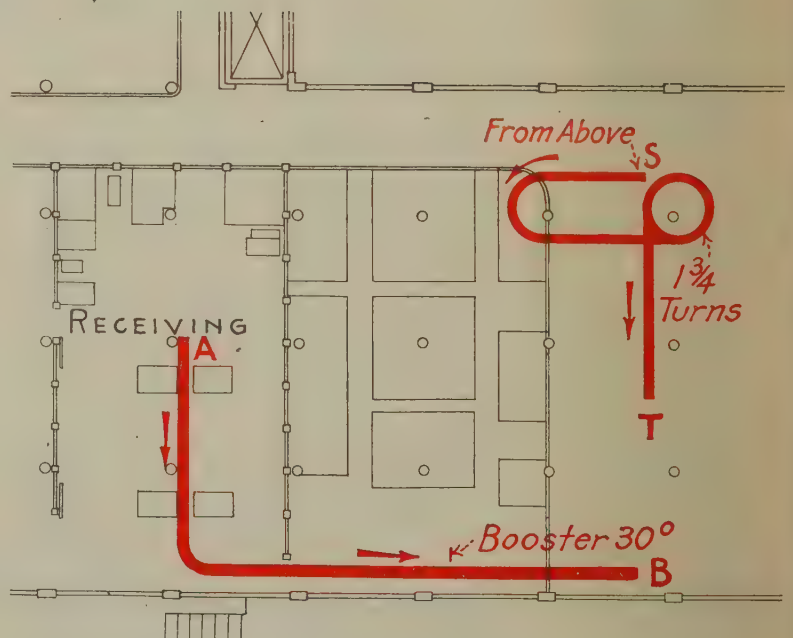
*Resident editor at Cincinnati for THE IRON AGE.

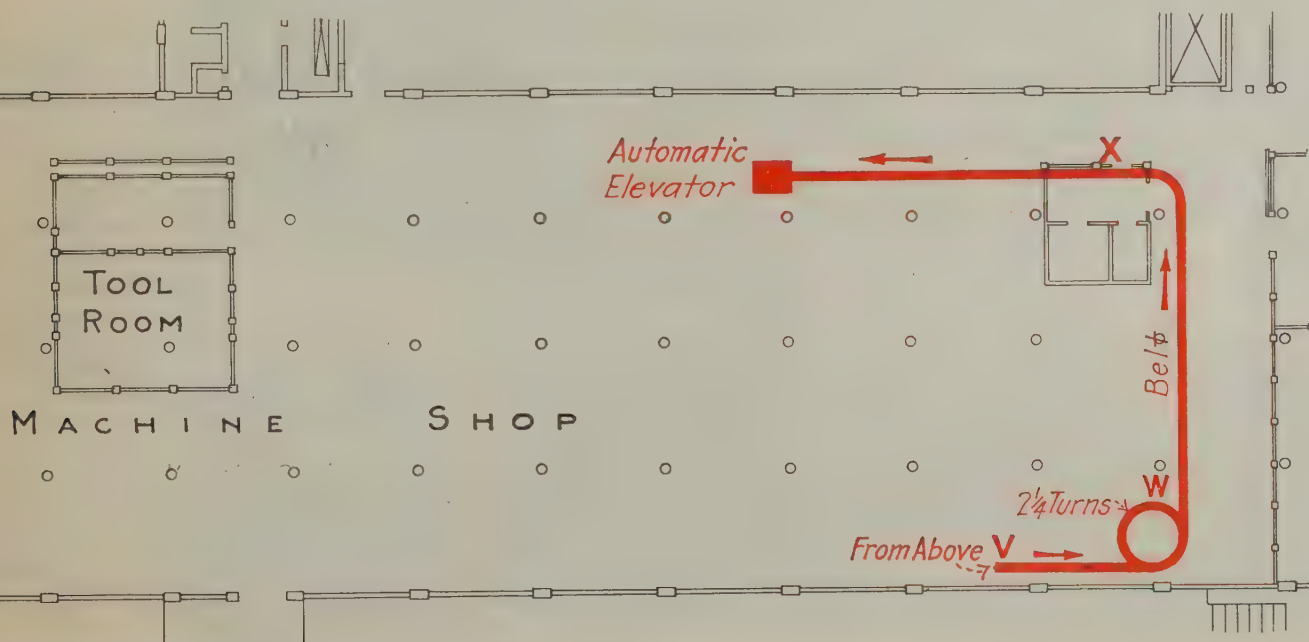
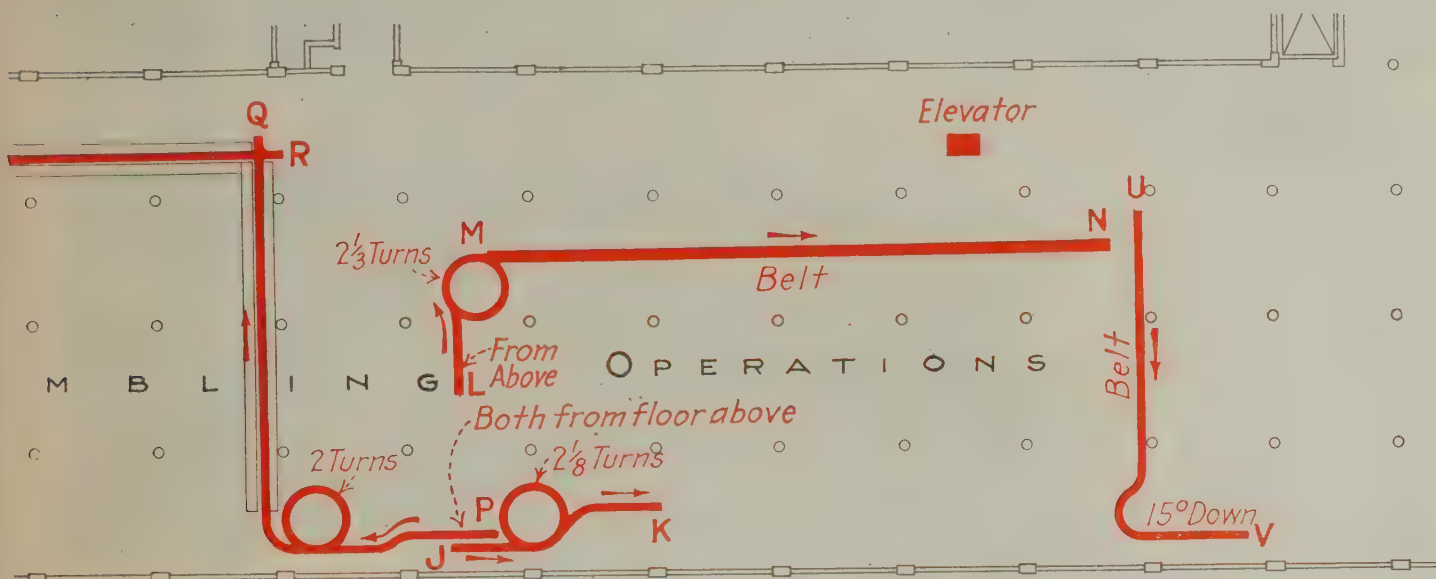
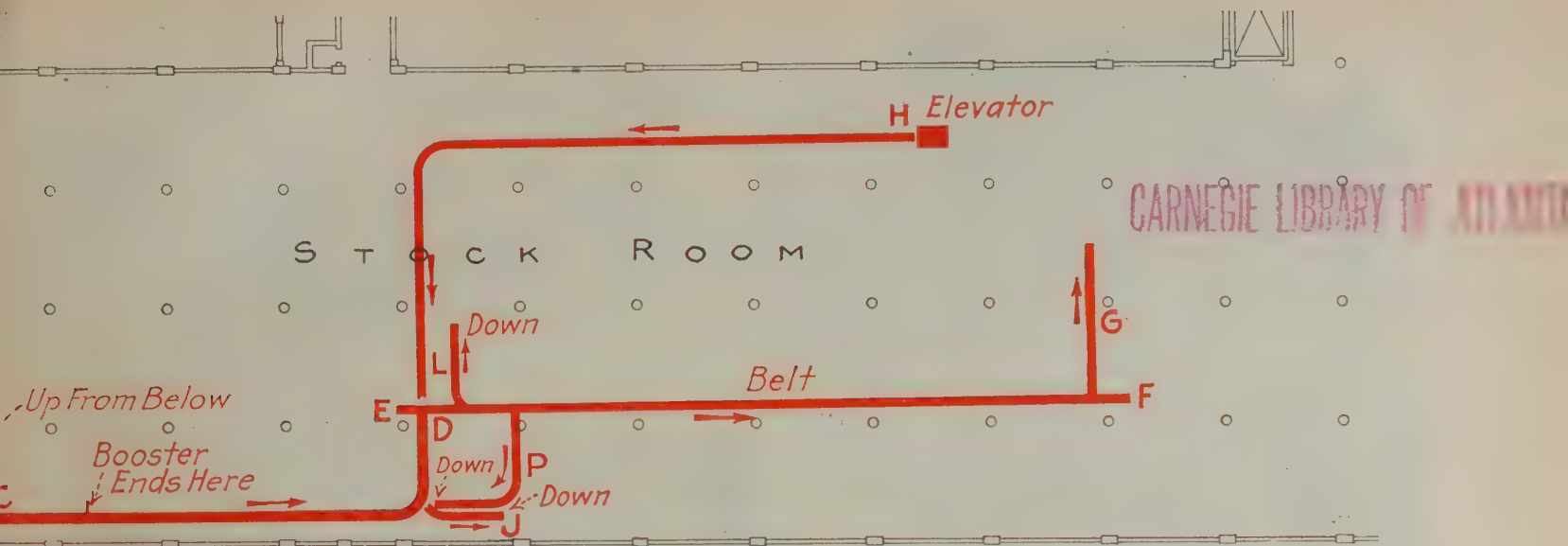
GRAVITY Conveyor Along Left Wall (Third Floor) Receives Tote Pans from Booster from First Floor and Passes Them to Belt Conveyor Through Center of Stockroom (Shown Also in View Below.) Tote pans coming to belt from right are from vertical elevator. Pans returned on lower run of belt are deflected to either side on roller spirals. Man in center is operating deflector

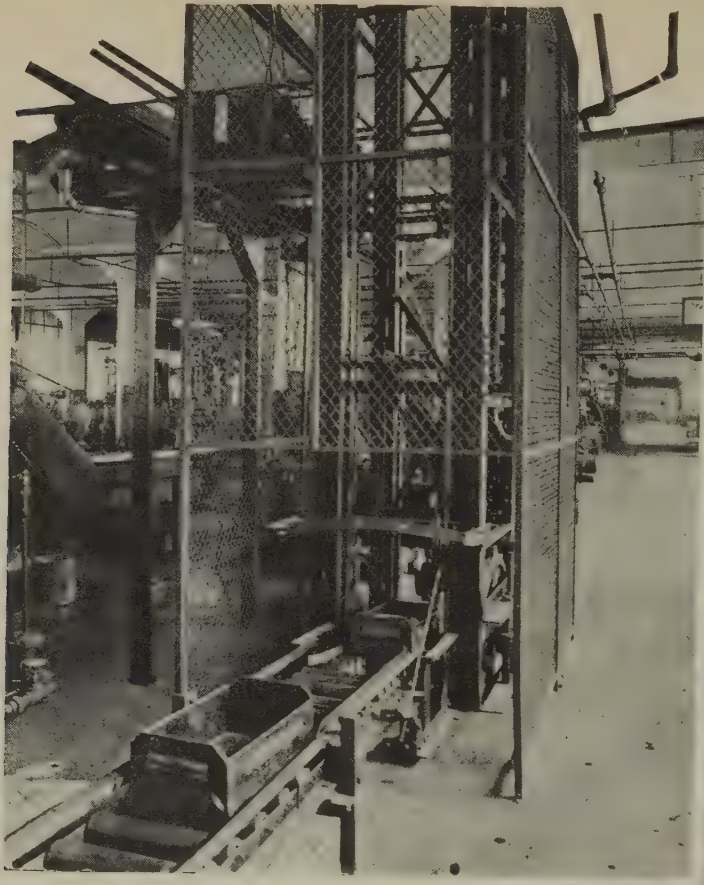


Floor Plans Show Interconnecting Units of System

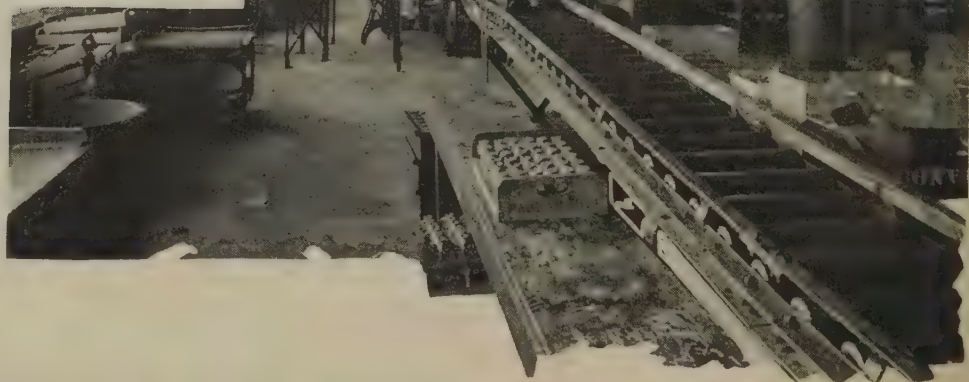
CONVEYORS Connecting the Three Floors Are Shown in Red on the Diagram. The floors are shown one above the other as they occur in the building, the one at top of page being the top floor. Materials, received at left end in lower floor, are placed on conveyor at *A* to go to the stockroom. At *B* they pass up through the floor to the second story on a booster conveyor with 30-deg. grade. This carries them through the second floor (*BC*) and to the third floor where, at *D*, the material is delivered to the belt conveyor *EF*, running lengthwise in the stockroom. A short conveyor *G* facilitates distribution of some of the material. From the stockroom, material going to various departments is placed on the lower run of the belt conveyor *EF* and may be switched off at either *L* or *P*, both of which lead down through the floor at 15-deg. slope into spirals on the second floor, which is the assembly department. What goes over *L* traverses the spiral *M* and is delivered to the belt conveyor *MN*. What goes over *P* traverses the spiral between *P* and *Q* and much of it is delivered on the line *RS*, which at *S* again goes down through the floor at 15-deg. grade to the first floor. Here, after making a loop and a spiral, the conveyor ends at *T* in the machine shop. Another conveyor *UV* in the assembly department takes other material to the other end of the machine shop, going down through the floor at 15-deg. grade at *V*. This traverses another spiral on the first floor, coming out at *W* and then, over a belt conveyor, feeds the line *X*, which leads to the automatic elevator. This elevator carries material up through the three floors, with delivery at each floor. In the stockroom it deposits material on the conveyor at *H*. This conveyor eventually leaves this floor at *J*, going down through the second floor over another spiral and ending up at *K*. All of these spirals are 11 ft. in diameter and of 3 to 3½ ft. pitch and are fitted with rollers, so that gravity carries the material downward in tote boxes



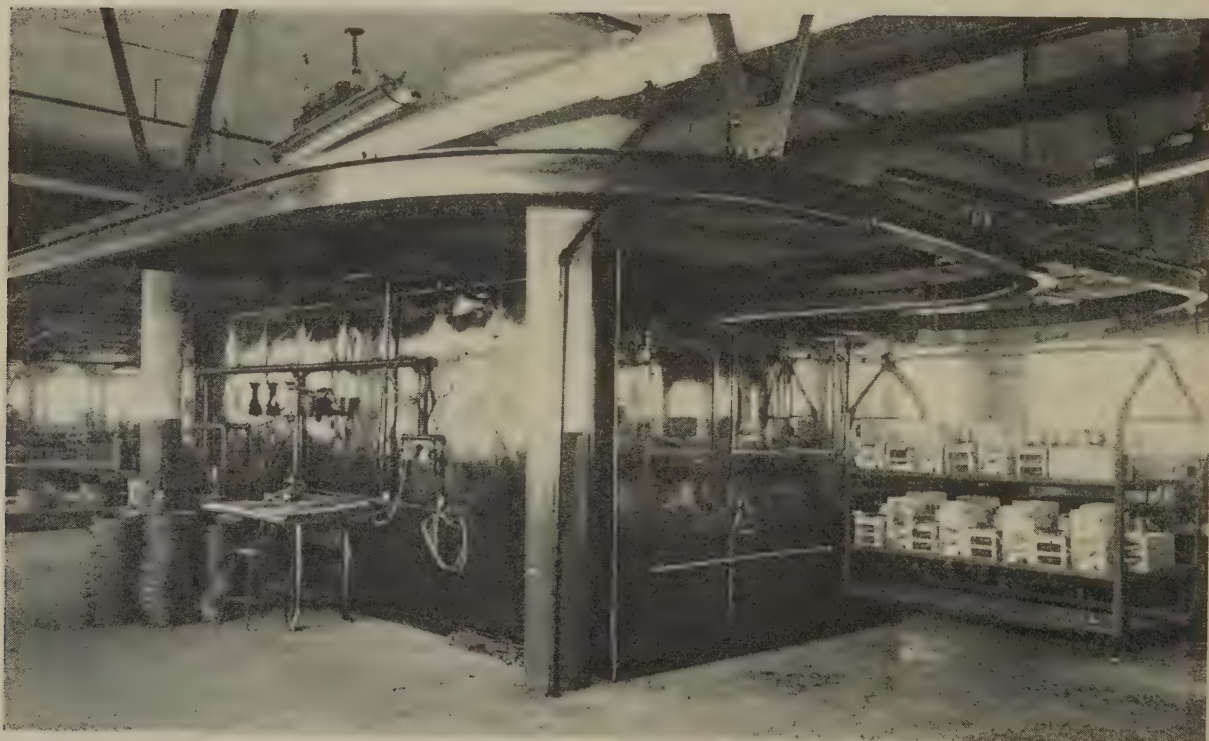




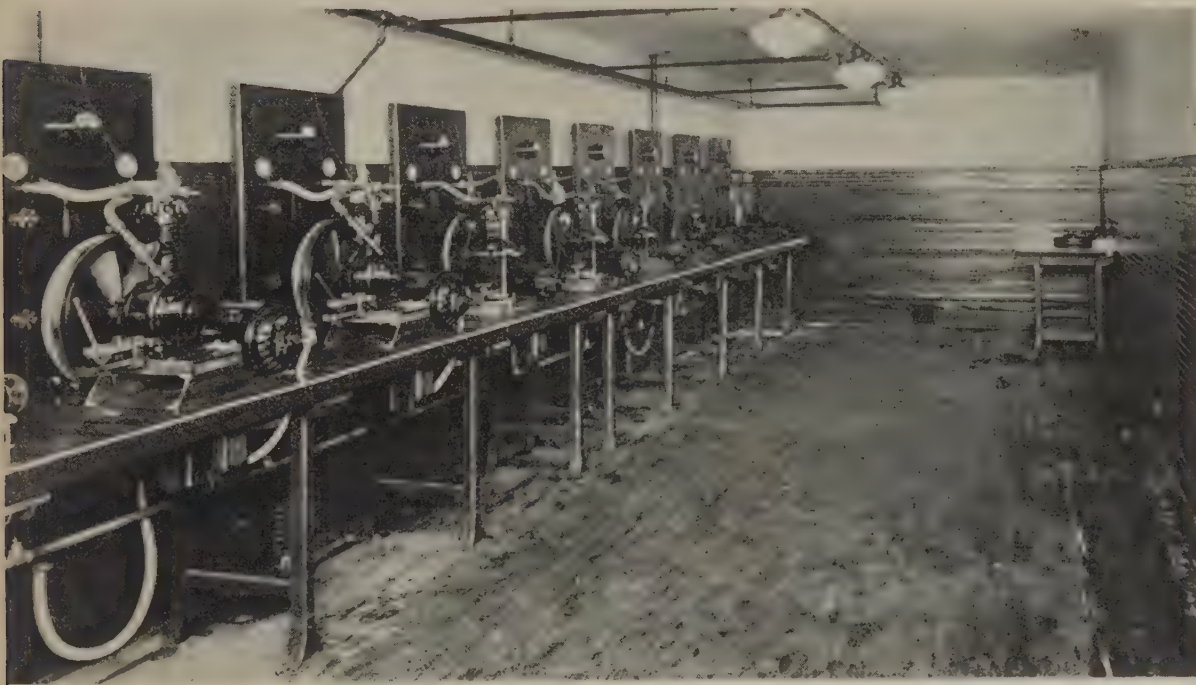
ROLLER Spiral on Second Floor (Below) Receiving from Gravity Conveyor Shown on Lower Left of Photograph at Top of Page 266. Note deflector, switch and switch arm, which are operated from floor above to discharge to gravity conveyor in foreground or to threaded belt. On loading table is shown the form of holder by means of which various parts are shipped in the tote pans



AUTOMATIC Loading Station, on First Floor, of Vertical Elevator (Above) Which Delivers Tote Pans from First-Floor Machine Shop to Third-Floor Stockroom

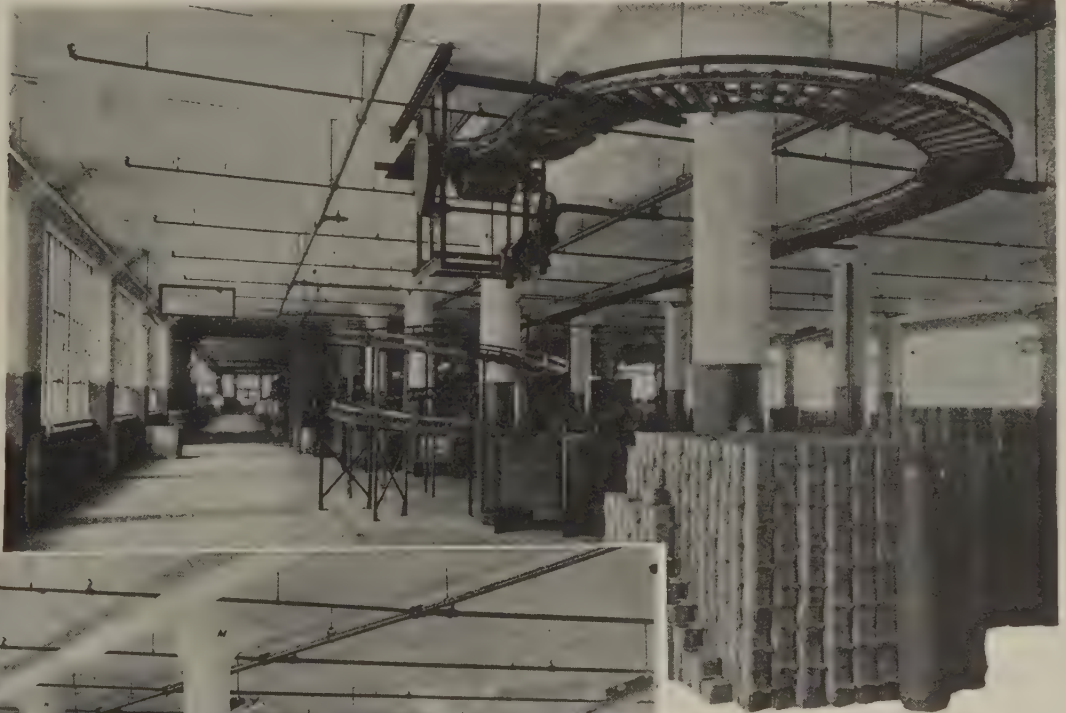


MONORAILS Carry Material Into and Through Dehydrating Ovens, Hanging Trays Being Used for the Reception of the Parts to Be Treated



**"SILENT
Testing"**
of Compress-
sors, Which
Are Carried
Here from
End of Assem-
bly Line by
Means of an
Overhead
Chain Con-
veyor

TAKE-UP End of Belt
(Threaded) Is Shown
at Right Coming Down
from Second Floor and
Delivering to Curve and
Roller Spiral on First
Floor. All spirals are 11
ft. in diameter, with pitch
of 3 to 3½ ft.



TOP Run and (Third
Floor) Discharge of
Vertical Elevator Are
Shown at Left. This grav-
ity roller conveyor deliv-
ers to stockroom belt as
shown at left on lower
photograph on page 266

or racks, from the tote pans, but do not impede the movement of the latter.

Stockroom Control of Tote Pan Movement

ROUTING of the tote pans is regulated chiefly from the stockroom. Material to be delivered from stock to sub-assembly departments is placed in tote pans and sent out from the stockroom on the belt conveyor. This delivers it to spiral gravity conveyors connecting with various belt and gravity conveyors running into the sub-assembly departments. When the tote pans have gone the length of the assembly line to which they are assigned, and have been emptied of their contents, they may be held for use at the inspection point. If they are not needed there they may be returned to the stockroom for rerouting.

Raw stock coming into the plant is carried by means of an inclined conveyor from the receiving department on the first floor to the third floor, where the stockroom is located. The conveyor is equipped with standard pusher bars and runs at a speed of 60 ft. a minute. It delivers the stock, always in tote pans, to a gravity roller conveyor discharging on to a belt conveyor moving down the center of the stockroom. The belt conveyor consists of an upper and a lower run, material moving into the stockroom on the upper run and passing out on the lower.

Assembly work is done principally on the second floor. Material is delivered from the stockroom on the third floor to the belt conveyors along the assembly lines by means of spiral gravity conveyors, and assembled parts are carried to the storage and shipping departments on the first floor in a similar manner. The general plan of having material go from the first to the third floor and thence to the second and again to the first has been followed in laying out production lines in the plant, and the entire conveying system has been designed to conform to and facilitate this arrangement.

Special Arrangements Facilitate Some Operations

IN certain cases provision has been made for special carriers. For example, compressor units, after being painted, are placed on a special carrier suspended from an overhead monorail conveyor running into a continuous-type dehydrating oven. The carrier has three shelves, the bottoms of which are perforated so that material resting on them can dry easily. When the compressors come from the oven they are removed from the carrier and are tested under gas pressure for leaks. They then are charged with oil and are put on an overhead conveyor for delivery to the final assembly department, where they move into the condenser assembly line.

For the silent testing of compressors after assembly a special room has been set aside on the third floor. Compressors are carried there from the end of the assembly line on the second floor by means of an overhead chain conveyor.

Ice cream cabinet condensers are assembled on a continuous roller conveyor, but, on account of their bulk, weight and the peculiar requirements of the assembly operations, they are pushed by hand from one position to another. At the end of the assembly line they are placed on specially designed carriers and are moved on a monorail conveyor into a baking oven. From the oven they are transported on a vertical conveyor to the charging room on the floor below, where they are charged with sulphur dioxide and oil. From this point delivery is made by roller conveyor to the department where the condensers are assembled into the holding cabinets. Still on the roller conveyor, the unit is tested and then is sent to the crating room and to the warehouse for shipment.

Automatic Elevator Takes Machined Parts to Stockroom

MACHINED parts from the machine shop are delivered by means of a gravity roller conveyor on to an automatic pendant-type vertical elevator, to be taken

to the stockroom on the third floor. This stockroom serves for storage of both raw materials and finished parts ready for the assembling operations. The elevator is motor driven, and the loading stations at each floor are cable-controlled and are properly interlocked to prevent jamming the elevator. If the elevator is being loaded at the first floor, for instance, the loading stations on the second and third floors are locked so that no material can be fed on to the elevator.

The elevator, which loads and unloads automatically, is equipped with metal carriers each of which is just large enough to accommodate comfortably one of the tote pans. These carriers are spaced about 8 ft. apart and their speed can be regulated so as to conform to the movement of the tote pans discharging on to them.

Through the machine shop runs a belt conveyor along which parts in process move from one operator to the next. The lower run of the conveyor is used to carry chips from the machine shop, the chips being gathered in the tote pans.

Monorails are employed rather extensively, when they afford better facilities for transportation than roller or belt conveyors. For example, in addition to being used in carrying material into and through dehydrating ovens, monorails bring flywheels from the paint room and radiators from the sub-assemblies to the unit assembly department. Furthermore, a monorail has been erected through the stockroom and through the radiator, condenser coil, evaporator and tank assembly departments.

Considered as a whole, the system, which was designed and installed by the Kelvinator engineers, is comprised of 44 different units, many of which dovetail into each other. It has made possible the movement of materials at whatever speed or in whatever quantities are called for by production schedules, without the necessity of employing a constantly fluctuating number of workmen. The permanent decrease in the amount of man power has been sufficient in itself to account for a large reduction in costs. However, to state that these savings are all that has been accomplished would be omitting mention of the most important results. It has made practicable the economical manufacture of refrigerating units on a mass production basis, an achievement which would have been impossible of attainment were it not for the comprehensive mechanical transportation lines connecting the various operating departments.

Measures Temperature of Welding Flame

At the meeting of the Verein Deutscher Ingenieure, held at Essen, June 9 to 11, Prof. A. Henning described his experiments on the temperature of the oxy-acetylene flame. According to an abstract of the paper published in *Engineering*, the temperature was measured by Kurlbaum's methods, the flame being colored for that purpose with lithium carbonate. The flame was measured at a number of places at different heights above the edge of the burner and at different distances from the vertical axis. The proportions of acetylene and oxygen used were also altered. The maximum temperature, 3100 deg. C., was obtained with the ordinary proportion of 1:1 used in welding blowpipes. The acetylene pressure was 7 lb., and the oxygen pressure 45 lb. per sq. in.

Handling of Personnel

Industrial accidents, factory management, hours of work, fatigue and rest periods, lighting, heating, ventilation and sanitation are discussed in a 48-page mimeographed pamphlet issued by the Library of National Bureau of Casualty and Surety Underwriters, 1 Park Avenue, New York. It was prepared by Mildred B. Pressman and includes a review of general literature on these subjects, and literature on their relation to the questions of safety and production.

Carbon Deposition Near Furnace Top

No More Than a Third Can Come from Volatile Matter in Coke; Remainder Must Come from Blast Furnace Gases Themselves

BY F. C. HOWARD*

IT is generally acknowledged that the manufacture of pig iron is the very basis of the steel and ferrous alloy industries. Therefore any information on the chemical reactions involved is not only of scientific importance but may be of real economic value. A thorough understanding of these reactions is essential for the proper design of blast furnaces, and should be of real benefit to the furnace operator.

Many textbooks and articles speculate as to the reactions taking place and show the complete equations, but fail to take into consideration the steps involved or the rate of reaction and the equilibrium constants. However, there is much valuable data in the literature in which the physical chemistry involved has not been considered. Recent work done by the Bureau of Mines in the Birmingham district is of real interest and significance.

In Technical Papers No. 397 and 391, entitled "Composition of Materials from Various Elevations in an Iron Blast Furnace" and "Iron Blast Furnace Reactions," by S. P. Kinney, P. H. Royster and T. L. Joseph, tests are described which sampled both gases and solids at different levels in the iron blast furnace for a period of many days. The gas analyses represent the average of 1000 tests and should be fairly representative of furnace operation. The results are shown in Table I:

Table I—Gas Analyses at Different Levels in the Blast Furnace

	Height Above Tuyeres	Temp. Deg. C.	Per Cent by Volume			
			CO ₂	CO	H ₂	N ₂
Top Gas.....		168.0	9.9	28.1	2.0	60.0
Plane No. 1.....	60 ft. 4 in.	204.0	10.3	27.0	1.87	60.8
Plane No. 2.....	53 ft. 4 in.	465.5	12.1	26.5	1.69	59.7
Plane No. 3.....	41 ft. 9 in.	745.0	9.0	28.6	1.64	60.7
Plane No. 4.....	19 ft. 3 in.	853.0	1.1	33.6	0.8	64.5
Bosh.....		1350.0	0.0	34.1	0.79	65.1

It should be noted in connection with the above table that the CO content decreases steadily to a point 53 ft. 4 in. above the tuyeres, after which it begins to increase. The CO₂ content is zero at the bosh, increases steadily to the same point and then falls off. It should also be noted that percentages are given by volume, which is equivalent to molecular percentage.

We can assume that the nitrogen comes from the air and goes through the furnace unchanged. That the amount of nitrogen coming into the furnace with the coke is negligible is apparent from the following computations:

- Burden: 2626 lb. coke; 2240 lb. iron; 9695 lb. air.
 Analysis of coke: 0.6 per cent nitrogen; 1.0 per cent volatile.
 Molecular weight air assumed at 29 (79.1 per cent nitrogen).
 Molecular weight nitrogen is 28.
 Mols air in blast = $9695 \div 29 = 334$.
 (a) Mols nitrogen in blast = $334 \times 0.791 = 264$.
 (b) Mols nitrogen in coke = $2626 \times 0.006 \div 28 = 0.56$.
 Proportion (b) to (a) = $0.56 \div 264 = 0.00213$.
 Correction for nitrogen in coke assuming all of it goes to gas
 $60 \times 0.00213 = 0.128$, a negligible correction.

The gas analyses were then recalculated on a basis of 60 mols of nitrogen and the results are shown in the following table:

Table II.—Gas Analyses at Different Levels in Blast Furnace Mols of Gas per 60 Mols N₂

	CO ₂	CO	H ₂	N ₂
Top Gas.....	9.9	28.1	2.0	60.0
Plane No. 1.....	10.2	26.7	1.85	60.0
Plane No. 2.....	12.2	26.6	1.70	60.0
Plane No. 3.....	8.9	28.3	1.62	60.0
Plane No. 4.....	1.0	31.2	0.74	60.0
Bosh.....	0.0	31.4	0.73	60.0

A recalculation of these analyses on the basis of 60 mols of nitrogen shows the total carbon in the gas and is given in Table III.

Table III—Total Carbon in Gas—Mols per 60 Mols N₂

Position	Total Carbon	Position	Total Carbon
Top Gas.....	38.0	Plane No. 3.....	37.2
Plane No. 1.....	36.9	Plane No. 4.....	32.2
Plane No. 2.....	38.8	Bosh.....	31.4

It is of real significance to note that the total carbon in the gas increases steadily from the bosh to Plane No. 2. At Plane No. 1 the total carbon decreases and then increases in the Top Gas. This would seem to indicate that there is a deposition of carbon between Plane No. 1 and Plane No. 2, a fact which was brought out in the oxygen calculations of Technical Paper No. 391, cited above.

A calculation shows that this increase between Plane No. 1 and the top of the furnace cannot be due to carbon coming from the volatile matter. Coke is 1 per cent volatile. Assuming a formula for this volatile matter to be n(CH₂) it is 86 per cent carbon.

$$\begin{aligned} \text{Mols carbon from volatile} &= 2626 \times 0.01 \times 0.86 \div 12 = 1.88. \\ \text{Molecular proportion carbon from volatile to nitrogen} \\ \text{from blast} &= 1.88 \div 264 = 0.0071. \\ \text{Total carbon from volatile per 60 mols N}_2 &= 0.0071 \times 60 = 0.4. \end{aligned}$$

Total carbon in top gas from Table III is 38.0 mols and 36.9 at Plane No. 1, or an increase of 1.1 mols. Compare this with 0.4 mol of carbon which it might have received from the coke as volatile matter.

This work strongly indicates that the deposition of carbon in the top of the blast furnace comes from the blast furnace gases themselves. In this particular case it amounts to 1.9 mols as compared with 0.4 mol that might be deposited from volatile matter in coke, and hence is greater in amount than would be obtained if volatile matter only were decomposed.

The following table shows the total mols of gases per 60 mols of N₂, exclusive of N₂:

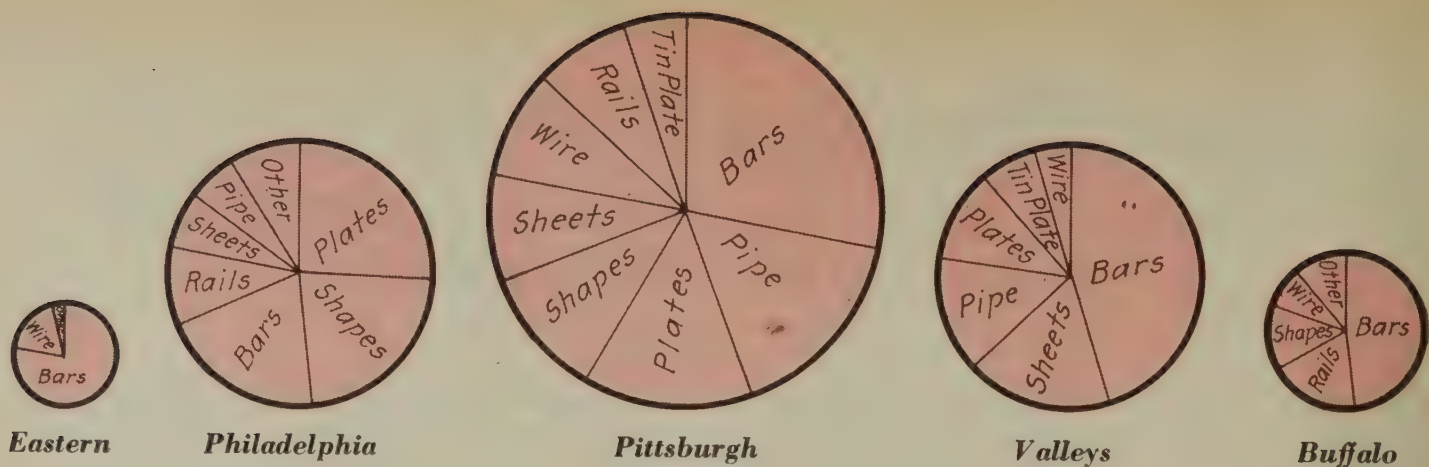
Table IV—Mols of Other Gases per 60 Mols N₂

Position	Total Gas Except N ₂	Position	Total Gas Except N ₂
Top Gas.....	40.0	Plane No. 3.....	38.8
Plane No. 1.....	38.8	Plane No. 4.....	32.9
Plane No. 2.....	40.5	Bosh.....	32.1

It will be noticed that there is an increase from 32.1 to 40.5 mols in the total gases from the bosh to Plane No. 2, then a decrease of 1.7, after which it returns to 40. In other words, the total volume of gases leaving the furnace is not as great as that present in the furnace at Plane No. 2.

There is no apparent reason for a variation of 1.1 mols of carbon in the gases between Plane No. 1 and the top gas (Table III). Either there are reactions involving carbon which we have not considered or the furnace was not running at a uniform rate. Considering the size of the equipment, variation in material, differences in the technique of the operators and other incidentals, the latter presumption may be correct. If such is the case, the use of these data for a qualitative study of the reactions of the blast furnaces are of value, but it would not be so safe to use them for quantitative deductions about the furnace's reactions.

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United States Rolling Mill Capacity

Compilation of Rated Outputs of Leading Forms of
Steel in Each of Twelve Districts
of the Country

THREE years ago last January THE IRON AGE published several pages of tables and a map showing the location and capacity of all of the steel rolling mill units in the country. The tables indicated the subdivision of the rolling capacity for each type of product, showing how much could be produced at each plant in each district under each class of product. The total rolled capacity was there computed, as of Dec. 31, 1922, at 43,157,845 gross tons.

The figures have now been brought up to date. Reference was had to the 1926 directory of the American Iron and Steel Institute—the latest comprehensive publication of that character, and, in addition, verification or correction was made by more than 200 companies for the individual figures appertaining to those companies.

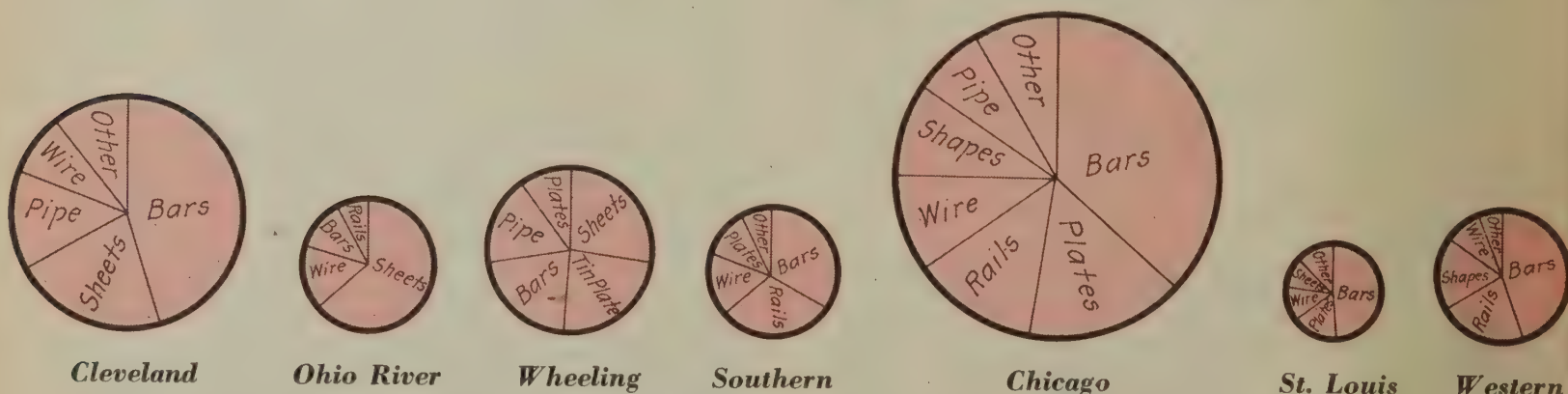
Representing as nearly as possible the situation on Jan. 1, 1928, the tables and diagrams shown herewith indicate the capacity of various districts and how those districts are equipped to various forms of steel. The total capacity appears to be 52,196,000 tons, or 21 per cent greater than five years earlier. The districts, somewhat loosely drawn, are shown on the map.

One of our diagrams shows the relative capacity of the different districts in the production of nine specific, leading items. Each circle has an area proportioned to the others in the ratio of the tonnage capacity of the different prod-

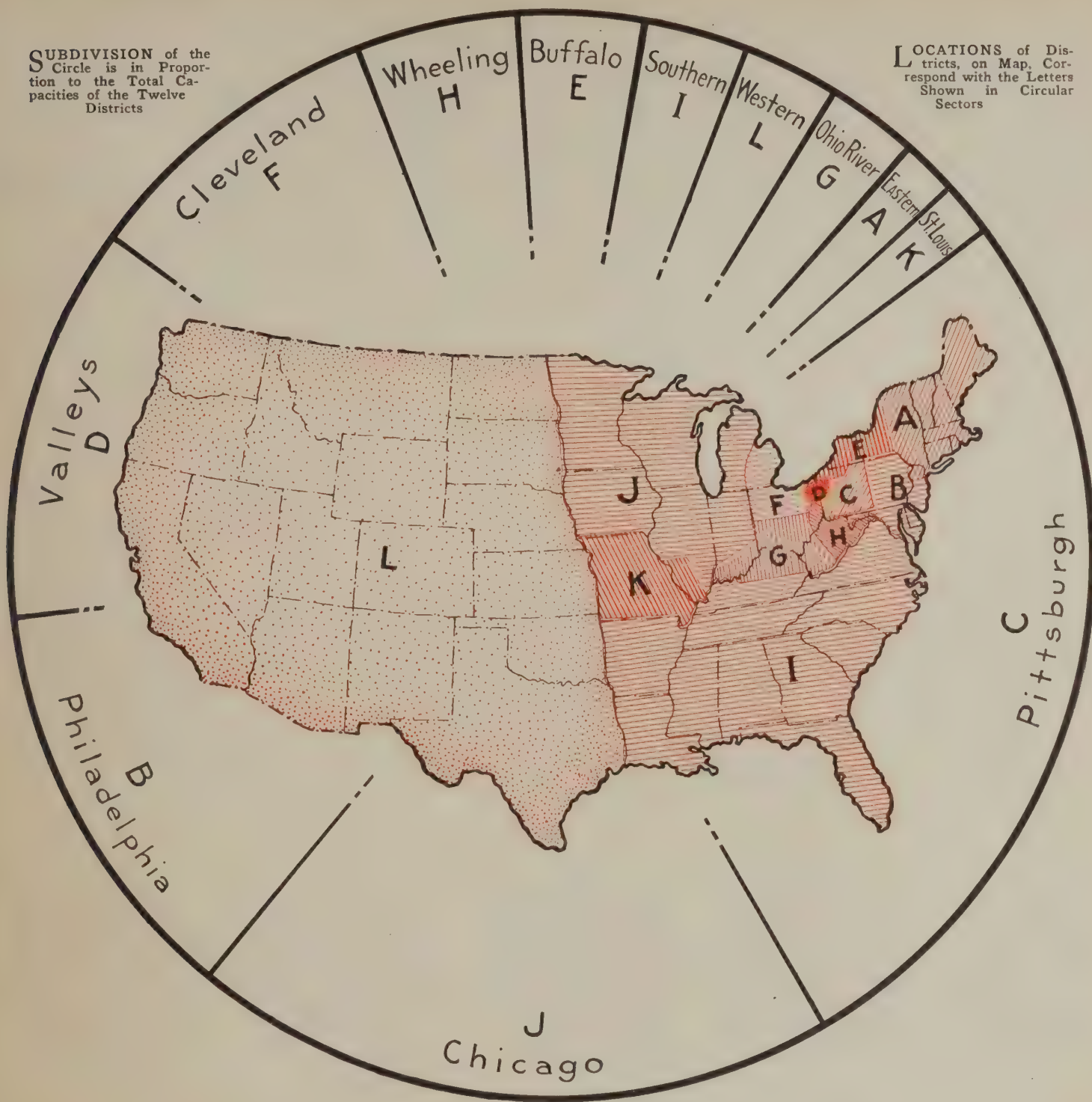
ucts. Except for rails, in which Chicago leads, the Pittsburgh district is the dominating influence in each product. Pittsburgh's share varies from 20½ per cent of the aggregate in sheets to 44 per cent of the tubular products. The Pittsburgh district has 26.9 per cent of the total capacity. Chicago's lead in rails is represented by 30.3 per cent of the total, against Pittsburgh's 23.4 per cent.

Another diagram shows the subdivision of the capacity of each district into the leading items of product. In most of the districts bars furnish the principal item. This reaches nearly 76 per cent in the small Eastern district, but drops to below 12 per cent in the Ohio River district. Plates take the lead in the Philadelphia district, while sheets in both the Wheeling and the Ohio River districts are ahead of all other products. In the latter, in particular, sheets account for more than 65 per cent of the total. Considering sheets and tin plate together, more than half of the total capacity of the Wheeling district is thus covered. Here, as in the other diagram, the area of each circle bears the same proportion to the other circles as the capacities of the respective districts.

While the total capacity for finished rolled product is placed at 52,196,000 tons, an increase of 21 per cent over the capacity at the end of 1922, no such increase has been made in the ingot production capacity of these plants. This is reported in the present table at 59,973,000 tons, against



Principal Products of Each District Are Shown at Top and Bottom of Page. Areas of circles are proportional to total capacity, district by district



ANNUAL CAPACITY OF FINISHED ROLLED IRON AND STEEL IN THE UNITED STATES ON JAN. 1, 1928, SUBDIVIDED INTO TWELVE PRODUCING DISTRICTS

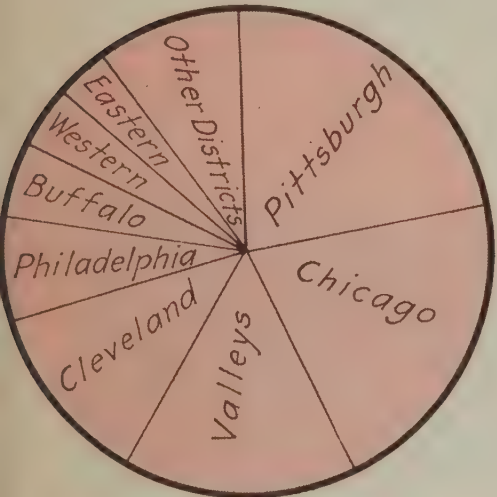
SUBDIVISION OF FINISHED ROLLED PRODUCT
(Thousands of Gross Tons)

Districts	No. of Plants	Total Ingots	Total Finished Rolled Product	Rails	Sheared and Universal Plates	Structural Shapes	Merchant Bars, Bands, Hoops, Etc.	Sheets and Light Plates	Black Plate for Tinning	Tubular Products (Incl. Seamless Tubes)	Wire Rods	Plain Wire (Net Tons)
A—Eastern	29	547	828	...	...	4	628	...	...	30	166	213
B—Philadelphia	58	7,148	6,382	588	1,655	1,458	1,334	426	182	386	355	344
C—Pittsburgh	76	15,201	14,044	1,058	1,840	1,532	3,879	1,317	697	2,418	1,305	1,216
D—Valleys	30	7,624	6,067	...	645	...	2,722	1,089	471	870	270	236
E—Buffalo	18	2,678	1,983	400	100	250	926	130	...	...	177	100
F—Cleveland	31	6,136	4,819	207	255	...	2,165	1,036	65	633	458	481
G—Ohio River	16	1,898	1,462	111	...	...	172	959	...	...	220	210
H—Wheeling	30	3,308	2,530	...	260	...	539	696	608	427	...	...
I—Southern	14	1,797	1,584	433	198	48	566	91	...	...	248	290
J—Chicago	48	11,281	10,126	1,373	1,566	914	3,730	531	272	738	1,002	1,038
K—St. Louis	9	740	814	...	128	38	395	86	67	...	100	...
L—Western	12	1,615	1,557	360	5	245	717	66	...	...	164	187
Total	371	59,973	52,196	4,530	6,652	4,489	17,773	6,427	2,362	5,502	4,465	4,315

WHAT MAKES UP THE STEEL OUTPUT OF EACH DISTRICT

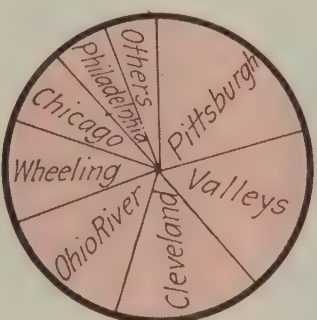
District	Total Finished Rolled Product	Rails	Sheared and Universal Plates	Structural Shapes	Merchant Bars, Bands, Hoops, Etc.	Sheets and Light Plates	Black Plate for Tinning	Tubular Products (Incl. Seamless Tubes)	Wire Rods
Percentage of District Total in Each Product									
A—Eastern	100.0	....	....	0.5	75.8	....	....	3.6	20.1
B—Philadelphia	100.0	9.2	25.9	22.8	20.9	6.7	2.9	6.0	5.6
C—Pittsburgh	100.0	7.5	13.1	10.9	27.6	9.4	5.0	17.2	9.3
D—Valleys	100.0	....	10.6	....	44.9	17.9	7.8	14.3	4.5
E—Buffalo	100.0	20.2	5.0	12.6	46.7	6.6	....	....	8.9
F—Cleveland	100.0	4.3	5.3	....	44.9	21.5	1.4	13.1	9.5
G—Ohio River	100.0	7.6	....	....	11.8	65.6	....	....	15.0
H—Wheeling	100.0	....	10.3	....	21.3	27.5	24.0	16.9	....
I—Southern	100.0	27.3	12.5	3.0	35.7	5.8	....	....	15.7
J—Chicago	100.0	13.6	15.5	9.0	36.8	5.2	2.7	7.3	9.9
K—St. Louis	100.0	....	15.7	4.6	48.6	10.6	8.2	....	12.3
L—Western	100.0	23.1	0.3	15.7	46.1	4.3	....	....	10.5

Bars



Showing Contributions of Districts to Total Capacity in Nine Products

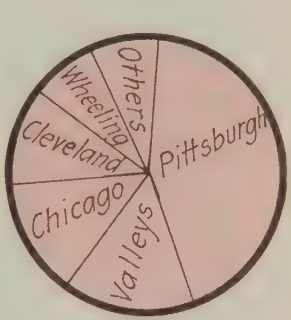
Sheets



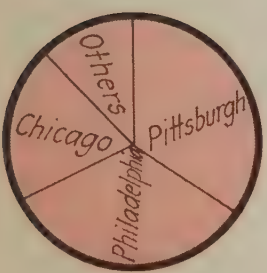
Plates



Pipe



Shapes



Rails



Drawn Wire



Wire Rods



Tin Plate



HOW MUCH OF EACH FORM OF STEEL IS MADE IN EACH DISTRICT

District	Total Ingots	Total Finished Rolled Product	Rails	Sheared and Universal Plates	Structural Shapes	Merchant Bars, Bands, Hoops, Etc.	Sheets and Light Plates	Black Plate for Tinning	Tubular Products (Incl. Seamless Tubes)	Wire Rods	Plain Wire (Net Tons)
Percentage of Each District to the Total United States											
A—Eastern	0.91	1.59	....	....	0.09	3.53	....	....	0.54	3.72	4.93
B—Philadelphia	11.92	12.23	12.97	24.88	32.47	7.50	6.63	7.71	7.01	7.95	7.97
C—Pittsburgh	25.35	26.91	23.86	27.66	34.13	21.82	20.49	29.49	43.95	29.22	28.18
D—Valleys	12.71	11.62	....	9.70	....	15.32	16.95	19.94	15.81	6.05	5.47
E—Buffalo	4.47	3.80	8.83	1.50	5.57	5.21	2.02	....	....	3.96	2.33
F—Cleveland	10.23	9.23	4.57	3.83	....	12.18	16.12	2.75	11.51	10.26	11.15
G—Ohio River	3.16	2.80	2.45	....	....	0.97	14.92	....	....	4.93	4.87
H—Wheeling	5.52	4.85	....	3.91	....	3.03	10.83	25.75	7.76	....	....
I—Southern	3.00	3.04	9.56	2.98	1.07	3.19	1.42	....	....	5.56	6.72
J—Chicago	18.81	19.39	30.31	23.54	20.37	20.99	8.25	11.52	13.42	22.44	24.05
K—St. Louis	1.23	1.56	....	1.92	0.84	2.23	1.34	2.84	....	2.24	....
L—Western	2.69	2.98	7.95	0.08	5.46	4.03	1.03	....	....	3.67	4.33
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

55,522,000 tons for five years ago. The increase in ingot capacity has been thus only 8 per cent.

Figuring the ratio between rolled steel production and ingot production at 74 per cent, which is about the yield of finished steel which ingots have been producing in the past few years, the ingot capacity reported has called for a finished steel capacity of about 44,400,000 tons. The rolling capacity reported, however, is in excess of that amount by 17½ per cent.

This follows natural conditions, inasmuch as requirements vary from year to year, and rolling mill capacity always has to be in excess in the total of the probable requirements. Rail mills are thoroughly busy only a small portion of the year, and for the most part are not used for other products; similarly with other types of mills which are suited to only a narrow range of output. It happens, how-

ever, that the finished rolled capacity today is considerably further above the 74 per cent ratio to ingots than was the case five years ago. Evidently the several forms of steel made in a given plant are not likely to be simultaneously in full demand. Using the capacity figures given and the production figures for the various items as reported in *THE IRON AGE* of May 17, page 1401, we find that capacity was used in 1927 about in the following average proportions:

Rail making capacity at 62 per cent.

Plate mill capacity at 56 per cent.

Structural shapes at 83 per cent.

Merchant bars, etc., at 32 per cent.

Sheets at 62 per cent.

Tin plate at 81½ per cent.

Tubular products at 72½ per cent.

Wire products at 62 per cent.

Blowing Materials into Blast Furnace

German Experiments with Ore and Fuel Additions to Hearth Through Tuyeres—Problems Far from Solved

BLOWING ore and fuel into the hearth of the blast furnace was discussed in an interesting article in *Stahl und Eisen*. It was contributed by E. Bertram of the Halberger plant at Brebach-Saar, Germany, and gives a brief account of tests carried out at that plant since 1917.

Blowing in Dust Through Tuyeres

Tests were first made covering the use of flue dust. An arrangement was worked out by which flue dust could be taken from one of the large dust catchers and introduced into a pipe leading into the tuyeres. Details of the arrangement are not given. With good operation, the blast carried the flue dust smoothly into the furnace without producing dirty tuyeres. Also the dust production of the furnace did not increase even after long blowing.

From the first test it was observed that the dust exerted a cooling effect. If the furnace operation remained unchanged, it was not possible to produce No. 3 foundry iron, completely saturated with carbon. A partially saturated iron was made that was used directly for castings. As the chemical composition, otherwise, was hardly changed, the reason is probably to be sought in a change in the physical constitution.

Further it was noticed that, with the blowing in of large amounts of dust and with even furnace operation, the quality of the iron was not so good. The explanation is that an undesired lowering of hearth temperature is brought about. This can be avoided only by an increase of coke in the charge. Under the conditions at the Halberger plant, calculations based on tests showed that the blowing in of dust is economical, compared with briquetting, only when not more than 30.5 lb. of coke per ton of pig iron has to be added to the charge.

The process is economical only when the furnace is working with a great excess of temperature which has to be equalized with cold air additions to the blast. Whether it is to be recommended for the production of pig iron for steel making is to be doubted, as the reduction of manganese and other reactions will, without doubt, be influenced unfavorably.

The blowing in of fuels is much more difficult to carry out. After many failures a screw-feed was worked out that carried the material uniformly to the tuyeres and now from 10 to 50 per cent of the coke charge can be blown in as fuel additions. Tests showed that coal mud, raw coal, coke

dust and small coke cannot be used, at least so long as they are introduced into the chief blast main. In comparison with the effect produced by putting blast from a hot stove on to a cold working furnace, that produced by blowing in dry coke dust is sadly wanting. What is needed in such a case is not more fuel, but higher temperature. Blowing in cold fuel lowers the temperature. So long as oxygen is not mixed with the air nor the fuel preheated, this will always be the case.

The tests at the Brebacher plant have shown that the hope is unfortunately only a dream that, when a feeding arrangement of fuel to the hearth was worked out, a blast furnace would operate like a machine. Also the blowing in of cheaply made producer gas above the tuyere level appears to be an untenable practice. There remains only the hope that flue dust and fuel can be blown into the shaft of the furnace. In this way the cost of briquetting will be saved and the material will be preheated when brought into the hearth. However, the necessary arrangements cost money and the heat balance of the furnace requires that, with a large amount of flue dust addition, a corresponding increase of coke be made to the charge.

Results Summarized

The author's summary is that the blowing in of ore or flue dust gives rise to no difficulties with a blast furnace working under low pressure. It is not a suitable practice for the production of high-quality foundry iron or irons high in manganese, and is economical only if one is running with the object of producing gas or if considerable cold blast has to be used to equalize temperature.

Blowing in fuel gives rise to operating difficulties. Tests and theory show that the process is unworkable so long as fuel is introduced into the main blast line. There still remains the possibility of working out improved methods of introducing fuel to the furnace hearth. G. B. W.

"Getting Facts About Accidents," the second of a series of publications issued by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York, outlines current industrial practice in obtaining and using accident facts as a means of promoting plant safety. Accident forms are provided, which have been found helpful in recording the necessary facts and making them available for study.

Economies in Automatic Welding

Lowest Costs Require a Rapidly Melting Electrode of Proper
Size and Correct Balance Between Current Input
and Speed of Welding Head

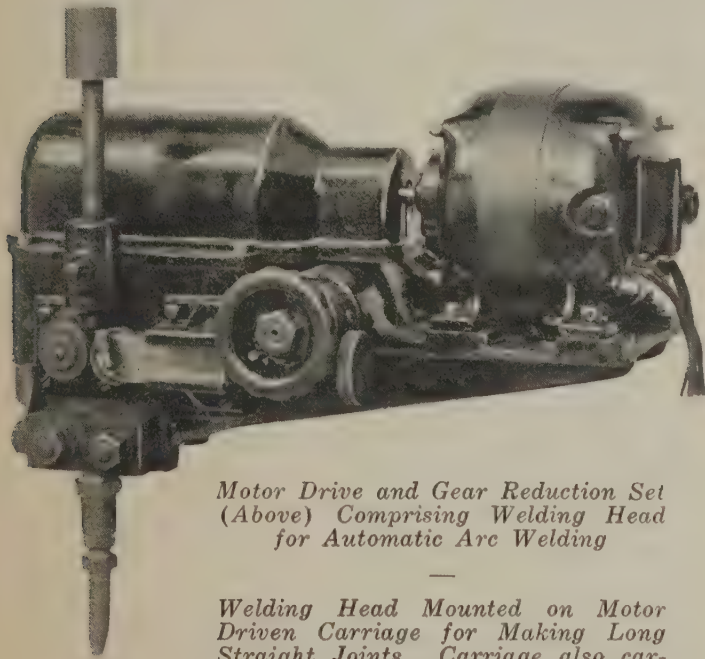
BY M. W. BREWSTER*

HAVING adopted welding as a cheaper or more satisfactory process than others, the next question is, "How can welding operations be speeded up to obtain the maximum output at a minimum cost?" Naturally, quality must not suffer. In the following discussion, the principal variables affecting operating costs will be considered.

It will be assumed that (1) handling charges have been

and measure the welding variables when their regulation is automatically controlled. The principles discussed, however, are equally applicable to hand welding operation. It is interesting to note that the automatic welding machine originated as a piece of research apparatus for studying certain aspects of hand welding.

A bead on a flat plate was used because it eliminated other variables such as joint preparation, backing up, and



*Motor Drive and Gear Reduction Set
(Above) Comprising Welding Head
for Automatic Arc Welding*

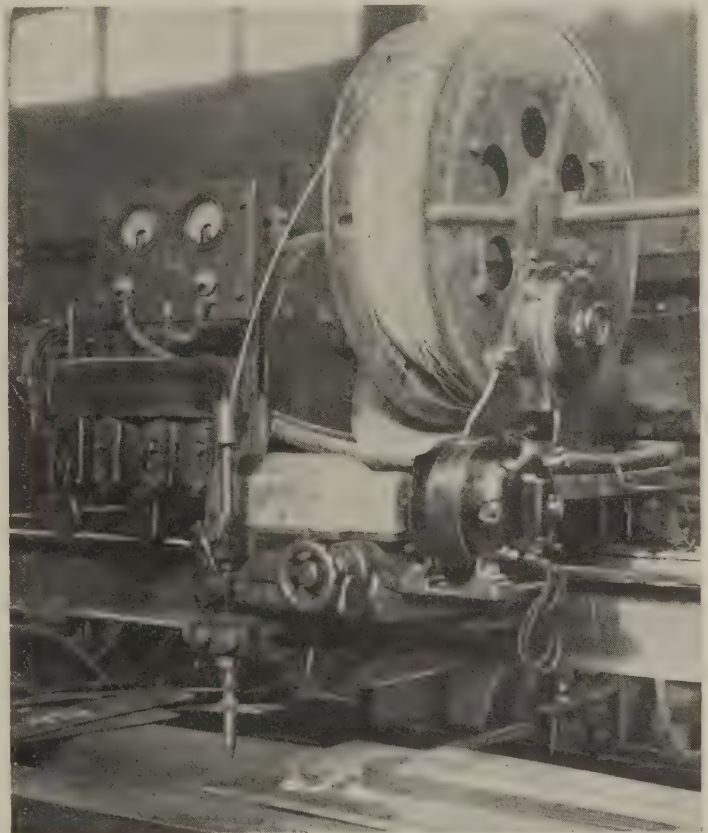
*Welding Head Mounted on Motor
Driven Carriage for Making Long
Straight Joints. Carriage also carries
reel of welding wire, current
control, and indicating meters*

reduced to a minimum, (2) the clamps or other fixtures used for holding or moving the product while it is being welded are correctly designed, (3) if the welds can be backed up, it has been effectively done, (4) disturbing magnetic influences have been reduced to a minimum, (5) the material to be welded is flange quality steel and (6) the joints are properly assembled and, if necessary, beveled on the edges. These are either plant layout or machine design problems. Our investigation is confined to a study of reducing welding costs by a proper balance of welding conditions only.

The following motions, materials and conditions remain to be considered:

1. The rate of electrode feed.
2. The rate of travel along the weld.
3. The kind or type of electrode.
4. The diameter of the electrode.
5. The value of welding current.
6. The voltage across the arc.

In order to determine the optimum conditions, the rate at which a satisfactory bead can be laid on a flat steel plate, as affected by the above variables, was studied. An arc welding machine was used because it is easier to control



the need for giving special attention to magnetic disturbances. It is not assumed that a bead on a flat plate is equivalent to a weld in a joint, but regardless of whether a joint or bead is considered, if by raising the current increased speed can be employed, there will be a saving in welding cost. Likewise changes in electrode diameter and type of electrode may effect savings in welding. The object being as stated above, the use of a bead on a flat plate is preferable to some arbitrarily selected type of joint because fewer welding variables are involved.

The physical dimensions of a bead made with No. 1 wire, $\frac{1}{8}$ -in. diameter, using 190 amp. and a travel speed of 15 in. per min. was arbitrarily selected as a standard. This bead possessed the qualities generally required of satisfactorily deposited weld metal. Good appearance, adequate penetration and absence of noticeable porosity were considered sufficient evidence of a "satisfactory" bead. The limits of current and speed were considered as reached when any one of these suffered. Practically all the inspection was made without destroying the bead because it is believed that a

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familiar type of weld or bead can be adequately judged without doing so, the same as the probable soundness of riveted joint can be determined without testing it to destruction.

Rate of Electrode Feed

If the motion of a hand arc welding operator is analyzed, it may be divided into travels in two directions: (a) along the direction of the weld, and (b) down toward the work in order to hold the arc length constant as the electrode is consumed. In automatic welding the second motion—that of feeding the electrode downward as it is consumed—is obtained by a wire-feeding device, easy to vary and capable of fine adjustment, called a welding head. The wire feed down through the vertical tubes, shown in the accompanying reproductions of photographs, is easily adjustable over a wide range by proper rotation of the two rollers with milled edges. Control is so devised that practically any predetermined voltage used in metallic arc welding can be held.

The rate of electrode feed depends primarily upon welding current and the melting rate of the electrode. This melting rate has an important effect on the ultimate speed at which a good weld can be obtained and will be considered further.

Rate of Travel Along the Weld

The travel along the weld may be obtained either by moving the work past the welding head or by mounting the welding head on a carriage that moves the head along the work in the direction of the weld. On a standard travel carriage, such as that shown, speed may be varied from 3½ to 80 in. per min.

It is desirable to observe certain important welding conditions. Too much emphasis cannot be placed on an even, smooth travel when working at the highest possible speed. To this end, final reduction of the movement should be through a worm gear. A small disturbance in any one of the welding conditions will result in a slower ultimate welding speed. Needless to say this travel movement should be easy to vary in small steps over and above the probable welding range. Uneven, jerky travel is particularly objectionable.

Melting Rate of Electrode

Of the many kinds of electrodes available, it is impossible to class any as definitely good or bad because of the lack of a standard for comparison. Some are good for one job, some for another. The proper plan is to select the one best suited for the particular job.

The first consideration, not only of the electrode problem in particular but of any welding job, is the qualities desired at the joint. The relative importance of strength, ductility and resistance to leakage or corrosion should be carefully considered. Other items that should be given attention are the design of the joint, the heat treatment, if any, and whether the joint is to be machined or ground.

In order to bring out another item often neglected, let it be assumed that several electrodes give welds that meet the conditions desired. Then select the one that will do the job at the highest speed. This depends not only on the electrode diameter and the welding current, but also on the melting rate of the electrode. Consideration of this factor is often neglected.

That the melting rate of the electrode differs may be seen from the curves in the accompanying chart, determined by making a satisfactory bead on a flat plate, as described. The diameters of the electrodes are identical and the metal of the two welding wires is of the same analysis. The electrodes differ in the fluxes used and the method of combining them with the electrode. The melting rate averages about 40 per cent less for No. I wire than for No. II. Similar results have also been obtained with one or two other types of electrodes.

Melting rate curves are seldom available to the shop foreman. It will be interesting to consider a case where these curves were not at hand. It was found that with 190 amp., ⅛-in. diameter electrode, and travel speed of 15 in. per min., a satisfactory bead could be obtained with No. I electrode, the wire feed being 14 in. per min. With No. II wire, and the same conditions otherwise, the wire feed was found to be 26 in. per min., indicating that the second electrode had 46 per cent greater melting rate. The bead made with the second type wire looked a little heavier but the apparent difference was slight.

The next step was to increase the current and travel speed on each type of wire until a limit was reached. With the first type of wire, the limiting condition for the kind of bead desired was 240 amp. at a travel speed of 18 in. per min.; with the wire with the higher melting rate, the limiting condition was 265 amp. and 24 in. per min. travel. It will be seen that the travel speed along the line of weld was 25 per cent faster when the electrode with the higher melting rate was used.

It is obvious from the example cited that, other conditions being equal, the melting rate is an important factor in speeding up production.

Larger Electrodes for Poorly Fitting Joints

In automatic welding, a ⅛-in. electrode is seldom used with a welding current over 200 amp.; hence in the above work a 3/16-in. electrode of the same type was tried using the same welding conditions as employed with ⅛-in. wire; namely, welding current 265 amp., and travel speed 24 in. per min. The electrode consumption with ⅛-in. wire was 44 in. per min., which, with a welding speed of 24 in. per min., gives a deposition of electrode of 0.076 lb. per ft. of weld. With 3/16-in. wire the electrode feed was 16 in. per min., which, with a welding speed of 24 in. per min., gives a consumption of 0.061 lb. of electrode per ft. of weld. These data illustrate that when the work consists of making a weld in abutting plates, and not laying down the

Tabulated Welding Conditions and Costs for Beads on a Flat Plate of Mild Steel

Comparison Group	Type of Electrode	Electrode Diam., Inches	Welding Current in Amperes	Travel Speed, In. per Min.	Electrode Consumption		Electrode per Lb. at \$0.09	Energy at \$0.02 per kw.hr.	Costs in Dollars per Foot of Bead			Total Cost at Following Hourly Labor Cost		
					In. per Min.	Lb. per Foot			Labor at Hourly Cost of			Total Cost at Following Hourly Labor Cost		
									\$0.50	\$0.70	\$0.90	\$0.50	\$0.70	\$0.90
Comparison of melting rates														
A	I	1/8	190	15	14	0.038	0.0035	0.005	0.034	0.047	0.061	0.043	0.056	0.070
	II	1/8	190	15	26	0.070	0.009	0.005	0.034	0.047	0.061	0.048	0.062	0.075
Determination of maximum speed for each type of electrode and its effect on cost														
B	I	1/8	240	18	20	0.044	0.0035	0.0057	0.029	0.04	0.051	0.038	0.049	0.060
	II	1/8	265	24	44	0.076	0.0068	0.0044	0.021	0.03	0.039	0.032	0.041	0.050
Effect of increase in wire size when excess current is used on smaller size														
C	II	1/8	265	24	44	0.076	0.0068	0.0044	0.021	0.03	0.039	0.032	0.041	0.050
	II	1/8	265	24	16	0.061	0.0055	0.0044	0.021	0.03	0.039	0.031	0.040	0.049
Effect of increase of current on speed and cost														
D	II	3/8	265	24	16	0.061	0.0055	0.0044	0.021	0.03	0.039	0.031	0.040	0.049
	II	3/8	320	31	22	0.066	0.006	0.0039	0.016	0.023	0.030	0.027	0.033	0.040

maximum amount of metal, it may be advantageous to increase the size of electrode because less electrode material is removed from the larger diameter wire at a given current and travel speed.

There are, of course, other factors equally important to be considered with reference to electrode diameter. Larger diameter electrodes permit heavier currents which tend to increase the speed. The type of joint also has a share in determining the electrode diameter. Poor fitting joints are uneconomical for welding when tight fitting joints can be made. In some few applications, however, it happens that the saving in welding cost does not justify the extra joint preparation to secure an altogether suitable fit. Small diameter wire, of course, can be used for a large bead, but will result in slower welding speed and very often a poorer quality of weld metal. In such applications where a considerable opening has to be filled or spanned by the weld it is generally found that the larger the diameter wire that can be used, the more satisfactory the finished product will be.

It is clearly shown in the chart that the melting rate of the electrode increases as the current is increased. This makes a given type of bead at a higher speed. It has also been shown that there may be a saving in electrode consumption by changing from a 1/8-in. to a 3/16-in. electrode, the welding current remaining the same. It will be shown later that an increased welding current resulted in a slightly higher electrode cost, but a decrease in the labor and power cost per foot of weld.

Voltage Across the Arc

The arc voltage is usually a measure of the length of the arc; the longer the arc the higher the voltage for any given type of electrode of a specified diameter. It is generally agreed that, although the proper arc length will not alone insure a good weld, a long arc generally results in a poor weld. With a short arc there is a greater heat concentration. With bare electrodes the long arc is more unstable than the short arc; the greater the arc length the more opportunity for the absorption of oxygen and nitrogen by the weld metal. This absorption is detrimental to the quality of the weld.

Because of the better control of conditions possible with the automatic arc welding machine, stable conditions can be obtained with longer or shorter arcs than can be held by the average hand welder. With all other conditions except the arc voltage at the same value, it will be found that a short arc makes a narrower bead with a higher crown and a sharper curvature. As the arc length is increased, the bead widens out and flattens down until either the arc becomes unstable or the quality of the bead suffers from excess absorption of gases from the atmosphere. Whether a limit is first reached to the flatness of the bead or to the quality of weld metal is dependent, to a large extent, on the type of electrode used—highly fluxed electrodes generally permit the use of higher arc voltages.

Calculation of Costs

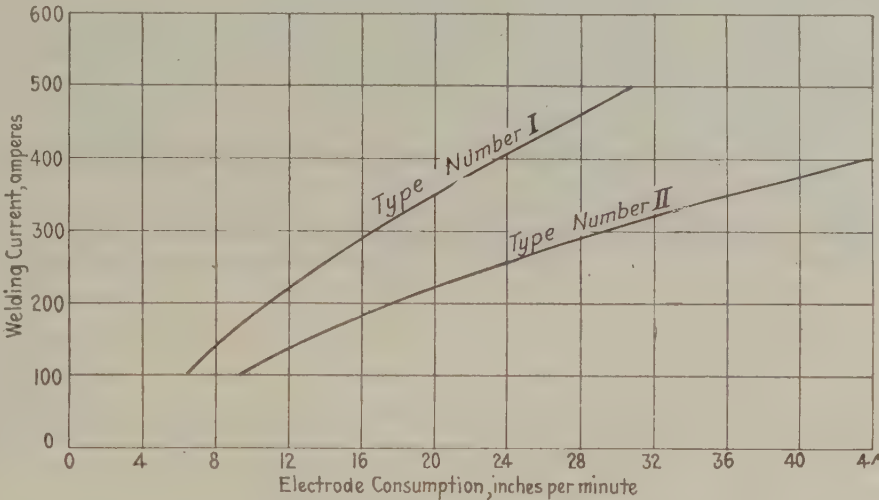
Three principal items to be considered in calculating welding costs are labor, electrode material and power.

Since the greater amount of welding, particularly automatic welding, consists of making linear joints or seams, cost calculations will be based on the cost per linear foot. The welding data used will be that employed in the preceding portion of this discussion, assembled in the table.

In order to bring out the points illustrated in the earlier part of this article, the data have been divided into four groups. Group A compares the melting rate of No. I and No. II wire. Group B gives the conditions of the highest speed with 1/8-in. diameter wire of both types. Group C illustrates the saving effected by changing to larger diam-

eter of electrode, other conditions remaining the same, and Group D shows the economy of increasing the current to obtain high welding speeds. This last point may also be illustrated by comparing the results with No. I wire in Group A with those of No. I wire in Group B. The same comparison may be made with No. II wire in these same groups.

In calculating electrode costs, the following electrode



Curves Showing Melting Rates of 5/32-In. Electrodes of Different Types

weights were used:

- 1/8-in. electrode.....0.0409 lb. per ft.
- 3/16-in. electrode.....0.0902 lb. per ft.

Power costs in general are calculated by finding the kilowatt input to the motor-generator set for a given welding current. To obtain this, it is necessary to have the efficiency curve of the motor-generator set used.

The following formulas give cost per running foot of weld:

To find the electrode cost in dollars per foot of bead multiply the electrode feed in in. per min. by the weight of the electrode per ft. of bead and by the electrode cost in dollars per pound, and divide the running product by the travel speed in in. per min.

To find the cost of electrical energy in dollars per foot of bead multiply the kilowatt input to the motor-generator set by 12 times the cost of the electrical energy in dollars per kw hr., and divide the product by 60 times the travel speed in in. per min.

To find the cost of labor in dollars per foot of bead divide 12 times the rate in dollars per hour by 60 times the travel speed in in. per min.

If hand welding instead of automatic welding were to be considered, the electrode consumption would be greater because 15 to 20 per cent of each length used is discarded. In automatic welding, this is eliminated by a continuous wire feed from a reel.

The usual hour rate for hand welders is within the range covered by the labor costs assumed above, but the welding speed of hand welders on a job to which automatic welding can successfully be applied is only 1/3 to 1/2 the speed of the latter.

Test, performance and manufacturing standards of electrical apparatus have been published by the National Electrical Manufacturers Association, 420 Lexington Avenue, New York, as the NEMA Handbook of Apparatus Standards, formerly known as the Electric Power Club Handbook of Apparatus Standards. The book embraces standards of electric power, control and measuring apparatus for the generation, distribution and utilization of electric energy.

Establishes Steel Foundry Laboratory

Large Company's Equipment for Research—High Frequency
Electric Melting Furnace, Testing and Heat-
Treating Equipment Available

FROM the standpoints of location, construction, equipment and personnel the new research laboratory of the American Steel Foundries serves well as an example of the growing tendency in American industry to search out, with the support of adequate laboratory facilities, methods and materials to satisfy the increasingly exacting demands of purchasers.

The laboratory is located at the East Chicago, Ind., plant of the company, in a building constructed during the war, when it served as a power plant for a forge shop, which has been dismantled. As the power house was located on the opposite side of the forge shop from the foundry units, the laboratory is now 300 yd. away from the nearest manufacturing building.

The framework of the laboratory building is of steel, and the walls are brick filled. The roof trusses are overlaid with cement tile, and the column and wall foundations are of concrete. Of special interest is the fact that the massive foundations, which formerly supported power machinery, are now being used most satisfactorily as testing machinery bases, affording a degree of rigidity which is often highly essential for work calling for a high degree of accuracy.

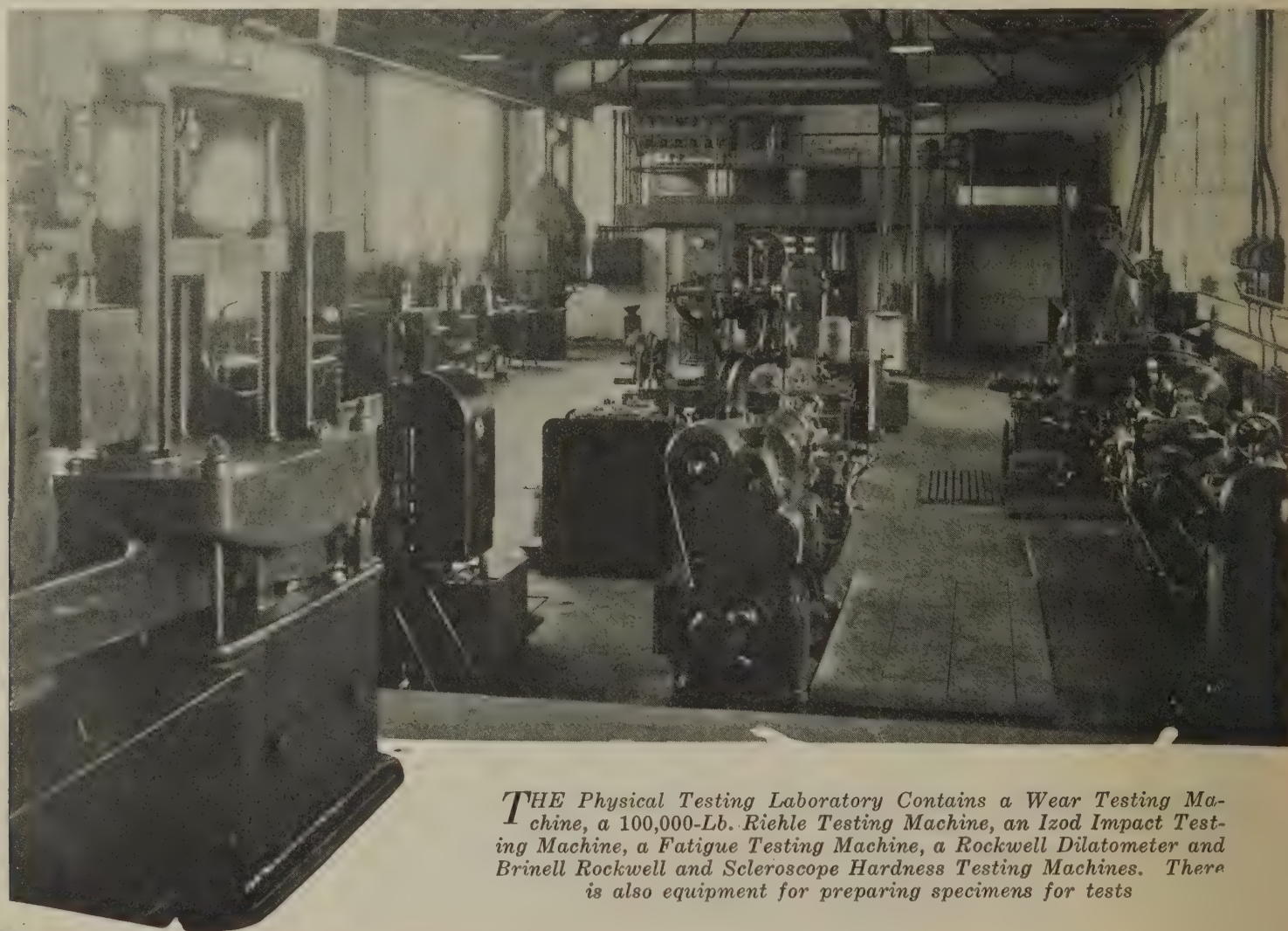
About one-half of the structure, which is 36 ft. wide by 320 ft. long, is now used for laboratory purposes. A 100 per

cent expansion in floor area is therefore possible without additional constructional expense.

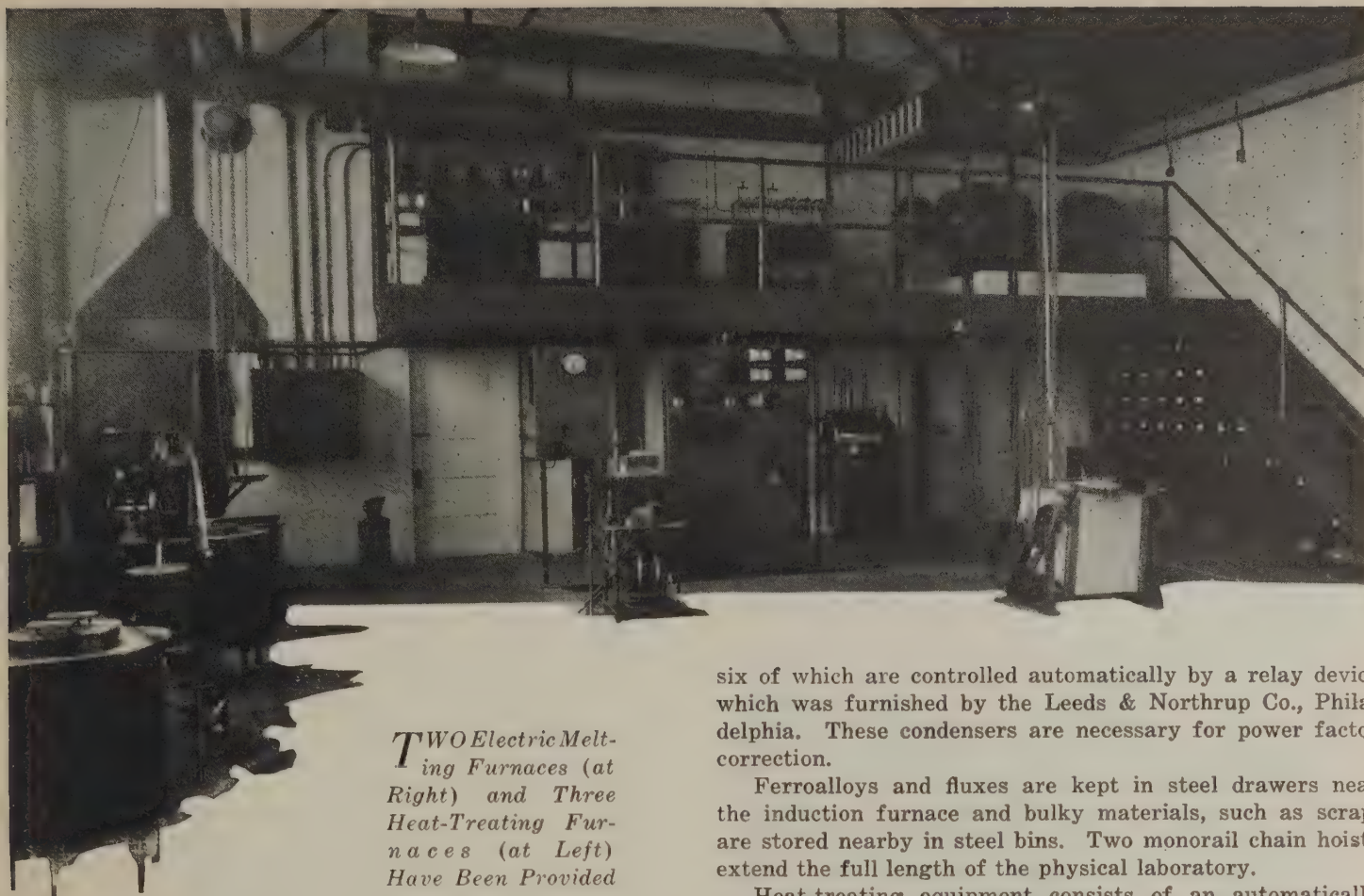
Photomicrographic equipment, which is located in a separate room, was furnished by E. Leitz, Inc., New York. It allows a magnification of 10,000 diameters. Ordinarily the work performed calls for a magnification of 100 to 1000 diameters, with an occasional magnification of 5000 diameters. This apparatus is equipped for photomicrographic work on specimens up to 8 in. square in actual size. The machine is equipped with shock absorbers, though there has been no occasion for their use on account of the massive foundation.

Adjacent to the microscopic room is a locker room and across the hall is a chemical laboratory. These departments, including offices and a library, occupy the north half of that portion of the building now in use. The remaining half is occupied by a workroom in which are located the melting units, the heat-treating units, the machine shop and the physical testing laboratory. In general the arrangement provides for the location of testing machines at the north end and along the east wall. Near the middle of the room and along the west wall is a well-equipped machine shop. At the south end of the room are located the melting furnaces and the heat-treating equipment.

Physical testing apparatus consists essentially of the fol-



THE Physical Testing Laboratory Contains a Wear Testing Machine, a 100,000-Lb. Riehle Testing Machine, an Izod Impact Testing Machine, a Fatigue Testing Machine, a Rockwell Dilatometer and Brinell Rockwell and Scleroscope Hardness Testing Machines. There is also equipment for preparing specimens for tests



TWO Electric Melting Furnaces (at Right) and Three Heat-Treating Furnaces (at Left) Have Been Provided

lowing machines: An Amster Frères wear testing machine is in continuous service. Instead of the load being applied with a spring, as originally designed for the machine, a floating load has been substituted in order to maintain a constant load as the specimens wear. An electric blower has been installed to keep the specimens from heating. The Riehle Brothers Testing Machine Co. furnished a 100,000-lb. testing machine and an impact testing machine of the Izod type. There is also an R. R. Moore fatigue testing machine, built by the Thompson Grinder Co., Springfield, Ohio. Fatigue tests are run at a speed of 1800 r.p.m. on specimens approximately $\frac{3}{10}$ in. in diameter at the center. Weights are added whereby a load of about 80,000 lb. per sq. in. may be applied.

Other equipment includes machines for preparing specimens for microscopic work and Brinell, Rockwell and scleroscope hardness testing apparatus. A dilatometer, which was furnished by the Stanley P. Rockwell Co., Hartford, Conn., is used to determine the expansion and contraction of specimens when subjected to heat and cold.

Machine tools are all driven by individual motors. They include a bench lathe, a 20-in. x 48-in. engine lathe, a 14-in. x 36-in. lathe, a metal band saw, a 16-in. shaper, a drilling machine and a grinder.

Special Melting Furnaces

Two melting furnaces have been provided, one of the carbon pile resistance type and the other an induction furnace. The latter was constructed by the Ajax Electrothermic Corporation, Trenton, N. J., with electrical supplementary equipment of General Electric manufacture. This induction furnace has a melting capacity of 100 lb. in 45 min., and heats of 150 lb. can be made. The furnace consists of a crucible which is surrounded by a water-cooled coil of flattened copper tubing wound on edge. This tubing is insulated from the crucible. Incoming current to the 60-kw. motor-generator set is three-phase, 60 cycles and 220 volts. Outgoing current is single-phase, 960 cycles and 900 volts. With this equipment are installed 18 condensers,

six of which are controlled automatically by a relay device which was furnished by the Leeds & Northrup Co., Philadelphia. These condensers are necessary for power factor correction.

Ferroalloys and fluxes are kept in steel drawers near the induction furnace and bulky materials, such as scrap, are stored nearby in steel bins. Two monorail chain hoists extend the full length of the physical laboratory.

Heat-treating equipment consists of an automatically controlled gas-fired furnace and two Leeds & Northrup Co. hump-type furnaces.

The basement of this building is used for the storage of surplus supplies and spare parts. The dark room, used for developing photographic plates, is also located there.

This research laboratory is equipped, therefore, for the production of experimental steels and alloys. Their heat treatment can be followed up under exacting conditions. After production and heat treatment, the properties of these alloys can be examined chemically, microscopically and physically.

Producing Large Die-Castings for Instrument Cases

For several years the Brown Instrument Co., Philadelphia, maker of indicating, recording and automatic control instruments, has almost entirely swung over to the use of aluminum die-castings for the instrument cases and cover bezels of practically all models of its instruments.

A number of the die-castings required presented difficulties. The aluminum cases now standard for continuous chart recorders, for example, are among the largest aluminum die-castings ever produced on a quantity basis. They are 15 in. high, 13 in. wide and no less than 7 in. deep.

Die-cast aluminum cases cost substantially more than cast iron cases, if the cost of the cases only is considered. There is, however, a perfection of detail assured by the process and flaws are comparatively rare. And their resistance to rusting and corrosion is a feature.

Precision work on the standard yard and inch is advocated by the American Institute of Weights and Measures, 115 Broadway, New York, so that material standard bars may be sent to London in 1932 for comparison with the imperial standard yard, at the decennial comparison then to be made.

Heat Treatment of Gray Iron

Strains May Be Relieved by Heating at Moderate Temperatures; Castings May Be Softened Without Weakening by Annealing Above the Critical

BY EDWARD E. MARBAKER, PH.D.*

WHILE considerable information exists on the heat treating of gray cast iron, it has been looked upon as a dangerous procedure, and until very recently the process was employed in very few foundries. One of the reasons for the slow progress in this field of investigation is the difficulty in obtaining satisfactory experimental results due to the fact that compared with steel, cast iron is a very complex alloy. However, notwithstanding the difficulty of the subject, a great deal of work has been done, and it has been established that the properties of gray iron castings can be profoundly affected by the use of a suitable heat treatment.

The object of this paper is to bring together the recent information with the hope that the interest of foundrymen, metallurgists and engineers may be aroused, and that further experimental and practical work will result in the improvement of cast iron. Much is being written of the effect of casting temperatures, methods of molding and rates of cooling, all of which are instrumental in producing gray cast iron of more uniform structure and superior physical properties. These variables come into play while the molten metal is cooling, while in heat treating the variables which must be controlled exist entirely in the solid state. One may be considered in a way as the reverse of the other, and it is certain that the physical laws which control the various steps in one process are equally effective in the other.

The student of the heat treatment of cast iron and its effects on the properties of the metal must be referred to the theories of the constitution of the iron-carbon alloys which are generally familiar to metallurgists. The assumption that cast iron is a steel of eutectoid composition, different from true steel in structure only because of the presence of graphite flakes, is generally followed. The basic theory which has been well substantiated in the case of steel can then be closely followed in working with cast iron, but the excess carbon is disregarded because the properties of the iron which it is desired to change by heat treatment are inherent in the constituents which are common both to steel and cast iron. The elements present in cast iron in much larger amount than in steel, such as silicon and manganese, exercise a profound influence on the properties of the metal; therefore only the fundamental ideas derived from the study of thermal effects on steel can be applied. Accordingly cast irons differing in composition require different heat treatments to bring about like effects. The time element in heat treating is as important as temperature, because the material is in the solid state and

molecular activity is necessarily reduced. Complete transformation is rarely obtained because the necessary extension of the time involves increased cost.

In actual heat treating operations two conditions may be brought about. In the first of these it is desirable only to remove strains which have been produced during the casting process, and this is carried out at relatively low temperatures. In the second case the cast iron is also softened and thus made more easily machinable. This procedure is carried out at higher temperatures.

In working out a schedule for heat treatment, especially for cast irons to be softened, the critical temperature of the particular iron (that is, the position of the thermal arrest *Ac*) should be determined. The changes in structure which it is desired to bring about take place above this point, and definite knowledge of its position eliminates the difficulties involved in the method of trial and error.

Removal of Strains in Castings

Practically no investigations on the heat treatment of cast iron were reported prior to 1915, although there had been many important contributions on the constitution of the iron-carbon alloys and on the growth of cast iron. While these investigations were not concerned with the practical results of heat treatment, they form the theoretical basis of subsequent work.

An anonymous author¹ reported in 1915 that the casting strains in small hardware parts can be relieved by heating for 8 hr. at dull redness (1100 deg. Fahr.), and then cooling very slowly, the time required being one day. These castings were softened also, "due to the precipitation of some of the combined carbon as graphite."

L. M. Sherwin² in 1917 investigated the problem quite carefully, using a series of irons of ordinary composition, except that the silicon content was low, and found that by heating at 1100 deg. Fahr. for 24 hr. and slowly cooling, the casting strains were removed and the hardness reduced slightly. The tensile strength was reduced about 5 per cent. It was also found that similar results were obtained by heating at 400 deg. Fahr. for 24 hr. and cooling slowly.

J. E. Hurst³ in 1919 studied the prolonged heat treatment of a series of commercial irons in the form of bars. The silicon content varied from 1.14 to 2.69 per cent. It was found that by heating at 1067 deg. Fahr. in a muffle furnace for periods of 72 and 150 hr. and cooling slowly, the hardness rapidly diminished with the time, and that the extent of the decomposition of the combined carbon depends upon the silicon content.

C. J. Wiltshire⁴ reported that in castings heated slowly to 700 deg. Fahr. and held at that temperature for 7 hr. and allowed to cool very slowly (20 hr. to 300 deg. Fahr.) the strains are completely eliminated.

J. T. Harper and R. S. MacPherran⁵ in 1923 found that casting strains are relieved by heating at 1150 deg. Fahr. for one hour. With longer heating the strength and hardness decrease materially.

In 1924, R. T. Rolfe⁶ made a very careful study of the following composition: total carbon 3.59, graphitic carbon 2.86, combined carbon 0.73, silicon 1.65, manganese 0.62,

*The Whiting Corporation's Industrial Fellowship, Mellon Institute of Industrial Research, Pittsburgh.

¹ *Foundry*, V. 43, p. 188 (1915).

² L. M. Sherwin, *Foundry*, V. 45, p. 435-8 (1917). *Transactions, Am. Foundrymen's Assn.*, V. 26, p. 509-26 (1917).

³ J. E. Hurst, *Engineering*, V. 108, p. 1-3 (1919).

⁴ C. J. Wiltshire, *Transactions, Am. Foundrymen's Assn.*, V. 28, p. 346-7 (1919).

⁵ J. T. Harper and R. S. MacPherran, *Foundry*, V. 51, p. 177-80 (1923). *Transactions, Am. Foundrymen's Assn.*, V. 30, p. 167 (1921).

⁶ R. T. Rolfe, *Metal Industry* (London), V. 24, p. 501-2, 525-6, 551-2 (1924).

sulphur 0.10, phosphorus 0.66. Bars were heated at various temperatures from 752 deg. Fahr. to 1832 deg. Fahr. for one hour and cooled slowly in hot sand. His conclusions were that casting strains can be removed successfully by heating at 1112 deg. Fahr. for one hour and cooling slowly. Tensile strength was reduced about 6.5 per cent and the hardness decreased 2.5 per cent.

J. W. Bolton,⁷ in the same year, found that strains can be removed by heating slowly to 700 to 1000 deg. Fahr. and cooling slowly in the furnace. He states that annealing to soften is practical only where strength requirements are low. He found, as did Rolfe, that annealing at 1350 deg. Fahr. weakened the casting greatly. In a later paper⁸ Bolton recommends a temperature of 700 to 800 deg. Fahr.

J. W. Donaldson⁹ carried out prolonged annealing tests at 842 deg. Fahr. and 1022 deg. Fahr. and found that the combined carbon content was decreased, with a corresponding lowering of strength and hardness. Decomposition of carbide increases with temperature or time.

F. Grotts¹⁰ in 1925 showed that the physical properties of cast iron can be radically modified by suitable heat treatment. His iron had total carbon 3.24, silicon 2.46, manganese 0.96, sulphur 0.15, phosphorus 0.514. The average transverse strength as cast was 3966 lb. and the Brinell hardness was 131. After heating at 700 deg. Fahr. and cooling slowly the transverse strength was 4366 lb. and the Brinell hardness 131. At higher temperatures the strength and hardness were much decreased. The conclusion was drawn that for removing strains quickly, it is good practice to anneal the castings at 600 deg. Fahr.; the strength and hardness are not then materially affected.

J. A. Capp¹¹ recommends that iron castings be heated from 932 to 1022 deg. Fahr. for from 4 to 10 hr., depending upon the section and weight.

In the following table is shown a recapitulation of the foregoing preheating schedules for the elimination of casting strains:

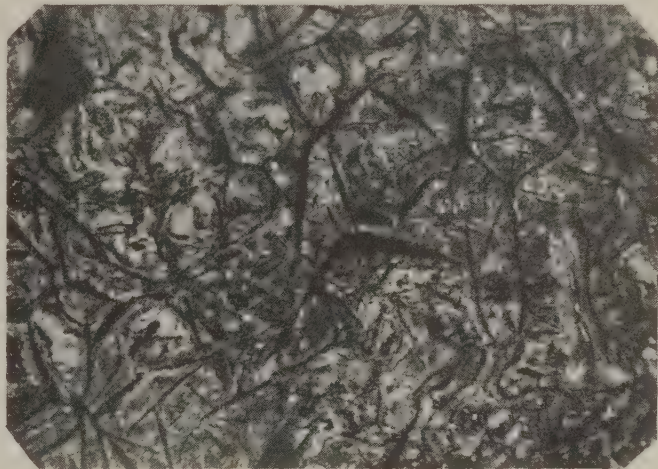
Author	Annealing Temperature, Deg. Fahr.	Time in Hours	Cooling Rate
Anonymous	1,100	8	slow (24 hr.)
Sherwin	1,100	24	slow
	400	24	slow
Hurst	1,067	72	slow
	1,067	750	slow
Wiltshire	700	7	slow
Harper and MacPherran	1,150	1	slow
Rolfe	1,100	1	slow
Bolton	700 to 1,000	..	slow
Donaldson	842 to 1,022	..	slow
Grotts	600	..	slow
Capp	932 to 1,022	4 to 10	slow
Bolton	700 to 800	..	slow

Some discrepancy exists, doubtless due to differences in analysis of the irons and the casting conditions. It is well known that the original structure has a profound influence on the success of heat treating and obviously the time may be diminished where the original structure is uniform. From these and other investigations (which will be cited later) it appears that the desired results may be obtained by heating at a high temperature for a short time or at a low temperature for a long time. This is borne out by the fact that in the "seasoning" of castings the strains are relieved at ordinary temperatures if a sufficient time is allowed. Some of the investigators unduly prolonged the time, and since the temperatures were well below the critical range (1350 deg. Fahr.) the properties of the castings were not materially changed. This is indicated by Sherwin's results, which were practically the same whether the bars were

heated at 1100 or 400 deg. Fahr. for 24 hr. Rolfe's results show that at 1100 deg. Fahr. such a long heat was unnecessary, for he accomplished in one hour all that Sherwin did in 24.

High-Temperature Annealing to Change the Structure

Cast iron may also be heat treated to make the structure more uniform, to reduce the hardness and to render it more easily machinable by reducing the combined carbon content. It is also possible to improve the strength and the resistance to impact. For such purposes the castings are heated to a temperature above the critical range—about 1350 deg. Fahr. for the commercial irons. This, it will be remembered, is the temperature at which steel containing 0.90 per cent carbon shows the all-pearlitic structure considered best for general purposes. By heating above the



Sand Cast Foundry Pig Iron. C = 3.2 to 3.5 Per Cent. X 100. Etch—5 per cent HNO₃ in alcohol. The structure is pearlitic with a small amount of cementite

critical temperature for a time depending upon the size of the casting, the structure changes to austenite; then when cooling slowly through the critical range the austenite changes to pearlite; subsequent rapid cooling traps the pearlitic structure, and thus a cast iron of superior quality is obtained.

In 1915 G. S. Evans¹² studied a series of ten commercial irons varying from light gray (almost all cementitic) to dark gray (pearlitic with excess graphite) and of Brinell hardness from 318 to 185. The silicon contents were high, varying from 2.70 to 3.81 per cent. The rate of transformation of the combined carbon into graphite was found to increase with temperature from 1300 deg. Fahr. to 1800 deg. Fahr. However, this reaction is so rapid at 1650 deg. Fahr. that in ordinary practice, where the combined carbon does not run over 0.50 per cent and with no appreciable chilling, it is simply necessary to heat to 1650 deg. Fahr. and cool immediately, either in the furnace or in the open air, to obtain the softening effect without materially affecting the strength. No change in composition or hardness was noted when annealing at 1250 deg. Fahr. or below. The change was slow at 1300 deg. Fahr., indicating that the critical range was between 1250 and 1300 deg. Fahr., the low range being due to the high silicon content. This is confirmed in malleable practice but not by the results of Potter's investigations noted later. Potter, however, worked with cast iron of lower silicon content. For instance, one of Evans' samples having the following composition: total carbon 3.28, graphitic carbon 2.70, combined carbon 0.58, silicon 2.98, manganese 0.32, sulphur 0.086, phosphorus 1.20, showed a Brinell hardness of 237 as cast. After heating at 1400 deg. Fahr. for 5 min. and cooling in the furnace to about 800 deg. Fahr. during a 3-hr. period, and then in air, this sample showed a hardness of 141, and

⁷ J. W. Bolton, IRON AGE, V. 114, p. 820-2 (1924).
⁸ J. W. Bolton, IRON AGE, V. 120, p. 611-2 (1927).
⁹ J. W. Donaldson, Foundry Trade Journal, V. 31, p. 517-22 (1925).
¹⁰ F. Grotts, Transactions, American Society for Steel Treating, V. 7, p. 735-42 (1925).
¹¹ J. A. Capp, American Machinist, V. 63, p. 385-7 (1925).
¹² G. S. Evans, Foundry, V. 43, p. 219-21 (1915).

the fracture was pearly. The combined carbon was completely changed to graphite.

Piwowsky¹³ in 1922 carried out annealing experiments at various temperatures and for different periods of time on a pearlitic cast iron having the following compositions: total carbon 3.18, graphitic carbon 2.49, combined carbon 0.69, silicon 2.95, manganese 0.63, sulphur 0.068, phosphorus 0.102. The *A_c* of this iron was 1490 to 1517 deg. Fahr. and the *A_r* was 1382 to 1337 deg. Fahr. When treated at temperatures below *A_r* the rate of decomposition of the pearlite was not high enough for practical purposes. Between *A_r* and *A_c* the rate is satisfactory when the silicon is sufficiently high. Rapid annealing is obtained by quickly heating to a temperature a little above *A_c*, and cooling through *A_r* at a rate less than 1 deg. per minute.

At about the same time, Schüz¹⁴ explained very clearly the changes in structure which result during heat treatment. He claimed that satisfactory annealing results from heating at 1382 to 1472 deg. Fahr. from 3 to 10 hr., depending upon the size of the casting. He also shows that an iron of the following composition: total carbon 3.56, graphitic carbon 3.06, combined carbon 0.56, silicon 2.26, manganese 0.56, sulphur 0.112, phosphorus 0.38, and of Brinell hardness 160 to 164, when annealed for 24 hr., the carbide decomposition begins at 932 deg. Fahr. and is complete at 1112 deg. Fahr.; for a six-hour period the reaction begins at 1022 deg. Fahr. and is complete at 1202 deg. Fahr.; and for a three-hour anneal the decomposition begins at 1067 deg. Fahr. and is complete at 1202 deg. Fahr. "These results are surprising," says Schüz, "since the critical temperatures are much lower than is generally accepted." He explains this by the fact that relatively little of the original carbon is combined and the graphite tends to gather together the temper carbon produced by annealing. This investigation further substantiates the theory that annealing at a high temperature for a short time has an effect equivalent to annealing at low temperatures for a long time.

J. F. Harper and R. S. MacPherran¹⁵ state that annealing to improve the machinability should be done at 1450 to 1550 deg. Fahr., followed by cooling slowly. The decrease in hardness is accompanied by a loss in strength.

A process for heat treating white or gray cast iron was patented by A. K. Schaap (U. S. Patent 1,514,070, Nov. 4, 1924), for which great softness and undiminished strength are claimed. The process is carried out by heating to a temperature slightly above the critical (1600 deg. Fahr.) in a wrought iron muffle surrounded by a gas flame and open at the top. As soon as the iron reaches the proper temperature, the muffle and its contents are removed from the furnace and allowed to cool in the open air, the casting being protected from drafts. About 15 min. are required to cool to a black heat, after which it may be cooled in the open air. The entire operation, starting with cold iron, is said to require 45 min. The time must be increased when treating heavy castings.

The following results are quoted:

	Untreated	Treated
Total carbon	3.39%	3.30%
Graphitic carbon	2.73	3.19
Combined carbon	.66	.11
Silicon	2.36	2.50
Manganese	.37	.29
Sulphur	.064	.086
Phosphorus	.736	.746
Brinell hardness	240	140
Tensile strength, lb. per sq. in.	21,750	20,070
Transverse strength	2,900	2,770

¹³ E. Piwowsky, *Stahl und Eisen*, V. 42, p. 1481-3 (1922). Translated in *Forging and Heat Treating*, V. 9, p. 182-5 (1923).

¹⁴ E. Schüz, *Stahl und Eisen*, V. 42, p. 1484-8 (1922). Translated in *Forging and Heat Treating*, V. 9, p. 182-5 (1923).

¹⁵ J. F. Harper and R. S. MacPherran, *Foundry*, V. 51, p. 177-80 (1923).

¹⁶ F. Grotts, *Transactions*, American Society for Steel Treating, V. 7, p. 735-42 (1925).

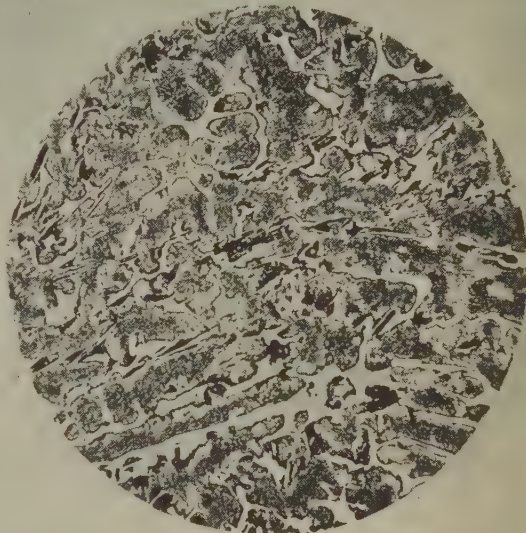
¹⁷ H. B. Knowlton, *Transactions*, American Society for Steel Treating, V. 4, p. 494-506 (1923).

¹⁸ O. W. Potter, *Foundry*, V. 54, p. 633-7, 678-80, 775-8 (1926).

¹⁹ O. W. Potter, *Foundry*, V. 55, p. 427-31, 491-5 (1927).

²⁰ J. W. Bolton, *IRON AGE*, V. 120, p. 611-2 (1927).

F. Grotts¹⁶ investigated the heat treating of cast iron in 1925 with the idea that castings containing hard spots and therefore difficultly machinable need not be scrapped, for by heat treating the structure may be rendered uniform throughout. Working with a cast iron of the following composition: total carbon 3.24, silicon 2.46, manganese 0.96, sulphur 0.150, phosphorus 0.514, which had a transverse strength of 3970 lb. and a Brinell hardness of 131, he found that by heating to 1200 deg. Fahr. the hardness was reduced to 92 and the transverse to 3630 lb. By heating to 1400 deg. Fahr. (above the critical) the hardness was further reduced to 90 and the strength increased to 3790 lb. Thus he is justified in concluding that heat treatment can be used



Cast Iron Annealed at 1380 Deg. F. (750 Deg. C.) for 15 Min. and Furnace Cooled. X 100. Etch—5 per cent *HNO₃* in alcohol. Structure shows cementite (white), pearlite (dark) and graphite (black)

to soften the iron without greatly weakening it. For certain classes of work he advises a heat treatment at 1750 deg. Fahr. for a short time, then machining, and finally heating, quenching and drawing to the desired hardness. This latter procedure is not unlike that of Knowlton,¹⁷ which is used primarily for hardening castings. In Knowlton's process, the casting is case-hardened by carburization, and is then reheated to 1700 deg. Fahr. for 3 hr., cooled to 1500 deg. Fahr. slowly, and then water quenched. It is claimed that some samples so treated were considerably stiffer than malleable castings and possessed a toughness comparable with that of case-hardened low carbon steel.

O. W. Potter¹⁸ finds the best combination of properties after heating at 1600 deg. Fahr. for 3 hr., cooling to black in 15 min. and then to room temperature in air. This is much like the Schaap process, the difference being that Potter held the metal at the annealing temperature for 3 hr. while Schaap proceeds to cool immediately after that temperature is reached. Potter obtained, as did Schaap, a uniformly soft casting with only a slight reduction in strength. In a more recent paper based on further experimental work, Potter¹⁹ restates his conclusions, but in his heat treating schedule the time for holding at the annealing temperature is reduced to 2 hr.

J. W. Bolton²⁰ summed the matter up very recently in a general way by stating (and in this he follows Piwowsky) that castings should be heated at a temperature somewhat above the critical temperature and then cooled slowly, at least in the temperature range between *A_c* and *A_r*. The time necessary is less the higher the temperature and the smaller the casting. Small castings can be completely an-

nealed in a few minutes at 1600 deg. Fahr. The metal becomes softer, more malleable, and weaker.

G. C. Priester and F. J. Curran²¹ worked with a number of cast irons of usual composition at temperatures from 1460 to 1650 deg. Fahr. for varying times. They sum up their work by advising the heating of the casting at a temperature above the critical and cooling slowly.

A table in which the results of the preceding investigations are recapitulated appears at right.

There is a much closer agreement among the schedules cited on the softening of cast iron to attain better machinability than with those for relieving strains. It will be noted that in general the theoretical considerations have been substantiated. The properties of cast iron can be improved in certain respects by heat treatment. The question arises as to whether iron castings of uniform structure and unstrained, even though the strength may be lower, are not superior from an engineering standpoint to ordinary untreated castings.

Conclusions

The best results in normalizing strained castings have been obtained by heating at temperatures considerably below the critical temperature for periods of time depending

²¹G. C. Priester and F. J. Curran, *Transactions, American Society for Steel Treating*, V. 11, p. 741-58 (1927).

Author	Annealing Temperature, Deg. Fahr.	Time in Hours	Cooling
Evans	1,400		3 hr. to 800 deg. Fahr.
	1,650		3 hr. to 800 deg. Fahr.
Piwowarski	1,500	5 min.	1 hr. through 1350 deg. Fahr. slow
Schüz	1,382 to 1,472	3 to 10 hr.	slow
Harper and MacPherran	1,450 to 1,550		slow to black heat
Schaap	1,600		slow
Potter	1,600	2-3	slow
Bolton	1,600	depends on size	slow
Priester and Curran	1,460 to 1,650		slow
Knowlton	1,700	3	slow to 1500 deg. Fahr. and water quench

upon the size and section of the castings, the object being to insure the heating of the castings throughout at the annealing temperature, and then cooling slowly.

In order to soften the casting and make it more easily machinable, it must be heated at a temperature above the critical point, held for a sufficient time to insure thorough heating, and then cooled slowly at least through the first 100 deg. Castings can be hardened again after machining, if desired, by reheating, quenching and drawing to the desired hardness.

Purchasing Department Eliminates Long Waits by Salesmen

BELIEVING that it might further improve its relations with the public by eliminating the long and annoying waits which salesmen are sometimes subjected to, the Oakland Motor Car Co., Pontiac, Mich., has adopted a new system, which in two months' operation has cut down the average waiting time for each caller to less than four minutes.

Charles O. Miller, supervisor of purchases, installed the system, which operates as follows:

When a salesman calls to see someone in the purchasing department, the clerk at the information desk records the time of his arrival and the time he had to wait before seeing the person he asked for.

The system has particular application to Mr. Miller's department. Under his supervision are nine buyers whose contacts are all with salesmen. Every morning Mr. Miller sends to every member of the department the record of the

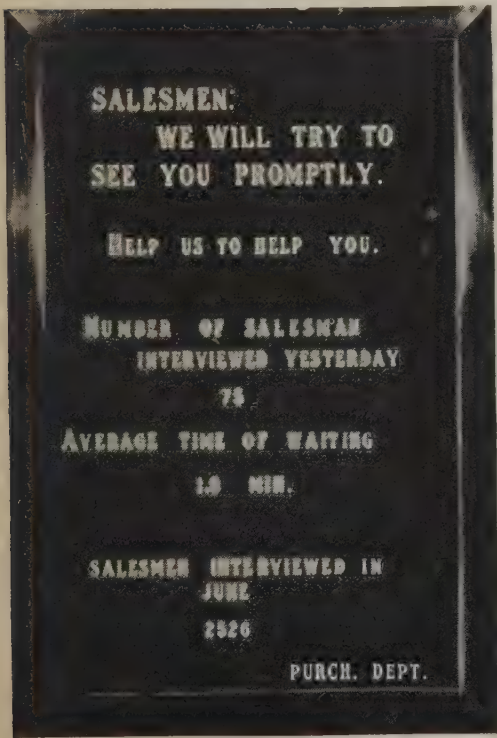
preceding day, which shows the number of contacts each man made and the length of time he kept his callers waiting. A spirit of rivalry has grown up as a result, each man vieing with the others to cut down the waiting-time average.

The best days record was an average wait of 1½ min., which the company considers remarkable in view of the fact that its callers in the purchasing department alone average from 100 to 200 a day.

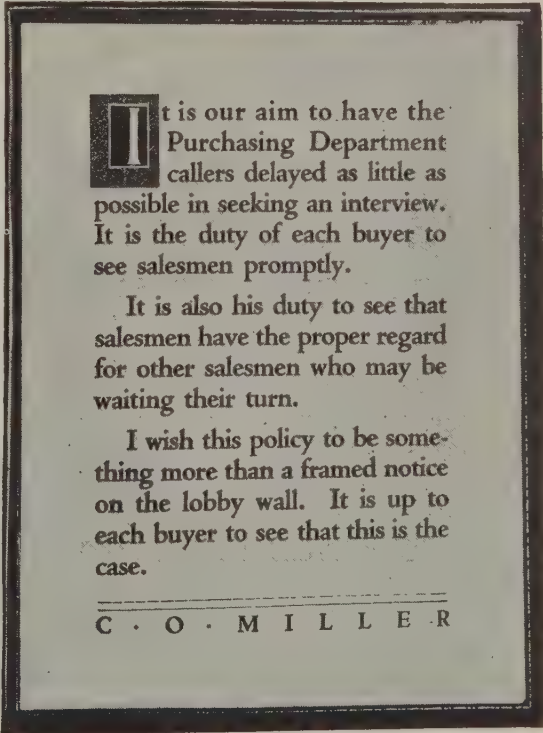
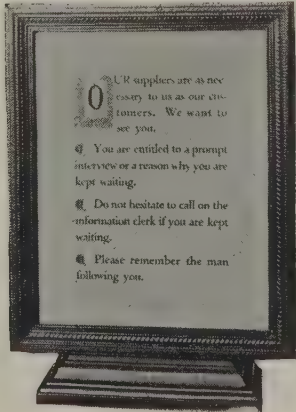
Moreover, the man who has something to sell to the Oakland company is assured of a welcome, for when he enters the lobby of the building he finds a sign which is reproduced in the center column below.

Once in a buyer's office, the salesman sees another sign, signed by Mr. Miller, and here also reproduced.

A score card is posted in the lobby daily showing the previous day's record.



These Signs in the Purchasing Department and Lobby of Oakland Motor Car Co.'s Plant Explain the Company's Aim to Interview Salesmen Promptly



Machines Large Structural Members

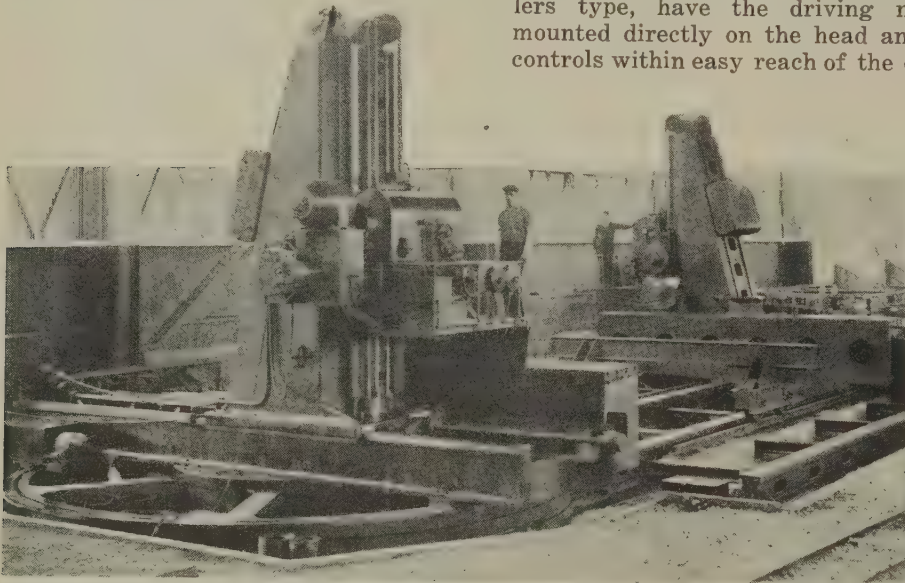
Special Equipment Consisting of Two Floor Boring, Drilling and Milling Units Used to Finish Ends of Columns and Other Sections

UNUSUAL accuracy and speed in finishing the abutting ends of large built-up structural members for tower and bridge sections are claimed

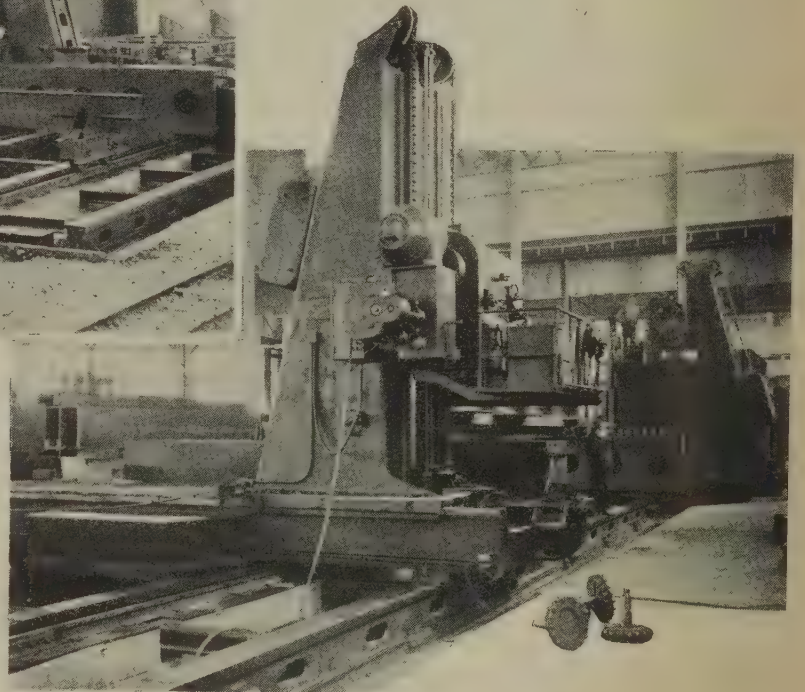
intermediate support is also provided in the form of a four-wheel truck to take care of any sag which might occur in the member being machined.

The milling units, of standard Sellers type, have the driving motor mounted directly on the head and all controls within easy reach of the oper-

ator when standing on the platform. The machines are also equipped with a wide range of boring and drilling speeds and feeds so that holes in the ends of the structural sections may be machined at the same setting of the work as for milling. Horizontal and vertical milling feeds are independent in direction and amount so that by combination the feed can be obtained in any direction. With this arrangement it is possible to turn corners or change direction without throwing out the milling feed, thereby eliminating interruption of the feed with its resultant mark in the work.



Special Equipment for Finishing Abutting Ends of Large Structural Members. The view above shows the general arrangement of the two units making up the machine, as well as of the longitudinal bed. The rotary unit, shown in the foreground, can be swiveled by power to an angle of 45 deg. in either direction. The intermediate work-support stands are located between the work tables of the machines, making up the complete equipment



for special floor boring, drilling and milling machines built recently by William Sellers & Co., Philadelphia, for the McClintic-Marshall Construction Co., Pottstown, Pa. The equipment was designed to mill the ends of columns and other sections 20 in. by 12 in. by 60 ft. long.

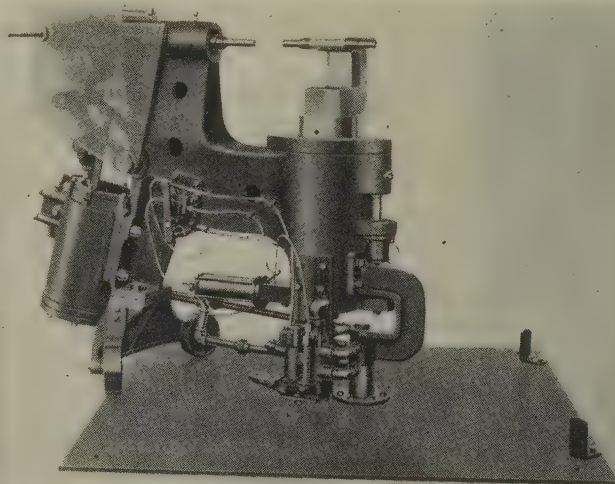
Arrangement of the machine may be noted from the illustrations. It is made up of two milling units mounted on a bed 80 ft. long, each unit consisting of a floor boring, drilling and milling machine. One unit is mounted on a rotary base at one end of the long bed and can be swiveled by power to an angle of 45 deg. in either direction so that the structural members may be finished on an angle as well as square. The second unit is mounted on a sub-base which may be adjusted longitudinally by power on the 80-ft. bed. This unit can be set to the required distance from the unit on the rotary base to finish both ends of sections, of any desired length up to maximum, at one setting. Each milling unit carries with it a slotted work-table for supporting and fastening the structural sections. An in-

Machine for Driving Web Rivets in Chassis Side Bars

THE Hanna Engineering Works, 1765 Elston Avenue, Chicago, has developed the riveter illustrated, which is particularly adapted for driving the web rivets in the side bars of automobile chassis frames.

In this machine the stake that supports the stationary die and that en-

ters the interior of the chassis frame is rotatable upon its vertical axis and is locked or indexed in two positions of rotation 180 deg. apart. The upper portion of the stake adjacent to the die mountings is offset or "goose necked." By indexing the stake the offset is thrown to the right or to the



The Combination of an Indexed Rotary Stake and Radially Rolling Base Permits the Machine to Drive a Diversity of Web Rivets. Pressure of 30 tons at 100-lb. air pressure is exerted at the dies

left as desired. An advantage of this arrangement is that the stationary die may be centered upon a rivet which joins a channel-shaped cross member to the side bar channel web, whether the flange legs at top and bottom of cross member extend toward the front or toward the rear of the chassis frame. The stake has double die mountings on one axis so that one die or the other is in position to oppose the live die regardless of stake indexing. This feature permits one riveter to enter upon rivets that would otherwise require two riveters.

The machine is mounted upon a radially rolling base which permits swinging it from the operating position on one side of a suspended chassis frame to the operating position on the other side of the frame. Trans-

verse and rotary movement are accomplished rapidly. It is claimed that because of the combination of an indexed rotary stake and radially rolling base one of these machines will drive as great a diversity of web rivets as four chassis frame riveters without these features. It is also stated that the machine is particularly adapted for truck and pleasure car frames of comparatively low daily production which require that each riveter drive a large number of distinct rivets in each frame.

The machine shown exerts 30 tons on the dies at 100 lb. air pressure and will drive rivets as large as $\frac{3}{4}$ in. in diameter hot and $\frac{7}{16}$ in. in diameter cold. It is also available in 20-ton and 15-ton capacities.

that stud. The ratchet shown contains 16 teeth and is operated by means of an indexing mechanism, including the rod *H* which extends into the machine. This rod carries a yoke on which a cam roll is mounted, and is operated by means of a cam on the main shaft of the machine.

Reciprocating motion is given to the rod through the cam roll. The rod is secured to the crank, mounted adjacent to the index ratchet, and thus oscillates that crank, causing the index pawl to engage the teeth of the ratchet. The lever secured in the pawl is intended for releasing the index ratchet in case the movement of the dial and the ratchet is impeded. In this event the dial can be turned in a direction opposite to the usual indexing motion and the obstructing piece can be removed.

Another detail view is an enlargement of the dial. This is machined so that the openings on the periphery fit the parts to be drilled and tapped. The openings are slightly oversize, to allow for variations in the castings or blanks. The relation of the holes drilled and tapped in these parts is controlled by a bushing carried by the arm *J* mounted on the sleeve, which slides on the stud and moves with the drilling spindles. The spring in contact with this arm tends to press the sleeve toward the dial and the work in it.

Fastened to the main body of the dial is the hardened plate *K*, with a

Horizontal Drilling and Tapping Machine

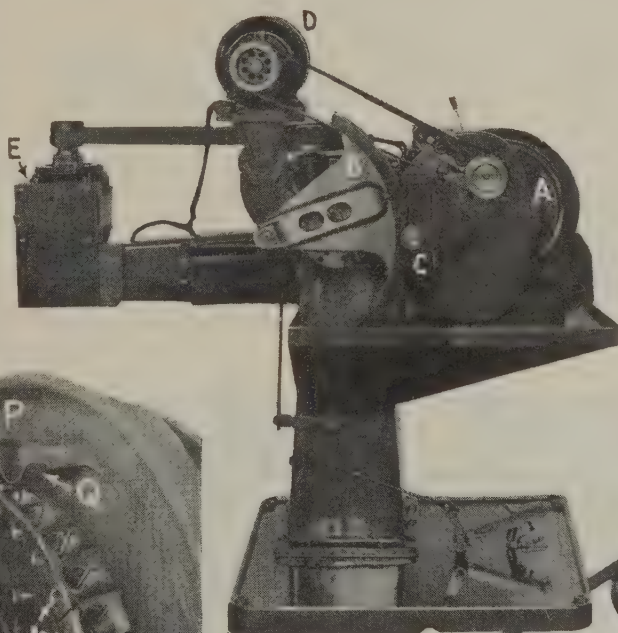
A NEW machine for drilling and tapping horizontally has been brought out by the Anderson Die Machine Co., Bridgeport. All the operating elements are similar to those in the company's standard No. 40 machine, except that the tapping spindles, as well as the drilling spindles and the axis of the dial, are in horizontal planes.

Where the hole to be drilled is of considerable depth and the material is stringy, the company's experience indicates that the horizontal machine is particularly well adapted. This is principally because the chips on such a design will drop free from the dial.

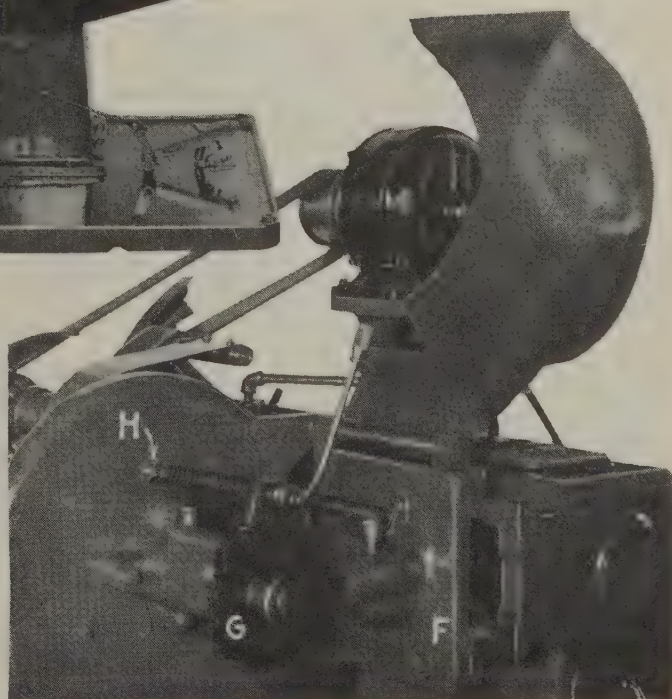
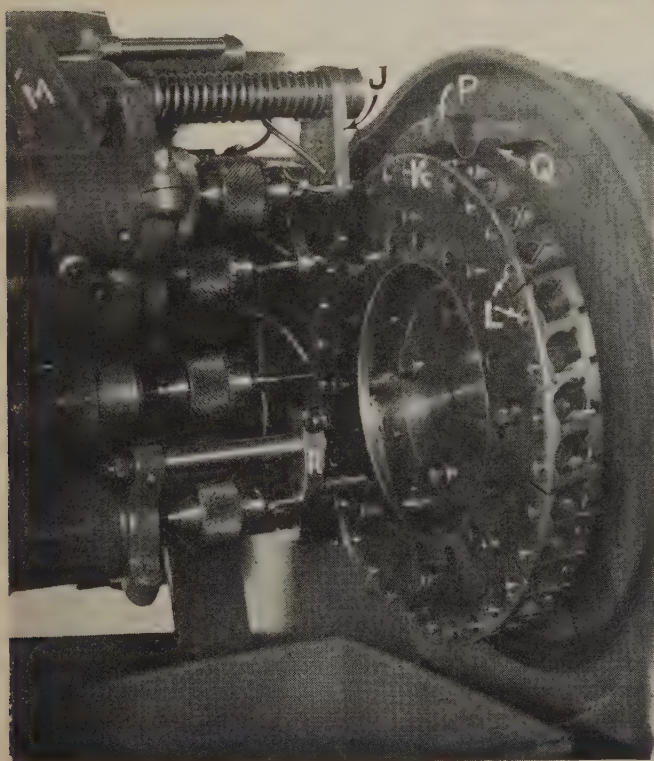
In the general view of the machine, which was taken from the end on which is located the segment operating the tapping spindles, *A* is the dial mounted in a housing, *B* is the segment operating the tapping spindles, and *C* shows the upper portion of the

spindle slide. The motor at *D* actuates the drilling spindles, while the main motor for operating the machine, as well as the tapping spindles, is located at *E*.

One detail shows the indexing mechanism, including the ratchet, the guard having been raised. In this view, *F* is the knee or slide on which the dial pan or housing is mounted. It carries the journal for the stud on which the dial operates. *G* is the index ratchet mounted on the end of



General Appearance of the Machine Is Supplemented by Two Details with Operating Units as Described in the Text



series of openings *LL* which fit the the lower end of the bushing on the arm *J*. The holes in the plate *K* correspond to the openings in the dial plate and are located to act as a jig.

As the spindle slide *M* approaches the dial and the work, the lower end of the bushing enters one of the openings *L* before the drill comes into contact with the work. This bushing exerts a pressure on the work so as to hold it more or less rigidly during the operation of drilling.

The particular dial illustrated has 32 openings. Hence, the index ratchet of 16 teeth presents two parts to be drilled and tapped for each stroke of the machine. On work of this nature the machine can operate at a speed of approximately 30 strokes a minute. This gives a theoretical production of 60 pieces a minute.

Parts, fed into the dial by hand, are generally malleable iron castings, subject to a certain variation in diameter or size. It sometimes happens

that a piece will not go into the dial to its proper depth. To prevent such defective parts being fed through to the drilling and tapping spindles, a rigid stop *P* is secured adjacent to the dial. This acts as a gage; if the part is not in position, it will lock the dial and prevent feeding. Preceding the stop is a spring *Q* which helps press a part into its proper place.

If a part thus impedes the rotation of the dial, the latter will be stopped in a position where the pilot pin *R* will prevent the drilling and tapping spindles from coming in contact with the dial. This prevents injury not only to the dial, but to the spindles. To clear the dial so as to permit further indexing, the lever projecting through the guard permits the operator to lift the index pawl out of the path of the index ratchet. This allows the dial to be rotated backward far enough so that the part which acted as an impediment may be removed.

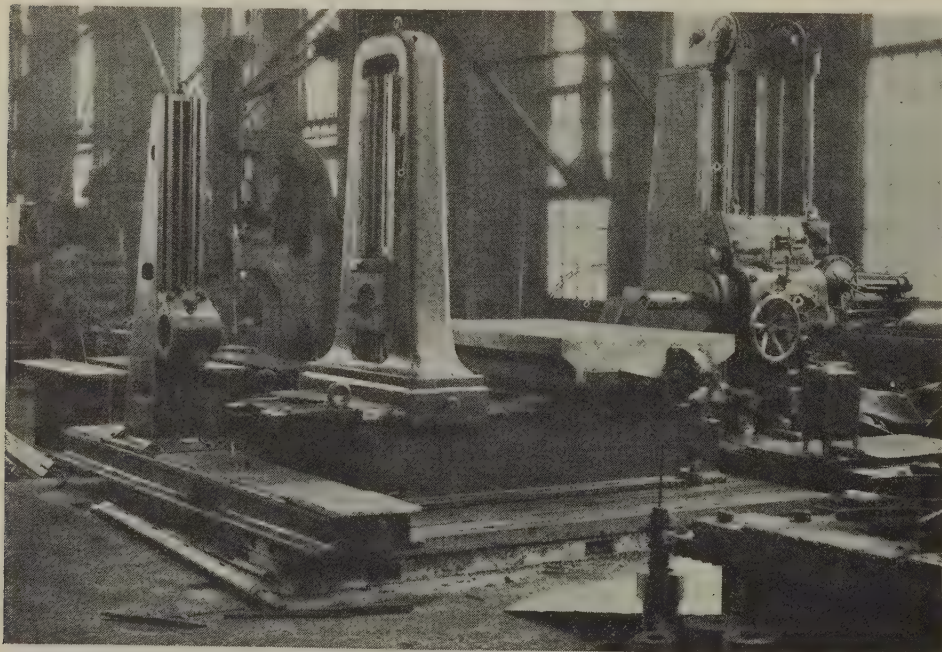
Combination Horizontal Boring, Drilling and Milling Machine

FOR use in structural and other metal-working shops, the work in which includes the machining of both small and large bulky pieces, Joseph T. Ryerson & Son, Inc., Sixteenth and Rockwell Streets, Chicago, is offering the combination floor and table type horizontal boring, drilling and milling machine here illustrated.

The machine shown was built for the Canadian Bridge Co., Walkersville, Ontario, Canada. It is a standard floor type horizontal boring and milling unit having a spindle saddle which is free to move vertically on the face of the column; a column with horizontal movement on its runway; a bed plate fastened to the runway; and an outer boring bar support which has hand movement on the bed plate parallel to the spindle travel. The

machine is arranged for direct motor drive and all speeds and feeds and power traverse to the spindle, spindle head and column are controlled from the head. The outer boring bar support, as well as the main post, is fitted with vernier and scales which read to 0.001 in.

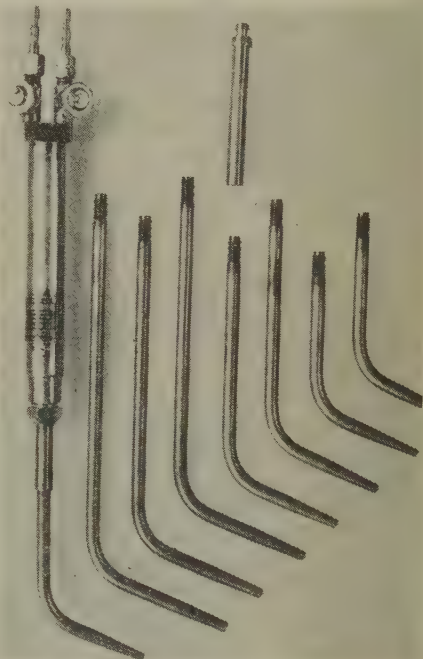
A special self-contained portable table, for use when machining small pieces, and which may be removed when the machine is wanted for larger work, is mounted on the bed plate. This table has movement in two directions, parallel with the spindle travel and parallel with the column travel. It is operated by hand, but the arrangement is such that an electric motor can be applied to provide table milling feeds and rapid traverse.



The Machine Combines Floor and Table Type Boring, Drilling and Milling Units. It was designed for use in machining both small and large pieces

Blowpipe Weighs 14 Ounces

THE Air Reduction Sales Co. has placed into production blowpipes known as style 8800 and style 8900, the latter of which is illustrated. The tips are made of seamless copper tubing, tapered and bent to an angle of $67\frac{1}{2}$ deg. Any one of these may be screwed into the mixer head, and this joint is so far from the heat of



Style 8900 Airco Welding Torch and Extra Tips

the flame that maintenance of a correct gas-tight joint is found to present no difficulty. Two mixing heads are provided, one for the smaller flames necessary for sheet metal, and the other to produce larger flames for steel plate.

Style 8800 is designed on similar lines, but is intended for general use where the heaviest sections may have to be welded. With No. 5 tip, the length is 17 in. and the weight 29 oz. Style 8900 with No. 1 tip is 14 in. long and weighs only 14 oz. The latter is equipped with light-weight hose and 3/16-in. connections.

Indianapolis Steel Treaters Elect Officers

A most successful year has been concluded by the Indianapolis Chapter, American Society for Steel Treating. At the annual frolic, held this year at Idelwood Park, the following officers for 1928-29 were elected:

Chairman: Edward J. P. Fisher, research metallurgist, Diamond Chain Mfg. Co.

Vice-Chairman: Carl J. Winkler, general superintendent, Schwitzer-Cummings Co.

Secretary: Nelson R. Gorsuch, industrial engineer, Citizens Gas Co.

Treasurer: Richard S. Smith, assistant director of research department, E. C. Atkins Co.

Foundrymen's 1929 Meeting in Chicago

Non-Operating, Limited Space Exhibition to Be Held in Hotel—Apprentice Contest Awards Announced

THE American Foundrymen's Association will hold its 1929 convention and exhibit at the Hotel Stevens, Chicago, the week of April 8. This was decided at a meeting of the board of directors held recently in Chicago. The exhibition hall of the Hotel Stevens will be utilized for exhibits and because of the limited space the size of booths will be restricted and there will be no exhibits in operation. Consideration was given to several plans, but there was unanimous adoption of the idea of limiting the scope of the exhibition next year. A larger exposition with operating exhibits will be held in 1930.

At its meeting the board of directors received the reports of judges of apprentice molding and pattern making contests and the awarding of certificates was authorized.

Winners of the pattern making contest were:

1. Frank F. Cuzzzone, General Electric Co., Schenectady, N. Y.
2. Arnold H. Behrens, Milwaukee Pattern & Mfg. Co., Milwaukee.
3. John Albert Anderson, John Deere Harvester Works, East Moline, Ill.

Winners of the gray iron molding contest were:

1. Peter G. Bathgate, Brown & Sharpe Mfg. Co., Providence, R. I.
2. George A. Shuster, Jr., Olney Foundry Co., Philadelphia.
3. Attilio Rocchi, Cresson-Morris Co., Philadelphia.

Only one prize was awarded in the steel molding contest because the castings submitted from Milwaukee were lost in transit and the second and third prizes will be announced later. Alex. Cooke, General Electric Co., Schenectady, N. Y., was winner of the first prize.

A resolution was adopted by the board of directors that the American Foundrymen's Association petition the United States Government to include in its biennial census of manufactures statistics on the number of young men being trained in various industries by formal or indentured apprenticeship, together with the proportion which this number bears to the number of skilled mechanics in each industry. The resolution commented on the fact that the training of young men for the foundry industry and for industry in general is handicapped by such lack of information.

Research Policy

The board authorized the appointment of a committee of five representing various branches of the industry to determine policies of the American Foundrymen's Association regarding research work and appropriations for that purpose. It referred to a committee of three the report of the committee on gray iron castings which recommended a program of joint research in cast iron,

the American Foundrymen's Association to cooperate with the Engineering Foundation, the Gray Iron Institute and others.

Uniform cost systems adopted by the Steel Founders' Society of America and the Malleable Iron Research Institute were recommended to all steel and malleable foundries, and the board decided to encourage the Gray Iron Institute to develop a uniform cost system for gray iron foundries. The organization of a representative group of non-ferrous foundries to develop a uniform cost system was also recommended.

Action on Standards

The recommendations of the joint committee on molding sand research that two tentative procedures for testing sand be advanced to standard, that two new tentative procedures be established and that some minor changes be made in the wording of others to clarify the text were approved. The printing of a new pamphlet showing standard and tentative methods of tests for molding sand was authorized.

Covel-Hanchett Co. Buys Badger Tool Co.

The Covel-Hanchett Co., Big Rapids, Mich., has purchased the Badger Tool Co., Beloit, Wis., manufacturer of heavy-type disk grinding machines. All of the equipment of the Badger company at Beloit will be moved to Big Rapids, Mich., and the Badger line will be manufactured in the Hanchett plant at that place.

A few months ago the Covel-Hanchett Co. bought the Wilmarth & Morman Co. plant at Grand Rapids, Mich., and now, with the addition of the Badger line, it will manufacture an almost complete line of grinding machinery, excepting internal and roll grinding machinery.

Simplification for Woven Wire Fencing

The Division of Simplified Practice, United States Department of Commerce, announces that simplified practice recommendation No. 9 on woven wire fencing, which was recently revised by the industry, is in effect as of July 1, subject to annual revision. The original recommendation, as adopted by the industry, reduced the variety of woven wire fencing from 552 to 69, and woven wire fence packages from 2072 to 138. The revised recommendation further reduced this to 62 and 117, respectively.

The board also approved the tentative standard malleable foundry refractories' shapes and sizes adopted by the joint committee on foundry refractories and passed upon favorably by the Division of Simplified Practice, United States Department of Commerce. The board authorized the appointment of a committee to consider the advisability of sponsoring a joint committee to draft uniform trade customs for the castings industry.

Resolutions were adopted in appreciation of the work done for the association by the retiring president, Stuart Wells Utley, and by two retiring directors, Jesse L. Jones and Herbert S. Simpson. The new board of directors was organized with the new president, S. T. Johnston of the S. Obermayer Co., Chicago, in the chair. C. E. Hoyt was reelected secretary-treasurer and manager of exhibits and R. E. Kennedy was reelected technical secretary. S. W. Utley, A. B. Root, Jr., S. C. Vessy and A. E. Hageboeck, who are directors, were elected members of the executive committee to serve with the president, vice-president and executive secretary. The resignation of W. D. Goldsmith as a director was accepted, the vacancy being filled by the election of H. Cole Estep, Penton Publishing Co., Cleveland.

New Plant for Preparing Foundry Sand

George F. Pettinos, 1206 Locust Street, Philadelphia, has recently put into operation a new plant near Millville, N. J., for the screening and washing of molding and core sand. The product, which is to be known as "Foundry Flints," is being marketed with emphasis on the smooth roundness of the flints and the care with which they are prepared. With grain sizes which, it is stated, are properly proportioned, a given amount of oil will go much further in making cores than would be the case with sand of irregular shape.

Inland Steel Buys Additional Land

The Inland Steel Co., Chicago, has bought a tract of 128.6 acres adjoining the Indiana Harbor, Ind., plant of the Youngstown Sheet & Tube Co. The land is the last unoccupied section in the vicinity of the Indiana Harbor plant of the Inland Steel Co. and was bought to provide room for future development. There are no immediate plans for the improvement of the property. The land was bought from Princeton and Harvard universities and the Massachusetts Institute of Technology, joint beneficiaries in the will of the late Henry C. Frick, former owner. The consideration was \$543,000.

Business Analysis and Forecast

Favorable Trade Conditions Are Strong

Business Still Following Downward Path Predicted by
P-V Line—No Serious Recession Likely

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

THAT demand and supply conditions are temporarily in balance may be indicated by the fact that the P-V line remained unchanged last month. Accordingly, commodity prices also were little changed, though such trend as has appeared has been downward. Business on the whole receded in June and in early July, as is clearly reflected in volume of freight tonnage, imports and steel production. Nevertheless, stocks of manufactured commodities in producers' hands are rather large in a number of industries. Industry in general is very spotty. A number of leading companies in the more active industries have been able to do very well, and report better earnings for the second quarter, but narrow

margins of profit are hurting the rank and file in many lines and reports of severe competition and numerous failures show that the average condition is but fair.

On the whole, the favorable conditions, aside from money and credit, are strong, and preliminary estimates indicate that the crop prospects are reassuring, except in the case of spring wheat. With demand in the key industries (building, automobiles, steel) good and the leading companies in a very strong financial position, business prospects for the fall are fair. Probably a little further recession in business activity will occur, but it will not be much more than seasonal and is likely to be followed by a period of irregular stability.

The year-end prospects, however, continue uncertain.

THREE chief problems, or questions, bearing on the business outlook, are found in bank credit, crops and the position of certain backward industries. If developments in these respects are satisfactory, the business situation will continue good; otherwise a downward trend may be expected.

As to the position of bank credit and money, no material change has occurred recently. Bank reserve ratios are relatively low in comparison with those of recent years, the Federal Reserve ratio being about 69 per cent in comparison with 79 a year ago. Loans and discounts are high in com-

Factors in the General Business Outlook

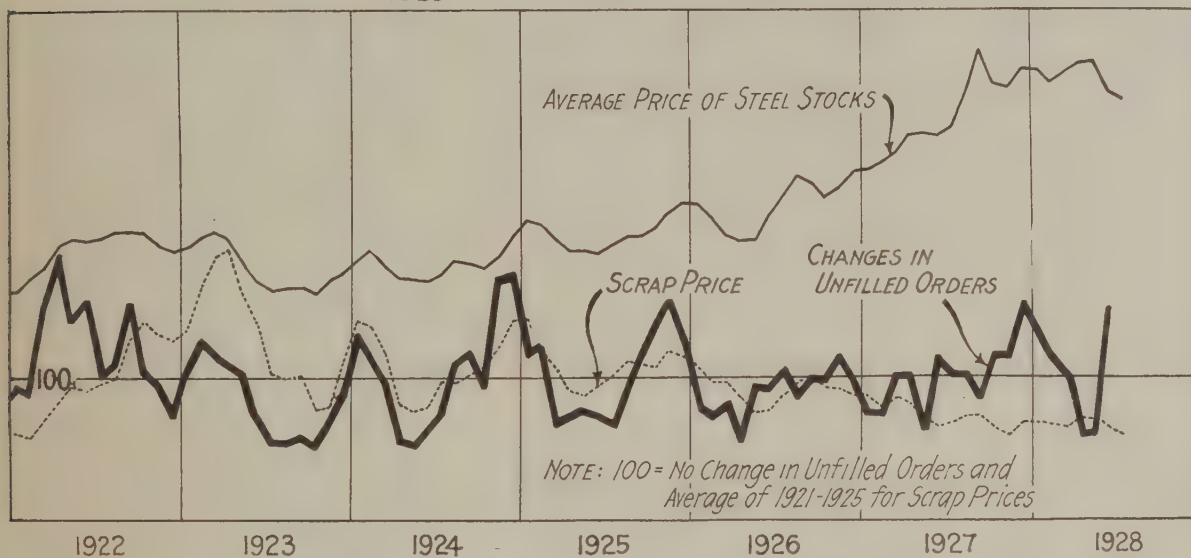
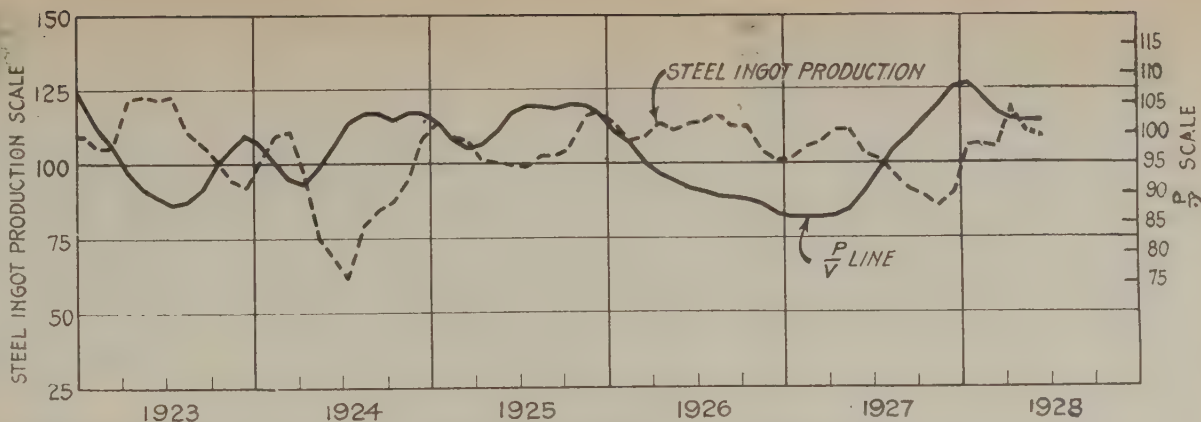
Favorable Factors

- (1) *Building activity continued its upward trend in June*
- (2) *Automobile production, though declining, is in large volume, considering the season*
- (3) *Retail trade volume is fairly large and continued to gain in June*
- (4) *Crop prospects good*
- (5) *Merchandise exports gained in June, considering the season*
- (6) *Unfilled steel orders increased*
- (7) *Strong financial position of most leading companies*
- (8) *Light mercantile inventories*

Unfavorable Factors

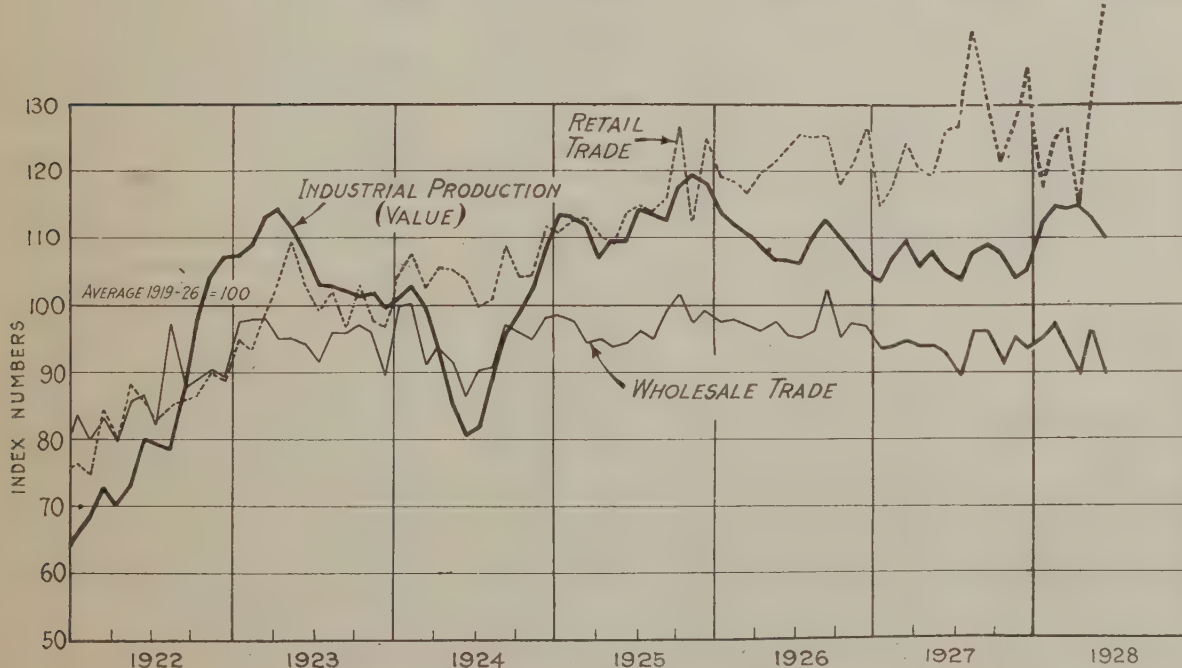
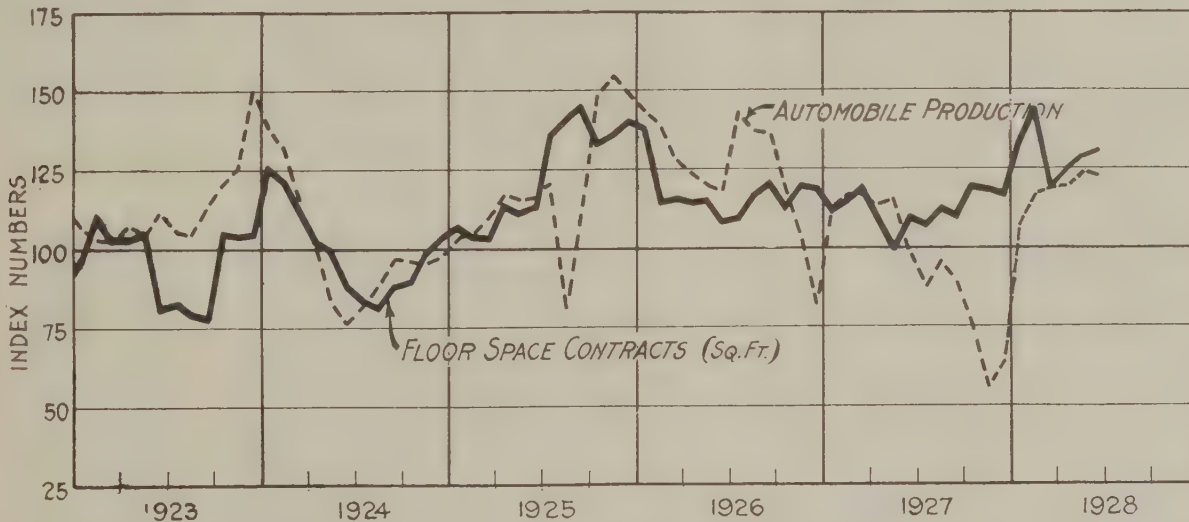
- (1) *Bank credit moderately strained and money rather tight*
- (2) *Declining commodity prices*
- (3) *Railroad freight traffic and revenue lower in June, with little improvement since then*
- (4) *A considerable number of industries are in an unfavorable position (textiles, rubber, paper, sugar, coal and pig iron; excess supply of crude and fuel oil)*
- (5) *Severe competition and narrow profit margins*
- (6) *Business failures numerous*
- (7) *Factory labor employment 4 per cent under a year ago*
- (8) *Political uncertainties*

DOWNWARD
Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Has Stopped. Steel Production (adjusted) after rising for five months has moved downward for two months



UNFILLED
Orders Have Again Turned Upward; Stock Prices, Though at a High Level, Are Irregular and Scrap Prices Are Weak. The two latter indexes point to lower operating conditions

BOTH Building Activity and Automobile Output Showed Great Strength in June. They are higher than at the same season in any of the past five years



RETAIL Trade Continues to Show Improved Buying Sentiment. Wholesale business remains slow, while industrial production is well in line with retail sales

parison with net demand deposits, running 119 per cent, against 109 per cent last year at this time. Brokers' loans in particular are out of line, the figure at this writing being \$4,184,000,000, against \$3,141,000,000 last year. The member banks are heavily in debt at the Reserve Banks, bills rediscounted amounting to well over \$1,000,000,000, in comparison with only \$398,000,000 at this time in 1927.

Money rates are above normal and tending to become higher. All this has been brought to a head by heavy gold exports during recent months, though the present situation has been forced by an over-extension of credit for speculation in stocks and in real estate. No relief is probable until there has been a large amount of liquidation in brokers' loans, which will allow a reduction in bills rediscounted. This situation at present is unfavorable, not only as to the outlook for investment securities, but also for business since *high money rates tend to check building operations and the purchase of equipment, to say nothing of their general effect on the cost of working capital and on financing of installment sales.*

The crop outlook is fairly good, and is reassuring as to the probability of any trouble developing in the farm situation. Some unfavorable aspects appear in the wheat crop, as spring wheat in the Northwest has shown up rather poorly, while the large Canadian wheat crop that is promised, together with the accumulation of winter wheat in the Southwest, threatens lower prices. But most of the other crops promise to be average or above average, and farm prices average so much above a year ago that the gross income of the farmers will probably be larger. Hogs are higher, the excess production being remedied, and afford a better market for the corn crop, volume of the latter being estimated at somewhat below last year's crop and the five-year average. Fruit crops in general are good and notably so on the Pacific Coast.

As to the sore spots among the industries, they continue sore—textiles, coal, paper, rubber, oil. No signs of sustained material improvement have appeared. Conditions in such industries must act as a drag on the progress of all industries taken together. The troubles of these backward industries, however, are not acute, but are a rather chronic condition to which we have become more or less adjusted during recent years.

Clearly the most threatening aspect of the business situation is to be found in money and credit.

Declining Steel Production Follows P-V Line

IF we make due allowance for the usual seasonal variations, the output of steel ingots in June declined for the second month in succession. This appears to be in response to the preceding action of the P-V line,

which barometer reached its peak in January. In June, however, the P-V line ceased to decline and its action indicates a temporarily stabilized position, with the general industrial output about in balance with the nation's demand at the present level of prices. The further trend of this barometer seems doubtful. It is determined by the ratio between commodity prices and the physical volume of trade, and, as the trend of prices seems to be slightly downward, any increase in physical volume (allowing for seasonal variation) would bring renewed decline.

Until the P-V line actually turns upward, we will consider the underlying tendency both in general business and in steel production to be downward and any increase in the monthly indexes to be temporary. Present indications suggest a fairly stable rate of steel production, with any change probably in the nature of a moderate and gradual recession.

Construction and Automobile Output Rounding Off

DURING recent months the steel industry and industry in general have been strongly supported by the activity in the building and automobile industry. It is, therefore, of much interest to note the trends established by the final June figures for these two key industries, and the more so because the two usually run together. We are again impressed with the appearance of "rounding off" in the two curves shown in the second chart.

Automobile production in the United States and Canada in June amounted to 425,100 cars and trucks, or 16,500 a day. This compares with 460,000 in May, or 17,690 a day. The decline is greater than usual for the season and our adjusted index, as shown in the chart, is 122.2 against 123.6 in the preceding month (the average for 1921-1927 is equal to 100). The June figure is record-breaking for that month, but it represents a real decline from May, and on the seasonally adjusted basis is exceeded by as many as ten months in the years 1925 and 1926. The automobile business has seen its seasonal peak for the year and will probably decline steadily during the remainder of 1928, though whether the decline will be much more than usual for the season remains uncertain.

Building activity fell off in June, but the decline was a little less than usually occurs in that month, and our adjusted index rose slightly, being 130.6 in comparison with 128.7 in May. This increase in the adjusted index is smaller than the increase of May over April, so that the rise in the building production curve has tapered off. Moreover, July weekly figures appear to indicate a decided decrease and are running behind a year ago, when building activity was relatively low. It should be remembered that the increase in vacancies

reported, on the one hand, and the high cost of money, on the other, are tending to curtail speculative building operations in cities, which operations have been an important factor in the last few months. In a word, in June these key industries, while fully normal in activity and furnishing strong support for the steel industry, showed indications of passing their peak and rounding off for a decline.

Industrial Output and Trade Hold Up Well

THE situation revealed in the third chart, dealing with production and trade, is not unfavorable. The total value of the industrial output in June, based on the Federal Reserve Board's index of production and Bradstreet's price index, was considerably above the average for 1919-1926, though below the level of retail sales. The trend of industrial production values was downward in May and June, and we know that freight traffic fell off and commodity prices were lower. This is as forecast by the P-V line.

Retail trade reached a new peak in June, judged by old standards, but the continued addition of new stores to the growing mail order and chain organizations has deprived our old indexes of much of their value. Even department store sales taken alone, however, were higher with reference to the average for 1919-1926 than the curve of industrial production values. Wholesale trade decreased in June and continues relatively low.

Little to Be Hoped for in Stock Market

OUR unfilled steel orders barometer has turned sharply upward, due to the change from a condition of decline to one of increase. As noted in a previous review, the circumstances make such a sharp rise unconvincing and judgment as to its significance should be suspended. Prices of heavy melting steel scrap at Pittsburgh declined in June, the average for the month being \$14.45 against \$15.25 in May. The July average will show a further decline, the figure for the first three weeks being \$14.08 and the latest price being \$14.25.

Although there has been a little response recently to the increase in the unfilled orders, the average price of a representative group of steel stocks fell sharply in June, the figure for that month being 150.5 in comparison with 160.7 in the preceding month, a drop of 6.3 per cent. At this writing steel stocks are showing a little strength, but the average for the first three weeks of July is only 148.1—a further small decline. In view of the money situation, no sustained recovery seems probable, and steel stocks are likely to suffer as a result of the apparent necessity for further general liquidation in securities.

June Continues Large Exports

Half-Year 20 Per Cent Ahead of 1927—Imports

Less in June, but Half-Year

Was 1½ Per Cent Up

WASHINGTON, July 27.—Maintaining their high rate, exports of iron and steel products from the United States in June aggregated 262,052 gross tons, which was only 5738 tons under the total of 267,890 tons exported in May, the largest monthly amount since February, 1921, when the volume was 393,328 tons. For the six months ended with June, exports amounted to 1,358,742 tons, or 225,315 tons over the total of 1,133,427 tons for the corresponding period of last year, an increase of a little less than 20 per cent. The reduction of 20 per cent in freight rates on iron and steel for exportation, effective Jan. 1, 1928, is assigned as one leading reason for the rising trend of exports. It is understood that this reduction, made "experimental" for one year, will be continued by the carriers, provided iron and steel exports

show an increase of 20 per cent, and that amount of gain has been almost reached so far this year.

Imports of iron and steel in June declined to 65,819 tons, a drop of 6287 tons under the 72,106 tons exported in May. For the six months ended with June, however, a slight increase, amounting to 6511 tons, was made over the corresponding period of last year, the respective totals being 389,895 tons and 383,384 tons.

Based on daily movement, exports in the 30 days of June were at a higher rate than in the 31 days of May, the June shipments averaging 8735 tons as against 8642 tons in May.

One of the important factors swelling the June shipments was scrap, exports of which amounted to 64,918 tons, against 59,417 tons in May, both being large quantities for this prod-

uct. Japan is said to be a controlling market in exports of scrap, and evidently is importing large quantities by reason of a shortage of pig iron. Exports to Japan, amounting to 18,551 tons, were greater than those to any other country in June. Canada ranked second, taking 13,797 tons. Italy took 12,622 tons; Poland and Danzig, 8990 tons, and Germany, 8713 tons. For the six months ended with June, exports of scrap totaled 250,455 tons, against 104,710 tons for the corresponding period of 1927.

Next to scrap, the largest item of exportation in June was tin plate, with a total of 22,276 tons, of which Canada took 5558 tons; Japan, 3195 tons; China, 2945 tons; Argentina, 2456 tons, and Mexico, 1179 tons. For the six months ended with June, exports of tin plate totaled 125,099 tons, against 152,767 tons for the first

Exports of Iron and Steel from the United States
(In Gross Tons)

	June		Six Months Ended June	
	1928	1927	1928	1927
Pig iron	5,674	4,863	25,329	22,539
Ferromanganese	338	75	4,861	293
Scrap	64,918	26,111	250,455	104,710
<i>Pig iron, ferroalloys and scrap</i>	<i>70,930</i>	<i>31,049</i>	<i>280,645</i>	<i>127,542</i>
Ingots, blooms, billets, sheet bar, skelp.....	5,198	12,096	56,930	39,335
Wire rods	4,818	1,625	18,479	8,612
<i>Semi-finished steel</i>	<i>10,016</i>	<i>13,721</i>	<i>75,409</i>	<i>47,947</i>
Steel bars	13,316	6,874	70,768	56,576
Alloy steel bars.....	1,276	732	7,492	3,029
Iron bars	158	487	1,818	2,516
Plates, iron and steel....	14,529	10,126	71,726	70,352
Sheets, galvanized	10,420	14,108	75,076	85,955
Sheets, black steel.....	19,223	12,136	90,311	90,229
Sheets, black iron.....	1,612	1,656	7,488	8,895
Hoops, bands, strip steel...	4,820	4,567	27,697	25,371
Tin plate; terne plate....	22,276	18,543	125,099	152,767
Structural shapes, plain material	19,356	11,744	89,873	66,222
Structural material, fabricated	11,476	6,824	42,294	33,165
Steel rails	12,483	11,601	109,586	97,917
Rail fastenings, switches, frogs, etc.	1,998	3,178	27,574	18,152
Boiler tubes, welded pipe and fittings	22,886	20,412	121,113	147,889
Plain wire	4,660	2,740	23,701	15,903
Barbed wire, and woven wire fencing	7,000	5,004	38,427	23,249
Wire cloth and screening..	169	171	846	1,130
Wire rope	430	407	2,578	2,406
Wire nails	1,300	581	8,607	3,572
Other nails and tacks....	1,091	744	5,265	3,999
Horseshoes	26	45	205	247
Bolts, nuts, rivets and washers, except track	1,281	969	6,500	5,753
<i>Rolled and finished steel</i>	<i>172,286</i>	<i>133,649</i>	<i>954,044</i>	<i>915,294</i>
Cast iron pipe and fittings	3,101	2,315	17,362	13,120
Car wheels and axles.....	1,702	947	7,624	9,605
Iron castings	754	568	6,386	5,799
Steel castings	812	911	5,240	4,187
Forgings	1,184	338	4,861	2,729
<i>Castings and forgings..</i>	<i>7,553</i>	<i>5,079</i>	<i>41,473</i>	<i>35,440</i>
All other	1,267	1,149	7,171	7,204
Total	262,052	184,647	1,358,742	1,133,427

Imports of Iron and Steel into the United States
(In Gross Tons)

	June		Six Months Ended June	
	1928	1927	1928	1927
Pig iron	11,799	13,497	75,295	60,319
Ferromanganese*	5,870	1,636	24,405	12,428
Ferrosilicon†	747	263	2,092	5,663
Ferrochromium‡	76	.....	338	382
Scrap	7,715	5,992	22,841	33,922
<i>Pig iron, ferroalloys and scrap</i>	<i>26,207</i>	<i>21,388</i>	<i>124,971</i>	<i>112,714</i>
Steel ingots, blooms, billets and slabs	2,054	1,037	11,866	6,545
Iron blooms, slabs, etc....	.....	.....	4	.....
Wire rods	1,119	597	9,417	6,599
<i>Semi-finished steel</i>	<i>3,173</i>	<i>1,634</i>	<i>21,287</i>	<i>13,144</i>
Rails and splice bars....	3,282	3,238	9,646	10,114
Structural shapes	14,438	12,563	88,686	75,336
Boiler and other plates...	2,215	285	3,157	2,540
Sheets and saw plates....	2,110	1,395	14,839	7,423
Steel bars	5,742	9,209	50,312	50,825
Bar iron	418	264	1,350	2,382
Hoops, bands and cotton ties	1,224	2,433	10,530	14,692
Tubular products (wrot.)..	2,773	7,583	21,055	32,492
Nails, tacks, staples.....	688	703	3,843	3,174
Tin plate	42	42	592	892
Bolts, nuts, rivets and washers	17	40	143	137
Round iron and steel wire	344	426	2,022	2,351
Barbed wire	183	284	1,749	2,846
Flat wire; strip steel....	103	215	153	1,421
Steel telegraph and telephone wire	25	3	1,162	30
Wire rope and strand....	184	259	803	1,363
Other wire	1	26	278	255
<i>Rolled and finished steel</i>	<i>33,789</i>	<i>38,968</i>	<i>210,320</i>	<i>208,273</i>
Cast iron pipe.....	2,525	6,886	31,517	47,545
Castings and forgings....	125	141	1,800	1,708
Total	65,819	69,017	389,895	383,384
Manganese ore*	12,650	36,851	83,917	336,603
Iron ore	188,892	231,815	1,268,413	2,636,933
Magnesite (dead burned)..	7,825	3,471	27,474	49,587

*Manganese content only.

†Silicon content only.

‡Chromium content only.

half of 1927. Of the six months' total for the present year, Japan took 26,683 tons, against 29,998 tons, while Canada took 23,387 tons, compared with 24,950 tons for the corresponding period of last year. Tin plate exports in May were 22,462 tons.

Exports of plain structural material in June totaled 19,356 tons, of which Canada took 17,377 tons. For the six months ended with June, exports of this material aggregated 89,873 tons, against 66,222 tons during the corresponding period last year. In May, exports of structural material were 18,498 tons. For the first half of the current year Canada took 75,492 tons, against 53,905 tons for the first six months of 1927.

Black steel sheets to the quantity of 19,223 tons were exported in June, of which 9767 tons went to Canada and 7207 tons went to Japan. For the first six months of 1928, exports of black sheets amounted to 90,311 tons, against 90,229 tons for the corresponding period of last year. Canada was the destination of 40,500 tons of this product during the first half of the present year, against 39,223 tons for the corresponding period of last year. Exports to Japan were 37,430 tons and 37,551 tons, respectively.

Of the 14,529 tons of plates exported in June, 12,202 tons went to Canada. For the first six months exports of plates were 71,726 tons, of which Canada took 60,534 tons. For the corresponding period of last year this class of exports totaled 70,352 tons, of which Canada took 55,991 tons.

Exports of boiler tubes and welded pipe in June totaled 21,281 tons, of which 9456 tons was casing and oil line pipe, 6905 tons was black welded pipe, and 3519 tons was galvanized pipe. These shipments were distributed to markets all over the world where there are oil operations.

Of the casing and oil exports in June, 2804 tons went to Venezuela, 1422 tons to Argentina, 672 tons to Canada, 630 tons to Mexico and 524 tons to Rumania. Japan took 1749 tons of black welded pipe; Canada, 898 tons; the United Kingdom, 673

tons, and Argentina, 479 tons. Galvanized pipe exports were distributed in small lots, the Dominican Republic taking the largest single quantity, amounting to 487 tons.

North and Central America and the West Indies took 124,397 tons of the June exports and 650,589 tons during the first half of the current year, against 558,960 tons for the corresponding period of last year. Canada and Newfoundland alone took 100,855 tons in June and 535,178 tons during the first six months of 1928, against 433,264 tons during the corresponding period of 1927. South America took 35,452 tons in June and 219,525 tons during the first six months of the present year, against 186,714 tons during the first six months of last year, Argentina leading.

Europe took 41,928 tons in June and 149,734 tons during the first half, against 90,664 tons during the corresponding period of last year. The Far East took 58,731 tons in June and 330,989 tons during the first six months, against 286,613 tons during the first six months of 1927. Japan took 40,387 tons in June, 181,572 tons during the first six months of the present year and 148,402 tons during the first six months of last year, and was (next to Canada) the largest consumer of steel products from the United States during all three periods.

The decrease in imports in June was due largely to the drop in incoming shipments of cast iron pipe when compared with May, the totals being

2525 tons and 9150 tons, respectively. Of the June imports of cast iron pipe, 1798 tons came from France and 450 tons from Germany. Pig iron imports rose to 11,799 tons in June, against 9732 tons in May. For the first six months they were 75,295 tons, against 60,319 tons for the corresponding period of last year. Of the June imports, 6726 tons came from the United Kingdom; for the first six months, imports from that country were 34,727 tons. British India supplied 3792 tons in June and 23,780 tons during the six months' period.

Of the 14,438 tons of structural shapes imported in June, 7287 tons came from Belgium, 4363 tons from France and 2585 tons from Germany. Of the 5742 tons of steel bars imported in June, 2574 tons came from Belgium, 1355 tons from Sweden and 1081 tons from France. Ferromanganese imports in June amounted to 5870 tons, of which 3256 tons came from Canada, 1357 tons from the United Kingdom and 1127 tons from Norway.

Soviet Russia supplied 4120 tons of the 12,650 tons of manganese ore concentrates imported in June, while 3131 tons came from Brazil, 3009 tons came from India and 2282 tons from British West Africa.

Belgium, with 13,555 tons, was the largest source of imports in June. The United Kingdom ranked second, with 11,623 tons, while Canada was third, with 10,524 tons. Germany and France supplied 9705 tons and 9150 tons, respectively.

Shrinkage in Imports of Iron Ore

IMPORTS of iron ore into the United States in June are reported by the Department of Commerce at 188,892 gross tons, compared with 211,270 tons in May. The June imports are the smallest since March and compare with 231,815 tons a year ago. For the first half-year the total was 1,268,413 tons, a reduction of about 1 per cent from last year's 1,280,756 tons.

Chile, with more than half the total, maintained its lead as a source of supply. French Africa in the six months has taken second place, which was held by Cuba last year. There was a gain of about 10 per cent in receipts from French Africa and a reduction of nearly 64,000 tons in the Cuban ore. Sweden sent 70,000 tons less than a year ago, no ore coming

from that country during June. On the other hand, Canada gained about 37,500 tons in the first half year, compared with 1927.

Details of the June shipments and of those of the first half year are shown in the table.

Meeting of American Manganese Producers

The annual meeting of the American Manganese Producers' Association will be held at the Mayflower Hotel, Washington, Sept. 10 and 11. A review of the progress of domestic manganese developments in the past year and prospects for the future will be presented. All persons interested in the development of American manganese are expected to be present. J. Carson Adkerson is president of the association.

Imports of Iron and Steel Products into the United States in June

From	Gross Tons
Austria	12
Belgium	13,555
Czechoslovakia	51
France	9,150
Germany	9,705
Hungary	141
Italy	115
Netherlands	950
Norway	1,460
Spain	196
Sweden	2,988
Switzerland	2
United Kingdom	11,623
Europe	49,948
Canada	10,524
Mexico	44
Cuba	3
Dominican Republic	806
Ecuador	700
America	12,077
British India	3,792
China	1
Japan	1
Total	65,819

SOURCES OF AMERICAN IMPORTS OF IRON ORE

	June		Six Months Ended June	
	1928	1927	1928	1927
Canada	303	970	42,726	5,179
Cuba	25,500	22,000	179,286	243,000
Chile	90,800	132,900	715,500	687,900
Spain	6,653		11,903	3,919
Sweden		22,776	19,614	89,120
French Africa	47,350	44,241	241,371	219,031
Other Countries	18,286	8,928	58,013	32,607
Total	188,892	231,815	1,268,413	1,280,756

Little Activity in European Markets

British Bank More Furnaces—Production in Germany Is Less and Orders Fall Off—France Pushes Internal Business

(By Cable)

LONDON, ENGLAND, July 30.

NORTH-EAST COAST producers have banked three additional blast furnaces, of which two were making hematite, leaving only 29 North-East Coast furnaces, including seven on hematite, now active. The industry, generally, is depressed, though export demand is improving slightly.

Foreign ore markets are idle. The Swedish strike has entered its seventh month without any sign of terminating.

Finished steel markets, generally, are quiet. Scottish plants are reopening this week, but there is no large accumulation of orders. There is some business to be had because of a stiffer tendency in Continental steel. But export sales are negligible, except in certain specialties.

Tin plate demand is improving. There is good export inquiry for mod-

erate lines, and Welsh makers hope to obtain enough business so that the industry may work generally at over 90 per cent of capacity. The forward position is being maintained, but some makers are anxious to dispose of August tin plate orders accepted at below 18s. basis, IC, f.o.b. works port.

Galvanized sheet markets are quiet, with an easier tendency. Black sheets are dull, but rollers of Japanese thin sheets are well placed for several weeks ahead.

On the Continent of Europe

Continental steel markets are strong. Germany is reported well sold on direct export orders. Syndicate prices are advancing, sheet bars being quoted up to £5 (\$24.30) a metric ton. Demand from Britain is quiet, owing to the holiday periods.

French production of pig iron in June was 844,000 metric tons; of raw steel, 797,000 tons.

products. While French and Saar district furnaces are selling increasing quantities of pig iron to consumers in South Germany, reports of large tonnages of British iron sold to this district are said to be somewhat exaggerated.

June output of pig iron totaled 1,021,350 metric tons, compared with 1,044,046 tons in May and 1,067,583 tons in June, 1927. Total production of pig iron in the first half of the year was 6,586,380 metric tons, slightly larger than the first half of 1927 with 6,365,057 tons.

The report of the Vereinigte Stahlwerke A. G., Dusseldorf, for the second quarter of this year, which is the third quarter of the company's business year, shows a decline in production and total sales, but an increase in exports. Pig iron output declined to 1,541,871 tons compared with 1,703,105 tons in the first quarter of the year, and steel ingot production to 1,619,150 metric tons compared with 1,842,187 tons in the first quarter. During the quarter the number of employees was reduced from 182,014 to 177,000. The decline in output of pig iron by 10.5 per cent and of steel by about 14 per cent is explained in the report as seasonal. During the quarter the company blew out one furnace and blew in a new furnace at its August Thyssen Huette at Hamborn. Unfilled tonnage at the end of the second quarter was 89.4 per cent of the unfilled tonnage at the

German Output Decreases

Unfilled Tonnage of United Steel Works Smaller—Prices Continue Unchanged

BERLIN, GERMANY, July 14.—The industrial outlook has not improved and no increase in demand for iron and steel seems to be expected for the rest of this year. The total of unemployed is declining, but the reduc-

tion in the number has been much smaller than during the first half of last year. The Pig Iron Syndicate is selling iron for August delivery at unchanged prices and no change has been made in domestic prices of steel

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

	Durham coke, del'd.....	£0 17½s. to £0 17¾s.	\$4.25 to \$4.31
Bilbao Rubio ore*.....	1 2½		5.48
Cleveland No. 1 fdy.....	3 8½	to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy.....	3 6		16.04
Cleveland No. 4 fdy.....	3 5		15.80
Cleveland No. 4 forge....	3 4½		15.68
Cleveland basic (nom.)..	3 5		15.80
East Coast mixed.....	3 8	to 3 9	16.53 to 16.77
East Coast hematite.....	3 10½		17.13
Rails, 60 lb. and up.....	7 15	to 8 5	37.66 to 40.10
Billets	6 0	to 6 15	29.16 to 32.81
Ferromanganese	13 15		66.83
Ferromanganese (export)	13 0	to 13 5	63.18 to 64.39
Sheet and tin plate bars, Welsh	6 0		29.16
Tin plate, base box.....	0 18	to 0 18¼	4.37 to 4.43
Black sheets, Japanese specifications	13 7½		65.00
Ship plates	7 12½	to 8 2½	1.63 to 1.74
Boiler plates	9 0	to 10 10	1.92 to 2.25
Tees	8 2½	to 8 12½	1.74 to 1.84
Channels	7 7½	to 7 17½	1.58 to 1.69
Beams	7 2½	to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 5	to 7 15	1.55 to 1.66
Steel hoops	9 0	to 10 0	1.92 to 2.14
Black sheets, 24 gage...	9 15	to 10 0	2.09 to 2.14
Galv. sheets, 24 gage....	13 7½		2.86
Cold rolled steel strip, 20 gage, nom.	16 0		3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports			
(Per Metric Ton)			
Foundry pig iron (a):			
Belgium	£3 3s.	to £3 5s.	\$15.32 to \$15.80
France	3 3	to 3 5	15.32 to 15.80
Luxemburg	3 3	to 3 5	15.32 to 15.80
Basic pig iron (nom.):			
Belgium	3 1	to 3 2	14.82 to 15.07
France	3 1	to 3 2	14.82 to 15.07
Luxemburg	3 1	to 3 2	14.82 to 15.07
Coke	0 18		4.37
Billets:			
Belgium	4 15½		23.21
France	4 15½		23.21
Merchant bars:			
Belgium	5 16		1.28
France	5 16		1.28
Luxemburg	5 16		1.28
Joists (beams):			
Belgium	4 18		1.08
France	4 18		1.08
Luxemburg	4 18		1.08
Angles:			
Belgium	5 10	to 5 12½	1.21 to 1.24
½-in. plate:			
Belgium (a)	6 12		1.45
Germany (a)	6 12		1.45
¾-in. ship plate:			
Belgium	6 8		1.41
Luxemburg	6 8		1.41
Sheets, heavy:			
Belgium	6 1		1.33
Germany	6 1		1.33

(a) Nominal.

beginning of the business year last October, whereas, at the beginning of this year, unfilled tonnage was 92.3 per cent of the total Oct. 1.

There has been no improvement in the engineering industries, but the monthly report of the Machine Manufacturers' Association states that business as a whole has not shown any further decline. Business in locomotives and textile machinery is quiet. Demand for agricultural machinery has increased as usual at this season and conditions in paper making and printing machinery are reported to be satisfactory.

There are renewed reports of a

merger of three large bridge construction companies, Harkort Bruck-enbau, Flender & Co. and Hein Lehmann & Co. Machine-tool tobacco machinery and textile machinery manufacturers and builders of motors, dredges and cranes are reported to have taken orders to the value of about 40,000,000 m. from the Jugoslavian Government, to be partly paid for on reparations account. It is reported from Amsterdam that all cars on Dutch railroads are to be fitted with Kunze-Knorr brakes by the end of 1929. All German railroad cars will be equipped with these brakes within the same time limit.

French Mills Seek Domestic Orders

Prices Offer More Profit Than Export—Sellers Booked for Five to Six Months

PARIS, FRANCE, July 16.—Some sizable contracts will probably be placed soon in connection with the planned improvement of ports, the second part of the naval program, railroad rolling stock requirements, electrification of railroads and the Loucheur plan for construction of low rent dwellings. A part of these orders, however, will be placed in Germany to reparations account and French industries have exhibited some uneasiness. Minister of Labor Loucheur, however, has stated that in the project for construction of low cost dwellings the portion awarded to Ger-

many on reparations account shall not exceed 20 to 25 per cent of the entire expenditure and that the price paid shall in no case exceed the price at which similar materials could be obtained in France.

Stabilization of the franc has had a favorable influence on the price situation, but export prices have shown further advances. Some increase in domestic prices is expected to result, more in finished material than in other forms, as finishing mills are in many cases quoting prices that have not been advanced with their costs. As a means to improve these prices, efforts are being made to form

"ententes," the latest of which was among the nail manufacturers.

Export prices have registered an advance of about 1s. (24c.) per ton, f.o.b. Antwerp in the past week. Merchant bars have been increased from £5 12s. (1.134c. per lb.) to £5 13s. per ton (1.35c. per lb.). Ordinary specifications of beams have been advanced from £4 16s. 3d. (1.06c. per lb.) a week ago to £4 17s. per ton (1.07c. per lb.). Plates are unchanged at £6 6s. 3d. per ton (1.21c. per lb.), f.o.b. Antwerp for ¼-in.

The efforts made recently by French pig iron producers to form a selling organization have not yet succeeded and formation is not now expected before October. French foundry consumers of hematite iron have protested against any action by the Government on the recent request of the French hematite iron producers that a reduction should be made in the quantities of foreign hematite temporarily admitted free of duties.

Domestic prices of steel continue firm and most mills have booked orders for the next five to six months. At the present price level, mills find a satisfactory margin of profit, which is leading them to seek further domestic orders rather than to compete for export business. This situation is aiding in bringing export prices to a higher level. The strike of dock workers at Antwerp and Rouen caused some temporary delays in shipments abroad, as it confined French shippers to the port of Dunkirk, but this strike has ended and normal conditions again prevail.

Japanese Market Shows Improvement

Prices Well Maintained Despite Imports—Domestic Tin Plate Output Increases

The report of A. Cameron & Co., Kobe, Japan, on Japanese business conditions in June is rather optimistic. It is pointed out that the yen has become fairly stable at about 46½c., which is considered low, as trade returns are rapidly improving and the yen should be at about 47½c. The low rate of the yen is attributed in part to the abnormal conditions in the money market, where call rates have steadily declined until the banks are filled with funds and soon may be compelled to lower their interest rates on deposits.

Black sheets have been in active demand, total arrivals during May being 16,541 tons, more than double the total of April. Of these, 9729 tons came from Great Britain, 4899 tons from the United States, 1396 tons from Germany, 314 tons from Belgium, 5 tons from Sweden and 198 tons from other countries. The large receipts of black sheets in May were something of a surprise, although it is known that small trial orders have been placed by the galvanizers with Belgian, Swedish and other foreign mills. Prices early in the month

were fairly firm, but the large arrivals brought about an easier tendency despite improvement in demand from consumers. At the end of June the market prices on black sheets were 72.50 sen (32.63c.) per sheet for British material; 74.50 sen (33.53c.) per sheet for American and 71.50 sen (32.18c.) per sheet for Kawasaki Dockyard Co. sheets.

With Japanese mills devoting more attention to the manufacture of ordinary sizes of tin plate (14 x 20 in.), some decline in the importation of foreign material seems to be expected. To replace this, an increase in demand for tin plate scrap is developing. The Government Works is steadily increasing its production and unless foreign makers find it possible to meet this competition, in a few years Japan may be importing but very little tin plate. At the end of June American tin plate was selling in this market at 12.20 yen (\$5.52) per 100 lb. base box, British tin plate at 11.80 yen (\$5.34) per base box and domestic tin plate from the Government Works at Yawata at 11.25 yen (\$5.09) per base box.

During June there was a sudden increase in activity in steel bars, speculators being active in the belief that local strikes of stevedores would obstruct the importation of the raw materials for the Government Works and that stocks would be considerably depleted. The strikes, however, were of short duration, with the result that speculators were left with material on their hands. Demand is good and the Government Works has advanced its quotations for future deliveries by 4 yen (\$1.81) per ton. At the end of June steel bars were quoted by the domestic interest at 96 yen (\$43.24) per ton with foreign material at 98 yen (\$44.35) per ton; domestic angles 95 yen (\$42.99) per ton and foreign 100 yen (\$45.25) per ton; domestic beams 89 yen (\$40.27) per ton and foreign 97 yen (\$43.89).

German Company Builds American Aircraft Motors

HAMBURG, GERMANY, July 14.—The Bayrische Motorenwerke, which recently bought the rights for Germany of the American patents covering the "Wasp" and "Hornet" type aircraft motors, is now offering these motors in Germany. Many parts of these motors are being built of "electron," which is said to reduce their weight by as much as 38 per cent.

American Mills More Active for Export

Reported Competing for Japanese Structural Orders—Foreign Steel Marking Considered Here

NEW YORK, July 31.—Export business continues small, but in the past few weeks, it is pointed out by exporters to South American markets and the Far East that American mills seem to be exhibiting more interest in foreign orders than for some time. While there is less evidence of severe competition among mills in the United States, they are reported to be willing to quote prices calculated to secure orders, particularly on bars and shapes.

On tin plate business with Japan, American makers have been rather successful in securing recent orders, but in competing with Welsh mills in South America, as occurred a few weeks ago for a small tonnage of tin plate, they have not been able to submit the lowest bids. About 5200 base boxes of oil can tin plate for the Tokuyama Fuel and Arsenal Department of the Japanese Government have been awarded to a Japanese export house in New York. The provision department of the Japanese Army is expected to open bids about the end of August on about 20,000 base boxes of canners tin plate.

While there is a fair volume of small lot business coming to this country from Japan, orders for light gage black sheets for such large users as galvanizing plants, are small and are expected to continue rather limited for a time as a result of the present boycott of Japanese goods by the Chinese. The political situation that has developed from the divergent views of the Japanese and new Chinese Nationalist Governments over Manchuria, is reported to have resulted in a refusal of many Chinese to handle or use either Japanese products or foreign products handled by Japanese traders. While this might appear to be a condition that would react to the advantage of American exporters and mills, who could transact business direct with the Chinese buyers, it is pointed out that the Japanese trading companies usually handle the credits and financing of sales of American material to China.

Imported Steel Quiet

Importers in New York report a good volume of inquiry for steel bars, structural material, hoops and bands, but not much business has developed as yet. Steel prices continue substantially unchanged at 1.78c. to 1.80c. per lb., base, on plain steel bars, delivered New York, and about 1.68c. per lb. on beams, delivered New York. Consumers have recently shown an interest in wire and wire nails, but no business of consequence is reported to have been closed.

Recently importers of foreign steel have received notifications from the United States Treasury Department that at the protest of a large inde-

pendent steel company their arrivals of foreign bars, shapes and similar material were being investigated for markings of country of origin. For

the past five years or more it has been the practice to bring in such heavy steel material without marks showing the country in which it was manufactured and this is based by the importers on Treasury Decision No. 10,600 made in 1923. Under this decision, it is not necessary to have foreign steel such as plates, shapes, bars and similar heavy material marked.

Youngstown-Ohio River Link Approved

Report to Interstate Commerce Commission Recommends Construction of Branch Line—Decision Not Final

WASHINGTON, July 31.—Construction of two branch lines by the Pittsburgh, Lisbon & Western Railroad, which would afford the Youngstown district direct connection with the Ohio River, was recommended in a proposed report to the Interstate Commerce Commission made public last Friday. The report was prepared by C. V. Burnside, assistant director Bureau of Finance of the commission. He also recommended that the Montour Railroad be granted authority to acquire control of the Lisbon by purchase of its capital stock. The request of the Lisbon for permission to retain the excess earnings from the new construction, the assistant director held, should be denied. Both the Montour and the Lisbon railroads are controlled by the Pittsburgh Coal Co.

The recommendations of the assistant director are victories not only for the applicants, but also for iron and steel interests in the Youngstown and surrounding territory, who strongly intervened on behalf of the application for construction of new lines of the Lisbon. They insisted that connection of the Youngstown district with the Ohio River was necessary if the Youngstown district is to compete successfully with the Pittsburgh district steel industry. It was declared that, by reason of rail and water service through the Monongahela, Allegheny and Ohio rivers, the Pittsburgh district enjoys lower assembling costs on inbound raw materials, as well as on outbound finished products to the South and Southwest, than does the Youngstown district, which now has no water service.

Youngstown District Handicapped

The Youngstown district, it was claimed, has been suffering greatly from these handicaps and as a result has yielded second place as a steel center to the Chicago district. It was contended that, with river connection for the transportation of coal from the Pittsburgh and Connellsville district to the Youngstown district and of steel products from that district to the markets of the South and Southwest, rates would be lower than at present and the district placed on a more nearly even competitive basis with the Pittsburgh district.

Representatives of the Youngstown Sheet & Tube Co., the Republic Iron & Steel Co., and the Sharon Steel Hoop Co., as well as the city of Youngstown, appeared as witnesses at the hearing on the application of the Lisbon and strongly supported testimony given by the applicants.

Trunk Lines Oppose New Road

Opposition to the applications was vigorously expressed by trunk line carriers serving the Pittsburgh district, including the Pennsylvania, Baltimore & Ohio and Pittsburgh & Lake Erie railroads. In substance, they insisted that the new lines are not necessary and that the service desired by the Youngstown district can be made available through hook-ups with the Pennsylvania and Pittsburgh & Lake Erie lines.

To this the intervening steel interests responded that they had for a long number of years endeavored to have the trunk lines make such a connection, but without success. The trunk line carriers also insisted that estimates as to the cost of the new construction were too small. The assistant director, however, said that engineers of the trunk line carriers had based their estimate of \$8,600,000 for the new branches, without equipment, on the basis of construction like that of the trunk line carriers, whereas it is proposed to follow costs of construction of the line of the Montour. The applicant's estimate was about \$3,500,000 less than that of the trunk line engineers' estimate and would average about \$206,000 per mile.

The next step in the proceeding probably will be the filing by the defendant interveners of exceptions to the assistant director's findings, followed by arguments by the commission previous to its decision.

On July 1, American shipyards were building, or were under contract to build, for private shipowners, 396 steel vessels of 225,740 gross register tons, compared with 413 steel vessels of 223,147 gross tons on June 1, according to the Bureau of Navigation, Department of Commerce.

Scrap Dealers Form an Institute

Organization Patterned After Such Associations in Other Lines Will Work for Improved Trade Conditions

THE Institute of Scrap Iron and Steel has been organized by the members of the Eastern Scrap Iron Association and will function along lines similar to those adopted by such organizations as the American Iron and Steel Institute and the Copper and Brass Research Association.

Aims of the new organization include the elimination of unfair and unprofitable business practices, the elimination of waste and the raising of the business to a more dignified and profitable level. The adoption of a code of ethics is a part of the immediate program.

In commenting on the relations between scrap dealers and consumers, Benjamin Schwartz, Baltimore lawyer, who was recently appointed director general of the scrap institute, said:

"I have heard some talk of arbitrary rejections by the mills. It occurs to me that the mills, too, may have their complaints against the scrap iron business. They should welcome an association of this kind, with a centralized responsibility to which they can turn for the dissemination of information, the correction of evils and complaints, and for cooperative effort in the interest and for the benefit of the entire steel industry."

The new institute purposes to function along the following lines:

The fostering of good will with the trade itself and promoting better understanding with consumers and producers.

Standardization of specifications so far as is practicable. A campaign of education is to be carried on among the members in an effort to eliminate the causes of rejections by the mills, due to lack of information.

Gathering of information and statistics concerning conditions in the industry and discussion of these facts at regular periods, with the aim of substituting knowledge for guesswork.

Adoption of a code of business ethics for the elimination of unfair, undesirable or unprofitable trade practices.

Study and standardization of trade customs, including uniform contracts, terms, deliveries, etc.

Arbitration of disputes through a properly constituted commission.

Establishment of a traffic bureau for the information of the dealer and adjustment of his transportation problems.

Organization of a credit service.

One of the things to which the institute will give attention is that of cost accounting in the scrap business. It is stated that few dealers know accurately the costs of handling scrap.

Eleven chapters will be organized, one each in the following cities: New York, Newark, Jersey City, Buffalo, Syracuse, Boston, Hartford, Philadelphia, Reading, Baltimore and Pittsburgh. David Strauss of the Continental Iron & Steel Co., New York, as chairman of the committee on membership, is supervising the organization of these chapters.

Officers of the Eastern Scrap Iron

Association, which has organized the institute, are as follows: President, Joseph G. Hitner, Henry A. Hitner's Sons Co., Philadelphia; vice-presidents, J. V. S. Bishop, Bishop & Co., Philadelphia; David Strauss, Continental Iron & Steel Co., New York; Ben Cohen, Louis Cohen & Son, Wilkes-Barre, Pa.; Stanton L. Dreifus, S. Snyder Corporation, Rochester, N. Y.; David Pollock, of firm of Mayer Pollock, Pottstown, Pa.; secretary,

Foundrymen of Central Illinois Organize

The Central Illinois Foundrymen's Club was organized at a meeting held at Springfield, Ill., on July 2. Officers elected are: President, H. R. Hire, Hire Foundry Co., Peoria; vice-president, M. W. Baker, Illinois Foundry Co., Springfield; treasurer, Franklin Whitehead, Meadows Mfg. Co., Bloomington. The club is composed of gray iron foundries in the central Illinois district.

Carbon Furnace to Be Scrapped

The plant of the Carbon Furnace Co., Ltd., Parryville, Pa., has been sold to Harry Orkin of Slatington, Pa., and the stack will be dismantled. The furnace, which is one of the oldest in eastern Pennsylvania, was built in 1869 and rebuilt in 1898. It has an annual capacity of 40,000 tons, but had not been operated since 1923.

Heavier Pig Iron Imports in June

IMPORTS of pig iron in June are reported by the Department of Commerce at 11,799 gross tons, compared with 9732 tons in May. Both figures are far below the April total of 20,845 tons. The June figure may be compared with 13,497 tons received in June, 1927. For the half year there has been a gain of about 15,000 tons, compared with last year.

Receipts of pig iron from Great Britain were practically three times

Herman Moskowitz, M. Samuel & Son, Inc., New York; treasurer, Thomas F. Kelly, Brooklyn.

Members of the executive committee are: Max Meltzer, Hausman & Wimmer Co., Pittsburgh; Allen R. Hoffer, Allen R. Hoffer Co., Philadelphia; Morris Shapiro, Boston Iron & Metal Co., Baltimore; Howard L. Warner, Frank Samuel & Co., Philadelphia; Max Fehheimer, Fehheimer Iron & Steel Co., Allentown, Pa.; Sam Jacob, Jacob Brothers, Bridgeport, Conn.; M. Bonomo, L. Schiavone & Bonomo Brothers, Inc., Jersey City, N. J.; A. Lipman, New York Scrap Iron & Steel Co., New York; Abraham Isaac, Elizabeth, N. J.

as heavy in the first half of 1928 as a year earlier. An increase of 23,000 tons from that source was partly offset by a reduction of more than 7700 tons in shipments from Germany, which country has almost disappeared as a supplier of pig iron to the United States market. British India holds the position second to Great Britain for the six months, the two countries accounting for considerably more than 75 per cent of the total imports. The Netherlands stands in third place. Details of the June receipts and of those of the first six months, for 1928 and 1927, are given in the table.

Alabama City Furnace Being Rebuilt

The Gulf States Steel Co., Birmingham, is dismantling its blast furnace at Alabama City, Ala., and will rebuild stack along improved lines incorporating Dovel features. Also coal handling equipment will be added. Dwight P. Robinson & Co., Inc., New York, is the engineer in charge and the Reeves Brothers Co., Alliance, Ohio, is fabricating the steel hull.

At a meeting of the trustees of the Massachusetts Gas Companies in Boston last week no mention was made in regard to the purchase of the properties by the Koppers Co., Pittsburgh. President Richards of the Boston companies will, it is expected, make some sort of an announcement before long regarding the status of negotiations with the Koppers Co.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	June		Six Months Ended June	
	1928	1927	1928	1927
United Kingdom.....	6,726	4,995	34,727	11,893
British India.....	3,792	5,667	23,780	22,792
Germany.....	55	750	95	7,811
Netherlands.....	894	1,840	13,515	16,020
Canada.....	...	19	378	689
France.....	...	23	...	23
Belgium.....	...	...	202	300
Norway.....	50	...	91	...
All Others.....	282	203	2,507	791
Total.....	11,799	13,497	75,295	60,319

This Issue in Brief

Production costs cut sharply by elaborate network of mechanical conveying systems. Electric refrigerator manufacturer uses 44 different conveying units, which have made possible a permanent decrease in the amount of man power; at the same time providing steady movement of materials in whatever quantities are called for by production schedules.—Page 265.

* * *

Removing strains from gray iron castings is best done by heating at temperatures considerably below the critical temperature for periods of time depending upon the size and section of the castings. The object is to heat the casting throughout at the annealing temperature, and then to cool slowly.—Page 285.

* * *

American machinery is increasingly popular abroad. During first half of 1928 foreign customers bought close to 240 million dollars worth of our machines, a gain of 13 per cent over total for same period of 1927.—Page 332.

* * *

Purchasing agents vie with each other to reduce salesmen's lost time. Automobile manufacturer keeps a record of the time each salesman is kept waiting and provides each buyer with a daily report, as a means of encouraging buyers to save salesmen's time.—Page 285.

* * *

Export steel business shows healthy gain. Rolled steel exports for June were 29 per cent above same month of last year. Shipments for first half of 1928 totaled 954,044 gross tons, a gain of more than 4 per cent over same period of 1927. Rolled steel imports increased about 1 per cent.—Page 293.

For best results in automatic welding, use a rapidly melting electrode, says welding machine manufacturer. Electrode which will do the required job at the highest speed should be selected, he says. This depends not only on the melting rate of the electrode, but also on the electrode diameter and welding current.—Page 277.

* * *

Blowing ore and fuel into blast furnace proves unsuccessful. The process lowers the temperature, and therefore is economical only when the furnace is working with a great excess of temperature.—Page 276.

* * *

Youngstown steel producers score a point in fight to get rail link between Youngstown and Ohio River. Commerce Commission examiner submits favorable report to commission, but trunk line railroads will object. If link is built it will give Youngstown producers the benefit of low-cost water transportation, and will enable them to compete for Southern and Southwestern business.—Page 297.

* * *

Standard tote pan is adopted for carrying small parts on conveying system. Holders, fitting snugly into the tote pans, are provided for each kind of part used in refrigerator plant. Workmen remove the holders, but not the pans themselves, from the conveyor.—Page 270.

* * *

Steel casting manufacturer's laboratory is equipped for steel making. In addition to the usual equipment for determining physical properties of specimens, laboratory in Midwest plant has special melting furnaces, to manufacture experimental steels and alloys.—Page 281.

Avoid long arc in automatic welding, says welding manufacturer, for it usually results in a poor weld. With a short arc there is a greater heat concentration, he says. The longer the arc the more opportunity there is for absorption of oxygen and nitrogen by the weld metal.—Page 277.

* * *

Carbon deposition near blast furnace top is not due to coke. Tests indicate that blast furnace gases are accountable.—Page 271.

* * *

Rolling mill capacity has increased sharply in past five years. The gain is about 21 per cent. Pittsburgh district leads with 27 per cent of the total capacity and Chicago district is next, with about 19½ per cent.—Page 272.

* * *

Will it be cheaper to weld by hand or to weld automatically? To answer this question, calculate the cost per running foot. That can be done by following the formula given on page 279.

* * *

Annealing gray iron castings to improve machinability should be done at 1450 to 1550 deg. Fahr., followed by slow cooling. However, the decrease in hardness is accompanied by loss in strength.—Page 284.

* * *

Decline of 3.8 per cent in July daily pig iron output. Estimated production was 98,834 tons a day, compared with 102,733 tons in June. Number of furnaces in blast Aug. 1 was 185, which was four less than on July 1.—Page 303.

* * *

Business activity may recede a little further, says Dr. Haney, but the recession will not be much more than seasonal, and is likely to be followed by a period of irregular stability.—Page 290.

A. I. FINDLEY
Editor

THE IRON AGE

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W. W. MACON
Managing Editor

Self-Government in Business

TRADE organizations, which have so multiplied in the last three years, have found a field of large usefulness in developing equitable business practices. In earlier years such associations existed in the shadowy fringe of the Sherman act, and even an expert counsel could not be sure that certain acts were legal. The Supreme Court decisions of 1925 cleared up the situation materially, with the result that co-operative and coordinating movements gathered momentum in all the ramifications of industry and trade. By informing the Federal Trade Commission and the Department of Justice of their activities, actual and proposed, the associations now move forward on definite lines, their freedom of action being restricted only in respect to agreements on prices that might be considered in restraint of trade.

Association members probably get the most tangible results from the interchange of information about production, stocks, distribution, competitive lines, cost keeping and credits. Governmental departments and bureaus find them the easiest and promptest sources of information about industry and the best avenue through which to approach such matters as standardization and simplification of practice. The public generally will be benefited by more stable business conditions, by improved quality of goods and by better trade practices.

It is this last item that is worthy of more remark. As an instance take furniture. Not so long ago a table made of painted gum wood with a little mahogany veneer on the top was sold as "mahogany furniture." When the dealers were reproached for this evident misbranding they replied that they were only doing what every one was doing and had been doing for years. They admitted that the practice was bad and would be glad to change it, but "the manufacturers would never agree." When the manufacturers were seen they told the same story of how they would like to reform, but they knew the dealers would never agree.

Obviously it was then a simple matter to get representative manufacturers and retailers into a conference and end misrepresentation in furniture. Such a stipulation on the branding of furniture has now been signed by more than 90 per cent of the industry. The result is unquestionably wholesome and redounds to the interest of the consuming public as well as of the trade. Truth in branding and advertising is a matter almost worthy of governmental regulation, but can be handled so much better by mutual consent.

Instances might be multiplied of long established practices, just over on the shady side, which have

been abandoned by reputable firms at the behest of their business associations. Of course, there will always be some non-cooperating firms who mistakenly think there will be selfish advantage in disregarding the general good. But once a trade practice is freely recognized as wholesome by an overwhelming majority of the members of an industry, as represented in a trade organization, it readily becomes a part of the code under which that industry practices self-government. And as we all know, government from within is far better than from without.

Must the Heat Treater Sweat?

IT is undoubtedly true that the recommended quenching temperatures for alloy and tool steels have been steadily rising during the past ten years. Furthermore, while a complicated treatment consisting of two or more heatings was once a rarity, the metallurgist today does not hesitate to specify it on many parts of extra duty or value. Even for so recently marketed a product as stainless steel, the makers are now telling their customers to quench it from a heat 100 degrees above what was usual when it was first exploited. The point is that the higher heat facilitates a higher saturation of chromium in the iron with a correspondingly better resistance to corrosion.

With these increasing temperatures furnace designers and the makers of refractory brick and heat resisting metals have had problems thrust upon them. Generally speaking, these new demands have been met, even if the cost at times has seemed excessive. Numerous special alloys for electrical resistors, furnace bottoms, and pots have been developed, and the purchaser usually has merely to balance the economies of a higher first cost against the longer life.

Higher temperatures also put a greater strain upon the heat treaters themselves; but it almost seems that they have been the last factor to receive consideration. One would imagine, on entering some heat treatment departments, that the management must think these skilled members of the organization are birds like the fabled phoenix, which flew out of an altar fire with never a tail feather singed. Else why would any one install heat-treating equipment operating at somewhere up to 2500 degrees Fahrenheit, blowing off white-hot furnace gases into a work room already superheated by a blazing summer sun? We find such operations in plants where it is evident from the variety of equipment, labor saving devices, and quality of work done, that much thought has been given to this important operation. Yet the men all have "sun-burned" noses and cheek bones. Perhaps a certain pride that they can

stand any heat which would wither a thin-skinned machinist keeps them at the sizzling job!

It has been said that the furnace gases should play around the rim of a lead pot in order to keep a crust from forming, and that the products of combustion should blow out a muffle door to guarantee a neutral atmosphere within. Even if this is true, it would not prevent building a generous hood with a vigorous suction fan to exhaust the gas. Nor would it prevent building brick flues to take away the gases from the larger stationary furnaces.

In fact, wherever large output is required, as in the Ford or Dodge factories, the manager does not hesitate to put a battery of furnaces right in the production line, flanked on either side by precision machine tools or other finishing operations.

Here the heat treater gets relief. He might well have first consideration in such installations; but the chances are the dust and smoke and heat were abolished because they don't mix at all well with good machine shop practice.

It would not be surprising to find that these smokeless, noiseless, heatless, heat-treating furnaces are more economical in the end than the more primitive types. A lower labor turnover and a better *esprit de corps* would overbalance a considerable increase in installation and maintenance expense. When all factors are considered, the best is always cheapest.

A Constructive Move in Sheets

AN important producer of sheets announces this week that after Oct. 1 its terms of payment will be 30 days net or one-half of 1 per cent discount for payment within 10 days of the date of the invoice. There are indications that like action will be taken by other sheet manufacturers, with the probability that in time the shortened discount will be as common in that branch of the industry as is now the 2 per cent that has been the practice for many years. Coming after a long series of efforts to advance sheet prices—efforts whose success has been rather in inverse proportion to the sheet trade's notorious need of a better profit—the new move takes on a significance beyond that ordinarily given to a detail of settlement between the buyer and the seller.

It is pointed out on behalf of the manufacturer that if the new discount on sheets becomes generally effective, all finished steel products would be on that basis apart from steel pipe, wire, tin plate and cold rolled strips. That is to say, as plates, shapes, bars and some other products now take but one-half of 1 per cent, there would be left slightly more than 25 per cent of the total of rolled steel subject to the 2 per cent discount.

It is further urged that this latter discount is the survival of the practice of the earlier years of long and uncertain credits, of wide swings in volume and prices, and of extreme fluctuations in the money market. Also, that 2 per cent for a 20-day anticipation of payment is equivalent to 36 per cent a year as against 9 per cent under the new arrangement—a rate which still gives a margin to the buyer who borrows to discount his bills.

The question will be raised whether there will be better success in establishing the short discount than

sheet manufacturers have had in advancing the market price of their product. Conditions seem to favor an affirmative answer. One consideration is that it is easier to secure general adhesion to a change in trade practice than to maintain a definite market price. Thus, two years ago makers of sheets recognized that selling prices had long been out of alinement with costs, heavy gages yielding a profit, while market prices on light gages represented bare cost or less than cost. After protracted effort, which involved scientific cost finding, No. 24 gage was made the base for black and galvanized sheets instead of No. 28 gage, and differentials were recast in line with rolling mill costs—an arrangement that promptly found acceptance throughout the trade. The net result of larger spreads on light gages and of reductions on some heavier gages was to establish the industry on a sounder basis, with somewhat better average return to mills rolling the full range of black and galvanized sheets.

It is significant that this week's move to better conditions in the sheet industry has for its background more than six months of sustained effort, in large part successful, to advance the heavier products—plates, shapes and bars—above the unprofitable level reached in the second half of 1927. Another factor of which account is to be taken is that a number of manufacturers of bars, plates and shapes have been at work on lines similar to those followed in the sheet industry two years ago, with a view to bringing extras for chemical content and for cutting and other services into better alinement with relative cost of production.

Westward Migration in Steel

OUR weekly market reviews of the past two years have made frequent mention of the higher rate at which steel plants in the Chicago district were operating, in comparison with those of the Pittsburgh and Youngstown districts. The statistical report of the American Iron and Steel Institute for 1927, issued this week, gives confirmation of these general statements and to some extent permits a statistical measure of the shift in steel production that has come since the abolition of Pittsburgh Plus. One of the tables gives the production of steel ingots by States, showing the output for 1927 in percentage of capacity at the beginning of the year. The average for the country was 75.48 per cent. Of the large producing States, two ran above this and three below, as follows:

	Per Cent
Indiana	88.03
Ohio	77.28
Illinois	73.97
Pennsylvania	71.52
New York	71.48

The smaller States cannot be referred to, as some of them are grouped together. However, State totals of steel ingots and castings combined are given, with very little bracketing, while there are separate tables for the Youngstown district and for Allegheny county, and the comparison can be pursued along that line. Total production of steel ingots and castings decreased almost 7 per cent from 1926 to 1927, but one observes that while Indiana (Gary and Indiana Harbor) lost only 1.8 per cent and Illinois only 4.2 per cent, the Youngstown district went down 11.7 per cent and Allegheny

county 11.0 per cent. West Virginia made the divergent showing of decreasing 8.9 per cent from 1925 to 1926, when the industry as a whole gained, and then increasing from 1926 to 1927 by 12.4 per cent, the cause of the decrease being presumably the abandonment of the Riverside plant of the National Tube Co., while one cause of the increase was the growth of the Weirton Steel Co.

Pennsylvania is the big State in ingot capacity, Ohio coming next but with less than two-thirds as much as Pennsylvania, while Indiana and Illinois combined do not equal Ohio. Comparisons by States, however, have limited value, for Pennsylvania has steel spread over almost its entire length, while Illinois and Indiana have steel only in one corner. In sequence the million-ton States in ingot capacity (representing nearly 93 per cent of the total) are as follows:

Pennsylvania ...	21,976,636	New York.....	2,819,350
Ohio	13,712,900	Alabama	2,140,000
Indiana	6,551,880	Maryland	1,662,600
Illinois	5,032,600	West Virginia...	1,180,000

These are capacities as of Dec. 31, 1927, the total of the United States being 59,435,766 gross tons. Residents of Detroit have lately acquired the impression that Michigan has become a great steel State, but it is assigned only 340,000 tons capacity, thus trailing distant California as well as Minnesota, on another edge of the country.

Added interest is given to these capacity statistics by the exhibits published elsewhere in this week's IRON AGE, comparing the rolling capacity in twelve different districts in nine classes of finished steel products. These are to be studied in connection with the reference made in the opening paragraph above to a possible relation between the shifts in steel making and the abolition of Pittsburgh Plus. Consideration should be given also to the development of new lines of finished steel manufacture in the Chicago district and to the increased use of waterways in the shipment of steel products, though to an extent these are to be reckoned as effects of the new regime of plural basing.

Changing Currents in Exports

THERE have been some notable gains in exports of steel products in the first half of the year, as compared with the first half of last year, and there have been some equally notable losses. Among the gains are 14,000 tons in steel bars (to which may be added 4500 tons more in alloy steel bars), nearly 24,000 tons in plain structural shapes and 9000 tons more in fabricated structural materials, nearly 12,000 tons in steel rails and an additional 9400 tons in rail fastenings, and 28,000 tons in wire products, of which 8000 tons was in plain wire, 15,000 tons in barbed wire and woven wire fencing and more than 5000 tons in wire nails.

Offsetting these gains, there have been losses of 11,000 tons in galvanized steel sheets, almost 28,000 tons in tin plate, nearly 27,000 tons in boiler tubes and other pipe and smaller amounts in other materials.

In the case of bars almost the whole gain came from increased shipments to Canada, which went from 34,700 tons to 46,500 tons. In plain heavy structural material Canada again accounted for most of the increase, exports to our Northern neighbor advancing from 54,000 tons to 75,500 tons. Rail shipments, how-

ever, took a different course. There was a gain of more than 20,000 tons in rails sent to Chile, almost 9000 tons in rails to Colombia and 8000 tons to China. Simultaneously, there was a decline of 11,000 tons in rail shipments to Japan, 7000 tons to Cuba and almost 4000 tons to Canada.

When it comes to wire shipments, Argentina made a heavy gain in plain and galvanized material, exports to that country having advanced from 557 tons to 4700 tons. Similarly with barbed wire and woven wire fencing; the exports to Argentina went up from 2353 tons a year ago to 8869 tons in the first half of this year. Under this classification Brazil also participated in the larger buying, taking more than 8650 tons, nearly double the 4800 tons of last year.

Reduction in shipments of tin plate is about half accounted for by the smaller takings of Argentina, which dropped from 24,000 tons to a little more than 10,000 tons. Brazil dropped off nearly 5000 tons, Great Britain 3800 tons, and Japan 3300 tons.

As a whole, the exports of the first half have shown a moderate improvement over those of last year. Deducting scrap exports, which have been more than twice as great this year as last, the total remains at 1,108,000 tons, against 1,029,000 tons last year.

With the prospect that the year's iron and steel exports will run in excess of the average of 2,120,000 tons in 1926 and 1927, which was 400,000 tons more than the average for 1924 and 1925, wonder will grow the more at the fantastic proposal of a New York banker in a public address last year that the steel manufacturers of the United States abandon export trade in steel in favor of their European competitors.

THE half-year index to THE IRON AGE covering the first six months of 1928 is now available for distribution. Those who have asked for the index in the past will receive it as before, so only those not on the list need make the request at this time, addressing the Reader Service Department, Iron Age Publishing Co., 239 West Thirty-ninth Street, New York.

CORRESPONDENCE

Oxyacetylene Flame Temperature

To the Editor: I was particularly interested in the statements about oxyacetylene flame temperature contained in your issue of July 26 (page 232), and I cannot refrain from quoting from a letter written to me by the late Prof. Joseph W. Richards on Oct. 15, 1916. He says that the theoretical temperature of the flame is 7250 deg. Fahr., and goes on:

"This solution neglects the small decomposition of CO₂ and H₂O at high temperatures, which would reduce this temperature some. I have not made that calculation, but it would probably reduce the temperature at the hottest part of the flame to 5400 deg. Fahr."

This is remarkably close to the figure (3100 deg. C. or 5600 deg. Fahr., in round numbers) obtained by Professor Henning in Germany. I referred to this in my paper that was read before the American Institute of Mining Engineers in February, 1918, the title of which was, "Some Structures in Steel Fusion Welds."

S. W. MILLER,

Consulting engineer Union Carbide and Carbon Research Laboratories, Inc.
Long Island City, N. Y.

Pig Iron Output Declined in July

Estimated Daily Rate of Production Was 3900 Tons or 3.8 Per Cent Less Than June Figure—Net Loss of Four Furnaces

TELEGRAPHED reports received by THE IRON AGE from all producers of pig iron in the United States, estimating their output for the last two days of July, indicate that daily production declined about 3.8 per cent, as compared with the June rate. These returns show a total estimated production of 3,063,841 tons or 98,834 tons daily during July. In the previous month total actual tonnage amounted to 3,082,000 tons, or 102,733 tons daily, the decrease in rate per day having been 3899 tons. In June there was a decrease from May of 3198 tons daily or 3 per cent.

According to these preliminary returns for July, six furnaces were blown in during the month and 10 blown out, a net loss of four furnaces. The loss was entirely in furnaces producing steel making iron, as the num-

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York and Massachusetts.....	191,963	199,045	212,333	205,556
Lehigh Valley	64,845	60,640	77,195	81,140
Schuylkill Valley	53,738	52,434	53,162	60,062
Lower Susq. and Lebanon Valleys....	29,980	29,207	32,019	31,522
Pittsburgh District	581,972	606,223	700,880	663,784
Shenango Valley	88,467	101,543	114,779	100,073
Western Pennsylvania	120,584	117,833	126,790	116,405
Maryland, Virginia and Kentucky....	111,851	116,691	100,508	102,678
Wheeling District	154,172	145,717	124,948	115,284
Mahoning Valley	284,657	291,174	309,842	310,227
Central and Northern Ohio.....	382,636	349,952	357,900	336,200
Southern Ohio	43,936	40,810	26,380	25,548
Illinois and Indiana.....	635,071	635,201	694,636	693,271
Mich., Minn., Mo., Wis., Colo. and Utah	122,279	127,085	137,987	134,163
Alabama	189,411	200,643	207,045	199,487
Tennessee	8,279	7,802	7,452	10,104
Total	3,063,841	3,082,000	3,283,856	3,185,504

ber of merchant stacks remains unchanged, two having been blown in and two out. The number of blast furnaces operating on Aug. 1 was thus 185, as compared with 189 on

July 1 and 198 on June 1.

Estimated production by districts is shown in the accompanying table and complete data for July will be published in THE IRON AGE of Aug. 9.

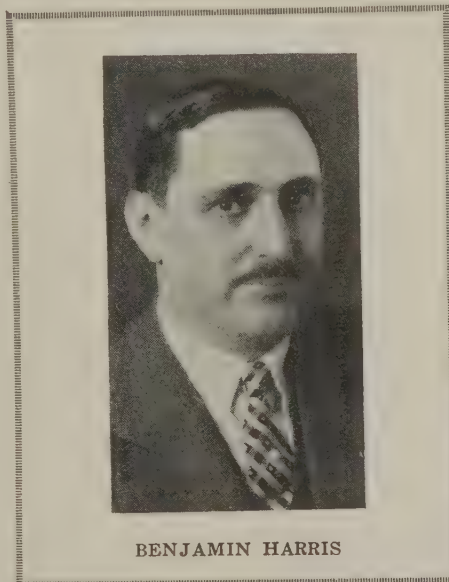
Non-Ferrous Metal Institute Is Organized

The Non-Ferrous Ingot Metal Institute was organized at a meeting held at Atlantic City, N. J., on July 20, at which most of the principal producers of the non-ferrous ingot metal ratified a constitution and by-laws and elected officers and executive committee members.

The first officers of the institute are: President, Benjamin Harris of Benjamin Harris & Co., Chicago; vice-president, I. Gleuck, Federated Metals Corporation, New York; treasurer, L. Chapman, H. Kramer & Co., Chicago; members of executive committee, William Lewin, Lewin Metals Corporation, St. Louis, and W. J. Coane, Ajax Metal Co., Philadelphia. R. D. T. Hollowell, experienced in trade organization work and at present secretary-treasurer of the American Face Brick Association, will shortly assume the management of the institute. Headquarters will be in Chicago.

"It is the ideal of the members of the institute," said Mr. Harris, "to develop policies which will be of constructive benefit both to the industry and the consuming public. It will be our purpose to build slowly and soundly, drawing freely upon the best in modern, conservative thought to determine the institute's objectives. With this policy in view, the initial activity will be to make a survey of the problems of both the manufacturers and consumers. Not until this survey has been completed will the institute attempt to determine which

of the many possible activities it will pursue. We will undoubtedly undertake, sooner or later, extensive technical researches into the problems of manufacture and utility of non-ferrous ingot metals, commercial re-



BENJAMIN HARRIS

searches to determine how we may better serve our present customers and locate new fields for development, the adoption and promotion of the use of high standards of quality and specifications, the encouragement of sound business practices, voluntarily aiding in the prevention of unfair competition and trade abuses, and the promotion of intelligent business management on a basis of wholesome competition."

Statistical Iron and Steel Report for 1927

Several new tables have been added in the 1927 Annual Statistical Report of the American Iron and Steel Institute which are not to be found in earlier editions. Principal among them are those relating to foreign countries. Seven pages of production figures for the principal producing countries cover iron ore, pig iron and ferroalloys and steel ingots and castings. These are for more than 20 countries and, so far as data are available, are given for all the elapsed years of the twentieth century. Eight pages of new data cover, for 1923 to 1927, inclusive, exports of various leading iron and steel products from the United States to the principal consuming countries beyond our borders.

"Practical capacity" has been abandoned as a measure of current operation. What formerly was called "theoretical capacity" is now used, but it is called merely "capacity."

Otherwise, with a few exceptions, the volume, which is now 119 pages in place of 102 last year, is much as it has been before—a vast storehouse of data on the years' production of iron and steel products of various sorts, grouped as experience has shown will be valuable. Pig iron, ingots and castings, rolled products—these are the chief divisions. But to this is appended much other information, tributary or otherwise, which steel men and those studying their problems like to have in such convenient form.

Iron and Steel Markets

August Opens with Unusual Promise

Demand Shows Expanding Tendency—Smaller Recession in
July Pig Iron Output Than a Year Ago—New
Cash Discount for Sheets

MARKET developments in steel are on the up side. Demand, which brought July output close to that of June, shows more of a tendency to expand than to contract in August. Bookings with most companies have slightly exceeded shipments, and unfilled orders have thus gained in the past month. There is less selling pressure, and from all the main producing centers is reported a gathering of price firmness as a result. Also, here and there is evidence of a disposition to cover for forward business.

Operations are easily at a 75 per cent of capacity rate, sustained by buying which is chiefly for immediate needs from many varied consuming industries. And no one of these is promising an early increase of notable proportions.

Bar mill products have bulked large in the unusual summer activity, which has brought sales in the past week, as in Chicago, to the average of the year to date. The 1.90c., Pittsburgh, price is the basis of new transactions, but they cover only a small tonnage. Large users are on mill books at lower levels, but mills are beginning to insist on prompt specifying to avoid carry-overs beyond the contract period.

Sheets are moving in a better volume, with sheet mills generally operating at an 85 per cent rate. Some recession in fresh orders from the automobile builders is explained by the delays commonly met in getting into full production on new models.

Important action has just been taken in the sheet trade by the American Rolling Mill Co., with indications it will be followed by other sheet makers generally. Instead of allowing a discount of 2 per cent for payments in 10 days, the discount will be $\frac{1}{2}$ per cent, as has applied for years to practically all hot-rolled products. This change in trade practice may add \$4,000,000 to \$5,000,000 per annum to sheet mill incomes.

Plate bookings of 7000 tons for oil storage tanks are reported from Chicago, and welded pipe makers are pressing for deliveries, with one sale of 12,000 tons of plates for such pipe. Car repair and rebuilding programs of the railroads are a sustaining factor. In oil well casing, Venezuela placed 1000 tons in the United States and 500 tons in Germany.

In the railroad equipment field has appeared an inquiry from the New York Central Lines for 55 locomotives and from the Chesapeake & Ohio for 500 gondola car bodies. The Chicago & Eastern Illinois bought 100 automobile cars.

In rails small orders are allowing mills to hold

operations above expectations. The Wheeling & Lake Erie bought 2500 tons.

July contracts for structural steel were heavy, an Eastern steel company reporting its bookings as the largest of any month this year. Considerable work is in prospect, including 16,600 tons for the Reynolds Tower Building in New York, which is to exceed the Woolworth Building in height, 15,000 tons for a Wall Street bank and office building, and 15,000 tons for the Chicago Board of Trade Building.

Pig iron returns for July, collected by telegraph, with all producers heard from and estimating the last two days, showed a production of 3,063,841 gross tons, or 98,834 tons a day, compared with 3,082,000 tons in June, or 102,733 tons a day. The recession is thus 3.8 per cent, but the daily output in July, 1927, which was 95,199 tons, fell off over $7\frac{1}{2}$ per cent from June, 1927. On Aug. 1, there were 185 furnaces active, four less than on July 1.

Movement of pig iron to consumers is heavier than usual at this season, especially in the Ohio-Michigan territory, and there are signs in various markets of increasing buying interest in requirements for the rest of the year. Prices show little strength, however, and have given ground at St. Louis, where foundry grades have been marked down 50c. a ton, and in eastern Pennsylvania, where a 20,000-ton purchase of basic iron brought out prices 25c. a ton lower. Sales at Cleveland were 40,000 tons, the largest week's business since April.

A move toward elimination of preferential prices of \$1 or \$2 a ton, which many consumers and jobbers have been enjoying, notably on wire products, has been begun by some of the larger steel companies. A one-price policy, with extras for small lots, is the aim.

Exports of iron and steel, excluding scrap, were 197,000 gross tons in June, against 203,700 tons in May. In June, 1927, the total was 158,500 tons. For the half-year, exports have been 1,108,000 tons, compared with 1,029,000 tons last year. Including scrap, these figures become 1,358,742 tons and 1,133,427 tons respectively.

Iron and steel imports in June were 65,819 gross tons, comparing with 72,106 tons in the preceding month and 69,017 tons a year ago. Finished material was 33,789 tons in June, a drop of 13 per cent from the 38,968 tons of June, 1927.

Both of THE IRON AGE composite prices remain at last week's levels. That for pig iron is \$17.04 a ton and that for finished steel is 2.319c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 31, 1928	July 24, 1928	July 2, 1928	Aug. 2, 1927
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.76	\$20.76
No. 2, Valley furnace.....	16.50	16.50	16.75	18.00
No. 2, Southern, Cin'ti.....	19.19	19.19	19.19	20.94
No. 2, Birmingham.....	15.50	15.50	15.50	17.25
No. 2 foundry, Chicago*.....	17.50	17.50	18.00	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.75
Basic, Valley furnace.....	16.00	16.00	16.00	17.50
Valley Bessemer, del'd P'gh..	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	17.50	18.00	19.50
Malleable, Valley.....	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh.....	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:	July 31, 1928	July 24, 1928	July 2, 1928	Aug. 2, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.85	1.85	1.85	1.80

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars Pittsburgh.....	1.85	1.85	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh.....	1.85	1.85	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.85	1.85	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	2.00
Beams, New York.....	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 31, 1928	July 24, 1928	July 2, 1928	Aug. 2, 1927
	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.60	2.60	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.50	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.35	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.40	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	July 31, 1928	July 24, 1928	July 2, 1928	Aug. 2, 1927
Heavy melting steel, P'gh.....	\$14.25	\$14.25	\$14.00	\$15.25
Heavy melting steel, Phila.....	13.00	13.00	13.00	13.00
Heavy melting steel, Ch'go.....	12.50	12.25	12.25	12.50
Heavy melting steel, Chicago	12.75	12.75	13.00	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.00
Carwheels, Pittsburgh.....	14.25	14.25	14.25	15.00
No. 1 cast, Pittsburgh.....	15.50	15.50	15.50	16.00
No. 1 cast, Philadelphia.....	13.50	13.50	13.50	15.00
No. 1 cast, Ch'go (net ton)...	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Ch'go (net)...	10.75	10.75	11.00	12.00

Coke, Connellsville, Per Net Ton at Oven:	July 31, 1928	July 24, 1928	July 2, 1928	Aug. 2, 1927
Furnace coke, prompt.....	\$2.75	\$2.60	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.87½	13.37½
Electrolytic copper, refinery...	14.50	14.50	14.50	13.00
Zinc, St. Louis.....	6.20	6.20	6.20	6.40
Zinc, New York.....	6.55	6.55	6.55	6.75
Lead, New York.....	6.00	6.00	6.15	6.45
Lead, St. Louis.....	6.20	6.20	6.30	6.60
Lead, New York.....	47.75	48.00	46.12½	65.50
Tin (Straits), New York.....	10.00	9.37½	9.62½	12.25
Antimony (Asiatic), N. Y.....				

Pittsburgh

Sustained Demand for Steel Keeps Ingot Output at 75 Per Cent—Stronger Stand on Prices

PITTSBURGH, July 31.—The steel market continues to surprise by a sustained demand at a time of year when it is usually on a tapering scale. In ingot production it shows more of a tendency to expand than to contract. Ingot production in the combined Pittsburgh, Youngstown, Wheeling and Johnstown districts is easily 75 per cent of capacity. In Youngstown, open-hearth furnace operations are more than 80 per cent, but the general average of that district is somewhat reduced by a rather low rate of Bessemer converter operation. A few low spots in plant engagement in the Pittsburgh district proper are more than counterbalanced by substantially full operation of steel works in Weirton and Steubenville. Based upon the number of active productive units, July is ending more actively than it began and, so far as this district is concerned, the month's ingot output, it is believed, will be very little smaller than that of June.

Wire products, as usual at this season of the year, are in light demand. While there has been some increase in the demand for oil country pipe, it has not assumed proportions sufficient to lift the market out of dullness. Rails and track fastenings are experiencing the quietness common to this time of the year. Bolts, nuts and rivets also are slow. In other finished steel products, however, business is

good, particularly for this season. Tin plate makers are freed from concern about new business between now and the end of September. Sheet business is active and there is cheerfulness in the reports as to the specifications for bars and shapes.

Railroad buying of sheets, done in quiet fashion, turns out to have been appreciably larger for at least one producer than it was in the corre-

sponding period last year. Generally, however, railroad buying has been disappointing in that it has not included many cars or locomotives, which not only mean orders for steel, but engagement of a good many fabricating plants.

The difference between present demand from the motor car builders and that of a month or two ago is very slight. This industry has had an exceptional season in production and sales; the question now is as to whether as the fall approaches the demand will continue as strong as it is now and whether the steel requirements of this industry will hold up to their present rate.

Pittsburgh has a favorable prospect in steel construction projects, but as they run heavily to railroad, Federal and county work, lettings are likely to be spread out over a longer period than if they were private ventures.

The movement toward a stronger price stand is gaining ground. Selling pressure in sheets and strips, which have been the weakest in the finished steel list, appears to be abating and on these lines there is increasing talk

of an advance on fourth quarter business.

Pig iron demands are small individually and in the aggregate. Scrap prices appear to be sustained more by dealer than consumer buying. The first change in spot furnace coke prices since the latter part of February has been an advance of 15c. a ton, brought about by a demand from a steel company to supplement its own production, which has swept the market bare of spot supplies suitable for blast furnace use.

Pig Iron.—There is a reasonably heavy movement of iron on old orders, but new business consists chiefly of the actual necessities of the smaller melters, who rarely buy much in advance of their known requirements. Some producers believe that the price situation is a little stronger, but the only evidence to support this is that Valley foundry iron has moved to certain Ohio points at which Cleveland furnaces have some advantage in freight charges over the Valley producers. In this district, on account of the changed mode of buying and the fact that melters rarely send out inquiries for iron, it is necessary for sellers to canvass the trade thoroughly and frequently. Such efforts mean orders but do not impress the buyer with the possibility of shortages of iron or of higher prices.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.50 to 16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Not much new business is developing, but consumers are taking shipments against contract commitments at a rate quite satisfactory to producers. Only a few of the larger users of ferromanganese failed to make provision against having to pay the advanced price effective on last half tonnages, and some have enough tonnage bought at \$100, Atlantic seaboard, to supply their needs through this quarter.

Semi-Finished Steel.—Billets, slabs and sheet bars are moving well on contracts generally priced at \$32,

Pittsburgh, for this quarter. Sheet and tin plate producers are well supplied with business; in strips, orders are making a good showing for this time of the year and July bookings have been only slightly behind those of June. Fresh purchases do not amount to much. Wire rods are only moderately active; the ruling price is \$42, base, Pittsburgh, but some tonnage placed at less and carried over by producers figures in the mill deliveries.

Bars, Plates and Shapes.—Bars and shapes are moving well on contracts, but in plates, both orders and specifications are rather light. So far as strictly new business is concerned, 1.90c., base Pittsburgh, now is minimum, but with the generous coverage given contract buyers at 1.85c., there is little new business except from small-lot buyers. The mills, however, are insistent that buyers specify on their 1.85c. contracts in the effort to avoid carrying any tonnage at that price beyond this quarter. This district has promising prospects for the next year in structural projects. Three bridges that will take 20,000 tons or more of steel are to be provided for from the \$43,000,000 county bond issue recently approved by the voters. A new Federal building is in sight for Pittsburgh, and the Pennsylvania Railroad is expected to spend about \$50,000,000 in bettering its local terminal facilities. That road has placed 1100 tons for a fruit auction shed at its local freight yards.

Rails and Track Supplies.—This is rarely an active period in rails and track fastenings, and this year is no exception. Prices show no change.

Wire Products.—The price situation is more stable than manufacturers have experienced in a long time. Nails are well established at \$2.55, base, per keg, Pittsburgh, and plain wire at \$2.40, base, per 100 lb., and no deviations from these prices are reported. Business is very quiet.

Tubular Goods.—A good many pipe line projects are reported to be under consideration, but producers take more satisfaction from the fact that actual orders for oil country pipe show a moderate but sustained increase and

that building and construction pipe is going out steadily. The secondary market, following a revision in the resale quotations which resulted in lower open prices, but an advance in actual sales prices, is really steady for the first time in at least two years. In tubing the best movement appears to be in the requirements of the motor car builders.

Sheets.—Business continues good, and while prices are not actually higher than they have been, the undertone of the market is firmer and an effort toward establishing 2c., base, on blue annealed, 2.65c., base, on black, and 3.50c., base, on galvanized, is finding a more general following. Although the common impression is that the railroads have not been taking much steel, a checkup by a local maker of sheets discloses that business from that source made a good gain in the second quarter over the first three months of the year and that the record for the first half of this year is appreciably better than for the same period last year. The American Sheet & Tin Plate Co. last week operated at 80 per cent of capacity and is scheduled at approximately that rate for this week. Independent mill operations are somewhat higher and the industry as a whole is running at around 85 per cent.

Tin Plate.—Production keeps up at a high rate in spite of the effect of hot weather upon mill crews. Some urgency of demand is indicated by the fact that the American Sheet & Tin Plate Co., in order to make good any loss of production due to hot weather, has been scheduling its mills on a 17-turn basis. Few makers can take sizable orders now for delivery before the middle or latter part of September.

Cold-Finished Steel Bars and Shafting.—There is little variation from week to week in the rate of mill shipments. The common report is that specifications are good for the time of year. There is nothing new as to prices.

Hot-Rolled Flats.—While July has not done so well as June in point of specifications and shipments, it is generally regarded as a satisfactory

THE IRON AGE Composite Prices

Finished Steel July 31, 1928, 2.319c. a Lb.

One week ago.....	2.319c.
One month ago.....	2.341c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c.,	Feb. 14;	2.314c.,
1927	2.453c.,	Jan. 4;	2.293c.,
1926	2.453c.,	Jan. 5;	2.403c.,
1925	2.560c.,	Jan. 6;	2.396c.,
1924	2.789c.,	Jan. 15;	2.460c.,
1923	2.824c.,	Apr. 24;	2.446c.,

Pig Iron July 31, 1928, \$17.04 a Gross Ton

One week ago.....	\$17.04
One month ago.....	17.25
One year ago.....	18.34
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75,	Feb. 14;	\$17.04,
1927	19.71,	Jan. 4;	17.54,
1926	21.54,	Jan. 5;	19.46,
1925	22.50,	Jan. 13;	18.96,
1924	22.88,	Feb. 26;	19.21,
1923	30.86,	Mar. 20;	20.77,

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland.....	2.04c. to 2.09c.
F.o.b. Cleveland.....	1.85c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Bethlehem.....	2.00c. to 2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland.....	2.15c.
Shafting, ground, f.o.b. mill.....	2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.60c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c.
No. 24, del'd Cleveland.....	2.74c. to 2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.55c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	0.25	\$2.90
2100 (1½% Nickel)	0.55	3.20
2300 (3½% Nickel)	1.50	4.15
2500 (5% Nickel)	2.25	4.90
3100 Nickel Chromium	0.55	3.20
3200 Nickel Chromium	1.35	4.00
3300 Nickel Chromium	3.80	6.45
3400 Nickel Chromium	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100 Chromium Spring Steel	0.20	2.85
6100 Chromium Vanadium Bars	1.20	3.85
6100 Chromium Vanadium Spring Steel	0.95	3.60
9250 Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1/8.....	45	19½	1/4 to 3/8..	+11	+39
1/4 to 3/8..	51	25½	1/2.....	22	2
1/2.....	56	42½	3/4.....	28	11
3/4.....	60	48½	1 to 1½..	30	13
1 to 3.....	62	50½			

Lap Weld

2.....	55	48½	2.....	23	7
2½ to 6..	59	47½	2½.....	26	11
7 and 8..	56	43½	3 to 6....	28	13
9 and 10..	54	41½	7 to 12..	26	11
11 and 12..	53	40½			

Butt Weld, extra strong, plain ends

1/8.....	41	24½	1/4 to 3/8..	+19	+54
1/4 to 3/8..	47	30½	1/2.....	21	17
1/2.....	53	42½	3/4.....	28	12
3/4.....	58	47½	1 to 1½..	30	14
1 to 1½..	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 4..	57	46½	2½ to 4..	29	15
4½ to 6..	56	45½	4½ to 6..	28	14
7 to 8....	52	39½	7 to 8....	21	7
9 and 10..	45	32½	9 to 12..	16	2
11 and 12..	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2½ in.....	27	1½ in.	+18
2½ to 3 in.....	37	1¾ to 1½ in..	+8
3 in.....	40	2 to 2½ in.....	2
3½ to 3¾ in.....	42½	2½ to 3 in.....	7
4 to 13 in.....	46	3¾ to 4½ in.....	9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld

Steel		Iron
Under 5000 lb..	4 Fives	1 Ten
5000 lb. to 12,000 lb.....	5 Fives	2 Tens
12,000 lb. to 21,000 lb.....	6 Fives	2 Tens & 2½
21,000 lb. and over.....	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1¼ to 1½ in..	55	3¼ to 3½ in..	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in..	45
2½ to 3 in.....	42		

Hot Rolled

2 and 2½ in....	40	3¼ and 3½ in..	56
2½ and 3 in....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in..	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

month because it ran so well ahead of the average for that month in the past few years. Prices are not quotably higher, but there is evidence that makers are tiring of doing business at prices that yield little, or at best a moderate profit, and selling pressure is lighter than it has been. In line with the tendency in some of the other finished steel products, it is expected that higher prices will be asked on fourth quarter tonnages. The common prices of local producers are 1.80c. to 1.90c., base, for wide strips, 2c. for 3-in. to 6-in., and 2.10c. to 2.20c. for less than 3-in. widths, while cooperage stock does not appear to be going at less than 2.30c.

Cold-Rolled Strips.—There has been much less than the usual summer dip in orders. This fact, coupled with the small profit that present prices yield, is reflected in a lessened anxiety for orders and a slightly steadier price situation. Makers generally are talking of an advance on fourth quarter business.

Bolts, Nuts and Rivets.—Business is rather slow in these products and is easily accommodated by a plant engagement of about 50 per cent of capacity. Railroad buying is at very close range and for real requirements. Lack of volume from this direction is an important factor in the dullness. Prices are still firm.

Coke and Coal.—Spot furnace coke has stiffened in price in the past few days, and against fairly liberal offerings recently at as low as \$2.60 to \$2.65, per net ton, at ovens, there are now no supplies of coke suitable for blast furnace use at less than \$2.75c. A steel company has been picking up spot tonnages steadily and it is said will be in the market for the next month or so, as its own by-product oven production is insufficient for its requirements. Beehive oven furnace coke production lately has been slipping steadily and it is doubt-

ful if much capacity now idle will be brought into production, since even at today's price the profit is not large enough to encourage repairs to idle ovens. Two Valley merchant producers of pig iron, which formerly operated their furnaces on beehive coke, now are running on by-product coke from steel company ovens, the coal being furnished by the buyers. Spot foundry coke still is in ample supply and rather easy in price. Some coal is moving to the Lakes, but otherwise the demand is slow and prices still are weak.

Old Material.—Blast furnace grades of scrap are higher, but generally the market is quotable at the levels of a week ago. Open-hearth grades are firm, as offerings are moderate and dealers with short orders to fill are covering them as fast as they can, usually at \$14 for heavy melting steel and in some cases at a little more. It is commonly realized that sales of a few weeks ago at \$14 were poor ones from the standpoint of profits, and with the possibility that steel works operations and scrap requirements will be larger in another 30 or 45 days, most sellers are inclined to take a small loss than run the risk of a larger one later. The August scrap list of the Pennsylvania Railroad contained approximately 36,000 net tons and that of the Baltimore & Ohio 10,020 gross tons. As dealers are bullish,

it is believed these lists will realize rather stiff advances over current prices.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.00 to \$14.50
Scrap rails	13.50 to 14.00
Compressed sheet steel....	13.75 to 14.00
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels.....	14.00 to 14.50
Sheet bar crops, ordinary....	14.50 to 15.00
Heavy breakable cast....	11.75 to 12.25
No. 2 railroad wrought....	14.00 to 14.50
Heavy steel axle turnings....	13.00 to 13.50
Machine shop turnings....	9.50 to 10.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	15.00 to 15.50
Railr. coil and leaf springs	15.00 to 15.50
Rolled steel wheels.....	15.00 to 15.50
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate....	17.50 to 18.00
Low phos., light grade....	16.50 to 17.00
Low phos. sheet bar crops.	17.50 to 18.00
Hvy. steel axle turnings..	13.00 to 13.50
Electric Furnace Grades:	
Low phos. punchings....	16.00 to 16.50
Hvy. steel axle turnings..	13.00 to 13.50
Blast Furnace Grades:	
Short shov'l'g steel turnings	10.00 to 10.50
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings.....	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades:	
Steel car axles	18.00 to 18.50
No. 1 railroad wrought....	10.50 to 11.00
Sheet bar crops	16.00 to 16.50
Cupola Grades:	
No. 1 cast	14.25 to 14.50
Rails 3 ft. and under.....	15.00 to 15.50
Malleable Grades:	
Railroad	14.00 to 14.50
Industrial	13.00 to 13.50
Agricultural	12.50 to 13.00

REINFORCING STEEL

OUTSTANDING among awards of 5400 tons reported during the last week were a bridge at Providence, R. I., which took 1800 tons, and a railroad terminal warehouse in New York requiring 1200 tons. A manufacturing building in Chicago calls for 2000 tons of the 2700 tons needed for new projects. Awards follow:

CAMBRIDGE, MASS., 100 tons, Boston & Maine Railroad warehouse, to Joseph T. Ryerson & Son.

BOSTON, 100 tons, Charles Street Garage Corporation, Cambridge Street, to Edwin A. Tucker.

PROVIDENCE, R. I., 1800 tons, Memorial Bridge; from Merritt-Chapman & Scott Corporation, general contractor, to McClintic-Marshall Co.

NEW YORK, 1200 tons, terminal warehouse for Lehigh Valley Railroad at 144th Street and Girard Avenue, to Concrete Steel Co.

CREIGHTON, PA., 100 tons, Pittsburgh Safety Glass Co., to Carlem Engineering Co.

CHICAGO, 100 tons, apartment building for H. B. Ryan, to Concrete Engineering Co.

CHICAGO, 200 tons of rail steel, caissons for Mercantile Mart, to Inland Steel Co.

CHICAGO, 900 tons, instead of 300 tons recently reported, plant for William J. Igoe Printing Co., to Kalman Steel Co.

CHICAGO, 256 tons of rail steel, garage at Eleventh and State Streets, to Calumet Steel Co.

CHICAGO, 220 tons of rail steel, Cook County road work on Cicero Avenue; placed by Chicago Heights Coal Co., contractor, with Calumet Steel Co.

OAK PARK, ILL., 200 tons of rail steel, apartment building at Seventy-third Avenue and Lake Street, to Calumet Steel Co.

MARSHALL COUNTY, ILL., 100 tons of rail steel, County road work; placed by Mid-West Supply Co., contractor, with Calumet Steel Co.

SEATTLE, WASH., 300 tons, store and a building for Richfield Oil Co., to Pacific Coast Steel Co.

TACOMA, WASH., 100 tons, chemical plant, to Northwest Steel Rolling Mills.

LOS ANGELES, 180 tons, retaining wall for Riverside-Dayton viaduct, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 300 tons, Harlem River tunnel; George H. Flynn Corporation, general contractor.

CHICAGO, 3000 tons, five junior high schools taking 600 tons each; bids, which are on entire tonnage, taken last week.

CHICAGO, 2000 tons, building for General Electric Co., West Pershing Road and Ashland Avenue; Graham, Anderson, Probst & White, architects.

SAN FRANCISCO, 300 tons, power house for Great Western Power Co.; bids soon.

SACRAMENTO, CAL., 108 tons, paving in Sacramento County; bids Aug. 15.

Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.

Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes....	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.55c.
Galv. sheets (No. 24), 25 or more bundles	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets	3.10c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large.....	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1½-in.....	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00
Sheet Bars	
	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs	
	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00
Skelp	
	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods	
	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock.....	\$5.00 per ton over base
*Chicago mill base is \$43. Cleveland mill base, \$42.	

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c. from the Caucasus.....	39c.
Manganese ore, washed, 52% manganese, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.00 to \$11.25
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ , delivered.....	50c. to 55c.

Ferromanganese	
	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00
Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys	
Ferrotungsten, per lb. contained metal, del'd	.95c.
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. An-niston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay	
Per 1000 f.o.b. Works	
First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey.....	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton.....	7.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick	
Per Net Ton	
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
Per 100 Pieces	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Per Cent Off List	
†Machine bolts	.70
†Carriage bolts	.70
Lag bolts	.70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	.70
Hot-pressed nuts, blank or tapped, square....	.70
Hot-pressed nuts, blank or tapped, hexagons..	.70
C.p.c. and t. square or hex. nuts, blank or tapped	.70
Washers*	.675c. to .650c. per lb. off list

Bolts and Nuts

Per Cent Off List	
Semi-finished hexagon nuts.....	.70
Semi-finished hexagon castellated nuts, S.A.E. .70	
Stove bolts in packages, Pittsburgh.80, 10 and 2½	
Stove bolts in packages, Chicago. .75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	.80, 10 and 5
Stove bolts in bulk, Chicago. .75, 20, 10, 5 and 2½	
Tire bolts	.60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)	
Base per 100 Lb.	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00

Small Rivets

(½-In. and Smaller)	
Per Cent Off List	
F.o.b. Pittsburgh.....	.70 and 10
F.o.b. Cleveland	.70 and 10
F.o.b. Chicago.....	.70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List	
Milled cap screws.....	.80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut threads.....	.80
Upset hex. head cap screws, U.S.S. thread. 85 and 5	
Upset hex. cap screws, S.A.E. thread. .85 and 5	
Upset set screws.....	.80, 10 and 10
Milled studs.....	.70 and 5

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Chicago

Steel Mill Backlogs Gained Slightly in July—Ingot Output 75 Per Cent With Outlook More Favorable

CHICAGO, July 31.—In contrast with a year ago, steel mill backlogs gained a trifle in July. The net result is that both new business and shipments of finished steel products in the seventh month of this year established a record over the corresponding periods in former years. The rate of specifying as August starts has not decreased and the belief is common that August will be better than the average summer month. Sales in the past week were equal to the average so far this year, showing marked improvement over the previous seven-day period. The bulk of this business is in bar mill products that are being directed principally to the manufacturers of automobiles and accessories.

Cold-drawn bar makers are taking larger quantities and railroads find heavier needs as they sustain car repair and rebuilding programs that are more extensive than is common at this time of the year. Manufacturers of welded pipe are pressing for deliveries and oil storage tank programs are of greater moment, bringing to this market plate business that is urgently needed in the absence of normal railroad equipment construction.

The No. 2 furnace at Gary was taken out of service July 28, bringing the count of active Steel Corporation stacks to 16 out of 27 in this district. In the meantime, ingot output remains at 75 per cent of capacity and the outlook is a trifle more favorable than a week ago that this rate will be maintained.

Sheets are moving in better volume and sales are more numerous at present quotations.

Both jobbing and contract foundries in this territory have taken on additional work and are in need of heavier shipments of pig iron. Sales, about one-half of which are for the third quarter and the remainder for the next five months, aggregate 30,000 tons in one of the most active buying periods since before the turn of this quarter.

Pig Iron.—Numerous sales of 500 to 3000 tons each mark this as an unusually active week in northern Illinois and southern Wisconsin, July sales were in excess of those in either July, 1926, or July, 1927, and purchases for the first seven months in 1928 are substantially ahead of the corresponding period in 1927. The foundry melt has grown measurably in the last 10 days, this being equally true of jobbing and contract shops. Production in the Chicago district remains steady and sellers continue to reduce stocks. The Cadillac furnace, a producer of charcoal iron, has been blown out.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	18.00
Malleable, not over 2.25 sil.....	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	21.51
So'th'n No. 2 (barge and rail).....	21.01
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A sale of 1000 tons of 19 to 21 per cent spiegeleisen is reported at St. Louis at \$31, Hazard, Pa. In the local market, this commodity is quiet. A Chicago steel mill user is making inquiry as to the possibility of bringing 3000 tons of ferromanganese by boat from Europe to Chicago.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Structural Material.—Although new business and that in prospect are of good size, contractors predict that the early fall will see a marked recession in large building activities in the Chicago area. Fabricators are already beginning to complain about conditions, though it is more on account of small backlogs than because of lack of work in shops at the beginning of the new month. Structural orders for the week total more than 7000 tons. A St. Louis shop will fabricate 1500 tons for an express building in that city. The Apparel Mart, Chicago, which is still in the stage of being financed, is now said to require between 50,000 and 60,000 tons of steel. Following the formation of the Colgate-Palmolive-Peet combination, an enlargement of the Palmolive-Peet Building in Chicago has been ordered. Over 3000 tons has been added, bringing the total order to 7000 tons of structural steel. Among old inquiries that are being revived is 15,000 tons for the Chicago Board of Trade Building.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Plates.—Of special importance to the local plate market are three orders for tank materials totaling over 7000 tons. This steel is for fabrication and erection in the Southwest. Definite action has not been taken on 12,000 tons sought by the Texas & Pacific Oil Co., but local sellers expect that orders will be placed in the next few days. The Humble Oil & Refining Co. may soon come into the market for a large tonnage of tankage materials and other oil companies are said to be contemplating similar action. All told, steel demand from the Southern and Southwestern oil fields promises well for August. Manufacturers of welded pipe are unusually busy and are pressing mills for weekly deliveries in excess of the tonnage scheduled at the time contracts were placed. Reports are insistent that railroad equipment purchases will be-

come larger and more numerous in the late summer and early fall. Orders this week include 100 automobile cars for the Chicago & Eastern Illinois and 100 underframes for the Fruit Growers' Express. Noteworthy among fresh inquiries is one for 500 gondola car bodies for the Chesapeake & Ohio and another for 100 automobile cars for the Missouri Pacific. Railroad repair programs are fully up to schedules in previous summers, as shown by specifications from that source. General demand for plates is surprisingly broad, and the total tonnage being ordered out clearly shows that the seasonal drop in shipments is less than a year ago, in spite of the fact that car shops are in need of little material. Deliveries average about three weeks and prices are steady at 2c., Chicago.

Mill prices on plates, per lb.: 2c., base Chicago.

Bars.—Users in practically all lines are making heavy demands for soft steel bars, with the result that a sharp increase is noticed both in new buying and specifications. While a few sales represent needs to finish out the third quarter, the bulk of new business is at close range. The total volume of specifications is above production at the moment. Individual releases are small and call attention to the fact that, while demand is widespread and above expectations, the attitude of buyers is conservative. Automobile manufacturers are still the most prominent among users of bar mill products. It is the steadiness of this industry that largely accounts for the largest July bar shipments in four years. Backlogs have grown a trifle and deliveries range from three to four weeks. Although iron bar mills are far from fully engaged, current orders at 2c. and specifications are considered satisfactory for this time of year. Shipments of alloy bars are but a reflection of the continued activity among manufacturers of automobiles. Prices and alloy differentials are steady. Shipments of rail steel bars do not match with production, thus affording producers an opportunity to build stocks against needs for reinforcing bars and fence posts. Contracts are on the basis of 1.85c., Chicago Heights, whereas small miscellaneous orders are being taken at 1.90c.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Reinforcing Bars.—Lettings are light, but an unusually large amount of business is pending and in prospect. July has been the leading month in 1928 in the number of quotations made on reinforcing work, and likewise the past seven days have seen the most active quoting of any week so far this year. Bending shops are still operating at 75 to 80 per cent of capacity. Recent lettings and inquiries are shown on page 308.

Sheets.—An upturn in operations is following closely on a larger volume of orders and specifications. Buyers

are now giving evidence that they wish to take advantage of the present low prices and that they are not willing to allow stocks to run to lower levels. The bulk of purchases are for 60 days and some inquiry has been made as to the attitude that producers will assume in booking business beyond the end of this quarter. Output stands close to 70 per cent of hot mill capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Rails and Track Supplies.—Local rail mills have been able to hold operations above expectations as result of a steady number of new small orders and additional releases against optional tonnages. Fresh inquiry for standard-section rails totals 2000 tons in miscellaneous lots. Sales of light rails in July were of good size when compared with the demand for this product in some previous months. New sales in track fastenings total 1500 tons, and specifications, which are larger, assure the maintenance of the rate of operations which has been adhered to during the past 30 days. A lot of iron tie plates has been taken at \$43 a ton, Chicago.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Specifications are steady and output ranges between 60 and 65 per cent of capacity. Users who are not covered by contracts are entering the market more freely and spot sales on makers' books represent close to 25 per cent of total orders. Prices are firm.

Coke.—By-product foundry coke is moving more rapidly against second half contracts, this being a reflection of the greater activity among foundries. Prices are steady at \$8, f.o.b. local furnaces.

Old Material.—Purchases of heavy melting steel and cast iron borings have brought prices 25c. above the levels of a week ago. Quotations for

most grades appear steady in the face of a greater number of small purchases by a wider circle of buyers. One of the local steel mills has taken heavy melting steel at \$13 a gross ton, delivered, while two users of borings each have ordered 500 tons at \$9.75. That an oversupply of scrap exists in this district is shown by the fact that rejections are unusually frequent and dealers are seeking outlets at Lake Erie ports. Although there may be an outward flow of scrap by water routes, it is probable that the Detroit district will furnish Chicago with certain grades by the same means of transportation. A dealer has paid at Indianapolis \$12.25 a gross ton, delivered Gary, for a round tonnage of heavy melting steel. The Chicago & North Western will sell 6000 tons and the Santa Fe is offering 8000 tons.

Prices deliv'd consumers' yards, Chicago:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'd steel carwheels	15.50 to 16.00
Rail'd tires, charg. box size	15.50 to 16.00
Rail'd leaf springs, cut apart	15.50 to 16.00

Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	15.75 to 16.25

Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phos. punchings.....	14.00 to 14.50
Low phos. plate, 12 in. and under	14.00 to 14.50

Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings.....	9.25 to 9.75
Short shoveling turnings.....	9.00 to 9.50
Machine shop turnings....	6.00 to 6.50

Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25

Cupola Grades:	
Steel rails less than 3 ft..	15.25 to 15.75
Angle bars, steel.....	14.25 to 14.75
Cast iron carwheels.....	12.75 to 13.00

Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00

Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	19.50 to 20.00
Iron car axles.....	24.00 to 24.50
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought...	10.75 to 11.25
No. 2 railroad wrought...	11.00 to 11.50
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50

Cupola Grades:	
No. 1 machinery cast....	13.50 to 14.00
No. 1 railroad cast.....	12.75 to 13.25
No. 1 agricultural cast....	12.50 to 13.00
Stove plate	10.75 to 11.25
Grate bars	11.25 to 11.75
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—Although July sales and production both dropped a trifle below the June totals, it is significant that July was unusually good. This can be accounted for in large measure by the uniform demand from the manufacturing trade because distribution in the farm areas has been cut during the time of intensive work in the fields. Demand for nails is

taking a turn for the better, but it is still far below the expectations of sellers during this, the active building season. Prices for wire nails are \$2.60, base, per keg, Chicago. Quotations on plain wire are steady at \$2.45 per 100 lb.

Cast Iron Pipe.—James B. Clow & Sons have taken 950 tons of 8-in. and 75 tons of 12-in. pipe for Milwaukee at \$42.24, delivered, or \$33.74, Birmingham. Contractors, having completed much of the work given them earlier in the year, are looking for fresh contracts and the prices they are bidding are lower than they were a month or six weeks ago. Fresh inquiry is not large and producers foresee a less active summer than in some of the past years. Springfield, Ill., will buy 700 tons of 10 and 16-in. class C and 36-in. class A pipe. The inquiry by St. Clair Shores, Mich., for 2200 tons, is still open. Railroads are taking cast iron in limited quantities and public utilities are finding a normal midsummer use for this commodity.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

RAILROAD EQUIPMENT

New York Central Inquires for 55 Locomotives

THE New York Central's inquiry for 55 locomotives is the feature of the week's equipment market. An additional 13 locomotives are also wanted for export. The Chesapeake & Ohio will purchase 500 gondola car bodies. Buying has been light, the only sizable order having been placed by the Chicago & Eastern Illinois for 100 automobile cars. Details of the week's business follow:

Chesapeake & Ohio has made inquiry for 500 70-ton hopper-bottom gondola car bodies and repairs to trucks.

Seaboard Air Line is said to have definitely withdrawn its recent inquiry for 1000 box cars.

Chicago, Rock Island & Pacific has placed 10 air-dump cars with Western Wheeled Scraper Co.

Chicago & Eastern Illinois has purchased 100 40-ton automobile cars from Mount Vernon Car Mfg. Co.

Cincinnati, Hamilton & Dayton has ordered 10 ballast cars from American Car & Foundry Co.

Fruit Growers Express has ordered 100 steel underframes for refrigerator cars from Pressed Steel Car Co.

Southern Pacific is inquiring for four gas-electric rail motor cars.

Chilean State Railways have made inquiry for 20 coaches and six sleeping cars. Bids will be received Nov. 23.

Buenos Aires & Pacific, Argentina, is inquiring for eight Mikado type locomotives.

F. C. Cochabamba, Santa Cruz, Bolivia, has ordered two Mikado type locomotives from American Locomotive Co.

Hu Len Hei Hun, China, is inquiring for five Mikado type locomotives.

New York Central is inquiring for 25 locomotives, type 4-8-2, and 30 locomotives, type 4-6-4.

Northern Illinois Coal Corporation has purchased six air-dump cars from Koppel Industrial Car & Equipment Co.

Philadelphia

Basic Pig Iron Declines Slightly on 20,000-Ton Purchase— Steel Prices Strengthening

PHILADELPHIA, July 31.—Orders for steel have registered a slight decline in the past week, but the total for the entire month is reported by most mills to have been quite satisfactory. Sellers are showing considerable determination in their effort to advance prices to 2.05c., Coatesville, on plates, 1.90c., Pittsburgh, on bars, and 2.05c., Bethlehem, on shapes. Sheet mills are also seeking to eliminate the tendency to weakness in prices and are beginning to offer more resistance to concessions. Shape prices are still unstable and on a lower level than quotations on plates or bars, with the market ranging from 1.95c., Pencoyd, Pa., to 2c., Bethlehem. On a purchase of 20,000 tons of basic pig iron by an Eastern steel company, the price declined 25c. a ton.

Pig Iron.—An eastern Pennsylvania consumer of basic iron, which has been inquiring for about 20,000 tons, has bought. Based on this and another recent purchase, basic iron is quotable at \$18.75 to \$19.25 per ton, delivered. Among recent inquiries for the foundry grade are a number of lots for the United States Navy, including about 400 tons for Puget Sound, and about a carload each for the navy yards at Portsmouth, Brooklyn and Philadelphia. The Baldwin Locomotive Works, Eddystone, Pa., is inquiring for 1500 to 2000 tons of cylinder iron, about 1.40 per cent silicon content, and the New York Air Brake Co., Watertown, N. Y., is in the market for about 100 tons of silvery iron. The present price of \$19.50 per ton, base furnace, on the foundry grade is apparently being maintained on current orders, which are composed principally of small lots. Sellers in this district report that some small tonnages of Buffalo iron are arriving for consumers in this territory.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to	
2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to	
2.75 sil.	20.76
East. Pa. No. 1X.....	21.26
Basic (del'd east. Pa.)...	\$18.75 to \$19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b.	
N. Y. State furnace)...	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b.	
furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to	
2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Buying is mostly of one or two carloads, on which the market price of \$105 per ton, seaboard, applies. Sellers report that the Ford Motor Co., recently in the market for about 1000 tons of ferromanganese for its Fordson plant, claims to have been able to buy at less than the quoted price for second half of \$105 per ton, seaboard, but no intimation of the extent of the concession was given by the buyer.

Bars.—Except for a slight decline in buying during the last week of the month, there has been an active market throughout July. Mills are endeavoring to obtain 1.90c., Pittsburgh, or 2.22c., Philadelphia, on all new busi-

ness, but there are many uncompleted contracts at 1.85c., Pittsburgh.

Plates.—Mills are succeeding in obtaining 2.05c., Coatesville, or 2.15c., Philadelphia, on much of the current small-lot business, but on larger tonnages 2c., Coatesville, or 2.10c., Philadelphia, is not uncommon. Except for a slight decline in orders toward the end of the month, business in July has been quite satisfactory for most sellers.

Shapes.—Efforts to advance the market to the level of plates and bars have not as yet met with much success. The maker at Pencoyd, Pa., has been quoting 1.95c. to 2c. per lb., Pencoyd, or 2.01c. to 2.06c., Philadelphia, and other mills have been meeting this price. As a result, Pencoyd has become, at least temporarily, a more usual basing point for shape prices than Bethlehem. Small tonnages occasionally bring up to 2c., Bethlehem, or 2.13c., Philadelphia, but the usual range of quotations seems to be 2.01c. to 2.08c., Philadelphia, based on 1.95c., Pencoyd, and 1.95c., Bethlehem. Fabricators are bidding on a number of projects in this territory, including highway bridges in Philadelphia, a high school at Pleasantville, N. J., dormitories at Princeton University and a factory building at Camden, N. J.

Sheets.—Concessions have not en-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier...	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands).....	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished.	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats.	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24).....	3.85c.
†Galvanized sheets (No. 24).....	4.60c.
Blue ann'l'd sheets (No. 10).....	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

tirely disappeared on black and galvanized sheets, but mills are evidently engaged in an earnest effort to maintain the market at 2.65c., Pittsburgh, or 2.97c., Philadelphia, for black and at 3.50c., Pittsburgh, or 3.82c., Philadelphia, for galvanized. Evidently prices \$1 a ton lower on black and \$2 lower on galvanized sheets are still obtainable by preferred buyers and distributors, but sellers are showing more resistance to efforts to obtain these concessions. Blue annealed sheets are fairly firm at 2c., Pittsburgh, or 2.32c., Philadelphia.

Warehouse Business.—Jobbers report a slightly smaller volume of business in the past week, but the total for the month has been satisfactory. Prices appear to be quite firm and in an effort to bring warehouse quotations more nearly in line with present mill prices, most jobbers are preparing to advance the base price of steel bars and small shapes within the next few days, probably to 2.70c. per lb. Quantity differentials are reported to be well maintained on all products.

Imports.—In the week ended July 28, 2000 tons of chrome ore arrived at this port from Portuguese Africa and 751 tons of pig iron came from India. Steel imports consisted of 524 tons of structural shapes and 12 tons of bars from Belgium and 19 tons of strip steel and four tons of steel scrap from the United Kingdom.

Old Material.—Prices of all grades are substantially unchanged. No. 1 heavy melting steel is still quoted at \$13 per ton, delivered eastern Pennsylvania mills, but a sizable tonnage has been bought at Sparrows Point, Md., for \$12.50 per ton, delivered. While a Coatesville, Pa., consumer is unwilling to pay more than \$14 per ton for occasional carloads of heavy breakable cast, a Harrisburg user has recently closed on some of this grade at \$14.50 per ton, delivered. Other consumers show little interest in making contracts.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails.....	12.50
No. 2 heavy melting steel.....	\$10.50 to 11.00
No. 1 railroad wrought....	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.25
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)....	10.00 to 10.50
Heavy breakable cast (for steel works)	14.00 to 15.00
Railroad grate bars.....	11.00 to 11.50
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under.....	17.50 to 18.00
Couplers and knuckles....	14.50 to 15.00
Rolled steel wheels.....	14.50 to 15.00
No. 1 blast f'nace scrap....	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire.....	11.00
Cast iron carwheels.....	15.50
No. 1 cast.....	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling....	14.50 to 15.00

New York

July Lettings of Structural Steel Bulk Large— Improvement in Pig Iron Inquiry

NEW YORK, July 31.—Increasing interest of buyers in their fall requirements has been the feature of the pig iron market in the last week, new inquiry being estimated at from 10,000 to 12,000 tons. Including business which had already been quoted on, fully 15,000 tons is now pending in the territory served by New York selling offices and action is still awaited on about 3000 tons of ballast iron for shipment to the Pacific Coast. A large consumer of malleable iron has come into the market for 6000 tons for delivery during August, September and October to its plants at Bridgeport, Union City and New Britain, Conn.; Troy, N. Y., and Wilmington, Del., and a radiator manufacturer will purchase 1400 tons of foundry iron for delivery during the third and fourth quarters at Norwich, Conn. Another New England melter is in the market for 1000 tons and a New Jersey melter is inquiring for a like quantity. The New York Air Brake Co. expects to buy 100 tons of silvery iron for Watertown, N. Y. A number of smaller inquiries for August and September requirements are before the trade and the first half of August is expected to bring out a substantial volume of fourth quarter business. Sales during the last week amounted possibly to 10,000 tons, the largest purchase, 2000 tons, for delivery over the remainder of the year. The A. P. Smith Mfg. Co., East Orange, N. J., is said to have closed for 750 tons of No. 2 plain and No. 2X for fourth quarter delivery and has made inquiry for an additional 100 tons of special iron for mixture purposes. Other sales have been principally in small tonnages, but have been well distributed, indicating, as does the steady rate of shipments against old contracts, that foundry operations are being well sustained. Buffalo foundry iron is still quotable at \$16 to \$17, furnace, but there have been sales, both in New England and in the New York district, in which the silicon differential has been waived. It is reported that the barge rate from Buffalo to New York is soon to be advanced 50c. a ton, and this promises a heavier movement of iron during the next few weeks, both for immediate consumption and for storage against requirements during the late fall. Eastern Pennsylvania producers are quoting \$19.50, furnace, for the base grade, but at that level are not able to compete with Buffalo barge iron.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$19.51 to \$20.01
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Plates, Shapes and Bars.—Structural steel lettings and inquiries in large volume continue to feature business in the heavy tonnage products. July awards of building work were large and prospects are encouraging for the rest of the summer. An award of 9500 tons for New York

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll, strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases, 4.50c. to 7.00c.	

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10

	Per Cent Off List
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10

	Per Cent Off List
Coach screws:	
½ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

	Black	Galv.
Standard Steel—		
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

	Black	Galv.
Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

	Prime	Seconds
Tin Plate (14 x 20 in.)		
Coke, 100 lb. base box....	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

	Prime	Seconds
Terne Plate (14 x 20 in.)		
IC—20-lb. coating.....	\$10.00 to \$11.00	
IC—30-lb. coating.....	12.00 to 13.00	
IC—40-lb. coating.....	13.75 to 14.25	

	Per Lb.
Sheets, Box Annealed—Black, C. R. One Pass	

	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.
No. 22.....	3.75c. to 3.95c.
No. 24.....	3.80c. to 4.00c.
No. 26.....	3.90c. to 4.10c.
No. 28*.....	4.05c. to 4.25c.
No. 30.....	4.30c. to 4.50c.

	Per Lb.
Sheets, Galvanized	
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*.....	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

subway work probably will be made this week. Outstanding among the inquiries is 18,000 tons for the new Reynolds Building, Forty-second Street and Lexington Avenue, which will be higher than the Woolworth Building. Another large building to be built at 1 Wall Street by the American Exchange-Irving Trust Co. will take about 15,000 tons. The dullness in the railroad equipment field continues, there being but one important inquiry and that is for 500 gondola car bodies and repairs to 500 trucks from the Chesapeake & Ohio. Prices on plates, shapes and bars are unchanged, but the tendency toward 1.90c., Pittsburgh, on bars is stronger and several fair-sized lots have been sold at that price. On plates, 2c., Coatesville, is the ruling price, while on shapes the mills are getting 2c., Bethlehem, with \$1 higher on both products in small lots. The demand for universal plates is exceptionally active, and one Eastern mill is unable to make better deliveries than three weeks, although shipments in a week to 10 days can be made of the sheared mill products.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets.—Notwithstanding efforts of several of the larger manufacturers of sheets to stiffen prices, some of the recent low quotations have not disappeared. Sales of galvanized sheets have been made at 3.30c. and 3.35c., but the more common quotation is 3.40c., with some makers asking 3.50c. Black sheets range from 2.60c. to 2.65c., Pittsburgh; some makers will not go below 2.65c., but on competitive business of an attractive character the buyer has little difficulty in getting 2.60c. Blue annealed sheets are fairly steady at 2c., but there are occasional sales at \$1 or \$2 a ton less.

Pipe.—An American mill has taken an order for more than 1000 tons of oil well casing for shipment to the Venezuelan oil fields, and the American representative of a German maker booked about 500 tons from the same buyer.

Cast Iron Pipe.—There is a fair volume of private purchasing of pressure pipe, but very little municipal inquiry. Southern makers continue fairly firm at \$34 to \$35 per ton, base Birmingham, which is not competitive in this district with Northern foundries maintaining from \$37.60 to \$38.60 per ton, delivered New York. Most of the recent buying has been confined to small lots to complete installations.

Prices per net ton, deliv'd New York: Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Reinforcing Bars.—The McClintic-Marshall Co. will furnish 1800 tons of bars for a bridge at Providence, R. I., and the Concrete Steel Co. has booked 1200 tons for a railroad warehouse in New York. The run of small orders has kept up at about the rate of recent weeks. The Gibbs Rice Co., Inc., New York, is low bidder on a

high school at White Plains, N. Y., which will require about 500 tons, and 300 tons will be needed for a tunnel under the Harlem River, on which the George H. Flynn Corporation is general contractor. Effective Aug. 1, distributors in this territory will not ship cut-to-length from mills, except in 40, 50 and 60-ft. lengths. At the same time a warehouse price of 2.15c. per lb., Pittsburgh, has been announced, making a delivered price on cars at New York of 2.49c. This compares with the old Youngstown warehouse price of 2.20c., or 2.57½c. on cars at New York. New York warehouse prices are unchanged.

Warehouse Business.—Orders have been slightly smaller since about the middle of the month, but most jobbers estimate that the total business for July will equal or be slightly in excess of that in June. Black and galvanized sheet prices continue at about 3.80c. per lb., base, for black and 4.50c., base, for galvanized in the metropolitan district with quotations in local New Jersey about 20c. per 100 lb. higher. There has been no change in discounts on machine bolts and coach screws, but in most cases warehouses are offering 60 per cent off list, even for small lots, rather than quote a range of 55 to 60 per cent off.

Coke.—Specifications on foundry coke contracts are good, indicating good seasonal foundry operations, but new sales are few. Foundry coke is unchanged at \$3.50 per net ton, Connellsville, and the furnace grade is quoted at \$2.50 to \$2.75. Special brands of foundry coke are offered at \$4.85, f.o.b. ovens, and delivered prices are \$8.56 per net ton to northern New Jersey, Jersey City and New-

ark and \$9.44 to New York and Brooklyn. By-product foundry coke is unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06 to \$10.29, New York or Brooklyn.

Old Material.—Dealers report a slightly smaller tonnage of scrap offered at present prices, but no scarcity of material seems to be in prospect. Prices on all grades show practically no change, except that on the basis of a recent sale of heavy breakable cast to a Coatesville, Pa., consumer, dealers are offering \$13.50 per ton, delivered, while others are quoting \$14 per ton, delivered to a Harrisburg, Pa., mill. No. 1 heavy melting steel has been bought by the consumer at Sparrows Point, Md., at \$12.50 per ton, delivered. Bids on the list of the Pennsylvania Railroad, offering about 40,000 tons, are to be opened this week.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.00 to	\$9.85
Heavy melting steel (yard)	6.00 to	6.25
No. 1 hvy. breakable cast.	9.75 to	10.00
Stove plate (steel works)...	6.75 to	7.25
Locomotive grate bars....	6.75 to	7.25
Machine shop turnings....	6.00 to	6.50
Short shoveling turnings..	6.00 to	6.50
Cast borings (blast furn. or steel works).....	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles.....	14.50 to	15.00
Iron car axles.....	23.50 to	24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to	8.75
Forge fire	6.50 to	6.75
No. 1 railroad wrought....	9.00 to	9.50
No. 1 yard wrot., long....	7.50 to	8.00
Rails for rolling.....	10.00 to	10.50
Cast iron carwheels.....	11.00 to	11.50
Stove plate (foundry)....	8.25 to	8.75
Malleable cast (railroad).....		10.00
Cast borings (chemical)...	10.75 to	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.00 to \$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.50

menting on the fact that the movement of iron to consumers is better than usual for this time of the year. Shipments in July were slightly larger than those in June and exceeded output. In fact, stocks on hand at district furnaces have been cut down considerably. Sales in the past week by Cleveland interests totaled approximately 40,000 tons, an increase of about 14,000 tons over the previous week. Pending business is of fair volume, the most important inquiry calling for 3200 tons of foundry iron for delivery over the remainder of the year to an Indiana consumer. As a result of the improvement in buying and of shipments, prices have assumed a firmer tone, although no actual changes have occurred. In Michigan, a larger number of orders have been booked at \$18, although the bulk of the tonnage is still being taken at \$17.50. For delivery to highly competitive points a strengthening of quotations is reported, the minimum price now being \$16.25, furnace.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.....	\$18.00
S'th'n fdy., sil. 1.75 to 2.25.....	\$21.50
Malleable	18.00
Ohio silvery, 8 per cent.....	28.00
Basic Valley furnace.....	16.00
Stand. low phos., Valley furn.....	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Warehouse Business.—Local jobbers have announced a reduction on galvanized and black sheets of \$3 and \$7 a ton respectively, the new schedule to become effective immediately. Otherwise, prices are being well maintained. The volume of business in the past week has been only moderate, but has been distributed among all products.

Sheets.—There has been a recession in fresh orders and in specifications during the past 10 days. The lull in buying is traceable largely to the slackened demand from the automobile industry. Many companies are bringing out new models, but will not get into sizable production for a short time and under the circumstances the release of more liberal specifications by companies in the automotive field probably will not materialize for a few weeks at least. Purchases by other consumers also have been light. The falling off in bookings has not affected prices, which are firmer. Black sheets are quoted at 2.65c., Valley, or 2.60c., Pittsburgh, while blue annealed stock ranges from 1.90c. to 2c., Pittsburgh, with most orders be-

Cleveland

July Steel Business Gains and Exceeds That of June—One Sheet Mill Advances Prices

CLEVELAND, July 31.—The last week of July has brought further improvement in bookings of heavy steel products, with the result that the volume of business in the past month exceeded that of June by a small percentage and that of July, 1927, by a comfortable margin. The betterment is reflected in an increasing tone of optimism which pervades the market. The general sentiment is that activities are being carried along at a rate somewhat above normal for midsummer and expectations are that the present liberal run of specifications and orders is a forerunner of a satisfactory movement of steel in the fall. The wide distribution of bookings among consuming industries is interpreted as an indication of well-sustained operations in many different lines.

While prices are showing a firmer tendency, bars, shapes and plates have by no means been established on a basis of 1.90c., Pittsburgh. A considerable number of current orders are being placed at that figure, but most contract customers are covered for this quarter at 1.85c., and in some cases contracts originally made at 1.90c. have been revised recently to the lower schedule. Plates still can be obtained at 1.85c., Pittsburgh, which is being rather widely quoted. Steel bars range from 1.85c. to 1.90c., Cleveland.

Almost without exception steel orders have called for small lots for immediate delivery. Building activities continue quiet, the only large jobs which have appeared being the new building for Lakeside Hospital, Cleveland, requiring 4000 tons of structural steel, and a structure in Detroit for the Bell Telephone Co., for which 1040 tons will be needed.

In pig iron the week was notable in that sales were the largest since early in April.

Pig Iron.—The situation is more encouraging to producers, who are com-

Warehouse Prices, f.o.b. Cleveland

Base per Lb.

Plates and struct. shapes.....	3.00c.
Soft steel bars.	3.00c.
Reinforc. steel bars.....	2.25c. to 2.75c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.40c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'd sheets (No. 10).....	3.25c.
No. 9 ann'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

ing placed at the lower figure. Galvanized sheets remain at 3.40c., Pittsburgh, and 3.45c., Valley. An important sheet maker has advanced black to 2.85c. and blue annealed to 2.10c., Pittsburgh, although in both cases it is offering pickled grades at \$2 a ton less.

Cold-Finished Steel Bars.—Mills are booking a moderate amount of business from companies in the automotive industry. The price is steady at 2.15c., Cleveland.

Strip Steel.—Consumers continue to specify rather meagerly against current contracts and fresh orders have been poor in volume. Quotations on hot-rolled strips average 1.75c., Pittsburgh, on wide material. Mills are reported to be selling cold-rolled strip at 2.65c., Cleveland, for 3 tons or more. Fender stock is unchanged at 4.10c.

Wire Products.—A slight improvement in buying is noticed, although current business reflects only a fair demand from consuming industries. Prices are showing signs of firmness.

Reinforcing Bars.—The Lakeside Hospital, this city, will require a considerable tonnage of bars, but the amount has not yet been computed. Rail steel bars are firm at 1.75c., mill.

Coke.—Consumers are accepting a fair amount of by-product foundry coke on present contracts, but forward buying is practically at a standstill, buyers preferring to confine orders to cover immediate needs only. Ohio by-product foundry coke is unchanged at \$7.75, Painesville, while Connellsville foundry coke remains at \$3.50 to \$4.85, ovens.

Semi-Finished Steel.—While forward buying of sheet bars is negligible, specifications on third quarter contracts have been satisfactory.

Quotations continue firm at \$32 to \$33, Cleveland, for sheet bars, billets and slabs.

Bolts, Nuts and Rivets.—Shipments to contract customers have been sustained at a fairly high level, a considerable percentage of the business having come from agricultural implement makers and from jobbers. Prices are steady and unchanged.

Old Material.—Steel plants have increased specifications against present contracts, so that the amount of material being shipped to consumers is of fair proportions. Local dealers are buying only enough tonnage to cover present contract obligations. Blast furnace grades are somewhat active, but foundry items are quiet. There is a good demand for machine shop turnings. Prices of several items have weakened, although quotations in general are fairly firm.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.00 to	\$13.00
No. 2 heavy melting steel.	\$12.25 to	\$12.50
Compressed sheet steel.	12.00 to	12.50
Light bundled sheet		
stamp'gs	11.50 to	11.75
Drop forge flashings.	11.25 to	11.50
Machine shop turnings.	7.00 to	7.25
No. 1 railroad wrought.	11.50 to	12.00
No. 2 railroad wrought.	13.50 to	13.75
No. 1 busheling.	10.50 to	11.00
Pipes and flues.	9.00 to	9.50
Steel axle turnings.	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops.	16.00 to	16.50
Low phos., billet, bloom and slab crops.	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap.	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.	9.00 to	9.25
Mixed bor'gs and short turn'gs	9.00 to	9.25
No. 2 busheling.	9.00 to	9.25
Cupola Grades		
No. 1 cast.	16.00 to	16.50
Railroad grate bars.	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling.	16.25 to	16.50

lines of steel commodities was four-months' notes without interest and 3 per cent for cash in 30 days. During the panic of 1893 a discussion came up regarding these terms because the steel companies were acting practically as bankers and could not afford to carry this large line of credit. The terms were then changed for many steel products to 30 days net or 2 per cent off for cash in 10 days.

"This present method of cash discount is a carryover from those earlier periods when trade and economic conditions were quite different from what they are today. For instance, goods were a long time in transit, money fluctuated, credit information was very incomplete and funds were scarce. An attractive cash discount was therefore offered by the seller to hasten payment, but today that condition is reversed; money is stable and rapidly available, deliveries are quick and there is abundant credit information.

"Manufacturers of sheets and strips are no longer justified in offering a 2 per cent cash discount for payment in 10 days and the new terms of ½ of 1 per cent simply apply the practice which has already been established among manufacturers of hot-rolled strips, shapes, plates, bars and other iron and steel products. Thirty-day terms of sale are now practically standard in the steel industry. A 2 per cent cash discount in 10 days is equivalent to a rate of 36 per cent a year. With existing money rates this is out of reason.

"The manufacturer of sheets and strips is justified in paying a cash discount rate that is somewhere near the market value for funds at this time. Under the announced policy of ½ of 1 per cent we will be paying the equivalent of 9 per cent per annum."

Cash Discount Reduced on Sheets

American Rolling Mill Co. Announces New Rate of ½ of 1 Per Cent for Cash in 10 Days

THE American Rolling Mill Co. has announced that, effective from Oct. 1, next, the cash discount on sheets will be reduced from 2 per cent in 10 days to ½ of 1 per cent. This action probably will be followed by other sheet makers and a similar reduction in the allowance for prompt payment of invoices on cold-rolled strips is expected to become effective on the same date. Thus there will be only three steel products on which the inducement to pay by the tenth of each month will be more than ½ of 1 per cent. These are tubular goods, tin plate and wire products.

On nails and some other wire products, the discount is 2 per cent in 10 days and net in 60 days, while on woven wire fence, which has spring and fall datings, the discount amounts to as much as 4 per cent for early payment. Since consumers of tin

plate are largely under cover for the remainder of this year and the contracts call for 2 per cent off for payment in 10 days following receipt of invoice, no reduction in the discount is probable this year, but it is likely that on first quarter and first half of 1928 business, tin plate and sheets will again have a common discount. The cash discount on pipe also is 2 per cent.

Easier Money Makes Lower Cash Discount Necessary

Commenting on the change announced by the American Rolling Mill Co., an officer of a large sheet manufacturing company said:

"During the period following the Civil War a large cash discount was offered by the seller; in the early eighties and nineties the standard terms of payment for many general

Bulgarian Metal Working Plants Hold Convention

BERLIN, GERMANY, July 14.—A convention of the Bulgarian metal industries, held recently at Sofia, agreed upon the creation of an Association of Bulgarian Metallurgical Companies. It was further decided to urge official measures for encouragement of the domestic machinery manufacturers. It was pointed out at the meeting that the domestic machinery builders have so far developed as to be able to meet most of the Bulgarian requirements. Output of agricultural machinery in the past year is reported at 110,000,000 lewas. Acting through the Bulgarian National Bank, the Government arranged the sale of these machines in Bulgaria at greatly reduced prices and deferred payments. At the conference it was brought out that tractors are the only agricultural machines not produced within the country. A petition is to be presented to the Government requesting the delay of proposed large agricultural machinery orders until the home industry has had an opportunity to modernize plants.

Canada

Demand for Structural Steel and Reinforcing Bars Features Business Across the Border

TORONTO, ONT., July 31.—Canadian manufacturing plants are turning out in physical volume approximately 140 per cent of the output reached at the peak of war-time activity 10 years ago, and in spite of lower prices their products have a gross value over 20 per cent higher. The value for 1927, was recently stated to be in the neighborhood of \$3,500,000,000, or about \$250,000,000 above the figures for 1926. This constitutes a record in the history of the country and indicates the extent to which Canada has shared in the general industrialization of non-European countries since the war.

While considerable improvement in industrial activity has featured business in this country, still greater strength along this line is expected. At the moment it is felt that not only are the Canadian railroads reaching a point where it will be necessary for them to embark upon a large scale program of rolling stock improvement, but that also the quite extensive branch line undertakings now in hand by the railroads and others still in project will result in a necessity for large additions to rolling stock. In the meantime, several of the Canadian companies producing rolling stock and other railroad equipment have had under active organization and development new manufacturing departments which are having the result of not only diversifying their production, but making them less dependent upon a single source of business.

As an example, the Canadian Car & Foundry Co., among other things, is developing a substantial business in the pressing of frames for automobiles. The National Steel Car Co. is working on several new lines. The Canadian Bronze Co. has been adapting its production to meet the needs of certain industries, such as newsprint. The Canadian Locomotive Co. has been showing activity in the direction of mining machinery. These new departments promise to register growth over the next few years and should the expected improvement in rolling stock demands materialize, they will benefit accordingly.

Pig Iron.—A majority of melters who place quarterly contracts are covered up to the end of September, so advance buying of foundry and malleable pig iron has practically ceased. Spot sales, however, are holding up well, buying at the moment being at the high average for the year, and decidedly better than that of July a year ago. Consumers who are situated to take delivery of iron by water are favoring this method of transportation and are placing spot orders for as high as 500 tons. Prices remain unchanged in the Toronto market.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25.	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25.	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—The demand for structural steel and reinforcing bars continues one of the features of the iron and steel industry of this country. Numerous orders have been closed for structural in lots ranging from 100 to 1000 tons and sizable tonnages are pending. For the new knitting mills at Hamilton, Ont., for J. R. Moddie & Sons, Ltd., 500 tons of reinforcing bars and 1500 tons of structural steel will be required. The Canada Permanent Mortgage Corporation, Toronto, will erect an office building at Bay and Adelaide Streets, for which approximately 7000 tons of structural steel will be required. Inquiries are out

for other proposed buildings, involving from 500 to 3000 tons, which are expected to be closed within the next two or three weeks.

Old Material.—Business in the scrap market remains quiet. Consumers are buying in small tonnages and only for immediate needs. Shipments of steel scrap into the Hamilton, Ont., district is a feature of the market, but little new buying is being done. Consumers throughout Ontario are ordering machinery cast and stove plate in limited tonnages. Prices are again showing a softening tendency, especially in the local market.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00
Per Net Ton		
No. 1 machinery cast....	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

St. Louis

Demand for Galvanized Sheets Improves—Tin Plate Active—Pig Iron Business Quiet

ST. LOUIS, July 31.—Sales of pig iron were rather light during the week, the St. Louis Gas & Coke Corporation getting 2000 tons, including 800 tons sold to an Illinois stove manufacturer and 200 tons to a northern Illinois melter and the remainder in lots of a carload or more. The insistence on immediate shipment of all orders is regarded as pointing to low stocks and consequent early buying. Business with stove foundries is reported to be better than usual at this time of year, and the melt of agricultural implement makers is being well sustained. The Granite City

maker has reduced its price to \$18.50 to \$19, f.o.b. furnace, and continues to meet competition from other makers of Northern iron. No inquiries for sizable tonnages are pending.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25' f.o.b.	....
Granite City, Ill.	\$18.50 to \$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	19.66
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—The usual summer dullness pervades the market for both domestic and foundry grades of coke, with no changes in prices. Not much activity is expected from dealers for the next few weeks, at least.

Finished Iron and Steel.—A marked improvement with respect to galvanized sheets was shown during the last week, according to the Granite City Steel Co. Incoming business was extremely satisfactory, the volume being sufficient to warrant operations virtually at capacity. Reports from various district offices in the South and Southwest indicate that a major buying movement is at hand. Sheet mill and tin mill business continues good, all units operating 100 per cent, or as close thereto as the summer heat will permit. Tin plate is in good demand, with prospects of continuing so for several months. Blue annealed sheets are not quite so

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galv. sheets (No. 24)	5.25c.
Blue ann'd sheets (No. 10)	3.60c.
Black corrug. sheets (No. 24)	4.50c.
Galv. corrug. sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

active as other items, although improved. Prices are steady, with a tendency toward stabilization. July warehouse business probably will show a falling off of about 15 per cent as compared with last month and July, 1927, which is largely due to the decrease in buying in the oil fields. The St. Louis industrial district demand holds up fairly well. The only structural job of consequence—825 tons for a terminal depot for the American Railway Express Co.—went to the Mississippi Valley Structural Steel Co.

Old Material.—The market for old material is extremely quiet. Consumers are showing little interest in the market, and it is not expected there will be any buying until the latter part of August. Dealers are buying from railroad lists to cover the few unfilled contracts. Railroad lists include: Pennsylvania, 43,565 tons; Union Pacific, 1990 tons; Big Four, 1400 tons; Standard Oil of Indiana,

110 tons; Missouri Pacific, 105 carloads; Chicago, Milwaukee & St. Paul, 167 carloads; Nickel Plate, 31 carloads and Frisco Lines, 17 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$10.50 to \$11.00
No. 1 locomotive tires....	12.00 to 12.50
Heavy shoveling steel....	10.50 to 11.00
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart..	12.00 to 12.50
Railroad springs.....	13.00 to 13.50
Bundled sheets.....	8.50 to 9.00
No. 2 railroad wrought....	11.00 to 11.50
No. 1 busheling.....	9.25 to 9.75
Cast iron borings.....	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling.....	12.75 to 13.25
Machine shop turnings....	6.25 to 6.75
Steel car axles	16.75 to 17.25
Iron car axles	25.75 to 26.25
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought....	9.00 to 9.50
Steel rails, less than 3 ft..	15.00 to 15.50
Steel angle bars.....	11.50 to 12.00
Cast iron carwheels.....	12.75 to 13.25
No. 1 machinery cast.....	13.00 to 13.50
Railroad malleable.....	11.25 to 11.75
No. 1 railroad cast.....	13.00 to 13.50
Stove plate	10.50 to 11.00
Agricult. malleable.....	12.00 to 12.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

see company is operating six at Ensley and six at Fairfield and the Gulf States Steel Co., three at Alabama City.

Cast Iron Pipe.—The market has been quiet and below normal for the past three weeks. New business is confined to small orders and the tonnage booked outside of the district is very light. Plant operations are at a fair level due to accumulation of small orders. Shipments have been fairly steady through July. Makers are holding closely to quotations of \$34 to \$35 for third quarter delivery.

Coke.—Demand for foundry coke continues light, reflecting midsummer conditions. Coke under contract is moving out at a fairly steady rate, though the total volume for July is somewhat less than that of June. The \$5 quotations for both spot and contract are unchanged.

Old Material.—The market has developed a better feeling than has been found for several weeks. Demand is somewhat stronger in nearly all lines, but sales are unusually light. Scrap steel rail and No. 1 cast are holding first place in the amount of activity. Prices are low and unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to \$9.00
Scrap steel rails.....	11.00 to 11.50
Short shoveling turnings..	7.50 to 8.00
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling.....	13.00
No. 1 cast.....	14.25
Tramcar wheels	12.50 to 13.50
Cast iron carwheels.....	12.00 to 13.00
Cast iron borings, chem..	13.50 to 14.00

Birmingham

Galvanized and Black Sheets Reduced \$1 a Ton—Pig Iron Demand Steady

BIRMINGHAM, July 31.—Pig iron melters prefer to carry light stocks and are demanding quick deliveries. Pending business is largely confined to small lots, but sales have improved noticeably during July. The market is firm at \$15.50. Some iron is being sold for September delivery, but a portion of the third quarter requirements is yet to be placed. Shipments by merchant producers have been ahead of the make for the past several days. This has been aided by reduced production due to pending furnace repairs by one company. Makers of cast iron pressure pipe, radiators and heavy machinery are among the heavy users. No changes in furnace operations have been made during the past week. Seventeen furnaces are in blast, eight being on foundry, seven on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	\$15.00 to 16.00

Finished Steel.—Demand for steel bars, shapes and plates continues steady and above the average for this season of the year. New business booked during July was heavier than that of the same month last year and showed a slight gain over that of June. Prices on bars, plates and shapes show a tendency toward greater stability. Quotations on galvanized and black sheets have been reduced \$1 a ton. Mill operations in the district were increased slightly during the past week. Railroad accessory buying is slack. Business is quieter with structural steel fabricators and bar manufacturers. The

Virginia Bridge & Iron Co. has received an order from the Alabama Power Co. for 600 tons of structural steel for a power house. Open-hearth operations have been the same during the past two weeks; the Tennes-

Youngstown

Ingot Production Close to 80 Per Cent—Most Finished Products Doing Well

YOUNGSTOWN, July 31.—If July ingot production of this district is less than that of the month before, it will be only a trifling decrease and will be chargeable largely to the limited rate of finishing mill operations and the consequent slowing up of steel production in Fourth of July week. Plant engagement since has been on a rising scale and today finds ingot output at close to 80 per cent of capacity.

The Republic Iron & Steel Co. has 12 of its 13 open-hearth furnaces in Youngstown in production, while all eight of the furnaces at its Warren works are melting. The Youngstown Sheet & Tube Co. has in operation all of its open-hearth furnaces at Campbell and five at its Brier Hill works, or 17 out of a total of 24 at both plants. The Sharon Steel Hoop Co. is operating four of its six furnaces at Lowellville. The total of active independent open-hearth units is 41 out of a total of 53. Bessemer production is rather low, with Republic Iron & Steel Co. operating only one converter on a single turn daily. The rate of output of the Carnegie Steel Co. in this district is well up to the average of the independent companies. This company recently took off furnaces

for repairs at its Ohio works and at its Farrell, Pa., works, but the Ohio works furnace again is in blast. Of the 26 steel works blast furnaces in the Mahoning and Shenango Valleys, 17 are producing iron.

Of the finished steel products of the district, only nails and wire are having an unsatisfactory sale. Steel bars are doing well and business in sheets is active enough to encourage producers to take a stronger price stand. In addition to the liberal amount of pipe line tonnage that came to this district in the latter part of June and the fore part of July, producers have been getting a little more oil country pipe business, and the demand for building and construction pipe is steady, though individual orders are small. There is little complaint as to

the demand for strips, but there is as to the prices at which they are selling.

There have been few periods in the history of tin plate when demand was better than it is now. The American Sheet & Tin Plate Co. has all of its tin mills in the Shenango Valley in operation and has found it necessary to work an extra turn to bring up the production, somewhat impaired by the fact that the mills' crews have been unable to stand up under the heat inside and outside the plants.

It is small wonder that, enjoying such a good business and plant operation at this time of the year, steel makers view the situation optimistically.

The Republic Iron & Steel Co. has advised its district offices that shortly it will complete changes in its old 20-in. skelp mill and use it as a mill

warehouse, in which will be carried a stock of merchant steel bars, bar mill angles and light channels and concrete reinforcing bars. It is stated that the establishment of this mill warehouse does not mean the company intends to enter the warehouse steel business, but having been handicapped in making promises of deliveries by reason of having no rollings scheduled, the warehouse stocks will be available and shipments can be made without the former dependence upon mill rolling schedules. Carload shipments from the warehouse will take the mill shipment prices, but on less than carload lots there is a minimum extra charge of \$5 a ton. The company plans to stock the 10 sizes of concrete reinforcing bars in 60-ft. lengths, but no fabricating or bending of them is to be attempted.

independent companies have quoted as low as 2.20c.

Shapes.—Although shape awards totaled less than 700 tons this week, pending business amounts to more than 12,000 tons, several large projects having come out for figures during the past few days. The Western Iron Works took 165 tons for an apartment in San Francisco. Bids will be opened Aug. 15 for 1400 tons for four sheds on pier 45, San Francisco, and bids are now being taken on 450 tons for a hotel in San Francisco. Claude Fisher, Los Angeles, was low bidder on the Bardsdale bridge at Ventura, Cal., calling for 570 tons. No change in the price of plain material has occurred, 2.35c., c.i.f. coast ports, being firm.

Cast Iron Pipe.—Awards so far this year are considerably below the total for the corresponding period last year. The Southwest Paving Co., Los Angeles, received the only large award of the week. This was 133 tons of 6 to 10-in. class B pipe for the improvement of El Centro Street in South Pasadena, Cal. Sierra Madre, Cal., voted bonds for a water system and bids will be called for shortly for 1053 tons of 4 to 16-in. class B pipe. The Monterey Water Co., Monterey, Cal., is taking bids on 530 tons. Compton, Cal., will open bids on Aug. 7 for 148 tons of 2 and 4-in. class B pipe, and Dallas, Tex., will open bids on Aug. 10 for 23,247 tons of 16 to 36-in. classes B and C pipe, with alternate bids on steel and concrete pipe. The Weyerhaeuser Timber Co., Longview, Wash., will shortly come into the market for 1503 tons of 4 to 12-in. class C pipe.

Standard Pipe.—Demand for both oil country goods and standard steel pipe has been limited to exceptionally small lots. Los Angeles has opened bids on 100,000 ft. of 1-in. extra heavy galvanized pipe and will make an award next week.

Coke.—Both inquiries and sales of foundry coke have been confined to small lots for prompt shipment, stock in foundry yards being sufficient to take care of present requirements.

San Francisco

Structural and Reinforcing Steel Demand Continues Active —7200 Tons of Plates Needed for Pipe Lines

SAN FRANCISCO, July 28 (*By Air Mail*).—During the past week a lull has occurred in demand for most forms of finished steel, although reinforcing steel bars and structural shapes continue active. Important new projects include 1400 tons of structural shapes for four sheds at pier 45, San Francisco; 7200 tons of plates for small-sized pipe lines for Oakland's municipal utility district and more than 23,000 tons of cast iron pipe for Dallas, Tex. The largest award of the week was 260 tons of shapes for a bridge at Benson, Ariz., booked by the Virginia Bridge & Iron Co.

Pig Iron.—The only inquiry of importance is for 400 tons for the Puget Sound Navy Yard. Little or no improvement is noticed in the rate of operations among jobbing foundries, which comprise the bulk of the plants on the coast, and as a result both sales and inquiries have been limited to small lots. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Out-of-stock prices in the bay district are firmer than in months, and while 2c. is shaded occasionally the tendency is to hold to this level, which is only a few dollars a ton higher than mill prices for reinforcing material. The largest award went to the Pacific Coast Steel Co. and involved 300 tons for two Seattle projects. Several large jobs have come out for figures, including 460 tons for

a storm drain at Culver City, Cal., 1500 tons for an apartment in Los Angeles and 300 tons for a power house in San Francisco.

Plates.—Demand for plates is quiet and only two projects of more than 100 tons are up for figures. The largest of these involves 7200 tons of 5/16 to 3/8-in. material for water mains in Oakland, bids on which will be opened Aug. 17. The Navy Department will open bids Aug. 7 for 131 tons for the Puget Sound Navy Yard. Practically all large producers are now quoting 2.25c., c.i.f., and some of the smaller

Boston

Pig Iron Market Dull as Most Consumers Are Covered for This Quarter—Scrap Quiet

BOSTON, July 31.—Not much pig iron business was done in the past week. Sales included Mystic, Buffalo, eastern New York State, western Pennsylvania and Alabama irons in small tonnages, with an aggregate of not more than 3000 tons. Buying for third quarter is practically over and most foundries have enough iron on hand or on order to last well into the fourth quarter. A large consumer has intimated to sellers that it will be in the market for a substantial tonnage late in August. The Universal Winding Co., Providence, R. I., is calling for bids on 500 tons of No. 2X

and 500 tons of No. 1X, deliveries to run from September through December. So far as prices go, it is still a buyer's market.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25 ..	\$20.91 to \$21.41
*Buffalo, sil. 2.25 to 2.75 ..	21.41 to 21.91
†Buffalo, sil. 1.75 to 2.25 ..	19.78 to 20.28
†Buffalo, sil. 2.25 to 2.75 ..	20.28 to 20.78
East. Penn., sil. 1.75 to 2.25 ..	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75 ..	23.65 to 24.15
Va., sil. 1.75 to 2.25	25.71
Va., sil. 2.25 to 2.75	26.21
Ala., sil. 1.75 to 2.25	22.41 to 24.27
Ala., sil. 2.25 to 2.75	22.91 to 24.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/8-in. and over	3.15c.
Small angles, under 3/8-in.	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.	3.75c.
Spring steel, 1/4-in. and thicker ..	5.00c.
Black sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.50c.
Struc. rivets, 1/2-in. and larger	5.65c.
Com. wire nails, base per keg	\$3.40
Cement c'd nails, 100-lb. keg	3.40

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. announce that the price of by-product foundry coke on contract shipments during August will remain at \$11 a ton, delivered within a \$3.10 freight rate zone. These ovens shipped more foundry coke in July than in any previous month this year. Despite the increase, the New England melt of iron is not more than 65 per cent of capacity and in all probability nearer 60 per cent, owing to the small melt by textile machinery makers. A little Connellsville foundry coke is moving into New England at \$5 a ton, ovens, or \$10.54, delivered in box cars, and at \$10.29 a ton, delivered in open cars.

Bars.—Consumption of steel bars is holding up well and running ahead of last year. The market is firm at 1.90c., base Pittsburgh. There is more stability in prices of reinforcing bars than in months, notwithstanding the keen competition for the small amount of business. The mill price now appears firm at 1.90c., base Pittsburgh, and the delivered price at \$2.26½, common Boston freight rate points, while the warehouse price is 2.90c., base.

Old Material.—Most of the activity in old material centers in the export market. A steamer is loading 3500 tons of scrap for shipment to Italy, and another boat will shortly begin loading 4000 to 5000 tons for shipment to Danzig. Exporters are still paying \$9.25 a ton, on dock, for No. 1 steel and \$8.75 for No. 2. Prices on material for domestic consumption are unchanged. They are unattractive to owners of material, consequently little scrap is moving. One or two dealers heretofore offering \$5 to \$5.50 a ton, on cars shipping point, for mixed borings and turnings, have dropped to \$4.50 to \$5, but others are holding to \$5 to \$5.50. New England foundries

Warehouse Prices, f.o.b. Boston	
	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

are taking only limited machinery cast tonnages.

Buying prices per gross ton, f.o.b. Boston rate shipping points:	
No. 1 heavy melting steel.	\$8.00 to \$8.50
Scrap T rails.....	7.50 to 8.00
Scrap girder rails.....	7.25 to 7.50
No. 1 railroad wrought...	8.50 to 9.00
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings.....	5.00 to 5.50
Cast iron borings (steel works and rolling mill)...	5.00 to 5.50
Bundled skeleton, long....	6.50 to 7.00
Forge flashings.....	6.50 to 7.00
Blast furnace borings and turnings	5.00 to 5.50
Forge scrap	5.50 to 6.00
Shafting	11.50 to 12.00
Steel car axles.....	14.50 to 15.00
Wrought pipe 1 in. in di- ameter (over 2 ft. long) ..	7.00 to 7.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast	\$13.50 to \$14.00
No. 1 machinery cast.....	14.00 to 14.50
No. 2 machinery cast.....	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable.....	13.50 to 14.50

Detroit

Automobile Production at High Rate—Employment Shows a Gain of 5000 in Past Week

DETROIT, July 31.—The so-called midsummer slump has not greatly affected the metalworking industry in this area, owing chiefly to the manner in which automobile production schedules have been holding up. As a matter of fact, the past week showed an increase of 5001 men on the report of the Employers' Association. The companies included in this report employ about two-thirds of the city's working population. The total this week is 270,557, or 68,563 more than the corresponding figure for 1927.

The final figures on Chevrolet output for the first six months of this year total 751,536 units, compared with 607,749 units for the same period of 1927. The final figures for June are 132,794 for the current year and 112,794 for June, 1927. It is estimated that both Chevrolet and Buick will have record outputs for the third quarter.

Chrysler is shipping about 1200 units a day. The original Chrysler schedule for the third quarter was set at 86,000 units, but has been revised to include an additional 500 units a day for the new Plymouth line. Including the third quarter production, the total output for Chrysler will exceed the 1927 figure of 192,000 cars, which up to that time was a record.

Dodge Brothers, Inc., showed shipments of 121,327 units up to June 30. This compares with 107,115 units for the same period of 1927. The gain is 13.3 per cent.

The Graham Paige Motors Corporation, with approximately 44,000 units, has more than doubled its entire output of 1927. Additional factory facilities now under way will increase capacity from 400 cars to 600 cars per day. These changes will include the erection of new buildings

and the installation of new equipment at both the main plant and the body plant at Wayne. These additions represent about \$700,000 for construction and equipment. This company has also purchased a group of buildings at Fort and McKinstry Streets, with 262,000 sq. ft. of floor space, to house the service and export shipping departments previously quartered at the main plant.

Output for the Willys Overland Co. is running about 1500 cars per day, 1100 of which are the Whippets. Production lines are going five and a half days a week on a two-shift basis. Parts manufacturing is partly on a three-shift basis. This company has let a \$250,000 contract for an addition to the new export building, which was completed only two months ago.

General Motors Corporation shows total production for the first six months of 1,083,316 units, compared with 883,477 for the same period of 1927.

The Hudson Motor Car Co. has just put into operation a new \$1,000,000 plant for lacquering and metalworking.

Paul G. Hoffman, vice-president Studebaker Corporation, states that retail deliveries have increased from 40 to 50 per cent since the introduction of the new model two weeks ago.

Shipments of pig iron in the district are considerably above those of June. August promises to continue at the present rate.

There is very little activity in the scrap market. Prices are unchanged.

Buffalo

Good Volume of Small-Lot Pig Iron Buying

BUFFALO, July 31.—Small-lot pig iron business has been brisk. There has been no large tonnage buying during the past 10 days, but there have been enough sales of lots up to 500 tons to make up a good volume. Inquiry is small, but includes one lot of 1000 tons. July shipments were greater than production, but the movement shows a tendency to slow up a little now. Buffalo sellers quote iron for local delivery on a \$17 base for foundry and \$17.50 for malleable.

Prices per gross ton, f.o.b. furnace:	
No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic	\$16.50 to 17.00
Lake Superior charcoal.....	27.28

Warehouse Prices, f.o.b. Buffalo	
	Base per Lb.
Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg....	\$3.65
Black wire, base per 100 lb.....	3.90

Old Material.—Both the Bethlehem and Donner companies are taking fairly large shipments of heavy melting steel. No new buying has been done as there is a very large tonnage under contract for delivery during the next 60 days. Prices remain largely nominal in the absence of tonnage buying.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.50 to	\$14.00
No. 2 heavy melting steel.	12.00 to	12.50
Scrap rails	13.00 to	13.50
Hydraulic comp. sheets	12.00 to	12.50
Hand bundled sheets	8.00 to	8.50
Drop forge flashings	12.00 to	12.50
No. 1 busheling	12.00 to	12.50
Hvy. steel axle turnings	12.00 to	12.50
Machine shop turnings	7.00 to	7.50
Acid Open-Hearth Grades		
R'l'r'd knuckles and couplers		15.00
R'l'r'd coil and leaf springs	15.00 to	16.00
Rolled steel wheels		15.00
Low phos. billet and bloom ends	16.00 to	16.50
Electric Furnace Grades		
Hvy. steel axle turnings	12.00 to	12.50
Short shov. steel turnings	9.00 to	9.50
Blast Furnace Grades		
Short shov. steel turnings	9.00 to	9.50
Short mixed borings and turnings	9.00 to	9.50
Cast iron borings	9.00 to	9.50
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	15.50 to	16.00
Iron axles	19.50 to	20.00
No. 1 railroad wrought	12.00 to	12.50
Cupola Grades		
No. 1 machinery cast	14.25 to	14.75
Stove plate	13.00 to	13.25
Locomotive grate bars	11.25 to	11.75
Steel rails, 3 ft. and under		16.50
Cast iron carwheels	12.00 to	12.50
Malleable Grades		
Industrial		15.00
Railroad		15.00
Agricultural		15.00

Cincinnati

Pig Iron Demand Better—Steel Sales in Good Volume

CINCINNATI, July 31.—Pig iron prices are unchanged in this market, with demand slightly better and prospects brighter. In the past few days one company has sold a 500-ton lot and another lot of 250 tons of Northern iron, both going to southern Ohio consumers. A few smaller orders have been taken by local firms, the week's sales totaling about 2000 tons. Some inquiries have been received, the largest for 3000 tons covering the requirements for the rest of the year of the Marmon Motor Car Co.; Northern iron is specified. A few small inquiries are under consideration, mostly for prompt delivery.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Small-lot buying of bars, structural shapes and plates continues in fair volume and specifications against third quarter contracts have been about normal. Operations among consuming industries are being sustained on a higher

plane than usual for this time of the year, so that producers are predicting that the mid-summer recession in orders will scarcely be discernible. Prices of heavy steel products are being maintained at 1.90c., base Pittsburgh. Structural steel in this district is still devoid of features, although fabricating shops are moderately well engaged on numerous small jobs. The nail and wire market has recovered somewhat from the depression created by the lack of interest on the part of consumers, sales having been the best in four weeks. Common wire nails are quoted at \$2.55 per keg, Ironton, plus a barge rate for delivery to Ohio River points. Sheet mills have booked impressive tonnages during the past two weeks, so that incoming business has been considerably ahead of that in July, 1927. Meanwhile, production has been kept at about 90 per cent of capacity. Prices are still a cause of concern to manufacturers. Galvanized sheets for roofing purposes have been selling at 3.30c. to 3.40c., base Pittsburgh, in the South, with 3.50c. prevailing in a few cases. Blue annealed ranges from 1.90c. to 2c., and black sheets are bringing from 2.60c. to 2.70c.

Warehouse Business.—Jobbers booked about 5 per cent less business in July than in June, the decline having been caused by seasonal conditions. Structural steel is in better demand and bars continue active. Prices are unchanged.

Coke.—Coke movement is very little better. Indications are that July movement will be slightly below that of June, the percentage, however, being very slight.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, \$9.02; Wise County coke, \$7.09 to \$7.59; New River coke, \$9.09 to \$9.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—The scrap market is looking slightly better; some sales are noted and some inquiries are under consideration. A sale of 2000 tons borings and turnings to a nearby blast furnace was at unchanged prices. Business is slowing down, as it usually does when rail offerings are reported. The Big Four offers only 1200 tons, closing July 31, but the Pennsylvania has approximately 50,000 tons to close Aug. 1, the New York

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinfrc. bars	3.15c.
Rail steel reinfrc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Central a blind offer to terminate Aug. 2, and the B. & O. 10,000 tons to close Aug. 1. The Erie offers a blind lot to close Aug. 1.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	\$10.75 to \$11.25
Scrap rails for melting	10.75 to 11.25
Loose sheet clippings	8.00 to 8.50
Bundled sheets	9.00 to 9.50
Cast iron borings	7.25 to 7.75
Machine shop turnings	6.75 to 7.25
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	11.00 to 11.50
No. 1 machinery cast	15.00 to 15.50
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00

Obituary

WALDO G. LUNGER, formerly western manager for the Union Twist Drill Co., Athol, Mass., with headquarters at Chicago, died on July 27 at Rome, N. Y., where he had resided since ill health forced his retirement some time ago. He was a graduate in mechanical engineering from the Stevens Institute of Technology, Hoboken, N. J.

EDGAR EVERETT STARK, hydroelectric engineer, died July 26 while addressing a Rotary Club luncheon at Poultney, Vt. He was 64 years of age, and Painesville, Ohio, was his birthplace. After graduation from the Case School of Applied Science, Cleveland, in 1882, he worked for several years with the Brush Laboratories, Cleveland, owned by Charles F. Brush, inventor of the arc light. In 1903 he moved to New Zealand and in the succeeding 18 years he built hydroelectric systems in various parts of Australia.

JAMES McNAUGHTON, vice-president Baldwin Locomotive Works, in charge of its New York office, died on July 27 at his home in Bronxville, N. Y., aged 68 years. He was born at Queensville, Ont., and early in life entered the employ of a railroad equipment manufacturer in Minnesota. Later he became associated with the American Locomotive Co., rising to a vice-presidency. During the World War he was instrumental in the organization of the Eddystone Munition Works, Eddystone, Pa., becoming president and general manager of the plant. At the close of the war he went with the Baldwin organization as a vice-president.

W. L. ARNOLD, until 1926 a vice-president of the Arnold Co., Chicago, engineer and constructor, died July 27.

HENRY J. BURT, structural engineer associated with Holabird & Roche, Chicago architects, died July 28, aged 55 years.

Non-Ferrous Metal Markets

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 31	July 30	July 28	July 27	July 26	July 25
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	47.75	47.75	...	47.82½	48.20	48.75
Lead, New York.....	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York.....	6.55	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis.....	6.20	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price ¼c. higher.

Copper Steady and Firm, Tin Slightly Easier, Lead and Zinc Unchanged, Antimony Advances

Copper.—Consumers have come into the market to a moderate extent during the past week for September copper. It is estimated in some quarters that about 20 per cent of the metal that will be needed for that month has been bought, and producers have now opened their books for October. There is very little August copper available, but all of the important users are well covered, so there is little fear of a shortage.

Metals from New York Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	50.00c. to 51.00c.
Tin, bar	52.00c. to 53.00c.
Copper, Lake.....	15.75c.
Copper, electrolytic.....	15.50c.
Copper, casting	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic.....	12.00c. to 12.50c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	53.00c.
Tin, bar	57.00c.
Copper, Lake	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting	14.00c.
Zinc, slab	8.00c.
Lead, American pig.....	7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	56.50c.
Solder, ½ and ½.....	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods.....	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Prices for electrolytic copper remain unchanged at 14.75c., delivered Connecticut Valley, as the domestic basis; while the export price is 15c., delivered European ports. Demand for Lake copper has been fairly active, mostly for August but some for September. Prices range from 14.75c. to 14.82½c., delivered.

Copper Averages.—The average price of Lake copper for the month of July, based on daily quotations in THE IRON AGE, was 14.76½c., delivered. The average price of electrolytic copper was 14.50c., refinery, or 14.75c., delivered in the Connecticut Valley.

Tin.—Except on Wednesday last, when consumers came into the market for nearby tin, the market has

been fairly quiet. About 400 tons was sold on Wednesday at an average of 48.75c., with some sales at 49c., but the price has since declined and today the market was quotable at 47.75c., which, however, represents a decline of only ¼c. per lb. in the week. Yesterday (Monday) there was again a good demand from consumers, but not much business resulted. London prices today were £214 for spot standard, £213 5s. for future standard, £216 15s. for spot Straits; the Singapore price was £215 10s.

Lead.—With business moderately good, the lead market has been steady throughout the week. Prices remain at 6c., St. Louis, and 6.20c., New York, the latter being the contract

Non-Ferrous Rolled Products

Zinc sheets were advanced ½c. per lb. on July 30 and are now quoted at 9.75c., base. There has been no change in mill prices on bronze, brass and copper products and zinc sheets are still quoted at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass.....	24.12½c.
Copper	25.00c.

Rods—	
High brass.....	17.00c.
Naval brass.....	19.75c.

Wire—	
Copper	16.75c.
High brass.....	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide		33.00c.
Tubes, base		42.00c.
Machine rods.....		34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light	6.00c.	7.50c.
Hvy. Machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. tngs.....	9.00c.	10.00c.
Lead, heavy	5.00c.	5.375c.
Lead, tea	3.75c.	4.25c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....		19.25c.
Copper, hot rolled.....		23.50c.
Copper, cold rolled, 14 oz. and heavier		25.75c.
Zinc		10.00c.
Lead, wide		9.75c.
Seamless Tubes—		
Brass		25.62½c.
Copper		26.50c.
Brazed Brass Tubes.....		27.25c.
Brass Rods.....		17.00c.

price of the American Smelting & Refining Co.

Zinc.—Prices are slightly stronger. While there were small sales during the week at 6.20c., East St. Louis, for prime Western, the bulk of the metal available at this price may have been taken and producers generally are asking 6.25c. for forward delivery. Indications are that 6.25c. may become the minimum of the market before the end of the week.

Antimony.—With more active business, antimony has strengthened within the week and today was quoted at 10c. for spot and 10.25c. for forward delivery, duty paid, New York.

Nickel.—Prices are unchanged at 35c. for ingot, 36c. for shot and 37c. for electrolytic nickel.

Aluminum.—Virgin metal, 98 to 99 per cent, continues at 23.90c. in

the outside market. The Aluminum Co. of America quotes 99 per cent plus at 24.30c.

Non-Ferrous Metals at Chicago

CHICAGO, July 31.—The local market is quiet, with sales in small volume and prices unchanged, except in tin, which has been advanced. Quotations for old metals are untested in a dull market.

Prices, per lb., in carload lots: Lake copper, 14.87½c.; tin, 49.50c.; lead, 6.10c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

New York Office Building Will Take 16,600 Tons and Chicago Board of Trade, 15,000 Tons—Awards Light

AN office building in New York, calling for 16,600 tons, and a structure for the Chicago Board of Trade, which will take 15,000 tons, brought the total of new projects reported during the week to 46,300 tons. Other large pending jobs which have come out recently are a municipal water development at Oakland, Cal., involving 7200 tons of plates, and a Cleveland hospital of 4000 tons. The following awards of 22,700 tons include no jobs of outstanding size:

WORCESTER, MASS., 700 tons, school, to Eastern Bridge & Structural Co.

STATE OF VERMONT, 400 tons, bridges, to American Bridge Co.

PROVIDENCE, 1500 tons, Memorial Bridge, to Phoenix Bridge Co.

HARTFORD, CONN., 600 tons, alteration to department store of Sage, Allen & Co., to an unnamed local fabricator.

NEW YORK, 14,275 tons reported to Structural Steel Board of Trade; 5400 tons in the following jobs not previously reported: Extension to East River power station at Fourteenth Street, to Post & McCord, Inc.; building for National City Bank, 3 West Twenty-eighth Street, to Taylor-Fichter Steel Construction Co., and Mount Washington Presbyterian Church, 84 Vermilyea Avenue, to Eidlitz & Ross.

NEW YORK, 1300 tons, addition to store of Bedell Co., 19 West Thirty-fourth Street, to Taylor-Fichter Steel Construction Co.

NEW YORK, 1200 tons, apartment building, 1 East End Avenue, to Levering & Garrigues Co.

NEW YORK, 700 tons, Methodist Episcopal Home at Spuyten Duyvil, to A. E. Norton, Inc.

NEW YORK, 400 tons, miscellaneous work for Interborough Rapid Transit Co., to Belmont Iron Works.

GARDEN CITY, N. Y., 800 tons, Adelphi College, to McClintic-Marshall Co.

GLENS FALLS, N. Y., 400 tons, building for Glens Falls Insurance Co., to McClintic-Marshall Co.

PENNSYLVANIA RAILROAD, 500 tons, bridge at Bridgeport, Pa., to McClintic-Marshall Co.

PENNSYLVANIA RAILROAD, 200 tons, bridges in western Pennsylvania, to American Bridge Co.

BALTIMORE, 250 tons, Park Bank addition, to Baltimore Steel Co.

BIRMINGHAM, 600 tons, power plant for

Alabama Power Co., to Virginia Bridge & Iron Co.

GREENSBURG, PA., 110 tons, tipples for Keystone Coal & Coke Co., to Jones & Laughlin Steel Corporation.

PITTSBURGH, 1100 tons, Pennsylvania Railroad produce yard buildings, to Jones & Laughlin Steel Corporation.

CLEVELAND, 150 tons, factory building for Eaton Axle & Spring Co., to Massillon Bridge & Structural Co.

CLEVELAND, 125 tons, factory building for Willard Storage Battery Co., to Massillon Bridge & Structural Co.

TOLEDO, OHIO, 500 tons, power plant for Henry L. Doherty & Co., to American Bridge Co.

CHICAGO, 3000 tons, tower on Palmolive-Peet Building, to American Bridge Co.

ST. LOUIS, 825 tons, express terminals for American Railway Express, to Mississippi Valley Structural Steel Co.

LINCOLN, NEB., 225 tons, Nurses' Home for St. Elizabeth Hospital, to St. Joseph Structural Steel Co., St. Joseph, Mo.

OMAHA, NEB., 650 tons, Joslyn Building, to Omaha Structural Steel Co.

GREAT FALLS, MONT., 600 tons, high school, to Minneapolis Steel & Machinery Co.

BENSON, ARIZ., 260 tons, bridge, to Virginia Bridge & Iron Co.

PHOENIX, ARIZ., 100 tons, high school auditorium, to Minneapolis Steel & Machinery Co.

SAN FRANCISCO, 165 tons, apartment building, Taylor and Jackson Streets, to Western Iron Works.

SAN FRANCISCO, 100 tons, apartment building on Eddy Street, to Golden Gate Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 16,600 tons, Reynolds Tower

Building at Forty-second Street and Lexington Avenue.

NEW YORK, 500 tons, miscellaneous work for Interborough Rapid Transit Co.

ITHACA, N. Y., unstated tonnage, plant industry building at Cornell University for New York State College of Agriculture.

STATE OF NEW YORK, 400 tons, highway bridges.

NASSAU COUNTY, N. Y., 400 tons, highway work.

PENNSYLVANIA RAILROAD, 500 tons, bridges.

ERIE RAILROAD, 200 tons, bridge at Rutherford, N. J.

WOODLYNNE, N. J., unstated tonnage, Woodlyne National Bank building.

PRINCETON, N. J., unstated tonnage, Joline and 1903 dormitories at Princeton University.

PLEASANTVILLE, N. J., unstated tonnage, senior high school; S. Hudson Vaughn, Atlantic City, N. J., architect.

ATLANTIC CITY, N. J., 160 tons, Park Lane Hotel; William Macy Stanton, Philadelphia, architect.

PHILADELPHIA, 800 tons, elevator wells for new Strawbridge & Clothier building; Turner Construction Co., New York, general contractor.

PHILADELPHIA, 590 tons; highway bridges at Sixth and Alleghany Streets, 375 tons, and at Ashdale Street, 100 tons, to Horridge, Elcock & Hall, general contractors; at Leverington Street, 115 tons, to Seeds & Durham, Philadelphia, general contractors.

PHILADELPHIA 1200 tons, Blackstone Hotel.

CAMDEN, N. J., unstated tonnage, factory building for Charles K. Cook Co., 211 South Second Street.

CLEVELAND, 4000 tons, Lakeside Hospital; bids close Aug. 15.

DETROIT, 1050 tons, Bell Telephone building.

CHICAGO, 1200 tons, building for General Electric Co., West Pershing Road and Ashland Avenue.

CHICAGO, 15,000 tons, Board of Trade Building.

CHICAGO, 1000 tons, power house for University of Chicago.

CHICAGO, 600 tons, store and loft building.

CHICAGO, 400 tons, Ashland Commercial Exhibit Building.

ST. LOUIS, 1200 tons, 18-story apartment building.

SAN FRANCISCO, 1400 tons, Pier 45; bids Aug. 15.

SAN FRANCISCO, 600 tons, power house for Great Western Power Co.; bids soon.

SAN FRANCISCO, 450 tons, hotel, Geary Street; bids being taken.

OAKLAND, CAL., 7200 tons plates, distributing mains for East Bay Municipal Utility District; bids Aug. 17.

PALO ALTO, CAL., 200 tons, telephone building; bids being received.

SACRAMENTO, CAL., 600 tons, office building; bids soon.

LOS ANGELES, 300 tons, apartment building on Whitely Avenue; bids being received.

LOS ANGELES, 320 tons, apartment building on South Serrano Street; bids being received.

The Electric Pig Iron Corporation, Canton, Ohio, has awarded the general contract to the Foundation Co., New York, for a ferrosilicon plant near Philo, Ohio, with initial unit 50 x 375 ft. in size, to cost about \$100,000. A contract has been made with Ohio Power Co. for power service from its generating station at Philo. Excavation has been started.

PERSONAL

ROBERT T. KENT, New York, has become manager of the sales and engineering departments of Divine Brothers Co., Utica, N. Y. Previous to making this connection Mr. Kent was general manager of the Bridgeport Brass Co., Bridgeport, Conn., and for several years before that engagement was superintendent of prison industries of New York, undertaking, at Governor Smith's request, the reorganization of these industries. Mr. Kent is editor and author of Kent's Mechanical Engineers' Handbook, and has been chairman of the A. S. M. E. committee on professional divisions, also for a time chairman of the management division. HOWARD E. BOARDMAN, Mr. Kent's predecessor at Utica, resigned recently to make a connection in New York in another line of business.

J. G. HEATH, vice-president Remington Arms Co., Inc., New York, has been placed in charge of the company's territory from Denver, Colo., to the Pacific Coast, and about Aug. 1 will establish headquarters at San Francisco. There will be no change in the Remington sales organization in the territory. Mr. Heath has been associated with the company during his entire business career, and in 1910 was made manager of the San Francisco office. In 1925 he was selected to head organization work in connection with the Remington Cash Register Co. and the following year became general sales manager for all products of that subsidiary.

W. H. GERHAUSER, recently elected president of the American Ship Building Co., Cleveland, has been made a director of the Union Trust Co. of that city.

JAMES F. MCCRORY, JR., until recently assistant manager Pittsburgh office, Eaton, Rhodes & Co., has become manager of sales for the Breck Fuel Co., Oliver Building, Pittsburgh.

W. R. HULBERT, sales manager of the thermit department, Metal & Thermit Corporation, 120 Broadway, New York, has resigned, and on Aug. 1 will become a member of the firm of Thomas H. & Milan H. Hulbert, 6 North Michigan Avenue, Chicago. He was graduated in mechanical engineering from Columbia University in 1904, and during the next three years was connected with the Power & Mining Machinery Co., the Rand Drill Co. and the Kobbe Co., New York. He went with the Goldschmidt Thermit Co. in 1907 as assistant engineer, and when the Metal & Thermit Corporation was formed in 1916 he was made sales manager of the thermit department. Mr. Hulbert will be succeeded by JOHN B. TINNON, since 1924 manager of the rail welding department.

Mr. Tinnon attended Vanderbilt University, Nashville, Tenn., and from 1908 until 1924 was identified with the electric railroad field.

SCOTT STEWART, president of W. J. Rainey, Inc., and vice-president of the Rainey-Wood Coke Co., 52 Vanderbilt Avenue, New York, was elected president and a director of the latter company at a recent board meeting. H. C. THOMAS, president Alan Wood Iron & Steel Co., Philadelphia, was elected vice-president and a director of the Rainey-Wood company; ALAN D. WOOD, vice-president and treasurer of the Alan Wood company, treasurer and a director, and H. R. AHRENS, secretary and treasurer of W. J. Rainey, Inc., secretary. R. A. RAINEY, chairman of W. J. Rainey, Inc., was also made a director of the coke company.

WILLIAM F. HARTMANN has retired from active service as treasurer of the Bethlehem Steel Corporation, New York, and its subsidiary companies. WILLIAM J. BROWN has been elected treasurer of the Bethlehem corporation, with offices at 25 Broadway, New York, and J. P. BENDER has been named treasurer of the Bethlehem Steel Co. and the Bethlehem Shipbuilding Corporation, Ltd., with offices at Bethlehem, Pa.

GEORGE L. ABBOTT, for the last 20 years associated with the Garlock Packing Co., Palmyra, N. Y., most recently as vice-president and general manager, has been elected president of the company, and has been succeeded by WARD K. ANGEVINE.

E. EVERETT GIBBS, formerly president Southern Can Co., Baltimore, which is now owned and operated by the Continental Can Co., Inc., New York, will continue with the Continental company as district representative at Baltimore.

MARTIN J. RYAN, for the last eleven months sales supervisor for the Northern New York Utilities, Inc., Utica, N. Y., has been appointed assistant sales manager of that company. He was formerly superintendent of the Giblin Foundries, of that city.

FOWLER MANNING has been appointed vice-president and general manager of L. C. Smith & Corona Typewriters, Inc., Syracuse, N. Y., and will take charge of the company's operations at Syracuse on Sept. 1. The position was created at the last meeting of the board, and in his new capacity Mr. Manning will relieve President FRANK R. FORD of many executive details.

LEWIS B. LINDEMUTH, of Carney & Lindemuth, consulting engineers, New York, left for Mexico on July 27 and will spend a month there as consultant for Cia, Fundidora de Fierro y Acero de Monterrey, S. A., Monterrey.

MARCUS T. DONAHUE has been appointed sales manager of the H. C. Atkins Mfg. Co., 2318 Randolph Street, St. Louis.

H. C. BECKWITH, for the last 12 years representative in the St. Louis district for the Trumbull Steel Co., Warren, Ohio, has been appointed St. Louis district representative for the Newport Rolling Mill Co., Newport, Ky., and for the West Leechburg Steel Co., Pittsburgh. His headquarters will remain at 1413 Chemical Building.

ANDREW R. JOHNSON, assistant New York district manager for the Republic Iron & Steel Co., has been appointed assistant general sales manager in charge of tin plate sales, with headquarters at Youngstown, succeeding AVERY C. ADAMS. Mr. Johnson was New York district sales manager for the Trumbull Steel Co. prior to its absorption by the Republic company.

WILLIAM L. FINGER, Ripley, Miss., has been appointed trade commissioner at Paris. Since May, 1926, he has been secretary to Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

GEORGE P. RHODES, president Colonial Steel Co., Pittsburgh, and IRVIN F. LEHMAN, vice-president Blaw-Knox Co., Pittsburgh, have been elected directors of the Pressed Steel Car Co.

JOHN M. ELLIS, New York district sales agent for the Bethlehem Steel Co., sailed July 28 for a several weeks' stay in Europe.

WILLIAMS C. DICKEY, New York representative of the Worth Steel Co., Claymont, Del., and other mills, will sail on the Berengaria Aug. 29 for a few weeks in Europe.

DONALD MACARTHUR, vice-president Seaboard By-Product Coke Co., Philadelphia, has, in addition to his present duties, been placed in general charge of the Philadelphia Coke Co., Philadelphia, a recently formed subsidiary of the Koppers Gas & Coke Co. W. H. EARLE, formerly in charge of the New York office of the Koppers Construction Co., will be manager of the new company; R. L. SPATZ, who has been a construction engineer for the Koppers Construction Co., will be assistant manager, and FRED DENIG, recently assistant superintendent of the operating department of the Construction company, will be superintendent. The coke plant now under

construction for the Philadelphia company will be placed in operation about Feb. 1, 1929.

ELLIOTT E. VAN CLEEF, 53 West Jackson Boulevard, Chicago, has been appointed district agent for the Roller-Smith Co., 233 Broadway, New York. MICHAEL B. MATHLEY, who has been connected with the company's Chicago office for a number of years, will be associated with Mr. Van Cleef.

WILLIAM HUNTER, who has been acting manager of the Philadelphia

office of the Niles-Bement-Pond Co. since the first of the year, was made manager of that office on July 1. He has been associated with the Niles company divisions for a number of years.

A. C. SHAND, for many years chief engineer of the Pennsylvania Railroad and more recently assistant to the vice-president in Philadelphia, retired Aug. 1. Mr. Shand, who was 70 years of age in July, has been connected with the railroad for about 49 years.

improving tendency in operations and an inclination on the part of customers to cover for forward business.

Bethlehem's Billing Price Rises

The Bethlehem Steel Corporation had net income in the second quarter of \$4,529,328, equivalent after dividends on preferred stock to \$1.57 a share on common. This compares with \$3,384,718 or 94c. a share on common in the preceding quarter and with \$5,048,680 in the second quarter last year.

In commenting upon the situation, President Eugene G. Grace stated that although the average billing price on all products during the last quarter was \$2 a ton less than in the June quarter last year, it was 53c. greater than in the preceding quarter. Operations during the second quarter averaged 82.5 per cent of capacity, compared with 79.5 per cent in the preceding quarter and with 75.6 per cent during the second quarter of 1927. "Current operations," he said, "are at a 75 per cent rate, as against 64 per cent in July, 1927. I look for a continuation of the increasing demand during the fall and winter and am also hopeful that the upward trend of price indicated by second quarter billings will continue."

The value of unfilled orders on hand June 30 was \$51,761,908, as compared with \$61,393,488 on March 31 and with \$48,655,757 on June 30, 1927.

Wheeling Makes Good Showing

Second quarter earnings of the Wheeling Steel Corporation amounted to \$1,530,125, as compared with \$1,024,213 in the preceding quarter and with \$855,936 in the June quarter last year. This company's half-year profits totaled \$2,554,338 in 1928 and \$1,848,186 in 1927.

Carrying the largest cargo ever transported on the Great Lakes, the steamer Carl D. Bradley tied up at the Buffington, Ind., harbor of the Universal Portland Cement Co. on July 27 with 16,033 gross tons of limestone. The Bradley used its own automatic electrical machinery to discharge its cargo at the rate of a ton a second.

Steel Company Earnings

Steel Corporation's for Second Quarter Were \$2.75 Per Share of Common Stock

EARNINGS of the United States Steel Corporation for the second quarter of 1928 were at the rate of \$2.75 per share of common stock, after providing for the preferred stock dividend, or substantially at the rate of the same quarter a year ago. The earnings of the first quarter were at a \$2.11 rate, so those for the first half of the year amount to \$4.86, against common stock dividend requirements of \$3.50, the regular 7 per cent rate, which was declared for the quarter just closed. In the second quarter of 1927, the common stock earnings were at a \$2.78 rate.

Total earnings were roughly \$6,000,000 greater in the June quarter than in the March quarter, but greater allowances were made for depreciation and the like, and the surplus for the quarter was \$7,110,428 against \$2,573,541 for the preceding quarter. The following tables show also the earnings of recent years:

EARNINGS IN RECENT YEARS			
Quarters	1928	1927	1926
1st	\$40,934,032	\$45,584,725	\$45,061,285
2nd	46,932,986	46,040,460	47,814,105
3rd	.....	41,373,831	52,626,826
4th	.....	31,247,529	53,502,525
EARNINGS FOR SECOND QUARTER			
Total Earnings			
April, 1928.....	\$13,927,481		
May, 1928.....	16,646,845		
June, 1928.....	16,358,660		
Total earnings after deducting expenses, taxes and interest			
\$46,932,986			
Less, charges and allowances for depletion, depreciation and amortization, as follows:			
To subsidiary companies .. \$13,614,451			
To sinking funds on corporation bonds			
2,889,634			
16,504,085			
Net income			
\$30,428,901			
Deduct: Interest corporation bonds			
\$4,045,422			
Premium on bonds redeemed			
514,721			
4,560,143			
Balance			
\$25,868,758			
Dividends:			
Preferred, 1% per cent			
\$6,304,919			
Common, 1% per cent			
12,453,411			
18,758,330			
Surplus for the quarter			
\$7,110,428			

President James A. Farrell, at the conclusion of the meeting of the board of directors of the Steel Corporation, July 31, issued the following statement:

Our shipments of finished steel products in the second quarter equaled 84½ per cent of total mill capacity, compared with 86 per cent in the first quarter of 1928, and with 84 per cent in the second quarter of 1927. The tonnage of shipments in the June quarter this year actually exceeded in total the tonnage shipped in the corresponding quarter in 1927.

The slightly higher selling prices netted in the second quarter, with improved operating costs, together with the receipt of income from seasonal business, account for the increase of 14½ per cent in reported earnings for the second compared with the first quarter of 1928, notwithstanding the volume of steel shipments, was slightly less.

Since July 1 operations of the mills have been slightly below the average for the second quarter, influenced somewhat by the slackening in pace arising from hot weather. The demand for steel as evidenced by new business being booked points to a very fair degree of operations, due consideration being given to general trade conditions, during the remainder of the summer and early fall.

Apart from the foregoing there are no features of special interest in the steel situation other than that business is proceeding as usual with an

Bethlehem's Comparative Income Account Over Four Years

	1928	1927	1926	1925
Total inc.....	\$10,767,959	\$11,219,069	\$12,096,033	\$9,708,528
Int., disc., etc.....	2,841,636	2,869,023	3,606,224	3,301,768
Depr. and depl.....	3,396,995	3,301,366	3,141,786	2,983,569
Net income.....	\$4,529,328	\$5,048,680	\$5,348,023	\$3,423,191
Pfd. divs.....	1,697,500	1,697,500	1,672,720	1,075,791
Surplus.....	\$2,831,828	\$3,351,180	\$3,675,303	\$2,347,400
Six months ended June 30:				
Total inc.....	\$20,342,907	\$22,976,358	\$24,069,071	\$20,107,844
Int., disc., etc.....	5,679,781	5,752,931	6,671,256	6,639,363
Depr. and depl.....	6,749,080	6,556,659	6,183,942	5,973,774
Net income.....	\$7,914,046	\$10,666,718	\$11,213,873	\$7,494,707
Pfd. divs.....	3,395,000	3,395,000	3,361,515	2,151,428
Surplus.....	\$4,519,046	\$7,271,718	\$7,852,358	\$5,343,279

Machinery Markets and News of the Works

Large Orders Placed in East

Wright Aeronautical Corporation, Paterson, N. J., Buys \$200,000 Worth of Turret Lathes and Milling Machines—July Business Good

JULY machine tool business in the entire country has averaged well up to the June total, while in the New York district some sellers who shared in the large orders placed by the Wright Aeronautical Corporation, Paterson, N. J., have had the best month of the year, and, in fact, the best month in several years.

The Wright Aeronautical Corporation bought upward of \$100,000 worth of milling machines and close to that amount in turret lathes. Its purchases of other tools also were considerable. In addition, the orders being placed by the General Electric Co. have swelled the month's sales.

At Cincinnati, Cleveland and Chicago sales fell somewhat below the totals for June, but were much better than the average for July. Railroad buying is light, but a fair amount of business is pending in the Detroit automobile district, especially in high production tools. Orders from miscellaneous industries make up the bulk of current business.

The Gabriel Snubber Mfg. Co., Cleveland, is to bring out a new hydraulic shock absorber for automobiles and probably will purchase additional equipment. The International Harvester Co. will build a caterpillar-type tractor in its Chicago works, and considerable new shop equipment will be needed. The Waukesha Motor Co., Waukesha, Wis., which is building a large addition to its plant, has bought a number of multiple spindle drilling machines and is still in the market for milling and drilling equipment. The Spicer Mfg. Corporation has bought additional machinery for its Toledo, Ohio, plant.

The Chicago Board of Education has issued a large list of equipment to be purchased for schools, bids to close Aug. 2.

New York

NEW YORK, July 28.—Large orders placed by the Wright Aeronautical Corporation, Paterson, N. J., eclipsed all other business done in the local machine tool market the past week. The Wright company's orders for milling machines and turret lathes alone well exceeded \$200,000, and other orders for miscellaneous tools were given out. Early deliveries were stipulated so that the new unit of the Wright plant can be put in production by Sept. 1 or shortly thereafter. Additional inquiries were received by the machine tool trade from the General Electric Co., which has been buying quite heavily for its refrigerator manufacturing departments at Schenectady and Erie. The Wright orders, together with a fairly good demand from scattered sources for single tools, will bring up July sales for many sellers in this district to the largest monthly total of the year. In a few instances it will be the largest month since the war. One turret lathe order amounted to \$70,000,

while a milling machine order totaled about \$60,000 and another was about \$50,000.

Sales of Niles-Bement-Pond Co. during the week included a 5-ft. and a 6-ft. radial drilling machine and a 73-in. boring mill. Pratt & Whitney division sold four lathes, two vertical shapers and two profiling machines.

Plans are under way by American Can Co., 120 Broadway, New York, for new factory branch and distributing plant at Denver, Colo., to cost close to \$200,000 with equipment; proposed to begin work about middle of August. Later, company is said to be planning main manufacturing unit at same location, to cost upward of \$750,000 with machinery. Company engineering department is in charge.

Officials of Dempsey Furnace Co., 525 Sixth Avenue, New York, have organized new company of same name to take over and expand present concern, and will increase production in line of industrial furnaces.

Farber & Kalkin, 1746 Pitkin Avenue, New York, architects, have filed plans for one-story automobile service, repair and garage building, 100 x 200 ft., to cost close to \$100,000 with equipment.

Central Foundry Co., 1434 Fulton Street, Brooklyn, has asked bids on general contract for new two-story branch storage and distributing plant at Forest Hills, L. I., to cost approximately \$40,000. Bly & Hamann, 551 Nostrand Avenue, are architects.

Northern Westchester Lighting Co., Ossining, N. Y., is having plans drawn for two power substations to cost approximately \$175,000 with equipment. Thomas E. Murray, Inc., 55 Duane Street, New York, is architect and engineer.

R. Hoe & Co., Inc., 504 Grand Street, New York, manufacturer of printing presses and parts, saws, etc., has purchased former plant of De La Vergne Machine Co., manufacturer of refrigerating equipment, fronting on East River, from 137th to 138th Street, and will remodel for new plant. Present business will be removed to new location and additional machinery provided for increase in output, particularly in connection with new model of newspaper printing press. Company is reported considering removal of branch plant at Dunellen, N. J., to new site, concentrating all production at that location.

DeYoung & Moscovitz, 11 East Forty-fourth Street, New York, architects, will soon take bids on general contract for five-story automobile service, repair and garage building, to cost approximately \$125,000 with equipment.

H. Muehlstein & Co., 41 East Forty-second Street, New York, Herman Muehlstein, head, manufacturer of rubber products, has acquired former machine and erecting shop of Erie Railroad Co. at Jersey City, N. J., and will remodel for new branch plant.

Sterling Casket Hardware Co., 5851 Grand Avenue, Maspeth, L. I., George R. Bailey, president, has awarded general contract to Eugene F. Warwick, Crescent Plaza Building, Long Island City, for one-story plant, 82 x 100 ft., to cost close to \$30,000 with equipment. Harry R. Harvie, 370 Seventh Avenue, New York, is architect.

Stern & Peyser, 12 East First Street, Mount Vernon, N. Y., architects, have plans for a two-story automobile service, repair and garage building, to cost \$100,000 with equipment.

Fire, July 22, damaged portion of factory of Noma Electric Corporation, 334-44 Hudson Street, New York, manufacturer of lighting equipment, fixtures, etc.

Lackawanna Railroad Co., 90 West Street, New York, plans installation of elevating, conveying and other freight-handling equipment, in group of warehouse and distributing buildings to cover six blocks at Jersey City, N. J., to cost close to \$14,000,000. Work is scheduled to begin soon. Engineering department of company is in charge.

Water Committee of Board of Trustees, South Orange, N. J., will receive bids until Aug. 15 for multiple unit zeolite water-softening plant for municipal waterworks, with complete mechanical accessories. Plans and specifications at

The Crane Market

NOT much new inquiry has appeared in the past week, either for overhead or locomotive cranes, but sellers are busy with a fair number of inquiries that have been in the market for some time. No action has been taken as yet on the cranes and steam shovels for export inquired for by Dwight P. Robin-

son & Co., New York, some time ago. Fox Brothers International Corporation, New York, will probably be in the market before long for some locomotive cranes for use in Turkey.

Among recent purchases are:

L. W. & P. Armstrong, 96 Wall Street,

New York, two 30-ton, 50-ft. span overhead cranes with two 15-ton trolleys for Centrale Fajardo at Fajardo, Porto Rico, from Whiffing Corporation.

Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., 25-ton hand power crane for power station from unnamed builder.

office of Ira T. Redfern, Village Hall, village engineer.

Hanson-Van Winkle-Munning Co., 324 Chestnut Street, Newark, comprising recent merger of Hanson-Van Winkle Co., Newark, and A. P. Munning & Co., Matawan, has purchased plant of Wickham Co., adjoining Munning plant at Matawan, recently vacated when company removed to Springfield, Ohio. New owner will remodel for expansion. It is purposed to build an addition later and concentrate larger part of production at that location.

Board of Public Works, Paterson, N. J., Edward Dupree, city clerk, is asking bids until Aug. 14 for power house for municipal refuse destructor plant, comprising turbo-generator, pumps, feed water heater, air compressors, pressure release tank, deep well air lift water system, valves and complete accessories. Plans and specifications at office of city engineer, City Hall.

Plant formerly occupied by R. Newman Hardware Co., St. Francis and East Ferry Streets, Newark, has been purchased by Rauchbach-Goldsmith Co., 9 St. Francis Street, manufacturer of metal trunks, etc. Property totals about 150,000 sq. ft. floor space, and will be used in part for expansion.

Newark Steam Heating Co., Newark, has purchased two-story factory at 131-33 South Twelfth Street, and will remodel for new plant.

International Metal Bed Co., 1-17 St. Francis Street, Newark, has been formed to manufacture metal beds. It will be in market for materials and equipment, particularly metal tubing, and will carry on all manufacturing operations except making of tubing.

W. B. Connor Co., Brooklyn, manufacturer of air filters, steam traps, pumps, etc., has leased, with option to purchase, 6½ acres at Lincoln Park, N. J., improved with factory building, 60 x 200 ft.

Doehler Furniture Co., Inc., Brooklyn, has been organized as subsidiary of Doehler Die Casting Co. to manufacture metal furniture, parts of which will be die-cast. All manufacturing will be done in plants of parent company.

Engineering Service Corporation, 943 Broadway, Albany, N. Y., has been formed to carry on engineering and research work including designing of mechanical devices and evolving plans for production cost reduction. Company has complete chemical and physical laboratories, testing equipment and machine shop facilities.

New England

BOSTON, July 30.—Contrary to earlier reports, the city of Boston has purchased no tools against its Hyde Park district school list. Machine tool dealers have refused to guarantee deliveries of

tools on specified dates. Bids close today on miscellaneous wood-working tools.

Kingsbury Machine Co., Keene, N. H., has started work on a plant addition.

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., is erecting machine shops, to cost with equipment \$130,000.

Leo Shlick, 314 Beacon Street, Boston, architect, has taken bids on a one-story 80 x 200 ft., addition for A. L. Adams Paper Co., Templeton, Mass., for which motors and other equipment are needed.

Plans are nearing completion for a one-story and sub-basement, 50 x 225 ft., addition for Metal Craftsman, Inc., 141 Georgia Avenue, Providence, R. I.

General Electric Co., River Works, West Lynn, Mass., has completed plans for a two-story, 20 x 100 ft., power house addition. Mr. Trudinger, 920 Western Avenue, Lynn, is in charge.

Plans have been drawn by H. T. McCluskey & Sons, Inc., Grand Avenue, New Haven, Conn., manufacturer of wire goods, for one-story addition, 40 x 62 ft., reported to cost about \$23,000 with equipment. Dwight E. Smith, New Haven, is architect.

Following recent purchase of plant and business of Fall River Spindle Co., Fall River, Mass., manufacturer of cotton mill machinery, etc., by Norlander Machine Co., New Bedford, Mass., latter company has leased property at Spartanburg, S. C., for Southern branch plant, to be devoted largely to parts production and repair work. Machinery from Fall River plant will be removed to new location and additional equipment provided. John Price, Sr., former owner of Fall River company, will be manager at Spartanburg.

A. D. Windle Co., Howe Avenue, Millbury, Mass., operating a local woolen mill, is reported contemplating a new power plant to cost close to \$50,000 with equipment.

J. M. Carpenter Tap & Die Co., Pawtucket, R. I., has been organized with capital of \$150,000 to take over and expand local company of same name with plant at 20 Newell Avenue, specializing in production of taps, dies, reamers and kindred metal cutting tools. New incorporators include R. S. Carter and A. H. Commins.

Peoples Hydro Electric Vermont Corporation, Montpelier, Vt., has begun work on hydroelectric generating plant on Winooski River, near Montpelier, to cost in excess of \$175,000 with equipment; extensions will be made in transmission lines.

Swaine Iron Works, Springfield, Mass., has acquired plant and business of Springfield Stamping & Tool Co., Inc., and will consolidate with its organization. New owner is reported planning continuance of production at Springfield works as branch plant.

Hartford Electric Light Co., Hartford, Conn., has awarded general contract to Industrial Construction Co., 721 Main

Street, for extensions and improvements in power plant, to cost more than \$40,000 with equipment.

Maine Steel Products Co., Portland, Me., recently organized to take over and consolidate Marine Hardware Equipment Co., Portland, and Bangor Iron Works, Bangor, Me., has begun operations at Portland mill and will devote initial output largely to production of improved type of steel snow plows, including parts and assembling.

Cadillac-LaSalle Co., Providence, R. I., operated by Cadillac Investment Co., Milton J. Budlong, head, local representative for Cadillac and LaSalle automobiles, plans early construction of new service, repair and sales building, to cost in excess of \$350,000 including equipment.

Kimball Aircraft Corporation, Naugatuck, Conn., has been formed to manufacture airplane motors. It has a local plant and will be in market for materials and equipment.

Pittsburgh

PITTSBURGH, July 30.—The Westinghouse Electric & Mfg. Co. is ordering steadily against its third quarter tool list, but this buying constitutes the principal activity in point of sales, which in general are adversely affected by the vacation period. Inquiries are numerous, however, and the trade takes hope, from the high rate of steel plant engagement for this time of year, that they will develop into actual business later.

Plans are being arranged by Pennsylvania Railroad, Pittsburgh, for new engine house with repair facilities, yard and terminal improvements, at Benwood, W. Va., to cost close to \$200,000 with equipment. Company is arranging expansion and improvement program in Pittsburgh district to cost close to \$40,000,000, including produce terminal, with cold storage and refrigerating division, and freight terminal, with elevating, conveying and other equipment. Last two noted projects are each reported to cost more than \$1,000,000.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has approved plans for four-story addition to plant at Clarksburg, W. Va., 150 x 390 ft., to cost more than \$300,000.

General Benzol Corporation, Warren, Pa., recently organized by A. L. Sleeman and associates, with capital of \$500,000, has purchased property of Warren Refining Co., whose plant in Venturatown district, was destroyed by fire more than a year ago. New owner plans construction of oil refinery to cost upward of \$200,000 with equipment; additional units will be added later.

Pennsylvania Transfer Co., 298 Duquesne Way, Pittsburgh, has awarded general building contract to Nicola Building Co., 6388 Penn Avenue, for one-story

automobile service, repair and garage building to cost approximately \$85,000 with equipment. J. P. McWilliams, 126 North Highland Avenue, is architect.

Pittsburgh Screw & Bolt Co., 2719-41 Preble Avenue, Pittsburgh, has filed plans for extensions and improvements in plant to cost about \$24,000.

John C. Neals, Sewickley, Pa., and associates have organized Altithermo Engineering Co., to establish and operate a plant for manufacture of gas machinery and appliances. L. B. Cuddy, Sewickley, will also be an official of company.

Trojan Steel Co., 322 South Avenue, Charleston, W. Va., will take over plant and property of Becker Steel Co., South Charleston, W. Va., recently acquired at public sale by R. M. Venable, Charleston, and associates. New owner plans improvements and will begin production soon.

Board of Education, Lewistown, Pa., is said to be planning installation of manual training equipment in two-story addition to junior high school to cost about \$160,000, for which bids will soon be asked on general contract. Hersh & Shollar, Commerce Building, Altoona, Pa., are architects.

H. Bettis Co., Inc., Wheeling, W. Va., manufacturer of wirebound barrels, boxes, etc., has acquired a factory at Zanesville, Ohio, and will remodel for branch plant, to cost close to \$100,000 including machinery. Company is said to be planning for further expansion at Zanesville.

South Atlantic

BALTIMORE, July 30.—Work will soon be started by Asiatic Petroleum Co., Ltd., 65 Broadway, New York, on new oil refinery and storage and distributing plant in Fairfield district, Baltimore, where property recently was acquired. Project will include one unit for asphalt refinery, and will cost about \$1,000,000.

Highland Motor Sales Co., 3415 Eastern Avenue, Baltimore, has revised plans for two-story service, repair and garage building, to cost more than \$80,000, for which bids will be asked on general contract early in September. R. C. Brockmeyer, 1665 North Milton Avenue, is architect.

American Oil Co., American Building, Baltimore, will soon take bids on general contract for one-story oil storage and distributing plant at Dunmore, Pa., to cost upward of \$75,000 with equipment.

Board of District Commissioners, District Building, Washington, will receive bids until Aug. 8 for steel shelving, cases, etc., for new McKinley high school.

American Chatillon Corporation, 393 Seventh Avenue, New York, has approved plans for one-story power house and machine shop at rayon mill at Rome, Ga. Entire project will consist of seven manufacturing units to cost approximately \$3,500,000 with machinery. Lockwood, Greene & Co., 1 Pershing Square, New York, and Greenville, S. C., are architects and engineers.

Chesapeake & Ohio Railroad Co., Richmond, Va., will make an expenditure of close to \$10,000,000 for expansion in locomotive and car repair facilities, instead of smaller sum previously noted in these columns, to be carried out in connection with general development program aggregating \$21,144,724. Shop work will include new locomotive construction and repair units at Huntington, W. Va., to cost \$3,500,000 with equipment; improvements and extensions

in shops at Richmond to cost \$1,000,000; additions to locomotive shops at Clifton Forge, Va., including equipment, to cost about \$1,000,000; extensions to shops at Hinton, W. Va., including track facilities, to cost \$1,260,000; new engine terminal with shop facilities at Cincinnati, to cost \$2,300,000 with machinery; and new engine house, with repair facilities, at Ashland, Ky., to cost \$500,000. Work on program will begin soon.

City Council, Baltimore, plans early acquisition of about 1000 acres as site for municipal airport, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, and other units, to cost more than \$500,000. Charles F. Goob is city engineer in charge.

Master Auto Repair Co., Charleston, S. C., recently organized by Arthur L. Way, 67 Reid Street, and associates, plans early establishment of machine repair shop, with facilities for parts manufacture, etc.

Southern Spring Bed Co., 290 Hunter Street, Atlanta, Ga., has awarded general contract to Padgett & Sutton, Bona Allen Building, for two-story plant unit, 100 x 122 ft., to cost about \$26,000 with equipment. Hentz, Adler & Schutze, Candler Building, are architects.

Paul A. Bennett Motor Co., 614 Trade Street, Winston-Salem, N. C., has leased two-story and basement building, 75 x 200 ft., to be erected at Sixth and Marshall Streets, for service, repair and garage unit, to cost close to \$100,000 with equipment.

Whitney Mfg. Co., Whitney, S. C., has approved plans for enlargements in machine shops and pumping plant at its textile mill, and will install additional equipment.

Farmville Furniture & Cabinet Co., Farmville, Va., has approved plans for first unit of new plant, consisting of two one-story factories, each 50 x 250 ft., to cost close to \$80,000 with equipment. Other units will be built later.

Conveying machinery and other handling equipment, factory trucks and tractors, etc., will be installed in new storage and distributing plant to be built by Public Improvement Commission, Munsey Building, Baltimore, to cost about \$570,000. J. E. Greiner, Lexington Building, is engineer.

Allen C. Davis, 121 South Howard Street, Baltimore, is at head of project to establish plant for manufacture of light aircraft. Arrangements are being made to lease building for parts production and assembling. A company will be organized to carry out enterprise.

Eanes Mfg. Co., Asheville, N. C., has been formed to manufacture Eanes weavers' knotter for textile makers. Device is at present being made under contract.

Babcock & Wilson Co. has completed plans for construction at Augusta, Ga., of a refractories plant, which will eventually represent an investment of more than \$1,000,000. A site was recently purchased on Georgia & Florida Railroad tracks and work upon first unit will be started soon. Machinery for plant will be built by company itself.

Philadelphia

PHILADELPHIA, July 30.—York Ice Machinery Co., Belmont and Thompson Streets, Philadelphia, manufacturer of ice-making and refrigerating ma-

chinery, has awarded general contract to Cramp & Co., Denckla Building, for three-story and basement addition, to cost \$115,000 with equipment. Main plant and headquarters are at York, Pa.

Branch-Crawford Co., 1539 Wood Street, Philadelphia, manufacturer of pipe hangers and kindred products, has asked bids on general contract for addition, to cost more than \$30,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Philadelphia Steam Co., care of Frank M. Hunter, Gibson Building, Chester, Pa., recently organized, has applied to city council, Philadelphia, for permission to construct steam power plant for central heating service, with initial capacity of about 100,000 hp. Company is arranging for bond issue of \$5,500,000 to provide for plant. Edward H. Reuss, Merion, Pa., is president.

Following recent acquisition of Federal Container Co., Fifty-sixth Street and Paschall Avenue, Philadelphia, by Fiber Board Products, Inc., San Francisco, purchasing company is having plans prepared for a new paperboard mill in vicinity of Philadelphia, to be operated by Federal branch. It will cost in excess of \$450,000 with machinery. Federal company will continue under management of T. C. Mitchell, formerly president.

Philadelphia Garage Co., Carlisle and Cherry Streets, Philadelphia, has awarded general contract to Goler Construction Co., 1600 Arch Street, for extensions and improvements in seven-story service repair and garage building to develop capacity for 1000 cars, to cost close to \$100,000.

Sears, Roebuck & Co., Roosevelt Boulevard, Philadelphia, operating a mail order business with headquarters at Chicago, has had plans drawn for three additional units at local factory branch and distributing plant, to be four stories and basement, 85 x 126 ft.; one story and basement, 85 x 105 ft.; and one story and basement, 40 x 84 ft., to cost more than \$400,000 with equipment. Nimmons, Carr & Wright, 122 South Michigan Avenue, Chicago, are architects.

New Matix Equipment Co., Philadelphia, care of John D. Lawrence, president, Board of Trade, Westville, N. J., recently organized by L. H. Meyers, Philadelphia, and associates, has acquired property at Westville for new plant to manufacture air brakes and kindred products. Initial unit will be one story, and cost more than \$25,000 with equipment.

Middlesex Paper Tube Co., Lowell, Mass., has leased portion of former plant of Mercer Automobile Co., Trenton, N. J., for new branch factory for manufacture of paper tubing, cardboard containers, etc.

City Council, Atlantic City, N. J., has plans for municipal airport expansion at Bader Field, including two steel hangars, with repair and reconditioning facilities, to cost close to \$50,000.

Norman Aircraft Co., care of Jacob Rosenfeld, High Street, Burlington, N. J., recently organized with capital of \$100,000, by Ohio interests, headed by J. W. Overturf, Cleveland, has acquired factory property at Stacy and Barclay Streets, for new plant for manufacture of airplanes. It is understood that an existing works will be removed to this location and additional equipment provided for parts and assembling.

Board of Water Commissioners, Wilmington, Del., has plans for extensions and improvements in municipal waterworks, including central pumping plant on Brandywine River. A fund of \$3,000,000 has been arranged for entire project.

W. Compton Wills is assistant engineer of water department.

Philadelphia Coke Co., Richmond and Kennedy Streets, Philadelphia, has filed plans for one-story manufacturing unit at artificial gas plant, now in course of construction, to cost \$105,000. Entire project will cost more than \$750,000.

Board of Education, Upper Darby, Pa., plans installation of manual training equipment in new three-story high school to cost \$750,000, for which bids are being asked on general contract until Aug. 8. Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, are architects.

Hercules Powder Co., Wilmington, Del., is said to have plans under way for new unit at plant at Carthage, Mo., for production of nitric acid, to be operated under an ammonia oxidation system, to cost close to \$300,000 with equipment.

Nevin Bus Terminal Co., Philadelphia, has engaged W. F. B. Koelle, 112 South Sixteenth Street, architect, to prepare plans for seven-story service, repair and terminal garage on site recently acquired, to cost close to \$500,000 with equipment.

American Steel Engineering Co., 3520 Queen Lane, Philadelphia, dealer in reinforcing steel, structural steel, rolling steel doors and other steel building products, has completed new shop, warehouse and office building at above address.

Detroit

DETROIT, July 30.—Cyclone Fence Co., Waukegan, Ill., has purchased Anthony plant of American Steel & Wire Co., Tecumseh, Mich., and will remodel for production of wire screens, wire cloth, etc. It is planned to begin operations early in fall.

Commonwealth Brass Corporation, 5781 Commonwealth Avenue, Detroit, is planning expansion and will install additional equipment.

Plant No. 1 of Rickenbacker Motor Co., Detroit, has been sold by Security Trust Co., 735 Griswold Street, receiver, to James Holden, Detroit, real estate dealer, acting for a company whose name is temporarily withheld, for a price of \$600,000, subject to approval of court. Receiver's sale of plant No. 2 of Rickenbacker company is scheduled for Aug. 2.

Grand Rapids Metalcraft Corporation, Grand Rapids, Mich., is arranging for an expansion program to include manufacture of new products for automobile service. Exclusive rights have been secured for manufacture of ventilating heater invented by J. W. Kelch, Detroit, and plant unit will be established exclusively for this output. Other departments soon to be operated include those for production of instrument panels, door trim panels, furniture stampings, cowl bars, ash receivers and metal furniture parts.

United States Gypsum Co., 200 West Adams Street, Chicago, has plans for new mill at Detroit for manufacture of gypsum building products, to cost more than \$400,000 with machinery. Plant will be operated in conjunction with other new mill to be built at East Chicago, Ind.

Plant of Jewett Radio Corporation, Telegraph Road, Pontiac, Mich., has been acquired by Baxter Laundries, Inc., Pontiac, and will be remodeled for new mechanical laundry, to cost about \$100,000 including automatic machinery, steam power equipment, etc.

Detroit Edison Co., 2000 Second Boulevard, Detroit, has filed plans for new two-story and basement power substation, to cost about \$350,000 with machinery.

Board of Education, Pontiac, Mich., is considering installation of manual training equipment in new junior high school to cost close to \$500,000, for which bids will be asked on general contract early in August. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

Pontiac Foundry & Machine Co., Pontiac, Mich., has been organized to manufacture non-ferrous castings, wood and metal patterns, dies, tools, jigs, fixtures, etc., and do general machine work. Company has purchased factory building at Dixie Highway and Scott Lake Road, Pontiac, and will do no additional building.

Lenert Aircraft Co., Pentwater, Mich., has been organized to manufacture airplanes of duralumin, chrome molybdenum steel tubing and flat stock.

Newaygo Portland Cement Co., Charlevoix, Mich., will begin work immediately on a plant to cost \$1,000,000.

Cleveland

CLEVELAND, July 30.—The machine tool market made a fair showing for July. While dealers' sales fell off the past week, volume during the month was about equal to that in June. Orders taken by a local turret lathe manufacturer were far ahead of June. Demand is still confined almost wholly to single machines and is well distributed between various industries. Considerable business in single tool inquiry is pending. Much of the demand is for replacement tools to reduce cost of operations.

Gabriel Snubber Mfg. Co., Cleveland, is planning to bring out a new hydraulic shock absorber for automobiles and it is understood will purchase some machinery equipment. Spicer Corporation has purchased additional machinery for its Toledo plant. Timken Roller Bearing Co., Canton, during the week bought a lathe and Diebold Safe & Lock Co., Cleveland, a radial drill.

Plans have been filed by Willys-Overland Co., Toledo, Ohio, for one-story addition to automobile plant, to be used primarily in connection with export production division, to cost about \$250,000.

New York Central Railroad Co., Ohio Central Lines, Cleveland, plans extensions and improvements in docks and terminal at Toledo, Ohio, including a new electrically-operated car-dumping plant and other mechanical terminal facilities, to cost in excess of \$1,000,000. J. R. Scofield, Toledo, is resident engineer in charge.

Vulcan Corporation has been organized by officials of Vulcan Last Co., Portsmouth, Ohio, manufacturer of iron shoe lasts, etc., to take over and expand company. New company has arranged for preferred stock issue of \$2,500,000, a portion of proceeds to be used for extensions. W. J. Burke is president.

Winton Engine Works, Inc., 2116 East 106th Street, Cleveland, is considering plans for two one-story buildings, to cost more than \$50,000 with equipment.

Vilchek Tool Co., 3000 East Eighty-seventh Street, Cleveland, has awarded general contract to Hunkin-Conkey Construction Co., for two one-story additions, 40 x 100 ft., and 30 x 60 ft., to cost about \$40,000 with equipment.

Glenn L. Martin Co., 16800 St. Clair Avenue, Cleveland, manufacturer of airplanes and parts, has engaged Small & Rowley, Terminal Tower Building, archi-

fects, to prepare plans for new plant at Baltimore, at municipal airport to be established by that city, with initial units for parts production and assembling to cost more than \$500,000.

National Air Transport, Inc., Cleveland Airport, Cleveland, is planning construction of new steel hangar, 100 x 120 ft., with repair and reconditioning facilities, to cost in excess of \$75,000, with equipment.

Standard Oil Co. of Ohio, Cleveland, has work under way on new gas absorption plant at local refinery, for reclaiming of gases formed during distillation process, to cost \$50,000 with equipment. Construction has also been started on similar unit at Toledo, to cost a like sum.

Commercial Steel Casting Co. has been formed as sales organization for steel casting division of Osgood Co., Marion, Ohio, which was recently consolidated with former Commercial Steel Casting Co.

Superior Metal Spinning & Mfg. Co., 132 Ontario Street, Toledo, Ohio, has been incorporated to take over business formerly operated by M. W. and J. F. Biringer. Company spins all kinds of metal and specializes in stainless steel, monel metal and non-ferrous products. It is building factory on Fitch Road, West Toledo, and will be in market for some equipment.

Additions to factory buildings and equipment now being made will more than double the present productive capacity of Bunting Brass & Bronze Co., Toledo, Ohio.

Buffalo

BUFFALO, July 30.—Property has been acquired by Kittinger Co., 1893 Elmwood Avenue, Buffalo, manufacturer of furniture, at Los Angeles, for Pacific Coast plant, for which plans will soon be drawn. Initial unit will be one story, aggregating about 400,000 sq. ft. floor space, and is reported to cost more than \$850,000 with machinery. Work will be started immediately on two-story factory branch and distributing plant, totaling about 35,000 sq. ft. of floor space, to be used preliminary to completion of main plant, to cost close to \$100,000. Herbert C. Emmons, 1100 South Oakland Street, Pasadena, Cal., is Los Angeles representative.

An aircraft company to specialize in production of English-type De Havilland-Moth airplanes is in negotiation with Chamber of Commerce, Buffalo, relative to site for new plant, and arrangements are expected to be concluded soon for land on Werle Road. Samuel B. Botsford, general manager, Chamber of Commerce, is in charge of negotiations.

Sun Oil Co., Finance Building, Philadelphia, is said to have authorized plans for construction of storage and distributing plant and office building at Syracuse, N. Y., to replace works recently destroyed by fire, with loss close to \$100,000.

Plans have been filed by Palace Laundry Co., Tenth and Pine Streets, Niagara Falls, N. Y., for one-story steam power plant at Lockport, N. Y., to cost close to \$55,000 with equipment.

James A. Louster and Paul H. Williams, Cazenovia, N. Y., have organized Diepress Co., with capital of \$400,000, to establish local plant for manufacture of dairy machinery and kindred equipment. Operations will begin at early date.

Brockway Motor Truck Corporation, Cortland, N. Y., has authorized plans

for one-story addition, to cost close to \$90,000 with equipment. C. W. Clark, Savings Bank Building, is architect.

Gould Paper Co., Lyons Falls, N. Y., plans rebuilding of portion of mill at Gouldtown, near Lyons Falls, destroyed by fire July 20, with loss approximating \$100,000 including equipment.

Art Work Shop, 828 East Ferry Street, Buffalo, manufacturer of automobile hardware and art metal goods, has filed plans for one-story addition to cost about \$24,000 including equipment.

Precise Products, Inc., Rochester, N. Y., recently organized by Ernest L. White, 60 Brunswick Street, and associates, plans operation of local plant for manufacture of tools, dies and kindred products.

Chicago

CHICAGO, July 30.—Machine tool orders in the past month have been heavier than usual for July, although lighter than in June. Demand is still considered active, although there has been an appreciable decline in inquiries in the past two weeks—a development that is not surprising in view of the vacation season.

Waukesha Motor Co., Waukesha, Wis., which is building a plant addition, has bought a number of multiple spindle drills and is still in the market for special milling and drilling equipment. International Harvester Co., Chicago, has decided to build a caterpillar-type tractor in its local tractor works. Considerable new equipment will be needed for production of this model. Link-Belt Co., Chicago, which is building an addition in this city, is in the market for a few machine tools. J. I. Case Threshing Machine Co., Racine, Wis., which has been a liberal buyer of machine tools in the past half year, has placed orders for two automatic lathes.

Chicago, Burlington & Quincy Railroad has bought an axle lathe and is about ready to close on a few more tools. Missouri-Kansas-Texas recently bought a few machine tools and will soon purchase the remainder of the items on its outstanding list. Missouri Pacific has indefinitely postponed action on inquiries that have been before the trade for some time. Chicago & North Western has issued an inquiry for a Marshalltown motor-driven throatless shear with circle-cutting attachment.

Chicago Board of Education has placed orders for a 16-in. x 6-ft. lathe and a cutter grinder for Washburn Vocational School. Board has also issued inquiries for equipment needed in various junior high schools. Bids on this equipment are to be in on Aug. 2. A list of the more important items follows:

Three motor-driven, 2-wheel dry grinders with 10-in. grinding wheels.

Three motor-driven No. 20 Stanley single-spindle plain-bearing floor-type drilling machines.

Three 11-in. x 4-ft. motor-driven engine lathes.

Three Yates-American motor-driven 30-in. band saws.

Three Yates-American motor-driven No. 1146 two-wheel dry grinders with 1½ x 10-in. grinding wheels.

Three Yates-American motor-driven No. 1, 6-in. bench jointers.

Twelve Yates-American, or equal, No. 12 motor-in-head lathes.

Three Pexto No. 3 squaring shears.

Six Pexto No. 63 bar folders.

Three Pexto No. 1005 cornice brakes.

Three motor-driven 1½ x 10-in. buffers and grinders.

Dallas Brass & Copper Co., 6601 West Grand Avenue, Chicago, has awarded

contract for a one-story plant building, 56 x 320 ft., to cost \$20,000.

Miehle Printing Press Mfg. Co., 1332-58 Damen Street, has awarded a contract for a plant building, 200 x 263 ft., to cost \$450,000.

Trindl Corporation, manufacturer of automobile engine parts, 2917 Wabash Avenue, Chicago, has awarded contract for a one-story plant, 125 x 235 ft., at Aurora, Ill., to cost \$55,000.

Daniel Burkhardtmeir Cooperage Co., 7244 South Chicago Avenue, Chicago, is receiving bids on a three-story addition to cost \$50,000.

Commonwealth Edison Co., 72 West Adams Street, Chicago, has awarded contract for a one-story substation, 50 x 92 ft., to cost \$110,000.

J. A. Sloan, 8259 Green Street, Chicago, has let contract for a one-story boiler room, 50 x 100 ft., to cost \$12,000.

Hart-Parr Co., Charles City, Iowa, machinist and founder, contemplates expanding its plant facilities.

Williams-White & Co., Moline, Ill., are erecting a foundry building, 90 x 260 ft., to cost \$100,000 with equipment.

Waukegan Foundry Co., Waukegan, Ill., contemplates construction of a plant addition.

Plans are being completed by Reiter Co., North Avenue, Elgin, Ill., manufacturer of water softeners, for two-story addition to cost more than \$40,000 with equipment. Bids will be asked on general contract soon.

Koenigsburg & Weisfeld, 155 North Clark Street, Chicago, architects, have asked bids on general contract for new six-story automobile service, repair and garage building, to cost in excess of \$250,000 with equipment.

Mathias Klein & Sons, 3200 Belmont Avenue, Chicago, manufacturers of line-men's tools and other electric power line equipment, have taken title to tract, 173 x 578 ft., on Wrightwood Avenue, and are said to be planning an additional unit.

Plans have been authorized by Ballard Storage & Transfer Co., 16 East Fourth Street, St. Paul, Minn., for four-story and basement automobile service, repair and garage building, with capacity of 300 cars, to cost \$250,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in one and three-story plant to be erected by Zinsmaster Baking Co., 97 Sherbourne Avenue, St. Paul, Minn., at Minneapolis, Minn., to cost about \$375,000, for which general contract has been let to Pike & Cook, 416 South Fifth Street, Minneapolis.

Rockford Metal Specialty Co., 624 Cedar Street, Rockford, Ill., manufacturer of automobile hardware, has superstructure under way for two-story addition, 50 x 150 ft., to cost approximately \$100,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects.

A. S. Alschuler, Inc., 28 East Jackson Boulevard, Chicago, architect, has asked bids on general contract for new multi-story automobile service, repair and garage building, 120 x 175 ft., to cost in excess of \$750,000 with equipment.

White Star Refining Co., Wood River, Ill., will rebuild portion of storage and distributing division at local refinery, destroyed by fire July 23, with loss reported in excess of \$150,000 with equipment.

Minnesota Power & Light Co., Power Building, Duluth, Minn., has asked bids on general contract for two-story and basement equipment storage and distributing plant, 80 x 125 ft., with shop

and repair facilities, to cost about \$150,000 with equipment. L. M. Pharis is company engineer.

Ingersoll Milling Machine Co., Douglas and Willoughby Streets, Rockford, Ill., is completing erection of three-story addition, 40 x 210 ft., to cost about \$100,000.

Terminal Grain Corporation, Grain Exchange Building, Sioux City, Iowa, has awarded general contract to Jones-Hettlesater Construction Co., Kansas City, Mo., for an addition to grain elevator to increase capacity 500,000 bu., to cost \$100,000 with equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Reynolds Electric Co., 2650 West Congress Street, Chicago, manufacturer of fractional horsepower motors and motor-driven appliances, has taken over Korrectolite Co., maker of illuminating products.

Murray Iron Works Co., Burlington, Iowa, engineer, founder and boiler maker, has appointed following district turbine sales managers: Fred H. Dorner, 311 Knapp Street, Milwaukee; Dennis Engineering Co., 243 North High Street, Columbus, Ohio, and Briggs Weaver Machinery Co., Dallas, Tex.

Cincinnati

CINCINNATI, July 30.—Machine tool builders state that July bookings were slightly better than normal, even though sales fell somewhat short of those in June. Two large local manufacturers, whose orders the past month were double those of June, are notable exceptions to the general average. The most interesting feature of the market is that buying has been exceptionally well distributed among various industries, the usual purchases by automobile companies having failed to materialize. However, machine tool companies specializing in high production tools favored by automobile makers state that the amount of pending business in the Detroit district is of fairly good volume.

The Illinois Central is expected to place an order the coming week for rebuilding 25 motor-driven engine lathes. The Southern Pacific has bought three engine lathes and the Louisville & Nashville probably will close on several lathes in the near future. The New River State School, Montgomery, W. Va., is in the market for three lathes, one miller, one upright drill, one shaper, one grinder, one hack saw, one bench grinder and a mandril press. Purchases will be made by the school's industrial education department.

Plans are under way by Armstrong Furnace Co., London, Ohio, recently formed to take over and expand plant and business of Thomas & Armstrong Co., for new plant at Columbus, Ohio, with initial one-story unit to total about 60,000 sq. ft. of floor space. It is proposed to remove considerable equipment from London plant to new location. Entire project will cost more than \$100,000. M. B. Armstrong is president.

Andrew Jergens Co., Spring Grove Avenue, Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Elm Street, for new six-story soap-manufacturing plant, 61 x 150 ft., to cost upward of \$125,000 with equipment.

Common Council, Providence, Ky., is asking bids until Aug. 13 for equipment

for municipal waterworks, including 300,000-gal. capacity steel standpipe, and 200,000-gal. capacity steel tank and tower. C. N. Harrub, Fourth & First National Bank Building, Nashville, Tenn., is engineer.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Aug. 15 for 356 propeller blades, propeller hub lock-nuts, propeller slit hub barrel assemblies, 200 split-hub alloy propeller blades, propeller split-hub sleeve assemblies, aluminum alloy blades, propeller spinner assemblies, etc., circular 62; until Aug. 17 for 288 fuel pump assemblies, circular 60.

City Council, Memphis, Tenn., is considering a bond issue of \$1,600,000, for a municipal grain elevator, with elevating, conveying, screening and other mechanical equipment, and for extensions in railroad facilities at municipal river terminals.

Herring, Hall, Marvin Safe Co., Hamilton, Ohio, has awarded general contract to Edward Honnert Co., Mount Healthy, Ohio, for two one-story additions, 20 x 300 ft., and 20 x 100 ft., to cost more than \$40,000 with equipment.

Detroit, Toledo & Ironton Railroad Co., Detroit, is reported planning new engine house, with repair facilities, and yard extensions at Lima, Ohio, to cost in excess of \$75,000. Work is scheduled to begin in fall.

Standard Ice Co., Knoxville, Tenn., is contemplating new ice-manufacturing plant, to cost approximately \$175,000 with machinery.

Board of Education, Louisville, has secured site at Second and Bloom Streets for new boys' high school, with manual training department, to cost close to \$700,000, for which plans will be drawn by J. Meyrick Colley, Administration Building, Eighth and Chestnut Streets, architect.

Meehan Steel Products Co., Ironton, Ohio, fabricator of structural steel and steel plates and jobber of iron and steel products, has purchased plant of Ironton Punch & Shear Co. and will operate machine shop and foundry on jobbing work, furnishing replacement parts on all machines previously made by Punch & Shear company.

Brass & Aluminum Products Co., Newport, Ky., recently organized, contemplates adding a plating plant to aluminum foundry now operated by T. E. Reynolds Co.

St. Louis

ST. LOUIS, July 30.—Bids will soon be asked on general contract by General Tire & Rubber Co., Akron, Ohio, for three-story factory branch and distributing plant at Kansas City, Mo., to cost about \$200,000 with equipment. Greenbaum, Hardy & Schumacher, Scarritt Building, Kansas City, are architects.

Automatic machinery, conveying and other equipment, will be installed in new plant to be built by Eagle Bottling Works, Inc., 1912 Walnut Street, Kansas City, Mo., on site just purchased, 125 x 130 ft., to cost about \$50,000 with equipment.

St. Louis County Water Co., St. Louis, is disposing of bond issue of \$1,000,000, a portion of proceeds to be used for extensions and improvements in waterworks stations and system.

Parks Airlines, Inc., Missouri Theater Building, St. Louis, is reported having plans drawn for new aircraft manufacturing plant at East St. Louis, Ill., with

initial unit, one story, 200 x 800 ft., for parts production and assembling, to cost in excess of \$300,000 with equipment.

Southwestern Bell Telephone Co., Telephone Building, St. Louis, has revised plans for two-story addition to equipment storage and distributing plant with service, repair and garage extension for company trucks and cars, to cost about \$85,000. I. R. Timlin is company architect.

Universal Cutter Co., 4567 Scott Avenue, St. Louis, manufacturer of cloth cutting machines and parts, has awarded general contract to Woermann Construction Co., Syndicate Trust Building, for two-story and basement plant, 55 x 115 ft., to cost about \$60,000 with equipment. Alfred H. Norris, 11 Dartford Place, Clayton, Mo., is architect.

Board of Education, Maplewood, Mo., is considering installation of manual training equipment in new high school to cost about \$200,000 for which plans will be drawn by William B. Ittner, Board of Education Building, St. Louis, architect.

Gruendler Patent Crusher & Pulverizer Co., 320 North Fourth Street, St. Louis, has filed plans for one-story addition, 100 x 160 ft., to be equipped primarily as machine shop, to cost close to \$50,000.

Tonkawa Petroleum Co., Tonkawa, Okla., is said to have plans for rebuilding portion of local refinery recently destroyed by fire, with equipment installation to include high pressure cracking stills and auxiliary apparatus, to cost more than \$75,000.

Arkansas Power & Light Co., Pine Bluff, Ark., plans installation of 50,000-gal. capacity steel tank on steel tower, in connection with expansion and improvements in waterworks at Risen, Ark.

Parks Air Lines, Inc., East St. Louis, Ill., plans erection of an aeroplane factory adjoining Parks airport, just south of this city.

American Steel Co., East St. Louis, Ill., will spend approximately \$250,000 in next two years on plant improvement. Work on program will commence within 90 days. A number of plant buildings will be torn down and replaced with structures adapted to making a general line of castings. Heretofore company has specialized in railroad steel castings.

Standard Steel Works, North Kansas City, Mo., manufacturer of sheet metal products, including storage and truck tanks for gas and oil, road building equipment, garage and filling station apparatus, will erect an addition, 120 x 305 ft. Company recently was given a contract by United Air Craft Corporation to manufacture aeroplanes.

Mid-West Specialty Co., Little Rock, Ark., incorporated with \$200,000 capital stock, will manufacture a gasoline reserve tank, patented by Dr. Robert H. Gillespie. Factory space has been obtained at Eighth and Izard Streets, and stamping machinery will be purchased.

Indiana

INDIANAPOLIS, July 30.—Plans are being drawn by F. Hilgemeier & Brother, 519 West Raymond Street, Indianapolis, meat packer, for new cold storage and refrigerating plant, to cost in excess of \$125,000 with equipment. T. Quatek is company engineer.

Graham-Paige Motor Co., West Warren Street, Detroit, has awarded general contract to M. J. Hoffman Construction Co., Furniture Building, Evansville, for

several one-story units, each about 90 x 240 ft., at its body-building plant at Evansville, to cost about \$500,000. This will form part of a \$1,500,000 expansion program, including addition to main plant at Detroit and extensions to body manufacturing works at Wayne, Mich.

New England Flexible Door Co., recently formed by G. E. Stevenson and G. C. Coverdale, Indianapolis, have taken option on plant of New England Pin Co., Winsted, Conn., for establishment of new factory. Structures will be remodeled and equipment installed at early date.

J. B. Bayard, 231 Main Street, Vincennes, architect, will soon take bids on general contract for new automobile service, repair and garage building, to cost close to \$100,000 with equipment.

Truck Engineering Co., East Pontiac Street, Fort Wayne, manufacturer of motor trucks, has awarded general contract to Buesching & Hagerman, 402 East Superior Street, for two one-story additions, to cost about \$35,000 with equipment. Guy Mahurin, Standard Building, is architect.

Delco-Remy Corporation, Anderson, manufacturer of automobile starting and lighting equipment, has completed plans for five-story addition, 53 x 168 ft., to cost more than \$90,000 with equipment.

Bastian-Morley Co., manufacturer of hot water heaters, Laporte, will soon build an addition to cost \$100,000.

Chicago Hardware Foundry Co., Elkhart, will soon start construction of an 80-ft. addition to its foundry to provide for a new core room.

Milwaukee

MILWAUKEE, July 30.—New business booked in July by local machine tool builders aggregates a volume considerably in excess of a year ago, and of satisfactory proportions in comparison with previous months this year. Prospects are also considered excellent for local and general revival of new shop construction. Inquiry is active, both for replacement needs and small lots for shop additions now under construction or contemplated. Sources of inquiry are broadly diversified.

Allis-Chalmers Mfg. Co., Milwaukee, which some time ago acquired entire interests of Monarch Tractor Co., Springfield, Ill., is contemplating a 100 per cent increase in production facilities of this division. It has not yet been decided if new shops are to be erected at Springfield, or entire operation transferred to main works in West Allis, Milwaukee. If this is done, a large group will be built. Monarch division builds heavy tractors, while tractor division of West Allis works specializes in lighter types for agricultural purposes.

Nash Motors Co., Kenosha, Wis., has placed general contract with Nelson & Co., Racine, Wis., for erection of a one-story addition, 63 x 238 ft., to Special Six works at Racine.

Board of Vocational Education, Green Bay, Wis., is having plans drawn by Foeller, Schober & Berners, local architects, for new \$100,000 manual training school, 120 x 150 ft., three stories and basement. Harvey Stewart is secretary of board.

Seaman Body Corporation, 1732 Richards Street, Milwaukee, division of Nash Motors Co., Kenosha, Wis., and manufacturing inclosed automobile bodies, has

acquired 20 acres near its present factories for future development. No decision has been made with respect to time of undertaking new construction. A \$250,000 addition was made early this year.

North End Foundry Co., 700 Sixtieth Avenue, West Allis, Milwaukee, is erecting a one-story shop addition, 47 x 80 ft. W. O. Krahn, 606 Fifty-first Street, Milwaukee, is general contractor.

Immel Construction Co., Fond du Lac, Wis., has general contract to erect a forge shop, 145 x 180 ft.; three-story warehouse, 96 x 125 ft., and a three-story elevator addition, 30 x 40 ft., for Van Brunt Mfg. Co., Horicon, Wis., division of Deere & Co., Moline, Ill. O. A. Eckerman, Moline, is chief construction engineer.

Strasburg Construction Co., Blackhawk Boulevard, Beloit, Wis., will erect a two-story factory, 40 x 100 ft., and a one-story shop, 50 x 100 ft., for manufacture of sash, doors and interior trim and hardwood specialties. Investment in buildings, tools and machinery will be about \$60,000.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., will build four new substations at a cost of about \$45,000. Sites have been acquired at Stoughton and Spring Green, Wis. E. J. Kallevang is chief engineer.

Magnetic Mfg. Co., Milwaukee, manufacturer of magnetic separators and special magnetic equipment, is in market for a 24-in. heavy-duty lathe.

Gulf States

BIRMINGHAM, July 30.—Plans have been approved by Wackman Welded Ware Co., Sawyer Street, Houston, Tex., for new one-story plant, to cost close to \$55,000 with equipment.

Common Council, Boerne, Tex., is asking bids until Aug. 8 for equipment for municipal waterworks, including 75,000-gal. elevated steel tank and tower. Terrell Bartlett Engineers, Inc., Calcasieu Building, San Antonio, Tex., is engineer.

Miller Refining Co., Wichita Falls, Tex., has been acquired by new interests, headed by J. J. and Meyer Taxman, who contemplate extensions and improvements in oil refinery, including installation of additional equipment.

International Paper Co., 100 East Forty-second Street, New York, has approved plans for group of units for kraft paper mill at Mobile, Ala., including main mill, 100 x 780 ft.; machine shop, 58 x 120 ft.; evaporating unit, 97 x 98 ft.; recovery room, 113 x 199 ft.; power house and other buildings. Entire project is reported to cost more than \$3,500,000. R. J. Cullen is vice-president, in charge.

Board of Commissioners, Boca Raton, Fla., will receive bids until Aug. 15 for pumping station and water treatment plant for municipal waterworks, capacity 500,000 gal. per day. Plans and specifications at office of Beulah Butler, town clerk; and H. S. R. McCurdy, 762 Lancaster Avenue, Bryn Mawr, Pa., consulting engineer.

Ponchatoula Ice Co., Ponchatoula, La., recently acquired by new interests, has plans for an addition to ice-manufacturing and cold storage plant, 100 x 200 ft., to cost more than \$65,000 with equipment. X. A. Kramer is head.

Amarillo Producers & Refiners Corporation, Amarillo, Tex., J. W. Warthar, head, is planning construction of new oil

refinery in vicinity of Pyote, Tex., with initial capacity of about 3000 bbl. per day, to cost close to \$200,000 with equipment.

State Building Commission, Jackson, Miss., is planning a steam-operated electric power plant at Oxford, Miss., to cost close to \$40,000 with equipment. Frank P. Gates, Edwards Hotel, Jackson, is architect.

Palmer Electric Sign Co., 20 East Forsyth Street, Jacksonville, Fla., is planning installation of equipment in local building, including metal-working machinery, shears, etc.

City Council, Jacksonville, Fla., is having plans drawn for an automobile service, repair shop and garage for municipal trucks and cars, to cost more than \$70,000 with equipment. City engineering department is in charge.

Phelps & DeWees, Gunter Building, San Antonio, Tex., architects, have plans for three-story automobile service, repair and garage building, 110 x 125 ft., to cost close to \$150,000 with equipment.

Tuscaloosa Ice & Cold Storage Co., Tuscaloosa, Ala., will make extensions and improvements in ice-manufacturing and cold storage plant, including installation of additional equipment, to cost about \$50,000.

Town Council, Kaplan, La., will receive bids until Aug. 14, for equipment for municipal electric light and water plant, including Diesel oil engine with capacity from 150 to 200 b.h.p. direct-connected to electric alternator, 2300-volt, 60-cycle, 3-phase, with belted exciter and direct-driven exciter; one 500-gal. per min. direct-driven pumping unit, with starter and accessories. C. H. Brookshire is town clerk.

Texas Pipe Line Co., Houston, Tex., has awarded contract to Saigh Engineering Co., Houston, for installation of 8-in. welded pipe line from Corsicana to San Augustine, for oil service, connecting with line from Port Arthur to San Augustine. Work will include installation of booster stations and other mechanical equipment.

Gulf States Paper Corporation, Tuscaloosa, Ala., has let contract to United Engineering & Construction Co., Philadelphia, for steam power plant to cost approximately \$600,000.

Prest-O-Lite Co., Birmingham, has let contract to Smallman Construction Co., Birmingham, for new plant to cost about \$50,000.

Pacific Coast

SAN FRANCISCO, July 25.—Lok-S-Top Fixture Co., Los Angeles, has leased one-story factory, 85 x 150 ft., to be erected on McKinley Avenue, and will equip for manufacture of metal specialties, to cost more than \$25,000. General building contract has been let to Ted R. Cooper, Inc., Western Pacific Building.

Electric Steel Mfg. Co., 3334 East Slauson Avenue, Vernon, Los Angeles, has taken out permit for one-story addition.

Kenneth Macdonald, Jr., Spring Arcade Building, Los Angeles, architect, has plans for twelve-story automobile service, repair and garage building, 75 x 156 ft., to cost in excess of \$450,000 with equipment.

Municipal Light Department, County-City Building, Seattle, has engaged Joseph Wilson and Paul Richardson, Henry Building, architects, to prepare plans for two-story and basement power substation, with equipment storage and repair facilities on upper floor, to cost upward of \$450,000 with machinery.

Oregon Canning Co., Lebanon, Ore., is considering rebuilding of portion of plant destroyed by fire July 24, with loss close to \$300,000 including equipment.

F. A. B. Mfg. Co., Oakland, Cal., manufacturer of pumps, parts, etc., is having plans drawn for one-story addition to plant at Emeryville, to cost about \$24,000 with equipment. McWethy & Greenleaf, 2710 Telegraph Avenue, Oakland, are architects.

Board of Education, Escalon, Cal., has approved plans for a one-story manual arts building at local high school, to cost close to \$30,000 with equipment.

Board of Education, Los Angeles, has authorized plans for one-story manual arts shop addition at James A. Garfield High School, to cost more than \$40,000 with equipment. Architectural division is in charge.

Hill-Mills Co., Spokane, Wash., representative for Cleveland Tractor Co., has plans for one-story plant, 50 x 150 ft., to cost about \$25,000 with equipment; unit will be used for parts, repairs and other service. Wells & Bertelson, Hyde Building, are architects.

Biles-Coleman Lumber Co., Omak, Wash., has authorized plans for a one-story addition to mill to cost approximately \$200,000 with machinery.

Canada

TORONTO, July 30.—Sales for the week, while confined mostly to single tools, covered many lines of industry and were in sufficient volume to maintain the former high weekly average. While current demand is mostly for replacement, orders for two or three units are appearing for garages and automobile repair plants. Inquiries are also being received for tools and equipment for new industrial plants, and it is expected that by the first of September builders and dealers will be well supplied with orders on new works account.

Ratepayers of Oakville, Ont., have carried by-laws in favor of establishing two new industries there, namely General Metal Devices, Ltd., and General Tire & Rubber Co. Manufacturing plants will be erected immediately.

John Evans, Water Street, Galt, Ont., is preparing plans for a one-story addition to plant of Dominion Tack & Nail Co.

C. Huet, 5039 Sherbrooke Street West, Montreal, is having plans prepared for erection of a five-story cement plant, concrete and brick construction, and is interested in prices and machinery.

Fittings, Ltd., 135 Spruce Street, Oshawa, Ont., manufacturer of chain belting, etc., will build an addition to cost \$40,000.

Shawinigan Chemical Co., Shawinigan Falls, Que., contemplates following construction in connection with its plant: Transformer building, lime kiln building to cost \$270,000, addition to grinding plant to cost \$55,700, new water line on Transmission Avenue to cost \$60,000, cooling room to cost \$50,000.

C. Lloyd & Son, Wingham, Ont., will build an addition to their wood-working plant and will require machinery and other equipment.

National Standard Co., Guelph, Ont., has awarded contracts in connection with \$12,000 plant addition for manufacture of wire braid, etc.

I. T. S. Rubber Co., of Canada, Ltd., 30 Alpine Avenue, Toronto, Ont., has awarded contracts for an addition to its plant, to cost \$80,000.

Phillips Plate Glass Co., Ottawa, Ont., contemplates erection of a manufacturing plant at Regina, Sask.

Western Canada

M. Peterson, City Clerk, Winnipeg, Man., will receive bids until Aug. 13 for two main hydraulic turbines and two service turbines to be installed at Slave Falls; plans with Hydro Electric System, 85 Princess Street, Winnipeg.

Foreign

IN connection with hydroelectric power project on Dnieper River, Russia, for Soviet Russian Government, now in progress, and estimated to cost \$85,000,000 with transmission system, purchases of additional equipment will be made under direction of Col. Hugh L. Cooper,

101 Park Avenue, New York, consulting engineer. During past year machinery in amount of \$1,500,000 has been purchased, and future expenditures for final completion are estimated in excess of \$15,000,000. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency for Soviet Government.

Department of War, The Hague, Netherlands, has authorized appropriations totaling close to \$100,000 for purchase of aeronautic equipment for Netherlands, East Indies, during 1929.

Power Securities Corporation, Ltd., London, England, has secured a concession for furnishing electric light and power and water in Palestine district, vicinity of Jerusalem. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Palestine No. 281817.

Fabrique Nationale D'Armes De Guerre, Herstal, Liege, Belgium, plan to install a battery of steam or compressed air stamping hammers, of various powers, as follows: 8000, 6000, 3500, 1750, 1000 and 750 lb. Particulars on use, and respective advantages and disadvantages of the two fluids are desired, considering the alternate systems in their entirety from the boiler or compressor, as the case may be.

Aeroindustry Stratus, Stockholm, Sweden, recently organized to manufacture aircraft and parts, has acquired a factory at Kungsor, near Eskilstuna, and plans early establishment of new plant for parts production and assembling, as well as aircraft motors ranging from 80 to 450-hp. rating. Company has requested loan of National Swedish Government in amount of 160,000 crowns (about \$41,000) to provide for initial operations.

Machinery Exports Ahead of Last Year

Six-Month Total Exceeds 1927 by 13 Per Cent—Imports Running Behind the First Half a Year Ago

WASHINGTON, July 27.—Exports of machinery aggregated a value of \$43,098,072 in June, against \$44,670,652 in May. For the six months ended June 30 they were valued at \$239,760,570, against \$212,116,959 for the corresponding period of last year. In June, 1927, exports of machinery were valued at \$34,192,252. Exports of industrial machinery in June were valued at \$20,031,155—slightly under May, when the value was \$20,274,976. For the first six months, exports of industrial machinery were valued at \$109,213,866, as compared with \$100,121,242 for the first six months of

1927. For June of last year exports of industrial machinery were valued at \$15,834,223.

Exports of power-driven metal-working machinery in June were valued at \$2,358,324, against \$1,970,348 in May. For the first six months exports of this class of equipment were valued at \$12,146,706, against \$8,728,733 for the corresponding period of last year. In June of last year exports of power-driven metal-working machinery were valued at \$1,496,908.

Exports of power-driven metal-working machinery as listed in THE IRON AGE table totaled 871 units, val-

ued at \$1,479,944, in June, compared with 724 units, \$1,235,109 in May.

Total imports of machinery and vehicles in June were valued at \$2,532,494, against \$2,424,688 in May, and \$2,293,115 in June of last year. For the first six months the values were \$13,934,429 in 1928 and \$15,331,523 in 1927. Imports of industrial, office and printing machinery in June were valued at \$1,745,826, against \$1,457,391 in May, and \$1,370,498 in June of last year. For the first six months they were valued at \$8,430,630, against \$9,058,831 for the first half of 1927.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	June		Six Months Ended June 30	
	1928	1927	1928	1927
Locomotives	\$142	\$343	\$1,025	\$3,941
Other steam engines.....	97	63	549	774
Boilers	129	155	582	984
Accessories and parts.....	34	49	335	260
Automobile engines	1,117	1,023	7,993	7,136
Other internal combustion engines	1,071	558	4,311	3,525
Accessories and parts.....	378	322	1,950	1,992
Electric locomotives	85	67	1,034	531
Other electric machinery and apparatus	626	523	3,801	4,136
Excavating machinery	244	319	1,435	2,204
Concrete mixers	66	64	511	634
Road making machinery.....	313	288	1,502	1,216
Elevators and elevator mach'ry	372	434	2,147	2,470
Mining and quarrying mach'ry	1,358	920	6,913	6,974
Oil well machinery.....	1,174	1,154	6,809	9,952
Pumps	499	379	2,778	3,051
Bending and power presses.....	283	101	917	770
Forging machines	97	114	407	476
Machine tools*	1,478	916	7,372	5,466
Other metal-working machinery and parts.....	512	411	2,970	2,320
Textile machinery	1,165	1,896	6,830	11,516
Sewing machines	771	393	4,472	2,590
Shoe machinery	173	154	947	768
Flour-mill and gristmill machinery	25	39	231	234
Sugar-mill machinery	280	217	2,160	1,329
Paper and pulp mill machinery	199	248	1,704	2,243
Sawmill machinery	73	78	458	389
Other woodworking machinery	152	102	916	668
Refrigerating and ice-making machinery	819	753	3,935	3,680
Air compressors	770	512	3,474	2,976
Typewriters	1,885	1,701	11,682	10,680
Power laundry machinery.....	103	113	585	772
Typesetting machines	375	284	2,268	1,915
Printing presses	410	543	3,051	3,023
Agricultural machinery and im- plements	10,295	7,857	54,012	42,248
All other machinery and parts.....	15,528	11,099	87,694	68,274
Total	\$43,098	\$34,192	\$239,760	\$212,117

*Principal details in another table.

Imports of Machinery into the United States

(By Value)

	June		Six Months Ended June	
	1928	1927	1928	1927
Metal-working machine tools.....	\$47,447	\$36,633	\$316,938	\$280,889
Agricultural machinery and implements	333,455	439,087	2,913,216	3,563,315
Electrical machinery and apparatus.....	97,611	165,944	737,540	948,721
Other power-generating machinery.....	12,276	5,154	84,828	43,832
Other industrial machinery	1,163,176	608,651	4,810,835	4,774,677
Vehicles except agricultural	250,732	187,503	1,427,616	1,157,537
Total	\$1,904,697	\$1,442,972	\$10,290,973	\$10,768,971

Exports of Power-Driven Metal-Working Machinery

	June, 1928		May, 1928	
	No.	Value	No.	Value
Engine lathes	85	\$195,814	63	\$126,294
Turret lathes	43	92,788	60	110,497
Other lathes	42	139,257	41	140,333
Vertical boring mills and chucking machines	6	7,427	17	42,563
Thread-cutting and automatic screw machines	91	123,397	63	80,635
Knee and column type milling machines	47	116,260	22	49,293
Other milling machines.....	115	133,227	34	88,974
Gear-cutting machines	38	110,014	43	101,770
Vertical drilling machines.....	52	49,641	23	13,112
Radial drilling machines.....	15	41,837	10	21,913
Other drilling machines.....	89	81,876	72	26,231
Planers and shapers.....	44	76,082	24	63,348
External cylindrical grinding machines	88	218,415	77	202,345
Internal grinding machines.....	56	57,672	95	90,068
Metal-working tool-sharpening machines	60	36,237	80	77,733
Total	871	\$1,479,944	724	\$1,235,109

THE IRON AGE

New York, August 9, 1928

ESTABLISHED 1855

VOL. 122, No. 6

Manufacturing Expense Control at Stutz Motor Plant

BY L. A. BARON

FOR several years the Stutz Motor Car Co. of America, Inc., has used a general budget plan. Expenses are divided into different schedules, one of which is "direct manufacturing expenses." Under this arrangement department heads are held responsible for the amount of expenses on each schedule, while the production manager is accountable for all of the operating costs in the entire plant.

The tying in of actual manufacturing expenses with the budget gave us more trouble than all other schedules combined. We found it necessary to dig into history to find the reasons why our expenses were over or under the budgeted amount. Previous to the adoption of our present plan several methods of trying to hold foremen responsible for the expenses of their departments had proved unsuccessful, because each was lacking in the proper scale of measuring expenses as compared with departmental production.

Budget, Applied Jan. 1, 1928, to 36 Departments, Pays Dividends —Standard-Time Wage Incentive Plan Employed in Place of Piece Rates

Our present plan, put into effect Jan. 1, 1928, is administered by the production manager working through the comptroller. In developing the plan it was thought that if foremen were sold on the idea of spending only a certain amount for each item of expense, they would be able to keep costs within a limit set by the management. The main problem was to determine the limit, which should be sufficiently flexible to allow foremen lee-

way to operate their departments to the best advantage of the plant as a whole.

Budget Rates Based on \$100 of Payroll

Throughout 1926 and 1927 our cost department kept accurate individual expense accounts with each manufacturing department. We had a manufacturing expense ledger divided into departments and under each department was a separate account for each expense of that department.

L. A. BARON, author of this article, is comptroller of the Stutz Motor Car Co. of America, Inc., Indianapolis, a position to which he was appointed in April, 1928, after having served as budget comptroller since June, 1927. He has been identified with the automobile industry for 15 years, first in the employ of the Searchlight Gas Co., which supplied acetylene gas for automobile lighting purposes, and then, after serving in the United States Army during the war as first lieutenant in field artillery and aviation, with the Tymann Re-Manufacturing Motors Co. as auditor. Later he was associated with the Marmon Motor Car Co. as a cost accountant and in December, 1925, was made director in charge of the cost, timekeeping and pay roll department of the Stutz company. Mr. Baron is the present secretary of the Indianapolis chapter of the National Association of Cost Accountants.



March 1, all rates would be revised, the performance for January and February being taken as a basis. As a consequence, the results in March showed considerable change from the two previous months.

Weekly Reports Permit Foremen to Correct Conditions Promptly

To enable foremen to correct conditions in their departments as soon as possible the management puts into their hands a weekly report on their performance. This report, the form of which may be noted from the accompanying illustration, goes to the foreman within ten days after the close of the pay period. This "weekly budget performance" sheet contains the budget for the week, the actual expenses, and the savings or losses, with the same information cumulative for the month. The details of the department expenses are compiled and a condensed report placed before the general manager and the production manager each week. On both departmental reports and the condensed report the budget and the savings are inserted in black and all losses in red.

When the weekly reports are sent out by the management, a general letter covering the performance for the week is dispatched to all foremen. The letter gives the standing of each department for the month to date and warns all foremen to bear down on all expenses which are showing up in red on the condensed report. In fact, the foreman of any department having a net red figure for the month is asked to report to the comptroller and explain the reasons for his failure to attain a better record. These explanations, gathered each week, are written up in a general report by the comptroller, who submits it to the management with the monthly operating statements. This method eliminates the necessity of digging into past history at a later date to account for the various figures.

The plan just outlined has produced valuable results. In the best quarter of 1927, that ended Sept. 30, manufacturing expenses were 63.11 per cent of the total factory payroll, whereas in the quarter ended March 31, 1928, these expenses dropped to 51.5 per cent, a saving of 11.61 per cent thus having been effected. We estimate that the experiment in controlling manufacturing expenses has paid about

THE Budget Committee, consisting of the Comptroller, Production Manager and His Assistant, is Empowered to Revise Budget Rates to Comply with Changes in Production Procedure and Other Special Conditions. The committee also proposes names for the special monthly prize of \$25

STUTE

March 10, 1928.

Foreman Responsible John Doe

Dept. No. and Name #12 Machine Shop

Pursuant to agreement as of this date we are submitting herewith revised budget rates effective as of March 1, 1928. These new rates are based on your actual expense for January and February.

Dept. Pay Roll for Jan. \$ 12,514.96

L. A. Baron

Budget Controller

" " " " Feb. 10,080.52

Total for two months 22,595.48

Symbol	Description	Total Exp. Jan. & Feb.	Rate March 1st.
230	Re-Operations Acct. Mtl. Shortage	2.35	.01
231	Salvage Expense	161.29	.71
232	Material Losses	584.59	2.59
233	Uncontrollable Labor Losses	498.02	2.21
234	Salvaging Vendor Defects	4.00	.02
235	Idle Time	23.85	.11
236	Day Rate Guaranty (Not revised)	62.38	.12
250	Waste & Rags	18.83	.08
251	Oils & Greases	91.36	.40
252	Gasoline & Kerosene	42.72	.19
253	Perishable Tools & Abrasives	1228.69	5.44
254	Electrical Supplies	18152	.08
255	General Shop Supplies	151.07	.67
203	Foremen & Assistants	339.23	45.00 per wk.
219	Departmental Stock Handling (Feb.)	4.73	.46
222	Oilers	76.13	.34
223	Sweepers and Janitors	432.00	1.91
224	Tool Grinding	499.62	2.21
225	Lay Out work	8.09	.04
226	Set up time	16.90	.07

No.

DETAIL OF ELEMENTS COVERED

DESCRIPTION

1.

Operator picks up (3) Crankcases from floor (1) each time, place same in fixture on table of machine, tighten all bolts and clamps, advance work to cutters -- start feed.

2.

Rough and finish mill, lugs, top and bottom face, and bearing locks to size.
Note: On Sub-Operation #2, Operator finishes clamping other (2) crankcases on table, removes (2) finished parts, place on floor.

3.

Operator throws out feed, and removes other part, place on floor with air hoist, back up table to load.

STUTZ MOTOR CAR CO. OF AMERICA										FORM 348	
STANDARD TIME ALLOWANCE											
PART NAME		Cylinder block & Crankcase						PART NO.		20475	
DESCRIPTION OF OPERATION		Mill Lugs & Bearing Locks to Size 1/4"x4-5/8"						OPER. NO.		20-141	
		Mill Top & Bottom Face to Size 16-1/4" Over						DATE EFFECT.		5-25-28	
		All Length						DEPT.		12	
OBSERVED BY		H. Holman				DATE OF OBSERVATION		5-25-28		GANG NO.	
REASON FOR STUDY		Change in Fixture to Facilitate Production									
SUPERSEDES STUDY AS OF		4-28-28									
COPIES SENT TO		THIS SPACE FOR USE OF COST AND PAY ROLL DEPT.						COMPUTATION OF STD. TIME		HRS. MINS.	
PRODUCTION MGR. (COST DEPT.)		USAGE						TOTAL AVERAGE TIME PER OPERATION		67 00	
PAY ROLL DEPT. CHIEF TIME KPR.		<i>One on all models</i>						CONTINGENCY TIME PER OPERATION FOR			
FOREMAN OF DEPT.								Changing Cutters 20%		13 00	
TIME KPR FOR DEPT. NO.		STANDARD COST PER CAR						TOTAL OF TIME STUDY TIME		80 00	
		STD. TIME | HR. RATE | COST EA. | USAGE | COST PER CAR						PLUS 25% PREMIUM TIME		20 00	
		<i>100" x 60 = 100 x 1 = 100</i>						TOTAL STANDARD TIME ALLOWED		100 00	
CODE NO.		STANDARD COST DATA		FORMER PRICE		AMT. FOR -		ENTERED ON CARDS			
<i>26-153</i>		<i>1.27</i>		<i>-.07</i>		<i>2.25</i>		<i>2.25</i>			
PERSONNEL DATA						EQUIPMENT AND MATERIAL					
OBSERVED BY H. Holman						TYPE OF MACHINE Ingersoll Miller					
OPERATOR S. JAMES						RATE PER HR. .60					
OPERATOR S. NO. 12-120 MALE Male FEMALE -						MACHINE NO. 154 SPINDLES 7					
						SPECIAL TOOLS OR FIXTURES 1 - #8-2969					
STANDARD GANG PERSONNEL						Fixture to Hold (2) Crankcases					
NO. OF OPER.		MALE OR FEMALE		@ HR. RATE		NO. OF OPER.		MALE OR FEMALE		@ HR. RATE	
12-120		Male		.60							
LOCATION OF WORK						On Floor by Machine					
KIND OF MATERIAL						Cast Iron LUBRICANT USED None					
SOURCE OF SUPPLY						Delivered by Dept. Trucker					
STANDARD HOUR RATE FOR OPERATOR OR GANG						.60					
STANDARD PRODUCTION FOR 8-HOUR DAY						6.75 Pcs.					
DETAIL OF FEEDS AND SPEEDS USED											
ELM. NO.	SPINDLE R.P.M.	DIAM. OF WORK	SURFACE FEET	FEED PER REV.	FEED PER MIN.	CUTS DEPTH	LENGTH	ACCURACY REQ.	TOOLS USED		
2	22	11"	63'-0"	.119	2.625	3/16"	12'-0"	.005	2-11"x1-3/4" Cutters		
"	29	9"	68'-0"	.090	"	"	"	"	2-9"x2" Cutters		
"	22	10"	57'-6"	.119	"	"	"	"	1-10"x2" Cutter		
"	"	11"	63'-0"	"	"	"	"	"	1-11"x2" "		
"	16	18"	75'-0"	.170	"	"	"	"	1-18"x2" "		
"	59	4-5/8"	72'-0"	.044	"	"	"	.0005	1-4-5/8"x1-1/2" "		
						#1 Fixture #8-2969					
TIME OBSERVATION AND RATE ACCEPTED BY				TOOLS AND EQUIPMENT APPROVED BY TOOL SUPERVISOR				METHODS APPROVED BY			
DEPT. FOREMAN John Doe				W. E. H.				PROD. MGR. W. K. S.			
GROUP LEADER A. Brown								ASST. PROD. MGR.			
DATE 5-25-28				DATE 5/25/28				DATE 5/25/28			
								DATE 5/28/28			

EVERY Operation in Each Department Is Time Studied and the Result Transferred to "Standard Time Allowance" Sheets of the Form Shown Above. Total time-study time is made up of the actual operating time plus contingency time. To this is added 25 per cent for bonus and the total of the two is the "standard time." If with a standard time of 100 min. and time-study of 80 min., the job is done in 80 min. the operator is entitled to a bonus of 25 per cent

ON the Reverse Side of the "Standard Time Allowance" Sheets Is Recorded Detail Elements of the Particular Operation as Shown at Top of Page

65 times the investment in prizes of \$100 a month. It has required less than the full time of one clerk to keep the records.

By this method of budgeting we are controlling the following list of manufacturing expenses in 36 factory departments:

Labor and Material Losses: Reoperations on account material shortage, salvage expense, material losses, uncontrollable labor losses, salvaging vendor defects, idle time, day rate guaranty.

Shop Supplies: Waste and wiping rags, oils and greases, gasoline and kerosene, perishable tools and abrasives, electrical supplies, general shop supplies.

Indirect Labor: Foremen and assistants, production control clerical, time study, tool design, watchmen and elevator men, shop clerical, process inspection, receiving inspection, final inspection, toolroom attendants, storeroom attendants, receiving room labor, department stock handling, car loading labor, firemen, oilers, sweepers and janitors, tool grinding and sharpening, layout work, set-up time, time-keeping, cost and payroll, payroll variations.

Other Indirect: Athletic and welfare, and other miscellaneous expense.

In connection with our budget system, we are using a productive labor plan, the basis of which is standard time with a bonus for performance in less than standard time. Every operation in each department is time studied and to the time study is added a reasonable allowance for stock handling, tooling, etc., this allowance being also based on a time study observation. The allowance and the actual time added together constitute what we call "time-study time," as shown on the "Standard Time Allowance" form reproduced herewith. To the time-study time is added 25 per cent for bonus, the total of the two making up "standard time."

Each operation bears a standard hourly rate, which is the prevailing rate paid in this territory for the particular class of work being done. Standard time multiplied by the standard hourly rate gives us our standard cost.

Performance is paid for on the following basis: All jobs completed between standard time and time-study time are paid for at the standard cost. Worked out on a percentage basis, this would figure out in the following manner: If the standard time is 100 min., time-study time would be 80 min. When the job is done in 80 min., there is a saving of 20 per cent of the standard time, which entitles the operator to a bonus of 25 per cent.

All operations completed in less than time-study time are paid for on the following basis: Actual time plus 25 per cent of the actual time plus 50 per cent of the time saved between the actual time and the time-study time. For example, an operator saving 30 per cent of standard time would be paid 132.16 per cent of the standard hourly rate for the job. When the time to complete an operation is more than the standard time, the operator is paid the standard hourly rate for the time taken to do the work.

To facilitate payroll accounting we have worked out a step-rate schedule based on savings of 2.5 per cent, each saving of that amount taking a higher rate of pay. These jumps are always an incentive for operators to better past performance.

Cost Reductions Credited Against Department Expense

A 30 per cent saving in standard time lessens the cost of the product 7.5 per cent, the reduced cost reverting to the department as a credit against department expenses. A 10 per cent increase in time over standard time increases the cost of the product 10 per cent. This increased cost is charged to the department as an expense. With the foreman receiving a credit for savings and being charged up on his budget with losses, we have his constant cooperation in seeing that all operators make as high a daily rate as possible.

With this article is printed a chart showing the time-study time, actual cost and standard cost based on a standard time of 100 min. and a standard hourly rate of 60c. This plan of pay is applied to individual workers, two-man teams and gang work. The following rules govern operations paid for on a gang basis:

1. On all assembly lines.
2. On all progressive lines of operation.
3. Where the task requires the labor of more than one operator.

4. Where labor of more than one operator of a department is habitually employed to complete all department operations on a part or unit.

5. Where like workers or machines are grouped together for the purpose of performing like operations on different parts or units.

This method is now being introduced and is supplanting individual and group piece work. We are selling the idea to the employees on the basis of earnings per hour instead of price per piece. We hire our employees at so much per hour and we find from past experience that new employees coming into the shop are interested primarily in their possible hourly earnings, not in price per job. In the departments where it has been installed it is meeting with success and we are receiving the cooperation of both the operators and the foremen.

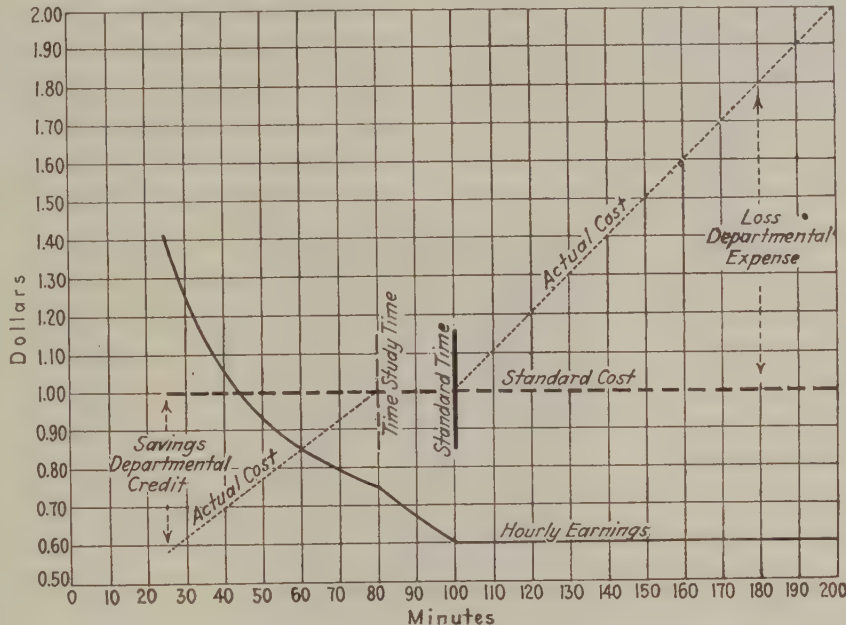


CHART Showing the Time-Study Time, Actual Cost and Standard Cost Based on a Standard Time of 100 Min. for the Operation and a Standard Hourly Rate of 60c. This standard-time wage incentive plan applied to individual workers, two-man teams, and gang work

Stainless Steel Chain to Strengthen London Cathedral

A stainless steel chain will girdle the dome of St. Paul's Cathedral, London, at the base of the famous whispering gallery, as a part of the strengthening work now in progress. The chain, which is now practically completed at Brown Bayley's steel works, Sheffield, England, has a length of 450 ft. and weighs over 33 tons.

Each link of the chain is composed of three or four solid bars 14 ft. 8 in. long. Originally a much bulkier chain had been designed by the contractors, but the steel plant was able to economize in bulk and weight.

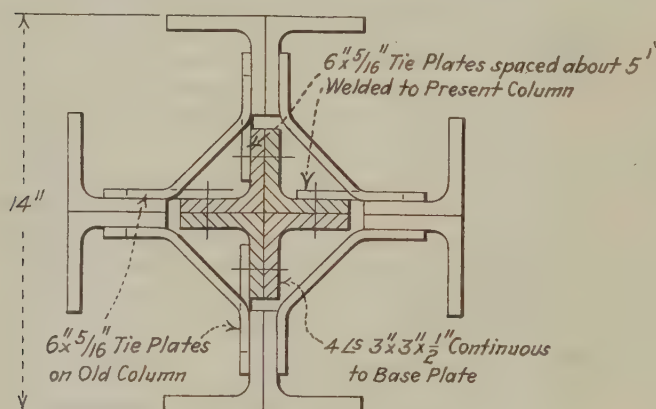
Steel Building Enlarged By Welder

Floor Area and Height Increased By Welding Reinforcements and Connecting Beams to Old Structure—
Minimum Damage to Plaster and Interior Trim

AN interesting example of how structural welding may be used to advantage when enlarging or remodeling an old steel-frame building may be drawn from work on the Rose Building, Cleveland, done by the Forest City Structural Steel Co. This six-story building was erected in 1898, and the owners intended not only to increase its ground area, but to carry the old portion up four more floors, notwithstanding the fact that the existing columns were not designed for this extra load. A further

a four-story H-column and the latter attached to it by edge welds.

The beams which carried the roof of the low section of the building were not of sufficient size to carry floor loads. To give them the necessary strength without disturbing the ceiling of the sixth floor, track rails were welded to the top flange of the existing beams as shown in one of the cuts. The flange of the rail was trimmed to $3\frac{1}{2}$ in. wide, so the upper flange of the I-beam would give the necessary sup-



Old Column Reinforced by Dropping Angle-Iron Cross Down Open Center and Welding in Place with Tie Plates

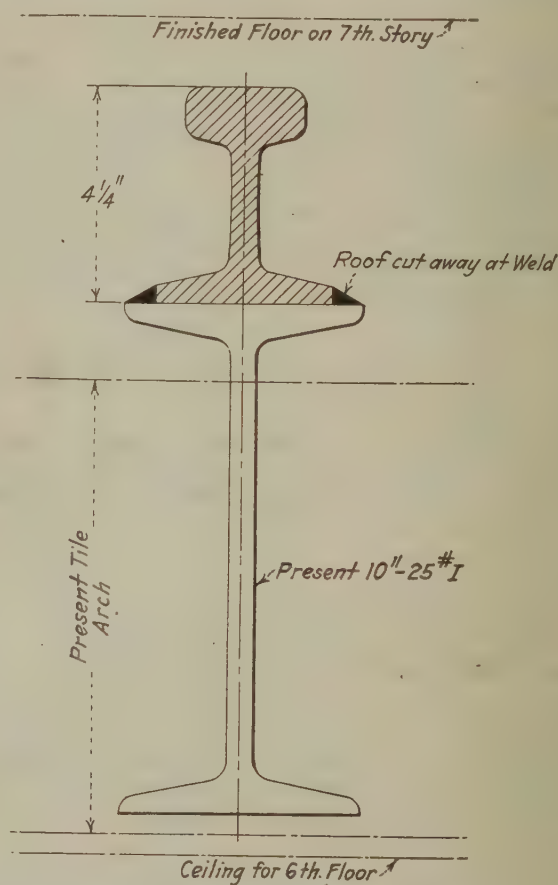
complication rested in the fact that the drawings showing the steel details had been lost.

It would have cost much money to uncover enough steel to enable joints between the existing steel and the new beams to be detailed and riveted in the conventional manner. Furthermore, tenants (mostly doctors and dentists) would have been disturbed or even temporarily dispossessed. This situation was met by uncovering only a small area of steel at each joint, measuring the connection to the new frame work, cutting a member in the field with an oxy-acetylene blowpipe, and then welding this connecting member to the exposed face of the old steel. Lincoln Stable-arc machines were used for this field welding. Most of these connections were made unknown to the tenants behind the curtain wall.

Reinforcement Placed Inside Columns

Reinforcement of the old columns was also done with a minimum of disturbance to plaster and interior finish. They are of the Gray type, made up of eight tees held together by straps riveted to the legs of the tees; thus the columns had an open center. To stiffen them and give them greater load bearing capacity, sections in the shape of a cross made up of four angles were inserted down this hollow center. The new steel was then joined to the old at five-foot intervals by plates welded to the legs of the angles and to the legs of the old tees.

A cross section of the strengthened section is shown in an accompanying drawing. To extend this column upward, it was cut off square, and a $1\frac{1}{2}$ in. cap plate welded to the supporting steel. This cap plate served as a base plate for



Roof Beams Strengthened Without Disturbing Ceiling Below by Welding Rail to Top Flange

port for the weld metal, and enable the workman to weld in the "down" position.

Welded steel bar joists are used in the new addition. These are held in position by welding the ends of each joist to the beams. The joists are tied transversely by welding a half-inch round rod to their bottom chords.

Operators were required at intervals to weld samples which were tested to satisfy requirements imposed by the local building commission.

Visual Inspection of Each Weld Insured Uniformly Good Work

By such methods the owners were enabled to receive full rentals from the old part of the building, and the tenants were discommoded to the minimum extent—either in having the interior trim of their rooms wrecked, or in being disturbed by noisy rivetting operations.

Mass Production Limited by Demand

Output en Masse Circumscribed by Restricted Markets

—Relatively Few Businesses Lend Themselves to Mass Manufacture

"THE idea that mass production is an unfailing key to wealth is a mistaken one," said Charles Piez, chairman Link-Belt Company, Chicago, when interviewed by a staff representative of *THE IRON AGE*. "The fact is overlooked that relatively few businesses lend themselves to mass production. A large proportion of the work of the Link-Belt Company, for example, is of a jobbing character, i.e., the building of equipment to meet special specifications.

"Even in industries where mass production methods can be employed, output is definitely limited by demand. To be sure, in some fields markets can be further expanded without great expense. It is no longer necessary to create a demand for automobiles. Every normal person wants to own a motor car, and it is only necessary to build one that he can afford to buy.

Lower Costs Do Not Guarantee Larger Sales

"But, because the automotive industry can cut costs and expand its market by producing en masse, it does not follow that other manufacturing lines can increase sales following a reduction in costs. In the materials-handling field, for instance, it would be absurd to assume that a price cut of a few hundred dollars would enlarge the demand for steam shovels or conveyors. Even in long established mass production industries, such as flour milling and beef packing, there are distinct limits to market expansion. As a matter of fact, the per capita consumption of flour and beef is only about four-fifths as large as before the war. The habits of the public have changed; mixed diets, including more fruit and vegetables, have replaced the former standard fare of roast beef, potatoes and bread. The gain in demand that would follow further cost reduction in milling and packing would doubtless be insignificant."

"Bituminous coal mining is another outstanding example of an industry that has a restricted market. To a large extent building, together with the industries dependent on it, is confronted with the same condition. The replacement of small buildings by skyscrapers in the Chicago Loop district is definitely limited by the area available. Granting that such construction will continue outside the present Chicago business district, it is doubtful whether the rate of replacement will be so rapid, with the advantages of central location lacking.

"The fact that output cannot be increased ad libitum is often overlooked in mass production industries. The economies from large-scale output are a constant temptation to

increase production first and worry about sales afterward. Efforts to sell goods in excess of consumption have added very considerably to the costs of marketing. In most industries, including those outside of the mass production field, distribution has become a major problem. In our own

company we have been conscious of a decided increase in the cost of selling in the past few years.

"Selling programs of the future must encompass a more scientific study of markets. Merchandising must be made more effective. Futile efforts to overcome the insurmountable must give way to the more intelligent cultivation of markets that can be captured. If building were declining, it would be foolish for a maker of shovels to try to increase his sales by an extensive advertising campaign. No advertising expenditures that he could make would succeed in reversing an economic trend.

Ineffective Merchandising Sometimes Handicaps a Whole Industry

"Lack of effective merchandising frequently causes a manufacturer or a whole industry to lose ground. The steel industry was among the first to develop mass production, but it now finds its market limited to a greater extent, in all probability, than would have been the case if its merchandising problem had received the same attention that was given to operating technique. It is now clear that the steel mills permitted the cement industry to outgeneral them in aggressively promoting the use of reinforced concrete.

"The problem of getting products to the ultimate users is not solved by high-pressure selling that merely moves goods from manufacturers' warehouses

to secondary hands. Goods must be wanted by the final buyer. Sales departments should make a careful research of markets before, and not after, production programs are inaugurated or plant expansion is undertaken.

Surplus Capacity Dictates Greater Cooperation

"While market study can be profitably pursued in all lines, the fact remains that most industries have surplus capacity and should control their output accordingly. Our own company could build more than it can sell, but, if it did so, it would be in red figures.

"There is no question that the Government must permit greater cooperation among competitors, particularly in those industries where excessive production not only wipes out profits but threatens their very integrity. Trade associations have done much by distributing information regarding consumption, sales and production. When sales are declin-



"THE idea that mass production is an unfailing key to wealth is a mistaken one. Relatively few businesses lend themselves to mass production, and even where mass methods can be employed, output is definitely limited by demand."
CHARLES PIEZ.

ing there is less temptation to slash prices if a company knows that it is holding its customary share of the total business done. The leavening effect of the trade association has been supplemented by the good work of the Department of Commerce in promoting economies through standardization and simplification.

Consolidation Only Alternative to Cooperation

"The only alternative to greater cooperation is consolidation. Mergers are desirable among companies making the same or closely allied goods, especially products sold by the ton. There is little doubt that if one company owned all the steel plants in this country steel could be sold more cheaply. When a great number of varieties of products are made, consolidation is less advantageous. Even in the case of such plants, mergers are sometimes economic. In 1906 three companies having much the same owning interests consolidated into the present Link-Belt Co. This merger benefited both ourselves and our customers. One management replaced three, a single branch office sufficed where two were formerly needed, and advertising expenditures, although double those of any one of the three merged companies, nevertheless fell below the previous combined outlay.

"The attitude of the general public toward mergers and trade associations has changed. It is no longer feared that prices will be raised to an unduly high level. Expansion of business can come only with the improvement of products and further reduction in costs. Extortionate prices would be an invitation to enterprising capitalists and executives to enter the field. Moreover, the stamping out of competition would probably result in Government control, an eventuality that industries seek to avoid. Nor is inter-industry competition to be forgotten. Excessively high prices in certain fields would tend to divert business to other industries.

Dominant Group of Stockholders Desirable in Large Company

"Consolidations, in my opinion, are well worthwhile in the automobile industry. In some other fields it is conceivable that mergers might become so large as to be unwieldy. Large companies with ownership widely diffused always run the risk of supplying insufficient incentive for progressive management. American stockholders are singularly apathetic, and there are distinct disadvantages in the impersonal touch of a hired management. I have always believed in the responsibility of stockholders. In a large organization it is desirable to have a group of stockholders dominating the company, such as the DuPont interests in the General Motors Corporation. Where there are no dominant owning interests it is well to encourage the management to acquire a real stake in the form of stock or a percentage of the profits. Profit-sharing is criticised because it tends to foster a driving type of management that fails to build up proper reserves or to keep plant and equipment in up-to-date and good working order. A similar self-interest manifests itself in piece-rate work, but just as the piece-rate method of wage payment calls for closer inspection of the product, so must a profit-sharing management be under closer control of the board of directors.

There Is No Fixed Buying Fund

"The problem of production, of course, is intimately connected with the problem of consumption. The development of new products and new uses for products brings about additional employment and greater purchasing power. There is no fixed buying fund. It is wrong to assume that the public has only so much to spend and that the fight is for the buyer's extra dollar. If you can create a new demand, the necessary buying power seems to be there.

"While this is broadly true, it should not lead to a misconception of the significance of the wage problem. The employer's responsibility to his workmen consists in pro-

viding them with steady work, under sanitary conditions, at the best possible wages. But to those who have to meet 52 payrolls a year, in the face of keen competitive conditions, the responsibility is by no means a light one.

Rise in Wages Has Been Natural

"In our industry and industries allied with it we have not consciously raised wages to maintain or increase the purchasing power of labor. Wages have had a natural rise. In 1914, when Ford raised wages of common labor to \$5 a day, he did it because he had an unlimited market and needed greatly expanded production. During the war and in the post-war period opportunities for higher wages appeared and, no doubt, did much to improve the relations between management and labor. It became clearer that employers and employees have a common stake in industry and that their fortunes rise and fall together. Management has generally accepted the view that wage reduction should be the last step in any business recession. It has, therefore, concentrated its attention on reducing labor costs through the increased use of labor-saving equipment. Such equipment was not introduced to raise the wage level; rather wages rose first and industry then set out to beat them—not by wage cuts, but indirectly through better methods and improved machinery.

Scientific Research of Prime Importance

"Economies in manufacturing have been forced by the high labor market and, naturally, have been prompted also by a desire to expand markets. Such great progress has been achieved in the development of more efficient methods and equipment that manufacturers have come to realize the prime importance of supporting scientific research in an effort to find new short cuts in cost reduction.

"The emphasis on lower costs has been matched by the attention given to financing buying. It is safe to say that the time on instalment payments on automobiles has been doubled in the past few years, thereby enabling many thousands of people with smaller incomes to purchase cars. Consumer purchases of mass production goods may be adversely affected by the decline in our stock of gold and recent advances in interest rates. Human nature must be considered in this connection, however. The check on instalment buying may be like the attempted check on brokers' loans. In other words, obstacles are often ineffective when a man wants something.

"The general effect on business of the outflow of gold cannot be appraised at this time, but it is not an unreasonable assumption that the return of the metal to countries that have long had a deficient supply will bring about a steadier and stabler world money market, to the ultimate benefit of this country."

"Zeolite Water Treatment" is the title of a reprint issued by the Department of Engineering Research, University of Michigan, Ann Arbor. The paper was read before the American Water Works Association. It is devoted to a water treatment system used in the heating plant of the Detroit Edison Co. The conclusion is that the system operates satisfactorily under careful supervision and that it is reasonably safe. The use of phosphoric acid gives less carbon dioxide in the steam and less caustic alkalinity in the boiler. It is believed that this phosphoric acid will eliminate scale in the tubes of the boiler.

"A Little History of Marking Devices" is the title of a 24-page pamphlet of unusual type issued by the Noble & Westbrook Mfg. Co., Hartford, Conn. The booklet illustrates a large number of nationally known trademarks, classifies the types which may be registered and tells how they may be attached to the various articles of consumption. Copies of this booklet may be had undoubtedly on request.

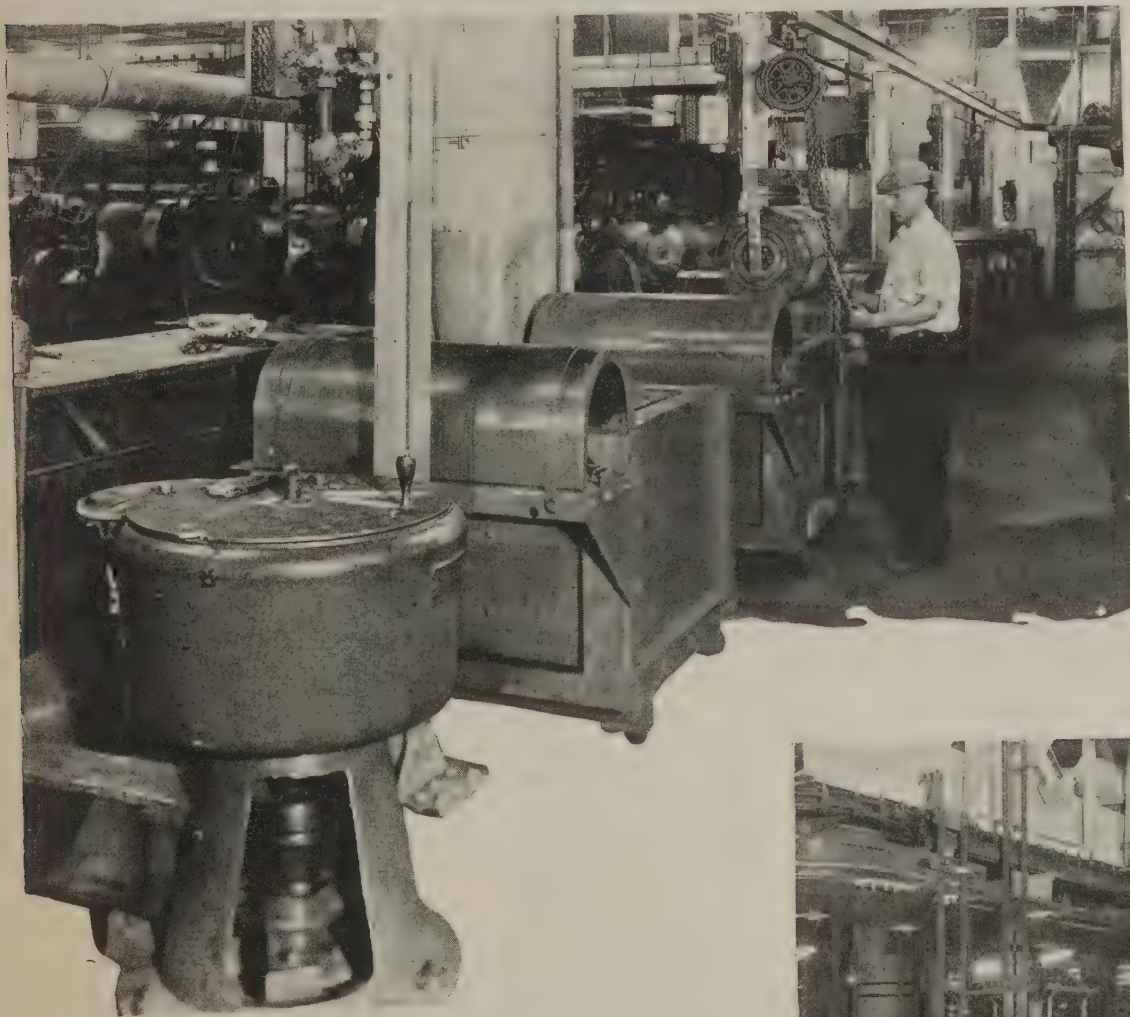
Automatic Cadmium Plating

After Brake Bands Are Racked and Placed on Hangers,
Further Passage Through Washing and Plating
Baths Is Entirely Automatic

BY FAY LEONE FAUROTE*

DEMAND for automatic plating has come naturally with mass production of exposed machine parts needing a protective or ornamental covering—especially from the automotive industry. Here beauty of ex-

In the old way of doing things this section of the manufacturing gamut was usually relegated to an outside shed with a dirt, cinder or slat floor. The place was often wet, the ground damp, the air full of unpleasant fumes. The



At Left—Semi-Automatic Equipment for Plating and Washing Small Parts

Below — Revolving Telescope Arms Above Conveyor Lift Hangers from Tank to Tank

ternal appearance vies with long life of the mechanism in the race for sales supremacy. Stainless steels and protective coatings have been so widely used in other industries that motor car manufacturers have been forced to adopt better and more permanent methods of rust prevention. Most automobile parts subject to oxidation and apt to have their efficiency impaired are now being covered with copper, brass, nickel, chromium or cadmium.

Automatic Equipment Makes for Neatness

Among the several interesting machines recently introduced into the Ford Motor Co. shops for manufacturing Model A is a battery of automatic cadmium plating tanks served by a combined automatic mechanism and conveyor. Virtually continuous, this new apparatus eliminates to a large extent the human uncertainties and incidentally the messiness of this operation.



*Mechanical engineer, New York.

metal parts were laboriously hung on hooks or racks and immersed singly or in groups in the various washing and plating solutions. At the end of the proper time (and that time was apt to vary according to the trustworthiness of the workman) the parts were again laboriously removed, one by one, carried dripping to the next tank, immersed again, pulled out and finally hung on a dripping rack where they remained until they were ready for transfer to the stockroom or to the buffing department. Many times there were not enough parts in any one batch to make it worth while for the foreman to rig up a wooden draining, plating or washing frame. Bent wires and wooden racks, wooden crossbars and grimy tanks combined with a crude switchboard in an entangling maze of wires—such was the old equipment. It was also necessary to truck parts from the machine shop to the polishing, plating and buffing rooms.

How different the modern automatic plating department! True, there still remain some of the old earmarks, but the job is no longer a messy one. No more need it be segregated. No more need the floors be running sewers, the workmen slushing around in rubber boots. Automatic plating tanks and mechanism may be put in or near the process line without greatly interfering with the work going on around it. Like heat treating, it may become part of a straight line of production.

Cadmium Plating Requires Four Tanks

The equipment shown has recently been installed in the Fordson plant for cadmium plating Model A brake shoes. It includes four main tanks: 1, the electric cleaning solution; 2, the first water rinse; 3, the cadmium electroplating tank proper; and 4, the hot water cleaning or rinsing tank.

The parts in groups of ten are hung on the suspension frames, which frames in turn are placed on conveyor hangers in pairs. Loading and unloading is done when the hangers are down between the tanks in the left foreground. Passage through the process is thereafter continuous and automatic. To get from the loading position and from tank to tank, a slowly revolving telescopic arm, whose end is guided around a rectangular path, picks the hanger off the supporting conveyor fingers, lifts it straight up, carries it forward in this elevated position, and then lowers it down again on the forward-moving conveyor, whereupon the work is submerged in the next solution.

This unique mechanical device eliminates the necessity for manual handling and makes the dipping a purely mechanical movement, performed in tempo and at a definite speed so that each operation is given just the right amount of time for its adequate performance. The first tank, shown in the left foreground, in which the parts remain suspended 2½ min., contains a cleaning solution of tri-phosphate of sodium, soda ash, caustic soda and a little sodium cyanide.

Electric Bus Bars Overhead

When submerged in this bath an electric potential is impressed on the metal parts to facilitate the chemical action. A bus bar will be observed just below the conveyor. Each hanger has a contact brush connected with spring clips, to make good contact with the bus bar during this portion of its travel. Naturally the hangers are attached to the casting at top by insulated bolts, so the passage of current will be from overhead bus, through hangers to work, and thence from work to contacts submerged in the tank.

While the brake shoes are in the cleaning tank the conveyor passes around the end wheel and travels from left to right at the rear. Reaching the second tank (not clearly shown at the rear) the hangers are lifted up automatically over the partition and down again into a wash solution.

This second tank contains circulating water and the rinsing operation requires 1½ min. The third tank, in which the parts remain suspended 21 min., is the main electroplating bath. It is a wide long tank in which the brake shoes remain submerged during the most of the trip from left to right (at the rear) and return. During this time the

brushes on the hangers are in contact with a bus bar, impressing the required potential on the submerged parts. The solution used for cadmium plating is composed of cadmium oxide, sodium cyanide, caustic soda and corn syrup.

The fourth and last tank is a hot water rinse, requiring 1½ min. The whole process consumes a total of 25 min.

This plating machine has a capacity of 3080 pieces an hour. Three men are required to operate it and it is estimated that by its use the labor of fifteen men per day is saved. Direct current at 6 volts is used, 20 amp. per sq. ft. of plating surface being required. A 5000-amp. generator set is located in an adjoining room.

Small Parts Handled in Tumbling Barrel

For very small parts which cannot be readily handled on racks a different method is employed. They are loaded into perforated copper buckets; given an "in and out" in a cleaning solution; immersed in hydrochloric acid for two minutes and then emptied into a revolving wooden barrel which, by means of an overhead trolley, is brought over the plating bath, immersed, and revolved for 20 min. in the plating solution. Finally the parts are emptied into a centrifugal dryer, the cadmium solution washed off and live steam is turned on for a 1 min. drying operation, after which they are dumped into containers for conveyance to the stockroom. The cathode placed inside of the barrel comes in contact with the work to be plated as it revolves. The tumbling barrels are made of wood, pierced with ¾-in. holes which allow the flow of the electric current and chemical solution from the anodes outside to the cathodic parts inside. This method is used for plating nuts, bolts and other small articles. It is estimated that this method costs hardly one-tenth of the old method in labor and materials.

In the photograph the centrifugal dryer is shown in the left foreground, while in the middle background a workman is seen preparing to immerse the revolving drum containing the parts into the plating solution. These operations, of course, are not continuous nor fully automatic, but are an adaptation which efficiently plates small parts.

Activities of American Engineering Standards Committee

According to the 1928 Year Book of the American Engineering Standards Committee, it costs \$41,500 in salaries and \$20,000 in expenses to conduct the committee's activities. This amount is raised from dues of 29 member organizations and contributions from 340 sustaining memberships. These figures represent a slight growth from the report for 1927.

Work is in progress on 164 projects, of which 54 were instituted during the fiscal year. Some 29 new standards were finally approved in the 12 months, bringing the grand total of American engineering standards to 111. Among those approved last year are a table of preferred numbers (a scientific basis of sizes for series of machines), standards for pipe flanges and fittings, for bolts and rivets, and safety codes for prevention of dust explosions.

Certain changes have been made in the procedure of committees, designed to expedite the work and to secure assent of all the groups concerned in the project under consideration. A change in name is also under contemplation, as noted in *THE IRON AGE* for July 12, page 84.

Laboratory investigation on the creep of metals at high temperature done during the year past in England at the National Physical Laboratory indicates that an increased chromium percentage (40 instead of 20) proved an advantage for high temperature use; at 800 deg. C. failure occurred mainly by cracking. Of the Ni:Cr:Fe alloys the proportions 25:25:50 have so far given the best results under prolonged loading at 800 deg.

Wide Ramifications of Shipbuilding

Calls for Materials Made on Nearly All Industries
—Benefits to Come with American
Merchant Marine

WITH practically every industry in the United States in line to be benefited, building up of a privately owned first-class American merchant marine comes nearer realization under the recently enacted Jones-White law than at any previous time during the present generation. Already negotiations looking to loans to private operators are being considered, while contracts have been completed for carrying the United States mails.

That the new law means much to American industry is accepted by the highest authorities, who are deeply interested in the restoration of an adequate merchant fleet within the keeping of the requirements of the nation, for carrying on its immense export and import trade. Indicative of this fact are the views expressed to THE IRON AGE by H. G. Smith, vice-president Bethlehem Shipbuilding Corporation, Ltd., and also vice-president and treasurer of the National Council of American Shipbuilders. Mr. Smith was one of the prominent witnesses who appeared before the House Committee on Merchant Marine and Fisheries at Washington in connection with hearings on the Jones-White measure.

"The Jones-White merchant marine act is the most constructive piece of merchant marine legislation that has been enacted within my recollection," Mr. Smith told THE IRON AGE. "While the act may not accomplish every-

thing necessary to establish a permanent American-owned, American-built merchant marine in the foreign trade, under private ownership, it is nevertheless a very important step in that direction.

Act to Save Shipyards from Stagnation

"In the first place, the act reasserts a policy backed up by a large majority vote in both houses of Congress, and further supported by a provision for long-term mail contracts for speeds of 10 knots and upward. The provision, together with a liberalization of loans, both as to the amount of the loan and the rate of interest, will make it possible for the private steamship owner to adopt a constructive program for operation, and to provide for the building of new tonnage. That some vessels will be built this year as the outcome of this merchant marine act seems assured, and this assurance is necessary to save the private shipbuilding industry of the United States, which is now at its lowest ebb within the history of modern steel ship construction.

"The Jones-White act is a notification to the world that we propose to carry a reasonable proportion of our world trade in our own vessels, built in American shipyards."

To show the stimulus which American industry will receive from shipbuilding, Mr. Smith cited the break-

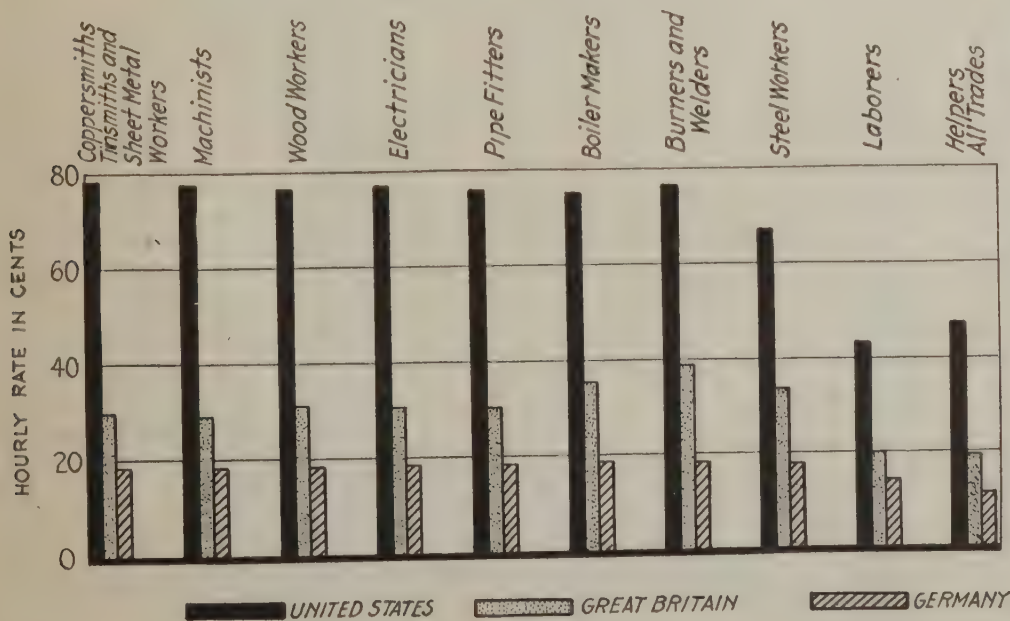
down cost of a 10,000-ton freight steamer as follows:

	Per Cent
Material	50.20
Labor	39.94
Insurance fees, taxes and depreciation	5.36
Freight	4.50

The percentages will be about the same for a motor vessel if the Diesel motors are constructed at the shipyard.

The foregoing percentages show that, for every \$1,000,000 spent in the building of a new vessel, \$502,000 is for materials—ordered from practically every industry in the United States. Analysis of the material distribution of a vessel built at one of the large shipyards shows that practically every State in the Union participates in the material required. Mr. Smith said that the rolled iron and steel in a ship is probably not more than 20 per cent of the total material cost. But, even on such a basis, the iron and steel in a \$1,000,000 ship would reach a value of \$104,000, and, with only a fair activity in shipbuilding, such sums when aggregated would reach substantial proportions. They certainly would mean much to heavy rolled lines, including plates, shapes and bars, as well as other products, and be an important influence in the market.

Other materials would consist of copper, tin, zinc, lead, lumber and allied products; textiles and their products, rubber products, leather,



COMPARATIVE Wage Rates in Three Countries, Showing the Handicap under Which American Shipbuilding Labors in Competition with European Ships Built at Lower Costs. It may be noted particularly that the American laborers are more highly paid than the skilled labor of Great Britain and Germany

electrical products, stone, clay and glass products, all of the elements entering into auxiliary machinery, running through the entire gamut of material down to miscellaneous hardware and food supplies. The machinery requirements would be appreciable, stimulating the machinery trade, as well as iron and steel requirements for their manufacture, and, in turn, lines entirely out of the iron and steel and machinery trade would require this class of equipment in supplying shipbuilding and ship-operating needs.

"The provisions of the bill," said Mr. Smith, "are such that new construction seems certain. This construction will be carried out in American shipyards, and over one-half of the stimulus given to every ship built is a stimulus to nearly every branch of American industry."

How Cost of Large Liner Would Be Distributed

Mr. Smith cited an assumed cost of \$15,000,000 for a passenger vessel of a type necessary to supplement the Leviathan, George Washington, and other leading vessels of the United States lines. Only about 39 per cent of the total cost of building such a vessel, it was explained, will be expended within a shipyard; 5.6 per cent for taxes, insurance and depreciation; 4.6 per cent for freight, and the remainder, 50.8 per cent, for material ordered by the shipbuilder from supply people throughout the country.

Taking the manufacture of steel as an example of this distribution, it

was explained that the shipbuilder pays for this steel as a finished material. The steel maker and supplier of raw materials, however, in producing this steel pay about three-quarters of its total cost to labor. Involved in the manufacture of steel is the purchase of ore, limestone, coke, scrap and miscellaneous materials purchased from various parts of the country, and each of these raw materials involves the purchase of other materials and employment of labor.

Also, said Mr. Smith, in the manufacture of any one of the products in any State, a further breakdown into labor and material will occur, with still further requisitions on other States for raw materials used in the manufacture of such product. The transportation of each of these products to the shipyard requires the services of railroads. Ten per cent of the total cost of construction of a vessel goes to the railroads to pay the transportation charges on materials ordered directly by the shipyard or equipment manufactured by independent contractors. Hence, transportation charges of approximately \$1,500,000 would be paid to the railroads in the construction of a vessel of the value of \$15,000,000.

Labor Gets Seven-Ninths of Total Cost

Of the total cost of \$15,000,000 for such a vessel, it was explained, the shipbuilder expends 39 per cent for labor in the shipyard, and the steel-maker and the suppliers of raw materials used in making steel about 79 per cent of the total cost of steel for

labor. Railroads expend about 41 per cent of the total amount of the freight bill for labor, and every other item of material involves the payment of a correspondingly large percentage of its cost for labor. An exclusive material charge does not exist, except for the intrinsic value of the ore in the mines, lumber in the forest, products of the field and profits to manufacturers.

"The net result," Mr. Smith said, "is that of the total cost of this \$15,000,000 ship, about 78 per cent goes to American labor, composed of almost every known craft, involving a total labor cost of about \$11,700,000, or 2,340,000 days work, or the employment of 7800 workmen at \$5 a day for one year, or 2600 workmen for three years, which is approximately the time required to build this vessel."

Materials Needed to Build a Freighter

The value of material required for a 10,000-ton steam cargo ship and purchased direct by the shipyard was placed at \$736,500, while the freight charges were fixed at \$70,000. Among the items listed and their values were the following: Rolled steel and rivets, \$201,500; sheet steel, \$1,820; sheet brass, \$440; sheet lead, \$200; cast steel, \$23,200; cast iron, \$38,700; cast brass, \$37,400; forgings, \$36,100; steel and iron pipe, \$6,550; brass and copper wire, \$15,800; lead pipe, \$800; valves, \$8,460; pipe fittings, \$4,850; hardware, \$2,200; wire rope, \$5,100; wire and conduit, \$4,100; galvanizing (zinc), \$13,000; generators, \$14,600; boilers, \$113,300; engine room auxiliaries, \$60,130; deck machinery, \$92,000.

Blast Furnace Capacity Declined in 1927

Loss of 3.4 Per Cent Brought Total to 49,605,720 Gross Tons—588,900 Tons Added This Year

TOTAL annual capacity of blast furnaces in the United States producing coke pig iron decreased 1,773,680 gross tons, or 3.4 per cent during 1927, according to the annual statistical report of the American Iron and Steel Institute. Total theoretical capacity, as of Dec. 31, 1927, stood at 49,605,720 gross tons, but three furnaces then under construction have since been completed, making the total as of Aug. 1, 1928, 50,194,620 gross tons. This figure does not include the capacity of 54 coke furnaces "which have long been idle or are likely to remain long inactive," and is based on the possible output of 300 furnaces. This is an average of 165,352 tons annually and indicates an average daily capacity per furnace of 453 tons.

Greatest losses of capacity were evidenced in Pennsylvania, Ohio and Virginia, the figures having been 1,254,100, 430,600 and 374,000 gross tons respectively. New Jersey and Missouri are each shown with no capacity in the 1927 analysis, but had 300,000 and 90,000 gross tons respec-

tively in the previous year. Large gains were shown in Indiana, Alabama and West Virginia, the figures being

291,200, 278,670 and 175,000 tons, respectively. Since the first of the year two new furnaces have been added in Alabama, bringing additional capacity there of 413,900 tons.

Detailed figures are shown in the accompanying table taken from the Institute's reports for the last two years.

ANNUAL CAPACITY OF COMPLETED AND BUILDING BLAST FURNACES BY STATES ON DEC. 31

	(Does Not Include Charcoal Furnaces)		Annual Capacity		Net Change, Tons
	Number of Furnaces	1926	1927	(Gross Tons)	
Massachusetts	1	1	175,000	140,000	+ 35,000
New York	25	26	3,595,800	3,781,000	+ 185,200
New Jersey	2	3	300,000	300,000	— 300,000
Pennsylvania	115	123	16,728,050	17,982,150	+ 1,254,100
Maryland	6	6	1,112,400	1,020,000	+ 92,400
Virginia	15	17	142,000	516,000	+ 374,000
West Virginia	5	5	760,000	585,000	+ 175,000
Kentucky	5	4	240,000	236,000	+ 4,000
Tennessee	10	11	180,000	314,000	+ 134,000
Alabama	33	33	3,577,170	3,298,500	+ 278,670
Ohio	69	69	11,299,000	11,729,600	+ 430,600
Indiana	18	18	4,399,200	4,108,000	+ 291,200
Illinois	26	26	5,171,600	5,048,650	+ 122,950
Michigan	4	4	665,000	665,000	—
Wisconsin	5	5	386,000	386,000	—
Minnesota	3	3	444,500	444,500	—
Missouri	2	2	90,000	90,000	— 90,000
Colorado	5	5	600,000	600,000	—
Utah	1	1	130,000	135,000	+ 5,000
Total completed	(b) 351	(c) 363	(d) 49,605,720	(d) 51,379,400	+ 1,773,680
Total building	3	2	588,900	302,750	+ 286,150
Grand total	354	365	50,194,620	51,682,150	+ 1,487,530

(b) Includes 54 coke furnaces which have been long idle or are likely to remain long inactive, the capacity of which is not included, as follows: New Jersey, 2; Pennsylvania, 15; Virginia, 11; Kentucky, 2; Tennessee, 6; Alabama, 5; Texas, 1; Ohio, 8; Wisconsin, 2, and Missouri, 2.

(c) Included 29 furnaces long idle, the capacity of which is not included, as follows: New Jersey, 1; Pennsylvania, 5; Virginia, 5; West Virginia, 2; Kentucky, 2; Tennessee, 4; Alabama, 3; Texas, 1; Ohio, 3; Wisconsin, 2, and Missouri, 1.

(d) Does not include annual capacity for ferromanganese, spiegeleisen, ferrosilicon and other ferroalloys, nor capacity of coke furnaces long idle or not likely to resume operations in near future.

Mileage Rates May Apply to Steel

Report to Interstate Commerce Commission Recommends
Revision Based on J. & L. Scale—Some Reductions,
but New England Rates Would Be Higher

WASHINGTON, Aug. 7.—A new set of railroad freight rates on iron and steel for the northeastern part of the country has been recommended for adoption by the Interstate Commerce Commission by Howard C. Faul and C. M. Bardwell, examiners on the staff of that body. They recommend it for "the removal of undue prejudice and undue preference."

If their recommendation is approved by the Interstate Commerce Commission, rates will be made in accordance with mileage scale that will force the steel industry to adapt itself to many new conditions.

Assuming that the rates from Pittsburgh to Chicago, from Chicago to St. Louis, from Pittsburgh to New York and from Chicago to New York are of prime importance, the effect of their recommendation is shown in the following summary:

The present rate of 34c. per 100 lb. from Pittsburgh to Chicago will remain unchanged. The present rate of 22c. from Chicago to St. Louis will be raised to 26c. The present rate of 34c. from Pittsburgh to New York will be reduced to 33c. and the rate from Chicago to New York will be cut from 56.5 to 47c.

Ohio Short-Haul Rates in Discard

These recommendations are the result of a lumping together of seventeen formal docket complaints and investigation docket cases created largely by the commission's decision in 1925 in the Jones & Laughlin complaint. One complaint was made against the so-called short-haul rates in Ohio, maintained by authority of Ohio law, to move steel from one plant to another in the steel producing territory. Adoption of the Faul and Bardwell recommendations would put the Ohio rates into the discard.

Parties interested were notified, when the report was served on them, that they would have until Sept. 15 to file exceptions to the recommendations and that replies to the exceptions would have to be in hand not later than Oct. 1. Those dates are taken by those familiar with the practices of the rate body as indicating arguments on the subject late in October or early in November.

This report was made in a general investigation under the Hoch-Smith resolution, the legislation enacted in January, 1925, in which Congress told the rate body to give a preference in freight rates to agri-

cultural products on account of the "existing depression." The commission gathered the objections to the J. & L. scale into one bunch and called the combination a Hoch-Smith resolution investigation. There are nearly a dozen of such investigations, each intended to give the regulating body such a view of rates that it may pick out the commodities upon which higher rates may be imposed to the end that rates on agricultural products may be lowered.

All the testimony and the arguments revolved around the J. & L. scale. The examiners reported that, as a whole, the steel industry was prosperous, or at least not in a depression.

There is no estimate as to the money effect the adoption of the mileage scale would have upon the railroads. Men who have been working on the case estimate that rates made in accordance with the new scale would deprive the railroads of about \$2,000,000. That would be a small sum in relation to the immense revenue the railroads derive from iron and steel in the northeastern part of the country.

Only domestic rates are covered by the report. The railroads took the export rates out of the case when they reduced the export rates to Atlantic ports to the basis of 60 per cent of the domestic basis.

The examiners recommend the abolition of differentials, port and Michigan, and of bridge arbitraries. Abolition of the port differentials, they figure, will mean little as the export rates are not involved. Port differentials were devised so as to equalize exports regardless of which port the exporter used.

Michigan differentials were devised about 10 years ago when class rates were revised in that part of the country between the Buffalo-Pittsburgh line on the east and the Mississippi River on the west, on account of the light traffic in Michigan north of Detroit. Steel took the differential adjustment because it moved and still moves generally on fifth class rates.

This scale is a specific scale not definitely related to any class rate. Therefore the examiners say there is no need to take care of light density traffic areas.

Higher Rates for New England

New England is to be the only part of the northeastern section that is to have rates on a higher level. Rates

into New England are to be 10 per cent higher than the rest of the section involved. Rates into and out of New England are to be on the scale. That will mean a healthy boost in rates now held down by the so-called wire list.

Another rise in rates is to take place in the low-rated section of western steel territory, particularly the district between Chicago and St. Louis. The group adjustment which shippers and railroads agreed upon to settle the turmoil created by the J. & L. scale is to be broken up and straight mileage applied. Under the J. & L. scale the railroads could have made the rate between Chicago and St. Louis 24.5c. The violent objections by the shippers forced the railroads to forego what they were privileged to take. Now the examiners say the railroads should be authorized to take more than the J. & L. scale would have given them.

Shippers Asked for Reductions

The railroads opposed any reduction in their revenues. All the shippers asked for reductions. Some of their proposals, if adopted, would cut heavily into the revenues of the railroads.

The Faul and Bardwell scale uses the J. & L. scale initial rate as its point of departure, but beyond the first block and up to and including 70 miles it is half a cent lower than the J. & L. scale. Between 70 miles and 500 miles it is in excess of that scale, the excess ranging from a half to a whole cent per 100 lb. For distances in excess of 500 miles, the new scale is lower than the one ordered in the J. & L. case. At 600 miles, the new scale calls for a rate of 38c., while the J. & L. rate for that distance is 40c. At 700 miles, the new scale rate is 41c. and the J. & L. rate 45c. At 1000 miles, the new rate is 50c. and the J. & L. rate 60c.

Only a limited amount of grouping of rates at points of origin and destination will be permitted. No origin points may be grouped on traffic going less than 150 miles. No destination groups will be allowed on traffic going less than 450 miles. Groups 20 miles wide may be established in accordance with the practice in making class rates in the central territory. The scale itself also permits limited grouping.

The abolition of bridge differentials at Ohio and Mississippi crossings will mean little because there are no out-

standing differentials on iron and steel except at Louisville. There are differentials on some iron and steel articles at St. Louis.

No attempt is made in the report to deal with the New York harbor situation. That situation is to be dealt with in the Eastern Class Rate Investigation, now pending.

Special Provision for Cast Iron Pipe

The iron and steel list is left as it stands although special provision is proposed for cast iron pipe and annealing pots. On account of the strong competition of Southern pipe foundries, the examiners say that where rates in the North and East have been made especially on account of that competition they are to be continued. As to annealing pots, they say the rates on them should not be any higher than on ingot molds. They said that nothing in the record warranted any change in the minimum carload of 36,000 lb. The actual loading, they said, averaged nearly double that figure. An increase in the minimum they said would seriously affect the jobber and small fabricator without increasing efficiency in the use of railroad equipment.

Faul and Bardwell said the record left no doubt about the desirability of a thorough revision of the rate structure. They said both shippers and railroads alleged or conceded that the present rates lacked uniformity, were

full of inconsistencies and resulted in prejudice and preference.

No transportation conditions between New England on the east and the Mississippi River on the west, they said, warranted a difference in the rate level. They said that every proposal submitted, although they differed widely as to the rate level, was designed to remove inconsistencies and to produce a more harmonious rate structure.

The mileage scale recommended by the examiners is as follows:

(Rates are in cents per 100 lb.)		
5 miles and under	.....	6
10 miles and over	5.....	6.5
15 miles and over	10.....	7
20 miles and over	15.....	7.5
25 miles and over	20.....	8
30 miles and over	25.....	8.5
35 miles and over	30.....	9
40 miles and over	35.....	9.5
45 miles and over	40.....	10
50 miles and over	45.....	10.5
55 miles and over	50.....	11
60 miles and over	55.....	11.5
65 miles and over	60.....	12
70 miles and over	65.....	12.5
75 miles and over	70.....	13
80 miles and over	75.....	13.5
85 miles and over	80.....	14
90 miles and over	85.....	14.5
95 miles and over	90.....	15
100 miles and over	95.....	15.5
105 miles and over	100.....	16
110 miles and over	105.....	16.5
120 miles and over	110.....	17
130 miles and over	120.....	17.5
140 miles and over	130.....	18
150 miles and over	140.....	18.5

160 miles and over	150.....	19
170 miles and over	160.....	19.5
180 miles and over	170.....	20
190 miles and over	180.....	20.5
200 miles and over	190.....	21
210 miles and over	200.....	21.5
220 miles and over	210.....	22
230 miles and over	220.....	22.5
240 miles and over	230.....	23
250 miles and over	240.....	23.5
260 miles and over	250.....	24
280 miles and over	260.....	25
300 miles and over	280.....	26
320 miles and over	300.....	27
340 miles and over	320.....	28
360 miles and over	340.....	29
380 miles and over	360.....	30
400 miles and over	380.....	31
425 miles and over	400.....	32
450 miles and over	425.....	33
475 miles and over	450.....	34
500 miles and over	475.....	35
535 miles and over	500.....	36
565 miles and over	535.....	37
600 miles and over	565.....	38
635 miles and over	600.....	39
665 miles and over	635.....	40
700 miles and over	665.....	41
735 miles and over	700.....	42
765 miles and over	735.....	43
800 miles and over	765.....	44
835 miles and over	800.....	45
865 miles and over	835.....	46
900 miles and over	865.....	47
935 miles and over	900.....	48
965 miles and over	935.....	49
1,000 miles and over	965.....	50
1,035 miles and over	1,000.....	51
1,065 miles and over	1,035.....	52
1,100 miles and over	1,065.....	53
1,135 miles and over	1,100.....	54
1,165 miles and over	1,135.....	55
1,200 miles and over	1,165.....	56

Toolroom Problem of Small Plants

Plan to Eliminate It by Means of a Cooperative Venture Participated in by Those Needing Tooling Service

BY BRUNO C. LECHLER AND EDWARD W. WEILER*

A MANUFACTURER of metal goods, in order to make his product economically, must provide himself with tools specially designed and specially built for his particular product. Of course he uses such standard tools as hammers, screw drivers, etc., and such standard tools as punch presses, lathes, drill presses, etc., but the efficiency of special tools that he must design for holding while working, for aiding in assembly for locating holes, etc., on his particular product are the factors in determining his ability to turn out his product quickly and cheaply and which enable him to defy competition.

Large manufacturing concerns who are continually making new products can afford to have their own toolrooms and tool designers; the smaller manufacturer usually depends on the outside jobbing toolshop, although not always with satisfaction.

Tool making is a highly specialized art and for this reason the smaller manufacturer cannot make his own

tools to the best advantage. An efficient toolmaker is an expensive man; he cannot be picked at random from the street; he is not in the same class with the ordinary production hand. Not all men who call themselves toolmakers are efficient at their trade. Quite often a toolmaker earning 80 to 90 cents an hour can spoil a piece worth \$50 or \$60 before it can be discovered that he is an inferior worker. Furthermore, not only is a badly needed piece spoiled, but a week's valuable time may be lost.

Toolroom equipment is expensive to buy. It must be of a much higher quality than ordinary production machinery. It must be capable of high accuracy. It must be handled with extreme care by some one familiar with it. Unless an expert toolmaker is put to work on it, it will soon lose the efficiency needed for producing good dies and tools. If this machinery is not used constantly it represents a large idle investment. Therefore the smaller manufacturer who only needs new tools occasionally, cannot economically afford to keep it. It is

sounder business for him to patronize the jobbing tool shop.

We may say, therefore, that it is very expensive for the smaller manufacturer to make his own tools for the following reasons:

- 1—Because of limited capital his toolroom equipment must necessarily be limited in scope.
- 2—As this equipment is idle a majority of the time, it becomes an unproductive investment, taking up needed space, requiring maintenance and being of use only a small part of the year.
- 3—The toolmakers hired will probably be for the most part inefficient. Even granting, however, that the tool gang is efficient, it will lack expert supervision.
- 4—A good tool engineer, needed to supervise a tool gang, cannot be picked up at short notice for a few weeks' period; he must be trained to the job.

In spite of all these objections many smaller manufacturers do maintain their own toolroom at a considerable loss, because they are of the opinion that they cannot get fair prices or fast enough delivery from the jobbing toolshop when they are in the market for their tools. With such manufacturers it is generally a case of requiring a large number of tools in a great hurry, and they hesitate to place themselves at the mercy of an outside agency. Since the jobbing tool shop has quite a number of customers who do not give it a constant flow of work, it must cater to the

*Tool Engineers, Eureka Tool & Machine Co., 42 Walnut Street, Newark, N. J.

average, and should the toolshop be overburdened at any particular time, it can only in fairness to all its customers divide its facilities as evenly as possible among its customers.

The result is dissatisfaction all around. For this reason the manufacturer often prefers to play safe and have his own equipment so he can have his set of dies and tools when he needs them.

Quite often, too, tooling up a new product requires considerable experimentation and adjustment, which precludes the possibility of agreeing on a contract price before the tooling up is begun. This often leads to arguments and misunderstandings, and the manufacturer feels that he is getting off cheaper in the end by having his own toolshop.

To eliminate these various causes for hesitancy on the part of the smaller manufacturer to giving his work out to the jobbing shop, and at the same time attempting to relieve him of the burden of an unproductive investment, the authors of this article propose the organization of a manufacturers' cooperative toolshop to serve those manufacturers who become members, to their mutual benefit.

The cooperative tool company centrally located and jointly operated takes care of all the enumerated difficulties in this way:

- 1—The cooperative shop is large enough to get all the necessary equipment consisting of substantial and efficient machinery. Single pieces of equipment might cost as high as \$10,000, while the average small manufacturer would not care to invest more than \$5,000 in his whole toolroom.
- 2—The cooperative shop is big enough to maintain a proper organization; with a tool engineer, draftsman, a well trained tool gang specialized on dies, jigs, fixtures, etc., some for heavy work, such as automobile fenders, and others for light work, such as hair springs on galvanometers, etc. In the manufacturer's own toolroom the man accustomed to repair a 2-ton press is often expected to make a tool accurate to 0.0001 in., which is anything but efficient.
- 3—It is not likely that more than one manufacturer will be using the facilities of the shop to a large extent at one time, so that any member could probably have three-fourths of the shop's equipment and personnel available for its use whenever needed, yet at the same time the shop need not neglect its other manufacturer members. In this way work is more nearly uniform, men have steadier employment, overhead is reduced, and the cost of doing work is lowered.
- 4—Under the proposed scheme each manufacturer member is to be a stockholder. He has access to the records, and shares in the profits; he has a say in the management. His tools will be built at the lowest possible cost; any profits will come back to him in dividends.
- 5—In order to prevent leakage of confidential methods of manufacture, etc., manufacturer members could be limited to one in each field of manufacture.

The Cooperative Tool Co. could be capitalized, say for \$100,000; \$50,000 to be paid in at the start, and the rest

of the stock to be held in the treasury.

The management of the shop would be under the direction of an experienced tool engineer. He would have as an assistant a draftsman and shop foreman, the duties of which offices could be performed either by one or two men, as the contingencies of the moment might demand. These men would be under a salary and at the same time would hold some of the common stock so as to work on a profit sharing basis. The direct management would be by a board of directors, elected by participating member stockholders and comprising, as far as feasible, one representative from each manufacturer member and also the manager of the shop.

Work would be done for each manufacturer member as it was needed on open order, the work to be billed at an hourly rate, plus material at cost. The hourly rate would be set so as to be on a par with that charged by regular jobbing tool shops. This would, of course, take into consideration, overhead, etc., and would be what the manufacturer would have to pay were he having his work done by an outside toolshop.

Whenever there was not enough work in the cooperative shop from participating members, outside jobbing work could be solicited, in order to keep the shop busy. However, the requirements of participating members would at all times receive preference.

The shop would be so organized that it would be possible to provide any participating member with the services of a repair toolmaker at an instant's notice. He could have three men put on work for him within a day's notice and six men within three days' notice. This would more than take care of any immediate rush jobs.

The tool engineer would divide his time between supervising the shop and designing dies or tools for participating members.

It is felt that with the plant as designed by us, a minimum of \$150,000 worth of tool work could be undertaken in a year. Because of the fact that a good many of the reoccurring idle periods so prevalent in a jobbing shop could be eliminated, the overall efficiency could be increased, and because the overhead could be reduced to a minimum, the profits of the cooperative toolshop would be exceedingly high, probably amounting to as much as \$30,000 for the first year, based on a \$150,000 gross business. This could be applied against dividends and would show a handsome return to each participating member against his investment. This should make the proposition exceedingly attractive to the smaller manufacturer who not alone could cut his original toolroom investment to as much as one-tenth of what his own toolroom would cost him, but could at the same time secure superior service and quality, and be relieved of all worry in connection with his toolwork.

The participating members would thus relieve themselves of the responsibility of maintaining a toolroom, which is of necessity separated from their production routine and is always a source of constant attention.

This plan for alleviating the toolroom difficulties of the small manufacturer should appeal to all farsighted managers of those manufacturing concerns who have not their own toolrooms, and who are dissatisfied with conditions as they find them at the present time in outside jobbing shops. It is planned to soon put this plan into actual operation in the Metropolitan New York district.

Coming Meetings

August

Ohio State Foundrymen's Association. Aug. 16 and 17. Annual convention, Cedar Point, Ohio. Arthur J. Tuscany, secretary-manager.

American Society of Mechanical Engineers. Aug. 27 to 30. Summer meeting starting with Great Lakes cruise at Buffalo, Aug. 20, followed by sessions at St. Paul and Minneapolis. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Council of Y. M. C. A. Aug. 29 to Sept. 2. Conference on human relations in industry, Silver Bay, Lake George, N. Y. Arthur H. Young, 165 Broadway, New York, chairman committee in charge of Silver Bay conference.

September

Canadian National Exhibition. Sept. 4 to 7. Second steel and power show, University of Toronto Arena, Toronto, Canada. C. Bradshaw, 24 Front Street, West, Toronto, executive director.

Institute of Metals. Sept. 4 to 7. Fall meeting, Liverpool, England. G.

Shaw Scott, 36 Victoria Street, London, S. W. 1, England, secretary.

Lake Superior Mining Institute. Sept. 7 and 8. Joint meeting with iron and steel division of the American Institute of Mining and Metallurgical Engineers, Crystal Inn, Crystal Falls, Mich., starting place. A. J. Yungbluth, Ishpeming, Mich., secretary.

American Manganese Producers' Association. Sept. 10 and 11. Annual meeting, Mayflower Hotel, Washington. J. Carson Adkerson, Metropolitan Bank Building, Washington, president.

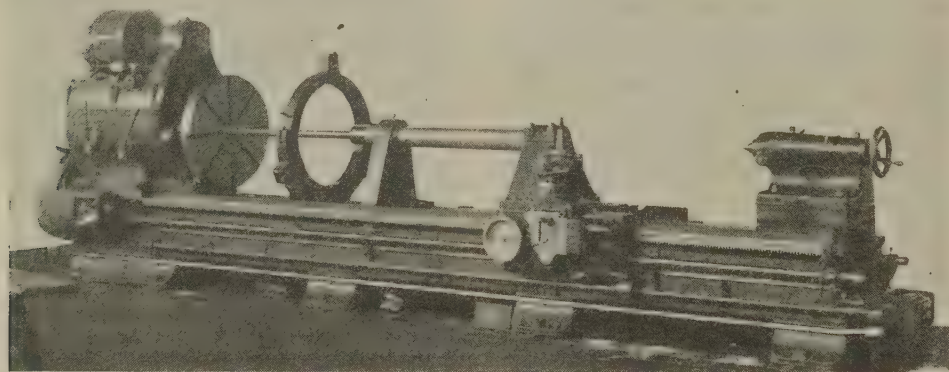
American Society of Mechanical Engineers. Sept. 17 to 20. Second national fuels meeting, Hotel Cleveland, Cleveland. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Electrochemical Society. Sept. 20 to 22. Fall meeting, Hotel Kanawha, Charleston, W. Va. Colin G. Fink, Columbia University, New York, secretary.

American Society of Mechanical Engineers. Sept. 24 to 27. Machine shop practice meeting, Cincinnati. L. C. Morrow, 29 West Thirty-ninth Street, New York, chairman of division.

Lathe With Boring Bar Attachment for Cylinders

A 36-in. by 22-ft. lathe with boring bar attachment for turning, boring and recessing large bushings for three-cylinder locomotive cylinders, furnished recently by the Niles Tool Works Co. division of the Niles-Bement-Pond Co., 111 Broadway, New York, for a foreign locomotive builder, is shown in the accompanying illustration.



With the Boring Bar Attachment Large Bushings for Locomotive Cylinders of Foreign Manufacture Are Turned, Bored and Recessed

tration. In the United States the general practice would be to perform these operations on a vertical boring and turning mill, but the design of the bushings and certain other factors have made it desirable to employ an engine lathe for the work.

The machine is the Niles standard Time Saver lathe with the addition of a boring bar bracket bolted across the wings of the carriage supporting a heavy boring bar. The boring bar has

an outer support and a pilot bar carried in a bushing on the spindle nose. The end of bar is fitted with a key to which a boring head is secured. A large center rest is also furnished.

The bushings are about 40 in. long, with an outside diameter of 27½ in. and a bore of 25½ in. They are cast with a flange for chucking on a faceplate. After chucking a light cut is taken on the outside diameter to provide a bearing for the large center

rest. The casting is then ready for the boring operation. After boring is completed, the bushing is mounted on an arbor between centers and the excess length of bushing and flange cut off, the outside diameter turned, both ends faced and recesses machined in both ends. The process requires two operations, but it is claimed that the results secured more than offset the extra time consumed.

Slitter and Coiler Combined to Permit Two Operations

USE of auxiliary equipment to permit the accomplishment of two operations at a single handling of material is illustrated in the slitter and coiler here pictured, which have been built by the Torrington Mfg. Co., Torrington, Conn. Although designed primarily for operation as a single unit, either of the two machines may be used separately if desired.

The slitting machine is of the three-housing type, in which the outer hous-

ing is withdrawn to an extension of the bed pedestal in changing cutter blades and spacing collars. Arbors are 6¼ in. in diameter, taking slitter blades 12 in. in diameter, 1 in. thick. The slitter has a capacity for cutting metal ¼ in. thick up to 42-in. trimmed width. An unusually rugged drive is provided through 50-hp. motor, with speed reduction through herringbone gears inclosed in an oil-tight case. Cutter arbor pinions, also of herringbone type, are located between the pinion housings and are entirely inclosed in grease-tight case. Cylind-

drical couplings connect the motor to the pinions and the pinions to the slitting machine. Adjustment of the top arbor is in parallel by means of a handwheel which operates lifting screws through worm gears. Provision is also made for lateral adjustment of the top arbor in relation to the bottom.

The coiler is of the usual three-roll type equipped with pinch or feed rolls. It permits the immediate removal of the coil without the necessity of stripping it from a block. An important feature of the coiler is the air-operated coil ejector, which is necessary because of the heavy coil made by the machine. Drive of coiler is by 25-hp. motor through pinions inclosed in an oil-tight case, and thence by spindles and couplings to the feed and coiling rolls.

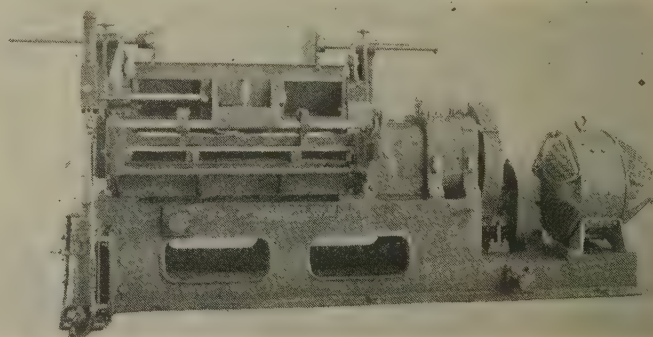
New Belt Conveyor Idler

A NEW idler for belt conveyors has been placed on the market by the Fairfield Engineering Co., Marion, Ohio. Centrifugal cast iron pipe is used for constructing the roller, and anti-friction bearings and direct high-pressure lubrication are included. Owing to the uniform wall thickness of the pipe and its trueness to shape, it is said to run without vibration and the cast iron is depended on to resist rust and abrasion. The grease pipes are extended to the end of the supporting frame, making the connection accessible and eliminating need to reach under moving belts.

Interchangeability of rollers is stressed. Bearing adjustment is said to be positive to any desired degree of fineness. The face of the return roller supports the belt 1½ in. above the bottom flanges of the springer channels, giving good belt clearance above supporting frame cross members.

The General Electric Co. paid \$1,600,905 in supplementary compensation on July 30 to employees in its various plants and offices who have been with the company for five years or more. This sum, the largest ever distributed by the company in this form, represents 5 per cent of the earnings of employees for the six months ending June 30, 1928. The largest amount, \$499,425, was paid to employees of the Schenectady works.

The Coiler, of Three-Roll Type with Feed Rolls, Permits Removal of the Coil without the Necessity of Stripping It from a Block. It has an air-operated coil ejector



The Slitting Machine, with Which the Coiler Is Used in Combination, Has Capacity for Strips Up to 42-In. Trimmed Width, ¼-In. Thick

Improved Piping Features New Broaching Machine

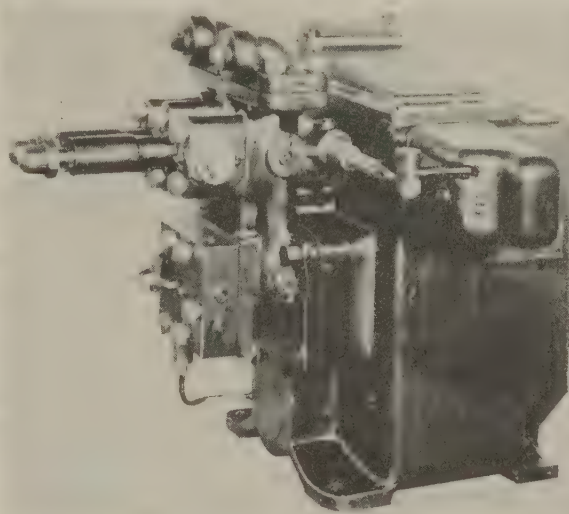
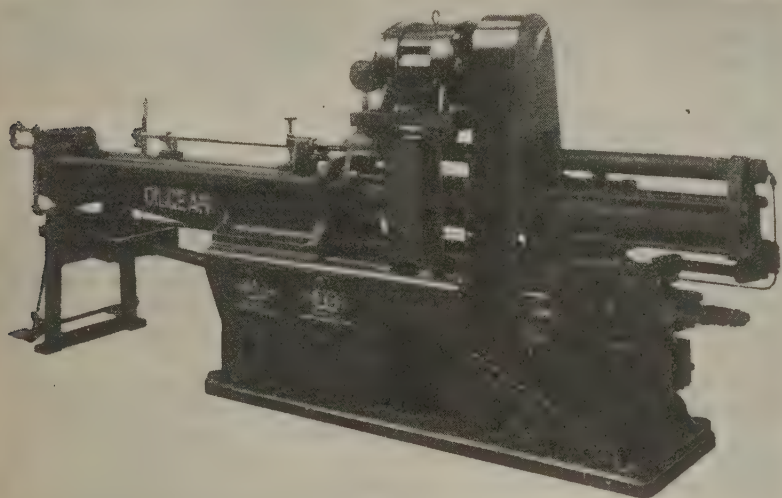
SIMPLIFICATION of the piping from the pump to the cylinder, making for greater compactness, is one of several refinements embodied recently in the high-speed broaching machines manufactured by the Oil-gear Co., Milwaukee. In the previous design the safety and unloading

to the pump itself. Piping beneath the cylinder is thus eliminated and the appearance of the machine greatly improved, as shown in the accompanying illustration of the improved No. 3 broaching machine. Flange and bolted pipe connections are employed.

A control bracket guard, intended to prevent possible injury to the operator's hands, is an added safety feature. Sea ring ram packing has

different pull center lines. This feature is of particular advantage in broaching keyways, when it is necessary to take two draws with a cutter-bar and then raise the center line of the draw-bar for the section cut, in order to obtain the proper depth of keyway.

The improved variable delivery pump, illustrated herewith, is designated as the type MD. Its displace-



Simplification of the Piping From the Pump to the Cylinder Makes For Greater Compactness. The smaller cut shows the improved variable-delivery pump

valves were mounted in the pipe lines, which arrangement required an unnecessary amount of piping and joints. In the improved pump the safety and relief valves have been manifolded on

been adopted as standard on all machines. The crosshead of the machine is now equipped with convenient adjustment for raising and lowering the drawhead slide to accommodate

ment is 17.1 cu. in. per revolution. The normal working pressure is 700 lb. per sq. in. and the peak pressure, 900 lb. per sq. in. Use of a 10 to 15 hp. motor is recommended.

Air-Motor Hoist of 10 Tons Capacity

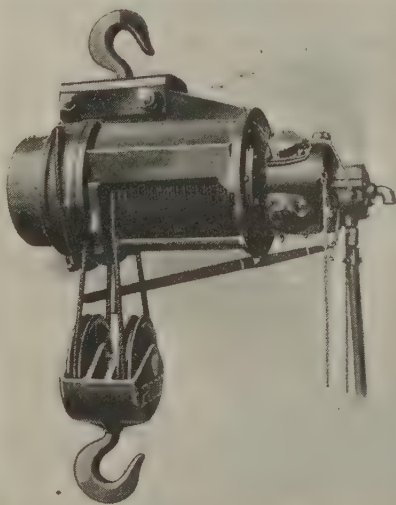
A NEW air-motor hoist of 20,000-lb. capacity is being offered by Ingersoll-Rand Co., 11 Broadway, New York. In railroad shops this hoist is used for handling locomotive drivers at lathes and presses, and for other heavy lifting work which would ordinarily tie up a crane.

The hoist construction employs a four-cylinder air motor geared to a rope drum, and all inclosed in a compact and dirt-proof housing. The gears are made of special steel and heat treated to insure extra strength and wearing qualities. They operate in a bath of semi-fluid grease, completely inclosed. Ball bearings or bronze bushings are provided at all points where experience has indicated that they will add to the efficiency and life of the hoist.

An automatic safety brake holds the load at any desired position for any length of time, regardless of air pressure. Control of the hoist movement is obtained by a graduated throttle and a well-balanced motor. The latter is practically without vibration. The cylinders are renewable and interchangeable, making it easy and inexpensive to renew them if worn after long service.

This hoist can be furnished with either a top hook or a chain-driven trolley as standard. Its weight,

equipped with top hook, is 1300 lb.; equipped with chain-driven trolley, 1800 lb. The pipe connection is $\frac{3}{4}$ -in.



An Automatic Brake Holds the Load at Any Position Regardless of Air Pressure

The cable is 9/16 in. in diameter and 83 ft. long and the maximum lift is 16 ft.

The Clipper Belt Lacer Co., Grand Rapids, Mich., announces a 10-in. open-end Clipper belt cutter which will cut and square belting up to and including 10 in. in width.

Power House Will Have 215,000 Hp. Turbo- Generator

THE New York Edison Co., in its new East River generating station, at Fourteenth Street, New York, will have the largest single-shaft, single-unit electric generator in the world. This turbo-generator, which will develop 160,000 kw., or 215,000 hp., is being built by the General Electric Co.

The steam generating units, which will be of the new water wall type, are to be installed by the Combustion Engineering Corporation. Each of the units required will have an aggregate heating surface of 45,120 sq. ft. and each is to produce 550,000 lb. of steam an hour, though studies are being continued to obtain a maximum capacity each of 800,000 lb. or more an hour.

Two 48-in. Hartzell-Charavay fans were recently installed in the 8-in. tie mill of the Atlantic Steel Co., Atlanta, Ga. The Charavay fans, which are made by the Hartzell Propeller Co., Piqua, Ohio, have a propeller of the type which has proved successful in airplane construction. The propeller blade is made of a metal alloy and is commonly direct connected to the electric motor for driving it, and the supporting ring and frame of the fan unit are constructed of aluminum for lightness and rust prevention.

European Mills Maintain High Prices

British Expect More Orders With Less Foreign Competition—United States Investigates Imported Steel Markings

(By Cable)

LONDON, ENGLAND, Aug. 7.

THE iron and steel markets are quiet after the holidays and the outlook is unfavorable. Northeast Coast pig iron output has been restricted to 29 blast furnaces and foundry iron prices are being maintained, despite the lack of new demand. There was partial resumption of Scottish production last week and full resumption is expected this week. The holiday was prolonged by depressed conditions, which have provided only a meager accumulation of orders for iron and steel.

Steel makers expect an improve-

ment based on the higher tendency of Continental prices and on Government aid.

New shipbuilding contracts are especially limited. Clyde output in July was 13 vessels of 38,700 tons, including one 10,000-ton cruiser.

Continental markets are strong as a result of sustained overseas demand and mills are well sold ahead. Belgian output in June was 321,000 metric tons of pig iron and 32,000 tons of steel ingots.

Tin plate is quiet and mills are closed for their annual week of suspension. Inquiry, however, is promising. Galvanized sheets are quiet and the black sheet market inactive.

slightly smaller than the average in May, but the average daily output of rolled steel products exceeded the previous month.

Domestic prices of steel products for August have been announced as 111.50 m. (\$26.62) per ton for blooms; 119 m. (\$28.40) per ton for billets; 138 m. (\$32.94) per ton for structural shapes; 141 m. (\$33.66) for steel bars and 164 m. (\$39.15) for steel bands. The usual rebates are quoted on sales to South Germany.

Steel producers here do not seem to expect any result from the initiative of Conservative members of Parliament in England in favoring a safeguarding duty on iron and steel. It is pointed out that this question was repeatedly under consideration prior to the war as part of the movement for tariff reform, but was strongly opposed by British shipbuilders and other manufacturing consumers, who claimed that their ability to compete in world markets was largely based upon their supply of low-priced, duty-free steel from abroad.

At the meeting of the International Steel Cartel last week some important changes were made. The German export quota, which has been limited to 275,000 tons a month in return for a reduction to \$1 a ton in the German penalties for overproduction, was advanced to 300,000 tons a month. In addition, the entire system of fines for exceeding output was revised. The

German Steel Consumers Well Stocked

Improved Buying Expected in Fall—Steel Cartel Revises Fines—Czechoslovakia Joins for Export

BERLIN, GERMANY, July 21.—The Rhenish-Westphalian steel industry continues to report a falling off in orders, but some allowance is made for the usual summer quiet and for the heavy purchases by consumers prior to the May advance in prices. Steel bars are still in good demand and delivery terms extended. Probably the least activity is reported by manufacturers dependent upon orders from the Railroads Corporation. In some quar-

ters greater activity is expected in the next two or three months.

Except for billets, demand for semi-finished material has declined considerably. Building construction is quite active and there is a good demand for structural material. Export business is better, a reflection of the reaction on the Brussels market following termination of the Antwerp dock workers' strike. In June the average daily output of steel ingots was

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.	£0 17½s. to £0 17¾s.	\$4.25 to \$4.31
Bilbao Rubio ore*	1 2½	5.48
Cleveland No. 1 fdy.	3 8½ to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy.	3 6	16.04
Cleveland No. 4 fdy.	3 5	15.80
Cleveland No. 4 forge.	3 4½	15.68
Cleveland basic (nom.)	3 5	15.80
East Coast mixed.	3 8 to 3 9	16.53 to 16.77
East Coast hematite.	3 10½	17.13
Rails, 60 lb. and up.	7 15 to 8 5	37.66 to 40.10
Billets	6 0 to 6 15	29.16 to 32.81
Ferromanganese	13 15	66.83
Ferromanganese (export).	13 0 to 13 5	63.18 to 64.39
Sheet and tin plate bars, Welsh	6 0	29.16
Tin plate, base box.	0 18 to 0 18¾	4.37 to 4.43
Black sheets, Japanese specifications	13 7½	65.00
Ship plates	7 12½ to 8 2½	1.63 to 1.74
Boiler plates	9 0 to 10 10	1.92 to 2.25
Tees	8 2½ to 8 12½	1.74 to 1.84
Channels	7 7½ to 7 17½	1.58 to 1.69
Beams	7 2½ to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in.	7 5 to 7 15	1.55 to 1.66
Steel hoops	9 0 to 10 0	1.92 to 2.14
Black sheets, 24 gage.	9 15 to 10 0	2.09 to 2.14
Galv. sheets, 24 gage.	13 7½	2.86
Cold rolled steel strip, 20 gage, nom.	16 0	3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)			
Foundry pig iron (a):			
Belgium	£3 3s. to £3 5s.	\$15.32 to \$15.80	
France	3 3 to 3 5	15.32 to 15.80	
Luxemburg	3 3 to 3 5	15.32 to 15.80	
Basic pig iron (nom.):			
Belgium	3 1 to 3 2	14.82 to 15.07	
France	3 1 to 3 2	14.82 to 15.07	
Luxemburg	3 1 to 3 2	14.82 to 15.07	
Coke	0 18	4.37	
Billets:			
Belgium	4 15½	23.21	
France	4 15½	23.21	
Merchant bars:			
Belgium	5 16	1.28	C. per lb.
France	5 16	1.28	
Luxemburg	5 16	1.28	
Joists (beams):			
Belgium	4 18	1.08	
France	4 18	1.08	
Luxemburg	4 18	1.08	
Angles:			
Belgium	5 10 to 5 12½	1.21 to 1.24	
½-in. plate:			
Belgium (a)	6 12	1.45	
Germany (a)	6 12	1.45	
3/16-in. ship plate:			
Belgium	6 8	1.41	
Luxemburg	6 8	1.41	
Sheets, heavy:			
Belgium	6 1	1.33	
Germany	6 1	1.33	

(a) Nominal.

penalty for exceeding the quota by 7.50 per cent or less is reduced from the former \$4 a ton to \$1 a ton; for producing more than 7.50 per cent or less than 10 per cent the fine is \$2 a ton. On all production in excess of 10 per cent of the quota the penalty continues at \$4 a ton. This applies to all members except Germany, regardless of whether the excess is sold at home or for export. For Germany, this ruling applies only to export.

The Central European group of

members in the International Steel Cartel has been dissolved and Austria and Hungary have become direct members of the cartel. Czechoslovakia, however, becomes a member on new terms, which leave production for the domestic market without any allotment, but set an annual export quota of 432,836 metric tons, the actual export of Czechoslovakia in 1927. Should the export quota be exceeded the usual penalties effective with other members are applied.

usually imported in boxes, kegs, or other containers.

"Iron and steel in various forms, such as blooms, billets, bars, beams, angles, or other forms of structural iron or steel, steel rails, fish plates, pig iron and iron or steel in other forms not manufactured into articles are regarded as material and not subject to marking to indicate the country of origin."

It is believed among importers that the present action is being brought about by a domestic steel maker in order that the definition of "material" may be decided and articles which need not be marked with the country of origin will be more completely specified. Any action before the Customs Court would not be taken until fall.

Export Orders Small

Exporters to South American markets and the Far East are fairly well occupied with inquiries for various steel products, but tonnages are in most cases small. A recent inquiry from Japan for about 190 tons of structural material is understood to have gone to a European mill, but about 400 tons of channels for the Imperial Government Railways in Japan was placed with a mill in the United States. There have been some small inquiries for steel bars recently from Japan and the usual export quotation by this country is reported to be about \$45 per ton, c.i.f. Japanese port.

In rails, about 360 tons of 91-lb. high T-rails for a privately owned railroad in the Moji district of Japan were placed with an American maker and 300 tons of 91-lb. high T-rails for the Ugigawa Denki Kido Kaisha were also awarded to a mill in the United States. Not much export business is reported in either light gage sheets or tin plate.

Belgian Market Active and Prices Higher

ANTWERP, BELGIUM, July 20.—A larger volume of business is being placed and prices are increasing slowly. Buyers are offering less resistance to advances and some sizable purchases have been made, especially by German and British buyers. Pig iron is quiet with the domestic price of No. 3 phosphoric foundry grade at 585 fr. (\$16.40) per ton, at the furnace and the export prices about £5 2s. 6d. (\$15.40) per ton, f.o.b. Antwerp.

In semi-finished material there is improved demand and mills seem to be fairly well booked with orders. Prices have advanced and are firm with blooms scarce at £4 5s. 6d. to £4 12s. 6d. (\$20.78 to \$22.48) per ton for 4-in. to 8-in., billets firm at £4 14s. (\$22.84) per ton for 3-in. and £4 15s. (\$23.09) per ton for 2-in. billets. There is an active demand for sheet bars and available supplies are small. The price has advanced to about £4 16s. (\$23.33) per ton, f.o.b. Antwerp.

The higher prices now prevailing are quite firm and mills are well

booked with business. Production of steel bars is limited so that there is only a small supply available with the market at £5 14s. 6d. per metric ton (1.26c. per lb.). Beam prices are strong at about £4 17s. 6d. per ton (1.07c. per lb.), f.o.b. Antwerp. Corrugated steel bars are £5 16s. 6d. per ton (1.28c. per lb.) and hot rolled hoops £6 15s. per ton (1.49c. per lb.), f.o.b. Antwerp. The sheet market is showing a tendency to advance with demand especially good for the heavier gages. Thomas sheets, 1/16-in. in thickness are quoted at about £6 17s. 6d. per ton (1.52c. per lb.), f.o.b. Antwerp.

German Rod Mills Seek Far Eastern Orders

HAMBURG, GERMANY, July 21.—Some disagreement has developed in the German Wire Rod Syndicate as to the proper quotations to be made on business for Japan. For some time prices have been too high to secure orders and most of the Japanese buying has been done in the United States and Canada. No agreement has been reached and further consideration of

Foreign Steel Prices Still High

Importers Here Sell Little—Steel Marked for Country of Origin—Export Orders Small

NEW YORK, Aug. 7.—Importers of steel from European mills continue rather inactive, unable to secure much business at the present level of Continental prices. A further advance in the foreign market has brought quotations on Bessemer steel bars to 1.83c. to 1.85c. per lb., delivered New York, to which must be added the cost of inspection and packing. Beams range from 1.68c. to 1.70c. per lb., duty paid, New York, and channels are about 1.75c. per lb., duty paid. While there has been some inquiry recently for wire nails, not much business has been transacted, as most buyers are evidently interested only in small lots of a few hundred kegs.

Recent notices sent by the United States Treasury Department to importers of steel, informing them that certain shipments of bars and shapes were being investigated because they were not marked as to the country of origin, appear to be the preliminary steps to a test case before the United States Customs Court. A leading American steel company is understood to have requested a complete statement by the Government as to the exact products which should be marked with the name of the country of origin under the tariff act. As a result of this, importers believe that the present investigation was instituted with the intention of selecting some shipment, of which a test case would be made to clarify the question.

Marking of imported material is covered in Section 304 of the Fordney-McCumber tariff. The section reads in part as follows:

Sec. 304. (a) That every article imported into the United States, which is capable of being marked, stamped, branded, or labeled, without injury, at the time of its manufacture or production, shall be marked, stamped, branded, or labeled, in legible English words in a conspicuous place that shall not be covered or obscured by any subsequent attachments or arrangements, so as to indicate the country of origin. Said marking, stamping, branding, or labeling shall be as nearly indelible and permanent as the nature of the article will permit.

This section of the tariff further states that: "Unless the article is exported under customs supervision, there shall be levied, collected, and paid upon every such article which at

the question is expected at the next meeting in August. Meanwhile, merchants have begun offering wire rods for export at Hamburg and other centers at 2s. 6d. to 3s. 6d. (60c. to 85c.) per ton lower price than the official syndicate figure of £6 (\$29.16) per ton for large lots. As there are no makers in Germany at present who are not members of the syndicate and the St. Ingebert works in the Saar has its own export organization, it is believed that these rods offered at less than the market are coming from German mills seeking to prevent total loss of their Far Eastern markets. As wire rods are sold f.o.b. Antwerp, it is difficult to trace the origin of a particular shipment. It seems to be expected that the syndicate will reduce all prices.

German Mill to Roll Aluminum on Steel Sheets

The Eisen und Stahlwerke Hoesch Actiengesellschaft, Dortmund, Germany, according to Trade Commissioner James E. Wallis, Berlin, is reported engaged upon the construction of a new plating plant and rolling mill on its property, Stockheide, in the Ruhr. In this new mill it is planned that aluminum, and later other metals, will be rolled on ordinary black steel sheets by a special, patented process, the invention of an engineer of the Wickeder Iron & Steel Works. It is expected that this new aluminum plate will have a decided effect upon the present tin plate industry. Machinery for this new plant is being made by the Krupp Works.

The development of this new "plate" by the Hoesch company is the more significant when it is recalled that this company, since its amalgamation with the Wolf, Netter & Jacoby Co., Berlin, now produces the largest tonnage of tin plate of any German works engaged in the manufacture of this product.

German Open-Hearth Extra Causes Output Decline

HAMBURG, GERMANY, July 21.—The steel ingot production in the first half of 1928 of 7,914,599 metric tons was only slightly less than the 7,952,370 tons produced in the first half of 1927. Output of Thomas steel, however, increased, and open-hearth steel production showed a corresponding decline. Of the total for the first half of this year, 4,086,741 tons was basic and acid open-hearth grade, which was 291,645 tons less than the total in the same period of last year. At the same time the output of Thomas grade was 3,586,414 tons, which was 237,849 tons more than in the previous year. This shift in output is noteworthy as from 1921 to 1927 open-hearth output has been constantly increasing and Thomas steel production declining.

The decline in open-hearth is explained, at least in part, by the recent

increase in the extra for open-hearth steel from 3 m. to 5 m. (70c. to \$1.20) per metric ton and the further advance in January to 8 m. (\$1.90) per ton. The latest increase brought the cost to a level that was not interesting

to consumers. In consequence of this reduction in demand for open-hearth steel and the recent lower prices of steel scrap, it is believed that mills will reduce the extra to the former level of 5 m. (\$1.20) per ton.

New Extras for Special Analysis Steels

Charges from \$1 to \$5 a Ton to Be Imposed for Carbon, Manganese, Silicon, Sulphur, Phosphorus, Etc.

THE report of a committee of steel manufacturers, of which Charles O. Hadly, vice-president in charge of sales Alan Wood Iron & Steel Co., Philadelphia, was chairman, covering the costs of manufacturing carbon steel billets, published in THE IRON AGE, Oct. 14, 1926, and presented at the fall, 1926, meeting of the American Iron and Steel Institute, is the basis of a new list of extras for chemical composition covering all forms of finished and semi-finished steel. The new extras vary slightly in some respects from the findings of the Hadly committee, but essentially they adhere closely to the facts disclosed by the cost studies of that committee.

The committee, using basic open-hearth steel of 0.10 per cent to and including 0.20 per cent carbon as a base, found the average cost of producing steel of 0.21 per cent to 0.50 per cent carbon was \$1 a ton above base; for steel of 0.51 per cent to 0.75 per cent carbon content, \$2 a ton above base; for 0.76 per cent to 0.95 per cent carbon steel, \$3 a ton, and for 0.96 per cent to 1.40 per cent carbon, \$5 a ton.

The actual list of extras imposes no charge for open-hearth steel running 0.10 per cent to 0.25 per cent carbon, a charge of \$1 a ton for carbon 0.26 per cent to 0.60 per cent, and of \$3 a ton for carbon of 0.61 per cent to 1.25 per cent. No charge is made in Bessemer steel running from 0.08 per cent to 0.25 per cent carbon. For open-hearth steel, when the maximum carbon range specified is 0.09 per cent, there is a charge of \$1 a ton and a like charge on Bessemer steel when the maximum range specified is 0.07 per cent. The Hadly committee found the extra cost of both open-hearth and Bessemer steel in the low carbon range was \$2 a ton.

Manganese Extras Up to \$5 a Ton

For manganese from 0.30 per cent to 0.90 per cent no charge is imposed; in the committee report, using a content of 0.30 per cent to 0.60 per cent as base, it was found there was an extra cost of \$2 a ton for 0.61 to 0.80 per cent manganese open-hearth or Bessemer steel, and of \$4 a ton for manganese content of 0.81 to 1.20 per cent. The card imposes a charge of \$2 a ton for 0.91 to 1.15 per cent manganese, of \$4 a ton for 1.15 to 1.35 per cent and of \$5 a ton for 1.36 to 1.50 per cent, but waives the charge for manganese of more than 1.15 per cent on

steel with a carbon content of under 0.20 per cent.

Silicon content extras also represent some modification of the cost findings of the Hadly committee and that also is true of sulphur content charges. For copper content up to 0.20 per cent minimum, the card calls for an extra of \$2 a ton, against the committee cost finding of \$3. The \$2 per ton charge, however, refers to bars, plates and shapes, and not to other products on which there is an existing extra for copper of \$3 a ton.

The new card follows:

EXTRAS FOR CHEMICAL COMPOSITION

(The mean of the range agreed on between purchaser and manufacturer shall determine the extra.)

For Carbon		
Open-hearth	0.10 to 0.25 }	No extra
Bessemer	0.08 to 0.25 }	
	0.26 to 0.60	5c. per 100 lb.
	0.61 to 1.25	15c. per 100 lb.
When maximum of range specified is—		
Open-hearth	0.09 }	5c. per 100 lb.
Bessemer	0.07 }	

For Manganese		
0.30 to 0.90		No extra
0.91 to 1.15		10c. per 100 lb.
1.16 to 1.35		20c. per 100 lb.
1.36 to 1.50		25c. per 100 lb.

(For manganese content above 1.15 the above extras do not apply to steel with carbon under 0.20 maximum.)

For Silicon		
0.10 to 0.25		10c. per 100 lb.
0.26 to 0.50		20c. per 100 lb.

For Sulphur		
0.07 minimum to 0.10 minimum		10c. per 100 lb.

For Copper		
Up to 0.20 minimum		10c. per 100 lb.

For Phosphorus		
(Not to apply on sheet bars.)		
0.04 minimum to 0.08 minimum		5c. per 100 lb.

(Extra for phosphorus content applies to open-hearth steel only.)

Extras for Physical Specifications

When material is ordered to physical properties, the extras for the required chemical contents shall apply. Orders specifying both physical properties and carbon contents will not be accepted.

The following ranges of elements are standard:

Carbon		
Up to .25 inclusive		5 points
.26 to .65 inclusive		10 points
.66 to 1.05 inclusive		15 points
1.06 and over		20 points
Manganese		
Up to .70 inclusive		20 points
.71 to 1.50 inclusive		30 points
Silicon		
Up to .20 inclusive		10 points
.21 to .30 inclusive		15 points
.31 to .50 inclusive		20 points

Specifications calling for closer ranges can only be adhered to at an extra cost unless a combination of orders is so arranged that all steel coming within the standard ranges can be applied.

This Issue in Brief

Cuts controllable manufacturing expense almost 12 per cent by budgeting each department on basis of payroll. Foreman of each department in Stutz plant receives a weekly report of indirect expense (including indirect labor, shop supplies, etc.), which shows standard allowance per \$100 of payroll. Prizes are awarded each month for best records. One clerk handles entire system.—Page 334.

* * *

You can not always widen your market by cutting your price. Many markets are restricted by factors other than price, so that price reductions produce no gain or a relatively insignificant gain in demand.—Page 339.

* * *

Apathetic stockholders are a brake on efficient management. "I believe in the responsibility of stockholders," says Link-Belt Co. head. Unless stockholders take an interest in the affairs of the company the disadvantages of a hired management make themselves felt.—Page 340.

* * *

Welds four additional stories to old six-story steel building. Cleveland fabricator inserts welded angles down the center of old hollow columns, joining old steel to new steel at five-foot intervals by means of welded plates. Cap plates welded to top of old columns serve as base for four-story H column.—Page 338.

* * *

Plating is done automatically in Ford plant. Parts are hung on suspension frames, which are placed on conveyor hangers. A revolving arm picks the hangers off the conveyor and lifts hangers from tank to tank. Dipping is purely mechanical and is evenly timed.—Page 342.

* * *

Plates small parts in wooden tumbling barrels. Ford immerses and revolves barrels in cadmium plating solution. A cathode is placed inside the barrel, coming in contact with the work as it revolves.—Page 342.

Iron-making capacity is declining. Blast furnace capacity was 49,605,720 tons on Jan. 1, 1928, and 51,379,400 tons one year earlier, a loss of 3.4 per cent.—Page 344.

* * *

To remove prejudice and preference, place iron and steel freight charges on a mileage basis, Commerce Commission examiners recommend. Territory affected is the northeastern section of the country. New scale would cost railroads about \$2,000,000 a year, according to some estimates.—Page 345.

* * *

Small manufacturers can save money by forming a cooperative tool shop, says engineer. Combination of a group of manufacturers would provide funds for buying modern equipment, engaging special tool-makers for each class of work, insuring quicker deliveries, and economies produced by steady operation of equipment.—Page 346.

* * *

Abandons individual and group piece work rates in favor of bonus system based on standard hourly performance. Stutz calculates "standard" by taking time-study time plus 25 per cent for bonus. Bonus is paid for beating the time-study time.—Page 337.

* * *

Almost every industry will benefit directly by Jones-White law, fostering American merchant marine, says shipbuilder. Shipyards buy from practically every industry. Material bills for each big ship run over \$7,000,000, representing about half the total cost.—Page 343.

* * *

Industrial production has increased about 8 per cent in last five years while factory employment has declined and wages increased. Economic progress is indicated by higher output and higher wages per worker.—Page 356.

Foreman is called to account when his total indirect departmental expenses show up "in the red." Automobile manufacturer gives each foreman a weekly record of his expenses as compared with predetermined standards. Explanations gathered each week by the comptroller are submitted to the management each month.—Page 335.

* * *

"Fixed buying fund" idea is a fallacy, says head of big corporation. It is wrong to assume that the public has so much to spend and that the fight is for the buyer's extra dollar. If you can create a new demand, the necessary buying power seems to be there.—Page 340.

* * *

If the operators beat the standard the foreman's record is credited. But if performance is below standard, losses are charged against the departmental budget. Thus the foreman sees that all his operators make as high a daily rate as possible, in Indiana automotive plant.—Page 337.

* * *

"Unemployment" is largely imaginary, Labor Federation statistics indicate. Even in flush times, statistics show that 7 to 8 per cent of workers are idle, and figures gathered in twenty-four large cities show that union laborers in all industries except building trades were 93 per cent employed in June.—Page 354.

* * *

Not many industries can adopt mass production methods profitably. And there are definite limits to production even in those industries that lend themselves to mass output, says Charles Piez. "The economies from large-scale output are a constant temptation to increase production first and worry about sales afterward." Selling cost on the surplus oftentimes outweighs heavily the saving in manufacturing cost.—Page 339.

A. I. FINDLEY
Editor.

THE IRON AGE

W. W. MACON
Managing Editor

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A Union View of Unemployment

A LARGE part of the space in the August issue of the *American Federationist*, the well-edited magazine of the American Federation of Labor, is given over to the discussion of unemployment—whether there is such a thing, and if so what are the remedies. The main impression left by these articles is that in general, union labor is not suffering from any shortage of work to do.

One article, using a statistical analysis of the United States census of manufactures, attacks the fundamental question, "When does unemployment begin?" or, stated another way, "How many people are out of work during periods of general prosperity?" This census gives the number of workers employed in about 350 industries for each month of the year. Selecting the highest figure for each industry during the year, and adding these together, gives a total which is supposed to represent the number of workers in those industries. Subtracting from this total the total number actually at work in a given month, gives the number of unemployed in that month. Averaging the derived percentages, month by month, gives the following unemployment: For 1914, 8.8 per cent; for 1919, 11.9 per cent; for 1921, 13.2 per cent; for 1923, 6.6 per cent; for 1925, 7.9 per cent. The author concludes that unless more than 7 or 8 per cent of the available workers are out of work, a state of "unemployment" can hardly be said to exist.

On the very next page is an analysis of unemployment in trade unions in twenty-four of the large cities during 1928. The totals have been steadily decreasing since January, and in June the total unemployed in all trades was 11 per cent. Segregating the building trades, it is found that their unemployment averages 22 per cent, while for all other trades the unemployment is 7 per cent. We know that the total of construction contracts is breaking all previous records, consequently there must be (generally speaking) work for those in the building trades who really seek it. And by their own figures, union laborers in other urban trades are employed to an almost unprecedented extent.

By other articles in this same magazine one is reminded that there are certain sore spots in the labor market. Not to mention the coal industry, an analysis of conditions shows that 29 per cent of the unionized workers in Philadelphia were unemployed during some part of March and April. The corresponding figure for 1927 was 19 per cent. Causes for this situation as seen by local union officials are various. Most believe that it is a normal seasonal fluctuation, or results from normal turnover; a contributing factor is the "general business depression caused by over-production, which

in turn is caused by speeding up and introduction of labor-saving machinery." (This, by the way, is a normal, continuing factor.) Changes in technique, style, non-union competition, migration of industry, politics, strikes, the Eighteenth Amendment, the failure of the Naval expansion bill—such causes for unemployment, put forward in all seriousness by men close to the workers, indicate how complicated the problem really is.

An interesting story of how the city of Wilmington, Del., scotched alarmist reports of unemployment appears on another page of the *Federationist*. In the spring the local press and pulpit were deploring the "tens of thousands" of unemployed "tramping the streets vainly in search of work." The whole city (with the exception of the Chamber of Commerce's publicity bureau) was depressed. Then Mayor Forrest, at the behest of several civic organizations, established an employment bureau, which has had the active cooperation of the local industries. While hundreds of men have been placed, "the report of thousands being unemployed has been proved to be incorrect. Talk of unemployment makes for more unemployment. Statistics don't make jobs, but Wilmington today is talking 'employment.'"

Such evidence certainly does not support alarmist reports about suffering among the wage earners, if such reports were ever given serious attention. It is well known that the representative labor unionist is constantly driving for higher wages and shorter hours, and is seldom if ever content with existing conditions. Consequently the reports in his official magazine can hardly be expected to be colored with roseate hues. Yet it seems that urban workers (except such as bricklayers and plumbers) are employed to nearly a record extent; that the causes of unemployment in certain exceptional centers are so various that they seem to be largely local manifestations, and finally that some "unemployment" may be found to be mythical, when a real search for idle workers is made.

Coal Miners and Economic Law

REPORTS from such conferences as officials of the United Mine Workers of America have been able to get with coal producers in the hope of making a fresh working agreement only confirm what has been plain to some minds, that operation of certain mines on a union basis and of others as non-union or open shop is futile. While the United Mine Workers have abandoned the so-called Jacksonville wage scale as a basis of negotiation, they still cling to the idea that the operators in Ohio, Indiana and Illinois (there have

been no conferences in central or western Pennsylvania) should be willing to pay a higher scale than now rules in the open shop districts.

The conferences between Ohio and Illinois operators, and the district executives of the miners' union, have failed of results because the operators wanted a scale that would be in line with existing wages in the fields with which they are in direct competition. On the other hand the union leaders contended that if they accepted the operators' suggestion, it would mean in turn a reduction in the open shop rates and a wage situation no different from what hitherto has existed. It is a little surprising that the union leaders are so concerned as to the effect the scale at which they will permit their members to work will have upon wages in open shop districts. If, they argue, they accepted the operators' proposal of \$5 a day for day labor in the Illinois mines, Kentucky operators would at once cut their scales enough to retain markets they have taken from Illinois operators. But why not reason that such action by the Kentucky producers would lead to discontent among their men and thus pave the way for unionization?

Is not this position of the union negotiators a practical admission that the United Mine Workers must muster much more numerical strength in the industry as a whole before they can enforce their demands upon any considerable part of it? The union has reached its present state of weakness by concentrating all its effort on wresting from soft coal operators a high and constantly mounting scale of wages. Now that it is shut up to a wage fixed by the public demand for coal, it finds economic law sitting on the other side of the conference table—a negotiator whose measure up to this time it has never thought it necessary to take.

Market Study a Prime Need

MASS production is an overworked term. Foreign visitors who have studied American industry commonly ascribe our prosperity to methods of mass manufacture. They are impressed by the spectacular, as exemplified by our automobile plants, but fail to see the whole picture.

The fact that relatively few businesses lend themselves to mass production is pointed out by Charles Piez, chairman Link-Belt Company, in an interview elsewhere in this issue. Much engineering work is designed and built to meet special requirements. Mass products enter only in the form of certain standard parts. The whole building industry, one of our major activities, is mainly based on contract work in which mass methods of operation play a minor role. Mass goods like structural steel, lumber, brick, tile and radiators are used in construction, but the building operation itself still consists of the execution of special plans and specifications.

The relation of mass production to market expansion is also frequently misunderstood. While the automobile industry has been able to reduce prices and increase sales by expanding output, that principle does not apply in fields with limited markets.

Lower prices would have little effect on the consumption of coal, beef or flour, but excessive production would be, and in the bituminous coal industry has been, disastrous. Outside of the mass production field the idea of increasing consumption by cutting

prices is illusive. A price difference of a few hundred dollars up or down will not raise or lower the demand for electric traveling cranes. Cranes are bought because they are wanted for a specific purpose. If one crane is needed in a plant no price inducement will lead to the purchase of two.

Mr. Piez has shown the danger of sweeping generalizations about our complex industrial organism. He has focused attention, moreover, on the importance of market research. Intelligent selling is the great need of the times. One must know his field and know it well before he can sell to advantage. Thorough study of markets will lead the way to the most effective and economical sales policy.

Industries Growing Into Maturity

IT is not fanciful to consider industries as passing through stages corresponding with the development of the individual human being, having infancy, adolescence, maturity and then further usefulness. Some difficult present problems in industry have light shed upon them by this comparison. We shall refer in particular to the steel industry, the automobile industry and the railroads.

In all three there has been and is regret that they do not "grow" as they used to. What does the human do? He "grows" in stature for a couple of decades, then reaching a so-called "maturity," but for decades afterward he grows in usefulness as the lives of many leaders in all lines of activity have testified.

It can be said that steel making has reached maturity, but only in the sense of its having attained a large tonnage. Does the consumer want weight in bridges, in automobiles, in airplanes? In the last five years steel tonnage has gained only in approximate proportion to the increase in population. The steel industry has reached a maturity by rapid growth in stature, but its usefulness is marked for continued and great increase by steel becoming more serviceable, pound for pound, as the years pass. Then it behooves producers to act as those having attained maturity, to put aside adolescent thoughts of physical growth and adopt the thoughts of maturity looking to growth in service, by making steel more adaptable and useful rather than by making more tonnage than is needed.

The automobile industry has reached a similar "maturity." The largest production, cars and trucks in the United States and Canada, in twelve consecutive months was the production in the twelve months through May, 1926. But the automobile increases in usefulness, in service rendered, and will continue to do so. Earnings reports of automobile companies show that the producers have an eye to profit rather than volume, as the industry is not in line for producing at much more than one-half its "capacity." The makers impress the public with their improvements in quality and appearance, in which they have an advantage over the steel producers. Eventually of course there will be less in this point.

Freight ton-mileage on the railroads used to double quite regularly every dozen years. Lately there has been no marked tendency for it to increase. Railroad-ing is not going down hill; it has simply reached a maturity in stature. There are new forms of transportation, by water and motor truck, which are having

their growth now. The railroads have their place. There is a large amount of transportation service which they are best fitted to render. The railroads are growing in efficiency. The fact that they do not buy many new freight cars does not show that they are going backward. American Railway Association reports show 96,753 freight cars installed in 1926 and 103,863 retired; in 1927, 71,040 installed and 91,435 retired, and in the first half of this year 28,651 installed and 42,867 retired, indicating a net decrease in number of cars in service of 41,721. The actual total in service was reported at 2,347,275 for Dec. 31, 1925, and 2,300,595 for June 30, 1928, making 46,680 decrease; but total capacity increased one-tenth of 1 per cent and average capacity per car from 44.77 net tons to 45.72 net tons.

Steel making, automobile production and railroad-ing, have grown up in stature but have long lives of increasing usefulness before them. Their functioning in maturity must differ from that of adolescence and they must come to a full realization of the fact.

Production, Employment and Wages

IN the Federal Reserve Bulletin are comprehensive statistics in succinct form of production, employment, factory payrolls and other things in the form of index numbers beginning with 1919 and running through May of this year. There is opportunity for a study of relationships showing that industrial production has increased in the last three years, also this year, that factory employment has decreased and that payrolls have decreased less, indicating larger earnings per man.

Index numbers for the three items are given below. For industrial production the base, 100, is the 1923-4-5 average. For the other two items 1919 is taken as base.

	Index Numbers		
	Industrial Production	Factory Employment	Factory Payrolls
1919.....	83	100	100
1920.....	87	103	124
1921.....	67	82	84
1922.....	85	90	89
1923.....	101	104	113
1924.....	95	95	104
1925.....	104	95	107
1926.....	108	96	109
1927.....	106	92	105
1928			
January ...	106	88	98
February ..	110	89	104
March	109	90	105
April	109	89	103
May	109	89	104

Considering industrial production as a separate item, we see a large increase in 1923. The increase over 1919 and 1920, when there seemed to be so much activity, and goods appeared to be scarce, was 19 per cent, marking the difference between inefficiency and shirking right after the war and reasonable efficiency after there had been a spell of hard times. Then we see further and fairly consistent gains up to and including this year; but the gain in five years has been only about 8 per cent, approximately the population gain.

It has been made clear in previous discussions of production and employment in THE IRON AGE that statistics showing the release of workers from indus-

tries whose activities are studied do not represent corresponding increases in unemployment, for workers go into new forms of employment. Unfortunately it is impossible even to estimate closely how nearly a balance is struck. The comparison between industrial production and factory employment is useful chiefly as an index of increasing efficiency in production methods. An index is obtained by dividing industrial production by factory employment, making 83 for 1919, 97 for 1923 and 122 for the first five months of this year, a remarkable progression indeed.

As to wages paid, an index is obtained by dividing factory payrolls by factory employment, making 100 for 1919, 109 for 1923 and 116 for this year, which is likewise a favorable progression.

All the figures are gratifying, as showing economic progress along sound lines. There is going to be much talk in the next few months about unemployment, with vague references to legislation. Talkers should be pinned down to actualities such as are indicated by these figures. Factories cannot be forced to produce more, or to employ more men in producing what they do. If politicians can bring about new forms of activity and patrons for them, let them go to it. If anything is needed it is that.

CORRESPONDENCE

Marking Ingots for Identification When Rolled Into Billets

To the Editor:—It will be found an impossible task to identify steel after rolling, by any paint or crayon marking prior to cogging or blooming, for two very definite reasons:—reduction of area and oxidation. Granting that you found it possible to secure a paint or crayon which would survive the furnace heat, you would find the marks distorted beyond recognition by the process of reduction.

Taking a 6-in. square ingot of 300 lb. weight and reducing it to a 2-in. square billet, the proportions will be as follows:

A 6-in. square x 28-in. or 300-lb. ingot will give a surface area on four sides of 672 sq. in. The same ingot reduced to 2 in. square gives a length of 22 ft. and 2112 sq. in. surface area. The comparison is 672 sq. in. to 2112 sq. in., or over three times the original area, which proves that the surplus area is secured by the metal working out from the interior during rolling.

Oxidation in the form of scale formation on commercial steels at normal temperatures of furnace heating will "shuck" off a paint or crayon mark to its practical extinction. Saw-marks and any form of nicking are prohibitive for the same reason, as reduction would distort them beyond recognition, as well as because of surface disfigurement and numerical limitation of this method.

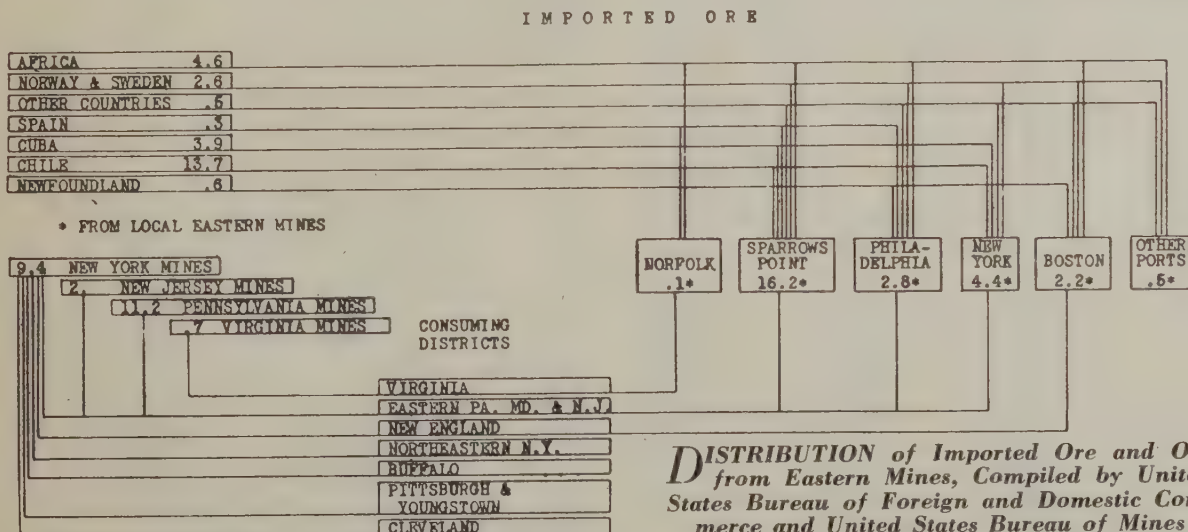
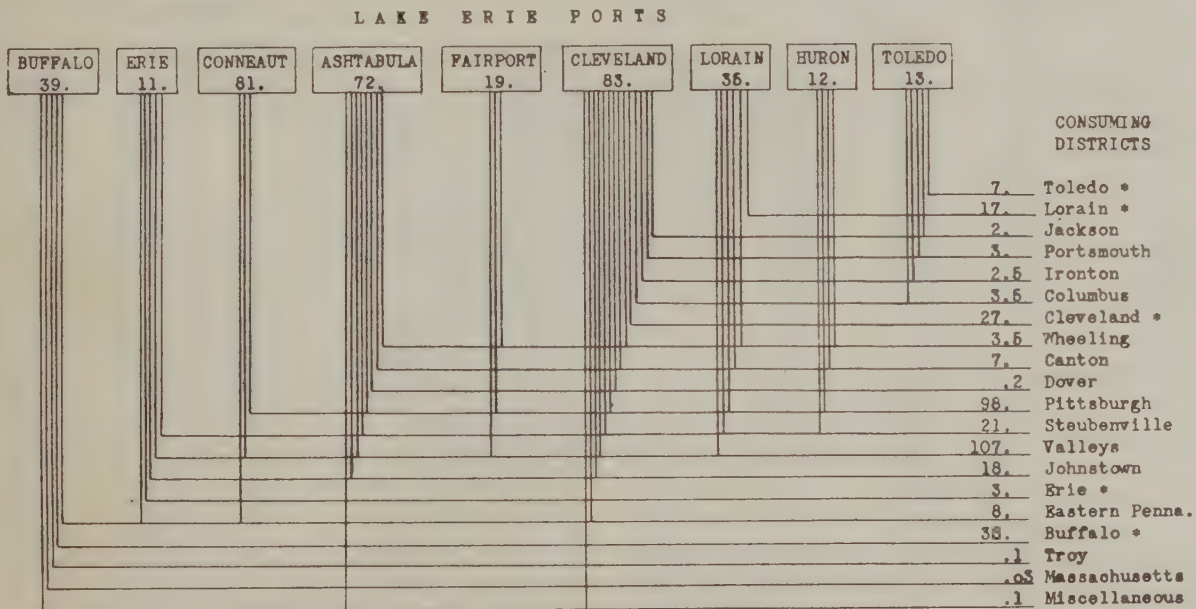
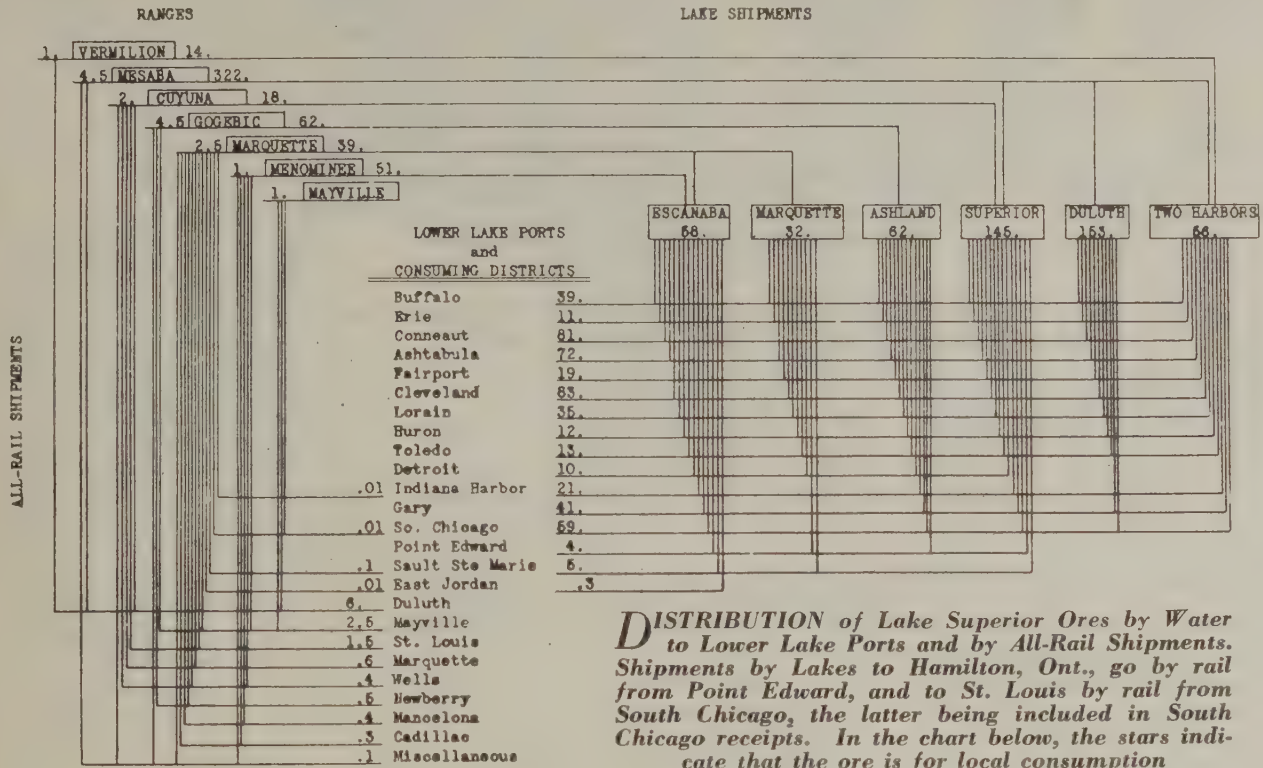
The only definite and certain way of securing the desired result is to use a tab of special non-oxidizing metal containing all the desired information. These tabs would be marked as desired for any identification and one inserted in the sink head of each ingot while it is still soft after pouring. This method will survive the furnace heat and will also carry through undisturbed during the mill operations, permitting easy and sure recognition of each billet.

EDWARD J. CUBLER.

4504 Weitzel Avenue, Baltimore, July 22.

Sources and Distribution of Ore in 1927

(Figures indicate tonnage in units of 100,000 tons)



July Pig Iron Output Falls Off

Complete Data Show the Daily Rate 3642 Tons
or 3.5 Per Cent Less Than June—
Net Loss of Four Furnaces

ACTUAL data for the pig iron production in July reveal considerable variation from the estimate published in THE IRON AGE, Aug. 2. The actual July output was higher than the estimate by 257 tons per day. The July rate was 99,091 tons per day compared with 98,834 tons per day as the estimate in the compilation of which the last two days of July were calculated by the producing companies.

Total July coke pig iron production was 3,071,824 gross tons or 99,091 tons per day for the 31 days as contrasted with 3,082,000 tons or 102,-

733 tons per day for the 30 days in June. This is a decrease for July of 3642 tons per day, or 3.5 per cent. The estimate last week showed a decrease of 3.8 per cent. July is the third month in succession to show a decrease, the June recession having been 3 per cent. Last year the July production was 2,951,160 tons or 95,199 tons per day. Thus the decline in July this year of 3.5 per cent in the daily rate compares with a decrease in July last year of 7.5 per cent.

Capacity Active Aug. 1

There were 185 furnaces active on

Aug. 1, having an estimated operating rate of 98,445 tons per day. This contrasts with an operating rate of 100,855 tons per day for the 189 furnaces active on July 1. Seven furnaces were blown in during July and 11 were shut down. Of the furnaces blown in, two were Steel Corporation stacks, four were independent steel company units, and one was a merchant stack. The 11 furnaces shut down were as follows: Steel Corporation, five furnaces; independent steel companies, three furnaces, and merchant producers, three furnaces. Thus the Steel Corporation had a net

Daily Average Production of Coke Pig Iron in the United States
by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year....	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,978	95,199	99,091
Aug.	60,875	87,241	103,241	95,073	.....
Sept.	68,442	90,873	104,543	92,498	.....
Oct.	79,907	97,528	107,553	89,810	.....
Nov.	83,656	100,767	107,890	88,279	.....
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107,043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York and Mass.	192,126	199,045	212,333	205,556
Lehigh Valley	64,921	60,640	77,195	81,140
Schuylkill Valley	53,855	52,434	53,162	60,062
Lower Susq. and Lebanon Valleys	30,079	29,207	32,019	31,522
Pittsburgh district	586,923	606,223	700,880	663,784
Shenango Valley	88,366	101,543	114,779	100,073
Western Pennsylvania ..	120,389	117,833	126,790	116,405
Maryland, Va. and Ky....	111,741	116,691	100,508	102,678
Wheeling district	154,636	145,717	124,948	115,284
Mahoning Valley	287,688	291,174	309,342	310,227
Central and North'n Ohio	379,277	349,952	357,900	336,200
Southern Ohio	44,339	40,810	26,380	25,548
Illinois and Indiana....	636,961	635,201	694,636	693,271
Mich., Minn., Mo., Wis., Colo. and Utah.....	122,875	127,085	137,987	134,163
Alabama	189,383	200,643	207,045	199,487
Tennessee	8,265	7,802	7,452	10,104

Total 3,071,824 3,082,000 3,283,856 3,185,504

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
July, 1927.....	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928.....	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931
June	81,630	21,103	102,733
July	79,513	19,578	99,091

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

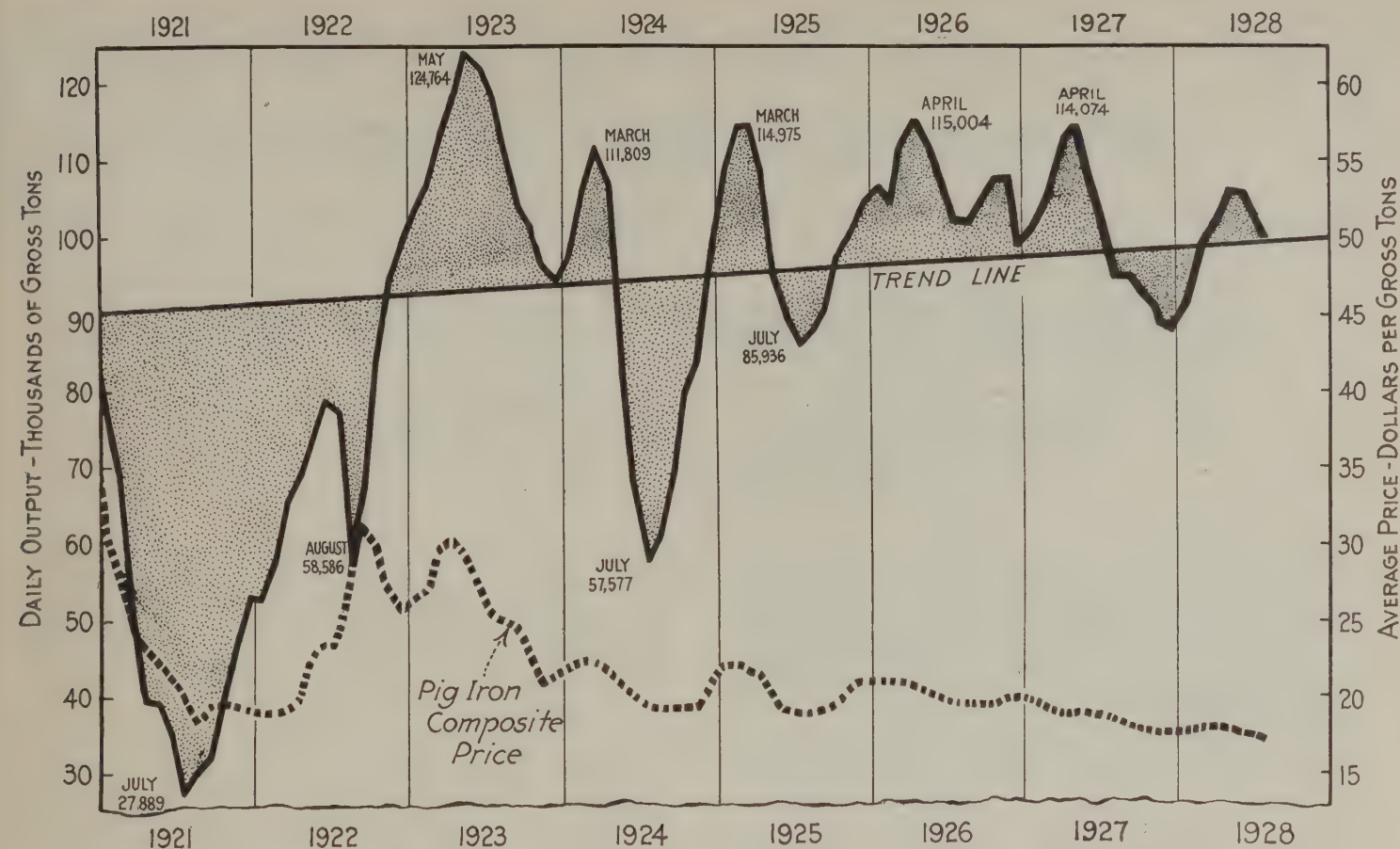
	Aug. 1		July 1	
Furnaces	Number in Blast	Capacity per Day	Number in Blast	Capacity per Day
New York:				
Buffalo	9	5,000	11	5,580
Other N. Y. and Mass....	2	825	2	800
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	6	2,460*	5	1,930*
Schuylkill Valley	4	1,730	4	1,750
Susquehanna Valley	2	910	2	975
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	1	60	1	80
Pittsburgh District	30	18,600	31	19,485
Ferromanganese	3	465	3	500
Shenango Valley	5	2,750	6	3,300
Western Pennsylvania ..	7	3,660	6	3,530
Ferromanganese	2	370	2	390
Maryland	5	2,610	5	2,600
Wheeling District	8	4,970	8	4,860
Ohio:				
Mahoning Valley	16	9,250	17	9,700
Central and Northern....	20	12,340	20	12,300
Southern	4	1,410	4	1,360
Illinois and Indiana....	29	19,900	29	19,780
Mich., Wis. and Minn....	5	2,150	6	2,665
Colo., Mo. and Utah	4	1,650	4	1,575
The South:				
Virginia	1	150	1	230
Ferromanganese	1	85	1	80
Kentucky	2	725	2	725
Alabama	16	6,030	16	6,320
Ferromanganese	1	80	1	80
Tennessee	2	265	2	260
Total	185	98,445	189	100,855

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months,
Beginning Jan. 1, 1926—Gross Tons.

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	3,082,000
½ year.....	19,848,461	19,430,678	18,520,921
July	3,223,338	2,951,160	3,071,824
Aug.	3,200,479	2,947,276	.....
Sept.	3,136,293	2,774,949	.....
Oct.	3,334,132	2,784,112	.....
Nov.	3,236,707	2,648,376	.....
Dec.	3,091,060	2,695,755	.....
Year*	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in July Was About 3.5 Per Cent Less Than in June; Composite Price Decreases Slightly
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

loss of three furnaces for the month, independent steel companies a net gain of one furnace, and merchant companies a net loss of two furnaces.

Steel and Merchant Iron

Steel-making iron in July was made at the rate of 79,513 tons per day, which was about 80 per cent of the total. In June the 81,630 tons per day of steel-making iron was also about 80 per cent of the total daily rate for the month. Merchant iron was, of course, about 20 per cent in each case. In July, 1927, the merchant iron was nearly 27 per cent of the total daily rate.

Possibly Active Furnaces Reduced

The Carbon furnace in the Lehigh Valley, the Tod furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley, and one Iroquois stack of the Youngstown Sheet & Tube Co. in the Chicago district have been abandoned during the last month and will be dismantled. This reduces the number of possibly active blast furnaces in the United States from 342 to 339.

Furnaces Blown In and Out

During July the following furnaces were blown in: One Bethlehem stack of the Bethlehem Steel Co. in the

Lehigh Valley; one Sparrows Point furnace of the Bethlehem Steel Co. in Maryland; one Donora furnace of the American Steel & Wire Co.; one Carrie furnace of the Carnegie Steel Co., and one Eliza stack of the Jones & Laughlin Steel Corporation, in the Pittsburgh district; the Colonial furnace in western Pennsylvania, and one Indiana Harbor furnace of the Youngstown Sheet & Tube Co. in the Chicago district.

Furnaces blown out during the month were as follows: One Susquehanna stack of the Hanna Furnace Co. and the Niagara furnace in the Buffalo district; one Sparrows Point stack of the Bethlehem Steel Co. in Maryland; one Carrie, one Clairton and one Edgar Thomson furnace of the Carnegie Steel Co., and one Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; one Farrell furnace of the Carnegie Steel Co. in the Shenango Valley; one Hubbard stack of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one Gary furnace of the Illinois Steel Co. in the Chicago district, and one Ford stack in Michigan.

Another New Record in Ferromanganese

At 32,909 tons the July output of ferromanganese was again the largest since separate records have been kept, surpassing the 32,088 tons made in June.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
	1927	1928	1927		1928	
			Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,943,881	2,155,133	31,844	7,486	22,298	†....
Feb.	2,256,651	2,274,880	24,560	7,045	19,320	†....
Mar.	2,675,417	2,588,158	27,834	7,650	27,912	†....
Apr.	2,637,919	2,555,500	24,735	12,907	18,405	†....
May	2,619,078	2,652,872	28,734	9,788	29,940	†....
June	2,343,409	2,448,905	29,232	10,535	32,088	†....
½ year	14,876,355	14,675,448	166,939	55,411	149,963	†....
July	2,163,101	2,464,896	26,394	9,350	32,909	†....
Aug.	2,213,815	.....	21,279	9,104	.....	.....
Sept.	2,090,200	.....	20,675	6,037	.....	.....
Oct.	2,076,722	.....	17,710	6,129	.....	.....
Nov.	1,938,043	.....	17,851	6,521	.....	.....
Dec.	1,987,652	.....	20,992	6,816	.....	.....
Year	27,345,888	.....	291,840	99,368	.....	.....

*Includes output of merchant furnaces.

†Data not available for publication.

Iron and Steel Markets

Demand Continues at July Rate

Improvement Extended to Railroad Car Industry—Steel Prices

Firmer—Extras Likely for Special Steels—Pig Iron

Buying Movement Under Way

ONE full week of August continues the record of sustained steel consumption which marked July. Output was slightly curtailed by hot weather, particularly in sheet and tin plate mills, but this served only to hold back shipments slightly and without disturbance to consumers, seeing that demand, while for known needs, is not essentially urgent.

The steel ingot returns for July emphasize the unusual summer activity. The production of open-hearth and Bessemer steel showed an expansion of nearly 2 per cent over June, besides immediately following a record half-year output. It was 19 per cent greater than the production of July, 1927, and the increase over June this year compares with a falling off last year of more than 8 per cent, from June to July. The 3,811,573 gross tons turned out last month brought the seven months' total nearly 1,600,000 tons ahead of the like period of 1927.

The improvement has extended to the railroad car industry, which has taken contracts for 550 cars for the Pennsylvania Railroad and is now figuring on cars and underframes for the Great Northern, which will require 45,000 tons of steel.

The diversified sources of business are indicative of a notably healthy situation among most manufacturing lines using pig iron as well as steel, for pronounced activity in forward pig iron covering in several centers is one of the week's developments. In Chicago steel sales have not been exceeded by any appreciable margin since the last week of March, when operations were close to capacity.

One result is that prices are showing more firmness than in many weeks. In the heavy tonnage products (plates, shapes and bars), orders are small, so well are large consumers covered, but where they figure back to a Pittsburgh basis, they all seem to be done at 1.90c. a pound. On black sheets 2.65c., Pittsburgh, is more common and on a larger tonnage than recently, and the mills now are expected to seek an advance on fourth-quarter business. Makers of strips also are taking a notably firm price stand.

An imminent promulgation of new extras for special analysis steels, to apply where there are measurable production costs for providing particular contents of carbon, silicon, manganese or other elements, is an illustration of the efforts to get remunerative prices. Charges of \$1 to \$5 a ton are comprehended on both semi-finished and finished steel. The proposal comes closely after that limiting the discount for cash payments on sheets, strips and hoops to ½ per cent instead of 2 per cent.

Complete returns of pig iron production last month

show an output of 3,071,824 gross tons, or 99,091 tons a day, a recession of 3.5 per cent from June. On Aug. 1 the 185 furnaces active were making iron at a rate of 98,445 tons a day, against 189 on July 1 producing at a rate of 100,855 tons. The net changes among active stacks were two fewer merchant furnaces, a loss of three Steel Corporation units and a gain of one among independent steel companies.

A pig iron buying movement of large proportions is under way in the Central West. At Cleveland, 50,000 tons was sold on top of close to that amount in the previous week. Chicago sales in July were 150,000 tons and business so far this month has continued at a corresponding rate. The market also is more active in the East, the week's sales at New York totaling 20,000 tons. About 50,000 to 75,000 tons of Buffalo iron, being brought down by barge from Buffalo furnaces, will be stored at New Jersey tidewater points to be reshipped by rail during the fall and winter to nearby consumers.

Heavy melting steel has moved up 75c. a ton at Pittsburgh and 25c. a ton at Chicago. There has been no marked increase in demand, but supplies are scarcer because of the low prices which have been prevailing.

Fabricated structural steel demand still gives high promise. New projects appearing in the week call for 52,000 tons, including 11,000 tons for 98 barges for the Mississippi River Commission, 6300 tons for a railroad bridge over Newark Bay and five buildings in Chicago requiring 2000 to 2500 tons each. Bookings amounted to 22,500 tons.

Present commitments for tin plate are sufficient to insure practically full operation through all next month. The Pacific Coast is now to have a tin plate plant, the Columbia Steel Corporation announcing plans to erect mills of 50,000 tons annual capacity at Pittsburg, Cal.

Tonnage from the pipe mills is coming chiefly from the oil companies for line pipe. The Youngstown Sheet & Tube Co. will supply 25,000 tons for 165 miles of a 14-in. line from Amarillo, Tex., to Enid, Okla. One oil company is believed to have 450 miles, or over 100,000 tons, to buy, and a proposed Wyoming to Salt Lake project calls for 350 miles of 20 or 22-in. pipe.

A new set of railroad freight rates on iron and steel now before the Interstate Commerce Commission would establish a mileage basis as a way to remove "undue prejudice and undue preference." Freight charges into New England from Pittsburgh would be 10 per cent higher, the Chicago-St. Louis rate would be raised from 22c. to 26c., the Ohio short haul rates would be discarded and there would also be numerous reductions. Arguments on exceptions made meanwhile will be heard probably in late October or in November.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Aug. 7, 1928	July 31, 1928	July 10, 1928	Aug. 9, 1927
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$20.76
No. 2, Valley furnace.....	16.50	16.50	16.75	17.50
No. 2, Southern, Cin'ti.....	19.19	19.19	19.19	20.94
No. 2, Birmingham.....	15.50	15.50	15.50	17.25
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.00	16.00	16.00	17.25
Valley Bessemer, del'd P'gh..	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	17.50	17.50	19.50
Malleable, Valley.....	17.00	17.00	17.00	17.50
Gray forge, Pittsburgh.....	18.01	18.01	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:

	Aug. 7, 1928	July 31, 1928	July 10, 1928	Aug. 9, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.85	1.85	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.85	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.24	2.19	2.19	2.14
Tank plates, Pittsburgh.....	1.90	1.85	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17 1/2	2.17 1/2	2.17 1/2	2.09
Beams, Pittsburgh.....	1.90	1.85	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	2.00
Beams, New York.....	2.14 1/2	2.14 1/2	2.14 1/2	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Aug. 7, 1928	July 31, 1928	July 10, 1928	Aug. 9, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.65	2.60	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.50	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$15.00	\$14.25	\$14.00	\$15.25
Heavy melting steel, Phila....	13.00	13.00	13.00	13.50
Heavy melting steel, Ch'go....	12.75	12.50	12.25	12.50
Carwheels, Chicago.....	12.75	12.75	12.75	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	15.50	16.00
No. 1 cast, Ch'go (net ton)...	13.50	13.50	13.50	15.00
No. 1 RR. wrot., Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Ch'go (net)...	10.75	10.75	11.00	12.00

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.75	\$2.75	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.75	13.50
Electrolytic copper, refinery...	14.50	14.50	14.50	13.12 1/2
Zinc, St. Louis.....	6.25	6.20	6.20	6.32 1/2
Zinc, New York.....	6.60	6.55	6.55	6.67 1/2
Lead, St. Louis.....	6.00	6.00	6.10	6.52 1/2
Lead, New York.....	6.20	6.20	6.20	6.80
Tin (Straits), New York.....	17.87 1/2	17.75	16.25	65.12 1/2
Antimony (Asiatic), N. Y.....	10.00	10.00	9.62 1/2	12.00

Pittsburgh

Tendency Toward Firmer Steel Prices as Mills Hold Recent Gain in Plant Engagement

PITTSBURGH, Aug. 7.—The steel industry is holding its recent gain in plant engagement, although it is probable that actual production has suffered somewhat from extremely hot weather. In point of specifications, the reports for the past week are quite as cheerful as those of the week before. Ingot production, on the basis of the units reported as active, still is fully 75 per cent, but considerable difficulty has been experienced in maintaining full crews in the sheet and tin mills on account of the heat, and it is probable that output of other classes of finishing mills has suffered from the same cause. This, however, merely means a slight backing up of orders and is not disturbing to either producers or consumers, as the demand, while constant, is not always urgent. More interesting than the fact that general business is running above normal for this time of year is the tendency of prices toward greater firmness.

While new business in bars, plates and shapes is limited by the fact that consumers generally are under cover for this quarter's requirements, the little that is coming out is finding sellers firm at 1.90c., base, Pittsburgh. A price of 2.65c., base, on black sheets is being named by more makers and on more tonnage than recently. Strip makers also are firmer in their prices. Preferential price treatment is more restricted. Indeed,

the disposition to make steel a more profitable commodity is gaining headway. There is not only the evidence of the reduction in the cash discount on sheets, strips, hoops and tin plate that producers have announced, but a list of chemical extras imposing a charge where there is a production cost, will be issued and will add to prices of all forms of semi-finished and finished products.

Scrap prices have advanced further

in this market; while there is some mill buying, the strength finds its chief explanation in nervousness among dealers who have gone short of the market and are alarmed by the very moderate offerings. There is little life to the pig iron market. In coke and coal, the condition still is that producers are seeking buyers rather than the reverse.

Pig Iron.—One sale of 500 tons of Bessemer iron is reported and scattering sales of this grade bring the total to about 1000 tons. There is no interest in basic iron and in foundry and malleable grades. Sales have been entirely of single carloads and orders have resulted more from active solicitation by sellers than from a pressing need on the part of melters. Steel foundries in this area still are running at under rather than above 50 per cent of capacity and engagement of close to 75 per cent of radiator and sanitary ware foundry capacity does not help pig iron sales much because operators are so well covered on their requirements. The movement on contracts is steady. Prices hold where they were a week ago. There are suggestions that less than \$16.50, Valley furnace, has been

done on No. 2 foundry, but they seem to be based on the fact that in some cases producers have not insisted on the full silicon differential for No. 2X grade. In view of the very limited demand, the silicon differentials of 50c. per half point of silicon are not being closely observed and 25c. is the usual demand. Most producers want as much for No. 3 and gray forge iron as for No. 2 foundry, but on the other hand have taken \$16.75 for No. 2X. There is still a quotation of \$16.75 for No. 2 grade. W. P. Snyder & Co. make the July average prices of basic and Bessemer iron from Valley furnaces \$16 and \$17, respectively, compared with \$15.43 and \$17 in June.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.50 to 16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—New business in ferromanganese, spiegeleisen and high grade ferrosilicon does not amount to much, as most users are under contract for the remainder of the year. As the steel industry is operating at a surprisingly high rate for this time of the year, specifications against ferroalloy contracts are above the seasonal average. Prices hold at recent levels.

Semi-Finished Steel.—A high rate of engagement of sheet and tin mills is reflected in specifications for sheet bars. Strip mill operations are down a little from what they were recently and this development has caused a corresponding letdown in the movement of billets and slabs. Prices are unchanged, with current shipments going at \$32, but with \$33 asked on new billet and slab business and also mentioned as the fourth quarter price of sheet bars. Buyers are meeting with no success in efforts to break \$42, base Pittsburgh, on wire rods.

Bars, Plates and Shapes.—The market is becoming more fully established at 1.90c., base Pittsburgh, on these products. It is the uniform quotation of mills here and rules on shipments

other than on contracts, which commonly are priced at 1.85c. Few buyers failed to secure full coverage for this quarter at 1.85c., and strictly new business does not reach very sizable proportions. Bar and shape specifications are coming along well. Plates are not doing as well as the others, but more than 12,000 tons is in sight in river barges and scows. On Aug. 17 bids will be opened at Memphis for 98 barges for the Mississippi River Commission, requiring 11,000 tons of plates and small shapes.

Wire Products.—Business is running a little behind that done at this time last year, but so far as prices are concerned there have been few periods in recent years when they were any more firmly maintained than they are now.

Rails and Track Supplies.—Specifications against contracts for spikes and other track supplies are somewhat heavier than they were recently. Not much new buying is being done. Light-section rails and small spikes still are dull.

Tubular Goods.—Fairly good demand is noticed for oil well pipe from the Seminole, Okla., field and from California, but it is for deep well drilling and runs heavier in seamless than in welded pipe. Standard-weight pipe is moving steadily for building and construction work. The chief prop to an average engagement of 70 per cent pipe-making capacity, however, is in line pipe. The Youngstown Sheet & Tube Co. recently took 25,000 tons of 14-in. pipe for a line to run from Amarillo, Tex., to Enid, Okla. Like other recent awards, this calls for early shipment. That company, also Spang, Chalfant & Co. and the National Tube Co. are busy on line pipe. The Texas Co. is reported to have placed with a Milwaukee fabricator 450 miles of 24-in. pipe for a gas line; that diameter, weighing 87 lb. per ft., would mean over 100,000 tons. This company has not yet closed for an oil pipe line to run from western Texas to Port Arthur, calling for 20,000 to 25,000 tons of 4 to 12-in. pipe. A 350-mile gas line is being projected to run from Wyoming to Salt Lake City, but this is probably

some distance away from an award, since franchises have not yet been granted.

Sheets.—Since all sheet consuming industries are normally busy for this time of the year and some upturn is noted in the activities of the farm implement manufacturers, sheet specifications still are flowing in at a good rate and mill operations show no recession. Production is somewhat under the rate of mill engagement on account of the extreme heat, which has made difficult the maintenance of full crews. The market appears stronger on black sheets and efforts to establish a minimum of 2.65c., base Pittsburgh, are meeting with some success. On galvanized sheets, the range remains at 3.40c., to 3.50c., base, while blue annealed sheets, produced by the jobbing mill as distinct from the strip mill product, hold at 2c., base.

Tin Plate.—Production has suffered rather heavily from excessively hot weather and while all of the mills are in operation, a good many turns have been lost, owing to the inability of mill managers to obtain full crews. The American Sheet & Tin Plate Co., which has been working an extra turn on Saturdays to make up for production lost during the week, was unable to work this turn last Saturday on account of the heat. Present commitments are sufficient to insure practically full hot mill operations through all of next month.

Cold-Finished Steel Bars and Shafting.—Demand, as typified by specifications, is holding up well to the recent average. Automobile parts makers are ordering steadily on contracts, but not in excess of their actual requirements. The market is firm at 2.10c., base Pittsburgh, with an advance likely on fourth quarter business in view of the stronger tendency in hot-rolled bar prices.

Hot-Rolled Flats.—Besides the fact that specifications for strips are holding up well for the time of year, the market is featured by a steadier price situation. Makers generally want higher prices on fourth quarter tonnages and realize that price weakness at this juncture would defeat

THE IRON AGE Composite Prices

Finished Steel Aug. 7, 1928, 2.348c. a Lb.

One week ago.....	2.319c.
One month ago.....	2.326c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	1928	2.314c., Jan. 3
1927	2.453c., Jan. 4;	1927	2.293c., Oct. 25
1926	2.453c., Jan. 5;	1926	2.403c., May 18
1925	2.560c., Jan. 6;	1925	2.396c., Aug. 18
1924	2.789c., Jan. 15;	1924	2.460c., Oct. 14
1923	2.824c., Apr. 24;	1923	2.446c., Jan. 2

Pig Iron Aug. 7, 1928, \$17.04 a Gross Ton

One week ago.....	\$17.04
One month ago.....	17.09
One year ago.....	18.13
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75, Feb. 14;	1928	\$17.04, July 24
1927	19.71, Jan. 4;	1927	17.54, Nov. 1
1926	21.54, Jan. 5;	1926	19.46, July 13
1925	22.50, Jan. 13;	1925	18.96, July 7
1924	22.88, Feb. 26;	1924	19.21, Nov. 3
1923	30.86, Mar. 20;	1923	20.77, Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland.....	2.04c. to 2.09c.
F.o.b. Cleveland.....	1.85c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Bethlehem.....	2.00c. to 2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland.....	2.15c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.60c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c.
No. 24, del'd Cleveland.....	2.74c. to 2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$2.90
2100 (1½% Nickel).....	0.55	3.20
2300 (3½% Nickel).....	1.50	4.15
2500 (5% Nickel).....	2.25	4.90
3100 Nickel Chromium.....	0.55	3.20
3200 Nickel Chromium.....	1.35	4.00
3300 Nickel Chromium.....	3.80	6.45
3400 Nickel Chromium.....	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.10
5100 Chromium Spring Steel.....	0.20	2.85
6100 Chromium Vanadium Bars.....	1.20	3.85
6100 Chromium Vanadium Spring Steel.....	0.95	3.60
9250 Silicon Manganese Spring Steel.....	0.25	2.90
Chromium Nickel Vanadium.....	1.50	4.15
Carbon Vanadium.....	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1½.....	45	19½	¾ to 1½.....	+11	+89
1½ to 2.....	51	25½	1½.....	22	2
2.....	56	42½	2.....	28	11
2½.....	60	48½	1 to 1½.....	30	18
1 to 3.....	62	50½			

Lap Weld

2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	41½	7 to 12.....	26	11
11 and 12.....	53	40½			

Butt Weld, extra strong, plain ends

1½.....	41	24½	¾ to 1½.....	+19	+54
1½ to 2.....	47	30½	1½.....	21	17
2.....	53	42½	2.....	28	12
2½.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 3 in.....	37
3 in.....	40
3½ to 4 in.....	42½
4 to 13 in.....	46
1½ in.....	+18
1¾ to 1½ in.....	+9
2 to 2½ in.....	—2
2½ to 3 in.....	—7
3½ to 4 in.....	—9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1¼ to 1½ in.....	55	3½ to 3¾ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	46
2½ to 2¾ in.....	42		

Hot Rolled

2 and 2½ in.....	40	3¼ and 3½ in.....	56
2½ and 2¾ in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

efforts that may be made to get them. Makers of hoops have announced a reduction in the cash discount of from 1 per cent to one-half of one per cent, effective Oct. 1.

Cold-Rolled Strips.—As specifications on contracts continue to exceed expectations for this time of the year, the occasion does not exist for active solicitation of new business. Prices, though no higher than they have been, at least are steadier.

Bolts, Nuts and Rivets.—Firm prices, but only moderate activity still is the story of these products.

Warehouse Business.—Warehouse prices of sheets have been lowered \$2 per ton in keeping with the lower mill bases recently reached. Business is better in sheets than it was a month or so ago and is fairly active in the other steel products.

Coke and Coal.—Standard beehive oven furnace coke for spot or prompt delivery still is hard to buy at less than \$2.75 per net ton at ovens. This is the result of recent purchases by a steel company to supplement its by-product oven production and the fact that, with no assurance of a sustained demand, no ovens have been put into production. There are offerings of 48-hr. coke at \$2.65, which would be taken for blast furnace use if the requirements were urgent. Standard foundry coke sells commonly from \$3.75 to \$4, but there are offerings as low as \$3.25 and choice brands are priced from \$4.25 to \$4.85. The coal market still is very dull and prices are easy.

Old Material.—Heavy melting steel this week is quotable from \$14.50, at which one mill in the district bought a fair-sized tonnage, to \$15.50, which is the price reported to have been obtained for offerings of this grade in the August list of the Pennsylvania Railroad. Since the railroad steel went to a dealer, there is the inference that the mill at the point of delivery paid \$16, but this is not confirmed.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes ..	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. ..	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

firm. Mill buying has not been conspicuous lately and the stronger tendency which the market has lately developed finds its chief explanation in the fact that the short interest is large at two points and dealers are disturbed because not much scrap is coming out. Compressed sheets have moved up with heavy melting steel and the higher prices also are supported by sales. The market is also firm on machine shop turnings and on blast furnace grades. There is 4034 gross tons in the August scrap list of the Norfolk & Western.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.50
Scrap rails	14.00 to 15.00
Compressed sheet steel.....	14.50 to 14.75
Bundled sheets, sides and ends	13.50 to 13.75
Cast iron carwheels.....	14.00 to 14.50
Sheet bar crops, ordinary.....	15.00 to 15.50
Heavy breakable cast.....	11.75 to 12.25
No. 2 railroad wrought.....	14.50 to 15.50
Heavy steel axle turnings.....	13.00 to 13.50
Machine shop turnings.....	9.50 to 10.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers.....	15.00 to 15.50
Railr. coil and leaf springs.....	15.00 to 15.50
Rolled steel wheels.....	15.00 to 15.50
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate.....	17.50 to 18.00
Low phos., light grade.....	16.50 to 17.00
Low phos. sheet bar crops.....	17.50 to 18.00
Hvy. steel axle turnings.....	13.00 to 13.50
Electric Furnace Grades:	
Low phos. punchings.....	16.00 to 16.50
Hvy. steel axle turnings.....	13.00 to 13.50
Blast Furnace Grades:	
Short shov'l'g steel turnings	10.00 to 10.50
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings.....	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades:	
Steel car axles.....	18.25 to 18.75
No. 1 railroad wrought.....	10.50 to 11.00
Sheet bar crops	16.00 to 16.50
Cupola Grades:	
No. 1 cast	14.25 to 14.50
Rails 3 ft. and under.....	15.00 to 15.50

Rainey Interests Acquire Clyde Coal Co.

W. J. Rainey, Inc., New York, has bought the property of the Clyde Coal Co., comprising approximately 1000 acres of coal land, and on and near the Monongahela River a short distance south of Brownsville, Pa. A report that the purchaser had made a long time contract with the Sharpsville Furnace Co. to supply 30,000 tons of coal a month from the Clyde mine to a by-product coke plant to be built on Neville Island to serve the blast furnace recently bought from the United States Steel Corporation, however, is unconfirmed.

Activity in New England

The Strand & Sweet Mfg. Co., Winsted, Conn., enameled wires, is working on two 12-hr. shifts.

The north side H. B. Smith Co., Westfield, Mass., heater plant is now operating with a night shift. Early in the year there was talk of closing the plant because of a lack of business.

The Dunbar Brothers Co., Bristol, Conn., springs, did more business

during the first half of 1928 than in the whole of 1927. It reports substantial unfilled orders on its books and has a larger force than at any other time in its history except during the war.

Confirming earlier reports of an unsatisfactory textile machinery market in New England, the Foster Machine Co., Westfield, Mass., is operating at not more than 60 per cent of capacity. The company expects no real improvement in the machinery market until the many changes entering into the textile situation have run their course.

Scranton Mill Acquired For Lebanon Iron Co.

The Scranton Bolt & Nut Co., Scranton, Pa., has been taken over by interests represented by Charles Hart, president Delaware River Steel Co., Chester, Pa. For a number of months Mr. Hart has been active in reorganization work at the Lebanon Iron Co., Lebanon, Pa., and it is expected that the two companies will be closely connected. At present, however, no change will be made in the personnel or plant of either. Mr. Hart has been elected president and a director of the Scranton Bolt & Nut Co.

Valley Mills Operating 75 to 80 Per Cent

YOUNGSTOWN, Aug. 7.—Hot weather during the past week curtailed production at Valley iron and steel plants somewhat, though schedules are being well maintained at rates of recent weeks. Some steel makers estimate that output this summer will come close to establishing a mid-year record, especially in tin mills.

Steel ingot production is sustained at 75 to 80 per cent average. The Republic Iron & Steel Co., the Youngstown Sheet & Tube Co. and the Carnegie Steel Co. are averaging fully 75 per cent.

Inflow of new business is at the rate of recent weeks. Of 53 independent open-hearth furnaces, 40 are melting, a loss of one compared with the preceding week; 14 of 20 pipe mills are in action and 99 of 127 sheet mills. Bar, plate, strip and tin mills are maintaining the schedules of recent weeks. Independent Bessemer steel production is at 60 per cent.

A ten-story structure, an addition to Bullock's, Los Angeles, represents a record in speedy construction, according to the American Institute of Steel Construction. The old buildings on this site were demolished in April. The finished piers for the beams were in place May 1 and by June 1 all of the steel framing was in place. The structural steel amounting to 1172 tons, was erected in 15 working days, according to the Llewellyn Iron Works, Los Angeles, who were responsible for the job.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1 3/4-in.....	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock.....	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.

Manganese ore, washed, 52% manganese, from the Caucasus.....39c.
Manganese ore, Brazilian, African or Indian, basis 50%.....38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates.....\$11.00 to \$11.25

Chrome ore, 45 to 50% Cr₂O₃, crude, c.i.f. Atlantic seaboard.....\$22.00 to \$24.00

Molybdenum ore, 85% concentrates of MoS₂, delivered.....50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt.....	\$2.65 to \$2.75
Foundry, f.o.b. Connellsville prompt.....	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens..	8.00
Foundry, by-product, New England, del'd.....	11.00
Foundry, by-product, Newark or Jersey city, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-products, St. Louis, f.o.b. ovens.....	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines.....	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines.....	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines..	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines....	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	180.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd.....	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$290.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
	First Quality
	Second Quality
Pennsylvania	\$43.00 to \$46.00
Maryland	45.00 to 46.00
New Jersey.....	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton.....	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E..	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(1/2-In. and Larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00

Small Rivets

(7/16-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh.....	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago.....	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread.....	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs.....	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 3/4 in. x 6 in. take 10 per cent lower list prices.

Chicago

Western Steel Market Holds Gains of Last Few Weeks— Great Northern Seeks 2500 Cars

CHICAGO, Aug. 7.—There is every indication that the local steel market has held the gains made in the last few weeks. Prices for finished steel products, however, are not steady at 2c., Chicago, for the reason that some sellers continue to use 1.95c. per lb. for bargaining purposes, and still lower quotations are being made to fabricators and tank builders where specific tonnages are involved. This situation is expected in some quarters to change as mill order books slowly grow and as producers gain greater confidence in the trend of the market for the remainder of this quarter.

In finished steel, sales are the best since the week ended June 23 and have not been exceeded by an appreciable margin since the seven-day period ended March 31. Specifications, which match well with new business, are in greater volume than in any week since May 19 and have not been exceeded since the last week in March. It is worthy of note that weekly comparisons of business can go back to the closing week in the first quarter, when operations were close to capacity.

There is no change in the character of business. The improvement is general, even now extending to the car industry, which has begun to figure on 2500 freight cars and 2000 underframes for the Great Northern. This inquiry calls for 1000 ore cars, 500 gondolas, 500 flat cars and 500 box cars, which, with the steel needed for the underframes, will add not far from 45,000 tons of steel to producers' books.

Rail mill operations are fair, considering that this is beyond the time when such shipments are usually made. The Chicago, Rock Island & Pacific has applied for permission to build a 6-mile spur in Arkansas.

Following a sharp increase in building permits in Chicago, there is now over 15,000 tons of new structural inquiry before local fabricators. Awards during the week totaled 3000 tons.

Ferroalloys.—Prices for 19 to 21 per cent spiegeleisen range from \$31, Hazard, Pa., in tonnages to \$33 a ton in car lots, several sales of the latter size having been made during the week. Some of the foreign product is being offered freely at \$32. Ferromanganese is quiet and quotations are based on \$105, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Pig Iron.—The steady buying movement that started several weeks ago in the Northern iron market is still in evidence. Some buyers, having covered for the remainder of the year, are sufficiently attracted by present prices to make inquiry for tonnages to be delivered after Jan. 1. Inquiry for shipment in this and the next quarter is not being broadcast, buyers preferring to enter the market quietly. A few small orders to the west and south are being filled by iron from Granite City at prices that are governed by Chicago furnace quota-

tions and local freight rates. Some of this iron is reaching into territory where freight differentials favor Chicago producers. A Chicago user has ordered 2000 tons of foundry iron. A melter in Iowa will buy 1500 tons of Southern iron. Purchases in July totaled 150,000 tons and the daily rate in August compares favorably with that in July.

Prices per gross ton at Chicago:
N'th'n No. 2 fdy., sil. 1.75 to 2.25... \$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75... 18.00
Malleable, not over 2.25 sil..... 17.50
High phosphorus 17.50
Lake Super. charcoal, sil. 1.50.... 27.04
So'th'n No. 2 fdy. (all rail)..... 21.51
So'th'n No. 2 (barge and rail)..... 21.01
Low phos., sil. 1 to 2, copper free \$28.50 to 29.00
Silvery, sil. 8 per cent..... 29.79
Bess. ferrosilicon, 14-15%..... 46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Structural Material.—The outlook in structural material is taking a sudden change for the better as 10,000 tons in new projects comes before the trade. In Chicago, the Thompson Building and the Ruboff Garage will each require 2000 tons, and an extension to Wacker Drive calls for 2500 tons. The revival of the McCormick Estate building project promises 2500 tons additional, and if a permit is granted to the United States Gypsum Co. for a plant in the Calumet district another 2500 tons will be added to the active list. Noteworthy among awards are 1000 tons for a viaduct at Topeka, Kan.; 600 tons for highway bridges at Oklahoma City, Okla., and 500 tons for a school at Muncie, Ind. Building permits in Chicago during July were 41 per cent larger than in July, 1927, and 4 per cent larger than in June, this year. This situation is lending encouragement to fabricators, who have been engaged close to capacity in recent weeks, but who lacked the assurance that operations would be maintained even as far ahead as Sept. 1. Two large projects in Chicago are being held in check. The Fine Arts Building, requiring 5000 tons, cannot go ahead at present because bids for rehabilitation of the structure exceed the amount of the funds provided in the bond issue. The Patterson Estate building is delayed while the design is being changed. On the general run of business, shape prices are steady at 2c.; however, on highly competitive projects 1.90c., Chicago, is being done.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Plates.—New orders for plates for oil storage tanks are scarce, the total amounting only to 1000 tons. Inquiry, however, bulks large and the changed outlook throughout the oil industry gives steel producers encouragement. Specifications against recent business are large, the bulk of orders being for immediate shipment. Except for an inquiry from the Great Northern for 2500 freight cars and 2000 steel underframes, the railroad equipment market is quiet. Little business is coming to the steel trade from car builders. It is reported here that 150 of the all-steel refrigerator cars recently ordered by the Pennsylvania Railroad will be built in shops near Chicago. The Chicago, Burlington & Quincy is considering building 33 suburban passenger cars in its shops at Aurora, Ill. Plate mills are engaged at close to 70 per cent, due in large measure to demands of pipe makers, the building industry and oil field work.

Mill prices on plates, per lb.: 2c., base Chicago.

Bars.—Demand for soft steel bars remains near the high level reached a week ago. Local mills are engaged close to 80 per cent of capacity and occasionally a unit is found which is operating at capacity. In a few sizes deliveries have been pushed forward, the range now being three to five weeks. Reinforcing bar dealers are taking larger quantities, while the automobile industry and manufacturers of farm implements find that their needs are not diminishing. Unsteadiness in prices is no more marked than during the last three weeks. In scattered cases a seller will use 1.95c., Chicago, as a bargaining price, or he will drop to that figure for an attractive order. To offset this, however, several sizeable sales to industrial users at 2c. are reported. Demand for rail steel bars is steady and shipments do not quite measure up to production. Deliveries range from four to six weeks except for the more extended dates for tube products made from old rails.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Reinforcing Bars.—This week follows in the path of late July in the placing of contracts. Fresh inquiry is of good size and more is to come, as indicated by the activity of architects. Total business in the first seven months of this year was not equal to that in the corresponding part of 1927. Small orders are growing in number and shop schedules are well balanced. Some unsteadiness is noted in warehouse prices for billet steel bars, weakness being more evident in large tonnage quotations than on orders for 100 tons and less. Recent awards and fresh inquiries are shown on page 375.

Sheets.—Sales continue in fair volume and hot mill bookings are growing. This incoming business is in sufficient volume to defer any material profit which might come to producers through an advance in sheet prices.

That an advance is in sight now appears probable, but its effect will be more as a gesture toward getting higher prices for fourth quarter business than as a move that will widen margins of profit over the next 45 to 60 days. In some quarters it is believed that an advance now will lead to a second increase of \$2 a ton before the opening of the next quarter. Present prices at Chicago are 2.15c. per lb. for blue annealed sheets, 3.65c. for galvanized and 2.80c. for black sheets. Local sellers have not as yet taken definite action in establishing one half of 1 per cent discount in place of the 2 per cent for cash in 10 days, which some mills have announced will take effect Oct. 1. Current specifications, plus new business for immediate release, are holding hot mill operations at 75 to 80 per cent of capacity, and schedules are better arranged and further in advance than in late July. The roofing trade is actively buying against its fall needs.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Rails and Track Supplies.—Miscellaneous orders continue to reach this market and local rail mills are holding to 50 per cent of capacity. One railroad has placed 4000 tons of standard-section rails, this being new business over and above the old contract and option. The Milwaukee Harbor Commission will take figures on 750 tons of rails and 250 tons of track accessories. Track supply output holds to 70 to 80 per cent of capacity, a range that has been maintained for several weeks. Chicago mills are looking for the fall rail buying movement to start in September. Considerable optimism exists over the outlook for rail purchases, following exceptionally satisfactory crops that are now maturing in the West and Northwest.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—The strength shown in this market a week ago is being

carried forward and has now spread to the specialties. Electric furnace users have more business and are buying for future requirements. Less sales resistance is being offered by operators of gray iron foundries. It is reported from Milwaukee that an accumulation of heavy melting steel, which is said to have totaled over 75,000 tons at one time, has largely been absorbed by users in Chicago. This is having a strong influence on the local market. A heavier use of scrap at steel mills is reflected in lessened restriction as to the rate of shipments. Dealers are paying over \$13.25 a gross ton for heavy melting steel to be applied against old orders. The possibility of boat shipments of scrap from Chicago appear to hinge around the difficulty of the rapid assembling of the tonnage needed in order to avoid the per diem charge on the boat. An industrial producer offers 250 tons of cast iron borings.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.75 to \$13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels	15.50 to 16.00
Railr'd tires, charg. box size	15.50 to 16.00
Railr'd leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	15.75 to 16.25
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phos. punchings.....	14.00 to 14.50
Low phos. plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	9.00 to 9.50
Cast iron borings.....	9.25 to 9.75
Short shoveling turnings..	9.00 to 9.50
Machine shop turnings....	6.00 to 6.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft..	15.25 to 15.75
Angle bars, steel.....	14.50 to 15.00
Cast iron carwheels.....	12.75 to 13.00
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	19.50 to 20.00
Iron car axles.....	24.00 to 24.50
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought...	10.75 to 11.25
No. 2 railroad wrought...	11.25 to 11.75
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth.	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast.....	13.50 to 14.00
No. 1 railroad cast.....	12.75 to 13.25
No. 1 agricultural cast....	12.50 to 13.00
Stove plate	10.75 to 11.25
Grate bars	11.25 to 11.75
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cast Iron Pipe.—The bulk of going business, which is in small lots this week, is being taken at \$35 a ton, Birmingham, and quotations on large tonnages are close to \$34. Current business is for the most part of car lot proportions and fresh inquiry is

small in the aggregate, though several municipalities in and near Cook County, Illinois, are giving consideration to purchases of cast iron pipe. Two public utility companies have ordered a total of 800 tons, and several railroads have taken small tonnages. The only public inquiry of note is for 300 tons of 16 to 48-in. pipe for Columbus, Ohio. Total sales in the first seven months of this year lagged behind those in the corresponding period in 1927. Several foundries report low stocks on hand.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Hot-Rolled Strip.—Chicago district mills continue to operate at capacity, as users, including automobile frame makers, press for deliveries and release specifications at a steady rate. Prices are steady at 2c. to 2.30c. per lb., Chicago, depending on the width desired.

Wire Products.—Reports of current business vary, but as judged by shipments the general average strikes not far from the level of last week. Mill output remains at 60 to 65 per cent of capacity. Mill stocks are adequate and are being held stationary except in reinforcing mesh, which is in large demand at this time of the year. Sales to the manufacturing trade have grown in the last seven days. Jobbing trade in rural districts is quiet, but the outlook for the fall trade is favorable as based on the apparent assurance that crops will be large. New purchases and specifications by the railroads are light. Demand for nails remains sluggish, especially in rural districts. Reports of a sharp increase in building permits in Chicago in July hold some promise for a better demand from the local building trade.

Coke.—Shipments are steady and all ovens are lighted. Prices for by-product foundry coke are \$8, f.o.b. local ovens, and \$8.75 a ton, delivered in the Chicago switching district.

Bolts, Nuts and Rivets.—Specifications are steady. The industry is engaged at between 60 and 65 per cent of capacity.

Increases Land Holdings at Economy

Spang, Chalfant & Co. have acquired from the Columbia Steel & Shafting Co. approximately 44 acres of land which the latter bought about eight years ago at Economy, Pa., as a site for a plant which was to have combined the facilities of its plants at Carnegie and Rankin, Pa. Having previously acquired the land holdings of the Economite Society, Spang, Chalfant & Co. now hold title to about 500 acres of industrial land in Economy, or substantially all there is that is not occupied. The most recent purchase adjoins the site of the Standard Seamless Tube Co., now part of Spang, Chalfant & Co. An announcement as to the utilization of the land will be made this fall.

Warehouse Prices, f.o.b. Chicago	
Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb.	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg....	3.10

Philadelphia

July Activity in Steel Buying Continues, but Prices Still Show \$1 a Ton Range

PHILADELPHIA, Aug. 7.—The steady flow of steel business, which reached such satisfactory proportions in July, is continuing into the present month, so that sellers are beginning to view the third quarter with considerable optimism. Prices are still slightly irregular, the quoted market price applying in most cases only on small lots for prompt shipment. Sheet mills are endeavoring to stabilize prices on blue annealed, black and galvanized sheets by eliminating concessions of \$1 a ton on blue annealed and black and \$2 a ton on galvanized, but the lower levels are still obtainable, especially by distributors and other preferred buyers. Bar and plate prices show more firmness than quotations on shapes, but concessions from 2c. per lb., Pencoyd, on shapes have become less common than a few weeks ago.

Pig Iron.—Eastern Pennsylvania furnaces are maintaining \$19.50 per ton, base, on the foundry grade, but present inquiries, which range from a carload to 100 or 200 tons, offer little test of the market. Although Buffalo iron is being sold to many consumers in this district, sellers here are beginning to discount some of the low prices claimed by buyers. On a carload of foundry iron for the United States Navy Yard, Philadelphia, the Delaware River Steel Co. was low bidder and on a carload for the Brooklyn Navy Yard the Alan Wood Iron & Steel Co. was low. The Baldwin Locomotive Works, Eddystone, Pa., has closed on 2000 tons of cylinder iron with an eastern Pennsylvania steel company furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.	21.26
Basic (del'd east. Pa.)	\$18.75 to \$19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Billets.—Sales of rerolling quality at \$32 per ton are less common, most mills maintaining the market at \$33 per ton, Pittsburgh, on rerolling grade and \$38, Pittsburgh, for forging billets.

Bars.—While most mills are quoting 1.90c., Pittsburgh, or 2.22c., Philadelphia, on new business, it apparently applies for the most part to small orders for prompt shipment. Current contracts are, with few exceptions, at 1.85c., Pittsburgh, or 2.17c., Philadelphia, and desirable tonnages for delivery in this quarter usually bring out this price. Bar mills are well booked with orders, having had in July one of the best months of the year. Local construction projects requiring reinforcing bars seldom exceed 30 or 40 tons.

Shapes.—Prices are still considerably less than the scheduled market of 2.05c., Bethlehem, or 2.18c., Phila-

delphia, but concessions from 2c., Pencoyd, or 2.06c., Philadelphia, are less common, the bulk of present business being reported at 2.06c. to 2.08c., delivered Philadelphia.

Plates.—On small tonnages for prompt shipment 2.05c., Coatesville, usually applies, but larger business is at \$1 a ton less, or 2.10c., delivered Philadelphia, which is the current contract price. Mills report a good volume of business, especially large for midsummer.

Sheets.—Despite recent efforts of mills to maintain prices at a higher level, black sheets are still obtainable by preferred buyers at 2.60c. per lb., Pittsburgh, or 2.92c., Philadelphia, a concession of \$1 a ton from the quoted market; galvanized sheets still bring 3.40c., Pittsburgh, or 3.72c., Philadelphia, which is \$2 a ton lower than the price some mills are trying to maintain. There are still occasional instances of slight concessions from 2c., Pittsburgh, or 2.32c., Philadelphia, on blue annealed sheets, but most sales of this product show no concession.

Warehouse Business.—Effective Aug. 1, jobbers in this district advanced prices on bars and bar-size shapes 10c. per 100 lb. to 2.70c. per lb., base. The early part of July was active, but the final week of the month registered a slight decline in tonnage

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats.	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

moving from stock, and the total of orders in the first few days of the present month is also smaller.

Imports.—In the week ended Aug. 4 there were no arrivals of pig iron at this port, but a total of 14,623 tons of iron, manganese and chrome ore was received. Of this, 246 tons of iron ore was from Spain, 2000 tons of chrome ore from Portugal and, of three shipments of manganese ore, 7350 tons came from Russia, 5016 tons from British West Africa and 11 tons from Germany. Ferromanganese totaling 130 tons came from the United Kingdom and 50 tons of steel scrap arrived from Germany. Steel arrivals consisted of 406 tons of structural shapes from Belgium, 24 tons of steel bars from Germany and 46 tons of billets from Sweden.

Old Material.—Prices show little change, with a plentiful supply of scrap available at the present market levels. A small tonnage of machine shop turnings has been bought by a consumer at Phoenixville, Pa., for \$10.50 per ton, an advance of 25c. a ton from its previous purchase price. A mill at Claymont, Del., has bought close to 10,000 tons of No. 1 heavy melting steel from two dealers at \$13 per ton, delivered. A small tonnage of cast iron carwheels was closed last week at \$15.75 per ton, delivered, but a desirable order would apparently still bring out \$15 per ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails.	12.50
No. 2 heavy melting steel.	\$10.50 to 11.00
No. 1 railroad wrought.	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	14.00 to 15.00
Railroad grate bars.	11.00 to 11.50
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under.	17.50 to 18.00
Couplers and knuckles.	14.50 to 15.00
Rolled steel wheels.	14.50 to 15.00
No. 1 blast f'nace scrap.	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire.	11.00
Cast iron carwheels	15.50 to 15.75
No. 1 cast.	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling.	14.50 to 15.00

Pacific Coast Plant to Make Tin Plate

Tin plate is to be produced on the Pacific Coast for the first time in February, 1929, according to an announcement by the Columbia Steel Corporation, San Francisco. The directors of the company recently made an appropriation of \$4,300,000 for plant extensions, \$2,500,000 of which is to be used in constructing a tin plate mill at the Pittsburgh plant of the company. The new mill, when completed, will have a capacity of 50,000 tons per year.

New York

Pig Iron Sales Total 20,000 Tons—Structural Steel Outlook Continues Promising

NEW YORK, Aug. 7.—Pig iron sales amounting to more than 20,000 tons made the past week the most active of the summer and inquiries are coming out daily which promise to maintain a satisfactory volume of buying for the greater part of the month. There are also indications that prices have not shown further weakness, and any change which may have taken place seems to be on the side of firmness. Outstanding among the week's transactions was the purchase by the Eastern Malleable Iron Co. of 6000 tons of malleable for delivery over the remainder of the year to its five plants. The business is said to have been divided between two and possibly three furnaces. Another sale of 2000 tons is reported, and the Richmond Radiator Co. has closed against its inquiry for 1500 tons of foundry iron for Norwich, Conn. The bulk of this tonnage is said to have gone to the Massachusetts maker. Other sales of from 500 to 1000 tons are reported and smaller purchases include 200 tons of foundry iron for spot shipment to the Schenectady, N. Y., works of the American Locomotive Co. and 100 tons of silvery for the New York Air Brake Co. at Watertown, N. Y. Reported purchase of a substantial tonnage by the American Radiator Co. cannot be confirmed, although the company is expected to buy iron for its various Eastern plants in the near future. New inquiry, totaling from 10,000 to 12,000 tons, includes 4000 tons of No. 2 plain and No. 2X for shipment over the rest of the year to the two plants in northern New Jersey of a large furnace manufacturer. Some 3000 tons will be bought by another melter in this district, and smaller inquiries include a lot of 700 tons, 500 tons for a New England consumer and 250 tons for a melter in the New York territory. Buffalo furnaces are shipping foundry iron by barge to storage yards at New Jersey tidewater points and it is estimated that from 50,000 to 75,000 tons will have been accumulated by the time navigation on the State barge canal closes in the fall. One interest has storage facilities at Elizabethport and another at Jersey City and the iron will be reshipped by rail to Eastern consumers as the demand arises. While this movement virtually amounts to an extension of the time during which barge competition from Buffalo can affect this market, a curtailment of production at furnaces in that district seems to be leading to a somewhat better price situation. The Hanna Furnace Co. has blown out a Susquehanna stack and only three furnaces at Buffalo are now operating on foundry iron. The price of this grade still ranges from \$16 to \$16.50, furnace, and instances of cutting the lower figure are seldom heard outside

of highly competitive New England territory. An adjustment of freight rates on the New York, New Haven & Hartford Railroad in that district is said to have been favorable to the

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll, strip, soft and quarter	
hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'l'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	
	Per Cent
Machine bolts, cut thread:	Off List
¾ x 6 in. and smaller.....	60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.....	60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.
No. 22.....	3.75c. to 3.95c.
No. 24.....	3.80c. to 4.00c.
No. 26.....	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30.....	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Everett furnace. Eastern Pennsylvania iron is quoted at \$19.50, furnace.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75	
to 2.25.....	\$19.51 to \$20.01
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25.....	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75.....	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	
2.75 to 3.25.....	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Sheets.—Although no definite announcements have reached local selling offices, there are reports of a prospective advance in sheet prices. Meanwhile, some headway has been made in bringing about a degree of stabilization in present quotations. On black sheets, 2.65c., Pittsburgh, is the objective of most of the mills, and while 2.60c. may not have disappeared, it is more difficult for the buyer to find a mill willing to quote this price. On galvanized sheets, the situation is fairly well defined, with 3.40c. as the minimum and 3.50c. the maximum. Blue annealed sheets are fairly steady at 2c., particularly when quoted on by the jobbing mills. Coverage for the remainder of the quarter can be obtained at prevailing prices, but mills are cautious about making any commitments which might be construed as an effort on the part of buyers to provide for some of their fourth quarter requirements at present prices. The sheet trade is confident that prices will be at least \$2 a ton higher for the last quarter.

Plates, Shapes and Bars.—Sales totals for July computed by offices in New York were 10 to 15 per cent ahead of those for the same month last year, but generally were somewhat below the volume of business booked in this district in June. Orders during the first week of August have been keeping up to the July rate. That some consumers have enjoyed a larger business this quarter than they expected is indicated by several requests for extension of third quarter contracts. Some mills have been willing to make extensions at 1.85c. for actual requirements of buyers, while others have insisted on 1.90c., Pittsburgh, or the Eastern basing of 2.05c. Few instances of this kind have arisen, however, as nearly all buyers are covered for the quarter at the 1.85c. basis, and sales at 1.90c. are usually to the small buyers who did not make contracts. Some mills, as previously reported, have asked customers to specify all third quarter tonnage not later than Sept. 10, but in view of the usual practice of permitting specifications up to the last day of the quarter, the success of this change will not become apparent until Sept. 10 has arrived. Some buyers are expected to interpret their contracts as giving them the right to specify at any time within the 90 days, especially as the present contract form contains no wording which places any other limitation on the time for specifying. The volume of structural steel business continues to

increase, and there are a sufficient number of new projects in the market to afford excellent prospects for sustained activity. Structural mill schedules are better filled, and there is a lengthening of deliveries on some sizes. Prices quoted on fabricated material are also said to be slightly firmer, reflecting the higher prices which fabricators will have to pay. Structural steel awards for three sections of New York subways are being held up until after the meeting of the Board of Estimate on Aug. 16. Section 2, route 109, requiring 9400 tons, has been tentatively awarded pending approval by the board, and there are two other sections, one calling for 11,000 tons and the other for 4000 tons, which probably will be approved at the same time. About 6400 tons will be needed for approach spans for a Newark Bay bridge, to be used jointly by the Pennsylvania and Lehigh Valley Railroads. The Pennsylvania has bought 550 all-steel express refrigerator cars of a new type from four car builders.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Old Material.—Prices on most grades are stronger and in some cases brokers are offering from 25c. to 50c. per ton more than a week ago. No. 1 heavy melting steel is being purchased by brokers at \$12.50 per ton, delivered eastern Pennsylvania, to cover on \$13 contracts totaling about 10,000 tons for a Claymont, Del., consumer. Yard grade of heavy melting steel is quoted at \$10 to \$10.50 per ton, the lower price delivered to a Pottsville, Pa., mill and the higher quotation for Harrisburg and Conshohocken, Pa. Machine shop turnings are going to a Phoenixville, Pa., consumer at \$10 per ton, delivered. Heavy cast scrap in charging box size is being shipped to Conshohocken, Pa.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.00 to	\$9.85
Heavy melting steel (yard)	6.25 to	6.75
No. 1 hvy. breakable cast.	10.00 to	11.00
Stove plate (steel works)...	6.75 to	7.25
Locomotive grate bars....	6.75 to	7.25
Machine shop turnings....	6.25 to	6.50
Short shoveling turnings...	6.25 to	6.50
Cast borings (blast furn. or steel works).....	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles.....	15.00 to	15.50
Iron car axles.....	23.50 to	24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to	8.75
Forge fire	6.50 to	6.75
No. 1 railroad wrought....	9.00 to	9.50
No. 1 yard wrot., long....	7.50 to	8.00
Rails for rolling.....	10.00 to	10.50
Cast iron carwheels.....	11.00 to	12.00
Stove plate (foundry)....	8.25 to	8.75
Malleable cast (railroad)...		10.00
Cast borings (chemical)...	10.75 to	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.00 to	\$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	12.00 to	13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to	12.50

Warehouse Business.—Jobbers report a steady improvement in volume of orders, the first week of the month showing a larger total of shipments from stock than the first week of July. Prices are being maintained with very little shading, except on black

and galvanized sheets. The quoted range of prices on sheets is 3.80c. to 4c. per lb., base, for black and 4.50c. to 4.70c., base, for galvanized. In some instances, however, as low as 4.35c. on galvanized and 3.65c. on black are reported obtainable. Discounts on machine and carriage bolts and coach screws in the small sizes appear to have settled to 60 per cent off list even for the smaller lots, which formerly were quoted at 55 per cent off.

Reinforcing Bars.—Awards during the last week have been light but a considerable tonnage will be required in new projects which have come out recently. A causeway at Jones Beach, L. I., calls for 850 tons; a warehouse in New York, 600 tons; a boardwalk at Rockaway Beach, 325 tons; sewer work in the Borough of Queens, 350 tons, and two buildings for the Western Electric Co. at Kearny, N. J., 300 tons. Small orders are coming at about the same rate which prevailed during July. There has been no change in prices.

Cast Iron Pipe.—Southern makers continue to quote on a basis of \$34 to \$35 per net ton, base, Birmingham, which is \$43.25 to \$44.25 per ton, delivered New York, but Northern makers are maintaining \$37.60 to \$38.60 per ton, delivered; in some cases where competition is keen these prices are shaded by \$1 to \$2 a ton and more. The usual midsummer quiet pervades the market and buying is

limited to small lots. A municipal inquiry of size calls for 117,650 ft. (3260 tons) of 6, 8, 12 and 16-in. water pipe, classes A and B, for Fairlawn, N. J., bids opening Aug. 14. Alternate bids are being taken on centrifugal pipe. The American Construction & Securities Co., New York, is reported to have placed orders totaling about 850 tons of pipe in the past week for various properties. This is in addition to about 800 tons bought a fortnight ago.

Prices per net ton, deliv'd New York: Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—A somewhat firmer price tendency has developed in furnace coke and buyers are now forced to pay at least \$2.75 for this grade on August and September shipments. Some Connellsville interests have curtailed production to the extent that their order books are well filled during the remainder of the quarter and are not willing to take business at \$2.75. Foundry coke is unchanged at \$3.50 per net ton, Connellsville, and specifications against contracts are very satisfactory for this time of year. Special brands of foundry coke are offered at \$4.85, f.o.b. ovens, and delivered prices are \$8.56 per net ton to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke is unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06 to \$10.29, New York or Brooklyn.

Cleveland

Betterment in Demand for Steel Accompanied by Firmer Price Tone—Large Pig Iron Sales

CLEVELAND, Aug. 7.—Bookings of bars, shapes and plates in the first week of August show no letdown from the high average reached in the latter part of July, and in some cases an increase in orders and specifications is noticed. Shipments by district mills continue liberal and production is being carried along at a rate which is unusually satisfactory for this season of the year. While considerable tonnage is originating in the automobile industry, the diversified sources of recent business are indicative of a healthy situation among most manufacturing lines using steel. Concurrent with the betterment in demand is a further strengthening of prices. Mills are insisting that customers having the advantage of preferential prices must take the remaining tonnages on current contracts before the third quarter expires and this attitude is having the effect of imparting to the market an underlying tone of firmness.

Steel bars are quoted at 1.90c., Cleveland, although 1.85c. has not yet disappeared, while plates range from 1.85c. to 1.90c., Pittsburgh, with small miscellaneous lots bringing the latter figure. Shapes apparently are fairly well established at 1.90c., Pittsburgh.

The amount of inquiry before the trade presages a continuation of buying and of production on a scale which is considerably above normal for August. Greater activity is noted in structural steel, the outstanding event of the week having been the awarding of 4000 tons for bridge work in East Cleveland, which is a part of the local Union Terminal project. In general, fabricators in this district are run-

ning their shops on a curtailed basis, but reports from Michigan say that fabricating plants there are sufficiently well engaged to maintain operations at the present rate during the remainder of the summer.

The Wheeling & Lake Erie has purchased 1000 tons of 90-lb. rails from the leading interest.

A revival of interest in pig iron reported a week ago has developed into a somewhat formidable buying movement, sales in the past two weeks by Cleveland companies having aggregated more than 90,000 tons.

Pig Iron.—For the second consecutive week pig iron buying has been heavy, sales by Cleveland interests

having exceeded 50,000 tons. Apparently users are convinced that prices are scraping bottom and that there is a possibility of a strengthening in the market which may carry quotations to a higher level. Consequently, many melters are covering their requirements for the remainder of the year, although orders for spot shipment also are numerous. Business placed in Michigan has been the largest since early in the spring, foundry operations having been stimulated by the demand for castings from automobile companies which have recently announced new models. In fact, most of the tonnage bought in the past few weeks is destined for outside delivery, local consumers having been a minor factor in the market. In the first week of August the movement of iron on third quarter contracts increased beyond the average in July, and producers are confident that shipments this month will run ahead of those last month. So far as prices are concerned, there is a further tendency toward firmness, although no changes have been made. Local furnaces are so well fortified with third quarter orders that quotations for delivery to outlying competitive territories are reported to be from 25c. to 50c. a ton higher. In Michigan, foundry iron is selling at from \$17.50 to \$18, while iron for local delivery is steady at \$17.50, base furnace. Demand for low phosphorus iron is almost at a standstill.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.....	\$18.00
S'th'n fdy., sil. 1.75 to 2.25.....	21.50
Malleable.....	18.00
Ohio silvery, 8 per cent.....	28.00
Basic Valley furnace.....	16.00
Stand. low phos., Valley furn.....	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Shipments from upper Lake ports in July totaled 8,980,859 tons, an increase of 4.32 per cent compared with July, 1927. For the entire year to Aug. 1, the movement of iron ore amounted to 23,275,984 tons, which is a decrease of 3,104,521 tons, or 11.77 per cent, compared with that in the same period of 1927.

Bolts, Nuts and Rivets.—Specifications and orders have been unusually good and have come from diversified sources, although automobile companies, agricultural implement manufacturers and jobbers have contributed the bulk. Production is being sustained at a rate regarded as above normal for midsummer. Quotations are firm and unchanged.

Warehouse Prices, f.o.b. Cleveland

Base per Lb.

Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.75c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.40c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'd sheets (No. 10).....	3.25c.
No. 9 ann'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

Semi-Finished Steel.—Demand from contract customers increased slightly the past week so that shipments are at a fairly high level. Furthermore, production is on a scale somewhat greater than usual for August. Sheet bars, billets and slabs are unchanged at \$32 to \$33, Cleveland.

Warehouse Business.—The volume of orders placed with local jobbers has been only fair, but the tonnage has been well diversified. Quotations are steady and unchanged.

Reinforcing Bars.—Several important jobs are still pending, but there have been no lettings of consequence. Prices are firm, with new billet bars quoted at 1.85c., mill, and rail steel stock at 1.75c., mill.

Old Material.—The market continues in a somewhat buoyant state, largely on account of the liberal amount of material which local steel plants are accepting on current contracts. However, forward buying is negligible. In some cases foundry items are fairly active, but in general the demand for these grades is light. Prices are showing strength, but have not changed.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades

No. 1 heavy melting steel.....	\$13.00
No. 2 heavy melting steel.....	\$12.25 to 12.50
Compressed sheet steel.....	12.00 to 12.50
Light bundled sheet	
stamp'gs.....	11.50 to 11.75
Drop forge flashings.....	11.25 to 11.50
Machine shop turnings.....	7.00 to 7.25
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	13.50 to 13.75
No. 1 busheling.....	10.50 to 11.00
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades

Low phos. forging crops.....	16.00 to 16.50
Low phos., billet, bloom and slab crops.....	17.00 to 17.50
Low phos. sheet bar crops.....	16.50 to 17.00
Low phos. plate scrap.....	15.50 to 16.00

Blast Furnace Grades

Cast iron borings.....	9.00 to 9.25
Mixed bor'gs and short turn'gs.....	9.00 to 9.25
No. 2 busheling.....	9.00 to 9.25

Cupola Grades

No. 1 cast.....	16.00 to 16.50
Railroad grate bars.....	11.00 to 12.00
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25

Miscellaneous

Railroad malleable.....	15.00 to 15.50
Rails for rolling.....	16.25 to 16.50

Coke.—A flurry in 48-hr. beehive heating coke has carried quotations up to \$2.85, Connellsville, with some few producers asking \$3. Connellsville foundry coke, however, is unchanged at \$3.50 to \$4.85, ovens. Users of by-product foundry coke are accepting moderate tonnages on present contracts. A local maker of by-product domestic coke is maintaining a schedule of \$6, delivered to Cleveland dealers, for egg size.

Wire Products.—Specifications against current contracts have been fairly good and fresh buying is of moderate proportions, although confined to small miscellaneous lots for prompt delivery. In some cases common wire nails are being sold below \$2.55, Pittsburgh, for shipment to users in outlying territories. However, most producers are refusing to accept orders at less than the regular

schedule. Otherwise, quotations are steady.

Sheets.—Bookings in the past week have been slightly better, although specifications from companies allied with the automobile industry are showing the effects of a slackening in production. Fresh buying is almost without exception limited to small tonnages to cover immediate needs. Prices are showing the greatest strength in many weeks, but no changes are reported. Black sheets are quoted at 2.65c., Valley, or 2.60c., Pittsburgh, galvanized at 3.40c., Pittsburgh, or 3.45c., Valley, and blue annealed at 1.90c. to 2c., Pittsburgh,

Strip.—Steel users are placing a fair volume of specifications but new buying is light. Hot-rolled strips are steady at 1.75c., Pittsburgh, for wide material. Producers are quoting 2.65c., Cleveland, on cold-rolled strips for lots of 3 tons or more.

Detroit Scrap Market Dull

DETROIT, Aug. 7.—The market on old material in this district has been very quiet, with no sales involving large tonnage. Prices are the same as last quoted.

German Mills Make 10 Year Contract for Wabana Ore

HAMBURG, GERMANY, July 21.—A 10-year contract for Wabana iron ore has been signed with the British Imperial Production Co., Ltd., by the Vereinigte Stahlwerke A. G., Gutehoffnungshütte, Friedrich Krupp A. G., Mannesmann Tube Co. and the Klockner Co. Under the terms of the contract, which expires in 1938, these German consumers will take 700,000 tons a year for the next three years, increasing to 800,000 tons in 1931, to 950,000 tons in 1932 and 1,150,000 tons in 1933. Of these totals, about 70 per cent will be taken by the Vereinigte Stahlwerke A. G. at Dusseldorf. The price of the ore fixed by the contract is 11s. 3d. (\$2.73) per ton, f.o.b. The British Imperial Production Co. guarantees the ore shipped to be 52 per cent iron content and 0.8 to 1.00 per cent phosphorus.

Australia ranked third in 1927 among the foreign markets of the United States for agricultural implements, according to a study prepared by Trade Commissioner Elmer G. Pauly, Melbourne, and just issued by the Department of Commerce. The growth of American trade in farm machinery during the past 10 years has been striking, the report shows. In 1917 Canada had the bulk of the Australian business in agricultural implements, while for the fiscal year 1926-27 American manufacturers obtained approximately 60 per cent of the Australian import business in these lines and Canada 16 per cent. Some 15 per cent went to the United Kingdom.

San Francisco

Steel Business Expanding Slightly—Pending Structural Steel Projects for 15,000 Tons

SAN FRANCISCO, Aug. 4 (*By Air Mail*).—Movement of steel products on the Pacific Coast is expanding slightly and from present indications bookings for the year will be close to the total of last year. The greatest activity at present is in the market for structural steel shapes and reinforcing bars, some fair-sized lots being placed this week.

The Columbia Steel Corporation, San Francisco, has announced that plans are being prepared for a \$2,500,000 tin plate mill to be erected at its Pittsburgh site with a capacity of 50,000 tons a year. This mill will be the first one to be erected on the Pacific Coast.

Pig Iron.—Bids were opened this week in Washington for 400 tons of iron for the Puget Sound Navy Yard. This is the largest inquiry to come before the trade in many weeks. Sales and inquiries involve only small lots. An importer of foreign material has unloaded 1700 tons of Indian iron, 100 tons of which will be reshipped to north Pacific ports, the rest to be taken by Los Angeles and San Francisco consumers. No changes in quotations are noted.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Outstanding among the awards this week was 2288 tons for Drainage Improvement District No. 26 at Los Angeles, the general contract for which was secured by H. M. Baruch Corporation. The Pacific Coast Steel Co. was low bidder on 589 tons for the Big Dalton dam at Los Angeles and took 200 tons for a garage on Turk Street, San Francisco. New inquiries involve 140 tons for a hotel on Geary Street and 150 tons for an apartment on Green Street, San Francisco. Projects pending call for more than 5000 tons.

Plates.—Inquiries for plates are few and far between. The East Bay Municipal Utility District distributing system in Oakland, involving 7200 tons, bids on which will be opened Aug. 17, is the largest pending project. On Aug. 7 bids will be opened in

Washington for 131 tons of plates for the Mare Island Navy Yard. The General Petroleum Corporation, Los Angeles, is preparing plans for two 40,000 bbl. tanks and bids will be called for within the near future; approximately 400 tons is involved. While 2.25c., c.i.f., is general on desirable tonnages, some business is still going at 2.30c.

Shapes.—Several fair-sized structural awards were placed during the week; the largest was 1000 tons for a headframe, machine shop, hoist house and bins for the Consolidated Copper Co. at Kimberly, Nev., taken by the Kansas City Structural Steel Co. McClintic-Marshall Co. booked 700 tons for a hospital at Orange, Cal., while the Moore Dry Dock Co. took 280 tons of rail steel and shapes for a vault for the United States Mint in San Francisco. New inquiries call for 1200 tons for an apartment in San Francisco and 1100 tons for an office building in Oakland. Pending business now exceeds 15,000 tons. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—For the first time this year no awards of over 100 tons of cast iron pipe were reported. New inquiries developing during the week involved small lots only. Bids will be

opened next week on 416 tons for Tracy, Cal., and on 148 tons of 2 and 4-in. class B for Compton, Cal. The largest inquiry calls for 23,247 tons for Dallas, Tex., followed by 22,325 tons for the East Bay Municipal Utility District at Oakland.

Standard Pipe.—Little or no improvement in demand for standard pipe and oil country goods is noticed and the market remains exceptionally quiet. The only award of over 100 tons this week involved 109 tons of 1-in. extra heavy galvanized pipe for Los Angeles, placed with the Santa Fe Pipe & Supply Co.

Coke.—Demand for coke reflects the quiet condition prevailing in the pig iron market. A shipment of 4500 tons of English beehive and by-product coke is scheduled to arrive in port the latter part of the month. Most of this will apply against contracts placed some time ago. English by-product coke ranges from \$11.50 to \$13 a net ton, incoming dock, while beehive coke is quoted at \$16 a net ton.

Warehouse Material.—Some changes in out-of-stock prices in the San Francisco district have been made. No. 24 gage galvanized sheets have been reduced from 5.50c. to 5.40c.; blue annealed sheets, No. 10 gage, have been advanced from 3.90c. to 4c., while No. 24 gage black sheets have been advanced from 4.95c. to 5c. Warehouse interests report movement of stock during July as satisfactory.

Birmingham

Pig Iron Shipments Large and Stocks Are Being Reduced—Steel Demand Satisfactory

BIRMINGHAM, Aug. 7.—Pig iron sales vary little from the average of the past three weeks. The market is largely supported by a number of the smaller melters who prefer hand-to-mouth buying. The greater portion of third quarter iron is under contract. Selling is largely through quiet negotiations and very few inquiries are being received. Shipments have been large for several weeks and stocks in the district have been noticeably reduced. Quotations are unchanged from the \$15.50 base. Furnace operations have been the same for two weeks. Seventeen are in blast, eight on foundry, seven on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	\$15.00 to 16.00

Finished Steel.—An active demand continues and mill schedules are being well sustained. Prices, though unchanged, show more firmness than at any time in the past several months. Sales executives anticipate satisfactory conditions for the remainder of the quarter. Sheets are in greater de-

mand and prices firmer. The amount of overhanging tonnage in the structural steel and reinforcing bar markets is considered fair, but sales have been slow for the past several days. The only structural steel award of any importance is 350 tons booked by the Ingalls Iron Works Co. for the Du Pont Rayon Co. at Old Hickory, Tenn. The five active open-hearth of the Tennessee company is one less than last week. Six continue in operation at Fairfield. The Gulf States Steel Co. is still working three at Alabama City.

Cast Iron Pipe.—The pressure pipe market has been lacking in important bookings for the past month. Miscellaneous orders in small lots have been coming in at a rate sufficient to keep operations up to average. Shipments have been good for several weeks. Soil pipe shops are showing a little more activity. Quotations continue to be made on a base of \$34 to \$35 on 6-in. and larger sizes.

Coke.—The market is still somewhat depressed and sales are light. All by-product plants are still in operation, though some of them are not

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	.....	3.15c.
Soft steel bars	.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over	.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.	.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to $2\frac{3}{4}$ -in.	.....	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	.....	5.00c.
Black sheets (No. 24)	.....	5.00c.
Blue ann'd sheets (No. 10)	.....	4.00c.
Galv. sheets (No. 24)	.....	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger	.....	5.65c.
Com. wire nails, base per keg	.....	\$3.40
Cement c't'd nails, 100-lb. keg	.....	3.40

pushing production. Quotations are unchanged from \$5 base for both spot and contract.

Old Material.—The market has experienced a stronger demand during the past two weeks. Iron axle prices have been increased to \$21 to \$22 and No. 1 cast is being quoted at \$14, instead of \$14.25. Other quotations are the same.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to	\$9.00
Scrap steel rails.....	11.00 to	11.50
Short shoveling turnings..	7.50 to	8.00
Cast iron borings.....		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	21.00 to	22.00
No. 1 railroad wrought...	10.00 to	10.50
Rails for rolling.		13.00
No. 1 cast		14.00
Tramcar wheels	12.50 to	13.50
Cast iron carwheels.....	12.00 to	13.00
Cast iron borings, chem..	13.50 to	14.00

St. Louis

Slight Improvement in Pig Iron Demand—Scrap Dull and Weak—Sheets Firm

ST. LOUIS, Aug. 7.—Interest in pig iron on the part of consumers has developed moderate improvement. Shipments are holding up well, and requests for expedited delivery of early August contract quotas were reported. Sales were also larger, totaling approximately 7500 tons. Included was 2500 tons of basic, sold by the leading local producer to an East Side mill. Iowa implement dealers took 1800 tons, 500 of which was malleable. A machinery and engine builder in the district proper engaged 600 tons for third quarter shipment. The balance ranged from car lots to 200 tons, and was sold to melters in Missouri, Illinois and Iowa. Some fourth quarter inquiry of a tentative character has appeared.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$18.50 to \$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	19.66
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Aside from a slight quickening in demand for domestic sizes, the coke situation remains unchanged. An advance in its price by a leading Chicago by-product interest has had a tendency to stimulate dealers in this area to cover their requirements. Shipments of foundry coke have diminished since the middle of July, but the movement of industrial coke, particularly to the Northwest and West, holds up well.

Finished Iron and Steel.—Distributors of iron and steel from stock report a somewhat better demand for building materials, notably standard structural shapes for small jobs and reinforcing concrete bars. Ties and bands are in better call from the South, and there has been fair ordering of materials for conditioning and repairing cotton gins and seed mills.

Warehouse Prices, f.o.b. St. Louis

Base per Lb.

Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	5.25c.
Blue ann'd sheets (No. 10).....	3.60c.
Black corrug. sheets (No. 24).....	4.50c.
Galv. corrug. sheets.....	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more	70
Less than 100 lb.....	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Call from the oil, lumber and bituminous coal industries continues dull. Sheets are holding their own, the leading district producer being on full production in all sheet departments, including galvanized. Some reordering of tin plates has taken place by canners who underestimated their initial requirements. Numerous building projects are coming to light, but actual lettings are not of impressive proportions.

Old Material.—Scrap iron and steel remain in the depressed state which

has marked the past several weeks or months. Dealers report few new orders. The mills are taking only a few odd lots of specialties for mixing purposes, and gray iron foundries apparently have all the scrap they require at present. Quotable prices are unchanged, but it is doubtful if the figures shown could be realized on most items. In the immediate past there has been a better tone in rolling mill grades, with fair buying by interests specializing in reinforcing concrete material. Despite the depressed status of the market, the railroads continue to market heavily and to ship promptly. Railroad lists include: Baltimore & Ohio, 10,020 tons; Atchison, Topeka & Santa Fe, 7645 tons; Southern Pacific, 2855 tons; Mobile & Ohio, 23 cars; Pullman Co., 4 cars, and Chicago & Eastern Illinois, 10 cars.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$10.50 to	\$11.00
No. 1 locomotive tires.....	11.75 to	12.00
Heavy shoveling steel.....	10.50 to	11.00
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart..	12.00 to	12.50
Railroad springs.....	13.00 to	13.50
Bundled sheets	7.75 to	8.25
No. 2 railroad wrought...	11.00 to	11.50
No. 1 busheling.....	9.00 to	9.50
Cast iron borings.....	8.25 to	8.75
Iron rails	13.00 to	13.50
Rails for rolling	13.00 to	13.50
Machine shop turnings ..	7.00 to	7.50
Steel car axles	18.00 to	18.50
Iron car axles.....	25.50 to	25.75
Wrot. iron bars and trans.	18.25 to	18.75
No. 1 railroad wrought...	9.00 to	9.50
Steel rails, less than 3 ft..	15.00 to	15.50
Steel angle bars.....	11.75 to	12.25
Cast iron carwheels	13.00 to	13.50
No. 1 machinery cast....	13.00 to	13.50
Railroad malleable	11.50 to	12.00
No. 1 railroad cast.....	13.00 to	13.50
Stove plate	11.00 to	11.50
Agricult. malleable	11.50 to	12.00
Relay. rails, 60 lb. and under	20.50 to	23.50
Relay. rails, 70 lb. and over	26.50 to	29.00

Buffalo

Pending Pig Iron Totals 10,000 Tons—Steel Mills Operating at 80 Per Cent or Better

BUFFALO, Aug. 7.—While there is a lull in pig iron buying, a real improvement in the market is noticeable. The melt has increased and stocks are rapidly dwindling. The heating industry is showing a very satisfactory increase, with resulting growth in consumption of iron. An inquiry from New England is for 5000 to 6000 tons of malleable and total inquiry of 10,000 tons is reported. There has been considerable placing of 100-ton and carload orders, and producers are very optimistic over prospects within the next 30 days. The price of \$17,

base Buffalo, apparently has not been broken on district business in months. Some of the Buffalo furnaces are making steady shipment of iron via the barge canal for storage at New Jersey points against prospective business in the East. The Hanna Furnace Co. will probably blow in another furnace some time this month. The new Hanna stack may go in blast in September. The stack of the Tonawanda Iron Corporation is out for relining and other repairs and will return to blast some time in October. Considerable stock of iron is on hand to tide over the American Radiator Co.'s needs during the interim.

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic	\$16.50 to 17.00
Lake Superior charcoal.....	27.28

Finished Iron and Steel.—Demand for bars, shapes and plates is fair and operations of mills are around 80 per cent. Sheet prices are steadier, with 2.65c ruling for black sheets and 4c

for automobile body sheets. Sheet mill operations are at 85 to 88 per cent. Warehouse business during July was the best of any month since the beginning of the year. Wire demand is good, though the peak of demand for seasonal products has passed. Reinforcing bar makers are figuring a 375-ton school, and bids are in for the new Lockport, N. Y., filtration plant requiring 1000 tons of reinforcing bars. Plans are about completed for the new 26-story Rand Building.

Old Material.—The market has a slightly better tone, but no new buying of consequence has been done in two weeks. A few small orders for No. 1 machinery cast have been taken at \$14.50 to \$15, and a few similar transactions in steel rails at \$16 to \$16.50 are reported. Stove plate is dull; a consumer is still holding up shipments on sales made a month ago. Most of the larger plants are accepting shipments and the leading consumer continues to receive Detroit scrap by vessel at the rate of about five boatloads per month. This is

principally hydraulic compressed sheets.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	\$13.50 to	\$14.00
No. 2 heavy melting steel	12.00 to	12.50
Scrap rails	13.00 to	13.50
Hydraulic comp. sheets	12.00 to	12.50
Hand bundled sheets	8.00 to	8.50
Drop forge flashings	12.00 to	12.50
No. 1 busheling	12.00 to	12.50
Hvy. steel axle turnings	12.00 to	12.50
Machine shop turnings	7.00 to	7.50
No. 1 railroad wrought	11.00 to	11.50
Acid Open-Hearth Grades		
R'l'd knuckles and couplers		15.00
R'l'd coil and leaf springs	15.00 to	16.00
Rolled steel wheels		15.00
Low phos. billet and bloom ends	16.00 to	16.50
Electric Furnace Grades		
Hvy. steel axle turnings	12.00 to	12.50
Short shov. steel turnings	9.00 to	9.50
Blast Furnace Grades		
Short shov. steel turnings	9.00 to	9.50
Short mixed borings and turnings	9.00 to	9.50
Cast iron borings	9.00 to	9.50
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	15.50 to	16.00
Iron axles	19.50 to	20.00
Cupola Grades		
No. 1 machinery cast	14.25 to	14.75
Stove plate	13.00 to	13.25
Locomotive grate bars	11.25 to	11.75
Steel rails, 3 ft. and under	16.00 to	16.50
Cast iron car wheels	12.00 to	12.50
Malleable Grades		
Industrial		14.50
Railroad		14.50
Agricultural		14.50

Boston

Purchase of 500 Tons of Pig Iron by Providence Melter Brings Out Low Prices

BOSTON, Aug. 7.—Low prices were obtained last week by the Universal Winding Co., Providence, R. I., on 500 tons of No. 2X and an equal amount of No. 1X iron. The business was divided between a Buffalo furnace and one east of Buffalo. The purchase was made on a delivered basis. The No. 2X was sold at a delivered price close to \$20, while the No. 1X was sold at a price that figures back to less than \$16.50 a ton, Buffalo, allowing for low rail and water rates. Sales for the past week totaled approxi-

mately 4200 tons, of which the Mystic Iron Works booked 2200 tons. The remainder included small lots of Buffalo, New York State, western Pennsylvania and Alabama iron. A Springfield, Mass., foundry is asking for bids on 500 tons, another Massachusetts melter on an indefinite tonnage, which may run into five figures, and there are about a half dozen small inquiries; all of them, it is expected, will be closed within a week. One Buffalo interest reports stocks at the furnace as materially smaller than a month ago, but the shrinkage so far has failed to check price cutting by furnaces in that district.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	\$20.91 to \$21.41
*Buffalo, sil. 2.25 to 2.75	21.41 to 21.91
†Buffalo, sil. 1.75 to 2.25	19.78 to 20.28
†Buffalo, sil. 2.25 to 2.75	20.28 to 20.78
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25	25.71
Va., sil. 2.25 to 2.75	26.21
Ala., sil. 1.75 to 2.25	22.41 to 24.27
Ala., sil. 2.25 to 2.75	22.91 to 24.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama. *All rail rate. †Rail and water rate.

Coke.—Specifications against last half by-product foundry coke contracts so far this month have been about on a par with those for July. The market is by no means active, however. The price quoted by the New England Coal & Coke Co. and the Providence Gas Co. remains at \$11 a ton, delivered within a \$3.10 freight rate zone. Small tonnages of Connelville and New Jersey coke are

being sold in New England. The market for domestic fuel is rather flat.

Cast Iron Pipe.—The Warren Foundry & Pipe Co. has sold 100 tons of 6-in. pipe to the West Groton water district, West Groton, Mass., and 100 tons of 16-in. class C cement-lined pipe to Revere, Mass. The United States Cast Iron Pipe & Foundry Co. has sold 100 tons of 12-in. pipe to Lowell, Mass. No other municipal business has been closed, but private purchases are much larger than usual at this time of the year. Utility companies are taking good tonnages privately, including 20-in. and 30-in. pipe, and one is now negotiating for a fair-sized export tonnage. It is reported that Milford, Mass., has closed on 150 tons of 8-in. pipe, but details are lacking. The indications are the 19,000 ft. of 30-in. pipe for Massachusetts, under contract with the C. & R. Construction Co., will be steel instead of cast iron pipe. Most foundries are holding small pipe prices firmly, but one is making concessions. There is general price shading on large pipe. The range on 4-in. pipe is \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and on 6-in. to 12-in., \$41.10 to \$42.10. The usual \$5 differential is asked on class A and gas pipe.

Old Material.—The movement of old material out of New England in the past week was less than for any previous week this year. At prices offered by mills shippers cannot get their money back on any material that has to pass through yards. Activity centers in scrap for export, domestic trade being confined principally to machine shop turnings, machinery and textile cast. The demand for textile and machinery cast, however, is spotty. One New England consumer continues to take long bundled skeleton at \$6.50 to \$7 a ton, on cars shipping point. Prices on that material for Pennsylvania consumption are lower.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$8.00 to \$8.50
Scrap T rails	7.50 to 8.00
Scrap girder rails	7.25 to 7.50
No. 1 railroad wrought	8.50 to 9.00
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.00 to 5.50
Cast iron borings (steel works and rolling mill)	5.00 to 5.50
Bundled skeleton, long	6.50 to 7.00
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.00 to 5.50
Forge scrap	5.50 to 6.00
Shafting	11.50 to 12.00
Steel car axles	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$13.50 to \$14.00
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.50 to 14.50

The Pittsburgh Steel Co. has bought four 1400-hp. powdered coal fired Ladd boilers for its new power plant at Monessen, Pa.; the Pressed Steel Car Co., two 600-hp. powdered coal fired Heine boilers for its Chicago works and the Weirton Steel Co. a 900-hp. waste heat Heine boiler from the International Combustion Corporation.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.	*\$3.45c. to 5.45c.
Squares and flats	*\$3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Pig Iron Sales Decline Slightly—30,000 Tons in Prospective Structural Steel Contracts

TORONTO, ONT., Aug. 7.—Foundry and malleable pig iron sales in the Canadian markets have shown a slight decline. The daily melt, however, is holding at the former high level, and the slump in business is chiefly due to the fact that spot buyers are covered for the present and no advance buying is being done. July sales compared favorably with those of other months this year. Production of pig iron in Canada continues at a high rate, with eight blast furnaces blowing. Price shading is reported in the Montreal district.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25.	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25.	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—While no large tonnage contracts featured business in this market during the week, fabricators report a steady flow of small orders. For the Industrial Alcohol Co.'s plant addition at Corbyville, Ont., 800 tons of structural steel and 300 tons of reinforcing bars were placed; 400 tons of structural steel has been ordered for the addition to

the plant of the American Pad & Textile Co., Chatham, Ont. A few small tonnages were closed. Prospective business involves about 35,000 tons of structural steel.

Old Material.—A general slump in business has occurred in both Toronto and Montreal markets during the past week or 10 days. Consumers are showing little interest and are ordering supplies only when demands dictate. Current sales, few in number, are confined to small tonnages. Trading between dealers has also declined. Prices are showing a softening tendency in the Toronto district, but revisions have not been made in dealers' buying price lists.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	16.00	13.00
Stove plate	13.00	16.00
Standard carwheels	13.00	13.00
Malleable	13.00	13.00
	Per Net Ton	
No. 1 machinery cast....	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Cincinnati

Pig Iron Market Dull, But Scrap Market Shows Signs of Recovery

CINCINNATI, Aug. 7.—The pig iron market is still rather dull. The Marmion Motor Co. inquiry for 3200 tons of Northern iron is yet under consideration, with belief that it will be closed within the week. The Hooven, Owens, Rentschler inquiry is now reported as covered. It was for 5000 tons and went to a Northern furnace. A local distributor reports sales of two lots of silvery iron, 300 tons and 250 tons, respectively, with about 650 tons of Northern foundry iron. Another sale of 300 tons of malleable was reported, and around 200 tons of Northern iron. Sales of smaller lots down to carloads were fairly numerous.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable.....	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Old Material.—The scrap market has developed somewhat from its sluggish condition and some prices have

strengthened. Light inquiry has brought some sales at current prices and better. Dealers are loath to sell in large lots at present prices and this has brought higher bids from concerns seeking to buy. Most dealers are adding 25c. to 50c. to current quotations. Small orders have been received in car lots to 1000 tons, but dealers hesitate to sell on a market that is beginning to show signs of life.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$10.75 to \$11.25
Scrap rails for melting....	10.75 to 11.25
Loose sheet clippings.....	8.25 to 8.75
Bundled sheets	9.00 to 9.50
Cast iron borings.....	8.00 to 8.25
Machine shop turnings....	7.25 to 7.75
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	12.50 to 13.00
No. 1 locomotive tires....	12.75 to 13.25
No. 1 railroad wrought...	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels.....	11.00 to 11.50
No. 1 machinery cast....	15.00 to 15.50
No. 1 railroad cast.....	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable ...	10.50 to 11.00

REINFORCING STEEL

EXCEPT for a drainage improvement project at Los Angeles which took 2300 tons, the total of 6800 tons of reinforcing steel reported placed in the last week was principally in small tonnages. Inquiries, amounting to 3550 tons, included 1000 tons for a water filtration plant at Lockport, N. Y. Awards follow:

- PORT NEWARK, N. J., 150 tons, terminal improvement work, to Concrete Steel Co.
- HARRISON, N. J., 150 tons, factory building for Otis Elevator Co., to Igoe Brothers.
- NEW BRUNSWICK, N. J., 150 tons, building for Reichart Cocoa & Chocolate Co., to E. T. Edwards, Columbia, Pa.
- PITTSBURGH, 100 tons, Boulevard of the Allies, to Electric Welding Co.
- EVANSTON, ILL., 174 tons of rail steel bars, apartment building, to Barton Spiderweb System, Inc.
- CHICAGO, 277 tons, factory building, to Barton Spiderweb System, Inc.
- CHICAGO, 475 tons, apartment hotel at 6240 Sheridan Road, to Barton Spiderweb System, Inc.
- CHICAGO, 200 tons rail steel bars, apartment building at East Seventy-third Street and Lake Michigan Drive, to Calumet Steel Co.
- CHICAGO, 600 tons of rail steel bars, garage to Barton Spiderweb System, Inc.
- CHICAGO, 160 tons, public school building, from A. and E. Anderson, to Barton Spiderweb System, Inc.
- CHICAGO, 390 tons, two public school buildings, to Concrete Engineering Co.
- CHICAGO, 500 tons of rail steel bars, caissons for Mercantile Mart, to Inland Steel Co.; formerly reported as 200 tons.
- CHICAGO, 250 tons rail steel bars, garage at State and Eleventh Streets, to Calumet Steel Co.
- STATE OF ILLINOIS, 400 tons of rail steel bars, road work, to Calumet Steel Co.
- EVERETT, WASH., 275 tons, department store, to Pacific Coast Steel Co.
- SEATTLE, 130 tons, Grimshaw garage, to Northwest Steel Rolling Mills.
- LOS ANGELES, 2288 tons, Drainage Improvement District No. 26, to H. M. Baruch Corporation.
- SAN FRANCISCO, 200 tons, garage, Jones and Turk Streets, to Pacific Coast Steel Co.
- SAN FRANCISCO, 121 tons, bakery, Alameda and Bryant Streets, to Gunn, Carle & Co.

- Reinforcing Bars Pending**
- BOSTON, Charlestown district, 500 tons, H. P. Hood & Sons milk plant.
 - NEW YORK, 600 tons, warehouse for Western Union Telegraph Co.
 - NEW YORK, 350 tons, sewer work in Queens; Necaro Construction Co., general contractor.
 - ROCKAWAY BEACH, N. Y., 325 tons, boardwalk; Montrose Contracting Co., general contractor.
 - JONES BEACH, N. Y., 850 tons, causeway; C. H. Earle, general contractor.
 - KEARNY, N. J., 300 tons, buildings 51 and 52 for Western Electric Co.
 - BUFFALO, 150 to 375 tons, school No. 80; being figured.
 - LOCKPORT, N. Y., 1000 tons, city filtration plant; bids in.
 - GALESBURG, ILL., 190 tons, reservoir.
 - SAN FRANCISCO, 140 tons, hotel, Geary and Maggie Streets; bids being taken.
 - VENTURA, CAL., 118 tons, Bardsdale bridge, general contract to Claude Fisher, Los Angeles.

July Exceeds June in Ingot Production

Compared with July, 1927, It Is Up 19 Per Cent—Gain of Seven Months Over 1927 Nearly 1,600,000 Tons

PRODUCTION in July of open-hearth and Bessemer steel ingots in the United States, as indicated by the returns made to the American Iron and Steel Institute, was nearly 2 per cent more than in June, whereas a

year ago the July output fell off over 8 per cent from that of June. Counting out July 4 and the five Sundays, July is regarded as having 25 full working days, as was the case for July, 1927. On the basis of working

days, as shown in the accompanying table, the July output of 152,463 tons a day was nearly 6 per cent better than the daily rate of June and 19 per cent ahead of the daily rate of July, 1927. July of last year showed an average daily recession of 4½ per cent from June, comparing with the 6 per cent expansion this year.

The indicated total for seven months, 28,604,000 tons, is 1,592,934 tons ahead of the seven months of 1927, or practically 6 per cent.

SEVEN MONTHS' PRODUCTION OF STEEL INGOTS (GROSS TONS)

Months	1927					1928				
	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer				Open-Hearth	Bessemer			
Jan.	3,042,133	545,596	3,789,874	26	145,764	3,280,247	498,746	3,991,332	26	153,513
Feb.	3,043,492	565,226	3,812,046	24	158,835	3,308,728	521,366	4,045,304	25	161,812
Mar.	3,702,660	590,709	4,535,272	27	167,973	3,700,411	567,309	4,507,520	27	166,945
Apr.	3,341,750	565,440	4,127,335	26	158,744	3,509,637	564,039	4,302,573	25	172,103
May	3,273,593	557,785	4,047,251	26	155,663	3,397,631	581,949	4,203,190	27	155,674
June	2,823,107	486,053	3,495,609	26	134,446	3,016,487	527,351	3,742,964	26	143,960
July	2,596,349	436,883	3,204,135	25	128,165	3,075,247	533,550	3,811,573	25	152,463
7 Months....	21,823,084	3,747,692	27,011,522	180	150,064	23,288,388	3,794,310	28,604,456	181	158,036

Mining Engineers Active

Will Inspect Iron Mining at Wabana and Menominee—Metals and Petroleum Also to Be Discussed

NO less than six meetings will be held this fall by various sections of the American Institute of Mining and Metallurgical Engineers. These will replace the usual fall meeting which has been held for many years past, wherein all the members of the institute were invited to inspect some interesting region distant from headquarters.

The first gathering this year will assemble at the Copley-Plaza Hotel, Boston, Wednesday, Aug. 29, for a three-day discussion of geophysics, the scientific equivalent of the dowsing rod or water finder. On Sept. 1 the party will leave for a two-weeks' tour of Newfoundland and Nova Scotia, going by steamer and returning by rail. Visits will be made to the great Wabana iron mines, the new Buchans mine, the submarine coal mines at Glace Bay, the Steel Works at Sydney, the Malagash salt mine, and one of the famous gold mines of Nova Scotia.

Assembling at Crystal Inn, Crystal Falls, Mich., the newly organized Iron and Steel Division will inspect the Menominee Range on Sept. 7 and 8. This will be a joint meeting with the Lake Superior Mining Institute. Visits will be made to mines in the vicinity of Alpha, Caspion, Iron River and Iron Mountain. Complete details have been given in THE IRON AGE, July 26, page 254.

Sept. 10 to 15 (the week of the Steel Treaters' Show on the Pacific Coast), the Southern California section will meet at the Biltmore Hotel, Los Angeles, Cal. Discussions will be conducted on mining, milling, flotation, smelting and refining of gold, copper and zinc ores.

Institute of Metals Division will meet with the American Society for Steel Treating during the International Steel Exposition in Philadelphia.

Headquarters will be at the Benjamin Franklin Hotel. Titles of the papers so far promised were printed in THE IRON AGE, July 26, page 254.

A fall meeting of the Petroleum Division will be held at Tulsa, Okla., on Oct. 18 and 19. Reduced fares to that point may be had, since the International Petroleum Exposition will convene immediately thereafter. Papers will be devoted to the engineering problems of oil production.

July Ore Shipments Larger—Year's Total Lower

Iron ore shipments from the Lake Superior region amounted to 8,980,859 tons in July, an increase of 371,777 tons or 4.32 per cent above the 8,609,082 tons shipped from upper Lake ports in July, 1927. The total

for the season to Aug. 1 declined 3,104,521 tons or 11.77 per cent, compared with the 26,380,505 tons shipped to Aug. 1, 1927. The table gives in detail the shipments for July and for the season in 1928 and 1927 in gross tons.

Bureau of Standards Consolidates Publications

In the past the Bureau of Standards has issued the results of its scientific papers in two series of volumes, namely, "Scientific Papers" and "Technologic Papers." To date each of these publications has run to 22 volumes and the total comprises some 942 research papers.

Commencing with July, however, the two series will be consolidated in a single magazine, issued monthly and entitled "Bureau of Standards Journal of Research." The union of pure and applied science in one journal will, it is believed, tend to bridge the gap between the two fields, and by so much shorten the lag between discovery and its application.

The subscription price is \$2.75 per year, and remittances should be made direct to the Superintendent of Documents, Government Printing Office, Washington.

MOVEMENT OF LAKE SUPERIOR ORE

Port	July, 1928	July, 1927	To Aug. 1	
			1928	1927
Escanaba	904,613	931,347	2,372,815	2,793,646
Marquette	574,586	475,018	1,449,834	1,405,646
Ashland	1,023,854	1,053,368	2,892,629	3,362,554
Superior	2,523,721	2,492,338	6,477,514	7,314,772
Duluth	2,970,629	2,669,875	7,359,541	8,563,747
Two Harbors	983,456	987,136	2,543,651	2,940,140
Total	8,980,859	8,609,082	23,275,984	26,380,505
Increase	371,777	.....	.....	.....
Decrease .....	.....	.....	3,104,521	.....

Non-Ferrous Metal Markets

Copper Quiet But Firm, Tin Sales Large, Lead Slightly Easier, Zinc Active and Higher.

Copper.—More interest in September copper is being shown by domestic consumers this week and a fair amount of business has been placed, sales Monday and Tuesday being quite satisfactory. One large consumer is reported to have placed fairly liberal orders. It is estimated that about one-third of the September requirements of domestic users has been contracted for. Quotations continue unchanged and very firm at 14.75c., delivered in the Connecticut Valley, with

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Aug. 7	Aug. 6	Aug. 4	Aug. 3	Aug. 2	Aug. 1
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	47.87½	48.00	....	47.62½	47.62½	48.00
Lead, New York.....	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York.....	6.60	6.60	6.55	6.55	6.55	6.55
Zinc, St. Louis.....	6.25	6.25	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price ¼c. higher.

14.87½c. the price in the Middle West. Lake copper is fairly active with sales being made for October delivery and with quotations unchanged at 14.75c. to 14.87½c., delivered. Demand from abroad continues in moderate volume, all business being done at 15c., c.i.f. European ports, a quotation which was established May 25. Purchases are estimated at about 1000 tons a day thus far this month.

Tin.—Because of a bank holiday in London yesterday, Monday, and the closing of that market also on Saturday, consumers came into the market on Friday and during the week, making fairly liberal purchases and bringing the total for the week to about 1500 tons. These transactions cov-

ered spot and August delivery, showing decidedly that consumers have allowed their stocks to dwindle and are buying from hand to mouth. Disappointment was aroused by the American deliveries into consumption of only 5545 tons during July. This is explained as caused by the large amount of metal left on dock. With large supplies of spot metal, it appears strange that nearby positions should demand the premiums they do. The fact that 400 tons was sold Tuesday at Singapore is regarded as significant in reflecting large supplies of the metal. On Monday the market was dull and uninteresting owing to the holiday in London and Tuesday the market was also quiet with spot Straits tin quoted at 47.87½c., New York.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.00c. to 51.00c.
Tin, bar.....	52.00c. to 53.00c.
Copper, Lake.....	15.75c.
Copper, electrolytic.....	15.50c.
Copper, casting.....	14.75c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	12.25c. to 12.75c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.00c.
Tin, bar.....	57.00c.
Copper, Lake.....	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting.....	14.00c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c.
Antimony, Asiatic.....	16.00c.
Lead, bar.....	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	56.50c.
Solder, ½ and ½.....	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier.....	25.75c.
Seamless Tubes—	
Brass.....	24.12½c.
Copper.....	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods.....	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since May 25. Zinc sheets are still quoted at 9.75c., base, following the advance of July 30 and lead full sheets are unchanged.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	23.50c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass.....	24.12½c.
Copper.....	25.00c.

Rods—	
High brass.....	17.00c.
Naval brass.....	19.75c.

Wire—	
Copper.....	16.75c.
High brass.....	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....		33.00c.
Tubes, base.....		42.00c.
Machine rods.....		34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.625c.	14.00c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms.....	10.75c.	12.00c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light.....	6.00c.	7.50c.
Hvy. Machine composition.....	9.75c.	11.00c.
No. 1 yel. brass turnings.....	8.75c.	9.50c.
No. 1 red brass or compos. t'ings.....	9.00c.	10.00c.
Lead, heavy.....	5.00c.	5.375c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.00c.	3.50c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....		19.25c.
Copper, hot rolled.....		23.50c.
Copper, cold rolled, 14 oz. and heavier.....		25.75c.
Zinc.....		10.00c.
Lead, wide.....		9.75c.

Seamless Tubes—		
Brass.....		25.62½c.
Copper.....		26.50c.
Brazed Brass Tubes.....		27.25c.
Brass Rods.....		17.00c.

Prices at London today were as follows: Spot standard, £213 7s. 6d.; future standard, £211 17s. 6d. and spot Straits £215 17s. 6d. The Singapore price today was £216. Arrivals thus far this month have been only 410 tons with 6241 tons reported afloat.

Lead.—With the exception of a slightly easier situation in the West, prices are fairly firm. Sales of spot and August metal have been made at St. Louis at 5.97½c. to 6c. In the East, quotations continue firm and unchanged at 6.20c., New York, this being the contract price of the leading interest. Cable makers are reported as the heaviest buyers, but a fair amount of business is being done in other directions. One authority points out that so far this year business is reported larger than for the same period a year ago.

Zinc.—Galvanizers have been fairly liberal buyers the past week and sales in other directions are reported as satisfactory. The trend in prices has been gradually upward for some time and yesterday (Monday) a higher level was established at 6.25c., St. Louis, or 6.60c., New York, an advance of five points. One important factor is the information which producers are now obtaining from the American Zinc Institute as to the condition of forward orders. This is similar to information which copper producers have been obtaining for some time. The effect is to strengthen, or at least to more wisely guide, producers. Ore prices at Joplin were unchanged at \$40 last week. Sales are given as about 10,000 tons with production about 12,500 tons and shipments 11,500 tons. Stocks are reported as approximately 37,000 tons. The continued high production of ore is commented upon rather unfavorably.

Antimony.—Chinese metal is unchanged at 10c. for spot and 10.25c., for futures, duty paid, New York. The Chinese market is higher today, futures being quoted at 10.37½c.

Nickel.—Quotations are unchanged for wholesale lots of ingot nickel at 35c., with shot nickel at 36c. and for electrolytic nickel at 37c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, continues at 23.90c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 7.—Sales are spotty but larger in total volume than a week ago. Prices for copper and zinc are advanced. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 49c.; lead, 6.10c.; zinc, 6.40c.; in less-than-carload lots, antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Pennsylvania Orders 550 Steel Refrigerator Cars—Great Northern Will Buy 2500 Cars and 2000 Underframes

AN order for 550 all-steel express refrigerator cars for the Pennsylvania and an inquiry from the Great Northern for 2500 freight cars and 2000 underframes made the past week one of the most active of summer in the railroad equipment market. Other transactions of the week, details of which follow, were mostly of a minor nature:

Pennsylvania Railroad has ordered 200 all-steel passenger train refrigerator cars from American Car & Foundry Co., 200 from Pressed Steel Car Co., 100 from Pullman Car & Mfg. Corporation and 50 from General American Car Co.

Great Northern Equipment Co. is receiving bids on 500 50-ft. box cars, 500 52-ft. flat cars, 500 40-ft. coal cars, 1000

all-steel ore cars and 2000 steel underframes for box cars.

United States Navy Department has ordered two gondola cars from Pressed Steel Car Co.

Chicago, Burlington & Quincy will build 33 steel suburban passenger cars at its Aurora, Ill., shops.

Nevada Consolidated Copper Co. will buy 20 Ingoldsby-type ore cars of 60 tons capacity.

Lehigh & New England has ordered three steel underframe caboose cars from Pressed Steel Car Co.

International Railways of Central America have ordered two Mikado type locomotives from Baldwin Locomotive Works.

Manila Railroad, P. I., has ordered four three-cylinder Mikado type locomotives from Baldwin Locomotive Works.

To Design Steel Plant for Siberia

Chicago Engineers to Lay Out Soviet Project for Making Rails, Shapes, Bars and Plates

CHICAGO, Aug. 4.—The following dispatch was cabled by the Chicago *Daily News* correspondent in Moscow, John Gunther.

"H. J. Freyn, president Freyn Engineering Co., Chicago, left Moscow today with four of his engineers, after having completed negotiations for the construction of a new iron and steel plant at Kuznetsk, Siberia. As approved by the State Institution for the Projection of New Metal Works, the Soviet body charged with such engineering concessions, the projects call for a plant capable of producing initially 400,000 tons of rails, structural steel, bars and plates annually. This will be one of the largest factories in Siberia.

"Mr. Freyn said that the plant will be designed by his firm on entirely American lines, making full utilization of American practical experience and equipment. During his stay here Mr. Freyn also completed negotiations for the extension of his original contract of May, 1927, whereby technical assistance is accorded for five years to the Russian iron and steel industry. The present amplification agreements calls for a special Russian department of the Freyn Engineering Co. to be stationed at Leningrad. This establishment is to be on a permanent basis as a component part of the state institution for projecting new metal works. 'This agreement authorizes consultation with us on all problems connected with the iron and steel industry throughout Russia, the preparation and construction of drawings and the supervision of field construction of new and on remodeled iron and steel plants' Mr. Freyn said. He added that his relations with both the government officials and the engineers

were harmonious and effective. 'Since the Donetz trial (of coal mine officials and employees charged with subversive sabotage) the tendency is increasing to trust and cooperate with American engineers' said Mr. Freyn."

Reduced Cash Discount Generally Adopted

Manufacturers of sheet steel and cold-rolled strips have generally followed the lead of the American Rolling Mill Co. in reducing the discount for cash in 10 days on those products from 2 per cent to one-half of 1 per cent, effective from Oct. 1, next. Not a few manufacturers have adopted the practice of attaching this announcement as a rider to current invoices as a means of informing customers of the change.

Some doubt exists as to whether tin mill black plate will be affected by the change in the cash discount, because no definite announcement yet has been made. It is believed, however, that all sheet, tin and strip mill products will go to one-half of 1 per cent for cash in 10 days, and some go so far as to say that eventually all products of the industry will take that discount.

Announcement has been made that hoop steel, which has been sold at 1 per cent off in 10 days, as of Oct. 1, goes to one-half of 1 per cent discount for cash. A change in the cash discount on wire products from 2 per cent in 10 days and net in 60 days probably would encounter some difficulty, since mill distribution goes down through jobbers and retailers and nearer to ultimate consumers than other steel products.

Fabricated Structural Steel

Mississippi River Barges Will Take 11,000 Tons—New Projects Bulk Large While Awards Are Light

WITH 11,000 tons needed for 98 barges for the Mississippi River Commission and 6300 tons for a railroad bridge over Newark Bay, new projects totaled 52,000 tons. Five buildings in Chicago will require from 2000 to 2500 tons each, and two bridges elsewhere will take 4000 tons each. Of the following awards, which amount to 22,500 tons, the largest is 4000 tons for several railroad bridges for the Cleveland Union Terminals Co.

DURHAM, N. H., 250 tons, chemical building, to Eastern Bridge & Structural Co.
BOSTON, 155 tons, administration building for Simmons College, to New England Structural Co.
SPRINGFIELD, MASS., 600 tons, transmission towers for New England Power Construction Co., to American Bridge Co.

HARTFORD, CONN., 800 tons, Horace Bushnell Memorial Hall, to an unnamed fabricator.

NEW YORK, 2700 tons, Seward Park High School, to American Bridge Co.

BROOKLYN, 2500 tons, Samuel Tilden High School, to Bethlehem Fabricators, Inc.
WEHAWKEN, N. J., 1000 tons, ferry slips and bridges for New York, Ontario & Western Railroad, to Belmont Iron Works.

PHILADELPHIA, 118 tons, Ashdale Street highway bridge, to Phoenix Bridge Co.
AMBRIDGE, PA., 425 tons, two schools, Harmony school district and Ambridge Borough, to American Bridge Co.

DURHAM, N. C., 550 tons, buildings for Duke University, to Virginia Bridge & Iron Co.

SOUTHERN RAILWAY, 550 tons, bridge at Lumber City, Ga., to Virginia Bridge & Iron Co.

BUFFALO, 1000 tons, new telephone building, to Lackawanna Steel Construction Co.

NASHVILLE, TENN., 350 tons, for Du Pont Rayon Co., to Ingalls Iron Works Co.
FORT MYERS, FLA., 125 tons, bridge, to Ingalls Iron Works Co.

BEAUMONT, TEX., 200 tons, additions to junior high schools, to Orange Car & Steel Co., Orange, Tex.

CLEVELAND, 4000 tons, bridges for New York Central and Nickel Plate railroads, let by Union Terminals Co. to McClintic-Marshall Co.

MUNCIE, IND., 500 tons, school, to Indiana Bridge Co., local.

EVANSTON, ILL., 105 tons, high school, to Wendnagel & Co., Chicago.

CHICAGO, 130 tons, coal trestle for Blackstone Avenue power plant, to Midland Structural Steel Co., local.

CHICAGO, 830 tons, public school, to Vanderkloot Steel Works, local.

CHICAGO, 126 tons, building for American Forge Co., to Gage Structural Steel Co., local.

CHICAGO, 480 tons, McCrory store, to McClintic-Marshall Co.

STATE OF ILLINOIS, 300 tons, five highway bridges, to Continental Bridge Co., Chicago.

ST. LOUIS, 1000 tons, building for Century Electric Co., to Mississippi Valley Structural Steel Co.

TOPEKA, KAN., 1000 tons, viaduct for Santa Fe Railroad, to American Bridge Co.

OKLAHOMA CITY, OKLA., 600 tons, bridge, to McClintic-Marshall Co.

KIMBERLY, NEV., 1000 tons, head frame, hoist house, machine shop and bins for Consolidated Copper Co., to Kansas City Structural Steel Co.

DARRINGTON, WASH., 100 tons, bridge repairs for Northern Pacific, to Pacific Car & Foundry Co.

ORANGE, CAL., 700 tons, hospital, to McClintic-Marshall Co.

SAN FRANCISCO, 280 tons, 200 tons of rail steel and 80 tons of shapes for vault for United States Mint, to Moore Dry Dock Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WORCESTER, MASS., 1500 tons, telephone building.

QUINCY, MASS., 410 tons, stores and offices.

BOSTON, Brighton district, 188 tons, theater.

BOSTON, 127 tons, alterations at 352 Boylston Street.

BOSTON, 119 tons, George White fund health unit No. 4.

FALL RIVER, MASS., 129 tons, bank.

NEW HAVEN, CONN., 300 tons, high school.

NEW YORK, 400 tons, bakery for Dugan Brothers, Inc.

NEWARK, N. J., 6300 tons, approach spans for bridge over Newark Bay for Pennsylvania and Lehigh Valley railroads.

ERIE RAILROAD, 750 tons, 450 tons for bridge at Youngstown, Ohio, and 300 tons for bridge at Rutherford, N. J.

PENNSYLVANIA RAILROAD, 200 tons, bridge at Hinsdale, N. Y.

TOLEDO, OHIO, 4000 tons, bridge over Maumee River for Toledo Terminal Railway Co.

PENNSYLVANIA RAILROAD, 900 tons, four bridges.

COVINGTON, VA., 1500 tons, manufacturing buildings for Industrial Rayon Co.; bids closed Aug. 6.

PITTSBURGH, 1750 tons, 10 barges and three fuel scows for Union Barge Line.

MEMPHIS, TENN., 11,000 tons, 98 barges for Mississippi River Commission; bids to be opened Aug. 17.

ST. PETERS, IND., 1000 tons, highway bridge; Vincennes Bridge Co., low bidder.

MILWAUKEE, 2000 tons, building for Milwaukee Gas, Light & Coke Co.

TEXAS & PACIFIC RAILROAD, 4000 tons, bridges.

CHICAGO, 500 tons, two lift bridges.

CHICAGO, tonnage to be estimated, 45-story office building at 1 North La Salle Street.

CHICAGO, 2500 tons, mill building for United States Gypsum Co.

CHICAGO, 2000 tons, Thompson Building.

CHICAGO, 2000 tons, Ruboff Garage.

CHICAGO, 2500 tons, extension to Wacker Drive.

CHICAGO, 2500 tons, McCormick Estate buildings.

CHICAGO, 450 tons, junior high school; Hansell-Elcock Co., low bidder.

MINNEAPOLIS, tonnage not stated, 24-story office building.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 700 tons, two bridges.

OAKLAND, CAL., 1100 tons, office building at Fourteenth and Franklin Streets; bids being taken.

SAN FRANCISCO, 1200 tons, apartment building at Green and Leavenworth Streets; bids being taken.

DENVER, COLO., 103 tons of plates for pipe line for Bell Fourche project for United States Bureau of Reclamation in South Dakota; bids opened.

Machine Tool Exposition

To Be Held at Cleveland, Sept. 30 to Oct. 4, 1929—
Order of Preference of Exhibits

The National Machine Tool Builders' Association has announced that its next national machine tool exposition will be held Sept. 30 to Oct. 4, 1929, at the Public Auditorium in Cleveland, where the first exposition took place in 1927. An exposition committee, headed by J. Wallace Carrel, Lodge & Shipley Machine Tool Co., Cincinnati, is already functioning. Other members of this committee are: Henry Buker, Brown & Sharpe Mfg. Co., Providence, R. I.; Ralph E. Flanders, Jones & Lamson Machine Co., Springfield, Vt.; Robert M. Gaylord, Ingersoll Milling Machine Co., Rockford, Ill., and James E. Gleason, Gleason Works, Rochester, N. Y., with P. E. Bliss of Warner & Swasey Co., Cleveland, president of the association, and Ernest F. Du Brul, general manager of the association, as ex-officio participants in the committee's work.

The order of preference by which exhibits will be admitted to the show has been established as follows: 1, Machine tool exhibits by members of the association; 2, machine tool

exhibits by non-members; 3, trade press and manufacturers of accessories used exclusively on machine tools; 4, components and supplies not used exclusively on machine tools, such as anti-friction bearings, driving devices and shop supplies.

Allotments of display space and kindred matters will be handled at the association office, 630 Vine Street, Cincinnati, while details of exposition preparation and management will be taken care of by Roberts Everett, 225 West Thirty-fourth Street, New York.

Class I railroads, on July 15, had 151,886 freight cars in need of repair or 6.7 per cent of the number on line, according to reports just filed with the Car Service Division of the American Railway Association. This was an increase of 6676 over the number reported on July 1, at which time there were 145,210 or 6.5 per cent. Freight cars in need of heavy repairs on July 15, totaled 108,229 or 4.8 per cent, an increase of 964 compared with July 1.

PERSONAL

PRESLEY HAMILTON has been appointed district sales representative in charge of an office which has recently been established at 149 Broadway, New York, by Gears & Forgings, Inc., Cleveland. He has been located in the New York territory for



PRESLEY HAMILTON

the last 10 years and is well known among the manufacturing establishments which the company serves. Gears & Forgings, Inc., was established early this year by a merger of the Van Dorn & Dutton Co. and the Ohio Forge Co., Cleveland; the Fawcuss Machine Co., Pittsburgh, and the William Ganschow Co., Chicago.

HENRY S. BAKER has been appointed manager of cold rolled strip sales for the Sharon Steel Hoop Co., Sharon, Pa.

DAVID W. DUFFIELD, educational director of the Yawman & Erbe Mfg. Co., Rochester, N. Y., will address the Rochester Sales Managers Club on Aug. 24 at the noonday luncheon in the Chamber of Commerce Building.

GRANT THORN has resigned as sales manager of the American Cyanamid Co. to become associated with the subsidiaries of the International Combustion Engineering Corporation which are identified with coal tar products and allied chemical fields.

W. A. READY has been made president of the Ames Shovel & Tool Co., North Easton, Mass., to succeed ALFRED C. HOWELL. ALBERT H. DAGGETT is treasurer of the company, and L. J. REAY assistant treasurer, while N. T. JACOBS is manager of sales. Otherwise the personnel of the company remains practically as before. Mr. Ready is also president of a company engaged in the manufacture of radio goods, with a plant in Malden,

Mass. Mr. Daggett, heretofore connected with the financing department of Stone & Webster, Inc., Boston, has resigned his position there. Mr. Reay was previously associated with Stone & Webster, Inc., at Seattle, Wash. The Boston offices of the Ames company, for years located in the Ames Building, have been moved to North Easton. The company plans soon to start construction on new manufacturing units at North Easton.

JOSEPH A. ASHWELL, formerly purchasing agent of the American Bosch Magneto Co., Springfield, Mass., has been made purchasing agent of the New Departure Mfg. Co., Bristol, Conn., to succeed William A. Kimball, who recently resigned to engage in manufacturing at Newtown, Conn.

EDWARD P. ALLIS, III, vice-president Louis Allis Co., Milwaukee, manufacturer of electric motors, won the Wisconsin state amateur golf championship at Maple Bluff Country Club, Madison, Wis., on Aug. 3, for the ninth time.

PAUL MACKALL has been appointed vice-president in charge of sales of Bethlehem Steel Co., succeeding E. S. KNISELY, who becomes assistant to Mr. Mackall. H. G. WALTON, who was assistant general sales manager, succeeds Mr. Mackall as general sales manager. These changes were announced by President E. G. GRACE on Aug. 1 and took effect from that date. Other changes announced by the Bethlehem company in the structural and plate sales organization are as follows: V. A. JEVON, who has had charge of structural sales in the Pittsburgh district since 1919, has been appointed manager of structural and plate sales at Chicago, succeeding LEE HILLARD, who has been assigned to other duties. A. G. WILLIAMS, formerly sales agent in the Bethlehem district, succeeds Mr. Jevon as structural sales agent at Pittsburgh. ALFRED B. SCOTT succeeds Mr. Williams as structural sales agent in the Bethlehem district.

H. E. LEWIS, executive vice-president Bethlehem Steel Co., sailed July 28 on the Majestic for a European trip. He will be away five or six weeks.

RUDOLPH B. FLERSHEM, vice-president of the Marine Trust Co., Buffalo, and formerly vice-president of the American Radiator Co., has been elected chairman of the executive committee of the National Radiator Corporation, and GRANT PIERCE, who has been in charge of the New England territory of the American company, has been named president of the National corporation.

JOSEPH BECKER, for some time vice-president and consulting engineer for the Koppers Construction Co., Pittsburgh, has been made vice-president and general manager of the company. After several years in the laboratories of Dr. Koppers at Essen, Germany, Mr. Becker came to the United States, and since 1910 has been associated with all installations of Koppers ovens in the United States and Canada. He is the inventor of the type of oven bearing his name.

E. J. KEARNEY of the Kearney & Trecker Corporation, Milwaukee, who has been on a European tour, will return Aug. 11 on the Aquitania.

W. E. GRIFFITHS, for a number of years research metallurgist for the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., has become associated with the Duraloy Co., Pittsburgh, as research metallurgist.

DR. ROBERT J. ANDERSON, who was recently made vice-president in charge of production for the Fairmont Mfg. Co., Fairmont, W. Va., sailed on the Aquitania, Aug. 1, for an extended business trip abroad.

MORTON H. SMITH, president Morton B. Smith Co., 241 Front Street, New York, which is said to be the oldest non-ferrous metal scrap concern in the United States, will retire from active business as soon as the company's warehouses are sold. J. W. STRAUB, vice-president, will continue some of the lines in which the company has been engaged, but without a warehouse. Mr. Straub will be located temporarily at 241 Front Street. The business of Morton B. Smith Co. was established in 1847 by William D. Andrews, the inventor of the centrifugal pump. Morton B. Smith, father of Morton H. Smith, became associated with Mr. Andrews in 1859. After various changes in name, the company became known as the Morton B. Smith Co. in 1899.

WILLIAM C. RICE has been elected treasurer of the American Adamite Co., 410 Oliver Building, Pittsburgh, succeeding L. A. AMMON, resigned.

WILLIAM M. HENRY has been elected president of the Oswego Tool Co., Oswego, N. Y., succeeding his father, the late William J. Henry. PAUL A. HENRY, another son, has been made vice-president and treasurer, and C. N. WINFIELD, secretary.

ARTHUR JACKSON, president of the Arthur Jackson Machine Tool Co., Toronto, Canada, will sail from Montreal on Aug. 18 to attend the British Machine Tool Exhibition at Olympia, London, and also to visit a number of European plants.

CLAUDE HARTFORD has been elected vice-president of the American Elevator & Machine Corporation, 113 Cedar Street, New York. He was re-

cently manager of the industrial relations department of the New York Steam Corporation, having been associated with that company in July, 1913, and having served successively as assistant to the chief engineer, superintendent of the district embracing the lower portion of Manhattan, and engineer in the contract department. Mr. Hartford received his engineering education at Stevens Institute of Technology and Cornell University, and was graduated from the latter institution in 1910 with the degree of mechanical engineer. He has been a member of the American Society of Mechanical Engineers since 1912.

H. R. HIRE, who has been elected president of the recently organized Central Illinois Foundrymen's Club, has been president and manager of the Hire Foundry Co., 3000 North Adams Street, Peoria, Ill., since that company was founded April 1, 1926. He received his technical training at



H. R. HIRE

Bradley Polytechnic Institute, Peoria, and in 1910 became associated with the Acme Harvesting Machine Co., of the same city, as timekeeper in the foundry. In 1915 he was given charge of the melting and cost departments, and four years later went with the Maytag Co., Newton, Iowa, as metallurgist, also in charge of costs. He returned to Peoria in August, 1921, and after further study of metallurgy and cost finding, he organized the Crown Foundry Co. in July, 1922. He served as secretary and manager of this company until the founding of the Hire foundry.

A. F. MORRIS, for a number of years vice-president and sales manager of the Morgan Engineering Co., Alliance, Ohio, has been made president of that company. S. F. KALLENBAUGH, who has been with the company for 30 years, most recently as assistant sales manager, has been made sales manager. Mr. Kallenbaugh has been succeeded as assistant sales manager by TOM J. MUIR, who has been sales office manager. Mr. Muir has been identified with the Morgan company for 26 years.

WILLIAM PIEZ, Chicago district manager for the Concrete Steel Co., has tendered his resignation, effective Sept. 15.

H. P. LADDS has been appointed sales manager of the Lake Erie Bolt & Nut Co., Cleveland. For the past

four years he has been vice-president and general manager of the Maryland Bolt & Nut Co., Baltimore, and during the previous four years was general manager of the Rivet Grit Steel Co., Cleveland. At one time he was with the Bourne-Fuller Co. at New York and at Cleveland.

OBITUARY

JOHN T. BUCKLEY, of Philadelphia, formerly an executive of the Philadelphia Shipbuilding Corporation, died suddenly Aug. 6 while spending a vacation in Atlantic City, N. J.

WALDEMAR DRYSEN, chief mechanical engineer Blaw-Knox Co., Pittsburgh, was killed near his home at Sharpsburg, Pa., Aug. 5, evidently having been run down by an automobile. He was 38 years of age and was the inventor of the Blaw-Knox air preheater. For many years he was attached to the general offices of the United States Steel Corporation, and was an authority on such matters as furnace design and combustion.

WILLIAM A. PARKER, since 1905 purchasing agent for the Bessemer & Lake Erie and the Union railroads, subsidiaries of the United States Steel Corporation, died at Hesston, Pa., Aug. 6. He was born at Frostburg, Md., 65 years ago, and when a young man entered the employ of the Carnegie Steel Co., as a stenographer. Later he went with the Butler & Pittsburgh Railroad, which later was acquired by Andrew Carnegie and extended into what is now the Bessemer & Lake Erie Railroad.

FRANK McDOWELL LEAVITT, engineer and inventor and chief engineer of the E. W. Bliss Co., Brooklyn, died on Aug. 6 at his home in Scarsdale, N. Y. He was born at Athens, Ohio, March 3, 1856, and studied engineering at Stevens Institute of Technology, Hoboken, N. J., from which he was graduated in 1875. Immediately after graduation he became associated with Frederick E. Sickels in New York and aided in the development of the first steam steering gear used by the United States Navy. The following year he became associated with Bliss & Williams, Brooklyn. He left the company in 1881 but returned three years later when the firm had become the E. W. Bliss Co. and had remained with the organization ever since. One of his first important inventions was a tin can making machine which was widely utilized in the development of the canning industry. Later he brought out a toggle draw press for producing hollow pressed ware, which was followed by many other innovations in pressing and stamping machinery. He was also responsible for the Bliss-Leavitt torpedo now used by the United States

Navy. Mr. Leavitt was a member of the American Society of Mechanical Engineers, the American Society of Civil Engineers, the Society of Naval Architects and Marine Engineers, the American Association for the Advancement of Science and the Engineers Club of New York.

SAMUEL FRANK, a member of the Montgomery Iron & Steel Co., Philadelphia, structural steel fabricator, died on July 30. He was born at Diebolsheim-am-Rhine, France, in 1867, and studied ornamental iron work in a number of European cities before coming to the United States in 1889. In 1902 he became associated with the Steward & Stevens Iron Works, Philadelphia, continuing with the company after its merger with the Montgomery company in 1921.

P. V. VERNON, O. B. E., director and chief designer of Alfred Herbert, Ltd., Coventry, England, died on July 22 at his residence, Keresley Manor, North Coventry. He had been with the Alfred Herbert organization for 31 years and director since 1911.

WILLIAM H. NIEDRINGHAUS, superintendent of the National Enameling & Stamping Co., Granite City, Ill., and a member of the Niedringhaus family which founded that institution, died recently at his home in that city. He was born in St. Louis 70 years ago, and attended public schools there. His only occupation had been with the Enameling company, and at the time of his death he had served it consecutively for 50 years.

BENJAMIN THURSTON, general superintendent and a director of the American Screw Co., Providence, R. I., died Aug. 3, at the Massachusetts Homeopathic Hospital, Boston, following an illness of several weeks. He had been associated with the American Screw Co. for more than a half century, having started there as a machinist. He was born in Johnston, R. I., April 3, 1847. After attending the local schools he went to work for the Brown & Sharpe Mfg. Co., Providence. In 1902 he was made general superintendent of the American Screw Co.

HERBERT A. VIETS, president Fuller-Warren Co., Milwaukee, pioneer manufacturer of ranges and stoves, died July 29, aged 75 years.

Machinery Markets and News of the Works

Machine Tool Buying Steady

With July Sales Breaking Midsummer Records, Outlook for August Is Highly Satisfactory—Demand for Heavy Tools Is Slowest

PROSPECTS for a continued good rate of machine tool buying during August appear promising in the light of developments in the first week of the month. July sales broke midsummer records for many companies, and while there is no sign of further large orders such as were placed last month by the Wright Aeronautical Corporation and the General Electric Co., the volume of single tool sales remains steady and fairly large for this time of the year.

The Wright Aeronautical Corporation and General Electric Co. are understood to have some additional purchases to make to round out their new equipment.

An indication of the exceptional midsummer machine tool buying is seen in the statement by a Cleveland manufacturer of turret lathes that its July business was probably the largest in the history of the company.

Demand for heavy tools is slow, this being attributed to the small volume of railroad buying, but for small and medium-sized tools, and especially for high-production equipment, there is a steady inquiry. In the Chicago district tractor manufacturers are among the principal buyers. The A. O. Smith Corporation, Milwaukee, is in the market for three planers, five shapers, two turret lathes, three radial drills and a lathe.

Buying of tools in New England is better than it has been in some time. The city of Boston has bought a fairly large list of tools for its new Hyde Park school.

New York

NEW YORK, Aug. 7.—Machine tool buying in the first week of August continued at a steady pace, although it lacked large orders such as were placed in July by the Wright Aeronautical Corporation and the General Electric Co. Most of the current buying is in single tools and is being done by the more progressive companies, which recognize the necessity of replacing old tools with new and of cutting down unit production costs by the installation of the most modern equipment. Nearly all machine tool sellers in this market have a fair amount of business in prospect.

Niles-Bement-Pond Co. has sold 13 double-crank, straight-side presses, a Morris 3-ft. radial drill, an Acme 2-in. bolt cutter, a Cincinnati No. 4 high-speed tapping machine, two Ransom grinders and an Aurora 36-in. drill. Pratt & Whitney division sold four No. 2 jig borers, two 7 x 32-in. lathes, four No. 3 die sinkers, a 4-A plain die sinker, a 4-A universal die sinker, a 4½ x 12-in. thread milling machine, a 6 x 60-in. thread milling machine, a 6 x 90-in. thread milling machine, two 14-in. vertical surface grinders, five lathes and other tools.

E. W. Bliss Co., Fifty-third Street and Second Avenue, Brooklyn, manufacturer of presses and heavy machinery, is planning to devote portion of works to production of airplane engines and parts and is in negotiation for American rights for British engine unit. Company will limit output solely to engines and will not build complete airplanes.

Charles Hvass & Co., 508 East Nineteenth Street, New York, manufacturers of machinery and parts, have purchased adjoining property, and will use for expansion.

Board of Trustees, Woodlawn Cemetery, 20 East Twenty-third Street, New York, has plans for two-story automobile service, garage and mechanical shop, 62 x 145 ft., to cost approximately \$100,000 with equipment.

Officials of Gotham Silk Hosiery Co., 389 Fifth Avenue, New York, are organizing a subsidiary to take over patent rights and manufacture a recently perfected machine for mending hosiery. A plant will be established for manufacture of parts and assembling. S. E. Summerfield is president.

Board of Education, Ticonderoga, N. Y., plans installation of manual training equipment in new two-story high school to cost \$300,000, for which bids are being asked on general contract until Aug. 15.

Tooker & Marsh, 101 Park Avenue, New York, are architects.

Consolidated Automatic Merchandising Corporation, New York, has been organized to take over and consolidate General Vending Corporation, Automatic Merchandising Corporation, 285 Madison Avenue; Remington Service Machines, Inc., Schermack Corporation of America, and Sanitary Postage Service Corporation, 285 Madison Avenue, manufacturers and distributors of automatic and other vending machines. Consolidated company will be affiliated with United Cigar Stores Co. of America, 44 West Eighteenth Street, and will carry out expansion program for increased production and development of additional vending machine units. Headquarters will be established at 285 Madison Avenue. A. J. Sack is chairman of board, and Joseph J. Schermack, president.

T. E. Conklin Brass & Copper Co., 54 Lafayette Street, New York, has leased property at 113-15 Leonard Street, for expansion.

Charles Schaefer, Jr., 332 East 149th Street, New York, architect, has plans for a two-story automobile service, repair and garage building, 100 x 150 ft., to cost close to \$100,000 with equipment.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has acquired six-story adjoining building for expansion.

William Shary, 41 Union Square, New York, architect, has filed plans for a four-story automobile service, repair and garage building at 407-13 Sixty-first Street, to cost about \$100,000 with equipment.

Lackawanna Railroad Co., 90 West Street, New York, is reported considering plans for steam-operated electric power plant on Hackensack River, near Kearny, N. J., to cost more than \$4,000,000, to be used in connection with proposed electrification of suburban lines.

G. Edson Clark, Inc., Newark, operating an automobile body works at 562 Central Avenue, has leased building at 146 Norfolk Street for expansion.

Board of City Commissioners, Asbury Park, N. J., has work under way on a new power plant for central heating service to cost more than \$250,000 with equipment. Whitney Warren, 16 East Forty-seventh Street, New York, is architect.

F. L. Smidth & Co., 50 Church Street, New York, engineers, and manufacturers of cement mill machinery, have awarded general contract to Charles Flocken, 681 Newark Avenue, Elizabeth, N. J., for one-story foundry addition at Elizabeth, to cost about \$25,000. John S. Branne, Grand Central Terminal, New York, is consulting engineer.

Board of City Commissioners, Newark, has taken out permit for a new hangar at municipal airport, Port Newark, with repair facilities, to cost about \$65,000.

Board of Education, Bogota, N. J., is said to be planning installation of manual training equipment in four-story addition.

The Crane Market

VERY little new inquiry is reported either for electric overhead or locomotive cranes and buyers are slow to award business in some cases as a result of executives being on vacation at present. In the locomotive crane field two cranes for the New York Central Railroad are pending and a sand and gravel company in the New York district is in the market for three new cranes to replace three cranes that are in use. Lehigh University, Bethlehem, Pa., is in the market for a 10-ton, 18-ft. span, 3-motor overhead crane for a new laboratory

building. Carnegie Steel Co. will close in a few days for a 10-ton double trolley, 84-ft. span crane for its new warehouse near the McCutcheon mills, Pittsburgh.

Among recent purchases are:

F. L. Smidth & Co., 50 Church Street, New York, four overhead cranes for the Monolith-Portland Cement Co., Laramie, Wyo.; a 25-ton, 30-ft. span, 1-motor, 2-ton, 29-ft. span, 1-motor, 7-ton, 15-ft. 6-in. span hand power and 5-ton, 35-ft. span, hand power to a builder in the Middle West.

William F. Kenny Co., New York, con-

tractor, 20-ton electric locomotive crane, reported purchased from Ohio Locomotive Crane Co.

Hart & Early Co., 18 East Forty-first Street, New York, 5-ton truck crane from Browning Crane Co.

American Sheet & Tin Plate Co., for Monessen, Pa., works, one 15-ton, 58-ft. span crane from Cleveland Crane & Engineering Co.

McClintic-Marshall Co., for Leetsdale, Pa., works, two 30-ton, 34-ft. span cranes from Shaw Crane Works.

to high school, to cost about \$170,000, for which plans will be drawn by C. V. R. Bogert, 210 Main Street, Hackensack, N. J., architect.

Sonatron Tube Co., 88 Eighth Avenue, Newark, manufacturer of radio equipment, has awarded a general contract to Drill Construction Co., 889 Broad Street, for a four-story addition, 45 x 120 ft., to cost approximately \$75,000 with equipment. Siegler & Greenberg, 164 Market Street, are architects.

V. J. Eck, Broad Street, Red Bank, N. J., architect, has completed plans for two-story automobile service, repair and garage building, 80 x 100 ft., to cost more than \$100,000, with equipment.

Nizinite Metals Corporation, Perth Amboy, N. J., has been formed to manufacture nickel and chrome plates, zinc sheets and other metals. Plant will soon be in operation at Perth Amboy and materials and equipment have been contracted for.

Philadelphia

PHILADELPHIA, Aug. 6.—Property at Berks and Hancock Streets, Philadelphia, consisting of factory units on site, 109 x 240 ft., have been acquired by Acme Copper Smithing & Machine Co., 1024 Ridge Street, and will be used for expansion.

Yorke Iron Works, Inc., Philadelphia, has been organized with capital of 100 shares of stock to take over and expand company of same name with local works at 5738 Westminster Avenue. New company is headed by William A. Matsinger, 611 North Fifty-second Street, and James A. Lynd, 6362 Overbrook Avenue.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has arranged for increase in capital from \$50,000,000 to \$100,000,000, a portion of proceeds to be used for expansion. Company is said to be planning construction of new oil refinery in vicinity of Atreco, Tex., on Neches River, to cost in excess of \$12,000,000 with machinery, and will also carry out pipe line project in this same district through its subsidiary, Atlantic Pipe Line Co., totaling about 500 miles.

William Worlock & Co., Philadelphia, have leased property at 315 North Seventh Street and will establish a new machine shop.

Congoleum-Nairn Co., Inc., 1421 Chestnut Street, Philadelphia, manufacturer of linoleum, cork and other flooring, has awarded general contract to W. W. Lindsay & Co., Harrison Building, for five new units at plant at Marcus Hook, Pa., to cost about \$500,000 with machinery.

Work will include an automobile service, repair and garage building for company cars.

In connection with recent award by Gulf States Paper Corporation, Tuscaloosa, Ala., to United Engineers & Constructors, Inc., Sixteenth and Walnut Streets, Philadelphia, and 125 East Forty-sixth Street, New York, headed by Dwight P. Robinson, for new power plant, contracting company will make all purchases of equipment and carry out complete design and erection. Unit will be equipped with three 1000-hp. boilers and 7500-kw. turbo-generator, with pumping machinery, and complete accessories. Plant will use pulverized coal for fuel.

Following recent purchase of electric range division of Simplex Electric Heating Co., Cambridge, Mass., by Buckwalter Stove Co., Royersford, Pa., purchasing company will continue production at Cambridge works until October, at which time it is purposed to remove equipment to Royersford, where manufacture will be concentrated. Last noted plant will be increased to accommodate the expansion. Simplex company disposed of its appliance division to Edison Electric Appliance Co., Chicago, a subsidiary of General Electric Co., and is discontinuing operations.

Aircraft Development Co., Trenton, N. J., recently formed with capital of \$500,000, has established temporary offices at 220 Garfield Avenue and plans early operation of plant for manufacture of airplanes, including parts and assembling departments. William J. Ross and Floyd Patton, 130 North Warren Street, head new company.

Lehigh Valley Railroad Co., 143 Liberty Street, New York, has begun construction of new engine house at Lehighton, Pa., with repair facilities, to cost about \$75,000 with equipment.

Fletcher Works, Inc., Second Street and Glenwood Avenue, Philadelphia, manufacturer of textile machinery and parts, has purchased plant and business of Scranton Silk Machine Co., Scranton, Pa., manufacturer of similar equipment, and will consolidate with its organization. Production will be discontinued at Scranton and equipment removed to Philadelphia works, which will carry out expansion program.

Ludington Flying Service, Inc., Atlantic Building, Philadelphia, has plans for new hangar with repair facilities at Island Road and Penrose Ferry Boulevard, where aircraft field will be developed.

Following recent purchase of business and patents of Wright Mfg. Co., Lisbon, Ohio, manufacturer of chain hoists, etc., by American Chain Co., Bridgeport, Conn.,

and York, Pa., latter company is planning for removal of machinery to York plant in October, and will carry out expansion at that works. Wright company continues ownership of plant and buildings at Lisbon and is reported planning development of its foundry business after removal of acquired division.

Albert E. Peterson, 307 Trainer Avenue, Ridley Park, Pa., and associates have organized Moldic Co., with capital of \$20,000, and plans early operation of plant at Philadelphia for manufacture of ventilating equipment and devices. Edwin F. Uhland, 2828 D Street, Philadelphia, is also interested in new company.

Girard Smelting & Refining Co., Philadelphia, has purchased property in Philadelphia formerly occupied by Tacony Steel Co. Plant covers 46 acres and includes about 30 brick and steel buildings. Improvements and installation of new equipment will require about one year, after which Girard company's business, now housed in two plants, will be concentrated at new location.

New England

BOSTON, Aug. 6.—The buying of equipment by the city of Boston for its new Hyde Park district school featured an otherwise quiet machine tool market the past week. As purchases are divided among a number of dealers and manufacturers, a check-up on the actual number of tools bought cannot be made at this time. It is believed, however, a fairly large number of tools have been placed, although not as many as were contained in the original requisitions. Bids close today for millwright equipment for both old and new Hyde Park district high schools.

Small tools are selling much better than a year ago, and are about on a level with sales a month ago.

American Thermos Bottle Co., Norwich, Conn., has started work on an addition.

Bennett Wire Co., Norwalk, Conn., has sold its stock and business to Hudson Wire Co., Ossining, N. Y. Production will be resumed under name of Pequot Wire Co.

Cavanagh-Dobbs, Inc., South Norwalk, Conn., has awarded contract for a three-story plant, 260 x 300 ft.

Central Maine Power Co., Augusta, Me., has started work on a new power plant at Burnham, Me., for which miscellaneous equipment is required.

Goss & DeLeeuw Machine Co., New

Britain, Conn., has let contract to Alberthaw Co., Boston, for one-story manufacturing building, 100 x 175 ft.

Contract has been let by Raybestos Co., Inc., Bridgeport, Conn., manufacturer of brake lining, etc., to W. J. Shaughnessy, Jr., Fairfield Avenue, for one-story addition to plant at Stratford, Conn., 100 x 360 ft., to cost more than \$100,000 with machinery.

Bristol Co., Waterbury, Conn., manufacturer of recording instruments, has plans under way for one-story addition, to cost close to \$45,000 with equipment. F. A. Webster, 51 West Main Street, is architect.

Androscoggin Foundry Co., Auburn, Me., has completed plans for a one-story addition, to cost in excess of \$25,000 with equipment.

E. Ingraham Co., North Main Street, Bristol, Conn., manufacturer of clocks, clock mechanisms, etc., will take bids about Aug. 15 for five-story addition, 50 x 162 ft., to cost more than \$90,000. Max J. Unkelbach, New Britain, Conn., is architect.

Kingsbury Machine Co., Myrtle Street, Keene, N. H., has awarded general contract to G. W. Scott, 28 Washington Street, for two-story addition, to cost more than \$30,000 with equipment.

Fire, July 28, destroyed a building at plant of C. E. Bradley Corporation, Brattleboro, Vt., manufacturer of handles, etc., with loss reported at \$21,000. It is planned to rebuild.

Officials of Dard Hunter's Paper Mill, Chillicothe, Ohio, have organized Dard Hunter, Inc., a subsidiary, with capital of \$50,000, to take over former plant of Barnum & Richardson Co., Lime Rock, Conn., recently purchased by parent organization. New company will remodel with early installation of machinery for new mill. Entire project is reported to cost more than \$80,000. Dard Hunter, Chillicothe, is head.

Detroit

DETROIT, Aug. 6.—Plans are being considered by Stinson Aircraft Corporation, Northville, Mich., for a one-story addition, to cost about \$25,000 with equipment.

P. R. Periera, Polk Directory Building, Detroit, architect, has completed plans for new two-story service, repair and garage building, to cost approximately \$100,000 with equipment.

Electrical Warehouse, Inc., 452 West Larned Street, Detroit, is having plans drawn for new two-story service, storage and distributing plant, 75 x 190 ft., to cost in excess of \$65,000. Wright & Nice, General Motors Building, are architects.

Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of industrial oxygen, automatic welding machines, etc., is reported considering new branch plant near Center Line, Mich., to cost more than \$45,000 with equipment.

Cadillac Malleable Iron Co., Cadillac, Mich., has plans for extensions to increase output about 25 per cent. It recently arranged for increase in capital from \$500,000 to \$650,000, a portion of proceeds to be used for expansion.

Board of Education, Grand Rapids, has plans for an addition to vocational and technical high school, to cost more than \$150,000 with equipment. Turner & Thebaud, Michigan Trust Building, are architects, and W. W. Bradfield, same address, is engineer.

Higgins Brass & Mfg. Co., 12435 Dequindre Street, Detroit, will soon begin work on an addition, to cost upward of \$50,000 including equipment. George V. Pottle, Davis-Whitaker Building, is architect.

Ex-Cel Paper Co., Bangor, Mich., has plans for a new two-story mill, to cost more than \$400,000 with machinery, and will ask bids soon on general contract. Billingham & Cobb, 211 Woodward Avenue, Kalamazoo, are architects and engineers.

Plant of Cummer Mfg. Co., Cadillac, Mich., manufacturer of boxes, crates, etc., has been acquired by new interests, headed by J. P. and George Wilcox, Cadillac. A new company is being formed to establish works for manufacture of springs for automobile seats and kindred products.

Detroit Edison Co., Second Boulevard, Detroit, has authorized plans for a five-story power substation at Grand River and Larchmont Avenues, to cost \$215,000 with equipment. It will build another such station on Jefferson Avenue, to cost \$400,000.

Central Specialty Co., East Forest Avenue, Ypsilanti, is planning a one and two-story addition to foundry, to cost in excess of \$40,000 with equipment.

Acme Equipment Co., Inc., Detroit, dealer in new and used contractors' and power plant equipment, has removed its offices to 216 Hammond Building, Fort and Griswold Streets.

South Atlantic

BALTIMORE, Aug. 6.—Contract has been let by Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, manufacturer of metal bottle caps, bottling machinery, etc., to C. W. Schmidt, Hearst Tower Building, for one-story addition to plant at Highlandtown, to cost more than \$45,000 with equipment. L. R. White, Hearst Tower Building, is architect.

Salisbury Shipbuilding Co., Salisbury, Md., recently organized, has taken over former local shipyard of Smith & Williams, and will remodel and install new equipment for new plant. Ralph H. Grier and Charles T. Fisher, Salisbury, are heads.

International Harvester Co., Inc., 606 South Michigan Avenue, Chicago, has asked bids on general contract for new factory branch, service and repair building for motor truck division at Washington, to cost close to \$100,000 with equipment. E. A. Adt, Barr Building, Washington, is architect; C. B. Raffer, same address, is consulting engineer.

Stieff Co., 17 North Liberty Street, Baltimore, manufacturer of silverware and plated ware products, has awarded general contract to L. L. Chambers, Inc., Roland Avenue and Thirty-sixth Street, for one-story addition to plant, to cost more than \$30,000 with equipment.

Baker County Power Co., Camilla, Ga., purchased municipal electric light plant and waterworks at Norman Park, Ga., and plans extensions and improvements in that section. Company is operated by W. B. Foshay Co., Minneapolis, Minn.

United States Shipping Board, Washington, will receive bids until Aug. 21 for installation of main Diesel engines and auxiliary equipment on eight vessels of Merchant Fleet Corporation, including boilers, pumping units, etc. Capt. R. D. Gatewood is manager of maintenance and repair division.

Dempsey-York Co., Statesville, N. C., recently organized by A. P. Dempsey, 114 South Catherine Street, Baltimore, and D. H. York, Statesville, plans early operation of local plant for manufacture of sheet metal-working machinery and parts. It is understood that property has been acquired.

Board of Bibb County School Commissioners, Macon, Ga., plans construction of manual training shop additions to boys' high school, to be carried out in connection with school expansion program to cost about \$5,000,000.

Broad River Power Co., Columbia, S. C., a subsidiary of General Gas & Electric Co., 50 Pine Street, New York, is planning for increase in steam-operated electric generating plant at Parr Shoals, comprising new 30,000-kw turbo-generator, boilers and auxiliary equipment, to cost more than \$1,000,000. Company will also extend transmission line for connection with system of Lexington Water Power Co., an affiliated organization.

Midville Veneer Co., Midville, Ga., is considering rebuilding portion of mill destroyed by fire June 30, with loss in excess of \$130,000 including equipment.

Board of District Commissioners, District Building, Washington, is said to be planning installation of manual training equipment in new E. A. Paul Junior High School, to cost more than \$450,000 with equipment. A. L. Harris, District Building, is city architect.

Burwell-Harris Motor Co., 229 North Tryon Street, Charlotte, N. C., has awarded general contract to Southeastern Construction Co., 210 West Second Street, for three-story service, repair and garage building, 91 x 100 ft., to cost close to \$100,000. Lockwood, Greene & Co., Inc., Charlotte, are architects and engineers.

Virginia Electric & Power Co., Richmond, Va., plans construction of hydroelectric power house on Roanoke River, near Roanoke Rapids, for an initial output of 25,000 kw., to cost more than \$2,000,000 with power dam and transmission system.

Pierson-Larkin Refrigerating Corporation, Atlanta, Ga., recently organized with capital of \$100,000 by Virgil P. Warren, 1065 Ponce de Léon Avenue, and associates, plans operation of plant for manufacture of a patented aluminum electric refrigerating coil. Lester U. Larkin is also interested in company.

Anniston Scrap Material Co., Inc., North Broad Street, Rome, Ga., plans purchase of a conveyor and hoisting equipment. H. W. Buckner is general manager.

Pittsburgh

PITTSBURGH, Aug. 6.—Only one local machine tool dealer found July to have been a good month in point of sales. This firm sold several grinding machines to the Pennsylvania Railroad and had orders from the Pittsburgh & Lake Erie Railroad, Montour Railroad and Pressed Steel Car Co., and also shared in the orders placed by the Westinghouse Electric & Mfg. Co.

A vocational department has been authorized by Board of Education, Tyrone, Pa., in three-story and basement high school to cost about \$300,000, for which bids have been asked on general contract. Lawrie & Green, Third and Forster Streets, Harrisburg, Pa., are architects.

Reynolds Metals Co., recently organized with capital of about \$25,000,000, will take over and consolidate Robertshaw Thermostat Co., Youngwood, Pa., manufacturer of plumbing and heating specialties, with a number of other companies, including Fulton Syphon Co., Knoxville, Tenn.; United States Foil Co., Louisville, and Beech-nut Foil Co., Canajoharie, N. Y. New organization will continue production at all plants and contemplates expansion program in line of tin foil, heating, plumbing and affiliated mechanical equipment. Headquarters will be maintained at Louisville; Richard S. Reynolds, head of United States Foil Co., will be president of consolidated organization, and C. K. Reynolds, vice-president.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, is arranging for increase in capital from \$50,000,000 to \$65,000,000, a considerable portion of proceeds to be used for expansion. Company will build an addition to branch plant at Clarksburg, W. Va., to cost more than \$300,000 and is also interested in Pittsburgh Safety Glass Co., recently organized, which will soon proceed with plant at Creighton, Pa., for production of shatterproof glass, to cost more than \$1,000,000 with machinery. Parent company will also carry out expansion program at plant at Ford City, Pa., to cost upward of \$4,500,000.

City Council, New Martinsville, W. Va., has authorized bond issue of \$124,000 for construction of municipal electric light and power plant to cost \$83,000, and transmission and distributing system to cost \$41,000.

City Council, Erie, Pa., has authorized acquisition of 100 acres near Buffalo Road for a municipal airport, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, to cost more than \$100,000 with equipment.

Seamless Tube & Steel Co., New York and Pittsburgh, has been organized as consolidation of tube sales departments of Roland Steel Products Corporation, 114 Liberty Street, New York, and Paul F. Hermann Co., Keenan Building, Pittsburgh, and will engage principally in buying and selling tubular and other steel products, largely imported. Roland and Hermann companies will continue to operate separately on all products except tubular goods.

Lewis Foundry & Machine Co., Pittsburgh, is in market for a second-hand 500-lb. electric furnace, complete. M. Matthews is purchasing agent.

Indiana

INDIANAPOLIS, Aug. 6.—Plans are being completed by Federal Foundry Co., 502 South Harris Street, Indianapolis, for eight one-story additions, comprising brass foundry, 50 x 55 ft.; core room addition, 40 x 80 ft.; pattern shop, 40 x 50 ft.; two flash units, 38 x 100 ft., and other shops, to cost close to \$200,000 with equipment. Carter-Richards Co., Engineers' Building, Cleveland, is architect and engineer.

William M. Torrence, Muncie, has plans for a four-story automobile service, repair and garage building, 60 x 125 ft., to cost close to \$100,000 with equipment.

National Mill Supply Co., Fort Wayne, has awarded general contract to Olds Brothers, First National Bank Building, for an addition to cost about \$45,000 with equipment.

Martin-Parry Corporation, 1100 West

Henry Street, Indianapolis, manufacturer of automobile bodies, is removing equipment from plant of Cleveland Windshield Co., 1520 Fairfield Avenue, Cleveland, recently acquired, to Indianapolis works, where new department will be developed for this branch of manufacture. Company will also establish new chromium plating department for windshield parts.

Board of Education, Richmond, has taken option on 20-acre tract in southwest section of city as site for new high school, with manual training department, entire project to cost in excess of \$400,000 with equipment. Architect will soon be selected to prepare plans. W. Bates is superintendent in charge.

Cleveland

CLEVELAND, Aug. 6.—Machine tool dealers have had a fair amount of business the past week, bookings having consisted mostly of orders for single tools from widely diversified sources. The volume of inquiry indicates that sales this month probably will be about normal for midsummer. Some postponement of buying is noted on account of the absence of executives whose approval is necessary before orders can be placed. A local turret lathe manufacturer states that the number of sales made in the last 30 days probably is the largest in the history of the company. Production is being well maintained and in some cases deliveries cannot be made in less than four to five weeks.

Contract has been let by United States Aluminum Co., 2210 Harvard Avenue, Cleveland, a subsidiary of Aluminum Co. of America, Pittsburgh, to Industrial Construction Co., 308 Euclid Avenue, for five-story factory branch and distributing plant, 75 x 140 ft., to cost about \$300,000.

Grabler Mfg. Co., 6565 Broadway, Cleveland, manufacturer of clamps, hangers, etc., is having plans drawn for one-story addition, 40 x 80 ft., to cost about \$35,000 with equipment. Christian, Schwarzenberg & Gaede, Euclid Building, are architects.

Snappy Radiator & Battery Service Co., 736 Cleveland Avenue, S. W., Canton, Ohio, has awarded general contract to H. B. Fisher, Canton, for one-story addition, to cost about \$42,000 with equipment.

Scott-Ullman Co., 3311 Perkins Avenue, N. E., Cleveland, manufacturer of electric lighting fixtures and equipment, has leased about 10,000 sq. ft., at 2480 East Twenty-second Street for expansion.

Max Marmorstein, 1353 Chester County Union Mortgage Building, Cleveland, is at head of project to construct and operate a six-story automobile service, repair and garage building, 90 x 125 ft., to cost about \$250,000 with equipment.

Willard Storage Battery Co., 246 East 131st Street, Cleveland, has plans for one-story addition, 65 x 215 ft., to cost more than \$80,000 with equipment. R. C. Norberg is president and general manager.

Aetna Rubber Co., 815 East Seventy-ninth Street, Cleveland, manufacturer of hard and soft molded mechanical and other rubber goods, is completing plans for new plant at Ashtabula, Ohio, to cost close to \$100,000 with machinery. S. T. Campbell is president and general manager.

Cleveland Blow Pipe & Mfg. Co., formerly at 6950 Kinsman Road, Cleveland, has moved into larger quarters at 6505 Cedar Avenue.

Midland Furnace Co., 735 Huntington Bank Building, Columbus, Ohio, has been organized to manufacture warm air furnaces. It has secured property on Hocking Valley tracks in northwest section of city and contracts for factory buildings will be let at once. Furnaces will be made of 3/16-in. plates and No. 12 gage sheets and plant will have capacity of 25,000 units per year. R. C. Walker is president and general manager.

Auto-Diesel Piston Ring Co., 4520 Superior Avenue, Cleveland, has purchased Austin & Smith Co., Cleveland, and will operate as spring and wire forming department. Company now manufactures coil, extension, flat, spiral and torsion springs; metal body and furniture polish; compression rings for compressors, cranes, pumps, machinery, engines, lighting plants, and oil control and compression piston rings for automobiles, trucks and tractors.

Buffalo

BUFFALO, Aug. 6.—Bids will soon be asked on general contract by National Grinding Wheel Co., 2984 Main Street, Buffalo, J. J. Russ, general manager, for new abrasive and grinding wheel plant at Tonawanda, N. Y., consisting of one and two-story units, 80 x 100 ft. and 40 x 100 ft., respectively, and one-story office, to cost close to \$70,000 with equipment. L. A. Harding Construction Corporation, 1335 Main Street, Buffalo, is architect and engineer.

Champion Paper Co., Carthage, N. Y., has approved plans for one-story addition, 100 x 240 ft., to cost more than \$80,000 with machinery. It is scheduled for completion early in November. J. E. Warner, chief engineer for St. Regis Paper Co., Watertown, N. Y., an affiliated organization, is engineer.

Board of Education, Sidney, N. Y., is considering installation of manual training equipment in new three-story high and grade school to cost \$250,000, for which bids have been asked on general contract. Palmer Rogers, 101 Park Avenue, New York, is architect.

Genesee Motoramp Garage, 93 Pearl Street, Buffalo, C. F. Moe, manager, will soon take bids on general contract for six-story service, repair and garage building, to cost close to \$500,000 with equipment. E. B. Green & Sons, and A. Hart Hopkins, 1 Niagara Square, are architects.

International Paper Co., 100 East Forty-second Street, New York, is abandoning its mills at Glen Park, N. Y., and property has been placed on market, with water power rights retained by present owner. Company is said to be arranging plans for hydroelectric power development at this point, to cost in excess of \$1,000,000 with transmission lines.

Board of Education, Malone, N. Y., plans installation of manual training equipment in new two-story high school to cost in excess of \$500,000, for which bids will soon be asked on revised plans. Fuller & Robinson, 95 State Street, Albany, N. Y., are architects.

City Council, Niagara Falls, N. Y., has been authorized to acquire tract of 230 acres near Tuscarora Road for new municipal airport, to include hangars, repair and conditioning shops, oil storage and distributing building, and other units, with entire cost in excess of \$100,000.

Chicago

CHICAGO, Aug. 6.—July witnessed the close of several large industrial lists and August opens with the promise of a large volume of business, the bulk coming from widely scattered sources as indicated by the character of inquiries. There still is a substantial amount of business coming from tractor plants and it is probable that Allis-Chalmers Mfg. Co., will buy new equipment for its tractor works at Milwaukee, and Springfield, Ill. From the viewpoint of inquiry, dealers look on this as the best opening week in August for many years.

The A. O. Smith Corporation, Milwaukee, is in the market for three planers, five shapers, two turret lathes, a 36-in. lathe and three 4-ft. radial drills. The Chicago, Rock Island & Pacific is asking for prices on two 36-in. shapers, a 36-in. boring mill and a 36-in. lathe. Forging plants in this district are busy and are buying die making machinery. An automobile parts manufacturer in Iowa has purchased a No. 2 milling machine and the Nash Motors Co. is buying a few items for its three plants in Wisconsin.

Chicago State Co., Chicago, Charles J. Vopicka, president, will build a five-story public garage to cost \$300,000. Fox & Fox, 38 South Dearborn Street are architects.

Rodell Stattner, formerly superintendent of mechanical department of the Tipps Tool Co., will open a machine shop at Taylorville, Ill.

Martin Machine Works, 2234 Walnut Street, Chicago, has awarded contract for a new machine shop, 48 x 125 ft.

Furst-McNess Co., Freeport, Ill., plans installation of power equipment in connection with factory addition. The entire project will cost \$140,000.

East Side Levee & Sanitary District, Granite City, Ill., John D. Johns, president, will take bids for two pumping stations with mechanical equipment.

George Brumlich, 171 West Wacker Drive, Chicago, will build a 10-story garage, 80 x 149 ft., to cost \$500,000. B. W. Construction Co., is general contractor.

International Steel & Iron Co., 3136 West Fifty-first Street, Chicago, will build a two-story warehouse to cost \$200,000.

Cedar Rapids Pump & Supply Co., Cedar Rapids, Iowa, manufacturer of plumbing, heating, factory and well supplies, and Central Steel Products Co., Clinton, Iowa, maker of pipe nipples, spacers and fabricator of pipe, have been merged as Central Steel Products Co., with headquarters in Merchants National Bank Building, Cedar Rapids. Plants in Cedar Rapids and Clinton will be continued.

Plans are under way by American Can Co., 104 South Michigan Avenue, Chicago, for two-story top addition to plant at 6025 Western Avenue, to cost in excess of \$80,000. Engineering department at company headquarters, 120 Broadway, New York, is in charge.

Indestro Mfg. Co., 2650 Coyne Avenue, Chicago, manufacturer of universal joints, screw drivers, valve lifters and other tools, has arranged with Central Manufacturing District for new one and two-story plant, 300 x 305 ft., to be occupied under lease. It will cost in excess of \$400,000 with equipment. Present factory will be removed to new location and

increase in output arranged. A. Epstein, 2001 West Pershing Road, is engineer.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to A. G. Wahl, 616 Seventh Avenue, South, St. Cloud, for a two-story factory branch, service, storage and distributing plant at St. Cloud, to cost about \$150,000 with equipment.

Hine Brothers Soap Co., 4023 South Ashland Avenue, Chicago, plans rebuilding portion of plant destroyed by fire Aug. 2, with loss close to \$90,000 with equipment.

Diamond Calk Horseshoe Co., 4632 Grand Avenue, Duluth, Minn., is considering one-story addition, to cost close to \$40,000 with equipment.

Phoell Mfg. Co., 5700 West Roosevelt Road, Chicago, manufacturer of nuts, screws, bolts, etc., will proceed with superstructure for a one-story and basement addition, 100 x 300 ft., to cost more than \$150,000 with equipment. General contract has been let to Calumet Liberty-Way Construction Co., 9401 Stoney Island Avenue. A. S. Alschuler, 53 West Jackson Boulevard, is architect.

Hart-Parr Co., Charles City, Iowa, manufacturer of traction engines and parts, and other equipment, is arranging for sale of 60,000 shares of preferred stock, a considerable portion of fund to be used for plant enlargements and improvements.

West End Scrap Iron & Metal Co., 1910 West Michigan Street, Duluth, Minn., has awarded general contract to R. J. MacLeod & Co., Builders' Exchange, for two-story and basement storage and distributing plant, 42 x 110 ft., to cost about \$30,000. Thomas J. Shefchik, Glencoe Building, is architect.

Board of Education, Onawa, Iowa, is said to be planning installation of manual training facilities in new two-story and basement high school to cost about \$125,000. Beuttler & Arnold, Grain Exchange Building, Sioux City, Iowa, are architects.

Aetna Industries, Inc., 11 East Austin Avenue, Chicago, manufacturer of ornamental iron and metal goods, has purchased a one-story factory, 50 x 100 ft., at 2539-41 West Lake Street, for expansion.

Milwaukee

MILWAUKEE, Aug. 6.—Expansion of local industries not only is furnishing local machine tool builders with considerable business, but orders from other industrial centers are making a favorable aggregate of new business. Inquiry is also active, encouraging confidence in the belief that good business is in prospect during the remainder of the year.

Industrial employment in Milwaukee at the beginning of August marked a new peace-time high record, the 44 reporting shops having 37,314 persons at work. The average for the first seven months this year is 36,484, compared with a monthly average of 35,171 for the year 1927.

In addition to new shop, 301 x 108 ft., three stories, for which International Harvester Co. has just placed contracts, erection of another unit of Milwaukee farm tractor and cream separator works at 784 Park Street is contemplated at an investment of approximately \$500,000. Work will be undertaken as soon as Milwaukee Common Council vacates 200 ft. of Park Street within limits of works

site, which is expected in about two weeks. Paul F. Schryer is general manager.

Davis & Thompson Co., Fifty-seventh Avenue and Mitchell Street, West Allis, Milwaukee, manufacturer of automatic milling and drilling machinery, lathes, etc., contemplates erection of an addition.

Wisconsin Tool & Mfg. Co., 1219 Thirtieth Street, Milwaukee, has purchased a three-story and basement building at Forty-fourth and State Streets for \$90,000 and will spend about \$50,000 in alterations and additional equipment.

A. J. Lindemann & Hoverson Co., First and Cleveland Avenues, Milwaukee, manufacturer of stoves, ranges, heaters, electrical appliances, etc., has placed general contract with Klug & Smith Co., consulting engineer, 69 East Wisconsin Avenue, local, for construction of a new boiler house unit. Two 400-hp. boilers have been purchased from the Wickes Boiler Co., Saginaw, Mich.

City of Milwaukee has accepted bid of Pacholski & Doligalski, 450 Mitchell Street, for erection of a \$100,000 machine shop and assembly floor for Milwaukee Fire Department. It will be used for constructing and servicing fire apparatus. Roland E. Stoelting is commissioner of public works.

Tobin Tool & Die Works, 200 Ruggles Street, Fond du Lac, Wis., is starting work on a one-story machine shop addition, 50 x 60 ft., to cost about \$25,000 complete.

Kohn Mfg. Co., 1375 Thirtieth Street, Milwaukee, manufacturer of garbage incinerating units, has placed general contract with Byrne Brothers, 3100 Burleigh Street, for a shop addition, 59 x 105 ft., costing about \$30,000 complete.

Milwaukee Mill Supply Co., 1379 Thirty-first Street, Milwaukee, will build a two-story shop and warehouse building, 50 x 120 ft. Architect is Hugo V. Miller, 862 Third Street.

Universal Foundry Co., Oshkosh, Wis., which is building an addition, has increased its authorized capitalization from \$50,000 to \$100,000.

Acme Iron & Steel Co. is new name adopted by former Acme Iron & Wire Works, 1927 St. Paul Avenue, Milwaukee. Company fabricates structural and ornamental iron work.

Kearney & Trecker Corporation, Milwaukee, will erect new three-story office, adjoining present office building, which will release about 5000 sq. ft. additional for manufacturing purposes.

St. Louis

ST. LOUIS, Aug. 6.—A new power plant has been authorized by Anheuser-Busch, Inc., Pestalozzi Street, St. Louis, consisting of two 5000-kw. turbo-generators, three 1100-hp. boilers, superheaters, pumping equipment and auxiliary machinery; pulverized coal will be used as fuel and facilities for storage and handling installed. Improvements will be made in present power house. Entire project will cost close to \$1,000,000. Ophuls & Hill, Inc., 112 West Forty-second Street, New York, is engineer.

P. T. Drotts, Reliance Building, Kansas City, Kan., architect, has completed plans for a four-story automobile service, repair and garage building to cost close to \$175,000 with equipment.

American Foundry Co., Maud, Okla., is considering plans for one-story foundry and machine shop to cost more than \$35,000 with equipment.

Sinclair Pipe Line Co., Sinclair Building, Tulsa, Okla., a subsidiary of Sinclair Consolidated Oil Co., 45 Nassau Street, New York, is reported planning construction of pipe line from vicinity of Cushing, Okla., to a point near Chicago, to cost more than \$10,000,000.

Automatic machinery, conveying and other equipment will be installed in one and two-story addition, 50 x 133 ft., and 40 x 100 ft., to be built by Coca-Cola Bottling Co., 2540 Penn Street, Kansas City, Mo., to cost close to \$100,000. Hans Von Unwerth, Finance Building, is consulting engineer.

State Board of Public Affairs, Oklahoma City, Okla., has approved immediate construction of new power plant at State School for Blind, Muskogee, Okla., to cost about \$40,000. Layton, Hicks & Forsythe, Braniff Building, Oklahoma City, are architects.

Gasconade River Power Co., Pioneer Trust Building, Kansas City, Mo., has secured permission to proceed with hydroelectric power project near Rich Fountain, Mo., including power dam and generating station with capacity of 25,000 hp. Entire project will cost in excess of \$1,000,000 with transmission lines.

Board of Managers, Missouri School for Deaf, Fulton, Mo., has awarded general contract to W. R. Odor & Son, Canton, Mo., for two-story manual training building, 51 x 101 ft., to cost close to \$45,000 with equipment. C. A. Smith, Finance Building, Kansas City, Mo., is architect.

City Council, Bismark, Mo., will take bids soon for pumping machinery, elevated steel tank and tower, and auxiliary equipment for municipal waterworks. A bond issue of \$47,000 is being arranged. Russell & Axon, Railway Exchange Building, St. Louis, are consulting engineers.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has work under way on addition to steam-operated electric power plant at Harrah, Okla., known as Horse-shoe Lake Station, to develop output of 65,000 hp. It is purposed to complete work in November or December. Plans are under way for construction of two additional transmission lines. Company is a subsidiary of Standard Gas & Electric Co., 231 South La Salle Street, Chicago.

Oklahoma Railway Co., Terminal Building, Oklahoma City, Okla., will proceed with erection of three one-story shops, 100 x 170 ft., and two units, each 50 x 120 ft., with one-story automobile service, repair and garage building, 80 x 200 ft. Entire project will cost in excess of \$100,000 including equipment. Guy B. Treat is consulting engineer.

L. B. Foster Co., Pittsburgh, has opened office at 1725 Railway Exchange Building, St. Louis, and will render service for users of industrial trackage.

Gulf States

BIRMINGHAM, Aug. 6.—A company has been organized by W. D. Hayden, Houston, Tex., and associates to construct and operate a lime plant on local site, using oyster shells as raw material. Arnold & Weigel, Woodville, Ohio, engineers, have been engaged to prepare plans for initial unit. It will be of rotary kiln type, with complete crushing plant and auxiliary equipment, to cost more than \$300,000 with machinery.

Southern Cotton Oil Co., Decatur, Ala., has acquired adjoining property and is reported planning an addition for commercial fertilizer production, to cost in excess of \$45,000 with equipment. Company will also carry out expansion pro-

gram at present mill to cost approximately \$25,000. Headquarters are in Produce Exchange Annex, New York.

Armour & Co., Union Stock Yards, Chicago, plan installation of conveying equipment, refrigerating and cold storage machinery in new packing plant at Monroe, La., to cost \$125,000.

J. J. & M. Taxman Refining Co., Wichita Falls, Tex., recently organized by J. J. Taxman, and associates; has purchased local oil refinery of Miller Refining Co., and will take immediate possession. New owner will carry out expansion and betterment program to develop daily output of close to 2500 bbl.

Slaton Cotton Oil Co., Slaton, Tex., is planning a new unit, to cost approximately \$40,000 with equipment.

City Council, Marlin, Tex., is asking bids until Aug. 14 for two electrically-operated centrifugal pumps, each with capacity of 450 gal. per min., with complete automatic auxiliary equipment. Plans and specifications at office of Levi Goodrich, city engineer.

Turner & McPherson, Martin Building, Birmingham, architects, have completed plans for one-story automobile service, repair and garage building, 100 x 190 ft., to cost close to \$90,000 with equipment.

Texas Pipe Line Co., operated by Texas Corporation, Houston, Tex., is said to be completing plans for construction of pipe line from its Alma Gray oil properties, Gray County, to Electra, Tex., about 154 miles, using 8-in. diameter welded steel pipe. A new pumping plant will be constructed in vicinity of last-noted place, entire project to cost more than \$5,000,000.

Board of Education, Tallahassee, Fla., is reported planning installation of manual training equipment in new high school to cost about \$250,000, for which plans will be drawn by Edwards & Sayward, Marietta Building, Atlanta, Ga., architects.

Hartline Mfg. Co., Tampa, Fla., recently organized by E. M. Lively, Tampa, Fla., and associates, has taken over former plant of Hartline Blotter Pen Co., and will manufacture a special self-blotting fountain pen and kindred products. An expansion and improvement program will be carried out, including erection of one-story factory.

City Council, Waco, Tex., plans establishment of municipal airport, including hangars, repair and reconditioning shops, and other units, to cost about \$75,000. A bond issue has been authorized.

Board of City Commissioners, S. E. Moss, water commissioner, City Hall, Dallas, Tex., has deferred receiving bids for waterworks machinery, including power and pumping equipment, etc., to cost approximately \$4,000,000, from Aug. 8 until Sept. 1. Fuller & McClintock, 170 Broadway, New York, are consulting engineers. J. B. Winder is chief engineer of Dallas water department.

Mississippi Power Co., Gulfport, Miss., affiliated with Alabama Power Co., Birmingham, has secured permission for a hydroelectric power development on Mississippi River, vicinity of Muscle Shoals. Plant will be designed for initial capacity of about 100,000 hp. and ultimate output of 260,000 hp., and is reported to cost more than \$4,000,000 with transmission lines.

Elliott Core Drilling Co., 3210 Harrisburg Street, Houston, Tex., manufacturer of oil well equipment, has acquired property on Canal Street and is considering construction of new one-story plant, to cost more than \$25,000 with equipment.

Cincinnati

CINCINNATI, Aug. 6.—Plans are being considered by E. E. Peters Machine Co., Springfield, Ohio, for new one-story plant for manufacture of patented automobile starter, including parts and assembling departments.

Radio Broadcasting Station WAIU, Elks' Country Club grounds, Columbus, Ohio, plans early rebuilding portion of power house and station destroyed by fire Aug. 2, with loss reported close to \$100,000, including equipment. M. V. Ackerberg is engineer.

Stanton Motors, Inc., 841 North High Street, Columbus, will take bids at once for two-story and basement service, repair and garage building, to cost \$100,000 with equipment. Richards, McCarty & Bulford, 584 East Broad Street, are architects.

Fairfield Paper Box Co., Baltimore, Ohio, has awarded general contract to Wilbur Weaver, Lancaster, Ohio, for one-story addition to corrugated paper box plant, to cost close to \$80,000 with equipment.

Henry Vogt Machine Co., Tenth Street, Louisville, manufacturer of ice-making and refrigerating machinery, has asked bids on general contract for multi-story addition to cost about \$340,000, a portion of structure to be used for storage and distribution. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

Ovens, conveying machinery and other equipment will be installed in new plant to be built by Kentucky Macaroni Co., Inc., 121 North Fifth Street, Louisville, to cost about \$50,000. Clifford Reichert, Louisville, is architect.

Leschner Paper Co., State Street and Harrison Avenue, Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Elm Street, for two-story and basement addition, to cost approximately \$75,000 including equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Aug. 15 for one straight and one irregular cutting shear, circular 66; 42,200 ft. ignition cable, and 46,000 ft. shielded power and lighting cable, circular 69; until Aug. 13 for 1796 belt assemblies, circular 64; until Aug. 17 for 200 control assemblies, 720 cock assemblies, 50 air intake manifolds, 320 engine exhaust stacks, 1200 fuel tank outlet screens, 1742 exhaust header flanges, etc., circular 70; 97 lever and bracket assemblies, 825 trigger motor assemblies, 332 sight assemblies, 365 post assemblies and 807 plunger end assemblies, circular 663.

Omher Fare Register Co., Dayton, Ohio, plans rebuilding portion of storage and distributing division destroyed by fire July 31, with loss close to \$40,000 with equipment.

American Rolling Mill Co., Middletown, Ohio, has awarded general contract to H. W. Cox, Ashland, Ky., for one-story storage and distributing unit, 160 x 270 ft., at its Ashland works, to cost \$175,000 with handling and other equipment.

Pacific Coast

SAN FRANCISCO, Aug. 1.—Plans are being completed by California Electric Refrigeration Corporation, Napoleon and Jerrold Streets, San Francisco, manufacturer of refrigerating equipment, for one-story plant at Berkeley, to cost about \$40,000.

Master Metalath Mfg. Co., Los Angeles, has awarded general contract to E. H. Goff, 1219 West Ninety-fifth Street, for a new one-story plant, 108 x 120 ft.

Union Oil Co., Mills Building, San Francisco, has plans for a new storage and distributing plant at Oakland, Cal., to cost close to \$100,000 with equipment.

Thomas A. Box, 63 Sunshine Street, Sausalito, Cal., and associates have organized Home Safety Match Co., to construct and operate a plant in Peninsula district, San Mateo County. Initial unit will cost more than \$500,000 with machinery. A machine shop will be installed. William E. Williams, Sausalito, is also interested in new company.

Roper Motor Co., Phoenix, Ariz., R. D. Roper, president, has acquired property at West Adams Street and Sixth Avenue, 135 x 200 ft., and plans construction of service, repair and garage building, to cost close to \$100,000 with equipment.

Hardie Mfg. Co., 55 North Front Street, Portland, manufacturer of spraying machinery and devices, has awarded general contract to A. C. Teller & Son, Worcester Building, for new one-story plant, to cost approximately \$40,000 with equipment. Headquarters are at Hudson, Mich.

Ogden Motor Car Co., Ogden, Utah, has leased a new building, 95 x 130 ft., to be erected at Washington Avenue and Binford Street, for new service, repair and garage building, to cost about \$85,000 with equipment. George C. Whitmeyer & Sons, First National Bank Building, are contractors.

Western Wax Paper Co., North Portland, has awarded general contract to Frank J. Leonard, Lewis Building, for a new one-story mill, 112 x 240 ft., to cost close to \$100,000 with machinery.

Zellerbach Paper Co., 1213 Front Street, Sacramento, Cal., is arranging for early rebuilding of portion of plant recently destroyed by fire, to be three stories, totaling 35,000 sq. ft. floor space, to cost \$180,000 with equipment.

Tucson Gas, Electric Light & Power Co., Tucson, Ariz., has approved plans for a new one-story equipment storage and distributing plant, with repair facilities, 60 x 165 ft., to cost close to \$40,000 with equipment.

Southern California Edison Co., Los Angeles, is arranging a fund of \$130,000,000 for extensions and improvements in hydroelectric power and steam power plants, transmission and distributing lines, power substations and other facilities over a period of five years, or on basis of about \$26,000,000 per year. Close to \$90,000,000 will be used for steel tower transmission lines and distributing systems.

Hesler Machine & Iron Works, Portland, Ore., was damaged by fire July 27, with loss estimated at from \$80,000 to \$100,000. The same fire also damaged Peerless Pattern Works adjoining and destroyed patterns accumulated over 30 years.

Foreign

CONTRACT has been let by Compania Colon Transaerea Espanola, S. A., Seville, Spain, to Fox Brothers International Corporation, 33 Rector Street, New York, for construction of airport at Buenos Aires, Argentina, including hangars, repair and reconditioning shops, parts shops, oil storage and distributing buildings and other units, project to cost about \$5,000,000 with equipment. Company will operate a giant dirigible line

between Seville and Buenos Aires, and recently awarded similar contract to Fox organization for airport at first noted place.

Department of Public Works, Supplies and Tenders, Auckland, New Zealand, will receive bids until Sept. 11 for two electric traveling cranes, each of 10 cwt. rating, for indoor service, as per specifications on file.

Moscow Water Supply Service, city of Moscow, Russia, plans extensions in municipal waterworks to increase capacity about 30,000,000 gal. per day, including pumping machinery, power equipment and auxiliary machinery. Delegation has come to United States to make study of modern systems of required type and will make headquarters at office of Amtorg Trading Corporation, 165 Broadway, New York. J. Andronov, president of Borough of Khamovniki, city of Moscow, heads delegation.

Mond Nickel Co., Ltd., Clydach, South Wales, British Isles, is planning early construction of a sixth refining unit at local plant, to cost more than \$400,000 with equipment.

Soviet Russian Government, Moscow, will increase capacity of shipyard at Sormov, for production of river boats and barges. A department will be installed for manufacture of Diesel engine units, including parts and assembling. An appropriation of \$9,600,000 is said to have been authorized for expansion. American-Russian Chamber of Commerce, 145 West Fifty-seventh Street, New York, has information on project.

Canada

TORONTO, Aug. 6.—For the first seven months of this year total machine tool business exceeded that of a year ago, and according to builders and dealers this has been one of the best years since the war. Makers of machinery report plant operations about 20 per cent better than last year and many have large unfilled orders on hand.

The Canadian National and Canadian Pacific Railways have been large buyers of equipment for shops, and additional purchases are in prospect. More interest is reported for mining equipment, several companies in northern Ontario having recently announced plans for new mill construction and development work. The automotive industry is not strongly represented among purchasing interests, but the General Motors Corporation is expected to be in the market soon for equipment for plants at Oshawa and Walkerville, Ont., and Regina, Sask.

High School Board, Welland, Ont., A. B. McLean, chairman, is receiving prices, catalogs, etc., on lathes and general equipment for vocational training shop for a proposed school to cost \$200,000.

Bids will be received by city clerk, City Hall, Quebec, until Aug. 20 for a pumping unit to be installed in waterworks plant. J. A. Tremblay is engineer.

Plans are being prepared for a dam and power house to be built at Dixville, Que., on the Coaticook River, for Desrochers & Normandin, Coaticook, Que. Engineer is A. C. Crepeau, 30a Wellington Street North, Sherbrooke, Que.

Bids are being received, no closing date set, by J. G. W. Campbell, Truro, N. S., for an addition to power plant of Truro Electric Commission.

Lang & Ross, Sault Ste. Marie, Ont., have commenced work on a power line

to Montreal River in connection with \$1,000,000 power development project near Sault Ste. Marie for Great Lakes Power Co., Ltd. Plans for power house are not yet ready.

Empire Stove & Furnace Co., Owen Sound, Ont., has started work on an addition to its foundry.

Standard Paper Box Co. is building a \$75,000 addition to its plant at Montreal. A. Leduc, 1488 Gilford Avenue, is general contractor; Baulne & Leonard are engineers.

New Trade Publications

Wire-Rope Slings.—John A. Roebeling's Sons Co., Trenton, N. J. Illustrated descriptive pamphlet of 85 pages covering slings made of wire rope for handling heavy materials, including locomotives, large beams and girders, boilers, heavy guns, roll housings and other materials. Various types of grab hooks and other auxiliary equipment are shown, including lifting beams.

Sprockets and Chains.—Boston Gear Works Sales Co., Norfolk Downs, Mass. Various types of steel and other chains and sprockets which have been standardized for delivery from stock are described and illustrated. Horsepower and load tables and list prices are included.

Oxy-Acetylene Equipment.—Oxweld Acetylene Co., 30 East Forty-second Street, New York. Catalog, 56 pages. New equipment includes a cutting blowpipe which is said to be immune from "back-fire," and a new line of portable low-pressure acetylene generators using compressed cakes of calcium carbide.

Electronic Tornado.—Lincoln Electric Co., Cleveland. Eight-page folder describing principles underlying automatic carbon arc welding by the electronic tornado process, properties of the joint so made, and machines developed for its use. The process was described in THE IRON AGE June 28, page 1810.

Materials - Handling Equipment.—Lewis-Shepard Co., Watertown, Mass. Catalog of 36 pages devoted to engineering features of elevating trucks, stackers, platforms and skid racks and hand trucks and barrows. The catalog is thoroughly illustrated and contains clearance and dimension data for various sizes of the different units.

Centrifugal Pumps.—Pennsylvania Pump & Compressor Co., Easton, Pa. Bulletin 212 of 16 pages, illustrated, describes a line of multi-stage centrifugal pumps, showing their application to various uses and methods of connecting up to electric motors, steam turbines, gas engines, belts, etc.

Shot and Grit Blasting.—American Steel Abrasives Co., Galion, Ohio. Booklet presenting "15 facts for the foundry and forge shop" on shot and grit blasting in foundry work.

Oxwelded Industrial Piping.—Linde Air Products Co., 30 East Forty-second Street, New York. Illustrated pamphlet upholding the proposition that it is better to construct pipe lines of stock lengths and welded joints than to rely upon threaded joints, malleable fittings and specials.

Ohmmeters.—Roller-Smith Co., 233 Broadway, New York. Bulletin 300 of eight pages, illustrated, describing several types of ohmmeters, some of which are portable, and lists the prices for various instruments and attachments.

THE IRON AGE

New York, August 16, 1928

ESTABLISHED 1855

VOL. 122, No. 7

Dodge Electrifies Heat Treatment

Over Sixty Modern Furnaces
Required to Harden and Temper
Motor Car Parts—One Battery
Handles 450,000 Pounds of
Rough Forgings Daily

H EAT treating operations on parts used in the manufacture of motor cars by Dodge Brothers, Inc., Detroit, are now with only a few minor exceptions done in electric furnaces. New equipment of various continuous and automatic types includes over 60 furnaces, drawing a total current of 11,400 kw.

All carburizing is done in two types of electric furnaces, to be described fully in a later article. Among the more interesting heat treating operations in the plant, because of the methods and types of furnaces used, are the annealing and hardening of transmission gears and the hardening of rear axle ring gears, a subject worthy of treatment in the third paper of this series.

The Dodge company adopted electric furnaces with a view of improving the quality of its product, closely controlling the temperature, reducing plant maintenance, improving working conditions by cutting down smoke and heat, reducing rejections, and simplifying the automatic operations. Three years' operations by some of the furnaces are said by those in charge to have fulfilled the expectations concerning control and uniformity of the product. Maintenance costs have been materially reduced because no excessive temperatures exist in any portion of the furnace.

Dodge has two separate heat treating departments, Plant No. 1 for finished machine parts, and Plant No. 2 for forgings. The latter will be described first. Many of the heat treated forgings undergo further heat treating operations in Plant No. 1 after machine operations are completed.

Rejections in Plant No. 2 for heat treating forgings, it is stated, do not exceed 1 per cent.

No. 2 plant is particularly well arranged. The forge shop is located in a nearby parallel building and the heat treating equipment is so placed that there is a direct flow of work from the forge through the heat treat building to the machining department on the opposite side.

Unique Charging Devices

All furnaces for normalizing, quenching and drawing forgings have a combined capacity of 450,000 lb. every 24 hr. Their connected load is 7500 kw. To do this work there are 32 box type furnaces installed (20 for quenching and 12 for annealing), six pusher type furnaces for drawing and normalizing, and two pusher type furnaces for annealing gears.

Box type furnaces were supplied by the Electric Furnace Co. and are built in batteries of four. Each battery requires a floor space of 29 ft. 6 in. by 10 ft. 3 in.; the furnace hearths are each 5 ft. 6 in. by 8 ft. 6 in. As clearly shown in the head piece the cast iron door frames, structural steel members and masonry are supported on concrete piers. This places the furnace floor so high that the quenching tables do not need to be placed in pits. The outer furnace walls carry 4½ in. of brick and 13 in. of insulation; there is also 11½ in. of insulation between the individual furnaces in each battery. The hearth floor consists of three alloy plates locked at one end and an alloy steel wall

10 in. high. The floor is supported by fire brick standing between the heating elements.

Thus the metal floor and sides form an open-top trough, and heat is transmitted from the glowing electrical ribbons through the alloy bottom without much drop in thermal gradient, and from ribbons rung on the roof radiating direct. Heating elements of the T grid type are supported from the roof by brick and alloy clamps, and beneath the alloy floor they rest on fire brick.

As the parts are delivered from the forge shop, approximately 1000 lb. are loaded on a slide bottom tray slightly narrower than the furnace hearth. As shown in Fig. 1,

these trays are placed on stands at one side of an open aisle at about the same height as the furnace bottom, so the charging machines can pick them up readily. The frame of the tray is made of channel section, and has a heavy cast steel end provided with a T slot for the charging peel. Handling is done by the Alliance Machine Co. electrically operated charging machine having 3000 lb. capacity. This machine has a T shaped casting on the end of the peel which engages with the corresponding slot on the tray head and is provided with a lock. This is for lifting the weight. A screw under the peel carries a nut, a projection on the under side of which engages in a hole in the

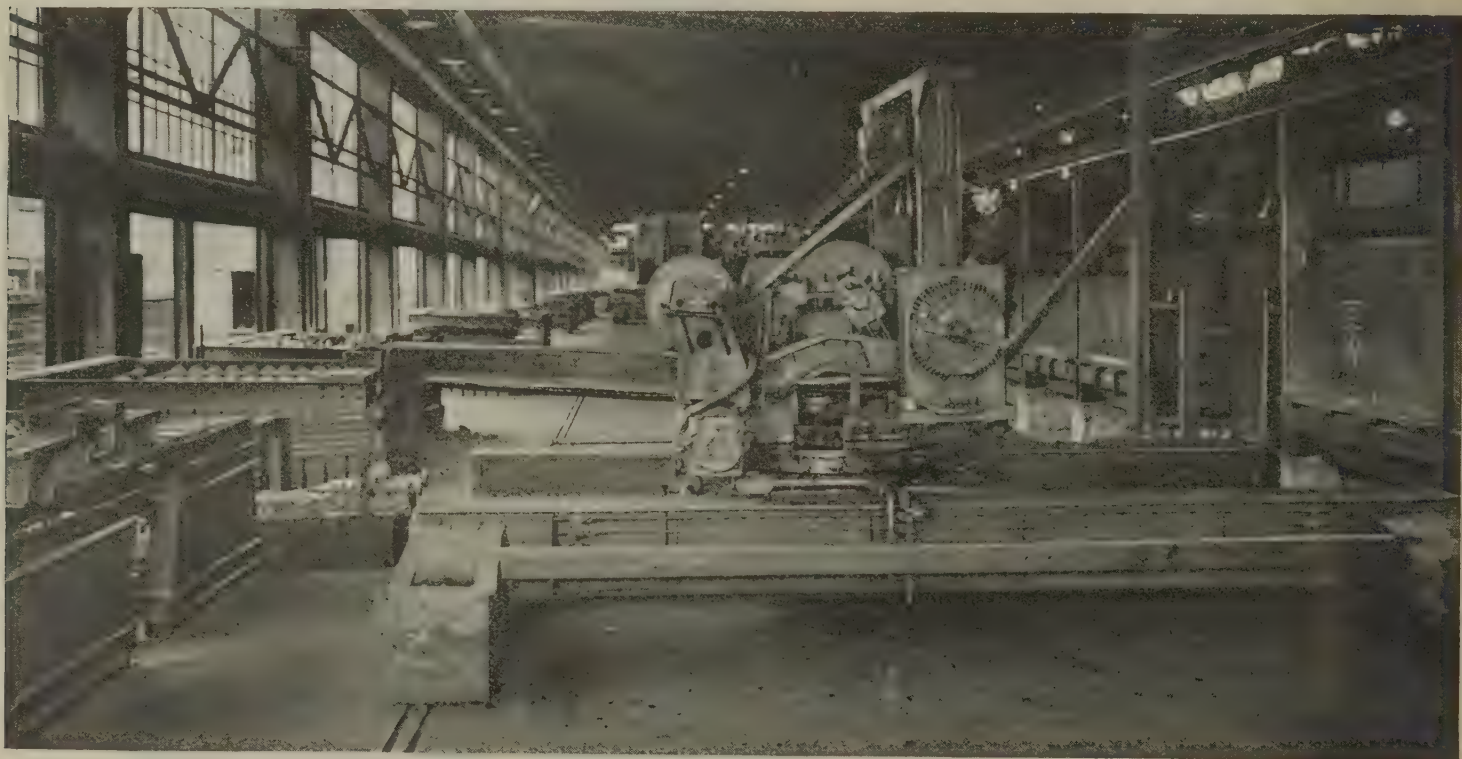


Fig. 1.—Charging Machine Picking up a Tray Loaded with Forged Crankshafts for Heat Treatment Prior to Machining. Trays are loaded into furnaces at right and emptied by sliding bottom out from under

Fig. 2.—Rear View of Pusher Type Furnaces. Quenching baths at three near batteries; baskets for air cooling at far batteries. Note electrical control equipment on power lines immediately above each furnace.



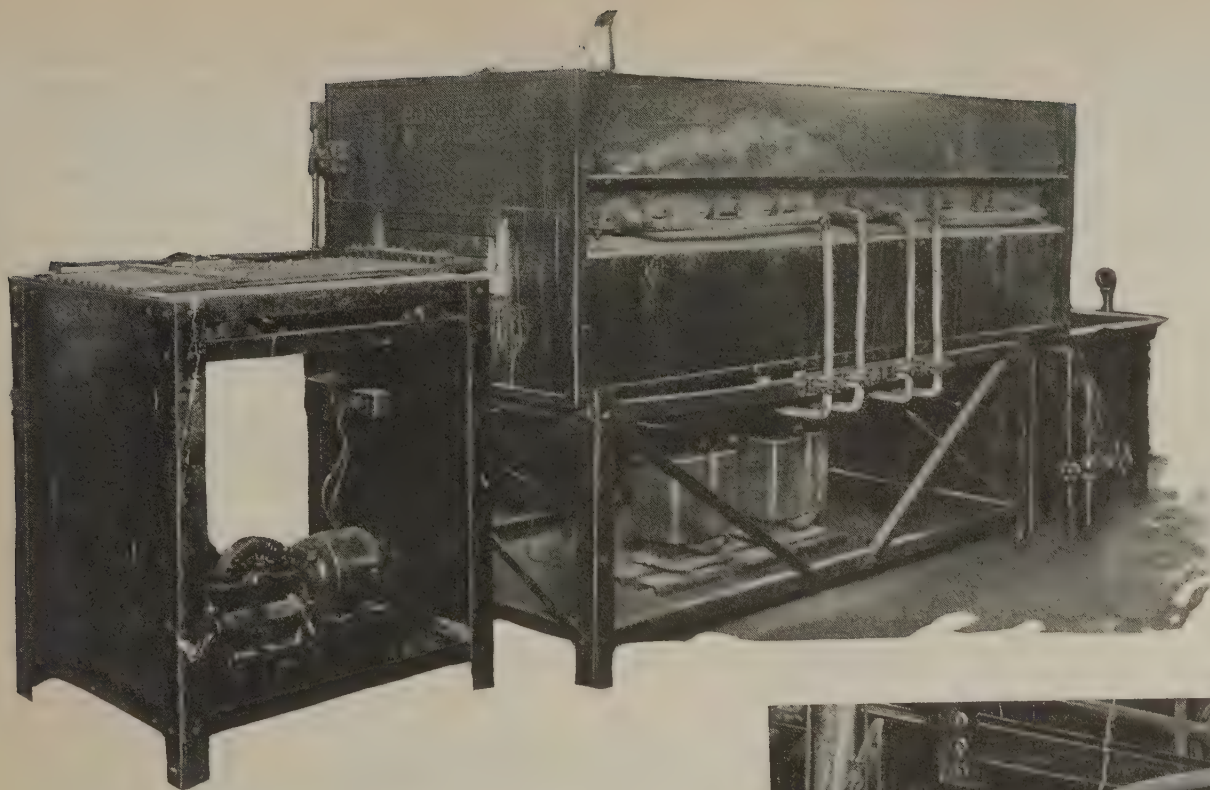


Fig. 4.—Tube Furnace for Connecting Rod Bolts. Work is pushed through tubes and quenched without contact with outside air. Note electric transformers under furnace and simple pusher at left

sliding bottom of the tray. This is for pulling the tray bottom out from under the load.

After the charging machine makes connection with the tray it faces about 180 deg. and moves along its track to a position in front of the furnace to be charged. Both furnace doors are raised and the charger advances, pushing the hot forgings remaining on the furnace hearth out the discharge door at the back. When the new load is in place the charging machine operator switches on the motor controlling the screw, and the bottom of the tray is withdrawn, thus depositing the cold forgings in correct position on the furnace hearth. The peel is then raised, lifting the tray above the charge, and withdraws it from the furnace. Then both doors are closed.

The entire time of loading and unloading is 30 seconds, during which the drop in furnace temperature is approximately 50 deg. Fahr.

Each furnace is connected with one phase of a 220-volt, 60-cycle, 3-phase line, and takes 154 kw. when the furnace is heating up from cold. An input of 135 kw. is required to maintain operations at 1650 deg. Fahr.

As shown in Fig. 2, quenching tanks are placed immediately behind three batteries of furnaces. Hot metal pushed out of the furnace falls into a submerged basket, and is later handled by an overhead electric traveling crane. The quenching solution (a caustic solution of 10 deg. Baume) is pumped through the tanks at the rate of 1000 gal. per min. Some furnaces do not have these tanks; a basket is placed below the door and collects parts which are to be cooled more slowly.

Most of the chassis forgings are heat treated in these box type furnaces. For example, 28 axles or 40 camshafts are placed on a tray and remain in the furnace 1 hr. at 1650 deg. The tray holds 16 crankshafts, which are in the furnace 2 hr. at 1550 deg. Heating times and temperatures naturally vary with the purpose intended and the chemical composition of the steel.

All work that is quenched after heating in the box type furnace goes to drawing furnaces placed just across the aisle from the quenching tanks. Such work includes axles, crankshafts, connecting rods, spring clips, hub forgings, and flanges, gear shift levers and brake levers. Crankshafts are drawn at 1090 deg. Fahr. and are restruck under a 5000-lb. board hammer as they are delivered from the continuous furnace. Ring gears are normalized at 1700 deg. Camshafts, drive pinions, and ring gears are given only an an-

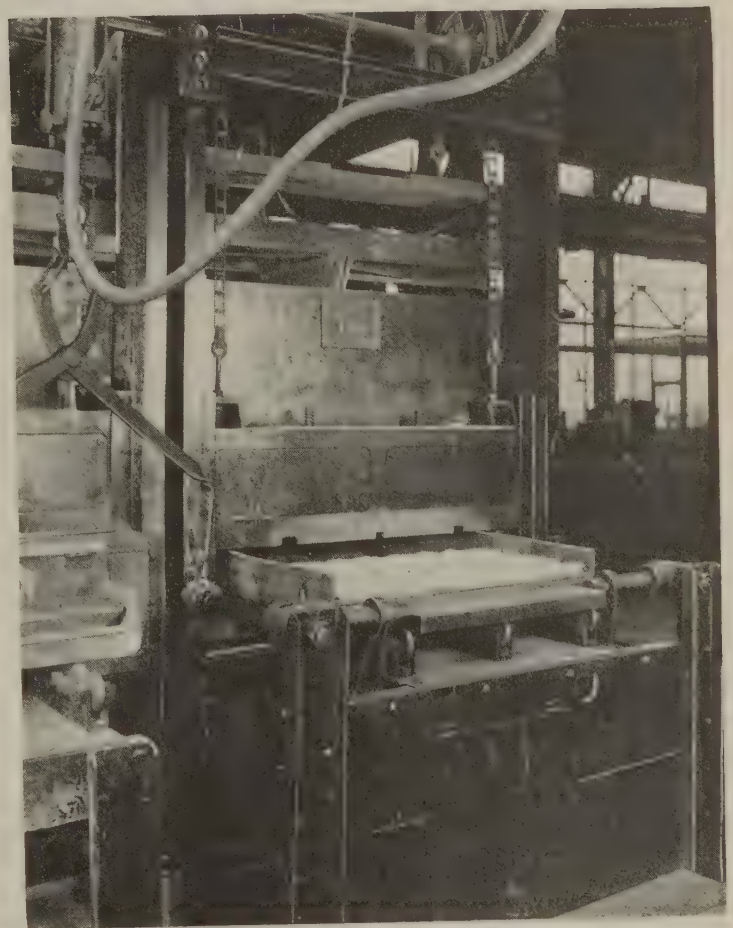


Fig. 3.—Pusher at Charging End of Continuous Normalizing Furnace. Pans of parts are lifted by tongs and overhead pneumatic cylinder

nealing operation at this stage of the process. They are cooled in the air, leaving them soft for machining. Subsequently they are carburized and hardened.

Six pusher type continuous furnaces are installed in Plant No. 2 for drawing and normalizing forgings. Four are 25 ft. in length and two for higher heats are 15 ft. in length. Two produce 5200 lb. per hr. at 1350 deg. with a power input of 430 kw. Two furnaces have an output of 5200 lb. per hr. at 1350 deg. with a power consumption of 570 kw. Each of a pair of double-chamber recuperative furnaces installed in another department to redraw crankshafts after finish machining has a capacity of 3300 lb. per hr. with two 150-kw. power zones. Two of the fur-

naces in Plant No. 2 have adjustable controls, so they can be used for either annealing or drawing.

These furnaces as shown in Fig. 3 have three alloy tracks running their length to carry alloy shoes which support trays for light forgings, or crankshafts and other larger forgings. A 5-hp. motor through a reduction gear and bell crank provides power by pushing on the shoes on the charging end. The pusher motor is actuated by a time clock so set that both doors open simultaneously. The clock closes a relay which operates the motor driven doors. The door mechanism is connected with the pusher mechanism, causing the pusher to operate one stroke, or approximately 15 in. While one charge is being pushed into the furnace at one end, another is being discharged from the opposite end.

Tube Furnace Protects Bolts from Air

Five electric furnaces are provided for heat treating miscellaneous parts of the Dodge cars. Brief notes on these are as follows:

An interesting device is shown in Fig. 4. It is a 50-kw. tube-type Hoskins furnace for hardening connecting rod

bolts. The work is put in ten troughs at the left, from which it is pushed through the tubes. After reaching heat it is discharged through the same pipes, extending down into an oil quenching tank. Thus there is no exposure to the air. Hardened bolts are then drawn to a Rockwell hardness of B-92 to 100. This Hoskins furnace has a two-zone control and a temperature of 1600 deg. Fahr.

The heads of exhaust valves of Silchrome steel, and intake valves of chrome nickel steel, are reheated in a 35-kw. continuous furnace to a temperature of 1650 deg. previous to an operation in a coining press.

A rotary furnace of 125 kw. with an 18-in. hearth is used for normalizing and hardening flywheel starter ring gears.

Rear axle hub flanges are brazed to the tubes in two 12-in. rotary hearth 110 kw. furnaces. These furnaces operate at a temperature of 1750 deg. and the work is in for 20 min.

Some castings such as flywheels, manifolds and valve stem guides are annealed in four Rockwell continuous oil-fired furnaces.

Alloys as Substitutes for Diamond Dies

Hard Tungsten Products for Wire Drawing Cost Less and Last Longer, According to German Claims

BY ALFRED DREBES*

TESTS to replace diamond dies for drawing by other materials go back to the war time when the price of diamonds constantly increased. Work in this direction led to the production of metal alloys which, while not possessing all the properties of the diamond, were suitable for the wire industry. They increased production and, through the obtaining of exact sized wire with smooth surface, improved the quality and increased the possible usefulness of the wire. Also the increasing introduction of machines making many passes affords an unusual opportunity for these materials as substitutes for diamonds. It is not too much to say that these materials have a future, not alone as substitutes for the diamond but also to replace the ordinary drawing dies made of steel and iron alloys.

In producing these artificial die materials, alloys of tungsten, titanium, iron, chromium, cerium and carbon were first investigated. It has been found that the most suitable alloy contains 75 to 95 per cent of tungsten and 5 to 25 per cent cobalt. Such alloys are produced from a mixture of tungstic acid and oxide of cobalt, powdered aluminum being used as a reaction material. The alloy is then cast into shape.

Another kind of hard metal is made by sintering hard metal alloys containing tungsten carbide with about 3 to 7 per cent carbon and metals with fairly low-melting points, such as tungsten, nickel, cobalt or iron. These additional materials do not exceed 10 per cent in amount. Also these alloys contain tungsten as the principal constituent amounting to at least 80 per cent.

Dies from these sintered and pressed materials are harder throughout than the cast material. The principal requirement for the dies is not hardness alone but absolute uniformity of the material, which must also be free from blowholes as well as uniform in other properties. Before being used the dies should be carefully examined with a magnifying glass to see if they are free from defects.

*Herborn in Hesse-Nassau, Germany.

The die opening must exhibit a highly polished surface and no roughness or else the wire will tear and crack.

The advantage of the hard metal dies compared with the diamond is, first, their decreased cost. Further, there is the constant danger of the diamond cracking during use. Compared with iron and steel dies the hard metal also offers great advantages, such as considerably increased life; also the wire remains much more exact in diameter, has a more polished and smoother appearance, and the speed of drawing can be considerably increased.

Drawing through hard metal dies is not different from drawing in diamond or steel dies. The material to be drawn should be previously well softened. The reduction should not be too light. For soft iron, brass, copper and aluminum wire a reduction of about 12 per cent is recommended. For harder wires, such as steel, bronze, hard copper and brass about 10 per cent, and for very hard wires, such as tungsten, molybdenum and nichrome, about 7.5 per cent. The first drafts after annealing can be about 2 per cent greater. The usual lubricating agents should be used and frequent cleaning of the dies during use is necessary, no great difference being recommended to ordinary practice. These hard alloy dies should be carefully polished, which may be conveniently done on a needle polishing machine.

Wages in the United States reached their highest point in 1920 with an index of 234 as an average hourly rate, using 1913 (106) as the base year, with a sharp downward trend to 1922 and after that a gradual rise, so that in 1926 wages were 129 per cent higher than in 1913. This is shown in a compilation made by the Bureau of Labor Statistics, Department of Labor, Washington, for the period 1840-1926, and published in the February number of the *Monthly Labor Review*. All lines of employment except agriculture are covered.

Studying Gas to Learn Conditions

Watching Formation of Graphite—Some of the Conditions Which Produce Rapid Driving and Much Iron Are Analyzed

BY WALLACE G. IMHOFF*

[That the color of the smoke end of the burning gases rising from the open-top blast furnace indicates the character of the metal was shown in the first instalment of this article. The second instalment carried the story forward, through tracing conditions in a particular cast of metal as a typical illustration of ideal conditions for lime combination with sulphur to form calcium sulphide. Conditions giving high production were entered into, one criterion being the fluidity of the iron and the slag, together with a high hearth temperature.—EDITOR.]

THESE conditions carried further produce a heavy, bluish purple gas. The hearth temperature has fallen much lower and the fusion zone has come down into the hearth. The temperature of the hearth has fallen so low that the iron when cast, instead of being a bright yellow color, is a cold orange. It is glistening and shining, owing to the supersaturation of carbon. When it is cast, the excess carbon in the iron, under reduced pressure and atmospheric temperature, is thrown out in the form of graphite and fills the iron runner to a depth of 4 in. The analyses of the iron and slag are given below:

IRON						SLAG					
Silicon	0.94	0.93	1.02	0.93	0.81	Silica	36.14				
Sulphur	0.033	0.033	0.036	0.030	0.030	Alumina	10.68				
Phosphorus	....	....	0.147	....	....	CaO	42.60				
Manganese	....	....	1.06	....	....	MgO	8.37				
						Fe	0.45				
						S	1.60				
Silicon	0.61	0.90	0.87	1.06	1.02	Silica	36.08				
Sulphur	0.039	0.033	0.031	0.027	0.028	Alumina	10.52				
Phosphorus	....	....	0.151	....	....	CaO	43.10				
Manganese	....	....	1.02	....	....	MgO	7.87				
						Fe	0.63				
						S	1.56				

These two sets of analyses show quite a contrast with the analyses for hot, yellow gas. The silica is 36.14 per cent, showing that the hearth is much colder. The sulphur is 1.56 instead of 2.17 per cent, another fact which verifies the statement that the hearth temperature is much lower; and the iron in the slag has risen to 0.63 per cent.

It is interesting to note that the first example for hot, yellow gas has the tendency to promote the formation of graphite by having high lime, a low fusion zone and a hot hearth. The graphite in the second case, however, comes from an entirely different cause, a decrease of hearth temperature. In the first case the iron is thick and mucky, due to the fact that the carbon has been removed in the form of graphite. In the second case the iron is thin and fluid, but is simply cold and oversaturated with carbon, due to a falling temperature. Hence when it comes out of the furnace into new conditions of pressure and temperature it is supersaturated, and therefore large quantities separate out as graphite.

In the former case, in the furnace hearth there is a tendency for the iron not to take up carbon; in the latter case, there is a tendency for the iron to take up all the car-

bon possible. The first condition supplies large quantities of carbon for the gas; the second condition takes away the carbon from the gas and holds it in the iron. The excess carbon gives a hot, yellow gas; the shortage of carbon gives a thin, cold, blue gas.

Wide Variations in Heat Value of Gas

Many other examples could be given to illustrate the conditions which produce heavy, hot, yellow gas and cold, thin, blue gas. Practical furnacemen know that there is a wide variation in the heating value of the gas from time to time, since it is necessary in some cases to fire the boilers with coal to keep up steam. This practical condition therefore indicates that there must be a change in the composition of the gas.

Studies of the reactions going on in the iron blast furnace and the gas composition, etc., have been made by S. P. Kinney, P. H. Royster and T. L. Joseph.† These investigations were carried out on a 300-ton furnace, making foundry iron, operated by the Central Iron & Coal Co., Holt, Ala.

Study of the results given in this paper shows that blast furnace gas is made up essentially of N, CO, CO₂ and small quantities of hydrogen, H. They show also not only that the composition of the gas varies across the furnace in the same plane, but that there is a variation in the gas at different planes in the furnace. The change of composition from top to bottom as given in Table II, page 8, of their study, shows an increase in the volume of CO from 28.1 per cent in the top gas to 34.1 per cent in the bosh gas, and a decrease in the volume ratio of CO₂ from 9.9 per cent in the top gas to 0.0 in the bosh gas. This shows the change of CO to CO₂.

The practical side of blast furnace gas has been ably covered by Herman A. Brassert in his paper (pages 47-54), "Modern American Blast Furnace Practice," read at the sixth general meeting of the American Iron and Steel Institute, New York, May 22, 1914. Charts showing the "Effect of Coke Rate on Analysis of Blast Furnace Gas," "Effect of Coke Rate on Production of Blast Furnace Gas," "Relation of Tons of Iron Per Day to Coke Rate," "Effect of Tons of Iron Per Day on Amount of Gas Produced Per Minute" and "Effect of Tons of Iron Per Day on Amount of Gas Produced Per Ton," are given. The gas analysis shows:

	Per Cent		Per Cent
CO	25.8	CH ₄	0.2
CO ₂	13.6	N	57.4
H	3.0		

The most significant fact, as shown in his Chart 3, is that, the higher the tonnage of iron produced in 24 hr., the lower the coke consumption to the ton. The question which immediately arises is, "What are the conditions that produce a ton of iron on 1700 to 1900 lb. of coke; how can these conditions be obtained?"

The most important ingredients of the gas are CO and CO₂. Forsythe‡ shows the percentage by volume from the top of the furnace to the bottom for each of these. There is a direct relation between the coke used, tonnage produced and gas formed. An explanation will now be offered for the conditions which give high production, low coke con-

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†"Study of the Reactions in an Iron Blast Furnace." Reports of investigations, Department of Commerce, Bureau of Mines, Serial No. 2747, April, 1926.

‡The Blast Furnace and the Manufacture of Pig Iron, by Forsythe, page 189.

sumption and good gas; in other words, answer the above question.

Production depends primarily upon the rapidity of reduction of the iron ore to metallic iron and the smooth, rapid driving of the furnace. If the conditions can be discovered which control these two factors, then we have discovered the conditions which will continually produce a high tonnage with low coke consumption.

Without entering into detail, a brief discussion will be given of some of the conditions which give rapid driving. These are:

- | | |
|----------------------------|--------------------------------|
| 1. Low fusion zone | 5. Proper stove heat control |
| 2. Moderate use of lime | 6. Clean raw materials |
| 3. High hearth temperature | 7. Right burden |
| 4. Proper wind | 8. Good condition of equipment |

A low fusion zone is of prime importance in obtaining a high production of pig iron. The main cause of raising the fusion zone up in the mantle, or higher into the middle of the furnace, is continued use of cold air. Besides being a disturbing factor in the driving, cold air upsets those chemical and metallurgical reactions going on inside the furnace which gives high production. Instead of using cold air the wind should be slightly increased; this will increase the tonnage instead of decreasing it.

Too high wind will raise the fusion zone. This will be reflected in the driving and the top heat. Practice soon establishes the proper amount of wind to use. The use of cold air should be avoided whenever possible, as it eventually starts the furnace to slipping and brings about irregular driving, which lowers production.

Lime Practice Causes Some Difficulties

The proper use of lime is a difficult feature to understand in blast furnace practice. It is essential to be able to distinguish whether the furnace really needs lime, or is lean simply from being cold. The slag should always be kept fluid, other conditions being right.

With the proper hearth temperature, the lime will combine with the sulphur and the silica will be reduced to silicon and then go into the iron. A hot hearth is an absolutely essential factor for these two reactions to take place. If the fusion zone is down in the hearth, and the hearth is cold, disastrous results may be encountered if there is too much lime on the burden. There is no reserve of heat in this case and no remedy except to slow down the revolutions of the engines. This reduces production.

By proper wind is meant that volume of wind which will

give the highest production with the smoothest driving. The temperature of the hearth should be controlled from the engine room, and not by the use of cold air. Cold air is a trouble maker. If the hearth is too hot, the logical procedure is to cool it down by getting a larger tonnage, not by decreasing the tonnage. The running of a furnace by this method requires greater skill, but pays well in the increase in production obtained.

Control of stove heat is another means of raising or lowering the hearth temperature. The best practice is to use the full stove heat all the time. An average, uniform heat is the ideal; there should be no violent fluctuations. As previously stated, the cold air by-pass is a trouble maker and should be used only as a last resort. If the furnace is too hot, increase the wind slightly and get a rich return in more pig iron.

Importance of Good Raw Stock

Clean raw materials are essential, also, to maintaining high production continuously. Fine, dirty coke, or dirty limestone, if used long enough, will tighten up the stock and disturb the proper metallurgical reactions essential to high production.

Proper mixture and proper proportions of raw materials are also important in obtaining the greatest output. Too much ore on a hot furnace will make it drive fast, but care should be taken it does not drive itself cold. Too little ore will tighten the furnace up and slow down driving. The gas in the former case will change from a hot, yellow gas to a thin, blue gas; in the latter case, the gas will be a bright yellow color.

It is hardly necessary to mention the fact that all equipment must be in good working order, to obtain high production. Delays in the skip house, on the furnace, in the engine room, reduce the tonnage of iron produced in 24 hr.

Stops or shutdowns for any great length of time affect the character of the gas. When it is known ahead of time that the shutdown will be for some time, extra coke will be put in. This furnishes an abundant supply of both heat and carbon and the gas is usually a bright, yellow color when this extra coke comes down. The two prime factors in producing heavy, yellow gas are an abundance of lime and coke. With the fusion zone down in the hearth, these factors set up conditions which promote the formation of large quantities of graphitic carbon, and an abundant supply of carbon for the gas.

Educational Work for Foundry to Be Undertaken by A. F. A.

FUNCTIONS of the recently organized educational committee of the American Foundrymen's Association are outlined in a report prepared by the former president, S. W. Utley, Detroit Steel Casting Co., Detroit, and approved by the board of directors. Members of the committee will be appointed soon.

As outlined in the report, "the object of this committee shall be to originate and disseminate to engineers and manufacturers information tending to produce a better realization of the value of the foundry industry and the possible use of castings in all kinds of manufacturing processes." Its function is to be purely educational and it shall not have as its direct object the merchandising of any particular kind of casting or the creating of a specific market for any material. It will work with the various trade associations connected with the foundry industry. No direct advertising will be done, this to be left, as now, to the various individual companies, but it hoped to persuade manufacturers to include in their advertising copy information which will help to tell the story of the foundry industry.

Publicity matter will be worked up for publication by the technical press and to some extent by the daily press.

Another function of the educational committee will be to furnish speakers for technical societies and for conferences at schools and colleges. Exhibits of motion pictures of the foundry industry are suggested as a feature of this work.

Furthermore, the educational committee hopes to "impress upon the buying public that there is more to a casting than a certain number of pounds of metal; that the character of the foundry, its technical control, its engineering ability and the ability of its organization is of as vital interest as the fact that it has a cupola or a furnace. The greatest drawback to the success of the foundry industry today is the poor quality of castings turned out by the unprogressive units, and the fact that the buyer considers the product of the well organized, progressive foundry on the same plane as the others. The bringing of this realization to the purchasing public should make membership in the American Foundrymen's Association much more sought after."

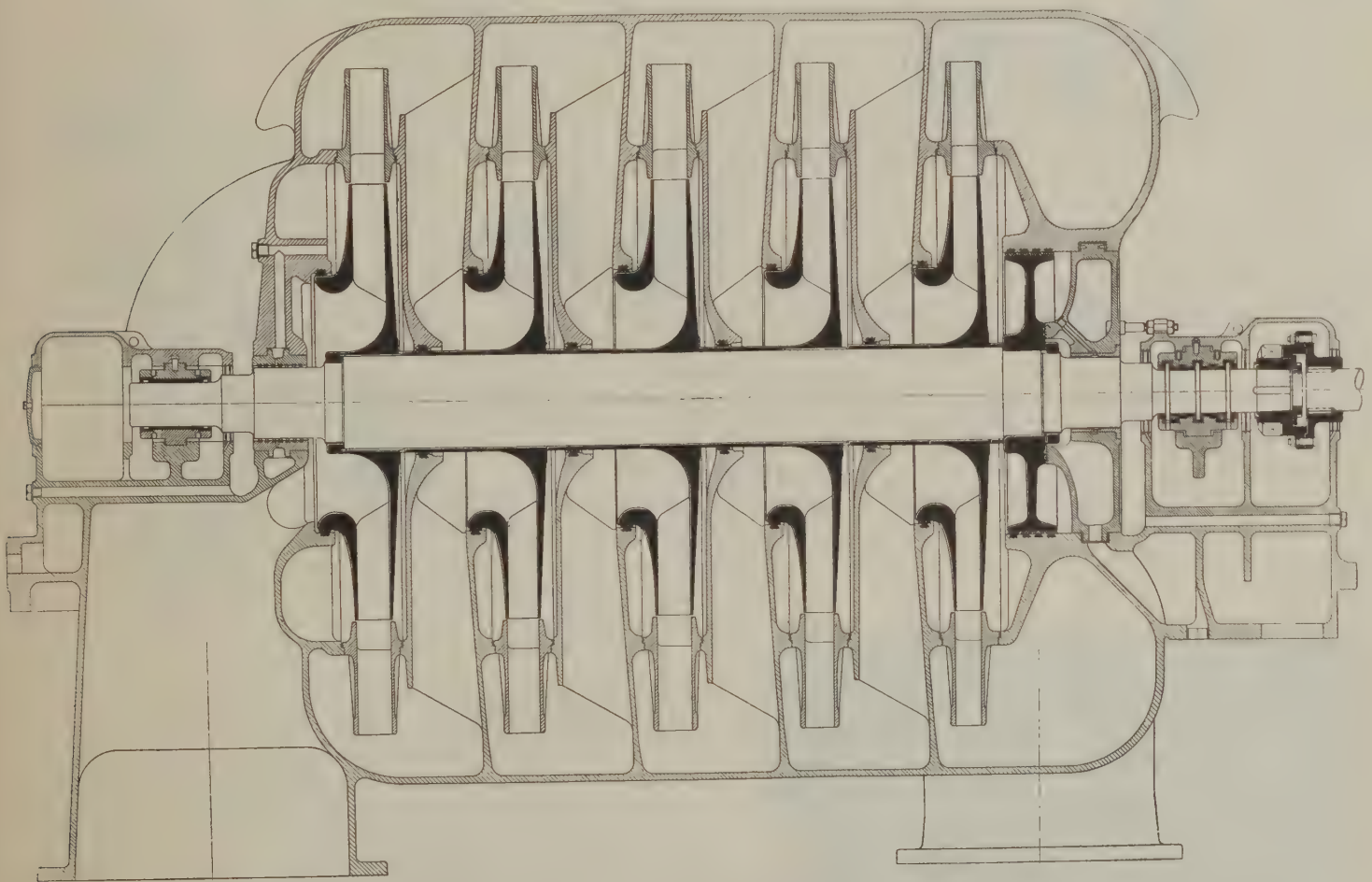
Brown, Boveri Blower at Braddock

New Turbo Unit at Edgar Thomson Works Applied to
Blast Furnace of 750 Tons Daily Capacity—Cooling
Water Required Only for Oil Coolers

AT the Edgar Thomson Works of the Carnegie Steel Co., Braddock, Pa., there has recently been put into service the first blast furnace turbo-blower of Brown, Boveri design to be installed in this country. The unit was furnished by the American Brown, Boveri Electric Corporation, Camden, N. J., which holds exclusive rights in this country for the manufacture of machinery to the designs of Brown, Boveri & Co., Ltd., Baden, Switzerland.

maximum operating load was specified as 60,000 cu. ft. a minute at a blast pressure of 30 lb. gage. In service the set has shown itself capable of delivering an inlet volume of 70,000 cu. ft. a minute at 30 lb. The operating speeds are conservative, ranging from about 2100 r.p.m. when delivering 50,000 cu. ft. at 18 lb. to 2700 r.p.m. when delivering 70,000 cu. ft. at 30 lb.

From the sectional view and the view of the lower half



Longitudinal Axial Section Through Blower Unit, Showing the Five Stages. Water cooling is not used

This is one of three new blowing units at the plant, as mentioned in *THE IRON AGE* of April 5.

The unit is of the four-bearing type, and consists of a five-stage, single-inlet, uncooled centrifugal blower direct connected by a semi-flexible claw type coupling to a combined impulse and reaction steam turbine, designed to operate with steam at 225 lb. per sq. in. gage and 150 deg. Fahr. superheat, exhausting into a vacuum of 28 to 28½ in. A light baseplate extends under the exhaust casing of the turbine and the adjacent bearing pedestal of the blower, the outboard pedestals of blower and turbine being provided with soleplates.

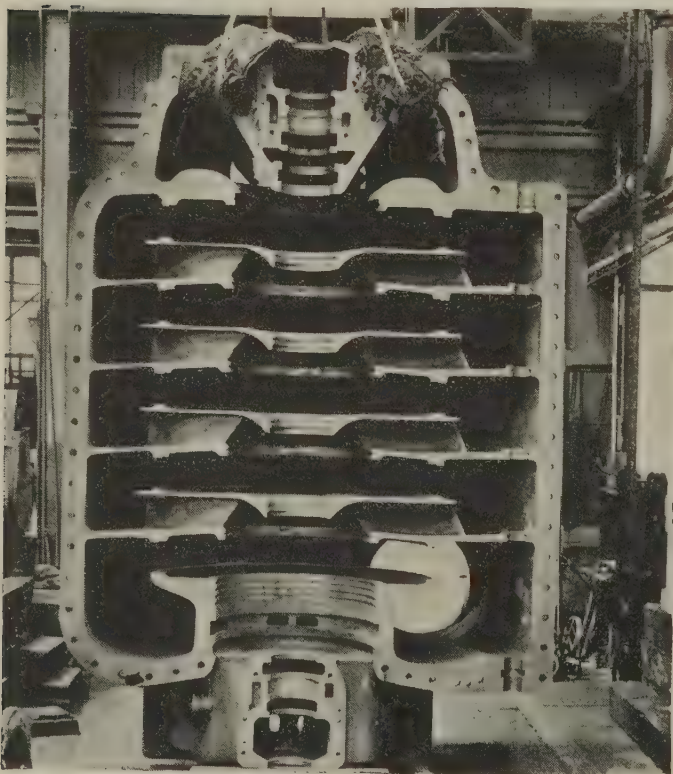
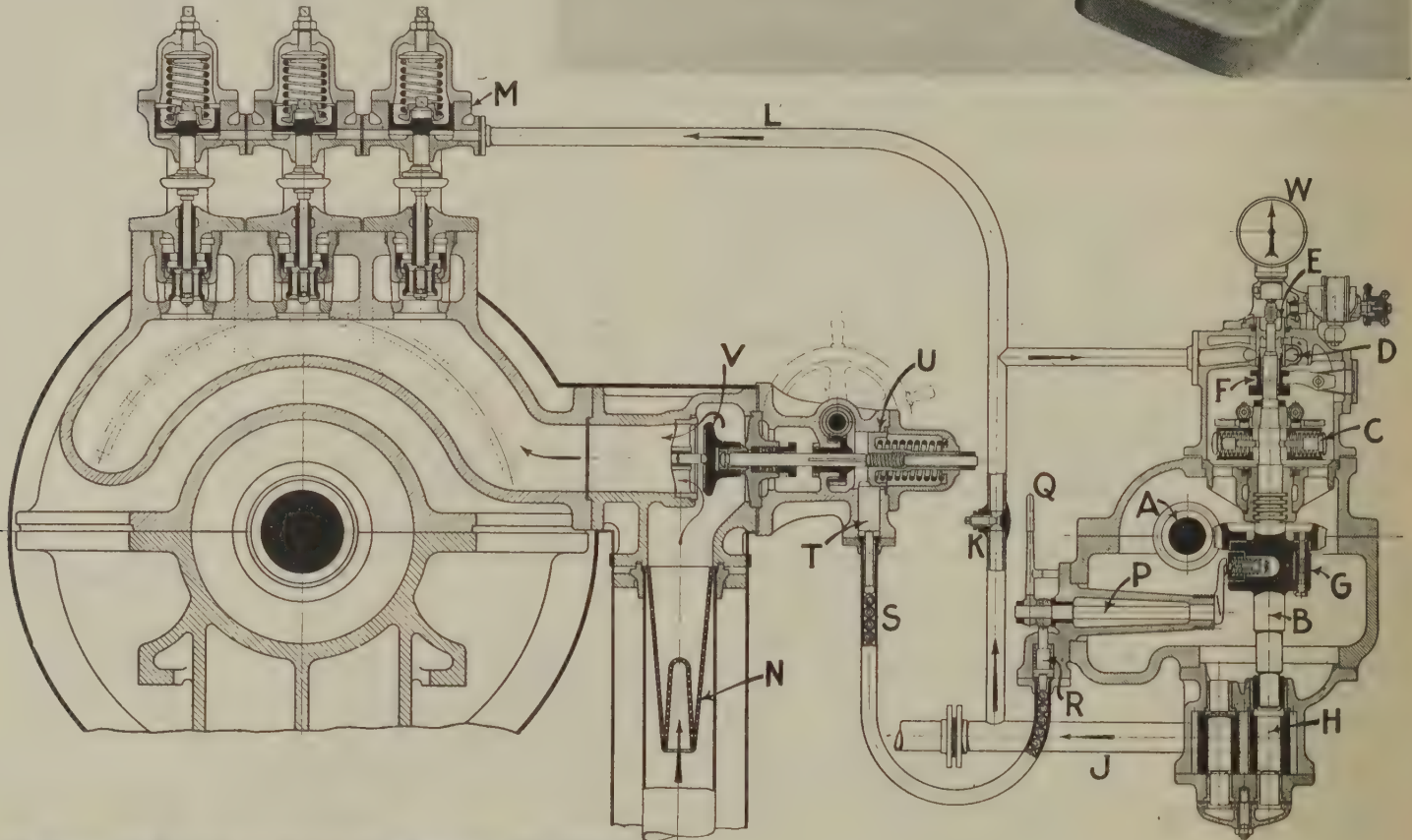
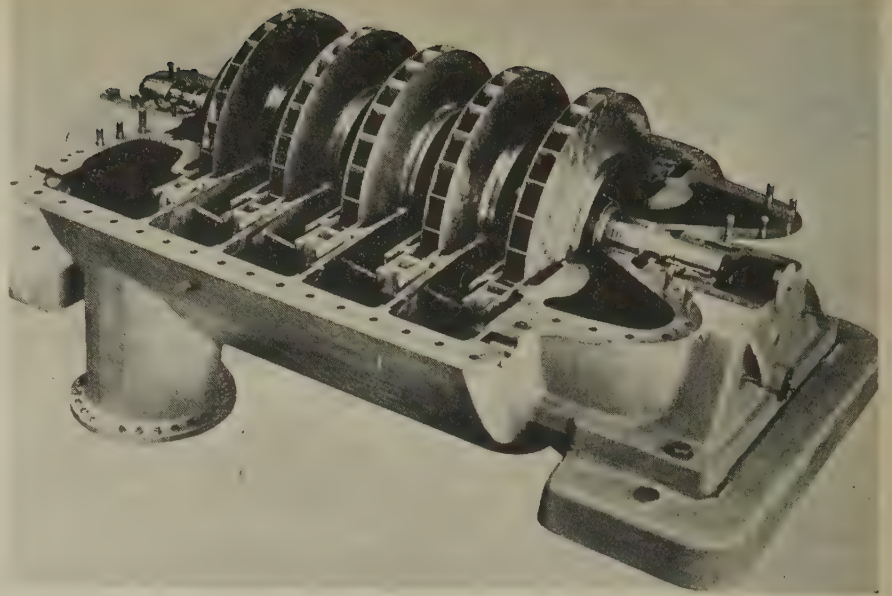
The set was designed to blow a furnace which has a daily capacity of 750 tons of pig iron. Accordingly, the

of the casing in course of manufacture an idea may be obtained of the design, which does not use water for cooling. The only cooling water required for the set is that for the oil coolers, two of which are furnished, connected in parallel, so that either one can be cleaned without shutting down the set.

The blower rotor is handled by a special lifting device furnished to facilitate erection. There is a pressure-balancing piston mounted at the high-pressure end of the shaft. This piston balances the greater portion of the axial thrust of the blower, and also carries labyrinth glands. As can be seen from the section, the chamber after the piston may be connected to the inlet branch of the blower, or to the atmosphere. As a result, air at atmos-

OPERATION of the Governor of the Steam Turbine End of the Unit May Be Noted from the Center Illustration. For ease in tracing the functions of the mechanism the governor is shown misplaced, at right of the turbine

THE upper half of the casing, as cast and machined, is shown below, and the lower half of casing in position, with rotor in place at the right. This shows the makeup of the rotor stages. A special lifting device facilitates erection handling of the rotor



spheric pressure only is back of the shaft-sealing glands, and leakage is slight.

At the extreme right of the shaft are the three thrust collars, which maintain the rotor in alinement, and take up any thrust not balanced by the piston. One illustration shows the rotor in place in the lower half of the casing. Surrounding the impeller wheels can be seen the curved diffuser blades through which the air passes before being directed into the inlet of the next impeller.

Perhaps the most striking feature of the turbine is the speed-governing device. In the illustration the governor shaft has been misplaced to the right, for ease in tracing the functions of the mechanism. The vertical governor shaft *B* is worm-gear driven from the turbine shaft *A*. Oil under pressure for lubrication and for actuating the turbine nozzle valves *M* is supplied by the gear oil pump *H* mounted on the lower end of the governor shaft. The oil under pressure for governing is drawn through an adjustable needle valve *K*. The movement of the spring-loaded nozzle valves is dependent upon the oil pressure in the oil pipe *L*. This oil pressure is controlled by the governor by-passing more or less oil from the oil pipe *L*, decreasing or increasing the oil pressure under the nozzle valves.

Through the throttling action of the needle valve *K* the oil pressure in the governing system can vary without affecting the pressure in the lubricating system. Oil by-passed by the governor lubricates the governor shaft mechanism.

The arrangement is such that the turbine cannot be started before oil pressure is available to the bearings, nor before sufficient pressure has been built up thereafter to operate the nozzle valve system. In case of failure of oil pressure, either in the bearing or nozzle systems, the nozzle valves will close automatically, thereby shutting off steam admission to the turbine.

An independent over-speed safety governor *G*, by striking the arm of the trip shaft *P* turns the shaft and releases the pressure on the column of balls *S*. This trips the spring-loaded main steam valve *V*, which cuts off the steam supply to the turbine.

In addition, the set is provided with a constant-volume governor, tied in with the speed governor in such a manner that the action of the former is supplanted by the latter when in service. In connecting the volume governor, an additional pipe line is connected to the annular

chamber *D* of the speed governor. In this pipe line is placed a relay-valve whose movement is controlled by a spring-backed diaphragm. This diaphragm is actuated by the differential pressure between a straight tube and a bent tube (Pitot principle) in the blower suction line. This differential pressure is a function of the volume drawn into the blower.

Any change in the volume will, therefore, alter the position of the diaphragm, and, consequently, the oil relay valve. More or less oil is by-passed by the valve, and, therefore, the oil pressure in the line *L* is varied, changing the position of the nozzle valve to admit more or less steam, thus varying the speed of the set. The diaphragm-relay unit, with a small amount of piping, is all that appears on the machine floor.

For slowing down the set when making a check or cast, the control sleeve *E* of the speed governor may be displaced, independently of volume governor and speed governor, by means of an electric motor controlled by a push-button, requiring no change in the setting of the volume governor. The control pillar carrying the push-button is located at a convenient point for the operator.

Research Aids New England Plants

Survey of Various Industries Discloses Efforts to Solve Manufacturing As Well As Marketing Problems

THE success with which many New England manufacturers are using research methods in developing new products and new uses for old ones is shown in the first of a series of reports on "Applying Research to Production," issued by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., in cooperation with the research committee of the New England Council.

The recent survey of the uses of research in New England industry made by the Metropolitan company in cooperation with the council disclosed that many New England manufacturers have been alive to the importance of research in developing established products and in introducing new ones.

Examples are presented under the headings "Improving Present Products," "Utilizing Waste Products" and "New Products for Today's Demands."

One striking instance is furnished by the Winchester Repeating Arms Co., New Haven, Conn., which maintains physical, chemical, metallurgical and ballistic laboratories and an experimental development department. The Morse Twist Drill & Machine Co., New Bedford, Mass., maintains a development laboratory in which new and improved tools are developed and tested before being manufactured in quantity. The Max Ams Machine Co., Bridgeport, Conn., went deeply into chemical research and succeeded in developing a gelatinous preparation which could be used instead of soldering to close the tops on tin food containers.

The Scovill Mfg. Co., Waterbury, Conn., brass manufacturer, adopted three methods for improving its product: first, by maintaining a uniformly high grade of metal; second, by constantly overhauling and renewing mechanical equipment; third, through continuous development work carried on through a research laboratory. A new type of road machine was developed through research by the Highway Products Co., New Bedford, Mass. The Max Ams Chemical Engineering Corporation, Bridgeport, builds equipment for the manufacture of rayon by all processes, and maintains an experimental plant in which rayon is

actually manufactured, in an effort to develop and perfect this equipment.

The problem of utilizing waste products, New England manufacturers interviewed in this survey reported, often can be solved through research. The Rumford Chemical Works, Providence, R. I., discovered that by-products of phosphoric acid production could be made into excellent plaster building blocks. The Acme Wire Co., New Haven, found out that short lengths of wire, previously discarded, could be used as lead wire in radio condensers. The Graton & Knight Co., Worcester, through the use of research, has been able to utilize 75 per cent of its scrap. At the Winchester Repeating Arms Co. plant all wastes and scrap material and equipment are routed to a central salvage department.

Research on Market Conditions

A large number of New England manufacturers have used research methods in developing products to keep up with current market conditions. In the case of the Blanchard Machine Co., Cambridge, Mass., a by-product grew so popular that it became the principal product of that company. The Carr Fastener Co., Cambridge, Mass., developed a number of its successful products by research into market conditions. The laboratory is used by the American Writing Paper Co., Holyoke, Mass., in the development of paper for new uses. By using research to test out the insulating properties of seaweed, the product of Samuel Cabot, Inc., Boston, was developed. The Eastern Mfg. Co., Bangor, Me., has developed a device which automatically weighs paper or other material passing through the mechanism in web form. The Bigelow-Hartford Co., Thompsonville, Conn., through research, changed its products to keep up with the changing fashions in the rug industry, introducing also the first mats for "table throws." The Scovill Mfg. Co. also introduced side lines which have increased the business volume of the company and have afforded steady employment.

Old Japanese Blades as Sharp

A DEVICE for determining the sharpness and durability of a cutting edge has been patented by Prof. K. Honda. It consists of a fixture which holds the blade, edge down and strictly horizontal, upon a pile of paper strips, 1 cm. wide. A definite load (1500 gm.) can be applied to press the blade against the paper pile, and then by lever motion, the blade is drawn back and forth 2 cm. The "sharpness" is measured by the number of sheets of paper cut during this operation, and the "durability" by the number of cuts required to reduce the sharpness by 50 per cent of its original value. Such values have only a relative meaning, so it is only necessary to use one kind of paper for a series of comparisons.

Cutting by pressure alone is done by wedge action; hence the sharpness determined without drawing back and forth is a function of the angle at the edge. This angle is easily determined by pressing the edge lightly on a piece of lead; the lead is then cross sectioned and the impression measured at 400 magnifications on the focusing plate of the camera. Such impressions also show the amount of wear on an edge after testing.

Before testing, the blade is honed and then finished on a microtom polishing device, until the edge is free from feathers, and when viewed sidewise at 400 magnifications has no wavy undulations nor nicks deeper than 0.02 in.

Tests made in this way on various pieces of cutlery by the inventor, and described in Science Reports of the Imperial University, Sendai, Japan (October, 1927), are summarized in Table I.

When corrected for edge angle, these data convince Prof. Honda that the Masa-

mune swords made some six hundred years ago are superior to anything known today, both in original sharpness and durability.

Safety Razors Examined

Tests were made on a series of safety razor blades, made for experimental purposes, and having an edge angle of 14 deg. It was found that initial sharpness and durability increased up to 1.3 per cent carbon; beyond 1.5 per cent carbon the blades became too brittle. The best heat treatments and results are shown in Table II.

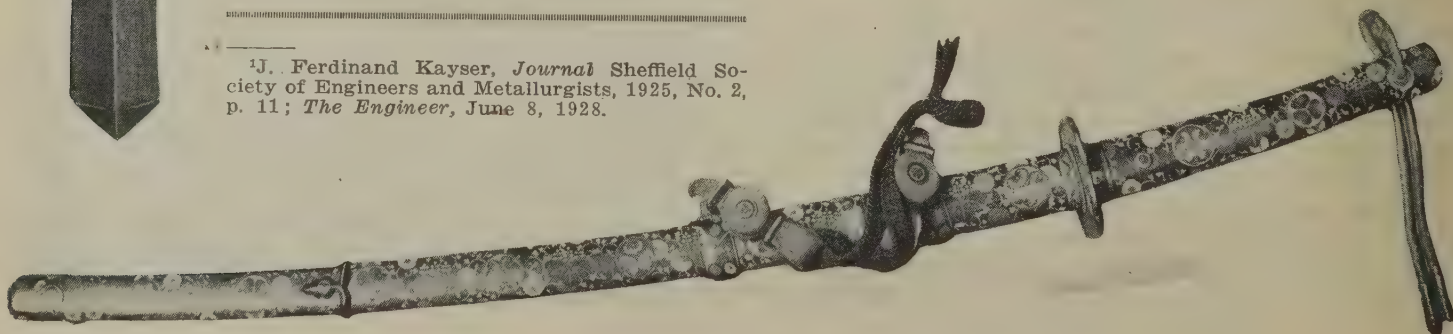
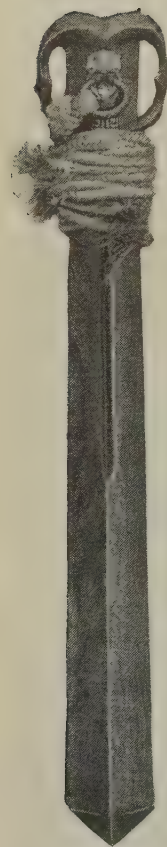
Studies on modern safety razor blades have also been recently published in England.¹ Several hundred examinations indicate that four types of edges are now marketed, the most common of which has a chisel cross section, with the metal near the cutting edge slightly rounded from both sides. Microscopic examination of such an edge will give very discordant results, unless a mounting fixture is used which places



Table I—Comparative Tests on Ancient and Modern Blades

Implement	Edge Angle	Original Sharpness	Durability
Hanckel Razor.....	15	117	8
Japanese Razor	15	110	6
Microtom	20	97	10
Stainless Kitchen Knife.....	27	56	9
Carbon Steel Kitchen Knife.....	25	55	12
Ancient Japanese Swords			
Hiromitsu	25	84	5
Masamune	33	66	15
Tadatsuna	32	58	8

¹J. Ferdinand Kayser, *Journal Sheffield Society of Engineers and Metallurgists*, 1925, No. 2, p. 11; *The Engineer*, June 8, 1928.



as the Best of Modern Razors

the tangent plane at the very edge exactly perpendicular with the optical axis of the microscope.

Characteristics of Good Blades

Modern safety razors are usually made of 1.1 to 1.3 carbon steel strip, heat treated and sharpened. The microstructure of good blades shows globular cementite embedded in a structureless matrix; but the size and distribution of the excess cementite varies greatly. After sharpening and before etching, according to Mr. Kayser "a good blade should exhibit a perfectly straight edge under 400 magnifications, and have a Firth diamond hardness of 650 to 800." This generalization, however, is denied by other investigators. After etching, globules of cementite seem to project from the cutting edge. Desch and Roberts think that the size and uniformity of such projections are related to the ability of the razor to keep a cutting edge, but Kayser can find no such relationship.

The latter investigator believes that Prof. Honda's

testing machine is unsuitable for razor blades, because a single cut through a pile of paper slips will ruin even the best razor for shaving. The only test now known to Kayser is actual shaving. He finds that shaving never causes a good razor edge to become wavy. If it is adequately protected from corrosion, wear eventually breaks down the edge in tiny patches, and in the last stage of usefulness, cementite particles may be found protruding from the cutting edge.

As a practical works test, microscopic examination at 30 diameters of the finished edge (unetched) placed in an adequate fixture will be sufficient, because if the edge has no perceptible nicks or undulations at that enlargement, it is as good as permitted by the limit of accuracy of the grinding machinery now in use.

The time-honored practice of drawing the honed blade across the finger-nail (in the cutlery shop a soft horn is substituted) is still used by the workmen in Sheffield cutlery houses to determine the fitness of razor blades for duty.

Putting an edge on the safety razor blade is done in the following manner:

1. Rough grinding on an emery wheel.
2. Fine grinding on an emery wheel or on steel rolls. (Alternative method: honing on a flat hone.)
3. Stropping.

Final stropping is apparently what produces the slight curvature on the ground surfaces just at the edge. A straight chisel edge is likely to feather, and is also liable to be too brittle for satisfactory use.

Frequently the published literature emphasizes the fact that razor blades should be wiped scrupulously dry and kept from moist atmosphere, for it appears that corrosion is the greatest enemy of a well-made blade. One author recommends careful drying with soft linen, then washing in absolute alcohol, then oiling in acid-free light machine oil.

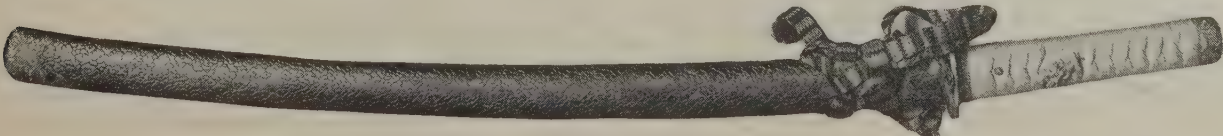


CEREMONIAL Swords for the Forthcoming Coronation of the Japanese Emperor Made in Tokio by Kyusuke Mori in the Old Manner, Despite the Modern Iron Siding on His Shop. (Wide World Photo). The border decorations are photographs of ancient Japanese swords and scabbards in the Metropolitan Museum of Art, New York

Table II—Best Heat Treatment for Safety Razors

Steel	Quench	Draw	Original Sharpness	Durability
0.9 Carbon	...740	150	102	12
1.3 Carbon	...740	150	127	12
1.3 C,1.0 W	...800 (a)	200	108	26
1.3 C,1.0 Cr	...800 (a)	200	115	24
1.3 C,0.5 Mo	...800 (a)	200	114	24

(a) After first heating to 900 deg. C., then cooled slowly in furnace to quenching temperature.





BOOK REVIEWS



Electric Heating Discussed for Commercial Executives

Electric Heating. By Edgar A. Wilcox. Pages, 469, 6 x 9 in.; illustrations, 252; tables, 129. Published by the McGraw-Hill Book Co., New York. Price, \$5.

Once in a while an author deserves a vote of thanks, and for the preparation of this second edition of a pretty good one appearing twelve years ago, this author should have one, suitably engrossed.

It undertakes to show that "the merits of electric heating are now being accorded deserved recognition." It might be said to be of more use to commercial executives and to salesmen than to purely technical readers; in other words, to market creators. Comparisons are made of the merits and limitations of fuel and electricity, and of the processes to which they may be applied with technical or commercial advantage or with relation to comfort and safety.

As most of the smaller and many of the larger appliances for electric heating depend on resistor elements, there is given a long list of factors of temperature, surface, exposure, etc., that should be considered.

The chapters on arc and resistance heating—arts that are bound to be of importance, not only in boiler making but also in shipbuilding and in steel bridge and house construction, to say nothing of repairing defective castings, is well prepared.

From metal furnaces for steel to incubators and brooders is a long jump, but the author does not neglect either. That electric heating is employed in painting, vitreous enameling and metal and chemical coating may be news to many, and they will find much of interest in this line.

Under the head of tempering of steel there are some statements that are not quite orthodox, in view of recent researches and experiments; for instance, that the rate of cooling is usually immaterial, whereas it has been shown by Weber, Frankel, Heyman and others that it is a very important factor, and that this time element depends very largely upon the temperatures employed for hardening and quenching or drawing; the same results being obtained by low hard tempering and long drawing temperature as with high temperature and short drawing period.

The chapters devoted to heating furnaces are unusually full and detailed; the limitations of fuel furnaces as regards large floor space, maintenance, labor cost, and difficulty of control with solid fuels, the necessity of auxiliary equipment, the frequent refractory repairs needed, the constant burner attention necessary for liquid fuel, and the explosive and poisonous nature, lack of availability in many industrial sections, diminishing supply and unreliability from year to year and also during cold weather, of natural gas, are pointed out.

As to the relative costs of fuel and electricity for furnace heating, the author states very properly that they are influenced by so many variables that no general comparisons can be made; the most carefully prepared preliminary estimates seldom check with the final results. He is, however, quite right in saying that such estimates are usually more correct and constant for electric than for fuel installations, provided all factors have been considered. The reasons for this statement are given on page 211.

The figures on the range of annealing temperatures for carbon steels, page 213, are hardly reliable enough for modern practice. The table of colors corresponding to temperatures should have been omitted, as no two workers have the same sense of color, and the conclusions of any one worker

vary with the amount of light in the room, and from time to time according as his eye is or is not fatigued. Today we must rely upon the pyrometer to get accurate results.

There is an excellent alphabetical index. It will probably be some time before there is a better book on this subject. If there is, it will probably be by Mr. Wilcox.

ROBERT GRIMSHAW.

Working of Canadian Labor Disputes Act

Postponing Strikes: A Study of the Canadian Industrial Disputes Act. By Ben M. Selekman. Pages, 405, 5 1/4 x 7 3/4 in.; tables, 24. Published by the Russell Sage Foundation, New York. Price, \$2.50.

This is a book in which a wealth of well chosen and timely material has been collected by experts and put together and commented on with good judgment. It is the result of observations "from the outside, looking in," and the compilers very candidly state that the conclusions reached on the subject are in some respects exactly the opposite from those arrived at in 1916. The change of base, however, was paralleled by that of the workers, who at first opposed the Canadian law concerning arbitration, and are now in favor thereof; the employers also experienced a change of heart.

The study considers the questions: Has the Disputes Act prevented strikes? What suggestions have been established by the boards for the technique of mediation and conciliation, investigation, and arbitration? What factors explain the change in labor's attitude? What has the Canadian Department of Labor worked out to prevent strikes and walkouts? What light does Canadian experience throw on the possibilities of governmental intervention in industrial disputes in our country?

The provisions of the Canadian act are laid down in considerable detail, and its operation from 1907 to 1925 tabulated and analyzed, showing that out of 640 applications in which only the machinery of the act was invoked, 431 boards sat and 536 cases were handled, over half of which were unanimous. In fact, in only 9 per cent was the strike not averted or ended. As with us, coal mining shows the largest proportion (40.7 per cent) of working days lost through strikes.

As regards administration of the act, officials in the Department of Labor constantly refused to prosecute for violations of the law; and the boards have discouraged publicity, some even excluding newspaper men from the hearings. There has been no code of industrial principles laid down or developed to govern decisions of the boards.

Complaints concerning the administration of the act have been due to: (1) Difficulty of employers and employees in agreeing as to the chairman, resulting in the Department of Labor's selecting him; usually, thought the employees, unfavorable to them. (2) The long time between establishing boards and submitting reports.

The last chapter is devoted to the significance of Canadian experience for the United States. The record "seems to point to conciliation as an excellent method of governmental intervention in industrial disputes." Its chief value lies "in the fact that it enables those intervening in industrial disputes to take a realistic view of the situation at hand."

There are two reasons for conciliation: It places upon the shoulders of employers and employees the responsibility for arriving at an amicable settlement, because whatever settlement is made must be translated into everyday prac-

tice by the employers and employees involved; and it puts the actual details of working out the settlement upon those most familiar with the technical aspect of the industry in which the dispute has arisen.

The report shows that on the Canadian railroads, where conditions are fairly stabilized, the machinery of the Disputes Act, where employed, has worked well. In the coal mines, however, it has failed. And in fine, it seems that compulsion as compared with conference and negotiation under governmental auspices is futile.

ROBERT GRIMSHAW.

1928—World's Greatest Foreign Trade Year

American Foreign Trade in 1928. Official Report of Fifteenth National Foreign Trade Convention at Houston, Tex., April 25-27, 1928. Pages 261, 6 x 9 in. Issued by the secretary, O. K. Davis, National Foreign Trade Convention headquarters, India House, New York.

Beginning with the organization meeting at Washington, D. C., in 1914, these foreign trade conventions have had a great output of high-grade literature on the development of the foreign trade of the United States. From the beginning, James A. Farrell, president United States Steel Corporation, has been chairman of the National Foreign Trade Council, and the steel and metal-working trades have been well represented at every gathering.

Secretary Davis, in issuing this 1928 volume, says that this is the world's greatest foreign trade year since pre-war time. The 48 principal trading nations of the world did \$19,482,000,000 worth of export business last year, compared with \$18,400,000,000 for 1925, which was the first year in which the world actually exceeded the pre-war volume of exports. The 1913 export total of 48 nations was about \$17,700,000,000. Thus, the figures for last year, computed in 1913 dollar values, showed a gain of \$1,782,000,000, or slightly above 10 per cent, in the course of world rehabilitation from the war.

The Houston convention, at which there were 1132 delegates, including more than 50 from 19 foreign countries, specialized on Latin-America. It was brought out that 10 nations south of Panama made a total gain in exports for the past two years of almost 20 per cent, giving South America world leadership in rate of increase in export trade. Combined purchases made by Latin-American countries in the United States exceeded \$900,000,000 and were greater than their total purchases from England, France and Germany in 1927. The Proceedings take in papers and discussions of three general sessions and three export merchandising sections. At each of the latter three phases of the problem were handled by experienced men.

Blue Book on Scrap Industry

A revised Blue Book has been issued by the National Association of Waste Material Dealers, Inc., Times Building, New York. The new publication, the first since 1923, contains 324 pages and is bound in a flexible imitation leather. In addition to the constitution and by-laws of the association, a brief history and a description of the association's activities, there are separate sections devoted to iron and steel scrap, non-ferrous metals, scrap rubber, etc.

The metal section contains the standard classification of non-ferrous scrap, printed in parallel columns of English, French and German and the classifications of the American Railway Association. There is also a classification for nickel and monel metal suggested by the association. Lists are given of chemists, assayers, testing companies and sworn weighers and assayers in the United States and other countries. Among the non-ferrous metal subjects covered in this section are tariff provisions, composition of railroad bearings, United States Navy specifications on cast gun metal,

imports and exports and a list of members dealing in non-ferrous metal scrap.

The iron and steel scrap section of the book, while not quite so complete as the non-ferrous section, gives the classification prepared by the association in conjunction with the National Association of Purchasing Agents and the Bureau of Standards. It contains tariff provisions, export and import matters, a suggested contract form for the purchase of iron or steel scrap and a list of members in this field.

There is considerable information on trade customs and specimens of suggested uniform contracts are shown. The Blue Book is much more complete with information than the first issue five years ago and provides a convenient form of reference for the buyer or seller of old material.

Quotations on Efficiency

A book, entitled "Personal and Business Efficiency," has been published under the authorship of C. A. Henderson by George H. Doran Co., New York. It has 308 pages and sells for \$2.

It might be expected that a work on the higher mathematics—say a treatise by Einstein—would perhaps be tiresome and difficult reading; but here we have a book the subject and treatment of which should but will not interest every reader concerned.

Its object is "to present systematically and without frills, yet in a non-technical way, the best practical results of study in the fields vital to the welfare of the business man himself." Says the author: "Especially there is need of one which looks upon the business man as first of all a man who, among other things, is in business."

What the author has given us is hundreds on hundreds of quotations, showing a very wide range of reading. We have the sayings and opinions of all sorts and conditions of men, from Plato to Trotzky (né Bronstein), we have Prince Henry of Prussia and Emerson, President Eliot and Henry Ford, Percy McDougall and Mark Twain, the manufacturers of Providence, R. I., and Nina Simmonds, all cited; but the author's contribution seems to have been (besides the quotation points) similar to one often cited by Montaigne.

The questionnaires at the end of each chapter may make the book more useful as a textbook for hard workers.

New Books Received

The Labor Problem. By J. A. Estey. Pages 378, 6¼ x 9½ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$3.

Economics of Consumption. By Warren C. Waite. Pages 263, 6¼ x 9½ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$3.

Influencing Men in Business. By Walter Dill Scott and Delton T. Howard. Pages 172, 6 x 9 in., illustrated. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$2.50.

Mineral Resources of the United States, 1925. Part I, metals, pages 768, 6 x 9¼ in. Part II, non-metals, pages 615. Published by the United States Government Printing Office, Washington. Price, \$1 each.

Commerce Yearbook, 1928. Vol. I—United States. Pages 708, 6 x 9¼ in., illustrated. Published by the United States Government Printing Office, Washington. Price, \$1.25.

Patent Office Practice. By Archie R. McCrady. Pages 387, 6½ x 9¼ in. Published by H. D. Williams Co., Ouray Building, Washington.

Mining Directory of Minnesota, 1928. By John J. Craig. Pages 229, 4¾ x 6¾ in., illustrated. Published by the University of Minnesota, Minneapolis, Minn. Price, \$1.

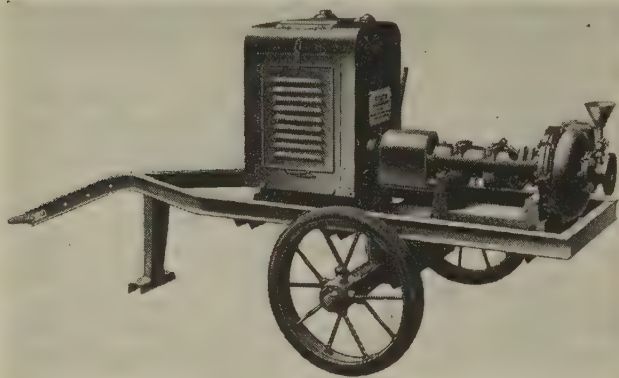
Technisches Hilfsbuch der Österreichisch-Alpinen Montangesellschaft. Pages 64, 5½ x 7½ in., illustrated. Published by Julius Springer, Schottengasse 4, Vienna, Austria. Price 3.60 m.

Industrial Lunch Rooms. Pages 65, 6 x 9 in., illustrated. Published by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$1.

Pumping Unit Has Manganese Steel Parts

THE American Manganese Steel Co., Chicago Heights, Ill., has developed a series of portable pumping units to meet conditions of shock, wear

a 6-hp. power plant; the 2½-in. discharge machine has an 8-hp. power plant, while the 3-in. unit has a 10-hp. power plant.



Manganese Steel Parts Are Designed to Meet Shock, Wear and Abrasion in This Portable Pump

and abrasion. There are three sizes now made, in which manganese steel has been used for shell, impeller and disks. All operate at 1200 r.p.m. The smallest size has 2-in. discharge and

A long sleeve bearing with ring oiling, and babbitted, supports the shafting, to which the impeller is press-fitted. A large oil reservoir supplies lubrication for the drive

shaft and the thrust bearing. The unit, mounted on a base plate, is connected by flexible coupling through a friction clutch to the source of power.

Electrically welded 3-in. channels form a frame, which is mounted on rubber-tired wheels, with spring shock absorbers fitted to the axle. The unit may be towed, while a leg near the towing ring supports the unit when it is stationary.

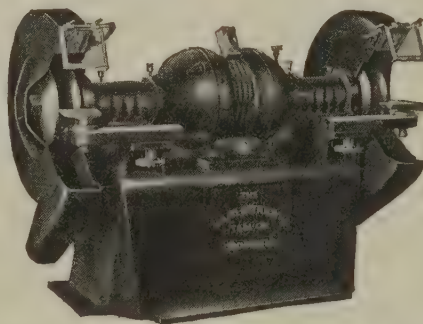
Power is applied from a Novo gas engine with satisfactory speed range. Regardless of size of unit, the chassis is uniform, having a length over-all of 9 ft. 6 in., an extreme width of 4 ft. 11 in. and a total height of 4 ft. The 24-in. wheels have a 4-ft. tread.

Capacity against a 34-ft. lift is given as 100 gal. a minute for the 2-in. unit. The 2½-in. unit is rated at 150 gal. a minute against a 34-ft. lift, while the 3-in. unit has 230 gal. capacity against a 37-ft. lift. These figures vary, of course, as the head and the length of the discharge line change.

Snagging Grinder Operates at 9500 Ft. Per Minute

A SNAGGING grinder with a speed of 9500 surface ft. per min., when equipped with 30-in. diameter wheels, having 2½ or 3-in. face, 18-in. hole and operating on 40 or 60-cycle circuits, has been placed on the market by the United States Electrical Tool Co., Cincinnati. When worn down to 24 in. in diameter, the wheel speed is 7500 ft. per min., the average speed of the 30-24-in. wheel being 8500 ft. per min. On 25 and 50-cycle circuits, 24-in. wheels with 2½ or 3-in. face and 12-in. hole, giving 9300 surface ft. per min., are recommended. The machine is furnished for 220, 440 and 550-volt, two or three-phase alternating current and 220-volt direct current.

The 15-hp. heavy-duty motor employed is rated for continuous service



High-Speed Operation, 9500 Ft. Per Min., with a 30-In. Wheel, Is a Feature. Wheel hoods are designed for speeds of 10,000 ft., per min.

at full horsepower with a temperature rise of 40 deg. C. and with momentary overload capacity in excess of 100 per cent. The machine is built to safety standards of the American Engineering Standards Committee code. The wheel flanges are keyed to the shaft and securely clamped to the wheel by cap screws. The wheel hoods are of structural steel and are designed for wheel speeds of 10,000 surface ft. per min. The doors on the safety hoods are fastened by cap screws. The wheel shaft is of nickel steel, is in one piece, and is mounted on four heavy-duty ball bearings which are carried in dustproof housings.

Ladle Gearing for Smaller Ladles

WHILE geared ladles for pouring tons of molten metal have been in use for a long time, there has been a need for a special, quick-acting gearing for ladles of from 500 to 1000 lb. capacity. Such a construction has been developed by the Modern Pouring Device Co., Port Washington, Wis.

The hardship of tilting a forked shank is done away with entirely through this mechanism. The operator stands directly back of the ladle, protected from the heat by a sheet metal shield. A steadying lever attached to the bail frame facilitates quick "spotting" of the ladle. This makes pouring with a 500-lb. geared ladle a one-man proposition.

The worm gearing is self-locking

and will hold the ladle in any desired position. After a mold is poured, it is necessary to tilt back the ladle only far enough to cut off the stream. It is not necessary to

bring it back into an upright position each time. While this geared ladle was originally designed for operation on a pouring device, it is used also on an electric crane or hoist hook if desired, and can be operated by one man.

At Either Side of the Steel Shank, A, Are Guards to Protect the Trunnions, B, from Metal Splashes. The trunnions run in roller bearings. A cut steel worm in cast steel housing and cast iron worm wheel are completely inclosed. The steadying handle is shown at top



Locomotive Axle Journal Turning Lathe

A NEW 90-in. locomotive axle journal turning lathe with double quartering and crank-pin turning attachments has been brought out by the Niles Tool Works Division of the Niles-Bement-Pond Co., 111 Broadway, New York. This machine is equipped also for turning inside and outside of journals. The arrangement for journal turning and quartering has been previously described and illustrated.

For crank-pin turning the heads, of

box tool type, are mounted on heavy bases bolted to the bed. The right-hand head is mounted on the base, to which the outside journal rest is attached. The left-hand head is mounted on an independent base, adjacent to the face plate. Both heads receive their rotation and their lateral adjustment from the quartering attachment spindles.

Capacity of these attachments for engine stroke is the same as for the quartering attachments—from 22 in.

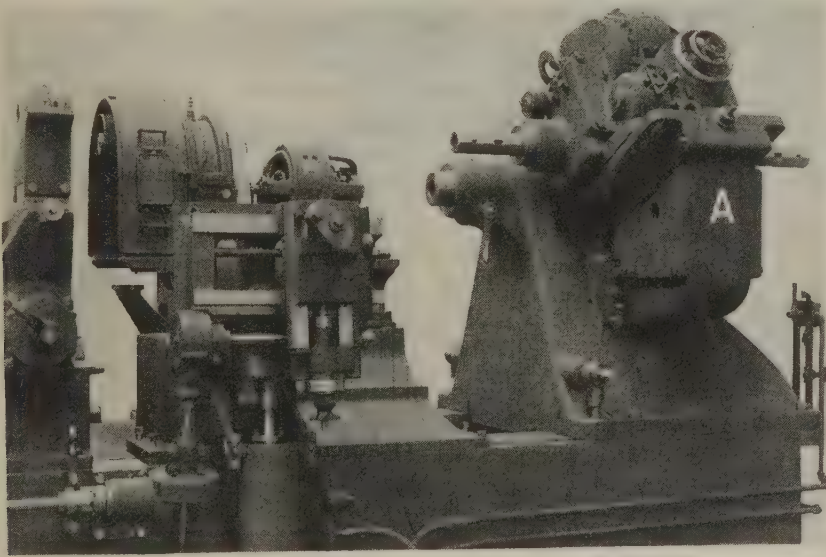
minimum to 40 in. maximum stroke. The crank-pin heads will turn pins from 7 to 12 in. in diameter and will accommodate pins of the maximum length.

Burnishing tools with shanks to fit the tool slots in the crank-pin head tool holders are regularly furnished, to secure the desired finish after the turning operation. As illustrated, the machine is arranged to handle wheel sets with 90-deg. leads only. Increasing adoption of three-cylinder locomotives with cranks 120 deg. apart has made it necessary to provide for accommodating these wheel sets also.

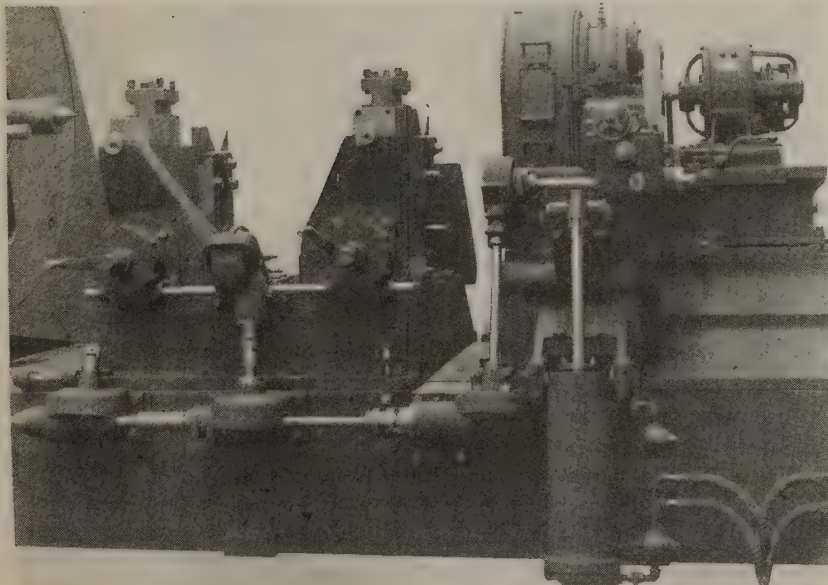
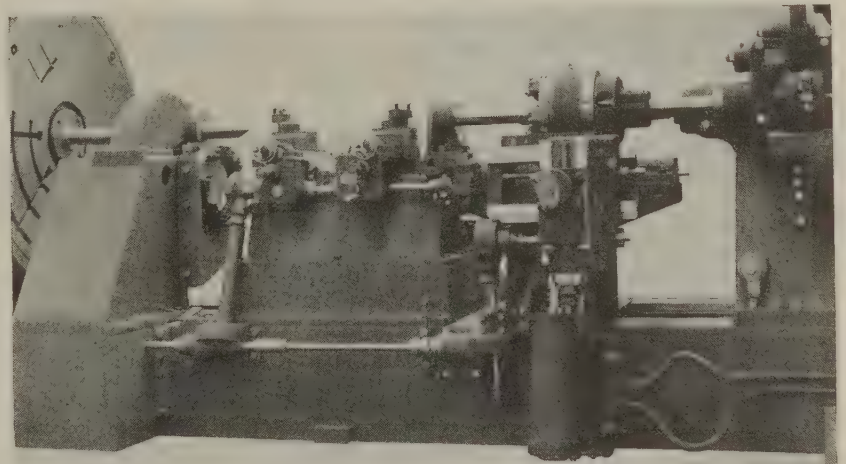
Where it is required to double quarter or turn the crank pins of such wheel sets, the right-hand attachment is raised and tilted 30 deg. by means of a filler block shown at A in detail view. This filler block may be readily removed to bring the quartering frame back to position for wheels with 90-deg. leads.

To support the boring bar for quartering and the crank-pin head for pin turning, additional brackets of corresponding height are supplied. These are secured to the members used for the same operations on wheels with 90-deg. leads.

Both journals on center crank axes for three-cylinder locomotives may be turned at one setting by use of the special rest shown in the second detail view. The rest has narrow slides



At Right Is a General View of the Lathe. Above is shown the fitting for handling three-crank axles, the filler block A tilting the head 30 deg. Below is the special rest for turning both journals, on three-cylinder locomotives, at one setting



and may be interchanged quickly with the regular rest. It has power longitudinal feed from the main feed shaft, but the cross-feed is by hand.

Among improvements recently incorporated on this machine are steel wearing plates on the bed, beneath the sliding heads. These plates, which are renewable, are the means of preserving alinement between the two heads. This feature is particularly necessary in this type of tool, to insure parallel journals.

Average weekly earnings in June in representative New York State factories are reported by the States Industrial Commissioner at \$29.48, compared with \$29.19 in May. Except for March, this is the highest monthly figure so far this year, but it was exceeded by four months last year.

Business Analysis and Forecast

Record Sales of Finished Steel Likely

Bookings of First Half Indicate That Year Will Surpass
1923—Leading Consumption Lines, However, Not So Promising

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

DURING recent months the actual demand for finished steel, as reflected in sales for current requirements has been extraordinarily large and has amply warranted the high rate of production during the first half of the year. The first chart shows the trend of the monthly tonnage of various items of finished steel sold, which together make up about 50 per cent of the total. They are sufficiently representative to be taken as indicating the general trend of steel sales with the exception of rails and tin plate. Such sales showed an upward trend in June, when they reached the highest point in that month of which we have any record.

The average sales (in tons) for the second quarter were much above those for any recent year and show but a very small decline from the first quarter. Moreover, the total for the first half year exceeds that for any year on record, and forged ahead of 1923. Since the 1923 sales in the second half were small, it seems almost certain that 1928 sales will make a new record.

The performance in various lines of finished steel, however, has not been uniform. Fabricated structural steel sales, though large, fell more than usual in June, and there is some indication that they are rounding off as building operations let up a little. On the other hand, steel sheet sales made a good seasonal increase and were probably the highest on record for the month, due chiefly to heavy automobile production. The sales of steel plates and steel castings declined quite sharply, and the production of castings much exceeded orders. The business in plates has been affected by the low level of railway equipment buying as well as by unfavorable conditions in the oil industry and ship building. Thus, even

the steel business shows signs of the prevalent spottiness.

Declining Building Activity Indicated

AS we have anticipated, building operations have begun to feel the effect of tighter money and the increased difficulty of floating securities. After rounding off in May and June, *building activity showed a declining trend in July*. There is usually some decline in that month, but this year it has been larger than normal. Construction contracts, measured in floor space, amounted to only 82,125,000 sq. ft. in July, against 93,981,000 sq. ft. in June, and our adjusted index falls to 129.5 per cent of the monthly average for 1921-26, against 130.6 per cent in June. The value of contemplated new construction in July was only \$647,683,000, against \$1,030,095,000, in the preceding month, and was actually smaller than a year ago. Building permits, too, show a similar development.

It is futile to compare building operations now with those of a year ago if the purpose is merely to draw an optimistic conclusion. In July, 1927, building was at a low ebb judged by the standards of recent years. As a matter of fact, contracts awarded last month were considerably lower than three years ago, in July, 1925; and, allowing for seasonal conditions, the July figure has been exceeded in ten months during the period since the middle of 1925.

Some evidence of the down-turn in building activity has already appeared in the bookings of structural steel. The decline in such bookings in June was a little more than usual, the figure being 303,800 tons, which compares with 311,300 tons in May. Apparently the downward trend continued in July, as trade reports concerning the orders for fabricated

structural steel last month indicate a weekly average of about 34,000 tons, against an average of 42,000 tons per week in June. Several large new projects, however, are reported to be pending.

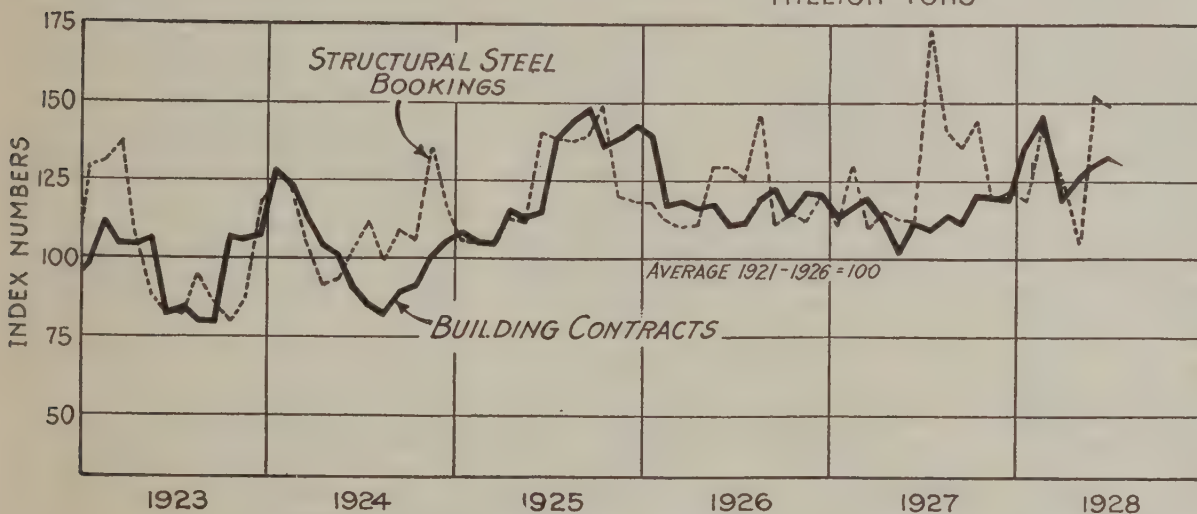
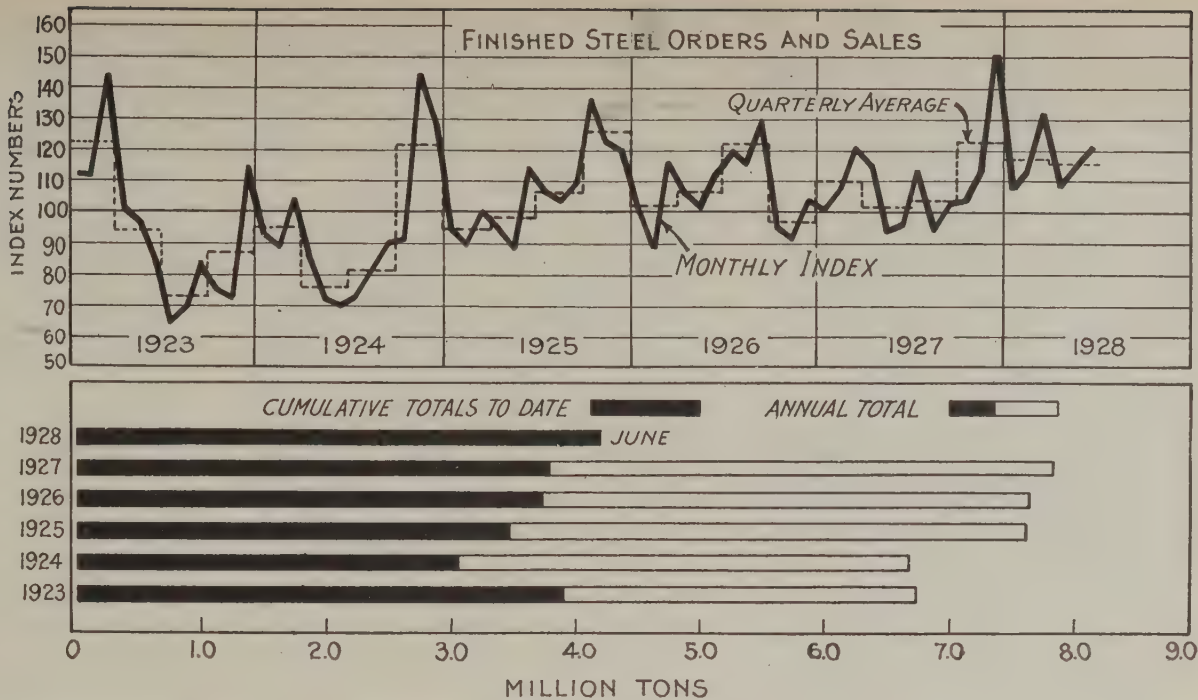
No Early Sustained Gains in Railroad Equipment

ORDERs for railroad equipment have shown no improvement, July having been a bad month in this line of business. The number of railroad cars ordered dropped to the smallest figure for the month that has appeared in many years, with domestic sales amounting to only 307 cars, in comparison with 1459 a year ago. Frequently there is a sharp seasonal decline in freight car buying during June and July, and some good sized inquiries have recently been reported, but conditions indicate no early sustained gains. The railroads have a rather large surplus of freight cars, and car loadings were fewer in July than in June. The carriers earned only 4.17 per cent on their investment in June, which is a smaller return than was earned a year ago.

As to locomotives, domestic orders for steam locomotives amounted to only 32 in July, and, though this is a few more than were ordered in the same month last year, it represents small business. That the total foreign and domestic orders for steam and electric locomotives declined is indicated by the fact that unfilled orders were reduced, in spite of a decline in shipments.

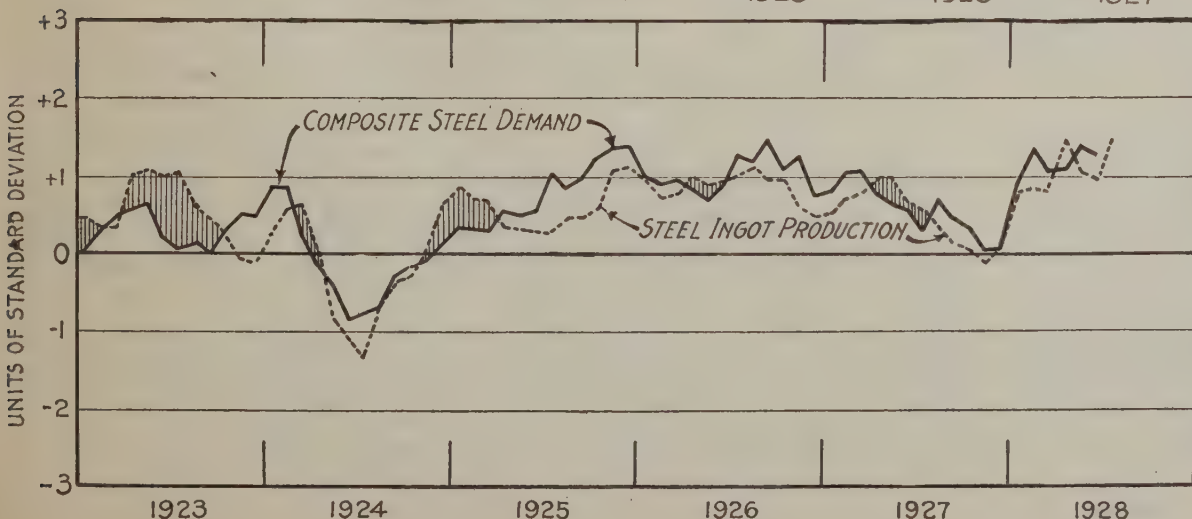
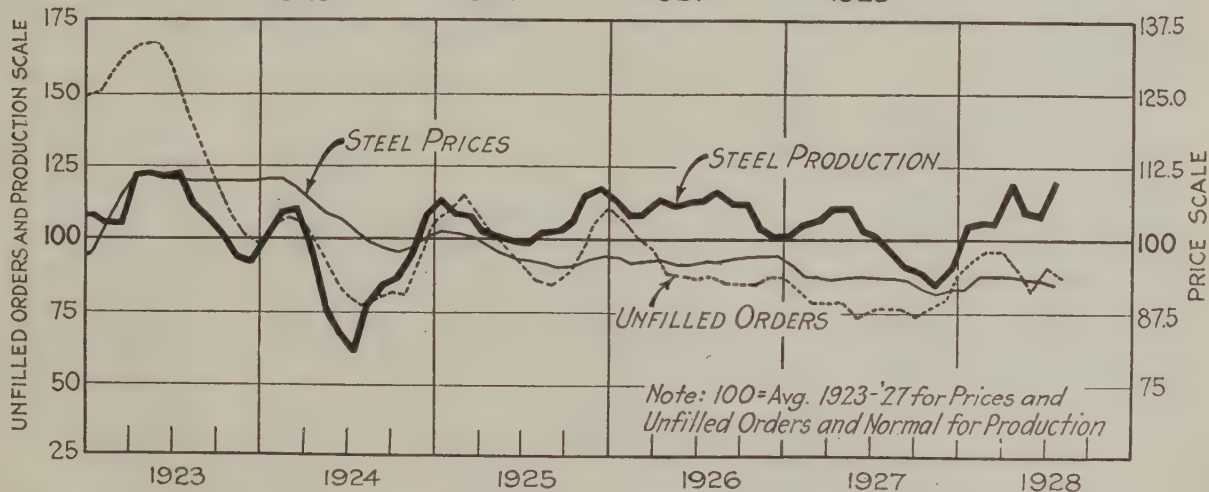
The total demand situation, as reflected in the combined activities of the chief consuming industries, is somewhat mixed; but resembles the trend of building, in that it is large but declining. As shown in the third chart, steel production in July rose so high as probably to exceed the indicated potential demand.

SALES of Finished Steel in the Second Quarter Were Much Above Those of Any Recent Year. The total for the first half forged ahead of 1923, and 1928 sales promise a new record



BUILDING Activity Showed a Declining Trend in July. Fabricated structural steel bookings fell off in June from May

STEEL Output Rose 19.2 Above Normal in July, Against 9 Per Cent Above Normal in June, Although a Decrease of Over 3 Per Cent Usually Occurs in the Seventh Month



STEEL Production in July Rose So High as Probably to Exceed the Indicated Potential Demand. And the outlook is for a moderate decline in the demand curve

The decline in the June index of composite demand was due to a reduction in freight traffic, in building activity, in automobile production, in general manufacturing, and in mining. The gains in exports, machine tool orders, and farm purchasing power, were not sufficient to offset these declines. The demand index becomes 118.2, which compares with 119.5 in May, and 108.5 in June, 1927.

Seasonal Gain in General Demand Is Likely

THE outlook appears to indicate a further moderate decline in the demand curve, and makes it seem possible that steel production has been speeded up too rapidly. It is likely that the recent high rate of production cannot be maintained.

There is no probability that consumer activity will show any more than a seasonal gain during the next few months—probably not that much. To begin with, *building activity* is headed downward, and under the influence of tightening money, is likely to continue on the decline. The country as a whole is well ahead of a normal building program.

In the second place, there is no indication of any improvement in the position of the *railroads*. In June, both net and gross earnings fell behind a year ago, and, allowing for the usual seasonal changes that occur from month to month, the volume of freight traffic showed a declining trend in both June and July. Good crops should benefit the western roads, but the question as to grain prices and the purchasing power of the farmers is still open. The railroads have slighted the maintenance of equipment, but they have a large surplus reported to be in a serviceable condition.

The *automobile industry* has caught up with the country's requirements, and the total production and sales fell off a little more than usual between May and June. The volume is unusually high, but this business generally goes as building does, and, while no rapid slump is indicated, a gradual irregular let-up in activity will probably be necessary.

The *oil industry* is better, but is still sick. It has an overdose of fuel oil, to say nothing of too much kerosene. The value of shut-in production is enormous, and the higher prices recently established for light crude may stimulate increased output and bring on a relapse. The prospects are uncertain and at best but fair.

Thus, the demand prospects indicate some decline. Any decline will start from a very high point, and at present does not seem likely to be severe. But *tight money, affecting the supply of funds, new security issues and building operations, is bound to restrict steel requirements for a time*—how long will depend upon the promptness with which the necessary readjustments are made in the credit situation.

This general position is supported

by the July decline of 66,000 tons in the unfilled orders of the steel corporation; which decline is contrary to the usual seasonal trend.

Relative Positions of Steel and Pig Iron Outputs

AS already intimated, it is our opinion that the output of steel ingots was stepped up too much in July. The average daily production was 152,500 tons, in comparison with 144,000 tons in June. Usually a seasonal decrease of over 3 per cent occurs in the seventh month, so that the adjusted index rose sharply, becoming 119.2 per cent of normal, against 109 per cent in June and 101.3 per cent last year. This is not only extraordinary high for the season, but is above the composite demand level. *The increase in output has been at the expense of the size of order books.* It seems highly improbable that production at this rate can be maintained.

The average price of finished steel in July was the lowest since January, being only 2.321c. a lb. This compares with 2.367c. a year ago, and is only 92 per cent of the average for the last five years. Unquestionably a firming up in prices has been under way, but we cannot see the basis for a general advance. Sheets and nails, for example, are very low. Bars, too, are a little lower than normal.

in comparison with billets. But we can see no basis for anything more than a stiffening in the general level of prices and a realignment of items that are unduly low.

Pig iron production continues relatively low in comparison with steel. The average daily production decreased more than usual in July and was only 6.1 per cent above our estimate of normal. At \$17.07 the price made a new low monthly average for recent years, and was only 79.8 per cent of the average for the period of 1923-27.

The result is a sharp decline in the ratio of pig iron production to the ingot output, and this ratio is now below normal. Not enough pig iron is being produced, considering the recent rate of the steel output, and unless ingot production is rather sharply curtailed in the near future, pig iron prices are due to advance before long. It seems probable that pig iron prices will reach a little higher level within thirty days, barring some decidedly unfavorable development in general business which is not now to be foreseen.

Heavy melting steel scrap, at an average price of \$14.13 in Pittsburgh, was cheap in July, and the reduction in supply at the chief centers, together with the increased output of steel, has strengthened the market. Scrap markets will probably rule stronger through August at least.

Production of Pig Iron in First Half

The January-June Figures Shown in Detail on Facing Page
—Ferroalloy Output Relatively Large

PRODUCTION of pig iron and ferroalloys in the first half of the year, according to the American Iron and Steel Institute, was 18,686,412 gross tons. This was less than the 19,567,554 tons made in the first half of 1927 and it was also the smallest for any first half year since 1924, when 17,514,485 tons was made. The high record for the first half of a year (as well as for any half year) was 21,016,475 tons for January-July, 1923.

Separate tables cover coke pig iron, charcoal pig iron and ferroalloys.

The output of ferroalloys exceeded that of both halves of 1927.

Of the total production of pig iron and ferroalloys, 14,497,636 tons, or 79.2 per cent, was made for maker's own use. In the first half of 1927, this percentage was 76.5. Of the total output of foundry pig iron, 1,902,382 tons, as shown in the table, or 90.6 per cent, was made for sale. About 58 per cent of the ferromanganese and spiegeleisen produced was for maker's own use. This year separate figures for ferromanganese and spiegeleisen are not given.

Heavy Volume of Construction Work

WASHINGTON, Aug. 14.—More than \$4,000,000,000 have been expended for construction operations of all types in the United States since the opening of this year, according to statistics just compiled by the Associated General Contractors of America. The figures, based on actual shipments of construction materials, show the volume of operations carried on during the first seven months of this year to be 3 per cent greater than the total

recorded for the corresponding period of 1927.

The volume of work handled during July was the greatest ever recorded for that month of the year. It was last month's large volume, following the record-breaking June activities, that enabled the total for seven months to reach the high position it occupies.

July witnessed a slight decline from the lofty June level. Despite the drop, however, last month held a position topped by only August, 1927, and June of this year.

1928 January-June Output of Pig Iron

HALF-YEARLY OUTPUT OF PIG IRON AND FERRO-ALLOYS BY STATES.

HALF-YEARLY PRODUCTION OF PIG IRON BY STATES.*

States.	Blast furnaces. (a)				Production of pig iron not including ferro-alloys—Gross tons.		
	In blast Dec. 31, 1927.	June 30, 1928.			First half of 1927.	Second half of 1927.	First half of 1928.
		In.	Out.	Total.			
Massachusetts....	1	1	0	1	1,317,674	1,297,882	1,213,685
New York.....	13	12	9	21			
New Jersey.....	0	0	2	2			
Pennsylvania.....	48	52	49	101	6,374,364	5,092,093	5,762,007
Maryland.....	5	5	1	6	491,589	449,912	525,253
Virginia.....	1	1	12	13			
Alabama.....	18	16	19	35			
Texas.....	0	0	1	1	1,461,562	1,296,825	1,252,229
West Virginia.....	2	3	2	5	389,361	422,393	413,611
Kentucky.....	1	2	3	5			
Mississippi.....	0	0	1	1			
Tennessee.....	2	2	10	12	4,418,633	3,988,610	4,296,980
Ohio.....	35	44	19	63			
Illinois.....	16	15	10	25			
Indiana.....	11	14	4	18	1,840,038	1,748,425	2,042,079
Michigan.....	10	8	3	11	2,337,441	1,862,076	2,345,888
Wisconsin.....	1	0	5	5	227,381	228,346	165,179
Minnesota.....	2	2	1	3			
Missouri.....	0	0	2	2			
Colorado.....	3	3	2	5	344,027	269,600	295,430
Utah.....	0	1	0	1			
Total.....	169	181	155	336	19,202,070	16,656,162	18,312,341

(a) Completed and rebuilding pig iron furnaces.

HALF-YEARLY PRODUCTION OF COKE PIG IRON BY STATES.*

Massachusetts.....	1	1	0	1			
New York.....	13	12	9	21	1,317,674	1,297,882	1,213,685
New Jersey.....	0	0	2	2			
Pennsylvania.....	48	52	49	101	6,374,364	5,092,093	5,762,007
Maryland.....	5	5	1	6			
Virginia.....	1	1	12	13	491,589	449,912	525,253
Alabama.....	18	16	17	33	1,456,798	1,294,302	1,252,229
Texas.....	0	0	1	1			
West Virginia.....	2	3	2	5	378,629	411,614	404,993
Kentucky.....	1	2	3	5			
Tennessee.....	1	1	8	9			
Ohio.....	35	44	19	63	4,418,633	3,988,610	4,296,980
Illinois.....	16	15	10	25	1,840,038	1,748,425	2,042,079
Indiana.....	11	14	4	18	2,267,885	1,795,861	2,275,403
Michigan.....	4	4	0	4			
Wisconsin.....	1	0	5	5	227,381	228,346	165,179
Minnesota.....	2	2	1	3			
Missouri.....	0	0	2	2			
Colorado.....	3	3	2	5	344,027	269,600	295,430
Utah.....	0	1	0	1			
Total.....	162	176	147	323	19,117,018	16,576,645	18,233,238

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON BY STATES.*

Alabama.....	0	0	2	2			
Tennessee.....	1	1	2	3			
Mississippi.....	0	0	1	1	85,052	79,517	79,103
Michigan.....	6	4	3	7			
Total.....	7	5	8	13	85,052	79,517	79,103

HALF-YEARLY PRODUCTION OF ALL KINDS OF FERRO-ALLOYS BY STATES.†

New York.....	1	1	1	2			
New Jersey.....	0	0	0	0	64,776	95,019	93,192
Pennsylvania.....	6	8	1	9	199,094	164,048	185,021
Virginia.....	0	1	0	1			
West Virginia.....	0	0	0	0			
Tennessee.....	0	1	0	1	40,586	18,827	29,407
Alabama.....	0	1	0	1			
Ohio.....	2	2	3	5			
Illinois.....	0	0	0	0			
Michigan.....	0	0	0	0	61,028	64,035	66,451
Iowa.....	0	0	0	0			
Colorado.....	0	0	0	0			
Total.....	9	14	5	19	365,484	341,929	374,071

HALF-YEARLY PRODUCTION OF PIG IRON AND FERRO-ALLOYS ACCORDING TO FUEL USED.

Coke pig iron.....	162	176	147	323	19,117,018	16,576,645	18,233,238
Charcoal pig iron.....	7	5	8	13	85,052	79,517	79,103
Total pig iron.....	169	181	155	336	19,202,070	16,656,162	18,312,341
Total ferro-alloys.....	9	14	5	19	365,484	341,929	374,071
Grand total.....	178	195	160	355	19,567,554	16,998,091	18,686,412

* Does not include the production of ferro-manganese, spiegeleisen, ferro-silicon, or other ferro-alloys.

† Includes ferro-manganese, spiegeleisen, ferro-silicon, and other ferro-alloys made in blast furnaces or in electric furnaces.

‡ During the first half of 1928 there were 16 blast furnaces in operation making ferro-alloys only of ferro-alloys and pig iron.

|| Blast furnaces only; electric furnaces not included.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES AND FERRO-ALLOYS BY KINDS.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1927.	Second half of 1927.	First half of 1928.
Massachusetts, New York.....	424,856	498,610	518,625
Pennsylvania—Allegheny County.....	1,795,268	1,465,197	1,787,345
Other counties.....	2,005,274	1,576,737	1,855,362
Maryland, W. Va., Ala., Kentucky.....	1,087,654	846,735	1,141,242
Ohio.....	2,166,811	1,912,209	2,170,385
Indiana, Illinois.....	2,552,221	2,136,209	2,781,455
Michigan, Minnesota, Colorado, Utah.....	464,329	424,954	461,574
Total.....Gross tons.	10,496,413	8,860,951	10,715,988

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

Pennsylvania.....	1,961,151	1,569,739	1,784,783
N. Y., Md., W. Va., Tenn., Ala.....	670,219	636,223	497,099
Ohio.....	1,570,035	1,263,075	1,395,124
Indiana, Illinois.....	792,317	643,156	780,748
Total.....Gross tons.	4,993,722	4,112,193	4,457,754
Including low-phosphorus pig iron.....	194,033	218,844	160,681

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON.

Massachusetts, New York.....	600,756	510,331	435,834
Pennsylvania.....	486,879	419,117	247,567
Maryland, Virginia, Kentucky, Tenn.....	98,103	126,766	89,238
Alabama.....	630,087	677,409	585,902
Ohio.....	339,010	479,416	285,049
Illinois.....	234,234	234,206	220,730
Michigan.....	224,098	187,510	175,303
Wisconsin, Minnesota, Utah.....	130,039	126,458	65,775
Total.....Gross tons.	2,743,206	2,761,213	2,105,398

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York.....	130,174	114,516	106,426
Pennsylvania.....	41,009	33,733	32,757
Ohio.....	335,789	317,182	438,420
Kentucky, Illinois, Michigan, Minn.....	337,096	390,084	368,996
Total.....Gross tons.	844,068	855,515	946,599

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New York, Pennsylvania.....	84,127	27,533	51,668
Virginia, Alabama, Ohio.....	11,318	21,554	9,257
Total.....Gross tons.	95,445	49,087	60,925

HALF-YEARLY PRODUCTION OF MISCELLANEOUS GRADES OF PIG IRON AND DIRECT CASTINGS.

New York, Pennsylvania.....	2,327	1,717	2,879
Alabama.....	6,265	2,745	2,295
Ohio.....	6,988	4,804	6,507
Ind., Ill., Mich., Wisconsin, Colorado.....	13,636	8,237	13,996
Total.....Gross tons.	29,216	17,503	25,677

HALF-YEARLY PRODUCTION OF FERRO-ALLOYS BY KINDS.

Ferro-manganese and spiegeleisen.....	222,460	171,886	205,073
Ferro-silicon.....	125,637	152,640	152,389
Ferro-phos. and all other ferro-alloys.....	17,387	17,403	16,609
Total.....Gross tons.	365,484	341,929	374,071

PIG IRON AND FERRO-ALLOYS MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1928.

Pig iron and ferro-alloys.	For sale.	For maker's use.	Total. Gross tons.
Pig iron:			
Basic.....	810,714	9,905,274	10,715,988
Bessemer and low-phosphorus.....	227,164	4,230,590	4,457,754
Foundry.....	1,902,382	203,016	2,105,398
Malleable.....	844,586	102,013	946,599
Forge or mill.....	26,604	34,321	60,925
White and mottled, direct castings, etc.	3,255	22,422	25,677
Total pig iron.....Gross tons.	3,814,705	14,497,636	18,312,341
Ferro-alloys:			
Ferro-manganese and spiegeleisen.....	86,081	118,992	205,073
Ferro-silicon.....	152,389		152,389
All other ferro-alloys.....	16,609		16,609
Total ferro-alloys.....Gross tons.	255,079	118,992	374,071
Total pig iron and ferro-alloys G. T.	4,069,784	14,616,628	18,686,412

Mileage Rates Will Be Opposed

Reductions Proposed by Interstate Commerce Commission

Examiners Not So Large as Pittsburgh Mills Hoped

For—Hearings to Follow

STEEL companies, particularly those in the Pittsburgh, Youngstown and Wheeling districts, are expected to oppose vigorously the recommendations of the Interstate Commerce Commission's special examiners, Howard C. Faul and C. M. Bardwell, favoring the adoption of the mileage scale of freight rates on iron and steel products. Probably few, if any, of the shippers interested in the proceedings are satisfied with the outcome. Arguments for and against various features of the Faul-Bardwell plan will be made before the Interstate Commerce Commission. A Washington dispatch to *THE IRON AGE* published last week said that the commission probably would not hear arguments until fall, in which event it may be a year at least before the mileage scale, if approved by the commission, would go into effect.

That the adoption of the mileage scale would have the effect of further localizing the manufacture and distribution of steel products, a process that was started with the abolition of the "Pittsburgh plus" method of quoting prices is the opinion of many in the steel trade. Mills in the so-called Middle district (western Pennsylvania, West Virginia and Ohio) probably will not derive sufficient advantage from the small reductions in rates to Atlantic seaboard points, such as New York, Philadelphia and Baltimore, to offset the loss of tonnage which may result from the considerably higher rates to New England.

New England Rates Much Higher

New England, except for certain northern portions, has for some time had a blanket rate of 36.5c. per 100 lb. from Pittsburgh, 2.5c. above the Pittsburgh-New York rate. Under the mileage scale, however, blanket rates would be wiped out. Boston shipments would take a rate of 40c. and some more distant points in New England would take an even higher rate. New England manufacturing interests, which were represented at the hearings held by the Interstate Commerce Commission examiners, presumably will file objections to this scale on the ground of the injury it may do to New England industry.

It is admitted on all sides that the examiners had a most difficult task in sifting the maze of conflicting opinions and suggestions presented to them. The railroads admitted that steel should take a lower rate, but

opposed changes which would reduce their revenues. The steel companies, particularly those in the Pittsburgh and nearby districts, wanted lower rates, but what was more important they did not want to disturb the relationship existing between rates from different producing points to important consuming points. In its brief filed Nov. 1, 1927, the United States Steel Corporation said:

"How the commission can arrive at a solution of their problem through the maze of conflicting suggestions is difficult to understand. To our mind no two of these suggestions can be reconciled."

Fifth Class Rates Held Unreasonable

Shippers were practically unanimous, however, in urging the unreasonableness of fifth class rates as applied to steel. They did not attack the fifth class rates as such, but took the position that steel by reason of its relatively favorable transportation characteristics and the great volume in which it moves is entitled to lower rates.

The carriers did not deny that the general level of rates on steel is relatively high if transportation characteristics alone are considered. They admitted that a substantial profit is derived from steel and that it is highly desirable traffic. Their contention, briefly, was that their profits as a whole do not afford them more than a reasonable return and that steel rates are not too high when consideration is given to the value of the service or what the traffic will bear.

The carriers also contended that the present rate level does not restrict the movement of steel and cited the fact that New England consumers buy much of their steel from Pittsburgh, though there are nearer mills with lower freight rates, and that Michigan consumers also buy much of their steel from distant mills notwithstanding the fact that closer sources of supply are available for them also.

Rates Influence Steel Marketing

All of the testimony given by steel shippers indicated that the level of rates is of much less importance than their relationship. Since the virtual abandonment of the "Pittsburgh plus" method of quoting prices in favor of delivered prices freight rates have assumed greater influence upon the marketing of steel; therefore the im-

portance of having rates properly adjusted as between competing points of production was frequently emphasized.

Pittsburgh producers, for example, contended that the application of the fifth class rates from their mills to important markets in the East and of commodity rates lower than fifth class from the Eastern producing points to these markets is unduly prejudicial to them and unduly preferential to their Eastern competitors.

Producers in the Eastern district denied that the present rate adjustment to Eastern markets unduly prefers them or prejudices the Pittsburgh producers. They point out that the evidence in support of this claim consists almost entirely in showing that fifth class rates now apply from Pittsburgh, whereas commodity rates lower by varying percentages than fifth class apply from Eastern mills, with no proof that the respective fifth class rates are not properly related.

The Jones & Laughlin Steel Corporation contended that the decision in its case with respect to freight rates to Western points did not remove its cause for complaint and that existing rates, fixed under this so-called J. & L. scale, are still prejudicial to that company and preferential of competitors in Illinois and Indiana.

Producers in the Valley group contended that their rates are not properly related to those of their competitors, particularly competitors in the Pittsburgh district.

Say Rate Revision Is Needed

The examiners in their report say that "the record leaves no doubt as to the need and desirability of a thorough revision of the rate structure." They say, "There is disclosed an utter lack of consistency and orderly arrangement, accompanied by many instances of unlawful prejudice and preference which should be removed. . . . The evidence is persuasive that, with certain exceptions, rates on manufactured steel should be on a uniform level through the territory under consideration.

"It is the commission's duty," the examiners go on to say, "to fix reasonable rates on steel. While the record does not warrant as great reductions as would result from the application of the rates proposed by the shippers, it does indicate that many of the present rates are too high. A comparison

of steel with other commodities moving at fifth class rates or lower, the large and constant volume in which it moves, its heavy loading, the almost total absence of risk in connection with its transportation and its small value per weight unit, all are persuasive that fifth class rates are not a proper basis for this commodity."

In suggesting a uniform system of rates, the examiners say that "distance is the simplest and fairest measure of transportation service. If this system is adopted it will supplant a number of less extensive rate structures, some of them resulting from the interplay of competitive forces through a long period of years in which distance has played a minor part."

Moreover, the examiners point out that a uniform system of rates once established "should not be constantly threatened by the granting of concessions from the scale in favor of certain localities or certain traffic."

Port Differentials Disapproved

Although the examiners pattern the mileage scale they recommend on the J. & L. scale now effective in Western territory, they say that "it does not appear that this scale offers an entirely satisfactory solution of the problems presented." The examiners' objection to the use of the J. & L. scale is that, if universally applied, it would result in considerable increases in present rates because of its rate of progression.

In declaring against freight rate differentials, the examiners said: "The only purpose a differential can possibly have is to create an artificial

rate situation calculated to give some community an advantage to which its geographical location does not entitle it."

No objection was made by the examiners to the retention of the present differentials on eastbound traffic as affecting Johnstown, Pa., and Cumberland, Md., but otherwise the examiners recommend that the use of differentials be disapproved. The port differentials by which New York, Philadelphia and Baltimore have had a fixed relationship were disapproved. If the recommendation of the examiners on this point is approved by the commission, the mileage rate from Pittsburgh to Baltimore would be 27c., to Philadelphia, 25c., and to New York, 33c. Under the present scale Philadelphia is 2c. and Baltimore 3c. under the New York rate. In export trade particularly, wherein rates 60 per cent of the domestic rates are applied, the advantage in favor of Philadelphia and Baltimore as against New York may be expected to bring protests from shipping interests in New York.

Decision on Grouping

One of the most difficult problems in the rate case, the examiners report, arose in connection with the subject of origin and destination groups. On this point the report says:

"Some of the present origin groups of steel producing points seem to be entirely reasonable. An example is the Valleys or Youngstown group. This group includes a number of steel producing points within an area not more than 50 miles in diameter which have been grouped for many years. The Buffalo group is another compact

group containing only six steel producing points, no two of which are more than 20 miles apart. On the other hand, some of the existing groups are impossible of justification on any theory. The origin groups in the Eastern part of trunk line territory are undoubtedly much too large, particularly as they are used in connection with comparatively short hauls. The trunk line carriers concede that these groups cannot be defended."

In this connection the situation existing among eastern Pennsylvania mills is cited. Mills at Pencoyd, Coatesville, Phoenixville, Ivy Rock and Conshohocken pay 17.5c. per 100 lb. to New York, while Bethlehem, although the same distance to New York as Pencoyd (88 miles) pays 14.5c. Under the plan proposed by the examiners the Philadelphia group would be broken up and rates would be applied on a mileage basis, with Pencoyd and Conshohocken paying 14.5c., Ivy Rock, 15c., Phoenixville, 16c. and Coatesville, 17c. Bethlehem's rate would remain at 14.5c.

In considering the Pittsburgh group, the examiners see no reason for including such points as Erie, Pa., and Jamestown, N. Y., and recommend that Ohio and West Virginia points now included in the Pittsburgh group be given a separate grouping.

Would Restrict Destination Grouping

Destination groups, it was stated, do not seem to rest upon as logical grounds as do origin groups. Some of the shippers favored reasonable destination grouping if it can be accomplished without discrimination.

PRESENT AND PROPOSED RATES ON IRON AND STEEL IN CARLOAD LOTS
FROM PITTSBURGH, BUFFALO AND POINTS WEST TO MIDWESTERN CONSUMING POINTS
(Increases Are Shown in Boldface and Decreases in Italics)

TO	From Pittsburgh		From Youngstown		From Cleveland		From Chicago		From Buffalo	
	Pres.	Prop.	Pres.	Prop.	Pres.	Prop.	Pres.	Prop.	Pres.	Prop.
Akron, O.	19	17	9½	11	9	9	30	29	26	22
Bay City, Mich.	32½	31	30½	28	28	24	29½	26	29½	28
Bellfontaine, O.	26	23½	24	21	22	18½	27½	25	30	28
Cairo, Ill.	41½	40	41	40	38	38	26	30	47	51
Chicago	34	34	31	32	30	28	....	....	36	36
Cincinnati	27	27	26	26	26	23½	28	26	33	33
Cleveland	19	18	9½	12½	....	....	30	28	23	20½
Columbus, Ohio	25½	21	24	20½	21½	18	29	27	29	27
Dayton, O.	26	25	24	23½	24	20½	27½	25	31	30
Detroit	29	27	26½	23	23½	19½	27½	25	26½	23
Evansville, Ind.	37	36	36	36	34	34	23½	26	42	39
Flint, Mich.	31	29	29	26	27	22	28½	25	28	24
Indianapolis	29	30	27	29	27	26	18	20½	34	34
Louisville	32	33	31	33	31	30	25	26	37	37
Milwaukee	37	37	35	35	33	32	9½	14	34	38
Muncie, Ind.	27	28	24½	26	24½	22½	18	20½	31	32
Muskegon, Mich.	35	34	33	32	31	29	26	21	33	32
Peoria, Ill.	36	37	36	36	34	33	16½	19	39½	39
Quincy, Ill.	43	41	39	40	36	38	20	25	44½	43
Springfield, Ill.	38	38	37	36	34	34	18	20½	42½	40
St. Louis	40½	39	39½	38	36	37	22	25	44½	41
Toledo, O.	26	23½	22½	20	20	16½	26½	23	28	26
Youngstown	11	12	....	....	9½	12	32	32	23	20½

(Rates Are Shown in Cents per 100 Lb.)

The retention of the present large destination grouping in New England in connection with comparatively short hauls was not advocated by either shippers or carriers. The strongest criticism of destination grouping in the hearings was directed against the establishment of the group rates from Chicago to Illinois

destinations under the J. & L. scale. The examiners recommend on this point that no origin grouping be authorized in connection with hauls of less than approximately 150 miles, except as otherwise provided, and that no destination grouping be authorized in connection with hauls of less than approximately 450 miles.

The exception is that this would not prohibit the grouping of points located within a single switching district or in the industrial community immediately surrounding such district, nor would it prevent the grouping which would naturally result from the application of the distance scale.

Pittsburgh Objects to Fifth Class Rates—Approves Lower Rate to St. Louis

PITTSBURGH, Aug. 13.—Steel company traffic managers have had an opportunity to study the report of Examiners Howard C. Faul and C. M. Bardwell of the Interstate Commerce Commission and their recommendations for iron and steel freight rates for the northeastern part of the country. Although viewed strictly as a proposal that is likely to be revised before any new rates are ordered into effect, a feeling of disappointment that Pittsburgh did not get as much as it had asked is tempered by the fact that the proposed rates do take a definite step in the direction of modifying some of the inequalities, based upon the mileage principle, that had

been the basis of complaint by Pittsburgh district producers. The point is made that the rate from Pittsburgh to Chicago remains at 34c. per 100 lb. This is the fifth class rate between those points and, in its retention, it is seen that requests for a commodity rate went unheeded. On the other hand, the rate from Pittsburgh to St. Louis is to be lowered from 40½c. per 100 lb. to 39c. and that from Chicago to St. Louis is to be advanced from 22c. per 100 lb. to 25c., the differential in favor of Chicago over Pittsburgh being reduced to 14c. from 18½c. With Chicago mills quoting most products 10c. per 100 lb. higher than Pittsburgh, the

proposed rate to St. Louis would make it necessary for Pittsburgh mills to absorb only 80c. a ton to equalize the delivered price of Chicago mills, compared with \$1.70 under existing tariffs. The accompanying compilations compare present rates with those proposed from the principal producing centers to typical consuming centers. The new rates to the several New England points are assumed ones, since it is expected that, as the new rates have been worked out on a mileage basis, there will be different rates to the different destinations, instead of a common rate to all points in New England as at present.

PRESENT AND PROPOSED RATES ON IRON AND STEEL IN CARLOAD
LOTS FROM EASTERN PRODUCING POINTS TO EASTERN CONSUMING POINTS
(Increases Are Shown in Boldface and Decreases in Italics)

TO:	From Pittsburgh		From Buffalo		From Bethlehem		From Baltimore (Sparrows Point)		From Coatesville	
	Pres.	Prop.	Pres.	Prop.	Pres.	Prop.	Pres.	Prop.	Pres.	Prop.
Albany, N. Y.	34	34	21½	26	22½	21	22½	28	22½	24
Auburn, N. Y.	28½	29	14½	17½	22½	23½	22½	29	22½	25
Baltimore	31	27	32	32	19	19½	.....	.....	13½	15½
Berwick, Pa.	32	25	28	25	19	16½	19	20½	19	18½
Bethlehem, Pa.	32	29	32	29	.....	.....	19	19½	17½	13½
Binghamton, N. Y.	28½	28	19	21	22½	19	22½	26	22½	22
Buffalo	26½	23	.....	.....	32	29	32	32	32	30
Camden, N. J.	32	30	32	32	17½	12	16	17	12½	10½
Cumberland, Md.	15½	18½	25½	28	29½	23½	29	20	29½	22
Erie, Pa.	19	18½	13½	14½	31	31	30½	32	31	31
Harrisburg, Pa.	31	23½	32	27	17½	15	14½	15	12½	12½
Lancaster, Pa.	32	26	32	29	17½	14	14½	15	9	9
Newark	34	32	32	31	14½	13½	19	20½	17½	16½
New York	34	33	32	31	14½	15	19	21½	17½	17½
Norfolk, Va.	38	36	38	39	28½	27	21½	24	24	24
Philadelphia	32	29	32	32	13	12	14½	17	10	10
Reading, Pa.	32	27	32	29	13	9½	15½	17½	10	10
Richmond, Va.	38	32	38	37	28½	27	21½	19½	24	23½
Roanoke, Va.	38	33	38	39	34	31	34	25	34	29
Rochester, N. Y.	26½	26	11½	12½	22½	26	22½	30	22½	28
Scranton, Pa.	32	27	28	24	13	15½	19	22½	19	19
Syracuse, N. Y.	28½	30	17½	18½	22½	23	22½	30	22½	26
Trenton, N. J.	34	30	32	31	14½	12	19	18	15½	11½
Utica, N. Y.	31½	32	19	21	22½	23½	22½	30	22½	27
Washington	31	26	34	33	22½	21	11½	10½	18½	17½
Wilkes-Barre, Pa.	32	27	28	25	13	14½	19	22	19	18
Wilmington, Del.	32	29	32	32	17½	14½	14½	13½	8	9
York, Pa.	31	25	32	28	19	15½	14½	12	12½	11½
Boston	36½	40	33	34	25½	27	25½	32	25½	29
Hartford, Conn.	36½	37	33	32	25½	22	25½	27	25½	23½
New Haven, Conn.	36½	36	33	32	25½	20	25½	26	25½	21½
Providence, R. I.	36½	39	33	35	25½	26	25½	31	25½	22
Springfield, Mass.	36½	38	33	31	25½	23	25½	29	25½	25
Worcester, Mass.	36½	39	33	33	25½	25	25½	31	25½	27

(Rates Are Shown in Cents per 100 Lb.)

Corporate Profits Appear Stabilized

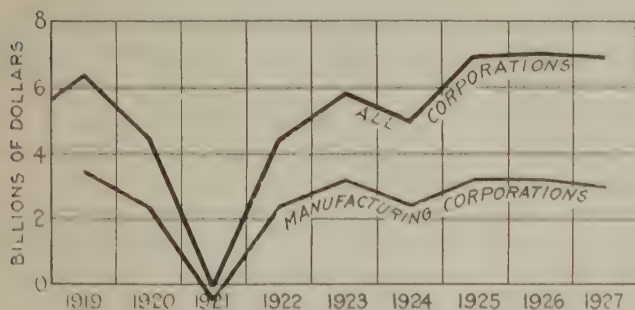
Total for All Corporations Close to \$7,000,000,000 Annually for Three Years—Manufacturing Profits Less in 1927

RECENT profits of corporations have been analyzed by the Harvard Economic Society from data furnished by the Commissioner of Internal Revenue, Washington. From a net deficit in 1921 there has been recovery until the last three calendar years have shown a practically uniform total approaching \$7,000,000,000 each year. The figures, together with those for manufacturing corporations, as distinguished from all other, are shown in the table. In the Harvard study mining, transportation, public utility, trading and financial corpo-

herewith has added to it the figures for manufacturing corporations.

It is pointed out that recent profits are more substantial than would be indicated by merely their size. The value of the dollar has much increased with the fall of prices since 1921. Profits are not now tied up in high-priced inventories, as was the case immediately after the war. Taxation is lower from Federal sources and thus a larger portion of the operating profits becomes available for dividends.

Stability of profits of the past few



Manufacturers Did Not Hold Their Profits So Well in 1927 as Did Other Corporations. Even so, 1925 to 1927 Showed Slight Fluctuation

rations were covered also, together with estimates for the farmers and for partnerships and sole proprietorships in business activities.

While the original diagram showed only the overall figures, the diagram

years is indicated by the fact that no one of the last three shows a variation of much more than 1 per cent from the average of the three. This is in contrast with the preceding period, in which variations from year

to year were from 30 to 40 per cent, even exempting the drop in 1921 of more than 100 per cent.

Two distinct cycles appear from the curves, one ending in the depreciation of 1921, while the other is still in its prosperity phase. The setback of 1924 appears moderate. As a matter of fact, profits that year were the third largest to that date since the war, being more than 10 per cent ahead of 1920, which through a large portion of its course was regarded as a boom year.

Profits of Corporations in Millions of Dollars

Year	All Corporations	All Manufacturing Corporations
1919	6,419	3,493
1920	4,468	2,337
1921	—55	—473
1922	4,380	2,331
1923	5,827	3,174
1924	4,998	2,417
1925	6,971	3,246
1926 (a)	7,050	3,240
1927 (a)	6,900	2,990

(a) Preliminary figures.

All the figures given are based upon the amounts reported by the corporations for income tax purposes. They would not tend to overstate the amount of corporate profits. They are net in a double sense: They represent profits after all expenses, including depreciation, depletion, interest, and Federal and other taxes; they represent profits of corporations in the aggregate, after allowing for deficits of all corporations losing money, though still going concerns. Intercompany dividends are excluded.

Coke Production in June 5 Per Cent Below May

WASHINGTON, July 31.—Due to a decrease of 3 per cent in the daily output of pig iron there was a slight decline in the production of coke during June, which dropped to 4,263,268 net tons, as against 4,475,864 tons in May, according to the Bureau of Mines. Beehive coke daily production fell off 16.6 per cent to 11,615 tons from 13,926 tons, while the daily output of by-product coke declined 0.2 per cent to 132,042 tons, from 132,254 tons.

For the six months ended with June total production of coke was 25,941,536 tons, against 26,532,075 tons for the corresponding period of last year. Production of by-product coke showed an increase of 7 per cent in output, with a total of 23,671,536 tons during the first half of 1928, compared with 22,113,075 tons for the first six months of 1927. Beehive coke production, on the contrary, showed a decline of more than 48 per cent, decreasing to 2,270,000 tons from 4,419,000 tons.

Of the by-production during the first six months of 1928, ovens in Pennsylvania, the Buffalo district, Ohio and adjacent plants made 12,-

347,799 tons; 2,255,710 tons were made in Alabama and Tennessee ovens and 6,054,730 tons in ovens in Illinois, Indiana, Michigan and Missouri.

With production of by-product coke in 1927 aggregating 43,884,726 tons, valued at \$232,043,803, figures just issued by the bureau show that 30,687,198 tons, valued at \$145,123,216, was used by the producers in blast furnaces, etc., while 3,761,864 tons, valued at \$20,448,285, was sold for furnace use and 1,938,653 tons, valued at \$15,112,967, was sold for foundry use.

Dry Cleaning of Blast Furnace Gas

Cleaning of gas from blast furnace operations without the use of water was described and illustrated in an article by George B. Cramp, which appeared at page 1111 of THE IRON AGE, Oct. 25, 1923. This method has now been taken up by the Gas Cleaning Engineering Corporation, 320 Broadway, New York, in addition to wet cleaning and other processes. The company has been organized to design and supervise the construction of general gas cleaning equipment.

Briefly, the method adopted is to pass the gas through a filter of flue dust, in which the dirt from the gas is entrapped. It is claimed that this method gives much cleaner gas than is obtainable by the wet method so long in vogue. At the same time it avoids cooling the gas and thereby saves much of its heat for use in hot blast stoves or under boilers. The design of the apparatus is tied up largely with questions of gas velocity to give best results. The cleaning is said to be adequate to fit the gas for burning without any further attention.

Among the advantages claimed are elimination of the high cost of maintenance experienced in wet washed gas apparatus and of the equipment and cost of pumping water. The first cost of the apparatus is said to be not much greater than that of the combination dry and wet apparatus so largely used. It is claimed that the dry cleaner will pay for itself by savings within three to five years.

The Concrete Reinforcing Steel Institute will hold its fall meeting at Shawnee-on-Delaware, Pa., Oct. 1 to 3.

Steel Treaters Announce Technical Program

Technical papers for the annual meeting of the American Society for Steel Treating, to be held in Philadelphia, Oct. 8 to 12, are announced as follows:

"Austenite Decomposition and Length Changes in Steel," by E. C. Bain and Willis S. N. Waring.

"The Cutting Qualities of an Alloy Steel as Influenced by Its Heat Treatment," by O. W. Boston and M. N. Landis.

"Metallurgical Problems of Transmission Gearing," by E. F. Davis.

"Methods of Approximating Certain Physical Characteristics of Nitrided Steel Cases," by G. M. Eaton.

"The Equation of the Carbon Time Curve in Basic Open-Hearth Refining and Prediction of Carbon Drop," by A. L. Feild.

"Surface Cooling of Steels in Quenching," by H. J. French, G. S. Cook and T. E. Hamill.

"High-Carbon, High-Chromium Steels," by J. P. Gill.

"Some of the Characteristics of Pearlite in Eutectoid Rail Steels," by O. V. Greene.

"On Oxygen Dissolved in Steel and Its Influence on the Structure," by M. A. Grossman.

"The Solubility of Carbon in Normal and Abnormal Steels," by Dr. O. E. Harder and Willard S. Johnson.

"Cloudburst Process for Hardness Testing and Hardening," by Edward G. Herbert.

"Deoxidation of Steel with Silicon," by C. H. Herty, Jr., and G. R. Fitterer.

"The Surface Hardening of Special Steels with Ammonia Gas Under Pressure," by Raymond H. Hobrock.

"On the Nature of Martensite Crystals," by Kotaro Honda.

"The Influence of Nickel on Combined Carbon in Gray Iron," by J. R. Houston.

"A New Tool Material," by Dr. S. L. Hoyt.

"A New Method for Heat Treating High Speed Steel," by H. C. Knerr.

"A Study of the Constitution of High Manganese Steels," by V. N. Krivobok.

"An Investigation of the Physical Properties of Certain Chromium-Aluminum Steels," by F. B. Lounsbury and W. R. Breeler.

"Depth and Character of Case Induced by Mixtures of Ferroalloys with Carburizing Compounds," by E. G. Mahin and R. C. Spencer.

"A Melting Record of Three Acid Open-Hearth Heats," by C. E. Meissner and W. E. Griffith.

"Service Annealing of Sling and Crane Chains," by W. J. Merten.

"Stainless Iron and Its Application to the Manufacture and Transportation of Nitric Acid," by W. M. Mitchell.

"Progress Made in the Use of Electric Furnaces for Heat Treating," by A. N. Otis.

"Chromium-Copper Steels as Possible Non-Corrosive Ferrous Alloys," by B. D. Saklatwalla and Albert W. Demler.

"Graphitization in the Presence of Nickel," by H. A. Schwartz.

"Heat Treatment of High Speed Steel to 2400 Degrees Fahr., in Molten Lead," by W. C. Searle.

"Steel Failures in Aircraft," by F. T. Sisco.

"On the Equilibrium Diagram of the Iron-Molybdenum System," by Takeshi Takei and Takejiro Murakami.

"The Torsional Modulus of Carbon Steel, Phosphor Bronze, Brass and Monel Metal," by William P. Wood.

"Decarburization of High Carbon Steel

in 'Reducing' Atmospheres," by J. J. Curran and J. H. G. Williams.

"Application of Normalized Steels to Crankshafts and Other Automotive Parts," by H. T. Chandler.

"The Effect of Furnace Atmospheres on Steels," by R. G. Guthrie.

"Nature of Dendrites," by H. G. Keshian.

"Chromium in Silicon-Manganese Steels for Engineering and Structural Application," by A. B. Kinzel.

No title suggested—by F. F. Lucas.

"Selection of Steels for Ford Industry," by J. L. McCloud.

"Chromium Iron and Nickel Chromium in Dealing with Corrosion and Heat Resistance," by T. H. Nelson.

"A New Development in Corrosion-Resisting Steel," by Frank R. Palmer.

"The Manufacture of Acid Open-Hearth Steel for the Production of Forging Ingots," by H. P. Rassbach.

"Importance of Technique in Polishing and Etching Difficult Materials," by Mr. Villella.

The tentative program for the Institute of Metals was published in THE IRON AGE, July 26, page 254.

Hotel Benjamin Franklin will be the headquarters of the steel treaters and the Institute of Metals, while the Bellevue-Stratford will be the headquarters of the American Welding Society during National Metal Week. All morning technical sessions will be held at the respective hotel headquarters of each society, the afternoon sessions assembling at rooms in the Commercial Museum, where the National Metal Exposition is to be held.

The annual banquet of the steel treaters will be held at the Benjamin Franklin Hotel, Thursday evening, Oct. 11.

Institute of Metals to Meet in Liverpool

The autumn meeting of the Institute of Metals will be held in Liverpool, England, from Sept. 4 to 7. The seventh autumn lecture is to be delivered by F. G. Martin on "Non-Ferrous Metals in the Shipping Industry." The following technical program has been arranged:

Laboratory Experiments on High Temperature Resistance Alloys, by C. J. Smithells, S. V. Williams and J. E. Avery.

Corrosion at Discontinuities in Metallic Protective Coatings, by U. R. Evans.

Constitution of the Alloys of Aluminum with Copper, Silicon and Iron, by A. C. C. Gwyer, H. W. L. Phillips and L. Mann.

Copper-Magnesium Alloys. Part III, by W. R. D. Jones.

Note on Practical Pyrometry, by G. B. Brook and H. J. Simcox.

Eighth Report to the Corrosion Research Committee. The Corrosion of Condenser Tubes. "Impingement Attack": Its Cause and Some Methods of Prevention, by R. May.

Rockwell Hardness Test, by J. E. Malam.

Die-Casting Alloys of Low Melting Point, by T. F. Russell, W. E. Goodrich, W. Cross, and (in part) N. P. Allen.

Work-Softening of Eutectic Alloys, by F. Hargreaves.

Die-Casting of Copper-Rich Alloys, by R. Genders, R. C. Reader and V. T. S. Foster.

Alpha Phase Boundary of the Copper-Silicon System, by C. S. Smith.

Properties and Production of Aluminum Die-Castings, by S. L. Archbutt, J. D. Crogan and J. W. Jenkins.

Methods for Investigating Alloys of Reactive Metals, by W. Hume-Rothery.

Strength of a Cadmium-Zinc and of a Tin-Lead Alloy Solder, by C. H. M. Jenkins.

Note on the Treatment of Aluminum and Aluminum Alloys with Chlorine, by D. R. Tullis.

Manufacturers Donate to Byrd Expedition

Manufacturers and dealers have been generous in donating to the South Pole expedition headed by Commander Richard E. Byrd, which gets under way this month. Goods valued at approximately \$500,000 have been given. Some of the manufacturers who have contributed supplies are:

Air Reduction Sales Co., New York, acetylene outfit.
American Screw Co., Providence, R. I., machine screws.
Armstrong Brothers Tool Co., Chicago, machinists' tools.
Bethlehem Steel Co., Bethlehem, Pa., steel.
Bridgeport Hardware Mfg. Co., Bridgeport, Conn., nail pullers.
Brown & Sharpe Mfg. Co., Providence, R. I., machine tools.
Carborundum Co., Niagara Falls, N. Y., grinding wheels.
Cleveland Twist Drill Co., Cleveland, drills.
Corbin Screw Corporation, New Britain, Conn., machine screws and nuts.
Thomas L. Dickenson, New York, emery wheel dresser.
Henry Disston & Sons, Inc., Philadelphia, files.
William Dixon, Inc., Newark, N. J., belt dressing.
Goodell-Pratt Co., Greenfield, Mass., bearing scrapers.
Greenfield Tap & Die Corporation, Greenfield, Mass., taps and dies.
Thomas Laughlin Co., Portland, Me., marine hardware.
David Maydole Hammer Co., Norwich, Conn., hammers.
Peck, Stow & Wilcox Co., Southington, Conn., tools.
Reed Mfg. Co., Erie, Pa., vises.
John A. Roebbling's Sons Co., Trenton, N. J., wire.
South Bend Lathe Co., South Bend, Ind., large lathe.
L. S. Starrett Co., Athol, Mass., machinists' tools.
Union Twist Drill Co., Athol, Mass., milling cutters.
Walworth Co., Boston, wrenches.
J. H. Williams & Co., Buffalo, drop forged tools.

Smaller Accident Rate at Metallurgical Works

Accidents at non-ferrous metallurgical works in 1926 were at the smallest rate on record. The figure was 110.8 for each thousand 300-day workers, compared with 116.4 in the preceding year and with an average of 142.2 in the 13 years, 1913-1925 inclusive. Fatal accidents showed a slight increase in 1926 over 1925, but otherwise were at the smallest rate ever recorded. They were 0.73 for each thousand 300-day workers, compared with 0.66 in 1925 and with an average of 1.04 in the 13 years preceding 1926.

Reduction in the accident rate below the 13-year record was 23.1 per cent; in the fatal rate the reduction was 29.8 per cent. Comparing 1913-1918 inclusive with 1919-1926 inclusive, the accident rate dropped from 151.0 to 131.7, or 12.8 per cent. Mean-time the fatal accident rate dropped from 1.21 to 0.88, or 27.6 per cent.

Seasonal Shrinkage in Coal Stocks

Stocks of bituminous coal in industrial hands on July 1 are reported by the National Association of Purchasing Agents at 39,855,000 net tons, compared with 40,890,000 tons on June 1. This continues the steady decline from the peak of 60,154,000 tons, on Oct. 1, 1927. Consumption in June is estimated at 32,521,000 tons, compared with 34,844,000 tons in May, and was the smallest for about a year. Production in June is placed at 41,264,000 tons, compared with 44,748,000 tons in May and, with the exception of April, the smallest in more than a year.

Supplies in various industries are estimated, at an average, for 37 days consumption. This includes 41 days for steel mills, 35 days for railroads, 67 days for electric utilities and gas plants, 19 days for by-product coke plants and 37 days for other industries.

Fewer Iron and Steel Workers

Employees in 194 establishments making iron and steel were 0.8 per cent fewer in June than in May, according to a report of the United States Bureau of Labor Statistics. The respective numbers were 263,452 and 261,302, representing identical establishments. Payrolls in those two months showed a drop of 3.7 per cent, indicating a pay envelope about 3 per cent lighter in June. The respective dollar values for one-week in each month were \$8,413,329 and \$8,104,362.

In 968 establishments devoted to foundry and machine shop products there was an increase of 0.5 per cent in number of wage earners and of 1.3 per cent in total payroll. Employees advanced from 237,474 to 238,643 and payrolls for one week from \$7,172,944 to \$7,268,951.

Machine tool plants to the number of 148 reported a gain of 1.7 per cent in number of employees and of 2.2 per cent in payroll total. Hardware establishments numbering 68 showed a gain of 0.7 per cent in employees and 2 per cent in payroll. Structural iron workers increased 2.8 per cent in number and 1.8 per cent in total payroll. Cast iron pipe foundries to the number of 39 showed an increase of 0.3 per cent in employees, but a decline of 7.5 per cent in amount of payroll.

Taken as a group, iron and steel and their products showed an increase of 0.1 per cent in number of employees and a decrease of 0.9 per cent in amount of payroll. Other metal products showed a decrease of 0.6 per cent in employees and 1.2 per cent in payroll.

Industrial Engineers to Meet in Rochester

"Profitable Prosperity, a Practical Program for Cutting Costs and Raising Profits," will be the general theme of the fifteenth national convention of the Society of Industrial Engineers, which will be held at Rochester, N. Y., Oct. 17, 18 and 19. The meeting will be held jointly with the industrial management council of the Rochester Chamber of Commerce and the sessions will be in the rooms of the chamber of commerce and at the Hotel Seneca. George C. Dent is executive secretary of the society, the headquarters of which are at 205 West Wacker Drive, Chicago.

Heavy Production of Petroleum Continues

Production of crude petroleum in the United States in June is reported by the Bureau of Mines at 75,681,000 bbl. of 42 gal., compared with 77,311,000 bbl. in May and with 67,697,000 bbl. in June last year. Totals for the six months are given as 431,889,000

bbl. in 1928 against 405,460,000 bbl. last year, representing an increase of about 6.5 per cent.

Although June showed a reduction from May in total, there was an increase of more than 1 per cent in daily average for the shorter month.

Imports in June were 6,553,000 bbl., compared with 6,766,000 bbl. in May, and exports were 1,879,000 bbl., compared with 1,493,000 bbl. in May. Figures for production are runs from stills.

Creosoted Wood Block Floors Increase in Demand

The use of treated wood block floors in the United States in 1927 increased 28 per cent over the previous year, according to figures prepared by the United States Forest Service in co-operation with the American Wood-Preservers' Association. A total of 13,853,817 sq. ft. of these blocks treated with creosote or creosote-coaltar paving oil was laid in 1927. The reason given for the increasing demand for floors of this kind is the desire for permanence, resilience, and high wearing qualities, especially in factories, machine and printing shops, foundries, etc., where heavy trucking is required.

Increase in Graphite Output

Graphite (plumbago or black lead) produced in 1927, was valued at \$2,931,584, or 14 per cent more than the 1925 value of \$2,569,487, according to data collected in 1928 at the biennial census of manufacturers by the Bureau of Census from 13 establishments (11 in 1925) engaged primarily in extraction from the ore and refining of graphite.

Two of the establishments in 1927 were located in Illinois, two in Michigan, two in New Jersey and two in Pennsylvania. The other five were in Alabama, California, New York, Ohio and Texas.

Comparison of First Half Earnings of Leading Steel Companies Over Three Years (In Thousands of Dollars)

	Total Stockhold- ers' Value, Dec. 31, 1927	Net Profits First Half 1928	Per Cent Earnings to Stock- holders' Value, 1928	Total Stockholders' Value, Dec. 31, 1926	Net Profits First Half 1927	Per Cent Earnings to Stock- holders' Value, 1927	Total Stockhold- ers' Value, Dec. 31, 1925	Net Profits First Half 1926	Per Cent Earnings to Stock- holders' Value, 1926
American Rolling Mill Co.	\$53,057	\$3,326	6.5	\$47,321	\$2,417	5.1	(Net Profits Not Available)		
Bethlehem Steel Corp.	401,319	7,914	2.0	392,283	10,667	2.7	\$343,143	\$11,214	3.3
A. M. Byers Co. (Sept. 30)	16,380	819	5.0	10,662	770	7.3	9,740	707	7.3
Central Alloy Steel Corp.	62,379	2,240	3.6	62,749	1,837	2.9	(Net Profits Not Available)		
Crucible Steel Co. of Am.	105,267	**2,428	2.4	104,700	2,975	2.9	(Net Profits Not Available)		
Donner Steel Co., Inc.	15,429	391	2.5	15,868	230	1.5	15,492	445	2.9
Gulf States Steel Co.	19,540	542	2.8	17,656	371	2.1	17,621	417	2.4
Inland Steel Co.	70,269	4,842	6.9	67,120	4,346	6.5	64,830	3,333	5.1
Jones & Laughlin Steel Corp.	169,077	7,145	4.2	163,638	7,235	4.4	155,125	7,502	4.8
Ludlum Steel Co.	3,541	266	7.5	3,707	134	3.6	3,727	180	5.2
Otis Steel Co.	22,174	†1,743	7.8	21,407	930	4.4	22,092	†1,414	6.4
Republic Iron & Steel Co.	89,904	1,541	1.7	89,836	2,033	2.3	88,562	2,443	2.8
Superior Steel Corp.	4,724	*32	—	4,914	*84	—	4,792	223	4.6
U. S. Steel Corporation	1,704,950	47,201	2.8	1,692,086	52,465	3.1	1,630,447	53,723	3.2
Wheeling Steel Corp.	78,054	2,554	3.3	76,877	1,848	2.4	74,790	2,288	3.1
Youngstown Sheet & Tube Co.	126,439	4,155	3.3	131,879	4,318	3.3	122,623	7,987	6.5
Total	2,942,523	87,075	3.0	2,902,703	92,492	3.2	2,552,984	91,876	3.6
Total without U. S. Steel	1,237,573	39,874	3.2	1,212,617	40,027	3.3	922,537	38,153	4.1

* Deficit.
** Estimated.
† Before bond interest.

European Export Trade Improving

British Business Small But Inquiry Is Good—Payment of Reparations in Material Causes Concern to French Mills

(By Cable)

LONDON, ENGLAND, Aug. 13.

IRON and steel demand is still under the influence of the holidays and business is small. Cleveland producers of pig iron are maintaining prices firmly, as output is restricted, but hematite makers are seeking to dispose of stocks.

Foreign ore is quiet. The Swedish miners' strike has ended, but the general situation in ore is unlikely to be affected for some months, as most consumers are fully covered to the end of the year.

Finished iron and steel is generally quiet, especially in demand for heavy ship material for export, but inquiry is improving. July export of pig iron was 30,957 tons, of which only 50 tons went to the United States. Exports of iron and steel were 333,079 tons.

Tin plate mills have resumed operation following the holidays, with good order books for October to end of the year, but some August-September tin plate is still obtainable at lower prices. Makers are confident that demand will be renewed as current inquiries promise some good business. Galvanized sheets are generally quiet except for steady sales of small lots which have imparted a steadier tone to prices. Black sheets continue quiet.

Continental iron and steel prices are strong with makers well booked with tonnage, but current business slack. Purchases of Continental material by British users have been negligible, as a result of the holidays.

Polish production from April to June was 55,000 tons of pig iron, 118,000 tons of steel ingots and 83,000 tons of rolled steel products.

it would increase the annual domestic output by about 4,000,000 tons is considered by German producers as questionable.

Reports in London of impending negotiations between Germany and Great Britain toward an agreement on pig iron are denied. It is stated here that the most that can be expected is an informal discussion as the British have no pig iron association or syndicate qualified to enter a binding agreement with any competitor. The recent appeal of Premier Baldwin for an international understanding is regarded as a political move to offset temporarily the persistent demands of the tariff advocates in his own party. No new negotiations have taken place toward admitting Britain to the International Steel Cartel.

Prospects of an agreement between Great Britain and Germany on pig iron have not been improved by the threatened increase of competition in coal. The Ruhr Coal Syndicate has again been aroused by British competition in the so-called "competitive districts" of Germany. In May, the syndicate resolved to withdraw in part from these "competitive districts" and leave them to Britain and Poland, but in June the decision was reversed and the syndicate reentered these districts with considerably increased sales. However, the British Government has now decided to antedate its already

Anglo-German Cartel Not Expected

Pig Iron Agreement Requires British Syndicate—British Coal Competition Stirs the Ruhr

BERLIN, GERMANY, Aug. 1.—Producers here continue to regard the increasing agitation of the British conservative party for a safeguarding duty on iron and steel as of little importance. It is pointed out that Germany, despite a tariff on iron and

steel, is a considerable importer of pig iron, steel and rolled products and that recently British imports of pig iron and steel have declined, but there has been no corresponding increase in home production. The argument of the proponents of a British tariff that

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	10	17 1/2 s.		\$4.25
Bilbao Itubio ore.....	1	2 1/4		5.48
Cleveland No. 1 fdy.....	3	8 1/2	to £8 9 1/2 s.	16.64 to \$16.89
Cleveland No. 3 fdy.....	3	6		16.04
Cleveland No. 4 fdy.....	3	5		15.80
Cleveland No. 4 forge.....	3	4 1/2		15.68
Cleveland basic (nom.)..	3	5		15.80
East Coast mixed.....	3	8		16.53
East Coast hematite.....	3	8 1/2		16.65
Rolls, 60 lb. and up.....	7	15	to 8 5	37.66 to 40.10
Billets.....	6	0	to 6 15	29.16 to 32.81
Ferromanganese.....	13	15		66.83
Ferromanganese (export).	13	0	to 13 5	63.18 to 64.39
Sheet and tin plate bars, Welsh.....	6	0		29.16
Tin plate, base box.....	0	18 1/2	to 0 18 1/4	4.40 to 4.43
Black sheets, Japanese specifications.....	13	7 1/2		65.00
Ship plates.....	7	12 1/2	to 8 2 1/2	1.63 to 1.74
Roller plates.....	9	0	to 10 10	1.92 to 2.25
Tees.....	8	2 1/2	to 8 12 1/2	1.74 to 1.84
Channels.....	7	7 1/2	to 7 17 1/2	1.58 to 1.69
Beams.....	7	2 1/2	to 7 12 1/2	1.53 to 1.63
Round bars, 3/4 to 3 in..	7	5	to 7-15	1.55 to 1.66
Steel hoops.....	9	0	to 10 0	1.92 to 2.14
Black sheets, 24 gage....	9	15	to 10 0	2.09 to 2.14
Galv. sheets, 24 gage....	13	7 1/2	to 13 10	2.86 to 2.93
Cold rolled steel strip, 20 gage, nom.....	16	0		3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):					
Belgium.....	£3	3s.	to £3	5s.	\$15.32 to \$15.80
France.....	3	3	to 3	5	15.32 to 15.80
Luxemburg.....	3	3	to 3	5	15.32 to 15.80
Basic pig iron (nom.):					
Belgium.....	3	1	to 3	2	14.82 to 15.07
France.....	3	1	to 3	2	14.82 to 15.07
Luxemburg.....	3	1	to 3	2	14.82 to 15.07
Coke.....	0	18			4.37
Billets:					
Belgium.....	4	17 1/2			23.21 to 23.69
France.....	4	17 1/2			23.21 to 23.69
Merchant bars:					C. per lb.
Belgium.....	5	17			1.29
France.....	5	17			1.29
Luxemburg.....	5	17			1.29
Joists (beams):					
Belgium.....	4	19			1.09
France.....	4	19			1.09
Luxemburg.....	4	19			1.09
Angles:					
Belgium.....	5	15			1.27
1/2-in. plate:					
Belgium (a).....	6	12			1.45
Germany (a).....	6	12			1.45
3/16-in. ship plate:					
Belgium.....	6	8			1.41
Luxemburg.....	6	8			1.41
Sheets, heavy:					
Belgium.....	6	1			1.33
Germany.....	6	1			1.33

(a) Nominal.

announced plan for reducing railroad freight rates. This plan gives British export coal an advantage that is interpreted in Germany as an indirect bounty. It will also cause the syndicate considerable financial loss unless the Ruhr producers withdraw from the "competitive districts," where selling can only be at a loss.

Domestic steel business is slightly quieter, with only high grade steels for the automotive industry in heavy demand. Engineering plants and other manufacturers report a decline in new orders and delivery terms have become shorter.

Export trade has improved and the Stahlwerksverband has advanced its prices. Quotations in foreign markets on wire rods and wire products, however, are unchanged. Exports to the United Kingdom, Holland, South American markets and India are active. Foreign demand for semi-finished material and bars has increased. Price rebates of the steel syndicate for August have in some cases been increased, while on other products

they have been reduced. The "world market" prices established by the syndicate for August are: Steel ingots, 81.50 m. (\$19.40) per metric ton; blooms, 86.50 m. (\$20.60) per ton; billets, 93 m. (\$22.14) per ton; shapes, 95.50 m. (\$22.74) per ton; steel bars, 113.50 m. (\$27.02) per ton, and wire rods, 120 m. (\$28.57) per ton.

A loose combination of works of the class known as "Arbeitsgemeinschaft" has been negotiated among the locomotive builders, including the Henschel works at Cassel, Borsig at Berlin, Tegeler Maschinenbau A. G. at Berlin and I. Maffei at Munich. The principal purpose of the new combination is given as an effort to further technical progress in locomotive building. Business in locomotives shows no evidence of improvement. In the past few years the Railroads Corporation has bought only about 100 locomotives a year and these had to be distributed to 20 different German builders. Recently the Maffei works at Munich booked an order for 22 locomotives from the Indian railroads.

Belgian Market Activity Promises Well for Fall

BRUSSELS, BELGIUM, July 29.—Iron and steel prices have been quite firm during the past 10 days, with many orders placed which were withheld during the Antwerp dock strike. This recovery of the market at a usually dull season is regarded as promising well for conditions in the fall.

Considerable railroad business has been booked and a contract for 35,000 tons of rails for the National railroads is pending in addition to some desirable export tonnages of railroad material for India and South American markets. Pig iron prices are firm despite French and British competition. Export quotations on steel per gross ton, f.o.b. Antwerp, are: Blooms, £4 12s. 6d. to £4 13s. 6d. (\$22.48 to \$22.72); slabs, £4 17s. to £4 17s. 6d. (\$23.57 to \$23.69); steel bars, £5 15s. to £5 16s. per ton (1.27c. to 1.28c. per lb.); wire rods, £6 per ton (1.32c. per lb.). Most prices are firm with an upward tendency.

Production of pig iron in June was slightly smaller than in May, but steel ingot and rolled products output showed a slight advance. Pig iron production was 321,030 metric tons, compared with 328,810 tons in May; steel ingot output 319,650 tons, compared with 316,210 tons in May, and production of rolled products 291,750 tons, compared with 276,250 metric tons in May.

German Metal Goods by Ships to Siberia

HAMBURG, GERMANY, July 28.—Following its successful trading voyage to Siberia last year, "Derutra," a company owned by German and Russian capital, is sending a fleet of eight ships, accompanied by two Russian ice breakers, to Siberia, via Archangel. The ships carry cargoes of agricultural machinery, metal goods and hardware of all kinds. They will sail up the Yenisei River, where their products will be exchanged for Siberian products. In this way most of the requirements of central Siberia for metal goods and machinery can be supplied by German industry. Last year the fleet consisted of four vessels, which sailed about this time and returned toward the end of September.

New Alloy Steel Works Established in France

PARIS, FRANCE, July 30.—A new steel plant has been established by German interests at Labuissiere under the name of Societe Anonyme des Fonderies de Labuissiere. Its principal production will be alloy and stainless steel and high quality steel tubes, a large proportion of which have been imported in the past from Great Britain and Germany.

Reparations Menace French Industry

German Payments in Kind Used in Extensive Projects Which Do Not Benefit French Makers

PARIS, FRANCE, Aug. 1.—German payment of reparations in materials is causing some uneasiness to the French metal trades. Thus far, credits placed under the head of reparations in kind have not been particularly large, but from 1928 on, as large a sum as 1,300,000,000 gold marks will be credited yearly to France by the Reparations Commission. As the cash payments by Germany will not exceed 300,000,000 gold marks annually, France will be forced to absorb about 1,000,000,000 gold marks of materials.

The primary object of the Dawes plan was to permit the purchase from Germany of such commodities as were needed for consumption in France, but not produced domestically in sufficient quantities, such as coal, nitrogen, fertilizers, dyes, sugar, lumber, produce, etc. So long as French production of these products is smaller than the consumption there is no objection to receiving them on reparations account. However, to absorb this vast annual credit under the Dawes plan, it has become necessary to lay down a large program of public works for the utilization of this material. This was the object of the act of March 24, 1928.

Under the program established by this act are the purchase of naval and other maritime craft, modernization of ports, purchase of railroad rolling stock and shop equipment, establishment of large coking projects in the east of France, supply of telephone cable between Paris and Bordeaux, supply of materials for the construction of low-rent dwellings and equipment for the French colonies.

To satisfy French producers that this influx of reparations material

from Germany would not seriously injure their business, the Government promised that only 20 per cent of the projected work would be done with reparations in kind. But it is pointed out by French manufacturers that if wages, transportation costs, etc., are deducted from the total cost of these projects, the 20 per cent, particularly in the case of port improvements, represents almost exactly the value of materials to be used. In addition, it is argued that for many years after termination of such work, it will be necessary to obtain repair parts from Germany.

Domestic demand is continuing to increase and there is a noticeable lengthening of deliveries on most products and concessions, in evidence early in July, have been almost eliminated. No advance in prices is expected, however, unless higher wages to coal miners in the Nord and the Saar mines causes increases in production costs.

Some works are considering increase in their capacity for production of open-hearth steel. Among these are the Acieries de Chatillon-Commeny, which is installing large furnaces. The Société Anonyme des Hauts Fourneaux, Forges et Acieries de Pompey is preparing to make nickel and chrome-nickel steel.

Machine tool builders report considerable activity and it is noteworthy that Andre Citroën, automobile manufacturer, is installing equipment for the production of a six-cylinder car about September. The total cost of this change will be about 40,000,000 fr. The company will continue to make a four-cylinder car.

Foreign Steel Too High to Compete

Importers in United States Sell Only Small Lots—Report That European and American Mills Will Meet

NEW YORK, Aug. 14.—With Continental steel prices continuing to advance, importers in New York are in most cases unable to do business in more than small lots. Following a recent increase in prices plain steel bars of Thomas grade are quoted at 1.29c. per lb., base, f.o.b. Antwerp, or about 1.85c. per lb., duty paid, New York. Beams are quoted at 1.70c. to 1.73c. per lb., New York, and channels at 1.73c. to 1.75., delivered New York. On the present scale of prices, open-hearth reinforcing bars are quotable at about 2c. per lb., duty paid, New York, or 2.10c. to 2.15c. per lb., delivered to consumers' plant in the metropolitan area.

As a result, the saving to consumers here is of so little consequence as to make it almost impossible for importers to sell concrete bars at these prices. In fact, the cost of the imported product is in excess of the price quoted locally in many cases on bars rolled from old rails and with a local New Jersey producer of iron bars reported preparing to roll concrete bars from old rails, importers

do not seem to expect much future reinforcing bar business.

Importers report a moderate volume of business in small tonnages of various products and in a few instances are able to offer steel delivered at slightly less than the present European quotation, having been in a position to buy distress tonnages that came onto the market during the recent Antwerp dock workers' strike. Importers show considerable interest in future development of the Steel Export Association recently formed here to include the leading interest and many of the large independent mills.

A cabled report was received about a week ago by an importer stating that it was reported in European steel circles that a meeting of European producers and the new Steel Export Association was scheduled for September and October in New York. This report is doubted here, but importers are interested, as they point out that at such a convention the question of limitation of European exports of steel to the United States might come under consideration.

trial managements is involved in the comparison between the two cities. Worcester's rate would doubtless be approximately that of Springfield were it not for the effects of years of competitive striving. The Springfield Safety Council has made an aggressive campaign. Plants are divided into four groups according to the number of employees. Each month the winner in each group is given the custody of a banner indicating leadership. Employers are becoming more and more interested, which means the application of authority to an insistence that every one in the plant organization—superintendent, foremen and the rank and file—turn his mind to safety.

German Yard Builds Ships of Copper Bearing Plates

HAMBURG, GERMANY, July 28.—Following numerous tests, which are reported to have had satisfactory results both to the shipping companies and the steel mills, copperoid steel plates, which contain 0.28 per cent copper, are to be used in the construction of two vessels at the Deschimag A. G. at Bremen. Tests made are understood to have shown that the higher cost of these copper bearing plates was offset by their extended wearing qualities through resistance to corrosion. Reduction of costs of painting and replacement of rusted plates are considered sufficient advantage and the same tensile strength as in ordinary ship plates was obtained. If the two vessels to be constructed prove satisfactory, it is planned to produce these plates on a larger scale for shipbuilding.

Safety Contests Reduce Accidents

Springfield and Worcester Figures Show the Latter City Gained From Competition

EARLY returns from the lost-time accident contests which have been started within a year by the local safety councils of a group of important manufacturing cities are interesting because comparisons can now be made with results in the similar contest which has been carried on in Worcester, Mass., without intermission for more than ten years! Until recently Worcester was the only city conducting such a contest. There the interest of participating firms has never lagged, for they saw accident hazard constantly diminishing. But it could only be guessed what part of the decrease came from the stimulus of competition and what part was due to the normal improvement in safety measures which would have reduced the hazard regardless of any contest.

The cities of Springfield, Mass., and Worcester have a number of resemblances industrially. Both have widely diversified manufactures. In both most of the large and many of the small plants are participating in the contest. Probably the natural industrial hazard runs no higher in the one city than in the other. But Springfield has been conducting its contest only since the beginning of 1928.

In the first half of this year 61 Springfield plants employed an average of 22,698 persons, who worked

27,591,207 man hours. In the same six months 42 Worcester plants employed an average of 23,133 persons, who worked 29,176,000 man hours. The method of reckoning results was the same in the two contests, being that established by the National Safety Council, in which the three factors are the number of man hours, the number of accidents and the number of days lost from employment because of them. From these are obtained two measures of comparison: One the frequency rate which is the number of accidents per million man hours, the other the severity rate, which is the average number of days lost per thousand man hours.

In Springfield in the initial six months of its contest the frequency rate was 19.36. In Worcester it was 7.6. In Springfield the severity rate was 1.16. In Worcester it was 0.42. In other words, the number of accidents was two and one-half times as great in the one city and their average severity nearly three times as great. An allowance should be made in favor of Springfield, in that its plants include more very small establishments whose accident rate has been found to be considerably higher than the average of the larger plants, because managements are more neglectful in applying safety measures.

No criticism of Springfield's indus-

European Freight Rates to Canada Reduced

HAMBURG, GERMANY, July 28.—Apparently in an effort to increase the tonnage of steel moving from Europe to Canada, shipping lines operating to Canadian ports have reduced rates on iron and steel from the Continent. The rate on pipe and steel tubes is now 27c. per 100 lb., a reduction of 12 per cent, and a corresponding downward revision has been made on other steel products.

The Detroit River was spanned Aug. 8 by a steel cable which was raised from the river and attached to the two concrete towers which will support the \$20,000,000 Ambassador Bridge. The main span of the bridge will be 1850 ft. in length.

The Columbia Steel Corporation has purchased from the Burke Iron Co. ore deposits near Iron Mountain, Utah, adding 15,000,000 tons to its holdings, which now aggregate 25,000,000 tons.

This Issue in Brief

Manufacture and distribution of steel products would be further localized by adoption of mileage rates on steel shipments, the trade believes. Producers and consumers, as well as railroads, will argue for and against the proposed scale at Commerce Commission's hearing.—Page 408.

* * *

Electric heat-treating furnaces in Dodge plant have hearth floors made of three alloy plates locked at one end, and an alloy steel wall 10 in. high. The floor is supported by fire brick standing between the heating elements. Heat is transmitted through the floor without much loss.—Page 389.

* * *

Wire-drawing dies of tungsten-cobalt last longer and cost less than diamond dies, according to German claims. Alloy dies are not so likely to crack in service; they produce a smoother wire, and drawing speed can be considerably increased, it is said.—Page 394.

* * *

For high production of pig iron, keep the fusion zone low. Continued use of cold air raises the fusion zone. If the hearth is too hot, the logical procedure is to cool it by getting a larger tonnage, not by decreasing the output.—Page 394.

* * *

Industrial research uncovers new markets for New England manufacturers and increases profits by revealing how waste can be utilized. In one case a by-product grew so popular that it has outstripped what was formerly a manufacturer's principal product. In other cases sidelines are materially increasing sales volume.—Page 397.

* * *

Tight money is restricting building activity, says Doctor Haney. Construction is headed downward and will likely continue to decline, economist believes.—Page 406.

Sharpness of cutlery can be measured by new device. Under a definite load, the blade is pressed against a pile of paper strips. "Sharpness" is measured by the number of strips cut, and "durability" by the number of cuts required to reduce sharpness by 50 per cent of original value.—Page 398.

* * *

Earnings of steel producers decline still further. Average earnings of 16 leading producers for first half of 1928, in relation to stockholders' value, was 3 per cent, the poorest showing for that period in the past three years.—Page 413.

* * *

Foreign steel imports at low ebb on Atlantic seaboard, owing to narrow margin between foreign and American steel prices. Difference leaves little or no profit for importer, after paying freight and handling charges.—Page 416.

* * *

Safety contest reduces accident rate. Worcester and Springfield, Mass., competed during first half of year. Springfield's frequency rate was 19.36, while Worcester's was only 7.6. The latter city's excellent showing is ascribed to the contest, which has been conducted for the past ten years.—Page 416.

* * *

Attempts to elevate prices by combinations are doomed to early failure. Excess producing capacity gives birth to the cartel, says editorial writer. Artificial manipulations at once invite outside competition.—Page 418.

* * *

Able industrial management is attracting more and more attention from investors. Security buyers are studying companies with increasing care, realizing that the well-managed concern is the one that may be expected to yield greater dividends.—Page 418.

Water for cooling not required in new blast furnace turbo-blower. The only cooling water needed is that for oil coolers. The turbine can not be started before oil pressure is available to the bearings. If oil pressure fails, the turbine automatically stops.—Page 397.

* * *

Pig iron prices will reach a little higher level within 30 days, says Doctor Haney, barring some unforeseen development in general business. Economist believes that not enough pig iron is being produced, considering the recent rate of steel output.—Page 406.

* * *

Object to reparation payments in shape of materials and equipment. French manufacturers declare their business will be injured by acceptance of naval craft, rolling stock, shop equipment, telephone cable, etc., as part payment of war bill, and that German manufacturers will obtain replacement and repair business.—Page 415.

* * *

Heat-treating furnaces charged quickly and with small loss of heat by use of unique charging mechanism. Furnace doors are raised and charger pushes out the heat-treated forgings and pushes in the tray of cold forgings. The bottom of the tray is withdrawn, depositing the forgings in correct position on the furnace hearth. The entire operation takes only 30 sec.—Page 391.

* * *

Aggregate annual corporate profits vary only slightly in past three years. Total has been close to seven billion dollars for three consecutive years. But in the case of manufacturing corporations alone profits for 1927 were about 8 per cent below those of previous two years.—Page 411.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Stock Market Appraisals

STOCK brokers last month charged their customers 7 per cent interest on debit balances. During the month investment bonds sold at prices that afforded a yield of about 5 per cent; preferred stocks about the same; while the common stocks of some of our superior industrial companies sold for a yield of less than 5 per cent and this was after the drastic decline in May and June, from which there has been only partial recovery. This summary looks contrary to preconceived ideas, and to a greater or less extent it is so in fact. Theoretically the prices for securities ought to adjust themselves to the money rate.

Why, then, do they fail to do so? The answer is two-fold. In the first place there is a prevailing sentiment that the high money rate at present existing is only ephemeral. Bankers and corporations enjoying a surplus may take advantage of it, but the rank and file of investors have to exercise their wits to find good bonds or preferred stocks yielding any more than 5 per cent. In the common stocks investors have been willing to buy on a yield of less than 5 per cent in the expectation that growth in business will relatively soon, in one way or another, produce an actual yield of a good deal more.

Thus, American Telephone and Telegraph, a premier security, which pays a \$9 dividend, with official intimations that the rate will not be raised, recently sold in excess of 200 and is now in the neighborhood of 175, making the return around 5 per cent. But the stockholders recently enjoyed valuable privileges, which are recurring and give them an actual return in excess of the nominal. So it is with other standard corporations.

This reflects two important things in the investing state of mind. The first is the confidence that is felt in our economic outlook, and the second is the belief that so long as our national economy is soundly conducted our natural increase in population together with our improvement in efficiency will swell the business, profits and dividends of our enterprises, providing that the enterprises are well managed.

The last qualification recognizes the importance of management in the present investor estimation. The concern that avoids labor difficulties, that engages in scientific research work, that develops new resources, etc., is the one that may be expected to yield increased dividends. The concern that shuns those policies is the one that is likely to cease paying anything at all. In regard to this industrial psychology investors are more and more discriminating.

An expert speculative public is ever trying to anticipate such developments and in its operations makes

use of banking credit. The tightening of credits curtails the activities of such persons, without affecting the economic denouement at all. If the outlook for a certain security indicates an appreciation of 10 per cent in the course of a year, it will reach that on the buying of investors who use their own funds, instead of the advance being effected in a few days on the buying of sharp speculators using borrowed money; and that is substantially the whole difference in events as between now and six months ago. The market will be less active, for there will be less churning.

In short, our stock market has become to a degree an intelligent and discriminating affair. We shall not venture to say that it is more so than ever before. However, it is distinctly not a market wherein gamblers may safely buy anything whatsoever, on the advice that the market is rising as a whole. On the contrary, we have now a situation wherein good things may be expected gradually to improve in value while bad things are likely to shrink.

Cartels Not a Cure

EUROPEAN industrial thought runs to cartels and conventions, whereof many have been formed in recent years. The idea is not new, such arrangements having been in existence in times long past. American thought does not now run that way for the simple reason that our laws forbid. The formation of associations for export trade is as far as our producers may go. European producers are unable to understand the difference and cynically remark that our laws permit concert of action for interference with their markets while preventing us from entering into any international agreements with them. This is, of course, a misunderstanding.

The cartel or convention is usually an exhibition of producers' despair, and for the long run nothing to occasion worry in the minds of consumers. It results from the development of excessive capacity for production and violent competition to make use of maximum capacity, with the consequent trimming of prices. The inspiration of the cartel is therefore fear and its purpose is to prevent prices from going lower rather than to raise them.

It has been the general experience of the world that attempts to elevate prices for the benefit of producers are doomed to early failure. Thus, the Secrétan corner in copper, the later adventure of the Amalgamated Copper Co., the Brazilian coffee valorization, and most recently the British rubber restriction. Almost all artificial manipulations in that direction at once invite outside competition. The only safety is in the

possession of natural monopolies, or with conditions so concentrated that agreements may be arranged and be kept among a few persons. Of this last the production of diamonds is a good example. There are not many commodities in respect to which conditions can be worked out so fortunately for the producers.

A general survey of production reveals bounteous natural resources, at least as far ahead as we do our figuring, and an excessive capacity for their beneficitation. Consequently the consumer enjoys low prices. In the end more or less capital is extinguished, as is happening now in the textile industry of New England. Meanwhile capital efficiently employed receives but a low return. An IRON AGE compilation shows that 16 of the largest steel companies of the country, including the Steel Corporation, earned 3 per cent for their stockholders in the first half of 1928, against 3.2 per cent in the first half of 1927. Mr. Schwab has estimated only 5 per cent per annum for the American iron and steel industry as a whole. Enmeshed in the operation of economic laws, the octopuses and giants are rather feeble. In the contest between capital and non-capital the former tends to get the worst of it.

Whence the Steel-Making Scrap?

TOTAL production of pig iron and ferroalloys in the first half of this year was 18,686,412 tons. The official statistics, just issued, are given elsewhere in this issue. Total production of steel ingots and castings may be estimated, rather closely, at about 25,400,000 tons. This would make the pig iron about 73½ per cent of the steel. Prior to 1911 production of pig iron exceeded that of steel ingots and castings, but in the past 17 years steel has been running ahead more and more.

There has always been a large excess of production of steel ingots and castings over the pig iron so used. That was true even in the Bessemer days, when scrap was thrown in to temper the heat caused by silicon running high. As far back as May 22, 1902, reference was made in an IRON AGE editorial to the rule made by large steel companies that scrap was no longer to be used in the converter but was to be saved for the open-hearth. So much pig iron was used in making iron castings that there was an excess of total pig iron over steel ingots and castings. Iron castings grew but little while steel grew greatly, and that helps to account for the swing so often mentioned, of "steel" exceeding pig iron. The works scrap has been chiefly responsible.

In the early days of basic open-hearth steel making there were large supplies of works scrap, because there was both Bessemer and open-hearth scrap. As open-hearth increased and Bessemer decreased the proportion of works scrap to basic steel decreased. Then came a turn in the other direction, and it is the extent of that turn which it is interesting to study at the present time.

A close measure can be had by dividing production of basic open-hearth steel ingots and castings into production of basic pig iron. As pig iron stocks used to vary materially it is safer to take pairs of years. In 1912-13 pig iron figured at 57.4 per cent. In 1926-27 it had decreased to 53.2 per cent. For the first half of this year basic pig was 10,715,988 tons and basic open-hearth ingots and castings may be put at 21,400,000

tons, which would make 50 per cent. The proportion of scrap has continued to increase.

There is ground in the statistics for the view that progress in the production of sound ingots has been entirely eaten up by demand for better steel, so that there is as much cropping, as large a percentage of works scrap, as a few years ago. The extra supply of scrap comes from outside, perhaps more industrial scrap, certainly more old material. And this latter is likely to increase for some years, for in the days when this old material was new the production of steel was increasing rapidly. Perhaps in time steel will be made to last longer, whereupon there would be another twist in the curve, but for a number of years the supply of old material will continue to grow.

British and American Outputs

SUPERIORITY of machine equipment in American manufacturing industries and much greater power behind the efforts of the average worker are emphasized in a report of the National Industrial Conference Board which compares British and American production results. Eight selected major industries in the United States used an average of one and one-half times as much horse power per wage earner as do the same industries in Great Britain. Production per worker shows a still more impressive difference, that in the United States being two and one-half to three times as much.

In this difference between the two countries in power consumed, on the one hand, and in production on the other, lies the very significant element of greater efficiency in the application of power. One horse power in the modern American steel mill or machine tool is of course a far greater producer than one horse power applied in machinery of older type, manufacturing the same product.

The difference in the two ratios is most marked in the steel industry. To quote the Conference Board report:

Steel works and rolling mills in Great Britain in 1924 employing 200,181 wage earners turned out \$660,895,000 of product, the net output or value added by manufacture representing \$195,125,000 of the total. In the United States, in 1925, \$2,946,068,000 worth of product was turned out with the relatively small working force of only 370,726, the net output or value added by manufacture amounting to \$1,134,107,000. In the British industry 9.15 horse power, in the American mills 12.85 horse power, was back of every worker. As a result, production in terms of value added by manufacture in the American steel industry was \$3,059 per wage earner employed, as against only \$975 per worker in the British mills, or more than three times as much.

In other words, with 33 1-3 per cent greater power back of the American worker more than three times the British output was secured, reckoning in dollars. These figures concerning the steel industry will astonish no one familiar with it. American mills have made extraordinary strides in productive efficiency, partly through better systems, but more particularly through better equipment. It may fairly be said that the main factor is the automatic character of so much of the

machinery, reducing to a minimum the number of men employed.

The Conference Board's survey shows similar ratios to exist in the automotive and electrical industries. There, too, it is undoubtedly a matter of investment in the most modern equipment, of never-ending improvements in American machine tools and their prompt utilization by our manufacturers in the constant effort to reduce costs by lowering the items of overhead and labor.

Tin Prices and Consumption

LAST June pig tin in New York dropped to 45.75 cents a pound, its lowest price in almost four years, or since September, 1924, and the market has since had only a slight recovery. As the average price in the last two calendar years was 65 cents, there is now a relatively low market, only a trifle above the average in the three years before the war. The 15-cent tin of 1898 is of course only of historical interest. Whither tin is trending in the next few years is a problem of great moment.

Marketwise tin is by far the most mysterious of the familiar metals. It is notable that those most fully posted frankly state that virtually they know almost nothing. It is impossible to measure closely the influence of price upon production but the influence upon consumption is a more open matter.

Consumption of tin in the United States is roughly about 35 per cent for making tin and terne plate, 25 per cent or less for making solder and up to about 15 per cent for bearing metal, of which the automobile industry is a very large consumer, this allocation leaving 25 per cent for miscellaneous. It is significant therefore that comparing the average of 1912-13 with the average of 1926-27, deliveries of tin in the United States as reported by the New York Metal Exchange increased only 61 per cent, while the production of tin plate increased 93 per cent and automobile production increased 835 per cent, or by about 3,600,000 cars and trucks per annum.

During this period the tin plate makers greatly reduced the amount of tin consumed per box of tin plate. At the same time they improved the quality, which is largely a matter of uniformity in distribution of the coating, accomplished by more accurate rolling of black plate and by improved tinning methods, while the "list edge," formerly involving a large loss, has been almost eliminated. Solder is conserved by methods of can making that take less of it, by there being more mechanical soldering, and by the tin proportion being decreased. Collapsible tubes are now made of lead except where health requirements intervene. With aluminum at 25 cents a pound, aluminum foil is displacing tin foil. The proportion of tin in babbitt metal has decreased.

These changes represent accomplishments and there is no reason for assuming that cheap tin would result in a reversion to older practices. There might, however, be expansion of tin consumption in new uses. So much has been done that little room seems to be left for further economies, and the industries using tin promise continued expansion. In the last 15 years United States consumption has increased considerably more than that of the rest of the world and thus there are chances of consumptive demands elsewhere having a large increase.

Propaganda of long ago that tin production could not be greatly increased is exploded, for it has increased and there has been much progress in the technique. The working of alluvial deposits has been extended to leaner gravels, for with the improved dredging equipment and the use of gravel pumps, facilitated by operations passing into strong hands with command of capital, a half pound of tin per cubic yard is workable against one and a half pounds formerly.

Both supplies and consumption of tin have increased this year. World supplies in the first half of the year were reported at 62,249 gross tons, or 4034 tons increase over the first half of last year. Deliveries are reported at 61,751 tons, or 2848 tons increase. The visible supply increased 498 tons, against a decrease of 688 tons in the first half of last year. In the Federated Malay States production has increased, and last year, stimulated by the high prices of 1926 and 1927, it was 52,176 tons or 13.5 per cent more than in 1926. This year it has been running 20 per cent higher than in 1927, but with the lower prices of recent months the higher cost workings may do less.

NEARLY half a billion dollars is added by the recent General Motors contract for group life, sickness and accident insurance to the \$6,379,000,000 of policies of this class in force at the close of 1927 for the benefit of industrial workers in the United States. Group insurance is least in cost, because negotiated and paid for in single transactions covering hundreds or thousands of individuals. It calls for no medical examinations and is independent of ages, because the employee group represents a fair average of human health, condition and hazard, and, surprisingly, its average age does not change. If an old-age endowment is included, with coverage for accidents outside of working hours, the workers' "total situation," as the insurance man calls it, is thoroughly protected. Helping the workers to help themselves is well understood to be a useful practice in promoting the welfare of industrial corporations. Group insurance protects the worker's family against loss of his earning power in case of accident or death, and with old-age provision included may even be said to protect him against the consequences of living too long.

HAVING failed to organize the automobile industry as well as various other metal-working lines, the American Federation of Labor is now to undertake the unionization of airplane manufacturing plants. The officers of the Federation cannot be unaware of the fact that the airplane plants, especially those building engines, have attracted to their payrolls the most expert of mechanics. In fact, there has been complaint recently from automobile companies that some of their best men were leaving for the better paid work of airplane engine building. Militant unionism has found that the more highly skilled the employment the greater the resistance to organizing effort. In the metal trades the best paid workers have not been attracted by the leveling aims of the unions and the supply of high-grade craftsmen seldom has been equal to the demand. Hence the outlook for the unionization of airplane mechanics cannot be called promising.

CORRESPONDENCE

Copper Content of Iron Ore

To the Editor:—I am attempting to get some information about the copper content of American iron ores. A fairly close examination of THE IRON AGE for the last 10 years fails to reveal any information on this subject. A number of articles were printed on the iron resources, giving the ordinary analyses in iron, sulphur and phosphorus, but none of them contained a figure showing that the ore had been analyzed for copper.

In the special volume of the British Iron and Steel Institute, covering its American visit in 1890, several analyses of iron ores are given, but even in this volume the only anal-

yses which quote copper are those of ore from the Cornwall banks in Pennsylvania. These ores have only a trace of phosphorus, but are high in both sulphur and copper. Three analyses for copper are listed at 0.75, 0.56 and 0.30.

So far as I can learn, most iron ores are free from copper. This is particularly true of the Birmingham district and the Lake Superior district. In Tennessee, there are a number of beds that are high in copper or other metals, but as they are worked for the copper content rather than for the iron, they can hardly be classed as iron ores.

The Bureau of Mines states that it has no record of the copper content of iron ores, although it is known that some ores, such as at Cornwall, Pa., and at Fierro, N. M., contain small quantities of copper.

If any of your readers have further data on the subject, a communication would be appreciated.

J. B. ROMER,

Chief chemist, Babcock & Wilcox Co.

Bayonne, N. J.



What Water Transportation Is Beginning to Mean

Developments Which Emphasize the Increasing Competition Which Chicago Mills Face Through Steel and Iron Coming from Abroad, from Eastern Plants of the United States, from the Pittsburgh District, Etc.

THE two photographs here reproduced show ships which have traveled from Europe by way of the St. Lawrence River and the Great Lakes to the docks of the East Chicago Dock Terminal Co. The upper one is of the Novadoc, which was loaded in England with low-phosphorus pig iron, and is being unloaded at Chicago. The lower one shows the unloading from a ship of structural shapes and pig iron; to be noted in this connection is the length of the steel beams and the facilities for double car loading.

The pig iron came over at a low rate not regarded as likely again to be duplicated or to become a regular practice, for the reason that the iron cargo was used essentially as ballast and that not many boats are expected

to make trips under similar conditions. The particular boat was built in Europe for service under Canadian direction on the Great Lakes.

What is portentous for Chicago and indicative of a further alinement of distribution territories for other sections of the country through wider use of water transportation are some of the negotiations under way. For example, the feasibility is under consideration of carrying cast iron pipe from New Jersey by ship to the Chicago district by exporting it by boat into Canada and then importing it from Canada through the St. Lawrence waterways, with delivery costs into Chicago for about one-half the all-rail freight rate from Birmingham to Chicago, which is \$8.20 a ton.

Similarly a Pittsburgh steel mill is planning to send steel by rail to Cleveland, where it would be put on board ship for transport to Chicago. With a rail charge of \$2.60 a ton, boat freight of \$1 a ton, and handling charges of 40c. and 50c. at Cleveland and Chicago, respectively, and the 50c. switching charge at Chicago, the transportation cost would be \$5, against \$6.80, the all-rail Pittsburgh-Chicago rate.

The special attention being paid to water shipments stresses the issue that a given production district, in this case Chicago, appears less secure from outside competition that the distinctly rail freight charges have helped to make it.



Iron and Steel Markets

Steel Demand Holds High Summer Level

Oil Pipe Business Mounting—Price Advances Announced on
Sheets and Shafting—Large Pig Iron Purchases
at Cleveland and New York

MID-AUGUST finds business holding up to the surprising volume of the past several weeks, without, however, signs of increases in the immediate future. The one exception is that the steel requirements for pipe for the oil industry are mounting rapidly. Otherwise, strictly new buying is on the whole not of impressive proportions. Seasonal expansion for fall needs, as in rails and wire products, cannot be expected before September.

Active specifying against contract purchases, often accompanied by demand for quick delivery because of low stocks, has lifted operations in the general Pittsburgh area to nearer 85 per cent of capacity than 80 per cent, or somewhat above the late July rate. In the Chicago district, specifications compare closely in volume with those of the first week of August, but for the most part they call for the lighter tonnage commodities and ingot output there has not increased.

The price trend is toward higher levels. Cold finished steel bars and shafting, including screw stock, have been advanced \$2 a ton, restoring the base of 2.20c., Pittsburgh or Chicago, and preparing for a higher base for fourth quarter sales, provided hot rolled bars hold the \$2 increase recently announced for the same period. New higher prices also have been named for last quarter sheet sales, and billets and other semi-finished steel are believed to be headed for a rise.

The oil industry has brought a brisk demand for seamless pipe for the new Santa Fe, Cal., oil field, and several pipe lines again are under active negotiation. A 250-mile line has just been closed, and the 480-mile line of 24-in. pipe from the Panhandle to Omaha, under consideration for some months, is an early likelihood, and progress is being made on a 500-mile line to St. Louis. For oil tanks for the Texas & Pacific 3000 tons of plates and 300 tons of large rivets will be required.

Several thousand tons of rails have been bought in the week, representing extra requirements for early delivery. Included were 1000 tons for the Wheeling & Lake Erie, on top of 2500 tons purchased two weeks ago, 1700 tons for the Southern and 2000 tons for the St. Louis & Southwestern.

The Missouri-Kansas-Texas has closed for 500 cars. For miscellaneous needs, the Pennsylvania is inquiring for 25,000 tons of plates, shapes and bars and the Great Northern for 6000 tons.

The prices to be asked for sheets for the fourth quarter are 4c. for autobody, 2.75c. for black, 3.60c. for galvanized and 2c. for blue annealed up to 45 in. in width and 2.10c. for sheets 45 in. and wider, all Pitts-

burgh base, with the usual differentials for Gary and Birmingham. Except for the autobody sheets, which would have the usual spread over black sheets, the new levels represent an advance of \$2 over what has been regarded as the regular market, but compared with the basis of the bulk of current shipments are actually \$3 higher on black and \$4 on the galvanized product.

The considerable volume of sheet buying meanwhile gives color to the belief that no little tonnage already covered will be carried into the last three months of the year.

Although fabricated structural steel bookings, totaling only 25,000 tons, amounted to about half the average of recent weeks, continued activity is indicated by new projects calling for more than 37,000 tons. Subway work in New York accounts for 29,000 tons of this total.

The heavy tonnage of structural steel placed with fabricating shops during July is reflected by the tonnage report for the month of the New York Structural Steel Board of Trade, which indicated bookings of 70,000 tons in the New York metropolitan territory, exclusive of bridges, subways, etc. This compares with 38,000 tons in the previous month and is the highest amount since July, 1927, when 73,000 tons was reported.

Nails show a sharp rise in demand. Mill output having dropped to a 60 per cent rate now gives promise of expanding, particularly with the fall trade in prospect. No price advances are talked of, stabilization having yet to be thoroughly realized, following the Steel Corporation's recent reduction to the mid-point of the wide spread that existed among prices.

Pig iron sales at Cleveland totaled 84,000 tons, one of the largest weekly totals of the year, following bookings of 100,000 tons in the previous fortnight. In New York 16,000 tons was sold in addition to 30,000 tons bought for various plants by a maker of heating equipment. Selling pressure from steel company furnaces is abating with the increased use of pig iron in open-hearth mixtures. Prices have a firmer tone in the Central West, but in the East attractive tonnages are still bringing out concessions. Much of the business done is for the fourth quarter, indicating that many foundries believe the market is scraping bottom and that there is no advantage in postponing buying.

Heavy melting scrap at Pittsburgh has advanced another 50c. a ton, making a recovery of \$1.50 to \$2 above the recent low point. Scarcity of scrap in the face of efforts of dealers to cover short sales indicates that the advance has not yet run its course.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$20.76
No. 2, Valley furnace.....	16.50	16.50	16.75	17.50
No. 2, Southern, Cin'ti.....	19.19	19.19	19.19	20.94
No. 2, Birmingham.....	15.50	15.50	15.50	17.25
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.00	16.00	16.00	17.25
Valley Bessemer, del'd P'gh....	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	17.50	17.50	19.50
Malleable, Valley.....	17.00	17.00	17.00	17.50
Gray forge, Pittsburgh.....	18.01	18.01	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc. Per Gross Ton:	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.85	1.80

Finished Iron and Steel,	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.90	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.24	2.24	2.19	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.50	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
Heavy melting steel, P'gh....	\$15.50	\$15.00	\$14.00	\$15.50
Heavy melting steel, Phila....	13.00	13.00	13.00	14.00
Heavy melting steel, Ch'go....	12.75	12.75	12.25	12.50
Carwheels, Chicago.....	12.75	12.75	12.75	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.25	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	15.50	16.00
No. 1 cast, Ch'go (net ton)....	14.00	13.50	13.50	14.75
No. 1 RR. wrot., Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Ch'go (net)..	11.00	10.75	10.75	11.50

Coke, Connellsville, Per Net Ton at Oven:	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Aug. 14, 1928	Aug. 7, 1928	July 17, 1928	Aug. 16, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.75	13.50
Electrolytic copper, refinery..	14.50	14.50	14.50	13.00
Zinc, St. Louis.....	6.25	6.25	6.20	6.37½
Zinc, New York.....	6.60	6.60	6.55	6.72½
Lead, St. Louis.....	6.00	6.00	6.05	6.40
Lead, New York.....	6.20	6.20	6.20	6.75
Tin (Straits), New York.....	48.25	47.87½	47.25	64.37½
Antimony (Asiatic), N. Y.....	10.00	10.00	9.50	12.00

Pittsburgh

Ingot Production Now Ranges from 80 to 85 Per Cent— Heavy Steel Scrap Again Advances 50c. a Ton

PITTSBURGH, Aug. 14.—If steel production is as large in the second half of the month as it has been in the first, August is likely to follow July in setting a record output. Mid-August finds this and nearby districts producing ingots at from 80 to 85 per cent of capacity. The leading manufacturers are producing at that range, while a number of the smaller companies are running virtually at capacity. The general average, therefore, is probably nearer 85 than 80 per cent.

A brisk demand for seamless pipe to take care of the requirements of the newly opened Santa Fe, Cal., oil field is one of the contributory causes for the upswing in steel output.

It seems that, while the larger producers wanted to conserve this field for development when the oil market improved, sinking of successful wells by some smaller operators made it necessary for the former to drill to prevent seepage of oil from below their land holdings. Coupled with the recent large pipe line orders, the steel requirements for pipe are mounting rapidly.

Specifications for sheets, tin plate, strip, bars and shapes all appear to have increased recently and the demand, as indicated by specifications, is at least holding its own in cold-

finished steel bars (screw stock). Rails, track supplies and wire products are slow, but that is a seasonal condition. Strictly new business is not of impressive proportions except in seamless pipe, and in a general way the experience of the Steel Corporation in decreasing order books is common to the industry at large. But fourth quarter buying has not yet begun to manifest itself.

Price tendencies still are toward higher levels. Announcement has been made by one company of advances of \$2 to \$3 a ton in the common finishes of sheets on fourth quarter business.

An advance of \$2 a ton on orders taken for shipment over the remainder of this quarter has been made in cold-finished steel bars and shafting. Strip makers have firmer price ideas as to the future, while in semi-finished steel there is no longer much doubt that an attempt will be made to establish a higher market on shipments in the final quarter of the year. Wire products are firmly held in most centers, and makers of plates, shapes and bars are earnest in their effort to establish prices at more profitable levels.

A scramble by dealers to cover short sales in the steel works grades has sent prices up another 50c. a ton, and the recovery from the recent low point now amounts to \$1.50 to \$2 on heavy melting steel. This advance is about as sharp as any that has taken place in the market in recent years and probably has not yet run its course, as offerings are still light and it is hard to get scrap past outside markets to Pittsburgh, even at current figures. With steel works operations on the increase, there is a danger that some consumers who have scrap on order may not get sufficient supplies to escape fresh purchases.

Pig Iron.—In point of business this market still presents a sharp contrast

with others. While there is a very steady movement on old orders and some furnaces are shipping as much iron as they are producing, the current demand is very light and in all grades runs entirely to single carloads. Prices are unchanged, but reflect a somewhat firmer attitude on the part of producers, some of whom already have named \$17, Valley furnace, as a minimum on fourth quarter foundry iron, or 50c. per ton more than is being done on current business. The steel companies appear to be using a larger proportion of their iron production than recently, and selling pressure from that direction has abated. The advance in scrap, which has brought heavy melting steel, delivered Pittsburgh, to even terms with basic iron at Valley furnaces is also a factor in the firmer prices on pig iron.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.50 to 16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Consumers are taking out ferromanganese, ferrosilicon and spiegeleisen very steadily on contracts, but new buying amounts to little. Prices are unchanged.

Semi-Finished Steel.—Continued high operation of sheet and tin mills is reflected in good specifications on contracts for sheet bars. Strip makers are taking out billets and slabs steadily. New business in these various forms is light. Current shipments generally carry a price of \$32, Pittsburgh or Youngstown, but it is becoming clearer that producers intend to ask \$1 a ton more on fourth quarter tonnages and one producer of billets already is naming \$34, Pittsburgh, as the fourth quarter contract price. Wire rods are firm at \$42, base Pittsburgh.

Bars, Plates and Shapes.—Specifications on existing contracts are rolling in freely in bars and shapes, but shipments on old orders are exceeding new business and backlogs are decreasing. On such new business as is developing—it is chiefly made

up of small lots—1.90c. is as low as any makers in this district are doing. Plates are not in such good demand as bars or shapes, and good railroad car tonnages seem essential to provide the mills with an engagement sufficient to make them independent of strip mill competition on prices. Pipe line orders are furnishing some plate mill engagement, and there is also a fair amount of river barge business. It has been a light week in structural awards for local shops.

Rails and Track Supplies.—The Norfolk & Western Railway this week will place 6000 kegs of spikes. The market for that product is easy rather than firm at \$2.80, base, per 100 lb., and there is somewhat less insistence upon the recently announced charge of \$5 a ton for less-than-carload lots. Shipments on old orders are fairly large and are exceeding new business. New rail business does not amount to much in either light or standard sections.

Wire Products.—Activity is lacking in nails and wire products, but there is marked firmness in prices. Dullness, common to this time of the year, is heightened by the large takings of jobbers earlier in the year to escape price advances.

Tubular Goods.—Continued good demand for seamless oil well pipe is noted, particularly from California, where deep drilling has uncovered fresh supplies. The Seminole field also is taking a goodly amount of seamless pipe. Lapwelded oil country goods are only moderately active, but lapwelded pipe capacity is well engaged on line pipe and the prospect is bright for additional business. The Texas Co. and several other producers are jointly interested in a pipe line calling for 218 miles of 16-in. pipe to run from Winkler County, Tex., and Lee County, N. M., to El Paso, Tex. The automotive industry still is a good taker of mechanical tubing.

Sheets.—The Youngstown Sheet & Tube Co. has announced fourth quarter prices, naming 4c. base, on automobile body sheets, 2.75c., base, on black, 3.60c., base, on galvanized and 2c., base, for blue annealed sheets of widths of less than 45 in. and 2.10c., base, for widths 45 in. and

over, these prices all being f.o.b. Pittsburgh. The new prices, which probably will be followed by other producers, represent no change in body sheets, nor on what has been commonly regarded as the market on blue annealed sheets; on black sheets they are \$2 to \$3 a ton above the recent market and on galvanized from \$2 to \$4 a ton higher. This company also announces the adoption, effective Oct. 1, of a cash discount of one-half of 1 per cent on the f.o.b. mill value for payment within 10 days from date of invoice. Several important producers have announced this change in terms, but as yet the American Sheet & Tin Plate Co. has not followed. It is understood that some opposition to it has developed among jobbers. Sheet specifications still are heavy, notably from the motor car builders, and a feature is the promptness with which shipments are wanted in a number of cases. New business is not keeping pace with shipments on old orders, but backlogs are not decreasing enough to warrant any lessening of mill operations, which still are averaging 85 per cent of capacity.

Tin Plate.—More favorable weather conditions have resulted in increased production. Demand for tin plate for perishable food containers continues heavy. The Northwestern salmon pack is exceeding expectations and has produced some supplementary orders to accommodate it. Mill operations still are more than 90 per cent of capacity, with output more in keeping with that rate on account of restored mill crew efficiency due to cooler weather. Changes in the furnaces at the Gary mills of the American Sheet & Tin Plate Co., to accommodate the new system of breaking down the bars on continuous mills, will mean that four mills (two double mills) will be idle at a time while the furnaces serving them are being altered.

Cold-Finished Steel Bars and Shafting.—Leading makers have announced an advance of \$2 a ton, effective immediately and to apply on new business accepted for shipment during the remainder of this quarter. No action yet has been taken on fourth quarter prices, which will be governed

THE IRON AGE Composite Prices

Finished Steel

Aug. 14, 1928, 2.348c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.319c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Aug. 14, 1928, \$17.04 a Gross Ton

One week ago.....	\$17.04
One month ago.....	17.09
One year ago.....	18.13
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.75,	Feb. 14;	\$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.13c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.21
2000 bundle lots.....	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh.....	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.74c. to 2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$2.90
2100 (1½% Nickel)	0.55	3.20
2300 (3½% Nickel)	1.50	4.15
2500 (5% Nickel)	2.25	4.90
3100 Nickel Chromium	0.55	3.20
3200 Nickel Chromium	1.35	4.00
3300 Nickel Chromium	3.80	6.45
3400 Nickel Chromium	3.20	5.85

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100 Chromium Spring Steel	0.20	2.85
6100 Chromium Vanadium Bars	1.20	3.85
6100 Chromium Vanadium Spring Steel	0.95	3.60
9250 Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium.....	1.50	4.15
Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/8	45	19½	1/4 to 3/8	+11	+89		
1/4 to 3/8	51	25½	3/8	22	2		
1/2	56	42½	1/2	25	11		
3/4	60	48½	1 to 1½	30	18		
1 to 3	62	50½					
2	55	43½	2	23	7		
2½ to 6	59	47½	2½	26	11		
7 and 8	56	43½	3 to 6	28	13		
9 and 10	54	41½	7 to 12	26	11		
11 and 12	53	40½					

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1/8	41	24½	1/4 to 3/8	+19	+54
1/4 to 3/8	47	30½	3/8	21	17
1/2	53	42½	1/2	28	12
3/4	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½	29	15
4½ to 6	56	45½	4½ to 6	25	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in. 27	1½ in. +18
2½ to 3 in. 37	1¾ to 1½ in. +8
3 in. 40	2 to 2½ in. -2
3¼ to 3½ in. 42½	2½ to 3 in. -7
4 to 13 in. 46	3½ to 4½ in. -9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb. 4 Fives	1 Ten
5000 lb. to 12,000 lb. 5 Fives	2 Tens
12,000 lb. to 21,000 lb. 6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in. 63	3 in. 48
1½ to 1½ in. 55	3½ to 3½ in. 50
1¾ in. 39	4 in. 53
2 to 2½ in. 34	4½, 5 and 6 in. 45
2½ to 2½ in. 42	

Hot Rolled

2 and 2½ in. 40	3½ and 3½ in. 56
2½ and 2½ in. 48	4 in. 59
3 in. 54	4½, 5 and 6 in. 48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads) ..	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

by the course of the hot-rolled bar market. Current specifications are running well ahead of ordinary experience at this time of the year.

Hot-Rolled Flats.—The past week has developed a fresh increase in specifications for hot-rolled strips and the month's business to date with most makers is running ahead of the same period last month. While prices still show a little irregularity, the trend in the main is in the direction of firmness, with a restoration of the regular schedules of 1.90c., base Pittsburgh, for 6-in. and wider, 2.10c. for 3 to 6-in. and 2.20c. for less than 3-in., the objective of most makers.

Cold-Rolled Strips.—Business, as typified by specifications on contracts, has improved materially. It is admitted that on some especially attractive business a base of 2.65c. per lb., Pittsburgh, for lots of 3 tons or more has been done, but generally 2.75c. is what is wanted on new tonnages for shipment over the remainder of this quarter.

Bolts, Nuts and Rivets.—Specifications are constant enough, but they are mostly for small lots and impose no tax upon productive capacity. Prices remain firm.

Coke and Coal.—The market is still rather bare of spot tonnages of beehive oven furnace coke, and, while demand is small, producers are having no trouble in making sales at \$2.75 per net ton at ovens. Spot foundry coke is plentiful and is selling at the same prices that have ruled for several weeks. The coal market is a shade more active as a result of an increased demand for household requirements. Gas slack has stiffened slightly in price, but quotations otherwise are unchanged, due to the fact that the prospect of somewhat larger demand has caused resump-tions by mines that have been idle. A request issued by local officials of the miners' union for a conference with

former union mine operators for a discussion of a wage scale has received scant attention from the latter.

Old Material.—It develops that two steel makers in the district whose requirements as to quality are exacting have paid \$16 for heavy melting steel, and a dealer short on this grade at another point in the district is reported to have paid even more to secure needed tonnages. The entire list is strong, and few grades have failed to reach higher levels than were current a week ago. Dealers are trying to buy heavy melting steel at \$15 to cover sales, but are not having much success, and the real minimum price is \$15.50. While there has been some mill buying, the upturn in the market essentially is the result of a panic among dealers who sold short and then became nervous over the moderate amount of material that was reaching the market. Offerings still are moderate, and it would seem as if still higher prices would be necessary to increase them. No scrap can reach this market from the West at present prices, because higher net returns are obtainable in Western consuming centers, and shipments from the East are hampered by the same conditions. It is easy to understand the scramble for

railroad lists and the high prices they have brought in the past two months.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$15.00 to	\$16.00
Scrap rails.....	15.00 to	15.50
Compressed sheet steel....	14.75 to	15.25
Bundled sheets, sides and ends.....	13.75 to	14.25
Cast iron carwheels.....	15.00 to	15.50
Sheet bar crops, ordinary....	15.50 to	16.00
Heavy breakable cast.....	12.00 to	12.50
No. 2 railroad wrought....	15.00 to	16.00
Heavy steel axle turnings....	14.00 to	14.50
Machine shop turnings....	10.00 to	10.50
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	16.00 to	16.50
Railr. coil and leaf springs	16.00 to	16.50
Rolled steel wheels.....	16.00 to	16.50
Low phos. billet and bloom ends.....	19.00 to	19.50
Low phos., mill plate.....	17.50 to	18.00
Low phos., light grade....	16.50 to	17.00
Low phos. sheet bar crops....	17.50 to	18.00
Hvy. steel axle turnings....	14.00 to	14.50
Electric Furnace Grades:		
Low phos. punchings.....	16.00 to	16.50
Hvy. steel axle turnings....	14.00 to	14.50
Blast Furnace Grades:		
Short shov'l'g steel turn-ings.....	11.00 to	11.50
Short mixed borings and turnings.....	11.00 to	11.50
Cast iron borings.....	11.00 to	11.50
No. 2 busheling.....	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles.....	18.25 to	18.75
No. 1 railroad wrought....	12.00 to	12.50
Sheet bar crops.....	16.50 to	17.00
Cupola Grades:		
No. 1 cast.....	14.50 to	15.00
Rails 3 ft. and under.....	16.00 to	16.50

Austin Machinery Corporation in Receivership

The Austin Machinery Corporation, 2969 Lake Shore Drive, Muskegon, Mich., maker of concrete mixers, gasoline locomotives and contractors' equipment, with plants at Toledo, Ohio, Fairmont, W. Va., and Muskegon, has announced the voluntary appointment of a receiver with the contemplated payment of all creditors and continued operation of business.

Westinghouse Building Arc-Welding Laboratory

The Westinghouse Electric & Mfg. Co. has under construction at East Pittsburgh, Pa., an arc welding laboratory, which will be 75 ft. wide, 170 ft. long and 40 ft. high. In keeping with the purpose of the building, the steel frame is to be arc-welded instead of riveted. It will house a 50-ton crane and in addition to the installation of arc-welding equipment, will have massive rolling and forming equipment to be used for forming and shaping the various parts that go into welded machinery. These include motor frames, generator frames, motor rotor rims, and motor end bells.

W. S. Rugg, vice-president of the company, in discussing the possibilities of arc-welding exempts only two classes of structures from the inroads of arc welding. Those structures for which a fabricated steel construction cannot be justified are small pieces built in great quantities, such as the frames and brackets of small diam-

eter motors and structures of such peculiar shape that they are not readily made from such commercial shapes of steel.

The company expects to weld turbine generator frames, locomotive frames, synchronous motor frames and spiders, boxes, machinery bases, floor plates and tanks, miscellaneous machinery parts, industrial heating apparatus, steel pipes, and shop furniture.

At the present time a 26-ton turbine generator frame entirely welded is being fabricated on the shop floors at East Pittsburgh. This generator, one of the largest in the country, will be installed in a New York station of the United Light & Power Co.

Ohio Employment Index Declined in July

In the iron and steel industries of Ohio the July employment index was 95, or 2 per cent less than in June, states the current bulletin of the Bureau of Business Research of Ohio State University. However, the index was 2 per cent higher than in July, 1927. Of the 169 reporting companies, 84 showed decreases in the number of wage earners, 76 increases, and 9 no change. In the machine tool group the standing in July was 4 per cent ahead of the June index of 101 and 25 per cent ahead of July, 1927. Of the 36 reporting concerns making special purpose machinery and appliances, 21 revealed a loss, 10 a gain, and five no change. The index for this group in July was 89, or 2 per cent less than in June.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates.....	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands.....	3.60c.
Hoops.....	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles.....	3.45c.
Galv. sheets (No. 24), 25 or more bundles.....	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets.....	3.35c.
Galv. corrug. sheets (No. 28), per square.....	\$4.31
Spikes, large.....	3.40c.
Small.....	3.80c. to 5.25c.
Boat.....	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. \$3.50	
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.....	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and in- cluding 1½-in.	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock.....	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....10.00c.

Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.

Manganese ore, washed, 52% manganese, from the Caucasus.....39c.

Manganese ore, Brazilian, African or Indian, basis 50%38c. to 39c.

Tungsten ore, high grade, per unit, in 60% concentrates\$10.85 to \$11.00

Per Gross Ton

Chrome ore, 45 to 50% Cr₂O₃, crude, c.i.f. Atlantic seaboard\$22.00 to \$24.00

Per Lb

Molybdenum ore, 85% concentrates of MoS₂, delivered.....50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd.....	11.00
Foundry, by-product, Newark or Jersey city, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-products, St. Louis, f.o.b. ovens.....	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines.....	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines.....	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines.....	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines.....	1.15 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up. 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines.....	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey.....	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton.....	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. 70	70
Stove bolts in packages, Pittsburgh, 80, 10 and 2½	70
Stove bolts in packages, Chicago, 75, 20, 10 and 5	70
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00

Small Rivets

(⅞-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh.....	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago.....	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	80 and 10
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread.....	80 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs.....	70 and 5

Chicago

Mill Operations Sustained But Ingot Output Tapers— Sheet Prices Advanced

CHICAGO, Aug. 14.—The number of steel mill units in operation remains unchanged, but, due to the character of incoming business, output measured in tons of ingots is a shade lower than last week. Specifications, which in total volume compare favorably with the first week in August, for the most part are releases against lighter-tonnage commodities, so that one mill with all departments operating can attain only 75 per cent of its practical ingot rating. Opinion varies as to the outlook for shipments during the remainder of this month.

In the last seven days rail mill production has been speeded up a trifle, but fresh inquiry in sight does not appear to warrant a continuation of the present rate of output. The Texas-New Mexico Railway has petitioned for permission to lay 58 miles of new track near Kermit, Tex.

Deliveries against recent structural awards are growing smaller, and from present indications mills cannot hope to benefit materially from new railroad car business for 45 to 60 days.

Prices for finished steel are taking a firmer stand. The leading independent producer in this district has announced an advance of \$2 a ton on black and galvanized sheets for delivery in the fourth quarter. Chicago quotations remain 2.15c. per lb. on blue annealed sheets, and no recognition is being given to strip mill widths. Sheet producers are falling in line in adopting the one-half of 1 per cent discount for cash, and wire manufacturers are considering making the same move.

Except for plates to be delivered in the Southwest there is less deviation than recently from 2c. per lb., Chicago, on bars, plates and shapes.

Pig Iron.—Buying, which is still active, has changed in character in that it is more evenly distributed over the entire district. A Chicago user has closed for 1000 tons of foundry iron and a nearby melter has taken 500 tons. To the west several sizable orders have been placed. Furnace stocks are pared closer, though some aid has been given to merchant iron sellers by the blowing in during July of a steel mill stack at Indiana Harbor. Stocks in the hands of producers are less well balanced than a month ago. It is reported that Ford will revert to the use of malleable castings, for which he had substituted forgings. A sale of silvery in this district has brought out a price below the commonly quoted market.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil.	1.75 to 2.25..	\$17.50
N'th'n No. 1 fdy., sil.	2.25 to 2.75..	18.00
Malleable, not over 2.25 sil.....		17.50
High phosphorus		17.50
Lake Super. charcoal, sil.	1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....		21.51
So'th'n No. 2 (barge and rail).....		21.01
Low phos., sil. 1 to 2, copper free		\$28.50 to 29.00
Silvery, sil. 8 per cent.....		29.79
Bess. ferrosilicon, 14-15%		46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet, affording little opportunity to test prices except in carlot sales. Contracts recently received obligate prac-

tically all large users of ferromanganese for the remainder of the year.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Structural Material.—Fabricators in this district are well engaged, several of the larger shops having backlogs of seven to eight weeks. Both awards and fresh inquiries are light, but the future is promising. The list of pending projects is impressive, and financial arrangements on promotional schemes are making progress. For the most part architects are busy. One office alone is preparing plans for five structures that will average 3000 tons each. Mill deliveries on plain material range from two to five weeks. Prices are moderately firm at 2c., Chicago.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Plates.—In a week that is quiet from the viewpoint of sales, local mills are concentrating on meeting the exacting delivery requirements of pipe makers, who recently have ordered over 40,000 tons of plates, and fabricators, who are hurrying through their shops the first shipments on projects that now have reached the state of steel erection. Tank steel ordered this week totals 1000 tons, and it is reported that 3000 tons of plates needed for water pipe in Oklahoma City, Okla., has been placed by a local contractor with an Eastern producer. The Texas & Pacific, which was reported to have been in need of 12,000 tons of plates, now is preparing plans for either six 150,000-bbl. tanks or 12 80,000-bbl. tanks, which will require about 3000 tons of steel. The Chicago, Burlington & Quincy will require over 500 tons of steel for the 33 suburban coaches that it intends to build in its own shops.

Mill prices on plates, per lb.: 2c., base, Chicago.

Bars.—Individual orders for soft steel bars are small but numerous and from practically every class of user. A seasonal letdown in demand from manufacturers of agricultural machinery is not apparent, and readjustments in the automobile trade do not appear to have diminished demand for steel from that source. Specifications from forgers are liberal. Prices for soft steel bars are stiffening, 2c., Chicago, being the ruling quotation. The

rate of shipments of alloy steel bars is undiminished, and output in this territory is steady. Prices are firm and alloy differentials are holding. Iron bar mills are operating on a hand-to-mouth basis and far below capacity. Current orders are being taken at 2c., Chicago. Improvement is noted in users' needs for rail steel bars. Both new business and specifications are coming from a wider range of buyers. Sales and shipments during the first two weeks in August were ahead of the corresponding period a year ago. Fall fence post business is slowly getting under way, but it will be three or four weeks before it reaches its full stride. The bulk of going tonnage is being taken at 1.85c., Chicago Heights, but small orders at 1.90c. are more numerous.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Sheets.—Chicago producers are announcing, effective for the fourth quarter, advances of \$2 a ton on black and galvanized sheets. The new prices will be 2.90c., delivered Chicago, for black sheets, and 3.75c. for galvanized. Blue annealed sheets will remain unchanged at 2.15c., Chicago, and no differentials will be recognized in strip mill widths. There has been wider adoption of a cash discount of one-half of 1 per cent, effective Oct. 1, in place of the present 2 per cent. The volume of new business is such that it is believed by some that a considerable tonnage purchased at third quarter prices will be carried over into the last three months of the year. One noticeable effect of the announcement of higher prices for next quarter is the stiffening of prevailing quotations. Specifications are more liberal, and hot mill schedules are better arranged, though hot weather is preventing output from climbing.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Reinforcing Bars.—A flurry of lower prices occurred during the early part of last week. Several low quotations made their appearance and at least one or two were promptly met. Prices are stiffening again and appear to have returned to levels that prevailed before the dip. It is reported that bids on the general contract for five junior high schools at Chicago have been rejected and the jobs will be readvertised. A similar move is said to be holding in check the General Electric Co.'s building project in Chicago. French inquiry is dragging, but architects are busy and dealers in reinforcing bars are looking forward to a substantial volume of business in the late summer and early fall months.

Rails and Track Supplies.—A Western railroad has closed for 3000 tons of standard-section rails for early delivery. Orders in recent weeks have forced producers to speed up output

a trifle. Miscellaneous business in track fastenings aggregates 2500 tons, and a Southern railroad has bought 500 tons of iron tie plates. Fresh inquiry for rails totals 3000 tons.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cold-Rolled Strip.—Demand is sustaining an output at 80 per cent of capacity. Prices for 1 up to 3-ton lots are steady at 3.30c., base, per lb., delivered at Chicago.

Wire Products.—Noteworthy in this market is a sharp increase in demand for wire nails. Purchases have been the heaviest in months and shipments are measurably larger. Jobbers in rural districts are finding wire business dull, though in some sections of the country demand for nails has created renewed interest. Railroad orders for wire products are normal for this time of the year. Although there has been some readjustment here and there in the manufacturing trade, the net volume of business being entered at the mills is little changed from the last month or two. Reports from east of the Mississippi River show that stocks in the hands of users are in some cases normal, but in most instances small, ranging from seven to 10 days' supply. Mill operations, after dropping to 60 per cent of capacity, now give promise of expanding, as producers anticipate an active fall trade, which is expected to get under way early in September. Mill stocks are of fair size and well rounded.

Old Material.—Although in size and number sales in this market are not impressive, nevertheless the firmness in prices developed recently has held and on some grades quotations have advanced. A purchaser has paid \$15.15 a gross ton, delivered, for 2000 tons of re-rolling rails, and a round tonnage of shoveling steel brought \$13.37 delivered. Special grades of heavy melting steel have brought as high as \$13 to \$13.25 for the No. 1 grade. Higher prices being paid by brokers have stimulated the movement of yard scrap. This situation is

affording opportunity for making a closer comparison between production and demand. Some sellers foresee a shortage in several grades. Railroad shipments are heavy and prompt. Lists offered this week include 3500 tons by the Rock Island, 2000 tons by the Grand Trunk and 1000 tons by the Chicago & Alton.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.75 to \$13.25
Shoveling steel.....	12.75 to 13.25
Frogs, switches and guards, cut apart, and misc. rails	13.75 to 14.25
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'd steel carwheels.....	15.50 to 16.00
Railr'd tires, charg. box size.....	15.50 to 16.00
Railr'd leaf springs cut apart.....	15.50 to 16.00

Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs.....	15.75 to 16.25

Electric Furnace Grades:	
Axle turnings.....	12.50 to 13.00
Low phos. punchings.....	14.25 to 14.75
Low phos. plate, 12 in. and under.....	14.25 to 14.75

Blast Furnace Grades:	
Axle turnings.....	9.00 to 9.50
Cast iron borings.....	9.25 to 9.75
Short shoveling turnings..	9.00 to 9.50
Machine shop turnings....	6.00 to 6.50

Rolling Mill Grades:	
Iron rails.....	13.50 to 14.00
Re-rolling rails.....	14.75 to 15.25

Cupola Grades:	
Steel rails less than 3 ft..	15.25 to 15.75
Angle bars, steel.....	15.00 to 15.50
Cast iron carwheels.....	12.75 to 13.00

Malleable Grades:	
Railroad.....	13.00 to 13.50
Agricultural.....	11.50 to 12.00

Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.....	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms.....	19.50 to 20.00
Iron car axles.....	24.00 to 24.50
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought....	11.00 to 11.50
No. 2 railroad wrought....	11.50 to 12.00
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50

Cupola Grades:	
No. 1 machinery cast.....	14.00 to 14.50
No. 1 railroad cast.....	13.00 to 13.50
No. 1 agricultural cast....	12.50 to 13.00
Stove plate.....	10.75 to 11.25
Grate bars.....	11.50 to 12.00
Brake shoes.....	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cast Iron Pipe.—Chicago will take bids Aug. 20 on 1920 tons of 6 and 12-in. Class B pipe. Noteworthy among awards for the week is 2200 tons of 6 and 8-in. Class B and 12-in. Class C pipe, which was purchased by St. Clair Shores, Mich., from the McWane Cast Iron Pipe Co. Contractors are more active in the Chicago district. They have ordered a round tonnage in the last seven days and will soon close for 2000 to 3000 tons of additional pipe. Small orders, including business taken from the railroads, are more numerous. It is reported that Highland Park, Ill., will soon award a general contract for supplying and laying about 400 tons of cast iron

pipe. Prices are firm at \$34 to \$35, Birmingham, for 6-in. and larger diameters.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Bolts, Nuts and Rivets.—An oil tank program being undertaken by the Texas & Pacific will require close to 300 tons of large rivets. Prices for this commodity are moderately steady at Chicago at \$3, base, per 100 lb. Recent sales in the Southwest, however, point to unsteadiness in that direction.

Cold-Finished Bars.—Announcement at Pittsburgh of a price advance of \$2 a ton has had no effect on this market, where producers continue to quote 2.10c. per lb., Chicago. Specifications are in large volume, and output is near capacity.

Coke.—Shipments have gained a trifle in keeping with improvement in foundry business. Prices are steady and all ovens in this district are lighted.

Steel Corporation's Orders Decreased in July

Unfilled orders on the books of the United States Steel Corporation decreased in July. The total on July 31 was 3,570,927 tons, compared with 3,637,009 tons on June 30—a decrease of 66,082 tons. On July 31, 1927, the corresponding total was 3,142,014 tons. The table gives the reported figures for the last 19 months.

	1928	1927
Jan. 31.....	4,275,947	3,800,177
Feb. 28.....	4,398,189	3,597,119
Mar. 31.....	4,335,206	3,553,140
April 30.....	3,872,133	3,456,132
May 31.....	3,416,822	3,050,941
June 30.....	3,637,009	3,053,246
July 31.....	3,570,927	3,142,014
Aug. 31.....	.....	3,196,037
Sept. 30.....	.....	3,148,113
Oct. 31.....	.....	3,341,040
Nov. 30.....	.....	3,454,444
Dec. 31.....	.....	3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Trackwork Output Lower in July

Production of trackwork in the United States for July showed a seasonal falling off from the average of the second quarter. According to the American Iron and Steel Institute statistics, the total of switches, switch stands, frogs, crossings, guard rails and appurtenances laid last month for T-rail track of 60 lb. per yd. and over was 11,776 net tons against 13,716 tons in June and 41,368 tons for the second quarter of the year. July trackwork in 1927 was 13,217 tons and the total for the second quarter of 1927 was 48,406 tons.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq. tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg....	3.10

Philadelphia

Sheet Mills Increase Width on Which Blue Annealed Base Applies—General Demand Slackens

PHILADELPHIA, Aug. 14.—The flow of steel orders, which was in unusually good volume through most of July and the first week of the present month, has been smaller in the past week, but this is explained in some quarters by the fact that it is mid-summer and at the peak of the vacation season. Mills are sufficiently well covered to carry them through a few quiet weeks, and prices on plates, shapes and bars are unchanged, with shapes showing greater firmness. Sellers are beginning seriously to consider 2c., Pittsburgh, on bars and 2.15c., Coatesville, on plates as quotations for fourth quarter, although buyers are not expected to show much interest in material for that delivery for another month or more. The Pennsylvania Railroad will open bids Aug. 21 on estimated requirements of about 25,000 tons of plates, shapes and bars. Individual tonnages of each product are not specified in its inquiry, but as a rule two-thirds or more of the total is plates.

A large sheet producer has announced an advance of \$2 a ton for fourth quarter to 2.75c., Pittsburgh, on black, and 3.50c., Pittsburgh, on galvanized, maintaining blue annealed at 2c. to 2.10c., Pittsburgh, depending upon the width. Several sheet mills have announced a change in the widths of blue annealed sheets on which the 10c. extra applies, the price of 2c. now being for sheets 45 in. and narrower, instead of applying only to sheets 40 in. and narrower. This action was taken, it is said, because increased widths are being offered by continuous mills.

Ferromanganese.—Requisitions against contracts are coming out freely, and there is a small volume of orders for carload lots. Quotations continue at \$105 per ton, seaboard.

Bars.—Demand has tapered, but prices are unchanged at 1.85c., Pittsburgh, or 2.17c., Philadelphia, for desirable specifications, and 1.90c., Pittsburgh, or 2.22c., Philadelphia, for small lots for prompt shipment. Mills are well booked with tonnage and are beginning seriously to consider 2c., Pittsburgh, as a basis for fourth quarter business. Local projects requiring reinforcing bars are small, ranging from specifications for a few tons to less than 100 tons in most cases.

Shapes.—The market is rather inactive, but prices have a slightly firmer tone, 1.95c., Pencoyd, Pa., or 2.01c., Philadelphia, being less common and 2c., Pencoyd, or 2.06c., Philadelphia, to 2c., Bethlehem, or 2.13c., Philadelphia, being more representative of the current market.

Plates.—Mills are fairly well filled with orders and are maintaining prices at 2c. to 2.05c., Coatesville, or

2.10c. to 2.15c., Philadelphia. Sellers are seriously considering 2.15c., Coatesville, or 2.25c., Philadelphia, as a fourth quarter price, although at present consumers are not interested in future buying.

Pig Iron.—Buying of foundry iron is limited to lots ranging from a carload to a few hundred tons, on which \$19.50 per ton, base furnace, applies. Following the recent sizable purchase of basic by a Coatesville consumer, no immediate activity in this grade is expected. Small tonnages of Buffalo iron continue to be sold to eastern Pennsylvania consumers. Low phosphorus iron is quiet. Virginia iron prices are unchanged, but one of the large Virginia cast iron pipe plants is in the market for a sizable tonnage and, with Birmingham furnaces quoting on a basis of about \$15.50 per ton, furnace, the Virginia maker may find it necessary to quote \$19.50 per ton, or lower.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X, 2.25 to 2.75 sil.	21.26
Basic (del'd east. Pa.)	\$18.75 to \$19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Sheets.—For current delivery mills are still quoting 2c., Pittsburgh, or 2.32c., Philadelphia, for blue annealed; 2.65c., Pittsburgh, or 2.97c., Philadelphia, for black, and 3.40c., Pittsburgh, or 3.72c., Philadelphia, for galvanized. Some mills are quoting a \$2 a ton advance on black and galvanized for

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., incl.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

fourth quarter and several producers, including the leading interest in this district, are now quoting 2c. per lb., Pittsburgh, on widths 45 in. and narrower and 2.10c., Pittsburgh, on wider than 45 in., in contrast with the former differential on sheets wider than 40 in. This change is attributed to the fact that continuous sheet mills are now able to offer wider material. Reduction of the discount for cash to ½ of 1 per cent for payment in 10 days by several sheet mills is evidently meeting with considerable opposition from distributors, but general action along this line by all producers is expected by Oct. 1.

Warehouse Business.—The total of orders thus far in August is reported as slightly smaller than in the early part of July, but prices are firm, including the \$2 a ton advance on bars and bar-sized shapes of Aug. 1.

Imports.—In the week ended Aug. 11 a total of 11,950 tons of iron ore arrived at this port from Algeria. Pig iron receipts totaled 1078 tons, of which 658 tons came from India, 267 tons from Norway and 153 tons from the Netherlands. Steel imports consisted of 710 tons of structural shapes and 6 tons of steel bands from Belgium, 263 tons of shapes from France and 78 tons of shapes from Germany. Steel scrap imports totaled 11 tons, from the United Kingdom.

Old Material.—Most grades of scrap show a firmer tendency, although prices are in most cases unchanged. Bundled sheets show an advance of 50c. a ton, on a small purchase by a Harrisburg consumer at \$10.50 a ton, and heavy breakable cast has been bought by the same mill at \$15 and \$15.50, delivered. Stove plate is quotable at \$11 to \$11.50, a small tonnage having been bought recently at \$11.50, delivered eastern Pennsylvania. Part of the present firmness in scrap prices seems to be a reflection of the stronger market situation in the Pittsburgh district.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00
Scrap T rails	12.50
No. 2 heavy melting steel	\$10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	10.00 to 10.50
Machine shop turnings (for steel works)	10.00 to 10.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	11.00 to 11.50
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast furnace scrap	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Cast iron carwheels	15.50 to 15.75
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

New York

Pig Iron Buying Continues Heavy—Three Subway Sections to Take 29,000 Tons of Steel

NEW YORK, Aug. 14.—Demand for pig iron remains heavy. While an increase in foundry melt is evident, there are also indications that large purchases are being made because buyers regard present prices low. Not counting purchases estimated at 20,000 to 30,000 tons by a large maker of heating equipment, sales in this territory for the week totaled over 16,000 tons. The Thatcher Co. closed for about 6000 tons of No. 2 plain for its Garwood, N. J., plant, buying both eastern Pennsylvania and Buffalo iron. The largest new inquiry is from the General Electric Co., calling for close to 5000 tons for fourth quarter shipment. For Bayway, N. J., this company wants 425 tons each of No. 1X and No. 2X; for Lynn, Mass., 400 tons of 3.25 to 3.75 per cent silicon foundry; for Everett, Mass., 400 tons of No. 1X; for Pittsfield, Mass., 600 tons of foundry analyzing 3 per cent and over in silicon; for Schenectady, N. Y., 1000 tons of No. 1X and No. 2X, and for Erie, Pa., 1500 tons. Buyers who have had attractive tonnages to offer have been able to secure low delivered prices, partly on account of barge rates and partly because of selling pressure. Because of the heavy grain movement, barges are scarce and water rates are advancing, with less than \$2.50 a ton from Buffalo to New York harbor hard to obtain. It is understood, however, that accumulations of barge iron at New Jersey ports, moved at lower rates, have been sold in large blocks. One seller continues to quote No. 2X at \$19.51, eastern New Jersey tide-water. This is presumably barge iron on the basis of \$16.50, Buffalo, to which \$2 has been added for the water movement and handling charges and \$1.01 for the railroad freight between such points as Jersey City and Newark and Elizabethport and Newark. At certain points in New Jersey, taking an all-rail rate of \$3.28 from Buffalo, there is little or no economy in buying barge iron. Pig iron selling is more of a study of freight rates than ever before, and aggregate sales of barge iron are much larger than in previous years. One important Buffalo interest that had planned to accumulate a stock at a New Jersey port has been unable to do so because of steady current demands for deliveries. Making allowance for the various combinations of rates, the base price of foundry iron at Buffalo is substantially unchanged at \$16 to \$16.50. Eastern Pennsylvania foundry iron for delivery in this district, however, has weakened, less than \$18.50, furnace, having been done on a large purchase. The Adrian Furnace Co., Dubois, Pa., plans to blow in its stack shortly. There continues to be a demand for Dutch and Indian irons, although they are not competitive with domestic metal on a price basis.

Dutch foundry in No. 1X and lower silicon grades is quoted at \$21 to \$21.50, duty paid port of entry.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91 to \$21.41
*Buf. No. 2, del'd east. N. J.	19.28 to 19.78
No. 2, del'd east. N. J. tidewater	19.01 to 19.51
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	20.89 to 22.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—Demand for ferromanganese is very light, but specifications on contract are heavy. A fair business is reported in carload and small lots of spiegeleisen which is quoted at \$33, furnace, for the 19 to 21 per cent alloy, and at \$32, furnace, for the 16 to 19 per cent grade.

Plates, Shapes and Bars.—With new buying practically negligible, little or no change in the price situation has been noticed in the last week. Consumers are well covered for the present quarter, many of them at prices \$1 to \$2 a ton under 1.90c., Pittsburgh, for bars, and 2.05c., Bethlehem, for shapes, but on spot business the higher prices are fairly well adhered to. However, it is still possible to buy plates at 2.17½c., New York, or 2c., Coatesville. Buyers are showing no interest in fourth quarter requirements, and it will be another month before the higher prices announced for that period can be tested. Structural business continues in large volume, and many important projects are pending on which early settlement is expected. With specifications coming in on the heavy sales of June and July, mill schedules are well filled and deliveries are lengthening. Fabricating prices are stronger. Three sections of the New York subway, calling for 29,000 tons of shapes, have come out for bids, and a 4000-ton section has been placed. Action is expected this week on the Reynolds Building, New York, which will take nearly 17,000 tons. The Structural Steel Board of Trade reports July structural lettings in the New York metropolitan district, exclusive of bridges, subway work, etc., of 70,000 tons. This compares with 38,000 tons in the previous month and is the highest monthly total since July, 1927, when awards amounted to 73,000 tons.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets and Strips.—Announcement of a \$2 a ton advance in black and galvanized sheet prices for the fourth quarter has been made by several independent producers. This will make quotations on black sheets 2.75c. per

lb., Pittsburgh, and galvanized, 3.50c., while blue annealed will remain at 2c., for widths up to 45 in., and 2.10c. for the wider sizes. Business, particularly specifications on old contracts, is showing considerable improvement over July, and the higher fourth quarter prices are expected to bring in large tonnages. There has also been some improvement in the demand for strip steel, and prices are steady at 2.90c. to 3c., Pittsburgh and

Warehouse Prices, f.o.b. New York

	Base per Lb.	
Plates and structural shapes.....	3.30c.	
Soft steel bars, small shapes.....	3.25c.	
Iron bars.....	3.24c.	
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—		
Rounds and hexagons.....	3.40c.	
Flats and squares.....	3.90c.	
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.	
Hoops.....	4.50c.	
Bands.....	4.00c.	
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.	
Long terme sheets (No. 24).....	5.60c. to 5.80c.	
Standard tool steel.....	12.00c.	
Wire, black annealed.....	4.50c.	
Wire, galv. annealed.....	5.15c.	
Tire steel, 1½ x ½ in. and larger..	3.30c.	
Smooth finish, 1 to 2½ x ¾ in. and larger.....	3.65c.	
Open-hearth spring steel, bases,	4.50c. to 7.00c.	
	Per Cent	
Machine bolts, cut thread:	Off List	
¾ x 6 in. and smaller.....	60	
1 x 30 in. and smaller.....	50 to 50 and 10	
Carriage bolts, cut thread:		
½ x 6 in. and smaller.....	60	
¾ x 20 in. and smaller.....	50 to 50 and 10	
Coach screws:		
½ x 6 in. and smaller.....	60	
1 x 16 in. and smaller.....	50 to 50 and 10	
Boiler Tubes—	Per 100 Ft.	
Lap welded, 2-in.....	\$17.33	
Seamless steel, 2-in.....	20.24	
Charcoal iron, 2-in.....	25.00	
Charcoal iron, 4-in.....	67.00	
Discount on Welded Pipe		
Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	43	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16
Tin Plate (14 x 20 in.)		
	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00
Terne Plate (14 x 20 in.)		
IC—20-lb. coating.....	\$10.00 to \$11.00	
IC—30-lb. coating.....	12.00 to 13.00	
IC—40-lb. coating.....	13.75 to 14.25	
Sheets, Box Annealed—Black, C. R.		
	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	
Sheets, Galvanized		
	Per Lb.	
No. 14.....	4.15c. to 4.35c.	
No. 16.....	4.00c. to 4.20c.	
No. 18.....	4.15c. to 4.35c.	
No. 20.....	4.30c. to 4.50c.	
No. 22.....	4.35c. to 4.55c.	
No. 24.....	4.50c. to 4.70c.	
No. 26.....	4.75c. to 4.95c.	
No. 28*	5.00c. to 5.20c.	
No. 30.....	5.40c. to 5.60c.	
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.		

Cleveland, on the cold-rolled product, and 1.75c. to 2.20c., Pittsburgh, for the hot-rolled material.

Pipe.—An oil company with headquarters in New York is inquiring for 18,000 tons of oil well pipe for shipment to South America. Other large projects are in prospect and the market for this material is expected to be active throughout the remainder of the year. The high rate of building activity in this district is reflected in the steady demand for standard butt-weld pipe.

Reinforcing Bars.—The first two weeks of the month have shown considerable improvement over July both in lettings and in new work in prospect. Nearly 2000 tons is included in jobs of 100 tons or more placed in the last week, the largest being a high school at White Plains, N. Y., which took 500 tons, and a factory building at Norwalk, Conn., calling for 400 tons. At least 3000 tons has been added to pending work. Distributors in this territory are no longer quoting mill prices except in exceptional cases, and the Pittsburgh warehouse price of 2.15c. per lb., or 2.49c., on cars at New York, seems to be definitely established. The practice of not shipping cut-to-length from mills except in 40, 50 and 60-ft. lengths has been generally adopted. Out of New York warehouse the common quotations are 2.80c. per lb. for lots of 5 tons or more, 2.95c., for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Cast Iron Pipe.—Southern makers of pressure pipe are still out of this market at present prices of \$34 to \$35 per ton, base Birmingham, and a \$9.25 freight rate into this district. Northern foundries continue to quote \$37.60 to \$38.60 per ton, delivered New York. Atlantic City, N. J., opens bids Aug. 16 on 4500 tons of 60-in. Class A pipe. Hartford, Conn., opened bids Aug. 11 on 150 tons of 8-in. and 325 tons of 12-in. Class D pipe, with alternate prices on Class 250 centrifugal pipe.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Warehouse Business.—Current buying is confined to small orders, but total bookings compare favorably with those of last month. Competition of foreign material is still encountered in sales of bars and shapes, but lately there has been a slight decrease in the activity of sellers of imported steel, probably as a result of higher prices in European markets. The sheet market is being maintained with only occasional concessions from the range of 3.80c. to 4c. per lb., base, for black and 4.50c. to 4.70c., base, for galvanized.

Coke.—Furnace grade continues to show decided firmness, partly as a result of curtailment of operations and partly because of the purchase last week by a Pittsburgh steel interest of 10 additional carloads a day from several Connellsville producers.

For delivery through next month \$2.75 to \$2.85 per net ton is quoted, but the usual price for shipment beyond Oct. 1 is close to \$3 a ton. Connellsville foundry coke for prompt shipment is quoted at about \$3.75, Connellsville. Special brands are unchanged at \$4.85, ovens, or delivered into this district; \$8.56 per net ton to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke is unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06 to \$10.29, New York or Brooklyn.

Old Material.—Prices are developing decided firmness and in some cases are slightly higher based on recent sales at advances of 50c. a ton. Holders of scrap are seeking higher prices from brokers and it is reported to be increasingly difficult to obtain material. Recently a consumer at Harrisburg, Pa., bought heavy breakable cast, stove plate and bundled sheets, and, on the basis of these new contracts, brokers are offering \$15 per ton for heavy breakable cast, \$11 per ton for stove plate and \$10 per ton for bundled sheets, delivered to Harrisburg. While there has been no change in the price of heavy melting steel delivered eastern Pennsylvania, some dealers are shipping their steel into

the Pittsburgh district, receiving \$15 to \$15.30 per ton, delivered, on a \$5.30 freight rate, or \$9.70 to \$10 per ton, New York. The eastern Pennsylvania price is unchanged at \$12.50 per ton, delivered. Brokers are buying foundry stove plate at \$10.75 per ton, delivered West Mahwah, N. J., which has a \$2.02 freight rate, and at \$11 per ton delivered Bayonne, N. J., which has a \$1.89 freight rate.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.00 to	\$9.85
Heavy melting steel (yard)	6.75 to	7.25
No. 1 hvy. breakable cast.	10.75 to	11.25
Stove plate (steel works)...	6.75 to	7.25
Locomotive grate bars....	6.75 to	7.25
Machine shop turnings....	6.25 to	6.50
Short shoveling turnings..	6.25 to	6.50
Cast borings (blast furn. or steel works).....	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles.....	15.00 to	15.50
Iron car axles.....	23.50 to	24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to	8.75
Forge fire	6.50 to	6.75
No. 1 railroad wrought....	9.00 to	9.50
No. 1 yard wrot., long....	7.50 to	8.00
Rails for rolling.....	10.00 to	10.50
Cast iron carwheels.....	11.00 to	12.00
Stove plate (foundry)....	8.75 to	9.00
Malleable cast (railroad)...		10.00
Cast borings (chemical)...	10.75 to	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.00 to	\$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	12.00 to	13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to	12.50

Cleveland

Finished Steel Prices Have Firmer Tone—Pig Iron Sales Total 84,000 Tons

CLEVELAND, Aug. 14.—The demand for finished steel is holding up unusually well for August. Mills are getting a good volume of specifications against contracts for steel bars. Structural material is fairly active, and plates are moving quite well in small lots. Several of the automobile manufacturers are under heavy production on new models, and the demand from that source is good for this season of the year. Orders for alloy steel bars are in sufficient volume to keep the leading Ohio manufacturer in operation close to capacity, and some of the sheet and hot-rolled strip mills have nearly as much tonnage on their books as earlier in the season, when the operations of automotive industry were larger. While structural lettings in the building field are not numerous, some good tonnage is coming out for bridge work.

The market continues to show a firmer tone on the heavier rolled products. While most consumers of steel bars and structural material are under contract at 1.85c., a moderate volume of small-lot business is being placed and outside mills are holding more closely to 1.90c., Pittsburgh.

A local producer is still quoting steel bars at 1.85c., Cleveland. On plates 1.85c., Pittsburgh, is still rather commonly named, although some small-lot business is being taken at 1.90c.

The Wheeling & Lake Erie Railway has purchased 1000 tons of rails from a Pittsburgh district mill, this order being supplemental to one placed for a similar tonnage reported last week.

In pig iron an active buying movement has developed.

Pig Iron.—Sales increased sharply in the past week. Cleveland interests sold 84,000 tons of pig iron in foundry and malleable grades, making the week one of the best of the year in volume of business. Buying was quite well distributed, though the automotive industry took a good percentage

of the tonnage. While there was a good volume of early shipment orders, the larger part of the business was in contracts covering the remainder of the year. There was also some buying for the fourth quarter by consumers that had already covered for the present quarter. Many foundries evidently feel that they can now forecast their requirements over the remainder of the year and, believing that prices are on rock bottom, see no advantage in postponing buying until later. The tone of the market is firmer. While there has been no advance in prices, furnaces are not showing the disposition to shade quotations in competitive territories that they did a few weeks ago. Cleveland producers claim to be holding firmly to \$16.50, furnace, for foundry and

malleable iron for outside shipment and are taking some business at that price. In Michigan there is a range of \$17.50 to \$18, furnace, shading of the lower price, which recently developed in a few cases, having disappeared. For Cleveland delivery the market is steady at \$17.50, furnace. Shipping orders are very good and show a little gain over July. Among new inquiries is one from the General Electric Co. for 1500 tons of foundry iron for its Erie, Pa., works.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.....	\$18.00
S'th'n fdy., sil. 1.75 to 2.25.....	21.50
Malleable	18.00
Ohio silvery, 8 per cent.....	28.00
Basic Valley furnace.....	16.00
Stand. low phos., Valley furn.....	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Lake shipments are holding up to recent volume. The ore balance on Lake Erie docks Aug. 1 was 5,385,007 tons, compared with 5,459,497 tons on the same date a year ago. Receipts at these docks during the month were 6,078,181 tons and for the season 15,124,977 tons, compared with 17,848,739 tons during the same period a year ago. Shipments from Lake Erie docks during July were 4,110,864 tons and for the season 11,410,116 tons, against 13,809,271 tons during the same period last year. Receipts at other Lake ports during July were 2,655,181 tons, compared with 2,281,622 tons during the same period last year.

Semi-Finished Steel.—Specifications are holding up to the recent good volume, and the leading local merchant producer continues to operate at 100 per cent of capacity. There is virtually no new business, as practically all consumers are under contract. Prices are steady at \$32 to \$33, Cleveland, for sheet bars, billets and slabs.

Bolts, Nuts and Rivets.—Orders are fair for August, having fallen but slightly below July in volume. The automotive industry, implement manufacturers and jobbers continue to specify fairly freely for bolts and nuts. Makers of nuts and bolts are operating at about 60 per cent of capacity.

Coke.—The demand for foundry coke is slow, and prices are unchanged at \$7.75, Painesville, for Ohio by-product coke and \$3.50 to \$4.85, ovens, for Connellsville foundry coke. Local by-product domestic coke is quoted at \$6, delivered Cleveland, for egg size.

Sheets.—Orders from the automotive industry are keeping up well, and the demand from other industries shows a gain. Consumers have allowed their stocks to run low and are buying for quick delivery. While the low prices that have appeared for some time are still being named, they are less common than a few weeks ago. Strong efforts will be made to get prices on a higher basis for the fourth quarter, and some mills have already announced advances for that delivery. Galvanized sheets are still available at 3.40c., Pittsburgh, and 3.45c., Valley. Mills are holding to 2.60., Pittsburgh, on black sheets and to 1.90c. on blue annealed.

Strip Steel.—Specifications for hot-rolled strip are good, and the market has a firmer tone in that mills are able in some cases to sell small lots at better than the ruling round-lot price of 1.75c. Cold-rolled strip is rather slow. The demand for this product has been lessened by the increased use on automobiles of one-piece fenders that are made entirely of full-finished sheets. While 2.75c., Cleveland, has been shaded \$2 a ton in Detroit, that price appears to be holding in this territory.

Wire Products.—The demand is moderate. While published quotations appear to be holding in most sections, shading to \$2.35, Cleveland, on wire and \$2.50 on nails is reported in some localities.

Reinforcing Bars.—The demand is light, and price shading continues on billet steel bars for local delivery. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Business.—Orders, particularly for steel bars and structural

material, show a gain over July. A lull is reported in the demand for sheets. Prices generally are firm except on reinforcing bars.

Old Material.—The market has a firmer tone, brought about by more liberal releases by local mills against old contracts. While there is no buying by mills, dealers having old orders to fill are being asked higher prices and, although resisting an advance, they have in some cases paid a little more for scrap than recently. No. 1 heavy melting steel has sold in small lots up to \$13.25, and machine shop turnings, at \$7.50, a 25c. a ton advance on both grades. Purchases of blast furnace scrap were made at \$9.10.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.....	\$13.00 to	\$13.25
No. 2 heavy melting steel.....	12.25 to	12.50
Compressed sheet steel.....	12.00 to	12.50
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	11.25 to	11.50
Machine shop turnings.....	7.25 to	7.50
No. 1 railroad wrought.....	11.50 to	12.00
No. 2 railroad wrought.....	13.50 to	13.75
No. 1 busheling.....	10.50 to	11.00
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops.....	16.00 to	16.50
Low phos., billet, bloom and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.....	16.50 to	17.00
Low phos. plate scrap.....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	9.00 to	9.25
Mixed bor'gs and short turn'gs	9.00 to	9.25
No. 2 busheling.....	9.00 to	9.25
Cupola Grades		
No. 1 cast.....	16.00 to	16.50
Railroad grate bars.....	11.00 to	12.00
Stove plate.....	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling.....	16.25 to	16.50

Hyb-lum—A New Light Aluminum Alloy

A new aluminum alloy has been placed on the market by the Sheet Aluminum Corporation, Jackson, Mich. It is described as "a balanced aluminum alloy, fundamentally new in composition and in application." It is claimed for this alloy that it combines lightness and strength to a greater degree than any other workable product ever developed on a commercial scale. The new alloy is named "Hyb-lum," protected under United States patent No. 1,579,481.

Research and experimental work was done by Victor N. Hybinette, Jr., with the advice and assistance of his father, an authority on non-ferrous metals. Prior to the introduction of Hyb-lum, the alloying elements of aluminum have been chiefly copper, manganese, silicon and magnesium. In the new alloy, nickel and metals of the chromium group are employed. The total addition of all heavy metals is given as approximately 2 per cent.

Among the qualities claimed for the new alloy are these properties: non-tarnishing, non-corrodibility, resistance to inter-crystalline corrosion, chemical resistivity, welding quality, strength and plasticity, non-fatigue,

low specific gravity, wide limits of temperature in heat treatment and stability after heat treatment, even at elevated temperatures.

The alloy is white, or silver like, without the grayish blue cast of aluminum. It takes a brilliant and lasting polish. It is manufactured in four different classes—A, B, C and D—with the composition virtually the same in all. They vary in physical properties according to annealing, hard rolling to different tempers, cold working and heat treatment. The alloy, it is added, is weldable by means of gas or the electric arc.

Iron Ore Distribution in 1927

In the charts showing the sources and distribution of iron ore in 1927, reproduced on page 357 of THE IRON AGE of Aug. 9, it seems that two errors were made in connection with rail shipments. The Lake Superior Iron Ore Association, which has headquarters at Cleveland, says that the all rail shipments from the Gogebic range should be 150,000 and not 450,000 tons as indicated, and similarly the all rail shipments from the Menominee range should be 10,000 and not 100,000 tons.

Warehouse Prices f.o.b. Cleveland

Base per Lb.

Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.40c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

San Francisco

Structural Shapes Most Active Product in Coast Markets—Low Prices on Reinforcing Steel

SAN FRANCISCO, Aug. 11 (*By Air Mail*).—August steel sales continue at a fair rate and show improvement over the volume booked last month. Included among the larger lettings of the week were 590 tons of reinforcing bars for the Big Dalton dam at Los Angeles, placed with the Pacific Coast Steel Co., and 455 tons of structural shapes for a bridge at Saugus, Cal., awarded to Claude Fisher Co., Los Angeles. Prices, however, from the viewpoint of the mill and the fabricator are far from satisfactory. Extremely low quotations on reinforcing bars out-of-stock continue in the San Francisco district.

Pig Iron.—Most of the melters have fair-sized stocks and are not keenly interested in the market. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—In addition to the Big Dalton dam project mentioned above, Culver City, Cal., placed 459 tons for a storm drain with Braun, Bryant & Austin. Including smaller awards the total for the week exceeded 2000 tons. New inquiries call for 500 tons for an apartment on Vine Street, Los Angeles, and 160 tons for a bridge at Maupin, Ore. Out-of-stock quotations continue at low levels, and while 2c. is occasionally obtained, most of the business is going at around 1.85c. This compares with a c.i.f. price on domestic structural steel of 2.35c. Merchant bar demand remains quiet; the majority of sales and inquiries call for less than carload lots.

Plates.—Only two inquiries of over 100 tons are up for figures. These involve 7200 tons of 5/16 to 3/8-in. materials for water mains in Oakland for the East Bay Municipal Utility District, bids on which will be opened Aug. 17, and 103 tons for a 36-in. pipe line for the Belle Fourche project in South Dakota for the Bureau of Reclamation, on which the Western Pipe & Steel Co. of San Francisco is low bidder. The Navy Department has placed 131 tons for the

Mare Island yard with an eastern producer. Quotations range from 2.20c. to 2.30c., the former price being quoted by one or two of the small independent producers.

Shapes.—Structural steel continues the most active product on the coast. Awards this week were in excess of 2300 tons. The Minneapolis Steel & Machinery Co. was awarded 650 tons for a high school at Great Falls, Mont. The Star Iron & Steel Works took 350 tons for a chemical plant at Tacoma and the McClintic-Marshall Co. booked 140 tons for a bridge at Sargent, Cal. Considerable new work is planned and architects expect to have working drawings on them completed within the next 60 days. These projects, together with those now up for figures, will exceed 25,000 tons. New inquiries include 250 tons for a hangar at Oakland, 170 tons for an apartment in San Mateo, Cal., and 170 tons for a bridge at Maupin, Ore. Shapes are firm at 2.35c., c.i.f.

Cast Iron Pipe.—W. J. Tobin, Oakland, secured the only award of over 100 tons. This project called for 416 tons of 4 to 12-inch class B pipe for Tracy, Cal. Bids were opened this week on 23,247 tons for Dallas, Tex., and bids will be opened next week on 22,325 tons for distributing mains in Oakland for the East Bay Municipal Utility District. On the latter project alternate bids on different types of pipe will be taken. Compton, Cal., opened bids this week on 148 tons of 2 and 4-in. class B pipe. Los Angeles has come into the market for 318 tons of 2-in. class B pipe, bids to be opened Aug. 14. On Aug. 27, San Diego, Cal., will open bids on 147 tons of 6 to 10-in. class C pipe for the improvement of Garnet Street.

Coke.—Movement of coke has not been heavy of late as foundry operations, especially among the jobbing classes of plants, have shown little or no improvement during the past 30 days and stocks on hand in foundry yards are apparently sufficient to take care of immediate requirements. English beehive is quoted at \$16 a net ton, incoming dock, and by-product coke ranges from \$11.50 to \$13.00 a net ton.

Birmingham

Pig Iron Shipments Keep Pace with Production—Steel Buying Holds Up Well

BIRMINGHAM, Aug. 14.—A fair amount of new pig iron tonnage, mostly for August, is coming in, but the market is not active. Buying is for early melt. Present bookings of merchant producers cover most of August and September production. Quotations continue at the \$15.50 base. Shipments thus far in August are keeping pace with production. In July the three merchant producers reduced their yard stocks, shipping more than they made. No changes have been made in furnace operations during the past three weeks. Seventeen are in blast, eight on foundry, seven on basic, one on ferromanganese and one on recarburizing iron. The Gulf States Steel Co. furnace, now being built, will not be ready until the latter part of next month. The second of the two new blast furnaces of the Tennessee company at Fairfield has been completed but is not in operation.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	\$15.00 to 16.00

Finished Steel.—New business and inquiries are holding up well and continue above the midsummer average. July bookings were above those of the same month last year and also slightly ahead of those in June. August is expected to show similar improvement. Prices are stationary. Structural steel fabricators report a quiet week. Fifteen open-hearth furnaces are being operated, the Tennes-

see company having six on at Fairfield and five at Ensley; the Gulf States Steel Co., three at Alabama City. The rod mill of Gulf States Steel Co. has been closed down for change from steam to electric power. Operations will be resumed the latter part of this month.

Cast Iron Pipe.—Very little new tonnage was booked by the pressure pipe plants during the past week. No awards of any consequence were placed. Operations are steady and at the same rate as for some weeks past. Plant activity so far this month has been largely based on tonnage secured in July. Quotations for third quarter deliveries remain around \$34 to \$35. The soil pipe market is still unsatisfactory and has changed but little.

Old Material.—Gradual improvement is being felt in certain lines, such as No. 1 cast and steel scrap. This has now been noticeable for several weeks. Demand is said to be slightly better. No changes in prices occurred during the past week.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to \$9.00
Scrap steel rails.....	11.00 to 11.50
Short shoveling turnings..	7.50 to 8.00
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling.....	13.00
No. 1 cast.....	14.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels.....	12.00 to 13.00
Cast iron borings, chem...	13.50 to 14.00

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, 3/16-in. and over.....	3.15c.
Small angles, under 3/16-in.....	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.....	3.75c.
Spring steel, 1/4-in. and thicker....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, 1/2-in. and larger....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100-lb. keg.....	3.40

St. Louis

Pig Iron Shipments in Satisfactory Volume—But New Buying Is Light—Scrap Slightly Firmer

ST. LOUIS, Aug. 14.—While purchasing of pig iron is not in impressive volume, shipments since the first of this month and specifications against contracts have been satisfactory. Certain melters, notably implement makers and some specialty manufacturers, are busy and in need of raw material. Consumers' stocks generally are low, in some instances considerably under normal even for this time of year. Reserves at blast furnaces serving this district have also been cut, and there is less anxiety to sell than early in the summer. The leading district producer is not pushing fourth quarter sales and is firmer on business for the rest of this quarter. Sales reported totaled 5200 tons, the largest 2000 tons of malleable to an East Side plant. A Kansas jobbing foundry took 400 tons and an Iowa specialty maker engaged 600 tons; the rest was scattered in 50 to 200-ton lots among users in Missouri, Illinois, Iowa and Indiana.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.
Granite City, Ill.	\$18.50 to \$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	19.66
Southern No. 2 fdy., deliv'd.	19.92
Northern malleable, deliv'd.	19.66
Northern basic, deliv'd.	19.66

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—The extreme hot weather has caused a slowing down in metallurgical coke, and new buying is at a minimum. Shipments, however, continue to make a fair showing, there being few requests for holdups. Local by-product oven stocks are larger than they were 30 days ago, but not above normal for this season. Prices are unchanged.

Finished Iron and Steel.—Warehousemen report business since the first of this month about up to expectations, with some departments better than looked for. Building material is in good demand, both in the district proper and in the surrounding trade area. Railroads have been swamped with offerings of grain and have kept their shops busy on emer-

gency repairs of box cars. This is reflected in buying by the carriers of a variety of shop supplies. Sheets continue quite active, with the call coming from diversified sources. Sales of small quantities of concrete reinforcing material are reported, but the only jobs of note were 165 tons for the Missouri Baptist Sanitarium, St. Louis, and 275 tons for a hotel at Eighth and Market Streets, St. Louis, both going to the Laclede Steel Co. Fabricators of structural steel are working on old orders, but report no new lettings of consequence.

Old Material.—For the first time in a number of weeks scrap iron and steel dealers report a firmer tone to the market. This is due to higher quotations in Chicago and further east rather than to increased buying by the industries here. Few sales are recorded. Stocks, however, are light, and any increase in demand could easily be reflected in an upturn in values. In face of the lack of demand, railroads continue to unload scrap,

and, singularly enough, are receiving good prices, conditions considered. Latest lists include: Southern Railway, 14,056 tons; Wabash, 2905 tons; Ann Arbor, 532 tons; Great Northern, 83 cars; Nickel Plate, 21 cars; Kansas City Southern, 281 tons; Chicago & Alton, 1240 tons; Texas Pacific, 490 tons; Chesapeake & Ohio, 3562 tons; Frisco, 10 cars, and Louisville & Nashville, 15,978 tons.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	.....	\$10.50 to \$11.00
No. 1 locomotive tires	.....	11.75 to 12.00
Heavy shoveling steel	.....	10.50 to 11.00
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart	.....	12.00 to 12.50
Railroad springs	.....	13.00 to 13.50
Bundled sheets	.....	7.75 to 8.25
No. 2 railroad wrought	.....	11.00 to 11.50
No. 1 busheling	.....	9.00 to 9.50
Cast iron borings	.....	8.25 to 8.75
Iron rails	.....	13.00 to 13.50
Rails for rolling	.....	13.00 to 13.50
Machine shop turnings	.....	7.00 to 7.50
Steel car axles	.....	18.00 to 18.50
Iron car axles	.....	25.50 to 25.75
Wrot. iron bars and trans.	.....	18.25 to 18.75
No. 1 railroad wrought	.....	9.00 to 9.50
Steel rails, less than 3 ft.	.....	15.00 to 15.50
Steel angle bars	.....	11.75 to 12.25
Cast iron carwheels	.....	13.00 to 13.50
No. 1 machinery cast	.....	13.00 to 13.50
Railroad malleable	.....	11.50 to 12.00
No. 1 railroad cast	.....	13.00 to 13.50
Stove plate	.....	11.00 to 11.50
Agricult. malleable	.....	11.50 to 12.00
Relay. rails, 60 lb. and under	.....	20.50 to 23.50
Relay. rails, 70 lb. and over	.....	26.50 to 29.00

Canada

Hotel at Halifax Takes 10,000 Tons of Steel—Like Tonnage Needed for Toronto Building

TORONTO, ONT., Aug. 14.—Interest in the Canadian pig iron markets showed more life during the past week. Foundry and malleable iron sales were in larger volume than in the week previous. Some inquiry is out for last quarter iron. Orders for 500 and 600-ton lots have been closed for delivery this month by water, and it is understood that this iron will be for late fall and winter consumption. Pig iron prices are unchanged.

Prices per gross ton:

	Delivered Toronto
No. 1 fdy., sil.	2.25 to 2.75, \$23.10 to \$23.60
No. 2 fdy., sil.	1.75 to 2.25, 23.10 to 23.60
Malleable	 23.10 to 23.60
	Delivered Montreal
No. 1 fdy., sil.	2.25 to 2.75, 24.50 to 25.00
No. 2 fdy., sil.	1.75 to 2.25, 24.50 to 25.00
Malleable	 24.50 to 25.00
Basic	 23.50 to 24.00
	Imported Iron, Montreal Warehouse
Summerlee	 33.50
Carron	 33.00

Structural Steel.—The general increase in building activities is reflected in a strong demand for structural steel and reinforcing bars. Among the larger contracts awarded in the week was that for the new Canadian National station and hotel at Halifax, N. S., involving 10,000 tons of structural steel, which went to the Dominion Bridge Co., Ltd. The Canadian Bank of Commerce, Toronto, will shortly award contracts in connection with a proposed office building to be erected at King and Jordan

Streets; about 10,000 tons of steel will be required.

Old Material.—Sales for the week showed some improvement over those of the first few days of the month. Heavy melting steel and turnings are moving freely into this district, and some buying of machinery cast and rails has been reported. The weakness in prices of a week or two ago has almost entirely disappeared.

Dealers' buying prices:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel		\$9.00	\$7.00
Rails, scrap		10.00	9.00
No. 1 wrought		9.00	11.00
Machine shop turnings		7.00	5.00
Boiler plate		7.00	6.00
Heavy axle turnings		7.50	6.50
Cast borings		7.50	5.00
Steel turnings		7.00	5.50
Wrought pipe		5.00	5.00
Steel axles		14.00	20.00
Axles, wrought iron		16.00	22.00
No. 1 machinery cast		16.00	13.00
Stove plate		13.00	16.00
Standard carwheels		13.00	13.00
	Per Net Ton		
No. 1 machinery cast		15.00	.....
Stove plate		9.00	.....
Standard carwheels		13.00	.....
Malleable scrap		13.00	.....

The Georgia Manganese & Iron Co., Atlanta, Ga., has been organized to develop manganese properties at Cartersville, Ga. Perin & Marshall, consulting engineers of New York, are in charge of the experimental work now going on.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	 3.25c.
Bars, soft steel or iron	 3.15c.
Cold-fin. rounds, shafting, screw stock	 3.75c.
Black sheets (No. 24)	 4.45c.
Galv. sheets (No. 24)	 5.25c.
Blue ann'l'd sheets (No. 10)	 3.60c.
Black corrug. sheets (No. 24)	 4.50c.
Galv. corrug. sheets	 5.30c.
Structural rivets	 3.75c.
Boiler rivets	 3.75c.
	Per Cent Off List
Tank rivets, 7/16-in. and smaller, 100 lb. or more	 70
Less than 100 lb.	 65
Machine bolts	 60
Carriage bolts	 60
Lag screws	 60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50

Boston

Heavy Melting Scrap Higher in More Active Market—More Interest in Pig Iron

BOSTON, Aug. 14.—While pig iron sales in the past week probably did not exceed 6000 tons—made up of 2000 tons of Mystic, 2000 tons of Buffalo iron and the rest divided between New York State, western Pennsylvania, Alabama and Indian brands—more interest is being shown in supplies, as attested by a comparatively large number of sales ranging from car lots to 300 tons. Most of the iron sold recently was for fourth quarter shipment; the average foundry has enough on hand and on contract to carry it through the third period. Despite reports from other districts of a firmer undertone to prices, No. 2X iron from the Buffalo district, in car lots, is still available in New England at \$16.50 a ton, furnace, and No. 1X, at \$17. These prices can be shaded on round tonnages. It is reported that bidding for barges has raised water rates. Pig iron prices, however, are as yet unaffected. Indian iron is selling at \$21.25 to \$21.75 a ton on dock here, duty paid.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$20.91 to \$21.41
*Buffalo, sil. 2.25 to 2.75..	21.41 to 21.91
†Buffalo, sil. 1.75 to 2.25..	19.78 to 20.28
†Buffalo, sil. 2.25 to 2.75..	20.28 to 20.78
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	22.41 to 24.27
Ala., sil. 2.25 to 2.75.....	22.91 to 24.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Imports.—Imports of pig iron at this port in July totaled 596 tons, all from India, whereas importations in the previous month were 800 tons, and in July last year, 1979 tons. Imports of ore in July were 9800 tons, all from Newfoundland, as against 18,731 tons

in June and 30,852 tons in July, last year.

Coke.—New England by-product foundry coke remains at \$11 a ton, delivered, within a \$3.10 freight rate zone, that price having been in effect since June 1. Deliveries on contracts are running about on a par with those for July, the best month so far this year. One maker is about a day behind on shipments. The same manufacturer's August deliveries of domestic coke are 50 per cent ahead of those for the same period in July, largely as a result of the installing of new screening equipment.

Cast Iron Pipe.—No open municipal pipe business has been closed. Private sales to cities, towns and companies are holding up well, however, and prices on such business are firm. Newton, Mass., has closed bids on 150 tons of 6-in. pipe but has made no award. The range on 4-in. pipe is \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and on 6-in. to 12-in., \$41.10 to \$42.10. The usual \$5 differential is asked on Class A and gas pipe.

Warehouse Business.—Warehouse deliveries in the first half of August are about equal to those for the first half of July, and exceed those of the same period in August, 1927. Stocks are well balanced but not heavy. It is still intimated that warehouse prices are to be higher, but nobody has taken the initiative, owing to the keen competition for business.

Old Material.—Reflecting higher prices in the Pittsburgh district, the local market for heavy melting steel is more active and now ranges from \$8.50 to \$9 a ton, on cars shipping point, with an occasional sale at \$9.25, contrasted with \$8 to \$8.50 a week ago. In addition to domestic business, there continues an export demand. One steamer has virtually finished loading 7000 to 7500 tons of steel for Italy. Another boat has started loading 3600 tons for Danzig. The freight rate on this lot is \$5.25 a ton. The Pittsburgh Testing Laboratory is inspecting the material for the shippers. No. 1 steel for export remains at \$9.25 a ton on dock here, and No. 2 at \$8.50 to \$8.75. Pipe is a little more active, with indications of being higher shortly. More orders for steel turnings, forge fire scrap and No. 1 machinery cast have been moved of late, but not in large quantities. The Boston & Maine Railroad yesterday closed bids on about 35 cars of miscellaneous material.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$8.50 to \$9.25
Scrap T rails.....	7.50 to 8.00
Scrap girder rails.....	7.25 to 7.50
No. 1 railroad wrought....	8.50 to 9.00
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings....	5.00 to 5.50
Cast iron borings (steel works and rolling mill)...	5.00 to 5.50
Bundled skeleton, long....	6.50 to 7.00
Forge flashings.....	6.50 to 7.00
Blast furnace borings and turnings.....	5.00 to 5.50
Forge scrap.....	5.50 to 6.00
Shafting.....	11.50 to 12.00
Steel car axles.....	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$13.50 to \$14.00
No. 1 machinery cast.....	14.00 to 14.50
No. 2 machinery cast.....	12.50 to 13.50
Stove plate.....	10.00 to 10.50
Railroad malleable.....	13.50 to 14.50

Pacific Northwest

Structural Steel and Reinforcing Projects Fairly Active—Inquiry for Plates Improved

SEATTLE, Aug. 11 (*By Air Mail*).—

A fair amount of new structural steel work is in sight, including 650 tons for Prince Rupert docks of the Canadian National Railways; two State highway bridges, one of 415 tons and the other of 445 tons, bids on which are to be opened Aug. 14; new buildings for the Hooker Chemical Co., Tacoma, Wash., 700 tons, bids to be called for shortly, and 145 tons for the Second Avenue extension, Seattle. Other fair-sized jobs are in sight, and it is believed the last three or four months of the year will be quite active.

Plates.—New inquiry for plates is better. On Aug. 13 Tacoma, Wash., is to open bids for 330 tons for extensions to water lines, while Edmonds, Wash., is in the market for 52,000 ft. of 4-in. to 12-in. pipe, bids to be asked in a week or two. Tank quality plates are quoted at 2.20c. to 2.25c., Seattle.

Bars.—Demand for reinforcing steel bars is more active. The Pacific Coast Steel Co. has taken 250 tons for an Everett, Wash., department store, about 100 tons for an addition to the Seattle Ice Cream Co.'s plant, 80 tons for an apartment in Seattle and 80 tons for a bridge at Nisqually, Wash. Contract for the Hanford Street tunnel has been awarded to George Nelson, a Seattle contractor, and it is expected that in a week or ten days contract will be awarded for 700 tons of reinforcing steel for this project.

Warehouse Business.—Local jobbers report that July was a very fair month, and so far August is just as good. One jobber has sent out new price cards under date of Aug. 1, in which prices of galvanized sheets have been reduced 25c. per 100 lb.; small rounds and squares have been advanced from 3c. to 3.50c.; angles ½-in. thick are up 50c. per 100 lb.

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	.50 and 5
Carriage bolts.....	.50 and 5
Lag screws.....	.50 and 5
Hot pressed nuts.....	.50 and 5
Cold-punched nuts.....	.50 and 5
Stove bolts.....	.70 and 10

*Including quantity differentials.

Cincinnati

Pig Iron Market Stronger—Heavy Melting Scrap Advances —Southern Coke Invades District

CINCINNATI, Aug. 14.—Pig iron producers and distributing houses are encouraged by the indications of a stronger and more active market. Northern producers have either raised their prices or are contemplating such action. One maker has circularized an advance of 50c. a ton. Recent sales by other manufacturers have been at better prices. This is true of both Lake and interior Ohio irons. Cleveland foundry iron, at least with one producer, is quoted at \$16.50, furnace, a price also named at a Columbus, Ohio, furnace. Southern furnaces are reported as having delayed opening books for the fourth quarter, and some business is reported as having been lost in consequence. This is also regarded as an indication that the sellers are not willing to take the prices prevailing in the face of what looks like a rising market. As yet, however, no change in prices has been announced in the South. An inquiry is current in this market for 250 tons of Southern iron. The only sizable inquiry is from a southern Ohio buyer for 500 to 1500 tons of Northern iron. One Cincinnati sales office sold 5500 tons in small lots, the largest being 250 tons, and another reported bookings of 1100 tons, the largest order being 200 tons. Sales were scattered over southern Indiana and Ohio. Prices remain at current quotations except that Northern iron is now quoted by several producers at \$16.50, furnace.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Demand for heavy steel products has been well sustained in the past week, specifications on current contracts having been especially liberal. Bars, shapes and plates are steady at 1.90c., base Pittsburgh, for small miscellaneous

lots for immediate delivery, attractive tonnages still being sold in some cases at 1.85c. Fabricators in this district are operating at a fair rate, and gas holder builders have recently booked orders which necessitate an increase in production. Sheet manufacturers report that specifications and fresh bookings have again turned upward after a short period during which incoming business fell off considerably. Unfilled orders are sufficient to insure sheet mill operations at close to 90 per cent of capacity during the next week. Meanwhile, prices have become better stabilized. Blue annealed stock is quoted at 1.90c. to 2c., base Pittsburgh, black sheets at 2.65c. to 2.75c. and galvanized at 3.40c. The wire market apparently is firmer, with common wire nails selling at a minimum of \$2.69 per keg, delivered Cincinnati, or \$2.55, Ironton.

Coke.—Reports continue that the Birmingham coke sellers are invading this territory, especially southern Indiana, where a price of \$3, ovens, has been quoted, while in Ohio outside the Cincinnati territory the prices named are from \$3 to \$3.50, ovens, and in the Cincinnati territory, \$4.25 to \$5.

Current prices locally have not changed. Foundry coke shipments are continuing at the rate reached at the close of July.

Old Material.—The scrap market has been improving, and prices of some grades have advanced. Inquiry is active with buyers bidding up prices. Dealers refuse to consider offers for heavy tonnages at the current market, being unwilling to sell large tonnages in the face of a rising market, especially for deferred or long term delivery. Prices again advanced this week 25c. to 50c. on sheet clippings, machine shop turnings, heavy melting steel, and carwheels. Sales have been in small tonnages but more numerous. Several melters are in the market this week, some for heavy tonnages. The prices that they will pay depend to a large extent on what the railroads obtain for their current offerings.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	\$11.00 to \$11.50
Scrap rails for melting	10.75 to 11.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.00 to 9.50
Cast iron borings	8.00 to 8.25
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 2 railroad wrought	11.00 to 11.50
Short rails	15.75 to 16.25
Cast iron carwheels	11.00 to 11.50
No. 1 machinery cast	15.00 to 15.50
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00

Detroit

Some Slackening in Automobile Production But Rate Is Ahead of That in 1927

DETROIT, Aug. 14.—There has been some slackening in automotive production, but the present volume is still running ahead of that of 1927.

The Buick Motor Co. produced 15,000 cars last month and is running now at approximately 900 a day. The Chevrolet company turned out approximately 120,000 cars and trucks during July, which sets a new July record for the company's production. Only 87,134 units were produced in the same month of 1927. July figures, however, are approximately 13,000 units short of June production.

To date, approximately 200,000 model A units have been produced by the Ford Motor Co. Production schedules are steadily advancing, with a daily output at present of approximately 3000 units. By September, it is expected, the company will be able to increase the rate of progress substantially and for the coming year production may exceed 10,000 units a day. All of the 36 domestic assembly plants of the Ford company are now in operation and payrolls are at the highest level in the history of the company.

Extensive additions are being begun at the Graham-Paige plants, including the one in Detroit, the one at Wayne, Mich., and also the Evans-

ville unit. The new buildings and equipment will increase capacity from 400 to 600 cars a day, and will necessitate an expenditure of approximately \$1,500,000.

The Packard Motor Car Co. shipped 3805 cars in July, compared with 3080 in July last year. The August schedule is set for 4800 units.

The July record for the sale of Studebaker cars stands at 12,600 units, 400 units under June and 3867 units in advance of July, 1927.

The Willys-Overland Co. up to July 15 showed sales of approximately 215,000 units. Sales for all of 1927 were only 171,743.

Old Material.—There has been considerable activity in the scrap market in this district, with several large inquiries pending for delivery to Ohio mills. Advances of 25 to 50c. per ton have been recorded.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$11.50 to \$12.00
Borings and short turnings	7.25 to 7.75
Long turnings	5.75 to 6.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	10.00 to 10.50
Stove plate	11.00 to 12.00
No. 1 busheling	8.75 to 9.25
Sheet clippings	6.50 to 7.00
Flashings	9.50 to 10.00

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reforc. bars	3.15c.
Rail steel reforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Buffalo

Heavy Steel Scrap Advances \$1 a Ton—Active Buying of Pig Iron

BUFFALO, Aug. 14.—Pig iron producers have been booking considerable tonnage, and inquiry has held up well. The lots sought are mostly of moderate size, but there have been some sizable inquiries also. The General Electric Co. is in the market for 5000 tons of foundry and malleable grades for its various plants, and a New England interest wants 4000 tons of foundry. The Kennedy Valve Mfg. Co., Elmira, N. Y., is inquiring for 300 to 500 tons of foundry and malleable. The Massey-Harris Harvester Co., Inc., has purchased 4000 tons of foundry and malleable for Batavia, N. Y., and Canada, the larger portion of the tonnage going to Batavia. Other lots placed include one of 600 tons of foundry; another of 500 tons of malleable and a third of 300 tons of malleable. On business in this district the market is firmly held at \$17, furnace, for No. 2 plain foundry and on malleable with silicon up to 2.75 per cent. One interest announces that it will waive no differentials on Eastern business and that it will adhere to a minimum of \$16.50, Buffalo base, on such shipments.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic.....	\$16.50 to 17.00
Lake Superior charcoal.....	27.28

Finished Steel.—Mill operations have again increased, now averaging close to 90 per cent of capacity. Prices on bars, shapes and plates are being firmly held, and specifications are in good volume. Black sheets are firm at 2.65c., base Pittsburgh, quotations as low as 2.60c. having practically disappeared. Galvanized sheets are 3.50c. to 3.55c., and automobile body sheets, 4c., base Pittsburgh. Strip steel is active, with shipping orders heavy. There is a feeling in the trade that higher strip prices will develop. Pipe specifications are satisfactory. Reinforcing bar awards are small in volume, although numerous.

Old Material.—Sharp competition for the available heavy melting steel drove prices up \$1 a ton this week, and further advances are expected. One purchase of a couple of thousand tons was made at \$14.50, but an offer of \$15 failed to pull out a tonnage. It was reported, though not verified, that one of the larger consumers had

meanwhile bought a tonnage at \$14.75. Most other grades remain quiet.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.50 to \$15.00
No. 2 heavy melting steel.....	13.00 to 13.25
Scrap rails.....	13.00 to 13.50
Hydraulic comp. sheets.....	13.00 to 13.25
Hand bundled sheets.....	8.00 to 8.50
Drop forge flashings.....	12.00 to 12.50
No. 1 busheling.....	13.00 to 13.25
Hvy. steel axle turnings.....	12.00 to 12.50
Machine shop turnings.....	7.00 to 7.50
No. 1 railroad wrought.....	11.00 to 11.50

Acid Open-Hearth Grades	
R'l'd knuckles and couplers.....	15.00
R'l'd coil and leaf springs.....	15.00 to 16.00
Rolled steel wheels.....	15.00
Low phos. billet and bloom ends.....	16.00 to 16.50

Electric Furnace Grades	
Hvy. steel axle turnings.....	12.00 to 12.50
Short shov. steel turnings.....	9.00 to 9.50

Blast Furnace Grades	
Short shov. steel turnings.....	9.00 to 9.50
Short mixed borings and turnings.....	9.00 to 9.50
Cast iron borings.....	9.00 to 9.50
No. 2 busheling.....	9.00 to 9.25

Rolling Mill Grades	
Steel car axles.....	15.50 to 16.00
Iron axles.....	19.50 to 20.00

Cupola Grades	
No. 1 machinery cast.....	14.25 to 14.75
Stove plate.....	13.00 to 13.25
Locomotive grate bars.....	11.25 to 11.75
Steel rails, 3 ft. and under.....	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50

Malleable Grades	
Industrial.....	14.50
Railroad.....	14.50
Agricultural.....	14.50

Youngstown

Sheet & Tube Company Advances Sheets for Fourth Quarter

YOUNGSTOWN, Aug. 14.—Fourth quarter sheet prices have been advanced an average of \$2 per ton by the Youngstown Sheet & Tube Co., and there are indications that other light steel products, such as strips, will also be marked up. The company also advises that, effective Oct. 1, its regular terms of payment on sheets will be changed to read: "Net cash within 30 days, or one-half of 1 per cent discount on f.o.b. mill value for payment within 10 days of date of invoice." This is in line with the policy recently adopted by other sheet manufacturers. In some cases, discounts up to 2 per cent for payment in 10 days have been allowed.

New prices quoted by the Sheet & Tube company are on a Pittsburgh base, with the usual differentials for Gary and Birmingham. The price schedule is: automobile body sheets, 4c. per lb., base; one-pass black sheets, 2.75c. per lb., base; galvanized sheets, 3.60c. per lb., base; blue annealed sheets, under 45 in. wide, 2c. per lb., base, and 2.10c. for 45 in. and wider.

Heavy mill operations rule this week, with 43 or 53 independent open-

hearth furnaces active and sentiment in the industry optimistic. The trend of prices is upward, and it is believed that advances will be realized by the fourth quarter.

Consumption of pig iron is running ahead of production, as furnace yard stocks are being depleted and there is little accumulation to fall back upon. Fall demand is expected to bring a number of blast furnaces into action. The Sheet & Tube company this week started its Grace stack in the Brier Hill group and will later suspend for repairs the Jeannette furnace in the same complement.

Black sheet prices, which were recently down to 2.60c. and 2.65c. per lb., Pittsburgh, are now more frequently 2.75c., and mills are aiming at 2.80c. Firmness is evident in other rolled steel prices, and the tone of the pig iron market is better.

Of 127 sheet mills in the Mahoning Valley, 108 started this week, with four to be added, and 12 of 20 tube mills are under power.

Steel fabricators continue to operate at 90 per cent of capacity or better. The A. M. Byers Co., Pittsburgh, continues to run its Girard puddling department at 60 per cent and rolling mills at 80 per cent. The Newton Steel Co. is operating all of its 20 mills at Newton Falls, Ohio.

Republic Iron & Steel Co. Lowers Cash Discount

Following the lead of the American Rolling Mill Co., the Republic Iron & Steel Co. has announced that on all orders accepted for delivery on and after Oct. 1 next, the terms on sheets and long ternes will be one-half of 1 per cent in 10 days, 30 days net. Discount will be allowed only on the value of the material f.o.b. mill and not on freight to destination.

Equipment Wanted by Frankfort, Ohio

The village of Frankfort, Ohio, will receive bids until Aug. 22 on the following equipment: one Fairbanks-Morse type Y vertical engine No. 562916, 75 hp., 300 r.p.m.; one Fairbanks-Morse alternator, 3-phase, 60-cycle, 1150 volts; one Fairbanks-Morse compound wound generator No. X36422, frame 61, 5 kw., 1400 r.p.m.; one centrifugal water pump; two 400-lb. test air tanks; one Fairbanks-Morse 3 x 3½-in., No. 10494 air compressor; one 200-gal. emergency oil tank; one 10,000-gal. fuel oil tank; one complete switchboard, h.v. 1150, l.v. 110; one No. 26063 single-phase Bullock generator, amp. 77.2; r.p.m. 900, volts 1100; one direct-current Westinghouse generator No. 40, type S.K., 1480 r.p.m., serial No. 1881581; 20 size 3 transformers; eight size 5 transformers; two size 7 transformers; one lot of odd fittings. Bids are to be addressed to D. F. Briggs, Jr., president of the board of public affairs.

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Non-Ferrous Metal Markets

Good Buying of Copper, Tin Prices Declining, Lead and Zinc Quiet and Steady

Copper.—Buying of copper for September delivery by domestic consumers has been quite heavy the past week and it is estimated in the trade that they have covered for about two-thirds of their requirements for that month. Foreign buying has also been quite liberal, sales last week being placed at probably 7500 to 8000 tons. Some August delivery as well as September was included in the foreign sales, but considerable metal must still be bought for next month's delivery. Thus far this week the mar-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Aug. 14	Aug. 13	Aug. 11	Aug. 10	Aug. 9	Aug. 8
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	48.25	48.25	....	48.87½	48.57½	48.10
Lead, New York.....	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

ket has been quiet with prices continuing very firm at 14.75c., delivered in the Connecticut Valley, and at 14.87½c., in the Central West. Lake copper is moderately active at 14.75c. to 14.87½c., delivered. The official quotation of Copper Exporters, Inc., continues unchanged at 15c., c.i.f., usual European ports. Statistics for July show a decrease in stocks of refined metal of about 4000 tons. Domestic shipments of over 82,000 tons were among the highest on record. Export shipments were large at nearly 57,000 tons.

Tin.—That consumers, both large and small, are not covered very far ahead is indicated by recent developments. They have been buying quite heavily the last week of nearby metal

and it is stated that they have much to buy yet for the remainder of the year. With the East selling freely, however, no scarcity is anticipated and there may even be an increase in the visible supply. With the tin plate industry very active and with automobile makers also running quite full, a large buying power is back of the market. Sales for last week were about 1200 tons, most of which was taken by consumers. Spot and August delivery, which is closely controlled and commands a good premium, was dealt in principally. Monday consumers took about 200 tons. Tuesday the market was very dull with spot Straits tin quoted at 48.25c., New York. Dealers are not at all active in the present market. Ar-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.00c. to 51.00c.
Tin, bar	52.00c. to 53.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	8.00c.
Lead, American pig.....	6.75c. to 7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	58.00c.
Solder, ½ and ½.....	32.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14-oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are holding at the same levels that have prevailed for nearly three months. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—

High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—

High brass	24.12½c.
Copper	25.00c.

Rods—

High brass	17.00c.
Naval brass	19.75c.

Wire—

Copper	16.75c.
High brass	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light.....	6.00c.	7.50c.
Hvy. machine composition	9.75c.	10.75c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. t'ings.....	9.00c.	10.00c.
Lead, heavy.....	5.00c.	5.375c.
Lead, tea.....	3.75c.	4.25c.
Zinc	3.00c.	3.50c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass		19.25c.
Copper, hot rolled.....		23.50c.
Copper, cold rolled, 14 oz. and heavier		25.75c.
Zinc		10.00c.
Lead, wide		9.75c.
Seamless Tubes—		
Brass		25.62½c.
Copper		26.50c.
Brazed Brass Tubes.....		27.25c.
Brass Rods		17.00c.

rivals thus far this month have been 2175 tons, with 7620 tons reported afloat.

Lead.—Quotations have been advancing in London, but thus far without any particular effect on this market. Prices here are firm and unchanged at 6c., St. Louis, and at 6.20c., New York, the latter being the quotation of the leading interest. Sales have been confined largely to carload and small lots for spot and August delivery, although one day last week a fair business was done in September delivery, interest in which is accumulating, some sales being made each day. Thus far producers have not been selling October delivery.

Zinc.—Consumer buying has been in fairly large volume the past week, but the feature has been the firmness of prices which continue unchanged at 6.25c., East St. Louis, or 6.60c., New York. Open inquiry has not been large, but considerable business has been done very quietly. In general the market has been featureless. In Saturday's Joplin market, ore prices were unchanged at \$40 a ton, which has prevailed since some time in May. Sales of ore for the week were about 9690 tons, with the output 12,500 tons, and with the week's shipments about 11,250 tons, leaving stocks on Aug. 11 at about 36,450

tons. This compares with about 50,000 tons on Jan. 1. Consuming inquiry Monday and Tuesday was only moderate.

Antimony.—Chinese metal for spot delivery is quoted at 10c. to 10.25c., New York, duty paid, with futures bringing a slight premium.

Nickel.—Quotations are unchanged with ingot nickel at 35c., with shot nickel at 36c. and with electrolytic nickel at 37c. per lb. in wholesale lots.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is unchanged at 23.90c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 14.—Individual sales are small but the aggregate tonnage is of fair size. Prompt delivery is expected by buyers. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 49.50c.; lead, 6.10c.; zinc, 6.35c.; in less-than-carload lots, antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

school, to Minnesota Steel & Machinery Co.

INDEX, WASH., 203 tons, bridge for Wallace Falls Timber Co., to Wallace Bridge & Structural Steel Co.

TACOMA, WASH., 350 tons, electric-chemical plant, to Star Iron & Steel Works. MARE ISLAND, CAL., 149 tons sheet piling for Government, to an unnamed interest.

MARE ISLAND, 131 tons plates for Government, to unnamed interest.

TEXAS AND PACIFIC RAILROAD, 4200 tons for bridge work, to an unnamed fabricator.

PALO ALTO, CAL., 166 tons, telephone building, to Judson-Pacific Co.

SACRAMENTO, CAL., 455 tons, bridge at Saugus, Cal., to Claude Fisher, Los Angeles.

SACRAMENTO, 140 tons, bridge at Sargent, Cal., to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 200 tons, city bridge on River Street.

NEW YORK, 29,000 tons, subway work; 6000 tons in section 2, route 106, bids Aug. 21; 20,000 tons in section 5, route 107, bids Aug. 31, and 3000 tons in section 5-B, route 109, bids Aug. 28.

BROOKLYN, 6000 tons, store building for Abraham & Straus.

ATLANTIC CITY, N. J., 350 tons, garage for Chalfonte-Haddon Hall.

LANSDOWNE, PA., 1000 tons, apartment building; Graham-Chambley Co., Philadelphia, general contractor.

MANSFIELD, OHIO, 200 tons, Hocking bank building.

DENVER, COLO., 103 tons plates for 36-in. pipe for Belle Fourche project in South Dakota for United States Bureau of Reclamation; Western Pipe & Steel Co., San Francisco, low bidder.

SAN MATEO, CAL., 170 tons, apartment building; bids being taken.

OAKLAND, CAL., 250 tons, hangar No. 4 for Port Commission; bids Aug. 13.

MAUPIN, ORE., 170 tons, bridge over Deschutes River; bids Aug. 14.

Record July Building in 37 Eastern States

July construction contracts in the territory east of the Rocky Mountains reached a total of \$583,432,400, according to F. W. Dodge Corporation. The area covered in this record consists of 37 States and includes about 91 per cent of the total country. The above figure was the highest July contract total on record. It was 9 per cent ahead of the total for the same month of last year, but there was a drop of 10 per cent from the total for June of this year.

Last month's record brought the total amount of new building and engineering work started since the first of this year up to \$4,028,299,900, establishing a new high record for new construction contracted for during the first seven months. The increase over the first seven months of 1927 was 8 per cent.

New work contemplated in the 37 States during the past month reached a total of \$647,682,700, being a loss of 37 per cent from the amount reported in the preceding month and a drop of 7 per cent from the amount reported in July of last year.

Fabricated Structural Steel

Additional New York Subway Work Calls for 29,000 Tons—Awards of Only 25,000 Tons

STRUCTURAL awards of 25,000 tons were less than half the average of recent weeks and included no sizable projects except a section of the New York subway requiring 4000 tons. The 37,250 tons called for in new projects was made up largely of three sections of the New York subway, requiring 29,000 tons, and a department store building in Brooklyn, which will take 6000 tons. Awards follow:

WORCESTER, MASS., 1600 tons, telephone building, to New England Structural Co.

QUINCY, MASS., 410 tons, stores and offices, to Palmer Steel Co.

NEW YORK, 4000 tons, section 1-A, route 8, of New York subway; from D. C. Serber, Inc., to Bethlehem Steel Co.

NEW YORK, 700 tons, column cores for Lehigh Valley warehouse at 144th Street and Girard Avenue, to Levering & Garrigues Co.

BROOKLYN, 600 tons, sheet piling for new subway, to Jones & Laughlin Steel Corporation.

OLEAN, N. Y., 250 tons, East State Street bridge, to McClintic-Marshall Co.

CATSKILL, N. Y., 110 tons, highway bridge, to American Bridge Co.

ADAMS STATION, N. J., 400 tons, highway bridge, to Phoenix Bridge Co.

TRENTON, N. J., 700 tons, second unit of State office building, to American Bridge Co.

PHILADELPHIA 800 tons, service elevators for Strawbridge & Clothier department store, to Bethlehem Steel Co.

BETHESDA, MD., 100 tons, highway bridge, to American Bridge Co.

COVINGTON, VA., 1500 tons, factory building for Industrial Rayon Co., to Virginia Bridge & Iron Co.

PENNSYLVANIA RAILROAD, 200 tons, two bridges in Ohio, to American Bridge Co.

ERIE RAILROAD, 425 tons, bridge at Youngstown, Ohio, to Jones & Laughlin Steel Corporation.

CLAIRTON, PA., 300 tons, two oil tanks for Carnegie Steel Co., to Riter-Conley Co.

PITTSBURGH, 2800 tons, 18 river barges for Union Barge Line Corporation, to American Bridge Co. and Dravo Contracting Co.; each nine barges and 1400 tons.

MEADVILLE, PA., 110 tons, Arter Hall, Allegheny College, to John Eichleay, Jr., Co.

YOUNGSTOWN, 180 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

VERMILION, OHIO, 130 tons, bridge for Ohio State Highway Department, to Fort Pitt Bridge Works.

BELLE, W. VA., 650 tons, 750,000-cu. ft. gas holder, to Stacey Mfg. Co.

LOUISVILLE, 1200 tons, warehouse, for Henry Vogt Co., to McClintic-Marshall Co.

STATE OF MICHIGAN, 170 tons, State highway bridge, to Massillon Bridge & Structural Co.

PITTSBURG, IND., 1100 tons, bridge across White River, to Vincennes Bridge Co.

MARSEILLES, ILL., 700 tons, bridge, to Mount Vernon Bridge Co.

CHICAGO, 500 tons, Goldberg Building, to McClintic-Marshall Co.

GREAT FALLS, MONT., 650 tons, high

PERSONAL

H. B. DEMPSEY and COMMANDER H. T. DYER have formed the Dempsey Furnace Co., Inc., 110 East Forty-second Street, New York, to design, manufacture and erect industrial furnaces formerly produced by the old Dempsey Furnace Co., which since August, 1925, has been operated as the Dempsey Furnace Division of the W. N. Best Corporation. All assets of the old company have been acquired and Mr. Dempsey will be president of the new company and Mr. Dyer, vice-president. The latter was formerly chief engineer of the Peabody Engineering Corporation.

H. M. CLYMER has been elected vice-president of the Lebanon Iron Co., Lebanon, Pa.

ALEXANDER GUTTMAN, New York, has been appointed chairman of a committee of common stockholders of the Wickwire Spencer Steel Co., Inc., formed to protect their investment.

M. M. HEDGES has been named president of the Hedges-Walsh-Weidner Boiler Co., Chattanooga, Tenn., formed recently by a merger of the Casey-Hedges Co. and the Walsh & Weidner Boiler Co.

WILLIAM HARRIS, East Bridgewater, Mass., recently was made superintendent of the Government foundry in the Panama Canal Zone.

GIFFORD K. SIMONDS, general manager of the Simonds Saw & Steel Co.,

Fitchburg, Mass., has been made a director of the International Paper Co.

F. H. MOVIEL has resigned as manager of the machinery division of the American Foundry Equipment Co., Mishawaka, Ind.

H. C. PETERSON, recently associated with the Underwriters' Laboratories, Chicago, has been made engineer for the Bundy Tubing Co., Detroit, according to an announcement by H. W. BUNDY, president of the company.

PAUL A. IVY, until recently associated with the American Cast Iron Pipe Co., Birmingham, has been elected vice-president of the National Cast Iron Pipe Co., of the same city. E. E. LINTHICUM continues as president of the National company. A. P. FINCK, who has been works manager, has been named general manager; W. H. SAUNDERS, assistant general manager, and A. M. FORD, chief engineer.

JOHN H. BODE has resigned as president and general manager of the Wellman-Seaver-Morgan Co., Cleveland, and has been succeeded by GEORGE W. BURRELL, formerly vice-president, who retired two years ago to take a rest after 27 years' affiliation with the company. Mr. Bode had been with the company about two years.

GEORGE D. BRANSTON has resigned

as manager of railroad material sales for the Jones & Laughlin Steel Corporation, Pittsburgh, to become associated, Sept. 1, with the Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., as comptroller and director. Prior to his connection with Jones & Laughlin corporation, Mr. Branston was for several years secretary and treasurer of Manning, Maxwell & Moore, Inc., New York.

FRANK F. CORBY, formerly vice-president in charge of sales for the Steel & Tube Co. of America, and more recently Pacific Coast representative for the A. M. Byers Co., has become associated with the Jones & Laughlin Steel Corporation as special Pacific Coast representative.

W. ROY MOORE has been appointed sales manager of an office which has been opened at room 1205, 71 Murray Street, New York, by the Billings & Spencer Co., Hartford, Conn., to serve the metropolitan New York and Philadelphia territories. ROBERT C. SMITH will be associated with Mr. Moore and will have charge of export sales.

ALBERT E. GROVER has been appointed cost consultant for the National Machine Tool Builders' Association and will begin work immediately in his new association. He has had many years of experience as cost accountant and comptroller of business houses and is a charter member of the Cleveland chapter of the National Association of Cost Accountants having served as president of the chapter in 1926 and 1927. Since 1923 he has been engaged in the installing of cost systems on his own account.

Obituary

C. KEMBLE BALDWIN, vice-president of the Robins Conveying Belt Co., New York, died in Los Angeles on Aug. 9, after a lingering illness. He was born at Philadelphia in 1873 and was graduated from Lehigh University in 1895.

HARRY E. HIGGINS, formerly vice-president of the Otis Steel Co., Cleveland, was instantly killed in an airplane accident at Palo Alto, Cal., Aug. 11. He had severed his connection with the Otis company several years ago and last year disposed of other business interests in Cleveland and moved to California.

JAMES B. LAUGHLIN, director and member of the executive committee Jones & Laughlin Steel Corporation, and its treasurer from 1904 to 1910, died at his summer home in Hyannis Port, Mass., Aug. 12. He was a grandson of James Laughlin, one of the founders of the Jones & Laughlin corporation, and was born in Pittsburgh 63 years ago. Following his graduation

from Princeton University in 1886 he joined the Jones & Laughlin company, and was superintendent of the Eliza furnaces from 1894 to 1900.

CAPT. WARREN ELSEY, formerly transportation master of the Vesta Coal Co. subsidiary of the Jones & Laughlin Steel Corporation, Pittsburgh, died at his home in Philadelphia, Aug. 11. He had been identified almost continuously with river transportation activities of the Jones & Laughlin organization from 1864 until his retirement about three years ago. He was born near Portsmouth, Ohio, in 1848. A son, P. C. Elsey, now is transportation master for the Vesta Coal Co., and another, Warren Elsey, Jr., is assistant superintendent of the Central Iron & Steel Co., Harrisburg, Pa.

SETH BARHAM, assistant treasurer of the American Radiator Co., New York, died on Aug. 13, after a lingering illness. He was also vice-president of the Humphreys Coal & Coke Co., Greensburg, Pa., and the Tonawanda Iron Corporation, North Tonawanda, N. Y., subsidiaries of the

Radiator Company, and had been identified with that organization for many years.

JOSEPH D. BASCOM, chairman of the board and one of the founders of the Broderick & Bascom Rope Co., St. Louis, died recently at his home in that city. He was 78 years of age and was born and had lived his entire life in St. Louis. In 1878, with John J. Broderick, he founded the firm of which he was head at the time of his death.

ALONZO C. PACKER, general inspector H. K. Porter Co., Pittsburgh, and inventor of the Packer locomotive truck, now in general use on American railroads, died at St. Francis Hospital, Pittsburgh, Aug. 6. He was born in Strattanville, Pa., April 29, 1852, and had been identified with the Porter company for 57 years.

FRANK W. GOODRICH, for 20 years plant superintendent for the Graton & Knight Co., Worcester, Mass., died on Aug. 10 at his home in that city, aged 56 years. He had been identified with the company for 40 years.

REINFORCING STEEL

AWARDS of 4400 tons reported during the last week include no jobs of outstanding size. Included in the 3500 tons called for by new projects are 1000 tons for a loft building in New York and a similar tonnage for three sections of the subway in the same city. Awards follow:

NORWALK, CONN., 400 tons, factory building for Sunfast Hat Co., to National Bridge Works, Inc.

WHITE PLAINS, N. Y., 500 tons, high school, to Ferro Building Products Co.

NEW YORK, 300 tons, sewer work in Queens; from Necaro Construction Co., general contractor, to Concrete Steel Co.

NEW YORK, 250 tons, subway section 1-A, route 8; from D. C. Serber, Inc., general contractor, to Igoo Brothers.

NEW YORK, 100 tons, Seward Park High School, to Carroll-McCreary Co., Inc.

NEW YORK, 100 tons, Queens Vocational School, to Tidewater Structural Materials Corporation.

NEWARK, N. J., 110 tons, First Avenue public school, to Tidewater Structural Materials Corporation.

BUFFALO, 100 tons, Bird Island pier, to a Buffalo maker.

CHICAGO, 160 tons, Palmolive-Peet Building, to Kalman Steel Co.

CHICAGO, 220 tons, Belmont Bank Building, to Truscon Steel Co.

CHICAGO, 160 tons, Victor Mfg. & Gasket Co., to an unnamed bidder.

CHICAGO, 120 tons, alterations to Olympic Theatre, to Duffin Iron Co., local.

CHICAGO, 175 tons of rail steel bars, Twelfth Street store, to an unnamed bidder.

EAST CHICAGO, IND., 200 tons of rail steel bars, bank building, to Barton Spiderweb System, Inc.

STATE OF ILLINOIS, 200 tons of rail steel bars, road work, to Olney J. Dean & Co.

LOS ANGELES, 589 tons, Big Dalton Dam, to Pacific Coast Steel Co.

CULVER CITY, CAL., 459 tons, storm drain, to Braun, Bryant & Austin.

VERNON, CAL., 181 tons, bridge over Los Angeles River at Soto Street, to Pozzo Construction Co.

OAKLAND, CAL., 104 tons, bridge over Niles Canyon, to Pacific Coast Steel Co.

SACRAMENTO, CAL., 147 tons, bridge at Saugus, Cal., to Barrett & Hilp, San Francisco.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1000 tons, loft building for B. B. Davis at Hudson, Dominick and Broome Streets.

NEW YORK, unstated tonnage, miscellaneous work in Mott Haven yard of New York, New Haven & Hartford Railroad.

NEW YORK, 1000 tons, three sections of subway; 300 tons in section 1, route 108, Triest Contracting Corporation, low bidder; 400 tons in section 2, route 106, bids Aug. 21, and 300 tons in section 5, route 107, bids Aug. 24.

STATE OF NEW JERSEY, 250 tons, highway work; 150 tons on route 25, bids Aug. 20, and 100 tons on route 17, bids in.

KEARNY, N. J., 300 tons, factory buildings Nos. 51 and 52 for Western Electric Co., Inc.; Austin Co., Philadelphia, general contractor.

CHICAGO, 120 tons, garage at Twenty-sixth Street and Michigan Boulevard.

CHICAGO, 150 tons, garage for Swift & Co.

CHICAGO, 315 tons, Judah Studio; Holabird & Root, architects.

MAUPIN, ORE., 160 tons, bridge over Deschutes River; bids Aug. 14.

LOS ANGELES, 500 tons, office building, Hollywood and Vine Streets; bids soon.

Notable Activity in New England

Reflecting the betterment in the small tool business, the Greenfield Tap & Die Corporation, Greenfield, Mass., during the first six months of this year did more business than in the corresponding period last year. The average of customers' orders was at the highest point since 1920. Furthermore, indications are the last six months of 1928 will exceed 1927 in volume and value.

The Standard Screw Co., Hartford, Conn., reports production and new orders running decidedly ahead of the same period last year, with first-half sales quite satisfactory.

The Geometric Tool Co., New Haven, Conn., reports no change in prices, but any movement would be upward. The plant is operating practically full and its stock of raw and finished materials is lower than at any time during the past 10 years. Sales through offices in New York, Philadelphia, Baltimore, Pittsburgh and Cincinnati are less than a year ago; those in northern territories, including Chicago, Indianapolis, Detroit, Toledo, Cleveland and upper New York State are far ahead of last year, while in New England they are just about holding their own. The West is below last year. In contrast, the export business is on the upturn and looks encouraging.

The Pratt & Whitney Co., Hartford, Conn., during the first half of 1928 ran its plant at capacity, with a day and night shift in some departments. Sales were considerably ahead of last year for the corresponding period. The company has sufficient business already booked and future business practically assured to warrant the statement that the plant will be operated full during the remainder of 1928 and into the first quarter of 1929. In addition to an excellent domestic business, the firm is well booked up on foreign orders.

Continued High Activity in Automobiles

Production of passenger cars and trucks in July in the United States and Canada, according to *Automotive Industries*, slightly exceeded 400,000, bringing the total for the first seven months to about 2,725,000. Production in July last year was 279,456 and the first seven months 2,475,150. In 1926, the industry's record year, July output amounted to 374,483 and the first seven months to 2,857,936. Production in August is running about 25 per cent higher than in the same month last year, a rate that unquestionably will be continued through the month. Factories which have recently introduced new models are in

several instances more than a month behind on deliveries and increasing operations during the month will serve only to reduce the number of orders carried into September. The Ford company, now building about 4000 cars daily, is still several months behind orders.

British Iron and Steel Output Lower in July

LONDON, ENGLAND, Aug. 13 (*By Cable*).—Pig iron production in July was 537,800 gross tons, and that of steel ingots and steel castings was 666,900 tons. Both show a decrease from the June totals.

A comparison of the July output with that of the six preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700
1928—June	563,700	709,500
1928—July	537,800	666,900

Stack to Go Out After Operating Nine Years

After continuous operation for nearly nine years, during which it has produced over 1,835,000 tons of pig iron, breaking, it is believed, all blast furnace operation and production records, "A" stack of the Toledo Furnace Co., Toledo, Ohio, operated by Pickands, Mather & Co., Cleveland, will be blown out next week. This furnace, after being rebuilt, went in blast Nov. 6, 1919, and it has not been cold since that date, having undergone only a few minor repairs such as patching the lining at the stock line. The lining at present is in good condition and, it is believed, would last a year or two longer, but most of the furnace equipment is literally worn out. For the past year the furnace has had a daily output of approximately 625 tons, or more than it produced when it was first built. The furnace will be relined, the hearth enlarged from 18 ft. to 19 ft. 6 in., and a new electric hoisting engine will be installed to replace the present steam engine.

Railroad Equipment

Missouri Pacific has ordered 100 automobile cars from American Car & Foundry Co.

Erie Railroad is inquiring for five 120-ton, depressed center flat cars.

Machinery Markets and News of the Works

Good Year for Machine Tools

Business in First Seven Months About Equal to That in 1919,
the Industry's Record Post-War Year

MACHINE tool business in the first seven months of 1928 was about equal to that in the first half of 1919, the industry's best post-war year, and is more than double the average of the corresponding number of months in 1922, 1923 or 1924, according to the monthly report of the National Machine Tool Builders' Association.

Figures compiled by the association on July orders and shipments show a slight dip downward for that month. The report says that "the present slacking off may be seasonal, as all indicators point to a continued good volume of orders, and the August reports may again show an upturn over June and July."

Shipments of machine tools in July reflected the vacation season, dropping about 6 per cent below those in June, but this helped to lift the volume of unfilled orders at the end of July to a figure approximately twice that of the orders received during the month.

The outlook for the machine tool industry is regarded as satisfactory, and comment is made by the association that the coming political campaign has not thus far disturbed business.

"General business ought gradually to be stimulated by the usual fall activity," says the report. "From August on it appears that we ought to have a good fall business in the machine tool line. The only possible dampening influence would be the effect of excessive speculation on the purchasing power of machine tool users. That, however, is not likely to be extremely serious and is a possibility rather than a probability."

"The business prospects of nearly all industries using machine tools are quite good. The oil producers, the shipyards and the railroad equipment concerns are the only tool buying groups whose present prospects can be classed as poor—and these groups are a relatively small proportion of our industry's customers."

August has brought a continued steady demand in nearly all market centers. The demand comes from a wide circle of manufacturing companies. Absences of executives on vacation this month have caused some delays in the placing of orders for equipment quoted on, but the volume of inquiry indicates that plans are under way for an upswing in buying activities in the early fall.

New York

NEW YORK, Aug. 14.—Machine tool buying in the first two weeks of August has proceeded at a steady rate, and while orders may not equal the exceptional totals of June and July, the outlook continues very promising. A good many executives of manufacturing plants are away on vacation this month, a situation which tends to delay the placing of orders on which quotations have been submitted, but the number of inquiries being received indicates that many manufacturers expect a continued high rate of manufacturing activities in the fall.

Russell, Burdsall & Ward Co., Port Chester, N. Y., has awarded general contract to Austin Co. for two-story addition to branch plant at Sterling, Ill., 65 x 160 ft., reported to cost upward of \$70,000

with equipment. Company is reported considering another addition in same plant.

Packard Motor Car Co. of New York, Broadway and Sixty-first Street, will take bids in September for new multi-story service, repair and garage building at 773-87 Eleventh Avenue, to cost more than \$1,500,000 with equipment. It is proposed to remove present mechanical plant at Long Island City to new location and provide additional capacity. Albert Kahn, Marquette Building, Detroit, and E. S. Parker, 119 West Fifty-seventh Street, New York, are architects.

R. H. Macy & Co., Thirty-fourth Street and Broadway, New York, have acquired property, 325 x 340 ft., at Newark, as site for multi-story storage and distributing plant, to include installation of mechanical-handling equipment, etc. Project is reported to cost more than \$200,000.

Shampan & Shampan, 188 Montague

Street, Brooklyn, architects, have filed plans for a two-story automobile service, repair and garage building, 89 x 180 ft., at Long Island City, to cost about \$180,000 with equipment; also for a similar two-story building, 100 x 277 ft., in Bronx, to cost more than \$200,000 with equipment.

Board of Education, Elmont, N. Y., is said to be planning installation of manual training equipment in new high school to cost in excess of \$750,000, for which bids will be asked in about 60 days on general contract. Knepper & Morris, 171 Madison Avenue, New York, are architects.

Central Foundry Co., 1434 Fulton Street, Brooklyn, has awarded general contract to P. M. Sterling, 33 West Forty-second Street, New York, for two-story branch storage and distributing plant at Forest Hills, L. I., to cost about \$40,000. Bly & Hamann, 551 Nostrand Avenue, Brooklyn, are architects.

C. N. Shinston, 2 Columbus Circle, New York, architect, has plans for one and two-story automobile service, repair and garage building, 100 x 200 ft., to cost close to \$100,000 with equipment.

National Air Transport, Inc., 420 Lexington Avenue, New York, is reported planning new air terminal at Dry Harbor, Middle Village, N. Y., including hangars, repair and reconditioning shops, oil storage and distributing building and other units.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has authorized expansion at its refinery at Bayway, Elizabeth, N. J., to include extensions in gasoline refining division to increase output by 4000 bbl. per day, to cost about \$1,500,000 with machinery.

Board of Education, New Milford, N. J., is considering installation of manual training equipment in new two-story and basement high school to cost \$350,000, for which bids will be asked at once on general contract. Ernest Sibley, Bluff Road, Palisades, N. J., is architect.

Globe-Wernicke Corporation, Cincinnati, manufacturer of filing equipment, desks and kindred products, has purchased Steel Equipment Corporation, Avenel, N. J., manufacturer of metal business furniture, safes, etc., and will consolidate with its organization. Avenel plant will be developed as Eastern manufacturing and distributing works, and expansion is planned. Purchasing company is said to plan organization of new company under name of Business Service Bureau, to take over and merge both organizations.

Board of Education, Dunellen, N. J., is said to be planning installation of manual training equipment in new junior high school to cost in excess of \$250,000, for which plans will be drawn by William Bragdon, 275 Morris Avenue, Elizabeth, N. J., and A. M. Korff, 203 Park Avenue, Plainfield, N. J., associated architects.

Eaton-Kent, Inc., 17 Academy Street, Newark, manufacturer of heating equipment and industrial apparatus, has leased a portion of former plant of Heller Brothers Co. and will equip for a machine shop and distributing service.

The Crane Market

THERE is very little new inquiry for locomotive or overhead traveling cranes, but sellers do not seem to expect much activity during the present midsummer season. Both in locomotive and overhead cranes there is some sizable export business pending from contracts being executed by American companies. In addition to the shop construction for the Turkish railroads, Fox Brothers International Co., New York, has contracts for the airway terminals of the new line to operate between Spain and Argentina. No action has been taken as yet by Dwight P. Robinson & Co., New York, on

the locomotive cranes and steam shovels for export to a contract in Argentina. In overhead cranes, the General Electric Co., Schenectady, N. Y., is about to close on several small capacity low-headroom cranes.

Among recent purchasers are:

Passaic Valley Sewerage Commission, Passaic, N. J., 15-ton crawl-tread locomotive crane from McMyler-Interstate Co.

McClelland & Junkersfeld, engineers, 68 Trinity Place, New York, 100-ton, 63-ft. 6-in. span, 4-motor, overhead crane for Great Western Power Co., San Francisco,

Cal., reported from Shaw Electric Crane Co.

Summers Fertilizer Co., Baltimore, Md., 5-ton, 80-ft. span, 4-motor, bucket handling crane from mid-western builder.

Globe Seamless Tubes Co., Milwaukee, 15-ton, 105-ft. span electric traveling crane, from unnamed bidder.

Sargent & Lundy, engineers, Chicago, 20-ton power house crane from Whiting Corporation.

Williams, White & Co., Moline, Ill., a 15-ton and a 30-ton electric crane, from Alfred Box & Co.

Bigbie Grate & Forced Draft Equipment Corporation, 90 West Street, New York, has been formed to make grates, blowers and heating equipment parts. Company is at present under contract to Hay Foundry & Iron Works, Newark.

Behr-Manning Corporation, Troy, N. Y., recently formed by consolidation of Herman Behr & Co., Brooklyn, and Manning Abrasive Co., Troy, has started construction of several buildings at Troy which will house machinery to be moved from Brooklyn plant, which will be discontinued. New buildings include machine shop, storehouse, manufacturing building, grading building, and power plant, with coal pocket, side tracks, etc. New construction will double capacity of plant and is estimated to cost \$350,000. Morton C. Tuttle Co., Boston, is engineer and builder.

New England

BOSTON, Aug. 13.—The local machine tool trade has been more active the past week than in some time. The purchase of equipment by the city of Boston for its new Hyde Park district school is still under final adjustment, pending delivery dates and other matters, as stated before, purchases have been spread over a fairly large list of dealers, and it probably will be another week before full details are available.

In addition to this business, used tool dealers have closed on a comparatively good volume. One house sold 11 used presses, including one large and 10 small; another sold a set of rolls, a radial drill, several lathes and presses, and two single spindle drills, another sale included two fairly large lathes and a drill press. The 11 presses went to a Philadelphia dealer, but all other tools were taken by New England users.

George S. Wilber, 67 Redlands Road, West Roxbury district, Boston, is asking bids on a steel sand hopper at Newton, Mass.

E. P. Aldridge, 761 Dudley Street, Dorchester district, Boston, has completed plans for a one-story repair shop, 70 x 108 ft., for Frank Kerby, Summer Street, Natick, Mass.

Lynn Ornamental Iron Works, 966 Broad Street, Lynn, Mass., has awarded contract for a new shop. Sanborn & Weed, 38 Exchange Street, are architects.

Work has been started on a one-story plant, 42 x 70 ft., for Jewelers Cooperative Refining Co., Chestnut Street, North

Attleboro, Mass., to replace one recently destroyed by fire.

M. S. Little Mfg. Co., 151 New Park Avenue, Hartford, Conn., manufacturer of plumbing equipment and supplies, has asked bids on general contract for one-story addition, 50 x 120 ft., with L extension 10 x 50 ft., to be equipped as a brass foundry. W. W. Dolliver, Hartford, is architect.

L. & M. Standard Parts Co., Boston, has leased property at 72 Brookline Avenue for a new shop.

Terkelsen Machine Co., 326 A Street, Cambridge, Mass., has asked bids on general contract for two-story addition, to cost close to \$28,000 with equipment. F. E. Leland, 238 Main Street, is architect.

Olson Brothers, Camp Street, Plainville, Conn., manufacturers of screw machine products, have plans for a one-story addition, 26 x 85 ft.

Huntington Aircraft Corporation, Newfield Building, Bridgeport, Conn., has plans for new one-story plant, consisting of parts and assembling departments, to cost more than \$75,000 with machinery.

New England Fuel & Transportation Co., 201 River Street, Everett, Mass., will begin work on new coke screening and car-loading plant, to cost more than \$75,000 with equipment.

New England Flexible Door Corporation, Winsted, Conn., has been formed to manufacture metal and other doors. Company will be in market for materials and equipment specially constructed for sheet steel press and cut work.

Philadelphia

PHILADELPHIA, Aug. 13.—Conveying, machinery, refrigerating, power and other equipment will be installed in new three and four-story meat packing plant to be built by F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, to cost about \$165,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Frank M. Cohen, 516 Greenwich Street, Philadelphia, and associates have organized United Machines Corporation, to operate local factory for manufacture of cloth-cutting, pressing and kindred machinery and parts. It is proposed to begin production soon. Albert C. Cohen, 5323 North Mervine Street, will be an official.

Federal Container Co., Fifty-sixth Street and Paschall Avenue, Philadelphia, manufacturer of corrugated and fibreboard containers, recently acquired by

Fibre Board Products, Inc., San Francisco, and now operated as unit of that company, has engaged V. D. Simons, 435 North Michigan Avenue, Chicago, mill engineer, to prepare plans for new mill for paperboard and fibreboard production in vicinity of Philadelphia. Initial unit will have capacity of 150 tons per day, and is reported to cost in excess of \$650,000 with machinery.

Branch-Crawford Co., 1539 Wood Street, Philadelphia, manufacturer of pipe hangers, and other equipment, has awarded general contract to Harry Gill, Jr., 2515 Germantown Avenue, for one-story addition, to cost about \$25,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Philadelphia Steam Co., Philadelphia, care of Frank M. Hunter, Gibson Building, Chester, Pa., recently organized, has engaged Philip H. Johnson, Widener Building, architect, to prepare plans for central steam plant, to cost more than \$2,500,000 with underground piping system.

Board of City Commissioners, Atlantic City, N. J., will establish municipal airport at Bader Field, consisting of two hangars, repair and reconditioning shop, oil storage and distributing plant, to cost about \$75,000.

Leeds & Lippincott Co., Atlantic City, N. J., operating Chalfonte-Haddon Hall Hotel, has awarded general contract to Turner Construction Co., Graybar Building, New York, for new six-story automobile service, repair and garage building, and addition to power plant, to cost more than \$750,000.

American Ice Co., Broad and Cherry Streets, Philadelphia, will soon take bids for one-story and basement ice-manufacturing plant, 80 x 150 ft., to cost more than \$60,000 with equipment.

Harrisburg Gas Co., Harrisburg, Pa., has purchased property, 65 x 265 ft., as site for new equipment storage and distributing plant, with machine and repair division, to cost about \$180,000.

Hajoca Corporation, 1136 Ridge Avenue, Philadelphia, manufacturer of plumbing equipment and supplies, has awarded general contract to F. M. Harris & Co., 1520 Parrish Street, for one and two-story factory branch and distributing plant, 50 x 190 ft., at Hazleton, Pa., to include pipe shop and other mechanical departments, to cost in excess of \$50,000.

Public Service of Pennsylvania, Inc., Wilkes-Barre, Pa., operating electric light and power properties, is disposing of bond issue of \$500,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

Traylor Engineering & Mfg. Co., Allentown, Pa., manufacturer of rock-crushing equipment, mining and other machinery, is arranging an expansion and improvement program for a new plant units and machinery to double, approximately, present capacity, reported to cost more than \$200,000. Samuel W. Traylor is president.

Pittsburgh

PITTSBURGH, Aug. 13.—Machine tool business is slow in this territory, partly due to the fact that many who direct purchases are away on vacations. Dealers have made prices on a considerable amount of business and expect increased sales when the vacation period ends.

Plans have been authorized by Craig Oil Co., Columbia Bank Building, Pittsburgh, R. T. Craig, president, for extensions and improvements in refinery, including new units and machinery to cost upward of \$400,000.

Board of Education, Fulton Building, Pittsburgh, is said to be planning installation of manual training equipment in addition to Baxter Junior High School, to cost about \$425,000. Kiehnel, Elliott & Chalfant, 515 Liberty Avenue, are architects.

Allegheny County Steam Heating Co., 435 Sixth Avenue, Pittsburgh, has begun work on new steam power plant for central heating service, to cost about \$660,000 with equipment.

Natural Gas Co. of West Virginia, Inc., Farmers' Bank Building, Pittsburgh, is concluding arrangements for purchase of plant and properties of Ohio Fuel & Gas Co., Alliance, Ohio, and vicinity, for \$895,000, and plans expansion and improvements, including pipe line construction. George W. Ratcliff is president.

Following acquisition of Kaestner & Hecht Co., 1500 North Branch Street, Chicago, manufacturer of electric elevators, by Westinghouse Electric & Mfg. Co., East Pittsburgh, Kaestner & Hecht name has been changed to Westinghouse Electric Elevator Co. It will be operated as separate unit.

South Atlantic

BALTIMORE, Aug. 13.—Contract has been let by Union Brothers, 37 West Cross Street, Baltimore, manufacturers of furniture, to J. L. Robinson Construction Co., 522 Park Avenue, for one-story addition, 50 x 300 ft., to cost more than \$100,000 with machinery. Benjamin Frank, 517 North Charles Street, is architect.

A. S. J. Atkinson, 3801 Macomb Street, N. W., Washington, architect, will soon take bids on general contract for five-story automobile service, repair and garage building, to cost about \$110,000 with equipment.

Starlighters Corporation, 735 Sansom Street, Philadelphia, Charles S. Bayer, Jr., president, recently organized, is planning construction and operation of airport in vicinity of Salisbury, Md., including hangars, repair and reconditioning shops, oil storage and distributing buildings, to cost in excess of \$80,000.

Tidewater Oil Co., 11 Broadway, New York, will soon begin construction on new oil storage and distributing plant at Baltimore, to cost close to \$500,000 with equipment.

Contract has been let by Industrial Rayon Co., Ninety-eighth Street and Walford Avenue, Cleveland, to Fiske-Carter Construction Co., Worcester, Mass., and Greenville, S. C., for new mill at Covington, Va., to include power house, machine shop and other units, entire project to cost in excess of \$1,000,000 with machinery.

Atlantic Gas Co., Lewis Building, Philadelphia, has authorized construction of artificial gas plant at Lexington, N. C., to cost upward of \$250,000, with 20 miles of piping system. Work will be carried out under supervision of Atlantic Construction & Engineering Co., an affiliated organization.

Standard Looms, Inc., East Spartanburg, S. C., has awarded general contract to Fiske-Carter Construction Co., Worcester, Mass., and Greenville, S. C., for plant to manufacture textile looms and other cotton mill machinery, consisting of one-story foundry, 180 x 350 ft.; one-story assembling plant, 140 x 380 ft.; and main operating unit, 180 x 350 ft. Entire project will cost about \$150,000 with equipment. Company was organized recently and has established offices at 519 East Main Street, Spartanburg; Isaac Andrews is president. Lockwood, Greene & Co., Charlotte, N. C., are architects and engineers.

International Harvester Co., Inc., 606 South Michigan Avenue, Chicago, has leased a building to be erected on South Elm Street, Greensboro, N. C., one-story 75 x 142 ft., for factory branch, service and repair building for motor truck division. General contract has been let to Walter Kidde & Co., Jefferson Standard Building, Greensboro.

George W. P. Overman, Norfolk, Va., is at head of project to operate a new plant for manufacture of a life-boat releasing gear. Initial works will be devoted to assembling and it is purposed to have malleable iron castings and other parts made at outside plants.

Twin City Boiler Works, Inc., Bristol, Va., is said to be planning purchase of a splitting shear, rotary type, to handle ¾-in. stock, and auxiliary equipment.

Detroit

DETROIT, Aug. 13.—Former factory of Michigan Furniture Co., Ann Arbor, Mich., has been acquired by Precision Products Co., same city, manufacturer of radio sets and equipment, for expansion. Property totals 40,000 sq. ft. of floor space.

Oldberg Mfg. Co., 2661 West Grand Boulevard, Detroit, manufacturer of automobile parts, is said to be planning one-story addition, to cost more than \$30,000 with equipment.

Chevrolet Motor Corporation, 3044 West Grand Boulevard, Detroit, has awarded general contract to Gervais F. Favrot, Balter Building, New Orleans, for one and two-story factory branch and distributing plant at Jefferson Davis Parkway and Venus Street, New Orleans, 122 x 250 ft., to cost in excess of \$125,000. Albert Kahn, Marquette Building, Detroit, is architect.

Detroit Casket Co., 2609 Hamilton Avenue, Detroit, will soon take bids on general contract for new one and two-story plant, with boiler house, to cost more than \$70,000 including equipment. Christian W. Brandt, 2111 Woodward Avenue, is architect.

Commercial Milling Co., 203 Randolph Street, Detroit, has awarded general contract to Foundation Co., Fulton Building,

Pittsburgh, for five-story addition to flour mill, to cost close to \$250,000 with equipment.

Briggs Commercial & Development Co., Detroit, has purchased former plant of Rickenbacker Motor Co., Cabot Avenue, and is interested in a company being organized under name of Verville Aircraft Co., to take over and occupy greater portion of plant for manufacture of commercial airplanes and parts.

Wilder-Strong Implement Co., Monroe, Mich., manufacturer of agricultural implements, etc., is said to have plans for one-story addition, to cost in excess of \$30,000 with equipment.

Fisher Body Corporation, Detroit, has asked bids on general contract for a one-story addition to automobile body works at Flint, Mich., to be used for pattern shop, die department, and other divisions, to cost about \$140,000. Company is said to have plans for another two-story addition at same location, to cost more than \$100,000. Albert Kahn, Marquette Building, Detroit, is architect.

Indiana

INDIANAPOLIS, Aug. 13.—Plans are being considered by John Deere Plow Co., 216 South Senate Street, Indianapolis, for new factory branch and distributing plant at Fort Wayne, to cost close to \$40,000 with equipment.

Central Indiana Gas Co., Anderson, plans expansion in artificial gas plant, including new holder, with capacity of about 200,000 cu. ft., to cost in excess of \$250,000.

Bishop, Knowlton & Carson, 312 North Meridian Street, Indianapolis, architects, have plans for three-story and basement baking plant at Louisville, for company whose name is temporarily withheld, to include ovens, power equipment, conveying and other machinery, to cost close to \$300,000.

Laurel Motors Corporation, Anderson, is arranging to specialize in production of airplane motors, and will arrange for parts manufacture and assembling.

Acme Works, Inc., 420 South Harding Street, Indianapolis, manufacturer of aluminum products, has awarded general contract to Robert Berner Co., 401 South Harding Street, for one-story addition, 80 x 136 ft., to cost close to \$25,000 with equipment.

Cleveland

CLEVELAND, Aug. 13.—Contract has been let by Ohio Crank Shaft Co., 6600 Clement Avenue, Cleveland, to J. L. Hunting Co., Guarantee Title Building, for one-story machine shop, 80 x 142 ft., to cost about \$70,000 with equipment.

Board of Education, Youngstown, has authorized remodeling and improving old Rayen high school for use as a technical and vocational high school, with installation of equipment. S. R. Creps, director, will be in charge and is making estimates of cost.

Dura Co., 1336 West Bancroft Street, Toledo, Ohio, manufacturer of automatic window regulators, etc., has awarded general contract to A. Bentley & Sons Co., Toledo, for new one-story plant, 260 x 500 ft., to cost more than \$175,000 with equipment.

Sun Radiator Cover, Inc., Cleveland, has leased portion of building at 7804 Carnegie Avenue, and will establish new plant for manufacture of radiator shields.

Ferro Enameling Co., B. F. Keith Building, Cleveland, metal and steel enameling, has awarded general contract to Kirschner Co., 2725 Pittsburgh Avenue, for two-story and basement addition, 54 x 68 ft., to cost close to \$35,000 with equipment.

City Council, Painesville, Ohio, plans early call for bids for equipment for addition to municipal electric light and power plant, to cost in excess of \$85,000.

Niles Steel Products Co., Niles, Ohio, is increasing its capital stock from \$200,000 to \$500,000 and enlarging its capacity one-third for production of steel containers. W. A. Thomas, former president Brier Hill Steel Co., is principal stockholder.

Truscon Steel Co. is centering its pressed steel department in Cleveland, where it purchased, at receiver's sale, plant of Hydraulic Pressed Steel Co. Part of Truscon company's pressed steel sales department has been transferred from Youngstown to Cleveland.

Federal Foundry Supply Co., Cleveland, is erecting new plant at 4600 East Seventy-first Street, Cleveland, part two stories, 90 x 180 ft., and office building, 24 x 120 ft. Machine shop will be 90 x 60 ft., stock room, 90 x 100 ft. and grinding room, 90 x 100 ft. Plant is expected to be in operation Oct. 1.

Transformer division of Packard Electric Co., Warren, Ohio, has been purchased by American Brown Boveri Electric Corporation, Camden, N. J., and manufacturing and engineering facilities will be consolidated with those of purchasing company at Camden. Transformers established under Packard trademark will be continued and coordinated with high-tension, large capacity transformers made by Brown Boveri company. N. A. Wolcott, president of Packard organization, will become associated with Camden company.

Buffalo

BUFFALO, Aug. 13.—Buffalo Tank Corporation, Buffalo, care of Ellis H. Gidley, Marine Trust Building, recently organized with capital of \$100,000, will operate local plant for manufacture of steel and galvanized tanks and kindred plate products.

Olean Tile Co., Olean, N. Y., has awarded general contract to A. A. Lane Construction Co., 1869 East Fifty-fifth Street, Cleveland, for three one-story additions, 100 x 105 ft., 50 x 360 ft., and 160 x 260 ft., to cost close to \$250,000 with machinery.

George F. Fisk, commissioner of public works, Municipal Building, Buffalo, is asking bids until Sept. 4 for construction of new buildings for New York State College for Teachers, Buffalo, including vocational school, as per plans and specifications on file.

Walter D. Webster, 61 Washington Avenue, and Willis D. Sweet, Jr., 3 Walling Avenue, Oneonta, N. Y., have organized Webster-Sweet, Inc., with capital of \$25,000, to operate a local plant for manufacture of engines and parts, and kindred equipment.

Consolidated Aircraft Corporation, Elmwood Avenue, Buffalo, has recently taken over additional buildings adjoining its plant and is carrying out an expansion program. A flying field, with hangar, repair and reconditioning shop and other units, is being established.

Ritter Dental Mfg. Co., Rochester, N. Y., has acquired Electro Dental Mfg. Co., Philadelphia, and will remove company to Rochester as soon as addition can be

erected. Extension will be two stories, 60 x 400 ft., and cost \$300,000. It is expected to be ready for occupancy Jan. 1. Edward L. Wayman is president and general manager of Ritter company.

Don F. Johnson & Co., Inc., 6 Terrace, Buffalo, has been formed to carry on wholesale hardware and mill supply business in Buffalo district, including Tonawanda, North Tonawanda, Niagara Falls, Lockport, Batavia and Jamestown. It will represent E. C. Atkins & Co., Inc., Indianapolis, hack saws, band saws and files; Buckeye Twist Drill Co., Alliance, Ohio, drills and reamers; Gardner Tap & Die Co., Marion, Ohio, taps and dies; Hisey-Wolf Machine Co., Cincinnati, electric drills, grinders and buffers, and Union Mfg. Co., New Britain, Conn., chucks and hoists. Don F. Johnson, recently president Duroflex Corporation, Buffalo, is president of new company.

Chicago

CHICAGO, Aug. 13.—Fresh inquiry for machine tools is in smaller volume and dealers are concentrating on prospective business which developed prior to this month. Small industrial buyers who want standard tools are fairly active, but in many cases are not satisfied with promises of delivery.

Railroad business is confined to miscellaneous inquiries. The Santa Fe will buy a spring banding press, and the Chicago, Milwaukee, St. Paul & Pacific will take prices on a frog and switch planer. The Burlington will purchase an 18-in. lathe, and the Rock Island is interested in a 48-in. radial drill. Quotations have been submitted on machine tools that will be purchased by A. O. Smith Corporation, Milwaukee.

Interstate Iron & Steel Co., 104 South Michigan Avenue, Chicago, will build a three-story transformer station, 50 x 83 ft., to cost \$18,000.

Cameron Can Machinery Co. 140 North Ashland Avenue, Chicago, will build an addition, 98 x 216 ft., to cost \$100,000.

Moline Iron Works, Moline, Ill., has been granted a permit to erect an addition.

Contract has been let by Emerson-Brantingham Co., South Independence Avenue, Rockford, Ill., manufacturer of agricultural implements to Security Building Co., 1016 Charles Street, for one-story addition, 120 x 215 ft., to cost close to \$100,000 with equipment.

Quaker Oats Co., 80 East Jackson Boulevard, Chicago, has awarded general contract to Leonard Construction Co., 37 South Wabash Avenue, for multi-story mill and distributing plant at Cedar Rapids, Iowa, 85 x 115 ft., to cost more than \$300,000 with equipment.

Chicago Printed String Co., 2411 Clybourn Avenue, Chicago, manufacturer of adhesive paper tape and kindred products, is having plans drawn for a two-story and basement plant, 85 x 125 ft., to cost about \$175,000 with equipment. Alfred S. Alschuler, 53 West Jackson Boulevard, is architect.

Standard Oil Co., 910 South Michigan Avenue, Chicago, has awarded general contract to Kaiser-Duett Co., Rialto Square Building, Joliet, Ill., for one and two-story storage and distributing plant, with boiler house and automobile service, repair and garage building at Joliet, to cost upward of \$100,000 with equipment.

Community Motors, Inc., 235 East Thirty-third Street, Chicago, has filed

plans for two-story service, repair and garage building, 130 x 175 ft., to cost in excess of \$250,000 with equipment.

Victor Mfg. & Gasket Co., 5750 Roosevelt Road, Chicago, manufacturer of gaskets and other power equipment, is completing plans for four-story addition, 100 x 160 ft., to cost \$150,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Boulevard, is architect and engineer.

Gulf States

BIRMINGHAM, Aug. 13.—Bids will soon be asked by Texas-Louisiana Power Co., Fort Worth, Tex., for new steam-operated electric generating plant at Olney, Tex., to cost in excess of \$150,000 with transmission system.

Ovens, power equipment, conveying and other machinery will be installed in new two-story plant at East Dallas, Tex., to be erected by Baird Baking Co., Fort Worth, Tex., to cost about \$160,000 with equipment.

Wilson & Toomer Fertilizer Co., West Bay Street, Jacksonville, Fla., is planning one-story addition, 200 x 500 ft., to cost close to \$100,000 with machinery.

City Council, Oxford, Miss., is said to be planning early purchase of one 2-ton electric traveling crane for installation in municipal power plant, for which plans have been drawn by Frank P. Gates, Edwards Hotel Building, Jackson, Miss., architect.

Board of Education, Corpus Christi, Tex., plans installation of manual training equipment in new three-story high school to cost about \$275,000, for which superstructure will soon be placed under way. G. P. Blevins is secretary in charge.

C. A. Parker, 533 Vine Street, Shreveport, La., and associates have awarded general contract to H. C. Bellows, 208 Edwards Street, for new three-story automobile service, repair and garage building to cost approximately \$130,000, with equipment.

City Council, Amarillo, Tex., is planning fund of \$45,000 for establishment of municipal airport, including hangar, 80 x 100 ft., machine and repair shops and other buildings. It is understood that company to be known as Amarillo Airport Corporation will be organized to carry out project. J. D. Bartlett is city manager, in charge.

Florida Container Co., Tampa, Fla., care of John T. Ladue and T. M. Schackelford, 933 Golf View Avenue, recently organized, has acquired property on Mississippi Avenue and plans early establishment of new plant for manufacture of corrugated and fiberboard containers.

United States Bureau of Mines, Department of Commerce, Washington, has awarded contract to James T. Taylor, Fort Worth, Tex., for new helium gas plant at Stoncy, near Amarillo, Tex., to cost about \$500,000 with machinery.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for new factory branch and distributing plant at Jacksonville, Fla., to cost more than \$300,000 with equipment.

Magnolia Petroleum Co., Dallas, Tex., has acquired tract of 600 acres adjoining storage and distributing plant at Midland, Tex., and plans early construction of additional units to cost more than \$250,000.

Lato Steel Mfg. Co., Texarkana, Ark.-Tex., has been incorporated to manufacture metal screens. It has purchased plant and patent rights of Delmar D. Pinkham and expects to develop this bus-

ness, adding other lines used in building operations and made from sheet metal. Later company expects to engage in fabrication of steel. J. K. Wadley is president of company.

Cincinnati

CINCINNATI, Aug. 13.—Although there has been a slight recession in machine tool buying since the first of the month, local builders are agreed that this is the best summer in several years, so far as bookings are concerned. Manufacturers are somewhat surprised at the level at which business has been sustained in the past 60 days, a level which is regarded as eminently satisfactory. Operations of Cincinnati machine tool plants are being carried along far above normal for the July-August period and no slackening of production is in sight. The large number of sources of current business is indicative of the widespread demand for new equipment among consuming industries.

American Car & Foundry Co. has bought a 48-in. car-wheel borer for installation at its Berwick, Pa., works, and A. S. Cameron Pump Works, Philipsburg, N. J., has purchased two 6-ft. right-line radial drills.

Bids will soon be asked on general contract by Ohio Valley Oxygen Co., 942 Kenyon Street, Cincinnati, manufacturer of industrial oxygen, etc., for one-story addition, to cost approximately \$35,000 with equipment. J. G. Steinkamp, Mercantile Library Building, is architect.

W. A. Cluff, chairman of board of trustees, State Normal College, Columbus, Ohio, is asking bids until Aug. 31 for extensions and improvements in power house at institution at Kent, Ohio, to cost approximately \$75,000, including new steam lines, tunnel, etc. Ronan & Engleson, 1694 North High Street, Columbus, are architects.

Ohio Fuel Gas Co., 99 North Front Street, Columbus, Ohio, has filed plans for two-story automobile service, repair and garage building, with equipment storage and distributing facilities, to cost about \$130,000 with equipment. E. C. Ramsey is in charge.

Federal Public Service Co., operating Crystal Ice & Cold Storage Co., Twenty-second Street and Central Avenue, Ashland, Ky., recently acquired, is reported planning new cold storage and refrigerating plant unit on adjoining site, to cost in excess of \$150,000 with machinery.

F. L. Saino Mfg. Co., 66 West Colorado Street, Memphis, Tenn., manufacturer of fire doors and other fireproof building products, is said to be planning an expansion and improvement program. Company recently arranged for increase in capital.

Springfield Metallic Casket Co., North Street, Springfield, Ohio, is said to be arranging early call for bids for addition to cost upward of \$175,000, for which plans are being drawn by Eastman & Budke, First National Bank Building, architect.

Aluminum Industries Corporation, 2416 Beekman Street, Cincinnati, has awarded general contract to H. C. Hazen, Cincinnati, for a one-story foundry, to cost close to \$20,000 with equipment.

Regan & Weller, Dermon Building, Memphis, Tenn., architects, have completed plans for new three-story boys' high school, with manual training facilities, to cost about \$260,000, for which superstructure will soon begin.

Milwaukee

MILWAUKEE, Aug. 13.—Machine-tool builders describe the situation as satisfactory, all things considered. Production is well sustained and some shops are on overtime schedules to keep deliveries within specifications. The bulk of business consists of single tools, with here and there a small lot order. The volume of inquiry received is taken to forecast favorable business. On the whole, this is the best summer season most tool builders have experienced in a number of years.

Wisconsin-Michigan Power Co., 112 East College Avenue, Appleton, Wis., has purchased 17,000 acres along both banks of the Sturgeon River, in Baraga County, Mich., and is undertaking a \$3,000,000 hydroelectric generating project covering three years. E. H. Schnidman is hydraulic engineer. D. K. Ellis, Appleton, is vice-president and general manager.

Hill-Hubbel Co., San Francisco, has leased former Kidwell Boiler Mfg. Co. plant at Thirty-second and Hopkins Streets, Milwaukee, for protective processing a welded steel pipe manufactured by A. O. Smith Corporation for a 350-mile pipe line for Texas Pipe Line Co. San Francisco company has developed an automatic system of covering pipe with asphalt and felt paper. Quarters in former Kidwell plant are only temporary, Hill-Hubbel Co. planning construction of a new shop in closer proximity to Smith plant. New plants also are to be established at Indiana Harbor, Ind., and Youngstown. Machinery for these branches is being built in Milwaukee shop. Herman Kramer is general superintendent.

Wisconsin Parts Co., 571 High Street, Oshkosh, Wis., manufacturer of axles and gears for heavy duty motor vehicles, is erecting two-story office building, 40 x 70 ft., and a one-story shop extension. Present office space will be converted into shop quarters. Tooling also will be materially increased.

Gunderman Motor Sales Co., 399 Fifty-first Avenue, West Allis, Milwaukee, is enlarging its service shop by an addition, 40 x 60 ft.

W. Clasmann Co., Milwaukee, has been incorporated to furnish sales and engineering service for industrial and mechanical equipment manufacturers. Headquarters are at 120 East Wisconsin Avenue. Principals are Fred W. and John W. Clasmann.

St. Louis

ST. LOUIS, Aug. 13.—Plans are being considered by Missouri Pacific Railroad Co., Missouri Pacific Building, St. Louis, for new car and locomotive repair shops at Nettleton, Mo., to cost in excess of \$100,000 with equipment. E. A. Hadley is chief engineer.

Pine Bluff Cotton Oil Mill, Pine Bluff, Ark., has arranged an expansion and improvement program to cost about \$50,000, including installation of two cotton oil presses and auxiliary equipment.

Cities Service Gas Co., Wichita, Kan., operated by Cities Service Co., 60 Wall Street, New York, has plans for new 16-in. pipe line for natural gas service from Ottawa and Kansas City, Kan. Company will also make extensions in gas compressor stations at Mooreland, Okla., and at points on Wichita-Pampa, Tex., line, and new 5000-hp. compressor units will be built at Corwin, Kan., and Higgins, Tex.

Tulsa Airport Corporation, Tulsa, Okla., has awarded general contract to B. Russell Shaw Co., 810 Olive Street, St. Louis, for complete airport, including hangars, machine and repair shops, oil storage and distributing building, control tower and other units.

Wetherell Motor Co., Twentieth and Harney Streets, Omaha, Neb., W. H. Wetherell, head, has leased new three-story and basement building, 146 x 200 ft., to be erected at Twentieth and Dodge Streets, for new service, repair and garage unit, to cost about \$160,000 with equipment. Harvey C. Peterson, Bankers Reserve Life Building, is architect.

Page Milk Co., Merrill, Wis., plans construction of power house and machine shop at new milk condensary at Marshall, Mo.; will also install can department, with conveying and other handling equipment. Entire project will cost in excess of \$200,000.

Oklahoma Steel Castings Co., Tulsa, Okla., has placed contract with Industrial Construction Co., Tulsa, for 50 x 50 ft. extension to finishing department and has purchased following equipment: Five-ton, overhead electric traveling crane from Shepard Electric Crane & Hoist Co.; 1-ton, gas fired, automatic temperature control annealing oven from Mahr Mfg. Co.; electric control mechanism from Brown Instrument Co., and rotary table sand blast room and complete dust arrester equipment, from Pangborn Corporation.

Sterling Machinery Corporation, 2307 Holmes Street, Kansas City, Mo., has been formed to manufacture electric and gasoline driven hoists. Contract for iron and semi-steel castings has been awarded to Kansas City Hay Press Foundry and machine work contract has been let to Schroer Brothers, Inc.

Pacific Coast

SAN FRANCISCO, Aug. 8.—Plans are being arranged by California Wire & Cable Co., Orange, Cal., for one-story addition, to cost close to \$80,000 with equipment.

Pacific Coast Pulp & Paper Co., Los Angeles, care of C. A. Kieren, Hotel Clunie, Sacramento, Cal., superintendent, recently organized, is taking bids on general contract for one, two and three-story mill at Richvale, Cal., with machine shop and miscellaneous units, to cost about \$900,000 with machinery. Peter Swan, Lewis Building, Portland, is engineer.

Morgan, Walls & Clements, Van Nuys Building, Los Angeles, architects, are completing plans for three-story and basement automobile service, repair and garage building, 60 x 150 ft., to cost in excess of \$120,000 with equipment.

Board of Education, Los Angeles, will soon begin work on one-story addition to manual training shop at David Starr Jordan High School, to cost about \$38,000. William A. Sheldon, Chamber of Commerce Building, secretary, in charge.

Coal Products Corporation, North Bend, Ore., is planning construction of one-story coal reducing, pulverizing and by-products plant on waterfront, 60 x 600 ft., to cost \$300,000 with equipment. Clyde M. Clefton is secretary.

Texas Oil Co., Yeon Building, Portland, has plans for oil storage and distributing plant on waterfront property, to cost in excess of \$350,000 with equipment. Entire project will include marine terminal facilities for oil handling and shipping,

and will cost upward of \$750,000. L. M. McCray is district manager.

Municipal Bureau of Supplies, San Francisco, is planning construction of storage and distributing plant, with repair department, to cost \$250,000 with conveying and other material-handling equipment.

California Sprayer Co., 6001 Pasadena Avenue, Los Angeles, manufacturer of spraying equipment, has plans for a two-story addition, 60 x 96 ft., to cost about \$20,000. Loy L. Smith, 1506 West Forty-sixth Street, is architect.

Canada

TORONTO, Aug. 13.—Demand for machine tools continues at a high level, and indications are that August business will equal that of any former month this year. While most of the business is for single tools, inquiry is coming out for complete equipment for industrial plants now under construction.

The Dominion Department of Railways and Canals, Ottawa, has awarded contract for operating machinery and electrical equipment for lock gates, taintor valves, regulating weirs and gateway for the Welland Canal to the Montreal Locomotive Works, Ltd., 145 St. James Street. Several other large contracts for equipment for new plants and electrical works, etc., have recently been closed and others are pending.

Canadian National Electric Railways, Toronto, have awarded contract to Bathe & McLelland, 17 Yonge Street, for construction of car house, sub-station, etc., at North Oshawa freight terminal to cost \$150,000.

Service Station Equipment Co., Ltd., 510 King Street East, Toronto, has awarded contract for new one-story factory, 100 x 400 ft. Machinery and tools will be purchased later.

Dominion Bridge Co., Redford Building, Toronto, has awarded contract to Dickie Construction Co., 17 Yorkville Avenue, for an addition to cost \$85,000.

General Metal Devices, Ltd., Oakville, Ont., has awarded contract to W. W. King for a factory to cost \$20,000. R. Card, 142 Chester Avenue, Toronto, is architect. Building will be one story, 60 x 300 ft.

Gilmour Chair, Ltd., Coaticook, Que., has awarded contract to Stewart Construction Co., Ltd., 12 Wellington Street North, Sherbrooke, Que., for a factory to cost \$80,000. It will be in three units each one story, 80 x 400 ft., 20 x 50 ft., and 56 x 109 ft. Ewart, Armer & Bryan, Jackson Building, Ottawa, are architects.

North Shore Power Co., Ltd., Des Forges Street, Three Rivers, Que., will build a \$50,000 addition to its plant.

F. A. Dallyn, 71 King Street West, Toronto, Ont., has plans for a filtration plant and power house in Queen Victoria Park, Dufferin Island, Niagara Falls, Ont., for Niagara Falls Water Commission, to cost \$500,000.

Sawmill owned by Hawkesbury Lumber Co., Hawkesbury, Ont., was destroyed by fire Aug. 9, with a loss estimated at \$200,000. Owner will rebuild immediately and will be in market for necessary equipment.

Foreign

PLANs have been approved by Eisen and Stahlwerke Aktiengesellschaft, Dortmund, Germany, manufacturer of iron and steel products, for an addition to be equipped in part as rolling mill for aluminum and other metals, and for metal plating. It is purposed to have the unit ready late in fall.

Colombian Ministry of Public Works, Bogota, Colombia, is asking bids until Sept. 10 for one 20-ton overhead electric traveling crane.

Electroplan of Soviet Russian Government, Moscow, has authorized plans for a steam-operated electric generating plant in Bobrikovsk district, Tula Province, about 140 miles from Moscow, to be developed as largest station of type in that country. Site is located in coal district and mining properties will be developed for fuel supply. Entire plant will have capacity of 300,000 kw. and is estimated to cost more than \$100,000,000. American-Russian Chamber of Commerce, 145 West Fifty-seventh Street, New York, has information on project.

State Electricity Commission of Victoria, Melbourne, Australia, will receive bids until Oct. 31 for watertube boilers and complete accessory equipment, as per plans and specifications on file, also available at office of Agent General for Victoria, Victoria House, Melbourne Place, Strand, London, England.

Minister of Interior, Asuncion, Paraguay, will ask tenders soon for a complete waterworks and sewage system for city, to cost about 4,560,000 Argentine gold pesos (about \$4,377,600), including power equipment, pumping machinery and other apparatus. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Paraguay No. 283379.

Mexican Eagle Oil Co., Mexico City, Mexico, is planning extensions and improvements in refinery at Minatitlan to double the present capacity, including construction of pipe line from new oil fields recently developed on Isthmus of Tehuantepec, with compressor stations, etc., to furnish additional supply of crude oil to refinery. Entire project will cost close to 6,000,000 pesos (\$3,000,000).

New Trade Publications

Air Hammers.—Union Iron Works, Hoboken, N. J. Bulletin 104 of 8 pages illustrates and describes a line of hammers designed primarily for construction work and particularly for driving sheet and piles. Those for sheeting weigh 97 and 220 lb. in the two sizes here featured, while the pile-driving hammers run up to a maximum of 21,000 lb., striking a blow of 17,815 lb.

Coal Cleaning.—"Stabilization of the Coal Industry and the Sand Flotation Process," H. M. Chance & Co., 943 Drexel Building, Philadelphia. Describes the various principles of coal washing, including flotation of coal in a water-sand sludge. The latter process is said to be installed in 25 plants with combined annual capacity of 10,000,000 tons.

Carburizing Furnaces.—American Gas Furnace Co., Elizabeth, N. J. Bulletin 12-A, showing rotary retort carburizing machines and stationary vertical retorts, the latter using gas as the carburizing agent. Both types of furnaces can be used for other purposes, such as annealing, rehardening, nitrogen hardening, and bright annealing in hydrogen.

1928-1929 Calendar.—David Bell Co., Buffalo. Calendar from August, 1928, to July, 1929, inclusive, featuring illustration of the Liberty Bell and the first note struck on it.

Refractory Materials.—Bolckow, Vaughan & Co., Ltd., Middlesbrough, England. Booklet describing silica and fireclay refractory products. Analyses and various uses of different products are included together with illustrations of typical installations.

Solder.—J. Linn Johnson Mfg. Co., Wilkes-Barre, Pa. Leaflet dealing with solder for iron and steel castings, etc., which may be applied without soldering iron and hardens immediately.

Steel Windows.—Bogert & Carlough Co., Paterson, N. J. Catalog J-28, describing Boca projected steel windows with emphasis on bronze ventilator guide, which is special feature. Specifications, detail drawings and complete data for architect or engineer are included.

Building Products.—Milwaukee Corrugating Co., Milwaukee. Catalog 20-

E, being a data book on materials and methods on building products. Engineering tables on reinforced concrete construction are included, together with details, specifications and general information regarding expanded metal lath, expansion corner bead and casings, interior metal trim, steel domes, channels and other firesafe building products.

Bolt Clippers and Cutters.—H. K. Porter, Inc., Everett, Mass. Catalog containing detailed information and specifications of bolt clippers and wire, nut, chain, bench and special cutters. There are diagrams showing capacities of tools and jaw openings and nearly every kind of jaw made for bolt clipper handles is included.

Superheaters.—Superheater Co., 17 East Forty-second Street, New York. Catalog devoted to the Elesco superheater for power plants. Various phases of superheat are discussed and there are illustrations and explanations of many types of boilers so equipped.

Tool Steels.—Poldi Steel Corporation of America, New York. Leaflet devoted to the uses of the various specialized tool steels manufactured by Poldi Steel Works, Prague, Czechoslovakia. High speed, carbon, alloy and special steels are included.

Unit Heaters.—Skinner Brothers Mfg. Co., Inc., Elizabeth, N. J. Engineering data book giving details of unit heaters for various types of industrial buildings.

Baling Presses.—Logemann Brothers Co., Milwaukee. Leaflet describing Logemann toggle lever type baling and scrap metal presses with belt or direct motor drive.

Condulets.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2112 dealing with condulets for railroad mail car lighting and fan installations. Full specifications and diagrams of lighting systems are included.

Resistance Thermometers.—Brown Instrument Co., Philadelphia. Catalog 93, containing detailed information about resistance thermometers for indicating, recording and controlling and for measuring temperatures from 300 to 1000 deg. Fahr. Full descriptions of applications to modern industrial uses are included.

THE IRON AGE

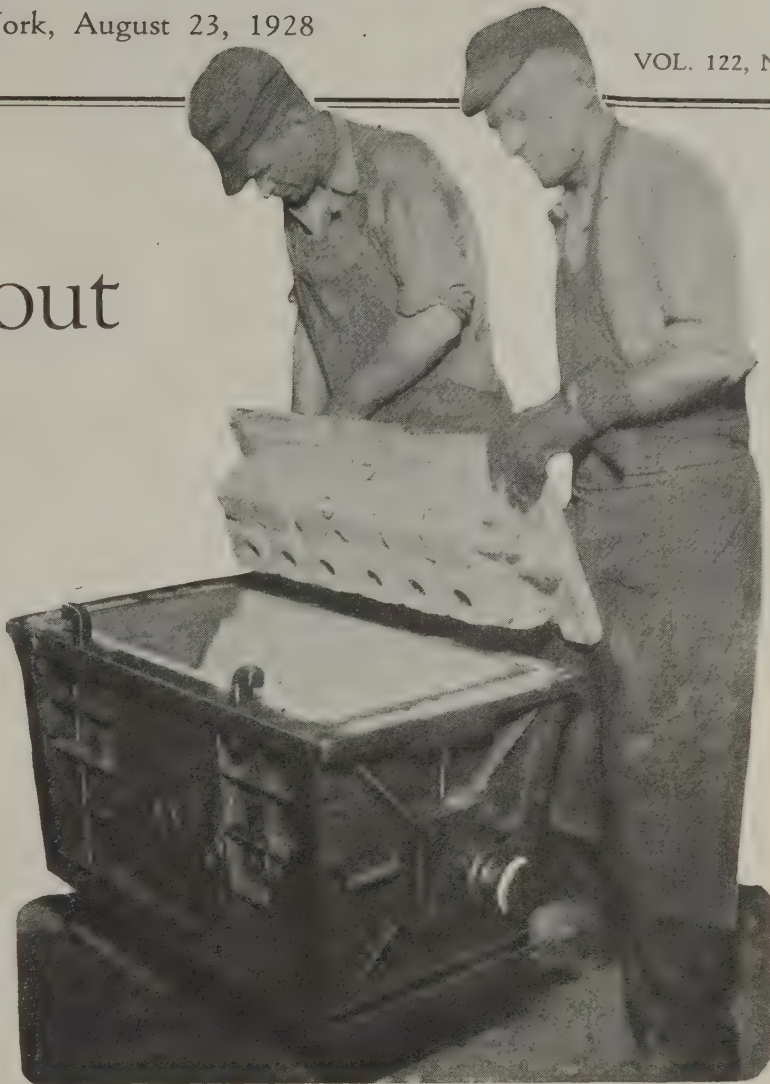
New York, August 23, 1928

ESTABLISHED 1855

VOL. 122, No. 8

Castings Without Green-Sand Molds

Dry-Sand Cores in Iron Box
Give Cylinder Blocks Close
to Required Dimensions—
Continuous Pour on
Conveyors



MOLDS for the Cylinder Blocks of the Dodge Victory and Standard Six Cars Are Made Entirely of Dry-Sand Cores. The rectangular wedge-shaped box takes the place of the flask. The men are setting in the last core which closes the mold

GREEN sand molds have been entirely eliminated in the manufacture of automobile cylinder block castings by Dodge Brothers, Inc., Detroit. The mold is now made entirely of dry sand cores. This interesting development in foundry methods is a step in the evolution of molding practices. It is said to result in a marked saving in labor and in floor space and in the production of castings which are better than those made by the former practices, in that they are more uniform in dimensions, in metal thickness and in weight. The mold, it is stated, is held within closer limits because the dry sand core has less tendency to give than a green sand mold. Heretofore for several years the Dodge foundry has been making only the drag half of the mold in green sand, using a one-piece flask and bottom board.

The mold is now made in a rectangular wedge-shaped box, which has superseded the one-piece flask and bottom board. This box is machined on the inside within 0.002-in. limits. The cores are so made that they fit into one another. Before they are assembled in the box they are inspected and gaged. The mold is built up upside down, as it is carried along on a conveyor.

First the water jacket core is placed on the bottom of the box. On top and around this is placed the water jacket block core, which forms the outside of the water jacket in the casting. On top of this a valve spring housing core is placed. Then come two side cores which form the outside of the crank case and a portion of the barrels. Next, the barrel core is put in the center of the water jacket, between the cylinder block core and valve spring core. This forms the inside of the barrel wall. The crank case core is placed between two side cores and two end cores, which form the gear housing or front end of the crank case and the fly-wheel mounting or rear end of the crank case, and over the cylinder barrel cores. The joint around this core is mudded to prevent iron from running out through the seam.

Clamps are then placed on top of the boxes and two runner boards are put on. The molds are then poured with two 100-lb. hand ladles, which are filled from a 2000-lb. bull ladle.

The cores are made in core machines and baked in continuous ovens, usual methods being followed in their manufacture. A whitewash coating is applied to the cores. This is used in place of a black coating, because of its high heat-



TRANSFERRING
the Mold from the
Pouring Conveyor
(Above) to the Cool-
ing Conveyor

AN Overhead Chain
Conveyor (at
Right) Lifts the Cast-
ings from the Cooling
Conveyor at Its Un-
loading End. Here any
cores that may be
sticking to it are re-
moved, this being the
first step in cleaning
the castings



conveyor it is hooked off by means of an overhead chain conveyor and is cleaned of any cores which may be sticking to the casting. The castings are then placed on the floor, where they cool at room temperature. When they go to the cleaning room the core wires are removed and they are sand blasted, chipped and ground. They are then water tested to 100 lb. pressure.

The cylinder molding unit occupies a space 30 ft. x 165 ft. In this there are three conveyors, the molding conveyor, a return box conveyor and the shakeout and cooling conveyors. The unit has a capacity of 1800 cylinder block castings in 18 hr., and it has established a record of 1600 castings in 16 hr. with two shifts.

resisting qualities, because it is cleaner to work with and for the reason that white cores reflect the light and make the core room a brighter, cleaner-looking room. Cores on completion pass down an inclined belt conveyor from the core room to the foundry floor, and over another belt conveyor to the cylinder line. The inside of the molding box is oiled to prevent the cores from sticking. This is sprayed on before the making of each mold. Gas which arises during the pouring is carried away through vents in the bottom of the molding box, that index with holes in the water-jacket core.

Passing the end of the mold conveyor after pouring, the molding box, which is provided with trunnions at the two ends, is picked up by an electric traveling crane. It is turned over on its trunnions and the casting and cores fall out on an apron-type cooling conveyor 10 ft. wide and 165 ft. long. The casting remains on this conveyor 90 min. to allow it to normalize. At the unloading end of the apron

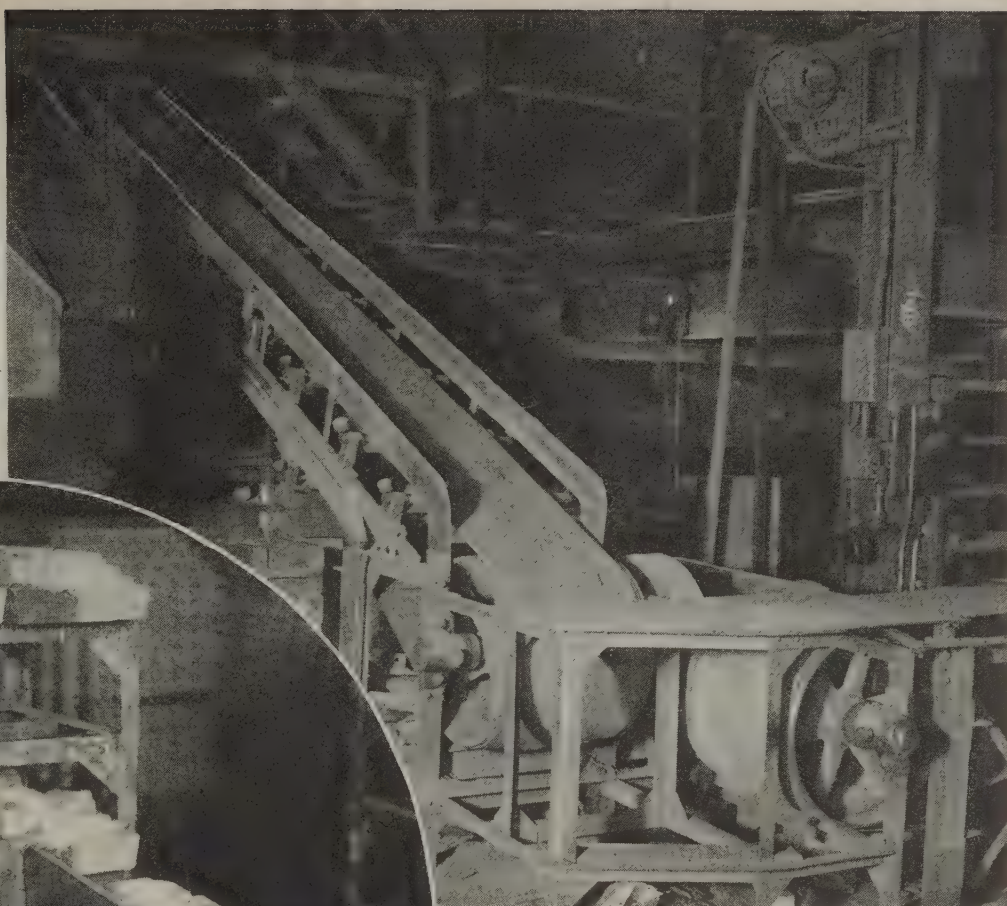
With the old methods and without conveyor equipment 300 cylinder blocks were produced in 9 hr. in a foundry floor space of approximately 60 x 350 ft. There is also a reduction in the space required for sand handling, molding machines and supplies.

The number of cores required depends on the design of the cylinder block and number of cylinders. A 6-cylinder block is being made with 338 lb. of core sand, or 87 lb. more than would be used in making the same casting in a green sand mold, but offsetting this is the elimination of the use of molding sand.

There is a saving in labor, it is stated, of 21 men, in making 1000 cylinder blocks a shift, as compared with the old method of using one-piece flasks and green sand molds.

Traveling over the apron-type conveyor shown above, the castings are not under a hood and the muffle effect which might thereby be obtained is not experienced. This is in contrast with the practice in certain foundries, both

COMPLETED Dry Sand Cores (at Right) Move Down the Inclined Belt Conveyor to the Foundry Floor and on to Another Belt Conveyor to the Cylinder Line, Where They Are Assembled in the Molding Box While the Latter Is Moving on a Conveyor



CHECKING the Accuracy of a Cylinder Core by Means of Jigs (Left). This is a most important part of the procedure, if the casting is to maintain the close limits of accuracy now demanded—in metal thickness, total weight and uniformity of dimensions

in the automotive field and elsewhere, of providing hoods for carrying away fumes and heated air. Where these cooling conveyors are provided with exhaust fans the cool-

ing of the castings proceeds, of course, at an accelerated pace. Frequently, in such cases, the product emerges at the other end in condition to be handled at once.

Sea-Water Corrosion of Steels

FIRST results are now available of the extended study of sea-water corrosion sponsored by the British Institution of Civil Engineers. Exposures of iron and steel are being made at Auckland, New Zealand; Halifax, Nova Scotia; Colombo, Ceylon, and Plymouth, England, on three groups, intended to be continued during five, ten and 15 years respectively. The five-year groups included not only single metals, but also pairs of dissimilar metals in contact with each other, the object being to throw light on the tendency in such pairs for one metal to be preserved at the expense of the other.

The first five years having fully expired, the samples from each port have been removed and examined by Dr. J. N. Friend. In each harbor each group of samples was divided into three sets, respectively fixed in the air above the water, at half-tide level, and totally submerged.

It is found that the five-year results from the various

ports show very satisfactory agreement with each other. Among other observations it is found that there is no great difference between the extent of corrosion of mild steel and of wrought iron, although in pairs of the two metals in contact the wrought iron corrodes more quickly, while the steel is partially preserved. Sulphur in steel appears to reduce its resistance to sea-water corrosion, and copper up to 2 per cent to increase it. Chromium steels and nickel steels, though very resistant to sea air and at half-tide level, are less so when totally submerged, and are also liable to severe pitting.

In resistance to corrosion as measured by loss of weight and pitting combined, the cast irons give the best results, but in some instances seem to show internal corrosion. The protection afforded to nickel or chromium steel by contact with mild steel at the expense of the latter is very marked.



Public Docks Encourage Water Shipments to Chicago

CHICAGO is now served by three public docks equipped to handle iron and steel. These are operated by the Terminals & Transportation Corporation of Illinois at 103d Street and the Calumet River, South Chicago, Ill.; the East Chicago Dock Terminal Co., Indiana Harbor, Ind., and the South Chicago Coal & Dock Co., South Chicago, Ill.

Chain of Water Terminals on Lakes

The first unit of the Terminals & Transportation Corporation, a terminal and warehouse at Duluth, Minn., was put in operation in 1923. Since that time similar facilities have been provided at Port Huron, Mich., Buffalo, Detroit and Chicago. In addition to these dock warehouses, the company has two transportation lines, the Minnesota-Atlantic Transit Co. and the Detroit-New York Transit Co. The Detroit-New York Transit Co. operates Diesel-electric motorships between Detroit and New York on regular schedules. The running time between the two cities is less than six days. The Minnesota-Atlantic Transit Co. operates steel steamers between Duluth and Buffalo, with stops at intermediate ports.

The Terminals & Transportation Corporation will finance goods in storage, making loans based on market value. Briefly, the whole service comprises:

1. Unloading of merchandise from railroad cars to boats.
2. Classification and storage.
3. Freezing, bonding and other special services.
4. Delivery to railroad, boat, express company or truck.
5. Transportation over Lake and canal line between Duluth, Chicago, Milwaukee, Port Huron, Detroit, Buffalo and New York.
6. Financial cooperation.

The McDougall terminal of the Terminals & Transportation

The illustration at the top of the page shows a cargo of structural steel being unloaded at the dock of the East Chicago Dock & Terminal Co., Indiana Harbor, Ind. The steel was shipped from a Lake Erie port.

tion Corporation at Duluth has 1500 ft. of dock, with two 3-ton electric cranes for handling heavy freight. The track capacity is 70 railroad cars. The terminal buildings are 128 ft. wide and several hundred feet in length, containing 350,000 sq. ft. of general storage space and 1,000,000 cu. ft. for cold storage. The main structure is six stories high.

At Detroit there are 1300 ft. of dock, handling bulk and package freight, the track capacity being 150 cars. The terminal building is 160 x 500 ft., 10 stories in height, and contains 800,000 sq. ft. of floor space. There are 2,500,000 cu. ft. of cold storage space and 5,000,000 cu. ft. for general storage. The tracks inside the building accommodate 25 cars.

At Buffalo, the Eastern terminus of heavy ship tonnage on the Great Lakes and the Western terminus of the New York State Barge Canal, the company has 1580 ft. of dock and a track capacity of 100 cars. The warehouse, 1050 ft. in length, provides 2,000,000 cu. ft. of general merchandise storage space and 2,000,000 cu. ft. for cold storage.

The terminal at Chicago includes a dock 1440 ft. long, which is equipped with two 30-ton locomotive cranes. The track capacity is 100 railroad cars. The steel storage warehouse is 80 x 600 ft.

Dock and warehouse facilities at Chicago were completed near the end of 1927, and therefore comparative figures of iron and steel shipments are not available. The company, at least at Chicago, is in the early stages of developing business. The terminal at Chicago is not equipped to handle coal or ore, but it has facilities for handling pig iron and iron and steel products.

The East Chicago Dock Terminal Co., a newly formed corporation, a subsidiary of the Interstate Terminal Warehouses, Inc., which owns and operates the North Pier Terminal at the mouth of the Chicago River, purchased in November, 1927, approximately 20 acres of ground on the

southeast bank of the Indiana Harbor Ship Canal, between Canal Street and the fork, having 1500 feet of dock frontage.

It also has a three-year option on approximately 77 acres of adjoining property, giving an additional 1700 ft. of dockage. This will give a total of 97 acres of open storage, but the company contemplates building sheds as soon as demand warrants. The property is located at the entrance of the Calumet River, which is a part of the Illinois waterways system, connecting with the Mississippi River. This dock is served by the Indiana Harbor Belt, the Baltimore & Ohio Chicago Terminal, the Elgin, Joliet & Eastern and the Pennsylvania railroads. The dock is laid out with four tracks running parallel to the water's edge, having a capacity of between 80 and 100 cars on the dock and from 40 to 50 additional cars on the lead-in track.

The dock is equipped with two 15-ton locomotive cranes, each having 55-ft. booms. There are also two 20-ton gantry cranes with 70-ft. spans. Ore-handling capacity is 4000 tons per day. Pig iron can be handled at the rate of 150 tons per hour by means of 55-in. and 65-in. magnets. Clam-shell buckets are provided in 1½ and 2½-cu. yd. capacities. Structural steel sections have been handled in lengths up to 90 ft.

This company, as previously stated, controls the North Pier Terminal at the mouth of the Chicago River, where 1,500,000 sq. ft. of storage space is available. It also operates warehouses at Cleveland and Indianapolis.

This year there have been received at this dock between 25 and 30 boats. Several have carried cargoes directly from European ports. Others have moved from the Atlantic Coast, Canadian ports, Buffalo, Cleveland and Detroit, with commodities destined not only to Chicago, but to points beyond, such as Denver, Kansas City, St. Louis and Milwaukee. There have also been a number of boats loaded for out-bound movement from Chicago to both American and Canadian ports on the Great Lakes.

The dock of the South Chicago Coal & Dock Co., South Chicago, Ill., is used to unload ore for rail shipment to Granite City, Ill. Four hundred thousand tons of ore passed over this dock in 1927, and an equal tonnage will be handled

before the close of navigation in 1928. The shipping charge on ore loaded at Escanaba, Mich., for delivery at Chicago is 47c. a gross ton and from Superior, Wis., to Chicago, 70c. a gross ton. The rail rate on ore from Chicago to Granite City is \$1.20 a ton. The South Chicago dock charges 21c. a gross ton for unloading and putting the ore on cars. This dock is 700 ft. in length. It is equipped with a gantry crane which will unload free running ore at the rate of 350 tons an hour. Consideration is now being given to the installation of a second crane equipped to handle structural material. Open air facilities are available for storage of ore, pig iron and structural material. The storage charge on pig iron varies from 5c. to 10c. a gross ton per month.

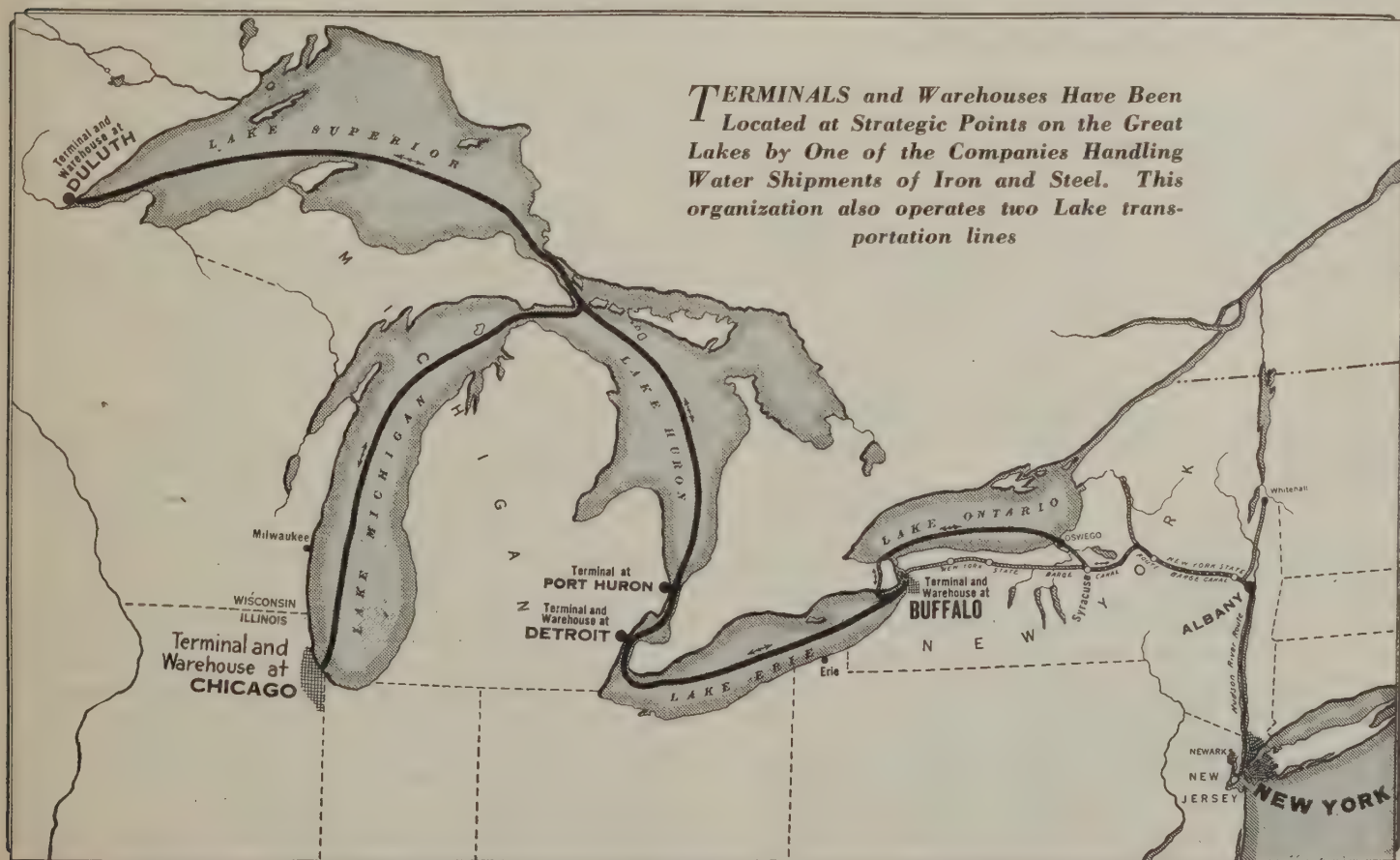
Sharp Gain in Water Shipments of Steel

Lake shipments of structural shapes to Chicago thus far in 1928 have averaged about 3000 tons a week. Up to Aug. 1 fully 20,000 tons of bars had been brought to Chicago by boat, and an equal tonnage is expected to be unloaded during August alone. In 1927 the Lake movement of structural shapes to Chicago was practically nil and the tonnage of bars shipped was negligible.

Boat shipments of pig iron from Lake Erie ports to Chicago totaled about 30,000 tons in 1927. The movement this year, up to Aug. 1, aggregated about 25,000 tons. The shipping season for pig iron in 1928 opened much earlier than in 1927, but, because of recent reductions in prices by Chicago furnaces, there is less incentive for Chicago brokers to bring in cargoes of pig iron than there was a year ago at this time. It is understood, however, that several vessels are still under contract and will handle cargoes to Chicago regardless of the existing relation between furnace prices of pig iron at Chicago and Lake Erie ports.

A boatload of low phosphorus pig iron has been shipped to Chicago directly from England in this season of navigation, and negotiations for a second shipment are now under way. It is also planned to arrange for direct boat shipments of ferromanganese from England and of spiegeleisen from Germany to Chicago.

The low phosphorus pig iron shipped from England was delivered to a Chicago dock for somewhat less than \$5.50 a



gross ton. A rate of \$5.50 a gross ton now being quoted on a proposed shipment from England to Chicago includes stops at two ports. Ferromanganese can also be handled at this rate. The vessels that will be available for these voyages across the ocean are said to be boats now being

built in Europe for Canadian service on the Great Lakes.

The Lake rate on pig iron from Cleveland to Chicago ranges from \$1.25 to \$1.50 a ton. Structural material can be moved from either Buffalo or Cleveland to Chicago at \$1 to \$1.25 a ton.

Performance Records of Stainless Steel

British Firms Find It Preferable for Pistons for Hydraulic Pumps, Blades for Steam Turbines, and Gas Engine Valves

BY N. F. BUDGEN, PH.D.*

CUTLERY is the most natural application of stainless steel. Its use enables large dining rooms to abolish the cleaning machines, to save work and reduce the wear of the blades. Surgical and dental instruments which must be protected against sterilizing agents are now usually made of stainless steel rather than of silver plated carbon steel. At Sheffield alone 750 tons of this metal is produced annually for cutlery manufacture.

There are three important further applications in mechanical construction which deserve special mention; namely, pistons for pumps or hydraulic presses, turbine blades and valves for internal combustion engines.

Pump Liners Resist Erosion

Davy Brothers, Ltd., Sheffield, England, built in 1915 a three cylinder pump, electric driven, for a pressure of 10,000 lb. per sq. in. One of the pistons was made of stainless steel, the other two of the more usual phosphor bronze.

This pump worked day and night until the end of the war. On inspection the diameter of the stainless steel piston was found to be reduced only 0.4 mm. in diameter, while the other two pistons were 2.8 mm. smaller. This reduction in wear evidently favors the conservation of power and the satisfactory working of the pump.

Tests on Steam Turbine Blades

Thomas Firth & Sons, Ltd., Sheffield, manufacturers of stainless steel, possess a Westinghouse steam turbine working at 3000 r.p.m., and receiving steam at 170 lb. per sq. in. superheated at 315 deg. C. It works uninterruptedly under a load factor varying from 25 to 100 per cent. The original blades were made of 5 per cent nickel steel. In June, 1920, some of these blades were replaced by others made of stainless steel and a few replacements were made in nickel steel.

The following table gives the characteristics of the two metals.

	Stainless Steel	Nickel Steel
Composition	0.30 per cent carbon 13.4 per cent chromium	0.19 per cent carbon 4.7 per cent nickel
Tensile strength ..	122,000 lb. per sq. in.	78,000 lb. per sq. in.
Elastic limit.....	99,000 lb. per sq. in.	54,000 lb. per sq. in.
Elongation	20 per cent	32 per cent
Brinell hardness ..	255	143

As mentioned before, in June, 1920, 24 blades were replaced in the high pressure wheel. On the one side of this wheel which functions in dry steam at a high temperature, 12 non-polished stainless steel blades were placed; on the opposite side six of the same metal, with three made of polished stainless steel and three of new nickel steel.

In the last wheel 12 blades were also replaced. On the one side of this wheel, which works in damp steam, three non-polished stainless steel blades were fitted and three in nickel steel, while on the opposite side three polished stainless steel and three nickel steel blades were fitted.

The turbine thus altered worked uninterruptedly for

3471 hr.; it was then taken down and while the nickel steel blades revealed the usual corrosion, the stainless steel ones were intact and had preserved all their original polish.

Results of these trials have been confirmed by those obtained by the Thomson-Houston company on one of its own turbines. At the beginning of 1916, this firm installed blades of a trial composition in the middle wheel of a turbine, but the wheel began to show corrosion very soon. Two hardened stainless steel blades were then fitted into this wheel, two of the same material hardened and tempered, two of phosphor bronze, two of nickel bronze, two of ordinary soft steel and two brass ones. This turbine was started in the autumn of 1916 and was not examined until April, 1918. With the exception of those made of stainless steel all the blades suffered slight erosion. Brass blades were especially worn. The extremities of the blades made of soft steel had become slightly uneven, while the nickel bronze ones had resisted as well as those made of stainless steel.

The turbine then operated until July, 1921, when it was found that the stainless steel blades were absolutely untouched on the edges. The inlet edges of the nickel bronze blades as well as the phosphor bronze ones had become uneven; those of soft steel were heavily corroded, the wear being about 1½ mm.

Such records show the advantage of stainless steel for the construction of turbines. The outline of the blades has great influence upon the performance; variations at the edges impart shocks and eddies, and reduce the efficiency. Non-corrosive blades reduce the necessary repairs and stoppages for cleaning and replacement.

Air Engine Valves Require Strength at Heat

Lastly may be mentioned the application of stainless steel for valves for internal combustion engines, especially those for aero engines and for the high-speed engines now so popular for motor cars. Noncorrosive valves and seats lengthen the time between regrindings and maintain unimpaired efficiency during operation.

What has really made the use of stainless steel for valves a success in aero engines is the security it gives during working because of the high strength at elevated temperatures. For such purposes the Derihon plant in Manchester supplied the Allies during the war 15,000 stainless steel airplane engine valves per week.

The automobile industry is leaning more and more toward the building of high output engines and to obtain this many English makers have fitted overhead valves. This arrangement has the serious disadvantages that a broken valve may fall into the compression chamber and break the piston and even the cylinder. Valve regrinding is also a lengthy and expensive operation on such an engine. Certain British firms using stainless steel valves guarantee 20,000 miles before it is necessary to regrind. Also the strength residing in this steel at high temperature permits the use of stronger springs and short valve stems.

*Metallurgical engineer, Birmingham, England.

Making Electric Manganese Steel

Details of Modern Practice for Ingots—Less Loss of Manganese—What Advantages Are Claimed Over Open-Hearth Method

BY J. H. HRUSKA*

IN the history of the metallurgical development of manganese steel, the general application of electric melting methods has resulted in an important improvement in the chemical as well as physical properties of this material.

Originally, the alloy steel manufacturers were strongly in favor of the generally used method of mixing low-carbon

Although many other specifications of the chemistry of high-manganese steels were introduced by the metal trade, most of the quality products of steel works producing this grade of steel may be ranged within these limits.

In order to avoid a rather tedious description of the metallurgical processes during the manufacture of high-grade manganese steel, a complete outline of a very satis-

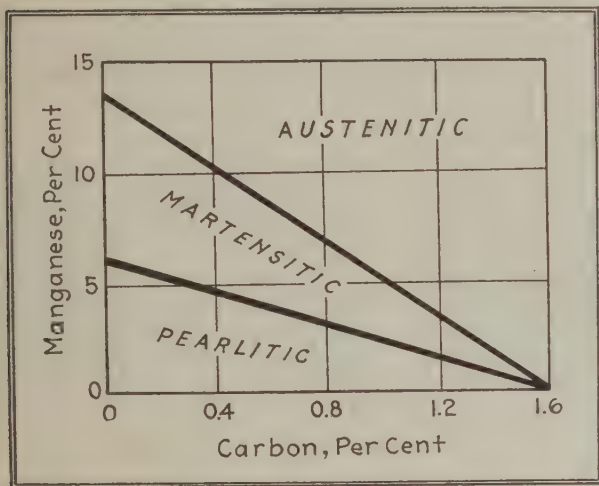


Fig. 1. (At Left)—Relationship Between Carbon and Manganese as Originally Observed and Determined by Guillet

steel with molten ferromanganese or else to risk a large percentage of the added manganese and melt both together. In either case great losses had to be expected. With the use of electrometallurgical melting and refining not only have these losses been eliminated, but a high-grade material has been obtained.

Of course, the melting and refining operations connected with the manufacture of electric manganese steel were higher in cost as compared with the older methods and it was for this fundamental reason that it took some pioneering to put electric manganese steel as a commercial product on the market.

Preparation of the Molten Metal

In the successful manufacture of manganese steel of the so-called austenitic type, the important relationship between carbon and manganese—as originally observed and determined by Léon Guillet (Fig. 1)—and partly also between carbon, manganese and silicon has steadily to be held in mind. Thus a certain standard analysis or rather minimum content of the various constituents resulted more or less automatically. This generally accepted "specification" reads as follows:

	Per Cent
Carbon	less than 1.10
Manganese	11.50–13.50
Silicon	less than 0.60
Phosphorus	less than 0.065
Sulphur	less than 0.020

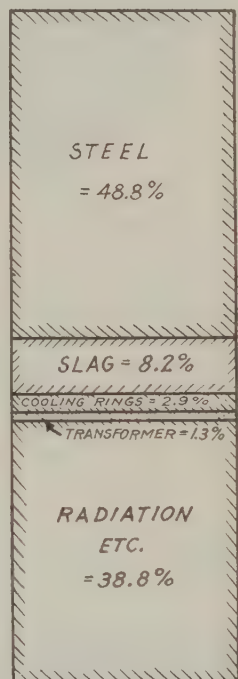


Fig. 2.—Heat Distribution Per Ton of Electric Manganese Steel

factory heat, made recently in a 7-ton basic Heroult furnace, is presented:

Charge used in making the heat:	Lb.
Carbon steel turnings.....	5,300
Carbon steel scrap.....	6,800
Initial metallic charge.....	12,100
Lime	160

Record of the heat:

Time	Operation	Length of Operation
9.47	Charging started.	
10.10	Current on.	
12.05	75 lb. scale added.	
12.37	102 lb. lime added.	
12.51	No. 1 samples of steel and slag taken.	
1.00	Furnace tilted in order to skim off the greatest part of oxidizing slag.	Charging, 23 min.
1.04	Current off and remainder of slag cleaned off the surface of the bath. Particular care taken in carrying out this operation.	Melting, 2 hr. 50 min.
1.07	Slagging finished; current on again.	Slagging, 7 min.
	After slagging, successively added:	
	45 lb. lime	
	10 lb. fluorspar	
	770 lb. ferrosilicomanganese	
1.22	75 lb. of lime added.	
1.28	Four shovels of powdered ferrosilicon thrown over slag mixture.	
1.34	No. 2 samples taken, after a thorough stirring of the bath.	

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- 1.37—Four shovels of powdered ferrosilicon thrown on slag surface.
- 1.40—30 lb. of lime added.
- 1.52—Four shovels of powdered ferrosilicon thrown on slag surface.
- 2.00—Samples No. 3 taken after the bath was thoroughly stirred.
- 2.03—1100 lb. of ferromanganese added and 30 lb. of lime added.
- 2.24—780 lb. of ferromanganese added.
- 2.33—Samples No. 4 taken.
- 2.35—30 lb. lime added, then three shovels of powdered coke thrown on slag. Bath stirred, and left quiet for the rest of the heat.
- 2.58—Samples No. 5 taken.
- 3.21—Current off. A few large pieces of lime thrown near taphole to "thicken" the slag.
- 3.22—First steel tapped into hot ladle (bottom pour ladle).
- 3.24—Ladle filled.
- 3.27—Teeming started.
- 3.35—Sample of steel (No. 6) taken.
- 3.49—Teeming finished. No skull in ladle or furnace.

Analyses of steel samples:

Sample	1	2	3	4	5	6
Carbon	0.04	0.18	0.21	1.04	1.00	1.01
Manganese	0.38	4.18	4.37	13.93	13.31	12.89
Silicon	0.01	0.31	0.26	0.29	0.23	0.22
Phosphorus	0.003	0.032	0.035	0.049	0.052	0.047
Sulphur	0.018	0.027	0.018	0.013	0.010	0.006

Analyses of slag samples:

Sample	1	2	3	4	5
	Dark Greenish Brown	Green Gray	All Samples Light Greenish Gray, Crumbling to White Powder		
Appearance					
Silica	8.92	23.11	24.83	24.42	25.53
Ferrous Oxide....	24.62	7.63	4.60	2.29	1.86
Manganous Oxide.	23.41	14.06	7.29	3.66	3.21
Calcium Oxide....	32.56	42.10	51.84	57.12	56.97

Finishings:

Ferrosilicomanganese (63.84 per cent Mn).....	770
Ferromanganese (78.41 per cent Mn).....	1880

Slags:

Lime (87.22 per cent CaO, 0.59 per cent MgO, 0.91 per cent SiO ₂ , 0.064 per cent S).....	262
	reducing slag 210
	462
Fluorspar (84.26 per cent CaF ₂).....furnace	10
	ladle 10
	20
Ferrosilicon, powdered.....	approximately 35
Coke dust.....	approximately 15

Thermal efficiency of furnace:

According to a scheme, outlined in one of the author's previous articles (THE IRON AGE, Dec. 31, 1925, page 1845), a similar

balance sheet was worked out for the heat mentioned in the preceding paragraphs with the following results (calculated per 1 ton of finished manganese steel, Fig. 2):

	Per Cent
Steel	48.8
Slags	8.2
Cooling rings.....	2.9
Transformer	1.3
Radiation, etc.....	38.8
	100.00

Ingot Practice

Austenitic manganese steels are mostly teemed into rather small square ingots, the weight of each ingot rarely exceeding five tons. Many quality steel works, here and abroad, use bottom pouring, which method, in this case particularly, has the advantage of a quicker teeming and consequently more uniform pouring conditions as well as a better yield of sound metal.

After teeming, the molds should be stripped off the ingots as soon as possible. Obviously, "stickers" must be attended to immediately and, if stripping is impossible, the mold must be broken. The ingots should be delivered to the soaking pits at a very high initial temperature and arrangements should be made to maintain at the time of charging approximately the same temperatures in the pits as those of the charged ingots.

Conclusions

Comparing the manufacture of ingots of austenitic manganese steel made in basic electric and open-hearth furnaces, the following points are mainly to be considered:

Advantages

- 1.—Homogeneous metal.
- 2.—Practically negligible losses of manganese.
- 3.—Very little non-metallic and gaseous inclusions.
- 4.—Possibility of a hotter steel.

Disadvantages

- 1.—Very often the steel is finished and tapped too hot, which fact causes the usual higher shrinkage of electric steel as compared with the product of open-hearth furnaces:
Open-hearth ... 2.1 to 2.5 per cent
Electric 2.7 to 3.0 per cent
- 2.—When using tilting ladles slag interferes very often, thus bottom pour ladles should be considered as standard practice.
- 3.—Mostly higher production costs.

Safety Hints for Lacquering

THE Hartford Accident & Indemnity Co., Hartford, Conn., has issued for free circulation a second edition of an attractive pamphlet entitled "Spray Coating—its Hazards and Safeguards." It gives a brief but clear account of the constitution of modern lacquers and the various precautions which are necessary to avoid injuring the health of employees or endangering the plant. Practical suggestions are made on approved methods of designing the spray-booth and the ventilating system, and simple but effective and cleanly housekeeping methods are suggested. The booklet should be a source of useful information to operators who do a relatively small amount of finishing by this new process.

The following safety hints are given on a sheet, suitable for framing and posting, which will be sent by the company to those who ask it:

1. Do not use lacquers containing poisonous substances such as methyl alcohol, benzol, or tetrachlormethane.
2. Provide adequate exhaust ventilation before beginning spraying operations.
3. Arrange ventilating equipment so that fumes will not pass through fan.
4. Respirators and masks should not be depended upon to combat fume hazard unless they are equipped with tube leading to fresh air supply.
5. Employ a gun pressure that does not produce an excessive amount of mist.
6. Workers using lacquers containing lead and silica should be periodically examined by a physician.
7. Separate booths should be provided for each spraying operation.
8. Lacquers should be stored in fire-resistive structures, well ventilated and lighted with vapor-proof globes.

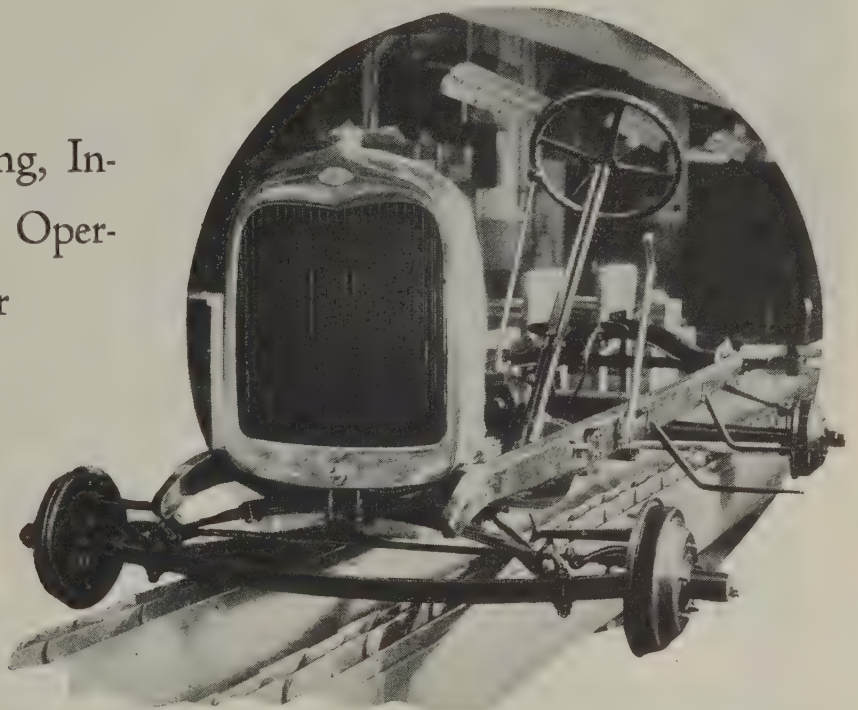
9. Main supplies of lacquer should not be stored in the factory proper.
10. Solvents and diluents should not be stored in the factory proper.
11. Use only incandescent vapor-proof globes for lighting.
12. Guard in an approved manner all switches and plugs.
13. Motors and flames should be safely isolated from spraying rooms.
14. Ground all electrical connections and make sure that thinner containers are grounded on metal supports—thus guarding against static electricity.
15. Iron or sparking metals should not be used for cleaning and scraping.
16. Steel lacquer drums should not be used for pressure containers.
17. Lacquers should not be mixed in the spraying room.
18. Air compressors should not be located in the spraying room.
19. Fire protection apparatus, extinguishers, sprinkler systems, etc., should be provided.
20. Keep equipment and factory clean—organize a strict, systematic cleaning schedule.

The part played by the foreman in the control of labor turnover is the third booklet of a series on the subject of labor turnover which has been issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., New York. The foreman, it is pointed out, "can help employees to become adjusted to their work quickly, he can develop loyalty and he should be the first to learn of problems and difficulties which confront every wage earner." A composite of the views of 40 manufacturing concerns is contained in the booklet.

How Ford Makes Front Axles

Methods of Forging and Forming, Including Bending and Stretching Operations for the Model-A Car

BY FAY LEONE FAUROT*



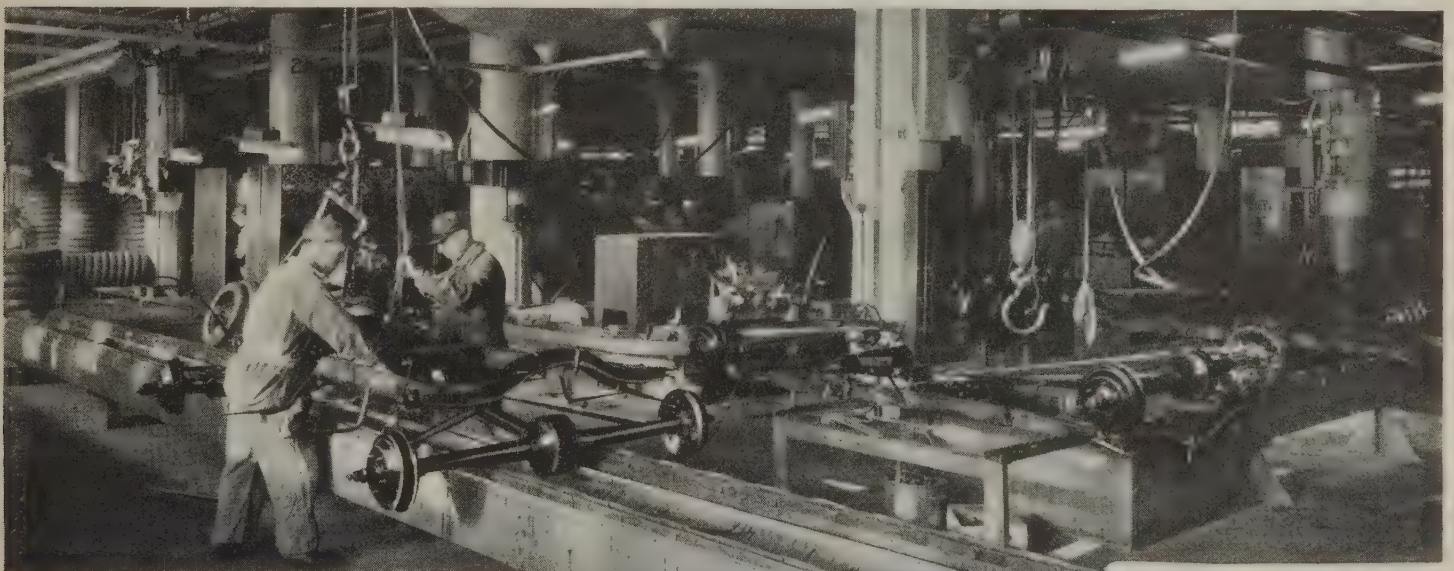
FORGING and forming of the Ford Model-A front axle parts are interesting processes. Especially interesting is the manner in which the left-hand spindle arm is forged and shaped and the means used to bend the front axle proper and stretch it to its required length.

Stock for the front axle is first cut to length on a No. 2 Niles & Jones shear, which handles 300 pieces of stock an hour. A 4-in. Ajax forging machine is then used to upset and bend each end, this operation proceeding at the rate of

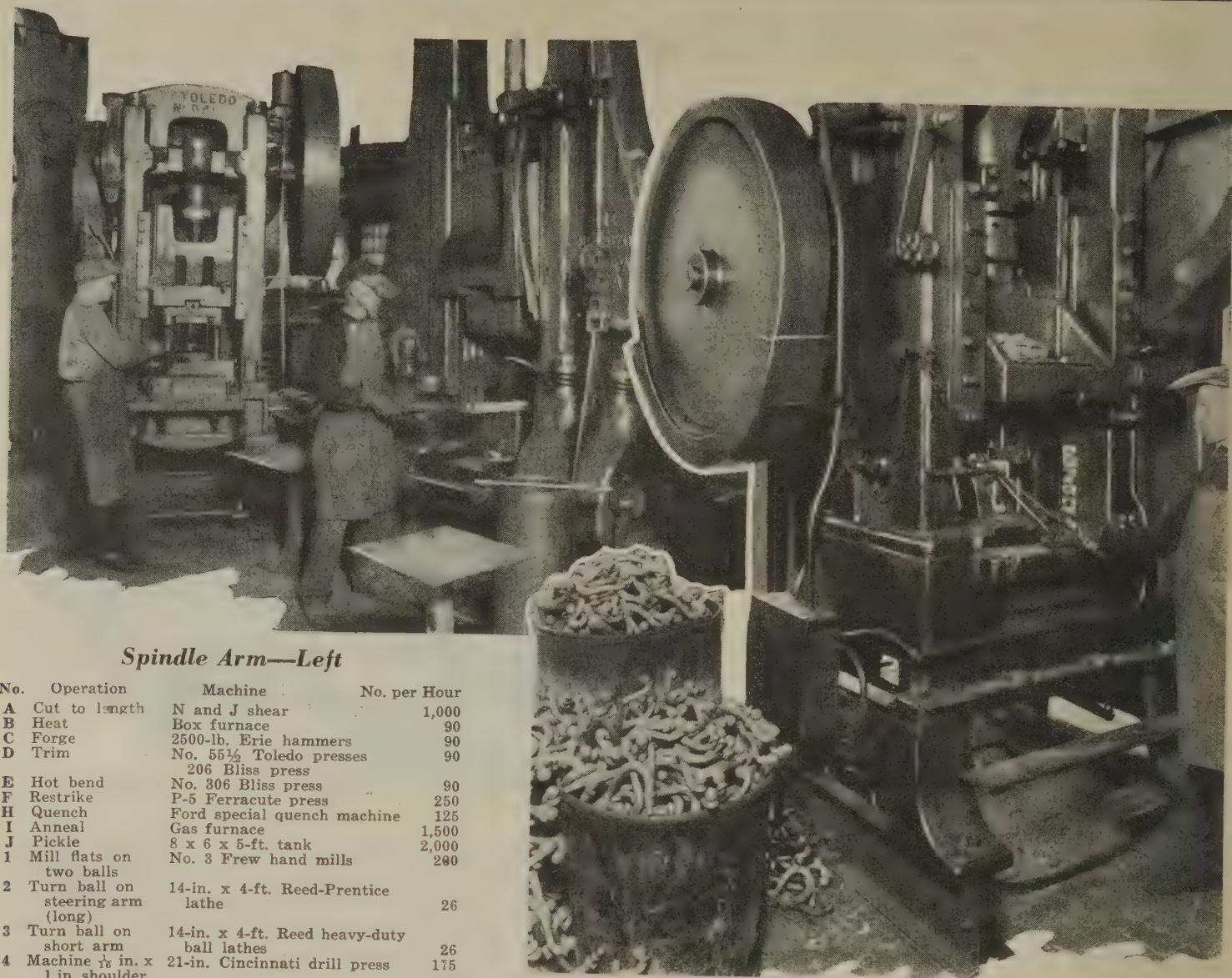
188 ends an hour. A 5000-lb. Erie hammer and a Bliss press are used for blocking, finishing and trimming each end, after which the forgings are given a bench inspection. The parts are then heated in the central section, put into a specially Ferracute press, shown in one photograph, where they are bent and stretched to proper length. This work proceeds also at the rate of 188 an hour.

They are then heated, quenched and annealed, after snagging on a No. 35 Ransom grinder. After a torture test on a 92½ Toledo press they are ground for a Brinell test,

*Mechanical engineer, 420 Lexington Avenue, New York.

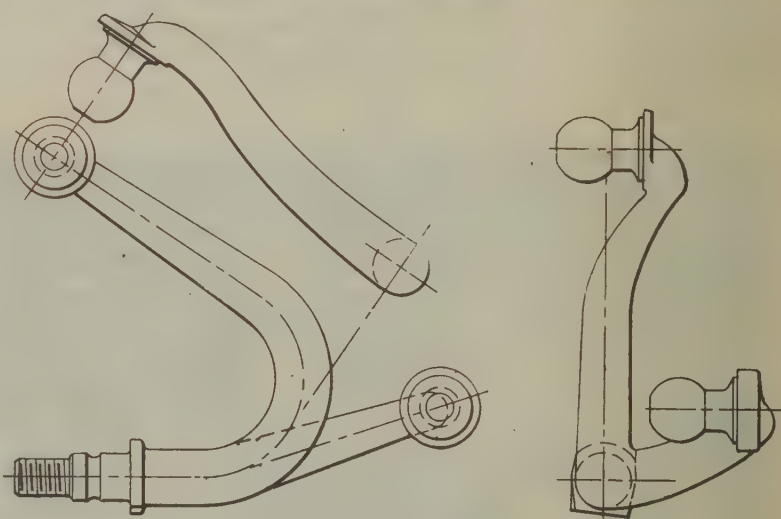


MOUNTING Axles on the Car Frame
Just Before Transferring the Frame
to the Start of the Final Assembly Line
Conveyor

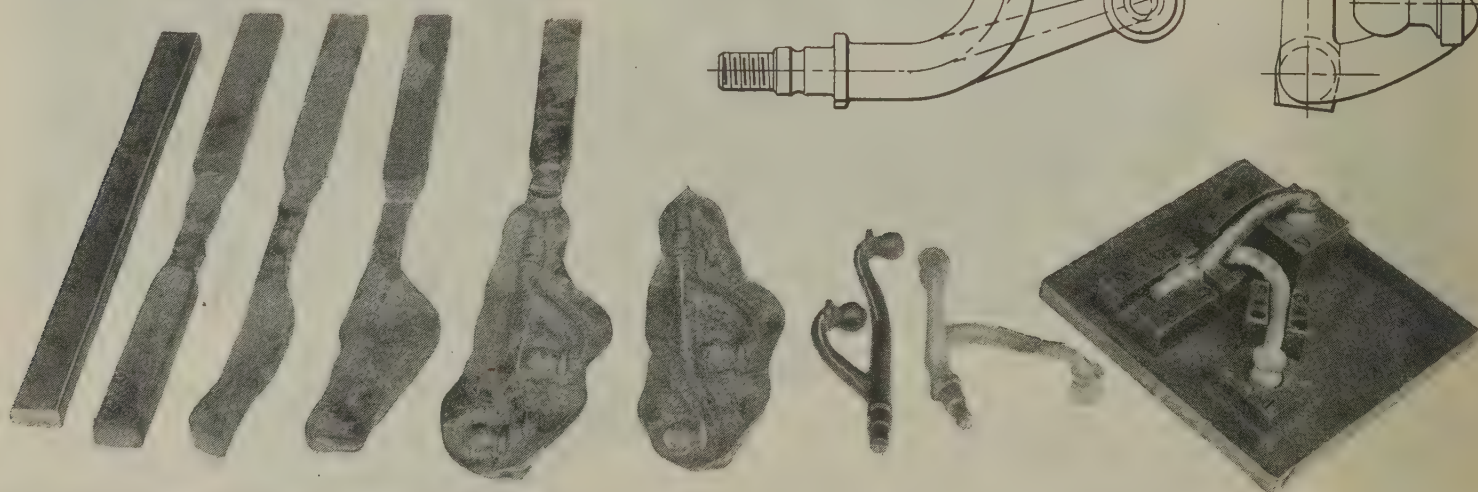


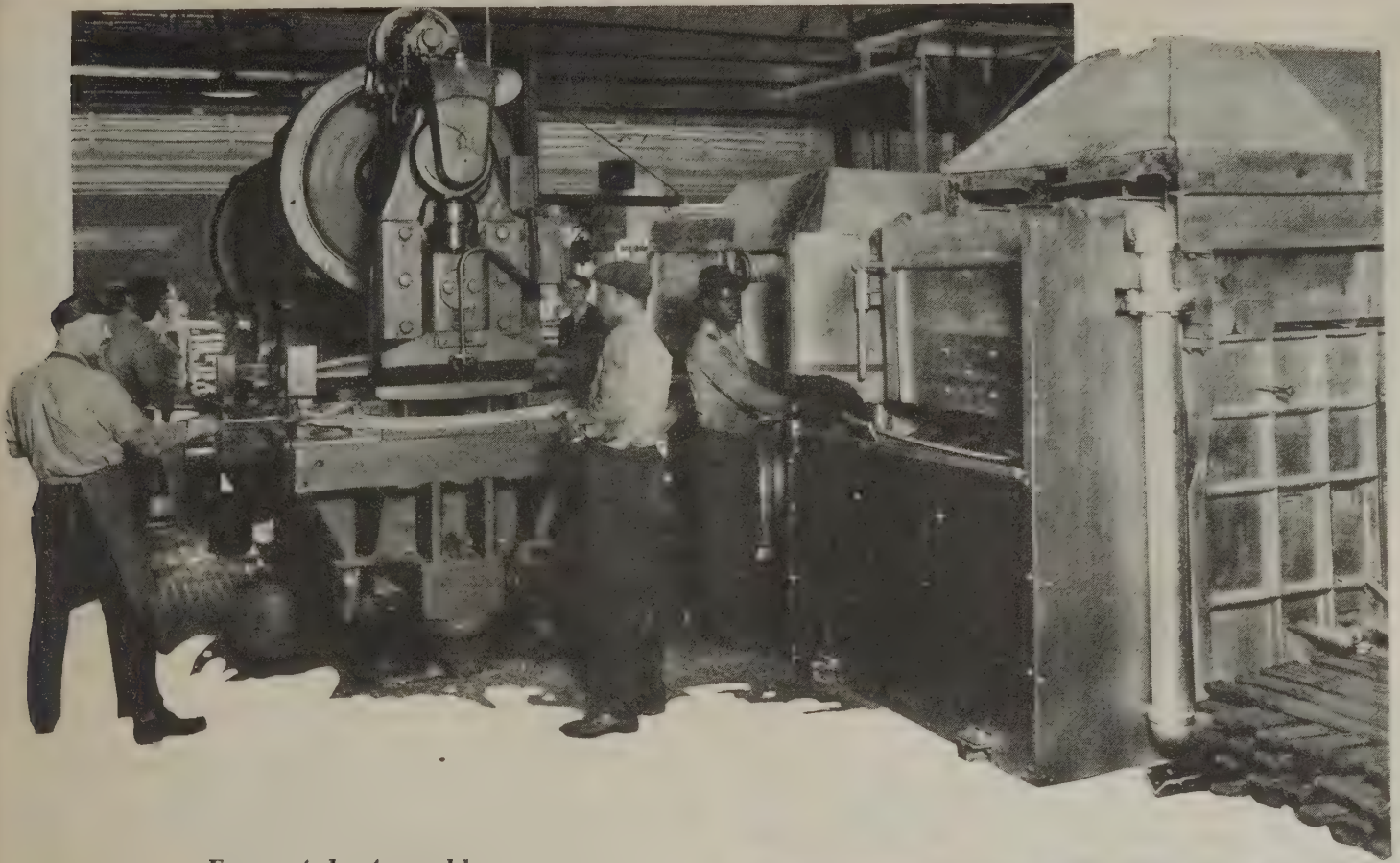
Spindle Arm—Left

No.	Operation	Machine	No. per Hour
A	Cut to length	N and J shear	1,000
B	Heat	Box furnace	90
C	Forge	2500-lb. Erie hammers	90
D	Trim	No. 55½ Toledo presses	90
E	Hot bend	206 Bliss press	
F	Restrike	No. 306 Bliss press	90
H	Quench	P-5 Ferracut press	250
I	Anneal	Ford special quench machine	125
J	Pickle	Gas furnace	1,500
1	Mill flats on two balls	8 x 6 x 5-ft. tank	2,000
2	Turn ball on steering arm (long)	No. 3 Frew hand mills	240
3	Turn ball on short arm	14-in. x 4-ft. Reed-Prentice lathe	26
4	Machine ⅞ in. x 1 in. shoulder	14-in. x 4-ft. Reed heavy-duty ball lathes	26
5	Mill flats to length on balls	21-in. Cincinnati drill press	175
6	Center drill	No. 3 Frew hand mill	200
7	Turn ¾ x ⅞ bearing	Ford centering machine	300
8	Turn oil groove	14-in. x 4-ft. Reed-Prentice lathe	40
9	Mill 532/.534	14-in. x 6-ft. Reed-Prentice lathes	150
10	Drill ⅝ in. hole in spindle arm left	5-in. Pratt & Whitney hand mills	225
11	Thread ⅞	No. 6-D Kent Acme drill, 6-spindle	300
12	Straighten	Special Illinois threader	300
		P-4 Ferracut press and bench	150



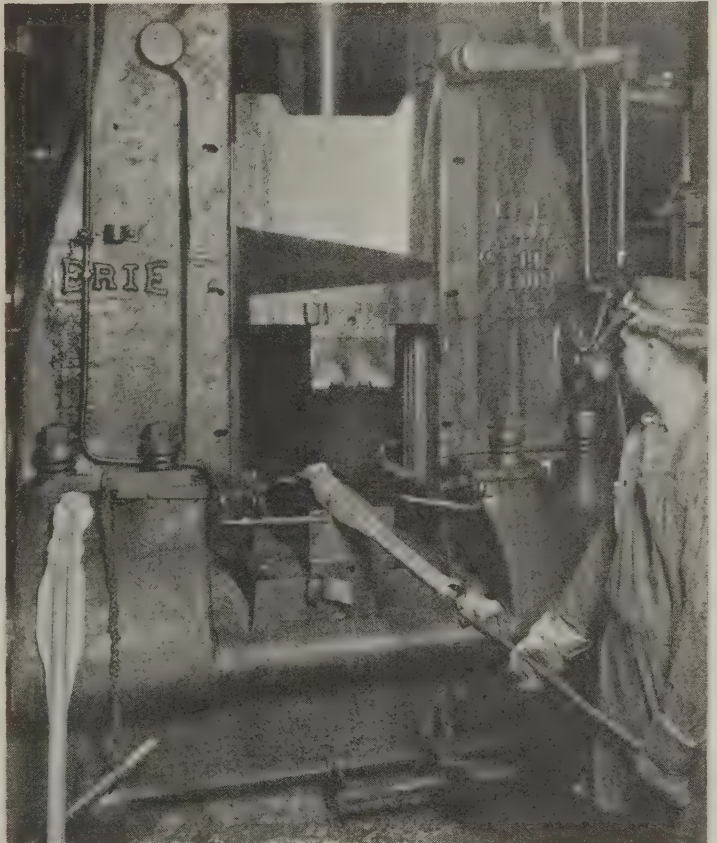
MAKING the Left-Hand Spindle Arm. This is shown in drawing and in photographs. One view shows a Bliss press bending the steering knuckle; another shows an Erie hammer forging the steering spindle arm from a straight bar. Steps in the forging are shown below



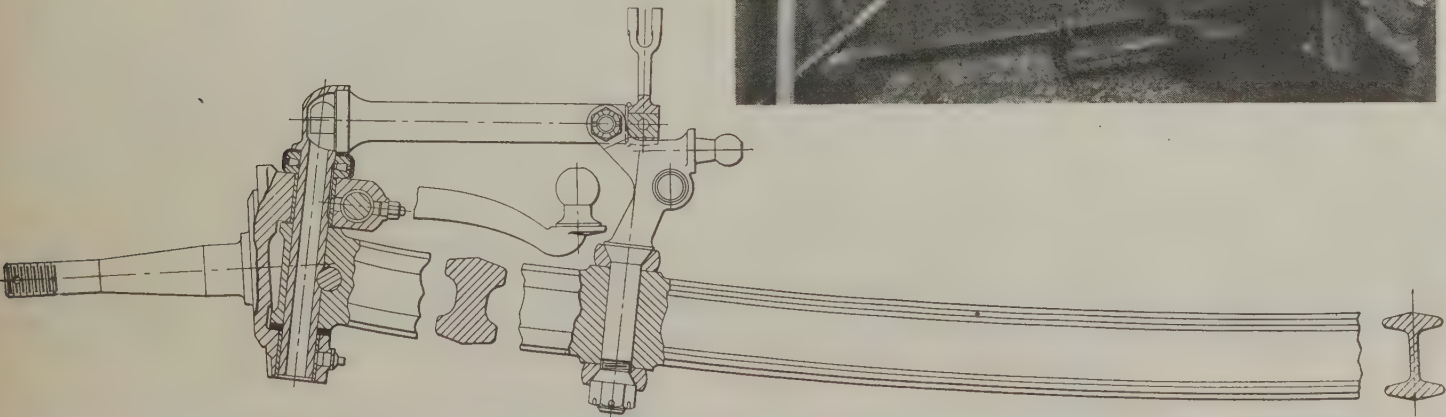


Front Axle Assembly

No.	Operation	Machine
1	Put one front axle into vise.....	Bench fixture
2	Assemble oilers, top and bottom, in two spindles.....	Bench
3	Fit one r. h. and one l. h. spindle arm into one spindle each and put on nuts.....	Bench
4	Put in two steel and felt washers, one set on each side	Bench
5	Put on two spindle bearings.....	Bench
6	Put in spindle bolts, left and right.....	Bench
7	Put in two spindle bolt locking pins and nuts.....	Bench
8	Assemble one radius rod on axle.....	Bench
9	Assemble spring perches on front axle.....	Bench
10	Assemble one brake shaft assembly r. h. and l. h. onto front axle.....	Bench
11	Assemble brake assembly on axle putting cam end in spindle bolt housing first.....	Bench
12	Assemble spring and ball seat assembly in connecting rod and put in adjusting screw.....	Bench
13	Assemble connecting rod on spindle arm balls.....	Bench
14	Put on spindle nut.....	Bench
15	Paint one coat of Primer and bake one hour at 250° heat.	



PREPARATION and Assembly of Front Axle, Showing Forging of the Axle in an Erie Hammer and Bending of the Axle to Exact Finished Contour by Means of Special Dies. The heating oven appears at upper right. The drawing shows assembly of one axle



straightened in a Ferracut press, put through a pickling operation on a conveyor and finally given a bench inspection for cracks. They are then ready for machining.

A special Ingersoll milling machine handling 65 pieces an hour mills the spindle and spring perch bosses, after which a four-spindle Foote-Burt drill drills spindle and spring perch bosses and reams them at the rate of 40 an hour. Two 9/16-in. holes are then drilled and reamed, on a 21-in. single-spindle Cincinnati drill press. A similar machine takes care of the next two operations, which are the countersinking of four 11/16-in. and two 9/16-in. holes and the spot facing of two 9/16-in. holes. Finish milling of the spindle bosses is done on a No. 32 Kempsmith milling machine at the rate of 80 an hour. After this the axle receives one coat of paint and is dried in an oven at the rate of 400 an hour. The accompanying photographs show the dies, hammers and work at various stages of the forging operation.

The nine operations in the forging and forming of the left-hand spindle arm are graphically shown in a progress photograph. Until one actually sees the progressive steps whereby a straight bar of steel is forcibly cajoled into yielding this grotesque but most efficient form one can hardly believe that such a result is possible. Forged flat, the two arms are finally brought to their final shape by bending over a die in the Bliss press shown in another illustration.

Six actual operations and the machines upon which they are performed are detailed in tabular form. Two of these lists of operations appear alongside the illustrations showing respectively the left-hand spindle arm and the front axle assembly. The others follow:

Spindle Arm—Right

No.	Operation	Machine	No. Per Hour
A	Cut to length	H. & J. guillotine-type shear	1,000
B	Heat	Furnace	90
C	Forge	1000-lb. Erie hammers	90
D	Trim	No. 73½ Bliss press.....	90
E	Heat	Furnace	—
F	Quench	Ford special quenching machine	125
G	Anneal	Gas-fired furnace	1,500
H	Restrike	400-lb. Erie steam hammer	750
I	Pickle	8 x 6 x 5-ft. tank.....	2,000
1	Mill flat on ball ..	No. 3 Frew hand mill	300
2	Turn ball	14-in. x 4-ft. heavy-duty ball lathe, two spindle speeds, 75 and 250 r.p.m. No tail-stock or feed, individual water pump, 12-in. air cylinder	26
2-A	Machine 1/16 x 1-in. shoulder	21-in. Cincinnati drill press, wet table	175
3	Mill flats to length on ball	Potter & Johnson shaver, using and mill	300
4	Center drill	Ford centering machine, Ford design—single end.	300
5	Turn ¾ x 9/16-in. bearing	14-in. x 4½-ft. Reed-Prentice lathe, wet table, tail-stock power, individual pump	40
6	Turn oil groove ...	14-in. x 6-ft. Reed-Prentice lathe, wet table, individual pump—spring tail-stock	150
7	Mill 0.532/0.534 in.	5-in. Pratt & Whitney hand mill; No. 1½ Brown & Sharpe mill	225
8	Drill 5/32-in. hole in spindle arm ..	6-D Kent Acme 6-spindle drill, wet table, equipped with individual B. & S. water pump	300
9	Thread 9/16-in. ...	Special Ford threader	300
10	Straighten	P-4 Ferracut press—standard and bench	150

Front Radius Rod Assembly

No.	Operation	Machine	No. Per Hour
1	Weld one Ford part (A-3412 foot) and Ford part A-3411	B-6 Winfield tube welders.	125
2	Trim flash on foot and tube assembly	CA-4 Ferracut punch press	250
3	Weld one tube and foot assembly to Ford part A-3409-B yoke	100-kva. flat-top welders..	100
4	Trim flash from one tube, yoke and foot assembly ..	CA-4 Ferracut punch presses	85
5	Weld one tube and foot assembly to tube, foot and yoke assembly ..	100-kva. flat-top welders..	100
6	Remove flash	CA-4 Ferracut punch press	185

Front Spindle Assembly

No.	Operation	Machine	No. Per Hour
1	Press bushing in one lug	No. DG 53 Ferracut press	300
2	Press bushing in other lug	No. DG 53 Ferracut press	300
3	Burr oil hole	14-in. 3-spindle Leland Gifford drill	1,000
4	Rough line ream ..	Cincinnati drill presses....	300
5	Broach and burnish 13/16-in. hole to size	No. DG 53 Ferracut press	400
6	Burr	Bench	—

Front Spring Perch Assembly

No.	Operation	Machine	No. Per Hour
1	Press front spring perch bush on front spring perch	P-3 Ferracut press; PG-3 upright punch press	500
2	Burr	Allen single-spindle drill press; No. 1 Allen sensitive drill press	375
3	Thread	Special Ford threaders; Special threading machine	200

Seams in Forgings Defined

A special committee was appointed in 1926 by the American Society for Testing Materials to consider whether it is possible to prepare a definition of "seams" and "injurious defects" so as to be available for the interpretation of these words when they appear in specifications for forgings. After considering the wide variety in the design and uses for forgings, it was voted by the committee at its last meeting that the definitions already proposed are as good as can be formulated. These are as follows:

A seam is a separation of the metal as determined by splitting of a chip taken at right angles to or parallel with the direction of the seam.

Seams or other surface imperfections in finished forgings will not be considered injurious if they can be removed by machining the surface of the forging to a depth of 1/64 in. for each inch in diameter of the forging.

The depth of the imperfections may be developed by taking several light cuts with a chipping tool until the deepest chip does not break at the line of the imperfection, or by filing or machining at right angles to the line of the imperfection until its depth has been established.



Completes New Foundry for Compressor and Engine Gray Iron Castings

THE Chicago Pneumatic Tool Co. has completed a new foundry at Franklin, Pa., for the production of gray iron castings for the air compressors and engines manufactured at the company's Franklin works. A storage shed measuring 60 x 330 ft. has also been erected. The new foundry building is 130 ft. wide and 220 ft. long and is ad-

jacent to the main plant, which consists of power house, machine shop, erecting floors, pattern shop, offices and shipping platforms.

The buildings and foundry equipment, which is of modern design throughout, represents an investment of more than \$400,000. The equipment includes two cupolas, one of 16



Equipment of the New Chicago Pneumatic Tool Company's Foundry Is of Modern Design Throughout. It includes two cupolas, several molding machines and automatic hopper type sand handling units. The type of building construction may be noted from exterior view above

tons per hour capacity and the other with half that capacity, 8 tons per hour. Two rotary blowers have been installed and crane equipment includes five traveling cranes, three of which are of 15 ton capacity, one of 10 ton and one of 5 tons, and yard cranes. Several molding machines of various capacities from 1000 to 20,000 lb., and including four squeezers, have been installed. Other major equipment includes three hopper-type automatic sand handling units, mold drying ovens and two large and four small core ovens. A daily capacity of 30 tons is provided, with ample pro-

vision for doubling this tonnage to meet the needs of growth of the business.

Approximately 225 men will be employed. It is stated that the new foundry unit will permit complete supervision of every step entering into the manufacture of the company's products, from raw material to the finished machines.

The company has other large plants at Detroit and Cleveland, where pneumatic and electric tools are manufactured.

Use Foreign Structural Steel Warily

Method of Manufacture and Lack of Usual Tests Cast Suspicion on Uniformity and Acceptability for Important Structures

A WARNING has been issued by the American Institute of Steel Construction, through its executive director, Charles F. Abbott, that the structural steel now being imported into the United States has not been made under the specifications customarily imposed on American steel. Consequently it should be used with caution, and placed into important structures only after careful and systematic testing indicates that its quality is uniform and better than the minimum limits of strength assumed by the designing engineer.

While taking the stand that a technical association such as the institute is not concerned in political matters, Mr. Abbott's statement points out that his organization is vitally interested in the quality of the material which goes into construction work. The institute has evolved standard specifications for steel construction work which have been adopted by practically every city in the United States. These standards require that the steel measure up to the high quality specified by the American Society for Testing Materials.

Imported Structural Steel Mostly Bessemer

"If the material passes these tests it may be made by either the Bessemer or the open-hearth process," the statement continues. "Bessemer steel is not so uniform in quality and we realize that only when the steel is made by the open-hearth process can we be fully assured that it will meet the high standards required."

"Inasmuch as most of the imported structural steel is produced by the Bessemer process a word of caution is issued to building owners in the United States. Foreign steel produced by the Bessemer process should be subjected to the most rigid tests before it is incorporated in any American structure. Aside from the chemical structure of the foreign material it not infrequently happens that its geometric proportions also make it inferior for American practice. Our 12-inch beams have a certain desirable flange width, and their webs a specific thickness. On the other hand, the European product has less metal in the flange, which makes it easier to roll but less efficient per pound of steel. In the United States a uniform quality of steel is used and, no matter what mill may make the beam, it is produced according to known standard specifications. It is inspected before it leaves the mill to determine whether or not it meets the necessary requirements."

"It will be wise for steel contractors not to look for price savings in the purchase of foreign-made structural steel, for in most cases nothing is gained thereby. Should a consignment of steel reach here and be found impractical for use, much time is lost by replacing that shipment by the domestic product. Word comes from Miami, Fla., that construction work on the Twelfth Avenue bridge is held up because the steel was purchased in Europe. Owing to a

strike, the shipment is still held in a Belgian port. The contractors would have completed their work May 15 but for this delay in receiving the steel.

"Not all losses are incident to delays in delivery, when a contract is based upon foreign steel. Some contracts in Brooklyn, N. Y., were held up because the foreign steel did not measure up to specifications and American material was substituted. Albert E. Kleinert, building superintendent of Brooklyn, states that he has found imported structural steel 10 per cent weaker than domestic structural steel. Europe does not find it necessary to make structural steel to American standards, for they usually construct buildings not over five or six stories in height, where strength of material is not so important."

Foreign Mill Tests and Markings Inadequate

"Domestic steel manufacturers make and record the tests made on each melt, which record can be compared and checked against the finished steel from each melt. It is generally impracticable to obtain such a record on steel imported from abroad. Tests made after its delivery are inadequate. In May of this year certain steel reported to have been imported was tested at Columbia University. The results of that test were not conclusive, and were so reported by building inspectors, for they established only the value of the pieces actually tested and failed to connect them with all the imported steel in question."

"The American Institute of Steel Construction, Inc., is not opposed to imported steel because it is foreign made, but it is opposed to anything that tends to lower American standards. If foreign steel is to be imported for structures here it should be subjected to the same rigid tests at the mill to which we subject our domestic product, and when it fails to meet those requirements its use in buildings and bridges should be prohibited."

The effect of nutritious food upon the health and consequent efficiency of employees and the inadequacy of commercial facilities for the needs of many industrial establishments has led to the installation by many companies of industrial lunch rooms, the problems of which are amply set forth in a booklet issued by the National Industrial Conference Board, Inc., New York. Types and physical characteristics of lunch rooms are fully covered together with their management and cost. In summing up it is brought out that "the most popular type of lunch room for all types of plants is the cafeteria, which requires managerial skill and a considerable outlay of money for its operation. As a result a number of companies that find it urgent to install luncheon facilities, but impractical to engage in a program of management and finance foreign to their business, deem it advisable to turn the management of their cafeterias over to concessionnaires."

Cutting Up Massive Scrap



OXY-ACETYLENE cutting is used so frequently and to such good effect in dismantling and wrecking operations that it now excites little comment. Such equipment is also used to advantage in scrap yards to supplement the drop ball and the alligator shear in the job of reducing ungainly or massive pieces of cast iron or steel to charging box size.

Photographs by courtesy of The Linde Air Products Co.



GASES may be obtained from individual cylinders of compressed gases, or from a central station where the oxygen and acetylene are generated and piped to various outlets. Frequently, portable acetylene generators are used to advantage. As shown in the view, a small generator, rated at 45 cu. ft. of acetulene an hour, can produce enough gas to cut through a cast iron fly-wheel rim, 3 1/4 in. by 24 in. with a 6 1/2 in. web.



HEAVER cutting on cast iron may be done by cutting half way through from one side, then turning the piece over and completing the job. The view shows a block 24 in. thick being reduced to smaller pieces in this manner by a workman under close supervision of another, skilled in cast iron cutting.

* * *

PLAIN carbon and alloy steel can be cut with an oxy-acetylene flame much more readily than cast iron. Twelve-inch armor plate may be trimmed to shape or cut into small section by a special blowpipe mounted on a simple traversing mechanism, driven by a long screw.

BULKY and intricate material, ranging from a steel ship down to a locomotive, offers no particular difficulty to a scrap yard properly equipped with blowpipes and handling equipment. A double walled firebox, with numberless rivets and stays, would probably cost more than the old material is worth to dismantle in any other way than by gas cutting.

Leaves from the Diary of a Foundry Apprentice

BY H. A. FROMMELT*

March 4.—Only here a month and a half, but I feel like an old-timer; not a bit sore, fit as a fiddle and liking this game better every day. Jack says you get to feel like the papa of a new born baby, without the after effects of doctor's bills, every time you see yourself as the "daddy" of a nice, bright, bouncer of a steel casting. "Jack has got right," as the Dutchman on our scenic railway would say. (Until I rode on the crane in our bay I wondered why they called it the "scenic railway"; now I know.)

March 10.—Received a schedule of "Related Studies" for the full four years. With the 4 hr. per week of home study, we "go to school" in actual time more than one year—1600 hr. to be exact. They spoke of this apprenticeship as "more an education than just a job" at the first interview. I was reminded of it yesterday while looking over a circular on apprenticeship that the company publishes.—That reminds me, must give that to Andy C., who is interested in this apprenticeship business.—Well we'll see. I'm going to copy the schedule here and check it off as they hand it out to us piece-meal.

Available Time:	Hr.
200 hr. per year obligatory on company time, four years	800
200 hr. per year prescribed home study, four years ..	800
Total available for related studies	1600
Time Required for:	
Related trade studies	891
Average number of unit lessons	54
Average time to complete each	16.5
Inspection trips (four trips per year, four hr. each) ..	64
Technical lectures (0.5 hr. each four hour period, or 25 hr. per year)	100
Non-technical lectures (same as technical)	100
Collateral trade and technical reading and study	100
Advanced studies (junior foremanship)	345
Technical Lectures (Illustrated)	
1. The Making of Iron and Steel, six half-hour lectures ..	3
2. Elementary Metallurgy, twelve half-hour lectures ..	6
3. Heat Treating, twelve half-hour lectures	6
4. Alloy Steels, six half-hour lectures	3
5. Company Products, twelve half-hour lectures	6
6. Modern Machine Shop Practice, twelve half-hour lectures	6
7. Modern Pattern Shop Practice, twelve half-hour lectures	6
8. Modern Foundry Practice, twelve half-hour lectures	6
9. Modern Industrial Buildings, six half-hour lectures ..	3
10. Materials Handling and Equipment, twelve half-hour lectures	6
11. Economics of Mass Production, six half-hour lectures	3
12. Modern Management, twelve half-hour lectures	6
13. Modern Foundry Sand Control, six half-hour lectures	3
14. Open-Hearth and Electric Steel Castings, twelve half-hour lectures	6
15. Power in Modern Manufacturing, twelve half-hour lectures	6
16. The Specialty Steel Castings Field, twelve half-hour lectures	6
17. Steel Castings, twelve half-hour lectures	6
18. Production Schedules and the Customer, six half-hour lectures	3
19. Financing Modern Business, twelve half-hour lectures	6
20. Miscellaneous, twelve half-hour lectures	6
Total	105

*Consultant, St. Louis.

Non-Technical Lectures. The Apprentice as:

1. Learner (Attitude in shop toward fellow apprentices, journeymen, foremen, et al.), 16 lectures, one hr. each	16
2. Employee (As a producer, manufacturing costs, etc.)	16
3. Member of Community (Civic and social obligations, home owning, etc.). 16 lectures	16
4. Member of Industrial Society (Labor policies, organizations, etc.)	16
5. As An Individual (Duties to self, safety, hygiene, etc.)	16
6. Future Journeyman (Opportunities, obligations, etc.)	16
Grand Total	96

Can you beat that! I never thought a hard-boiled foundry outfit would get down to figuring out the number of hours it took to complete a lesson. Supervisor Haney is certainly some generalissimo. He explained the course of studies in a general way and said that I would undoubtedly become better acquainted with it as time went on. I'll say I will, if I know anything about the way they run things around here. Last week a probationer was let out because he failed to keep up with his related studies. Mr. Haney explained that "related studies" mean studies related to the work we are doing in the shop. (Phew! that's the longest entry I've made in you yet, Diary, old dear.)

March 15.—Just returned from my first inspection trip. We visited our own machine and erecting shops. Did I say visit? It was harder than a shopping trip on bargain day that mother talks about. These are not inspection trips; they're detection trips—detect all the information that's lying around loose in 4 hr. and then write a report of 500 words to be handed in the following week. No foolin' about this. I thought it would be a little half holiday, but no such luck in an apprentice's life around here. Well, at any rate, learned all about the company's product, where our castings go and what they have to contend with in the machine shop. Scraping bearings on a big turbo-generator is some job. Give me the foundry any day. I don't like that close work. Setting small cores is bad enough.

March 22.—Thought I knew something of our product after that inspection trip. But after Mr. Haney quizzed me I decided to get a catalog and make some detection trips of my own.

March 30.—Young Delaney was made one of the chief foundry inspectors today. Graduated only a year and a half ago. Jack says he was not the brightest in the group, but very dependable and a chap who gets along with everybody. That seems to be most of an inspector's life, anyway.

April 10.—It's time I got caught up on some of these things I have been wanting to know about, for instance, ladles, stoppers, heads and risers, carbon and silicon, sulphur and phosphorus, silica wash, etc. I'll make a schedule of my own and check them as I get the answers.

April 15.—A shifted core! Who would have thought that a core had any shift left in it after a mold was nicely closed and all clamped down. One of my first core jobs—and of course the detective department—by the way, it was that Delaney, just turned inspector, who did the snooping—traced it to me and I couldn't disown the brat. There it was just like it had a floating rib. Naturally it had to be scrapped. Well, experience is a dear teacher—for the company in this case.

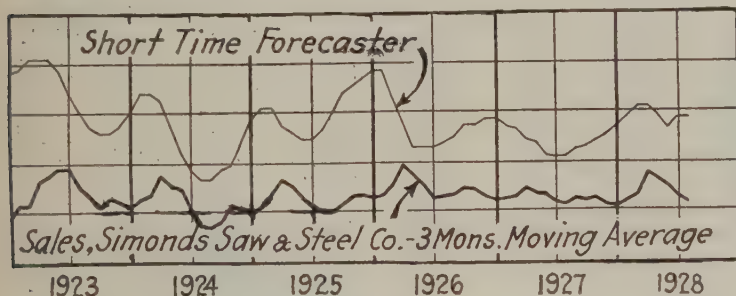
April 16.—The foreman of the training bay, Mr. Howard, demonstrated just how a core must be set so that it won't get St. Vitus dance when the mold is poured. I never realized that liquid metal pressed so hard against all parts of the mold, but it seems all so easy now that it has been explained. And me thinking I was ready to be promoted to other work!

A Short-Time Business Forecaster

Unfilled Orders of Steel Corporation and Building Contracts Presage
General Trend, Says Alvan T. Simonds

A SHORT-TIME forecaster of business is described in the September issue of *Looking Ahead* by Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass. This forecaster is based on prospective operations in the steel and building industries as indicated by unfilled orders of the Steel Corporation and awards of building contracts. On request Mr. Simonds will forward a detailed statement to any reader showing how the forecaster has been worked out.

This type of forecaster contrasts with one covering long-time movements outlined in previous issues of *Looking Ahead*. It was pointed out that, since the war, business has moved in short cycles of about three years in length; that is, with the peaks about three years apart and the lowest points about three years apart. Downward movements in



Sales of the Company Have Followed the Indicator, with Lag of Only a Month or Two

business, according to this analysis, have been preceded by rising money rates and upward movements by declining money rates. Mr. Simonds' article in the September issue of *Looking Ahead* follows in abstract.

From the fall of 1926 to the end of 1927, money rates moved down for about 15 months. If the regular sequence since the war is continued, the general movement of business will now be upward to a peak in 1929. Since the beginning of 1928, money rates have moved up sharply, and if money rates continue to move up for a few months more and the regular sequence since the war occurs, business will move down from the peak in 1929 for a time approximately equal in length to that of the upward movement in money rates. How much longer money rates may continue to move up is decidedly uncertain. We have called attention to the fact that the common error in comparing money rates with business movements is to expect that with a major change in the direction of money rates a change upward or downward immediately takes place in the movement of business. As a matter of fact, since the war the change has not begun until 12 to 15 months later than the turning point in money rates.

Election May Alter Business Trend

Everyone realizes that there is now an added complication that may decidedly affect the state of business in the United States in the fall of 1928 and for some months following. This is the presidential election. There are many who believe that the election of one of the candidates might result in a depressing influence upon business, severe enough to modify or even decidedly change what would have been its normal and regular movement. For this reason in this issue of *Looking Ahead* we are showing a short-time forecaster which we have found reliable in forecasting the sales of the Simonds Saw & Steel Co. Any favorable or unfavorable influence arising out of the Presidential election will show itself in this forecaster before it

does in the movement of general business and before it does in the sales of Simonds Saw & Steel Co. or those of other companies dependent upon general industrial activity. As we have stated before, the sales of the Simonds Saw & Steel Co. run practically parallel to general business and, even with less variation, parallel to the volume of manufacture in the United States. Anyone interested in forecasting the sales of a particular business can, of course, readily chart the sales and compare their movements with the movements of the short-time forecaster shown in this issue.

Prosperity Depends on Three Industries

Good business and widespread prosperity are assured so long as three great industries are growing in activity and in volume. These are the steel, the building, and the automobile businesses. If on the day that this article is being prepared, we could know just how much business is ahead of the steel industry for three or four months, and for the same length of time how much business is ahead of the building industry and how much is ahead of the automobile industry, we could know very accurately what is ahead of our business for that time. We are not able to get the amount of production ahead in the automobile industry. We can however get the figures for the unfilled orders of the United States Steel Corporation, which is so large a factor in the steel industry, and we have reports of building contracts awarded in 37 States. On the tenth of every month, therefore, we know quite accurately just how much work lies immediately ahead of two of the three greatest manufacturing industries in the United States.

The chart shows combined in the forecaster the movement in *work ahead* in steel production and in building. Changes in direction of this movement are regularly announced by a hesitation in the index for a month or longer; that is, instead of moving up or down, it moves horizontally. If it is going up and the horizontal movement takes place, it indicates that it is to be followed by a downward movement. If the movement is downward and the horizontal movement takes place, it indicates that it is to be followed by an upward movement. A study of the chart will show that this forecaster gives us advance notice of major changes up or down in the sales of the Simonds Saw & Steel Co.

French Steel Manufacturers

The annual directory of steel manufacturers of France, the *Annuaire* for 1927-1928, is of the same bulky proportions as its predecessors, a book about 5 x 8½ in. in size of page but near 2½ in. thick, having some 1400 pages. Over one-third of the book comprises advertisements of the supply and construction trades serving the steel industry. These are classified into 28 divisions, so that there is in fact a double directory, one of the steel producers and one of the supply industries, so to speak, those which supply the raw materials, build the plants and provide rolling machinery, furnaces, prime movers, material handling machinery and the like. The directory proper, besides an alphabetical arrangement of plants, gives a grouping according to products and also according to regions. Indexes include names of individuals mentioned, as well as the firm names, both being given in regional groups and alphabetically. The *Annuaire* is published by the Comité des Forges de France, 7 Rue de Madrid, Paris (VIII), France.

Where Steel Exports Went in First Half-Year

Canada Took 284,661 Tons of Nine Leading Items—Japan Retains Second Position with 78,120 Tons, Followed by Argentina, 39,387 Tons; China, 30,179 Tons; Mexico, 26,500 Tons; Brazil, 24,493 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	June		Six Months Ended June		June		Six Months Ended June		June		Six Months Ended June	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	14,529	10,126	71,726	70,352	10,420	14,108	75,076	85,955	19,223	12,136	90,311	90,229
Canada	12,202	8,613	60,584	55,991	3,185	4,603	17,132	20,578	9,767	6,963	40,500	39,223
Japan	380	162	878	547	110	5	1,096	1,359	7,207	1,997	37,430	37,551
Cuba	64	51	356	225	549	1,016	2,721	6,694	272	100	1,101	514
Philippine Islands	368	237	1,743	360	168	1,534	11,446	8,499	306	327	1,399	1,411
Mexico	132	47	373	468	730	592	4,085	3,995	275	146	1,169	894
Argentina					1,000	1,428	4,149	5,128	195	197	923	1,019
Chile						41		741	45	333	151	940
Colombia					768	966	3,607	4,154	25	26	281	265

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	June		Six Months Ended June		June		Six Months Ended June		June		Six Months Ended June	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	12,483	11,601	109,586	97,917	7,000	5,004	38,427	23,249	4,660	2,740	23,701	15,903
Canada	2,061	3,652	10,557	14,368	757	498	2,493	2,510	1,277	1,120	7,969	7,904
Japan	3,585	847	9,718	20,897					421		651	503
Cuba	180	1,631	1,461	8,420	661	349	2,555	1,112	415	136	614	604
Philippine Islands	30	533	3,925	2,074	184	288	799	1,025	95	8	145	153
Mexico	673	518	3,284	3,452	493	510	3,541	2,336	283	481	1,151	1,771
Argentina	883	178	2,776	199	1,981	563	8,869	2,353	1,633	323	4,699	557
Chile		298	20,514	440				18				
Colombia	2,093		9,200	527	556	242	2,079	1,886				
Brazil	12	573	13,581	14,847	546	1,052	8,656	4,837	135	33	535	1,530
China			21,028	13,214								

	Tin Plate				Steel Bars				Heavy Plain Structural Material			
	June		Six Months Ended June		June		Six Months Ended June		June		Six Months Ended June	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	22,276	18,543	125,099	152,767	13,816	6,874	70,768	56,576	19,356	11,744	89,873	66,222
Canada	5,558	4,188	23,387	24,950	9,139	4,723	46,547	34,735	17,377	9,566	75,492	53,905
Japan	3,195	2,707	26,683	29,998	166	79	480	589	5	574	1,184	2,025
Cuba	327	740	2,384	2,391	229	132	2,525	970	421	279	2,299	3,060
Mexico	1,179	1,250	6,786	6,589	56	44	374	538	130	120	603	400
Argentina	2,456	2,622	10,255	24,063					17	33	195	169
Chile	308	251	1,740	2,333					236	1,083	1,895	1,759
Brazil	90	1,007	1,721	6,673								
China	2,945	1,385	9,151	11,706								
British India	17		3,491	3,369								
United Kingdom			169	3,983	1,336	456	7,934	8,630				
Italy	651		6,694									

Destination of All Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	January through June			Country of Destination	January through June		
	June, 1928	1928	1927		June, 1928	1928	1927
North and Central America and West Indies	124,397	650,589	558,960	Italy	13,462	44,101	25,792
Canada and Newfoundland	100,855	535,178	433,264	Netherlands	182	1,333	1,712
Cuba	5,344	31,235	41,694	Russia	167	1,569	2,129
Mexico	7,973	39,798	44,690	United Kingdom	4,951	26,454	36,842
Guatemala	538	5,835	4,360	Other Europe	21,173	64,606	16,993
Panama	1,447	8,508	9,495	Far East	58,731	330,989	286,613
Salvador	669	1,886	2,671	British Malaya	133	3,414	5,662
British West Indies	1,012	4,368	7,698	China	6,869	57,535	32,804
Other West Indies	4,584	15,035	8,475	Dutch East Indies	2,916	14,051	20,128
Other Central America	1,975	8,746	6,613	India and Ceylon	1,368	13,562	14,935
South America	35,452	219,525	186,714	Japan and Chosen	40,387	181,572	148,402
Argentina	11,830	51,199	42,629	Kwangtung	76	2,981	15,144
Brazil	1,731	41,408	41,287	Philippine Islands	3,256	44,035	26,059
Chile	1,978	36,135	15,339	Australia	1,594	7,585	15,499
Colombia	5,689	35,206	31,368	New Zealand	95	1,047	678
Peru	2,333	13,388	17,302	Other Asia and Far East	2,037	5,207	7,302
Uruguay	1,427	5,084	6,846	Africa	1,644	7,905	10,476
Venezuela	10,107	33,970	30,556	British South Africa	688	3,481	4,593
Other South America	297	3,135	1,387	Egypt	627	3,083	2,239
Europe	41,828	149,734	90,664	Mozambique	159	479	3,099
Belgium	893	7,297	1,913	Other Africa	170	862	545
France	537	2,506	3,131	Total	262,052	1,358,742	1,133,427
Greece	463	1,868	2,152				

Gas Producer Arranged for Full Mechanical Operation

INCREASED gas making capacity and lower power, steam and water consumption are claimed for a new gas producer, designated as the type SB, which has been brought out by R. D. Wood & Co., 400 Chestnut Street, Philadelphia. The equipment operates on the same principle as the company's "heavy-duty" gas producer and is arranged for full mechanical operation, from the feeding of the coal to the removal of the ashes.

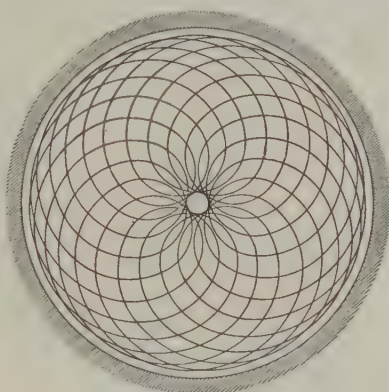
Arrangement of the machine may be noted from the accompanying illustrations. The fuel bed is agitated positively by means of a straight poker bar, which can be replaced conveniently. The mechanical coal feeder has no metal-to-metal contact between the stationary housing and the multiple pocket drum, which construction is emphasized as markedly reducing wear. Gas leakage between the stationary and moving member is prevented by a water seal.

The revolving ash pan is supported by three accessible conical rollers and rotates at the same speed as the producer shell, which arrangement is intended to prevent grinding of the ashes and subsequent increased resis-

porting construction of the producer as a whole, permitting of installation independently of the producer building, is another feature emphasized. Three columns carry the conical shell supporting rollers and the horizontal thrust rollers. The top plate, which is water cooled, is of steel plate construction heavily reinforced by structural shapes and provided with checkered cover plates. The foundation for the producer, of simple layout, requires approximately 15 cu. yd. of concrete.

Data from Mill Installation

The following operating data, furnished by the Wood company, is from a steel mill installation. The coal gasified is Lincoln Gas Coal Co., egg and nut "Pittsburgh vein" of the following analysis: Moisture, 1.38 per cent; volatile matter, 38.40; fixed car-



Agitation of the Fuel Bed During Six Revolutions Is Shown in Diagram Above

bon, 55.90; sulphur, 2.16, and ash, 5.70 per cent. The B.t.u. per lb. are 13,580 and the fusing point of the ash is 2200 deg. Fahr.

Rate of gasification, depending upon the demand of the heating furnaces, varied from 3750 to 5800 lb. per hr. or from 47.8 to 73.8 lb. of coal per sq. ft. of fuel bed area. Gas produced from this coal was of uniform quality and averaged 162.3 B.t.u. (low value at 62 deg. Fahr.) per cu. ft. containing 46.5 per cent combustibles. The average gas analysis is given at: CO₂, 5.8 per cent; CO, 26.2; CH₄, 3.8; C₂H₄, 0.8; H₂, 15.7; O₂, 0.2, and N, 47.5 per cent.

The following analysis of the producer ash is offered by the company as indicating how thoroughly the coal is converted into gas, the carbon content being only 0.355 per cent of the total carbon contained in the coal as charged into the producer. The average ash analysis is: Silica, 43.10 per cent; aluminum, oxide, 25.95; ferric oxide, 23.35; sulphur, 0.44; phosphorus, 0.06; lime, 1.50 and carbon, 5.60 per cent.

It is stated that during the period of observation, several months, no hand poking was done and the fuel bed at all times was level and loose, permitting a ½-in. diameter measur-

ing rod to be pushed down its entire length. A gas temperature of 1400 deg. Fahr. was maintained, no hot spots nor blow holes were developed and the wall remained free of clinker. Ashes were plowed continuously. The turbo-fan blower operated at approximately 50 lb. steam pressure and the total power consumption under maximum load was less than 3 hp. The



Mechanical Ash Discharge. The ash pan, supported by conical rollers, rotates at same speed as the producer shell

agitating bar used 270 gal. of cooling water per hour, the overflow cooling the top-plate.

Machine Shop Meeting at Cincinnati

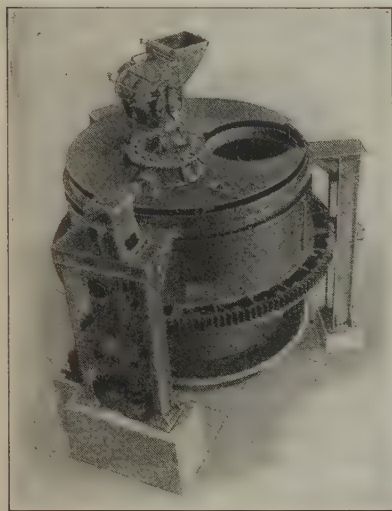
Among the papers scheduled for the machine shop practice meeting of the American Society of Mechanical Engineers at Cincinnati, Sept. 24-27, inclusive, are the following:

Airplane Production Problems, by R. W. Daniels, Baush Machine Tool Co., Springfield, Mass., and E. T. Jones, chief engineer, Wright Aeronautical Corporation, Paterson, N. J.

Theories of Bearing Lubrication, by Forrest E. Cardullo, chief engineer G. A. Gray Co., Cincinnati, and Analysis of Bearing Lubrication, by A. L. Jenkins, professor of mechanical engineering, University of Cincinnati.

Symposium on Machine Tools—Automotive Industry, by L. L. Roberts, mechanical superintendent Packard Motor Car Co., Detroit. Electric Industry, by J. R. Weaver, superintendent of manufacturing equipment, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Agricultural Implement Industry, by Max Sklovsky, chief engineer Deere & Co., Moline, Ill. Railroad Industry, by L. A. North, shop superintendent Illinois Central Railroad, Chicago.

The meeting provides for numerous plant inspection trips and two night trips by river steamer to Ashland, Ky., and return. Two technical sessions will be held on the boat and at Ashland will be visited the continuous sheet mill of the American Rolling Mill Co. A banquet is scheduled for Wednesday evening, Sept. 26, at which E. A. Muller, president King Machine Tool Co., and vice-president of the American Society of Mechanical Engineers, will be toastmaster.



All Operations, From Feeding of Coal to Removal of Ashes, Are Mechanically Actuated

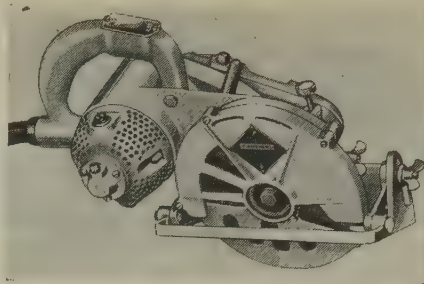
tance to the passage of the blast. The ash plow is of adjustable type, to permit continuous plowing of the ashes regardless of the amount of coal gasified, and a stationary agitating blade is provided to further agitate and move the ashes from the center of the producer toward the outside of the ash pan. The driving mechanism for continuously rotating the producer shell and agitating the poker bar is of simple design, each motion being actuated from a single shaft and without the use of levers, links or universal joints.

Maximum economy in steam consumption and close control of blast saturation is said to be assured by the turbo-fan blower employed, which is of multiple steam nozzle design and is noiseless in operation. Self-sup-

Small Electric Handsaw in Three Models

A NEW 2-in. capacity electric hand-saw, features of which include ruggedness of design and the use of a patented safety guard, has been added to the portable electric tool line of the Wappat Gear Works, Inc., Pittsburgh. The machine is intended for cutting all kinds of wood, soft metals, bakelite, fiber and other material, and is offered both for production and maintenance work.

Three models are available, one for plain square cutting, another, shown in the illustration, for bevel cutting, and a third having an adjustable dado cutter for grooving. On all models the shoe is adjustable vertically, which permits setting of the saw to cut to a predetermined depth. The lower saw guard completely incloses the saw blade, opens gradually by telescoping into the upper guard as the saw is



As the Saw Is Pushed Into the Material the Lower Guard Opens Gradually by Telescoping Into the Upper Guard. The shoe is adjustable vertically to permit cutting to predetermined depth. It immediately snaps shut when the cut is finished

pushed into the material, and immediately snaps shut as the cut is finished.

The machine is equipped with a high-speed fan-cooled universal motor which is furnished with ball bearings, and the arrangement is such that a blast of air is thrown to the front of the saw, thus clearing away the sawdust and permitting following the line closely. The saw shaft is mounted on tapered roller bearings and is driven by helical gears. The gears are mounted in ball bearings, which are entirely inclosed and run in grease.

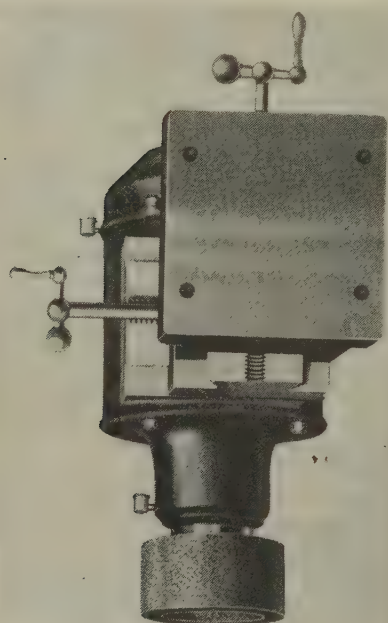
A double-pole non-arcng switch is mounted in the handle within easy reach of the operator's forefinger. The frame is of aluminum. All exposed steel parts of the machine are rust-proofed and in order to provide light weight and strength some of the parts are made of heat-treated aluminum alloy. A steel saw-table, measuring 16 x 26 x 11-in. high, can be furnished.

New Vertical Spindle Grinders

THE Hisey-Wolf Machine Co., Cincinnati, has added to its line a vertical-spindle grinder which is available in three types, having vertical, horizontal and double slide adjustment, respectively, the last named type, with the double slide adjust-

be done at one setting. The grinders are available in 1, 2 and 5-hp. sizes for alternating current and in 3-hp. for direct current. The 1-hp. machine, equipped for 220 or 440 volt three-phase alternating current, has a no-load speed of 3500 r.p.m. and em-

plays a cup wheel 6 in. in diameter, 3¼ in. high and a straight wheel 7 in. in diameter, 1 in. face. The weight is 110 lb., net. The largest machine of the same series operates at 1750 r.p.m., no load, takes an 8 x 4-in. cup wheel and a 12 x 1½-in. straight wheel. The weight of this size is 280 lb., net.



Vertical Spindle Grinder with Double Slide Adjustment. Machines with vertical and horizontal slide adjustment, respectively, are also available

ment, being shown in the accompanying illustration.

The machines are designed primarily for thrust grinding with the spindle in the horizontal position or with the grinding wheel swung down at any angle. Ball bearings, inclosed in leak-proof housings and lubricated constantly by a bath of oil, are used throughout. When employed in conjunction with a boring mill many internal and surface grinding jobs can

Improved Blacksmith's Hammer

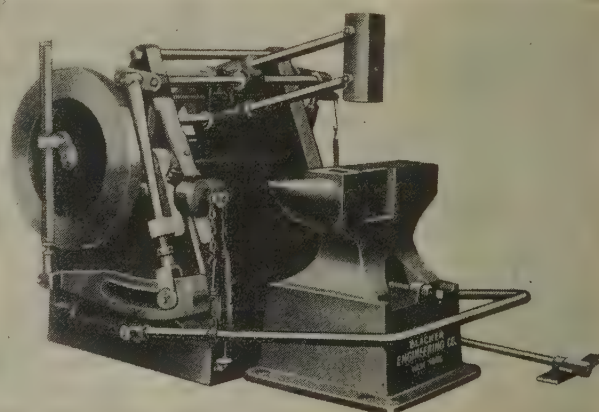
THE Blacker Engineering Co., Grand Central Terminal, New York, is marketing an improved model "B" blacksmith hammer, which is offered as a one-man power-operated tool, dispensing with the services of a striker. The machine retains the principles of the company's previous hammers but has been improved in a number of details and is larger and heavier. Thrust bearings are now employed in connection with the control mechanism and the motor drive has been rearranged to provide greater compactness of the machine as a whole.

The machine is essentially a power-operated sledge which works upon an ordinary anvil and requires the usual

hand anvil tools. A link motion provides positive control of the blows. The head has lateral traverse along the anvil face, with automatic knock-offs over the two hardie holes. The traverse of the head is controlled by the winged foot-lever shown at the right of the anvil, while the force of the blow is controlled by varying the amount of depression of the foot treadle which extends around the anvil. The blow struck may be varied from a light tap to about four times as heavy as that of a man striking. The hammer is arranged to strike up to 140 blows per min. It is rated to work 2½-in. and larger material.

Double shouldering operations may be done on the anvil illustrated, which

Compact Arrangement of the Driving Motor Is an Improved Feature. The hammerhead may be traversed over the anvil face and strikes made at the rate of 140 blows per min. The force of the blow may be regulated



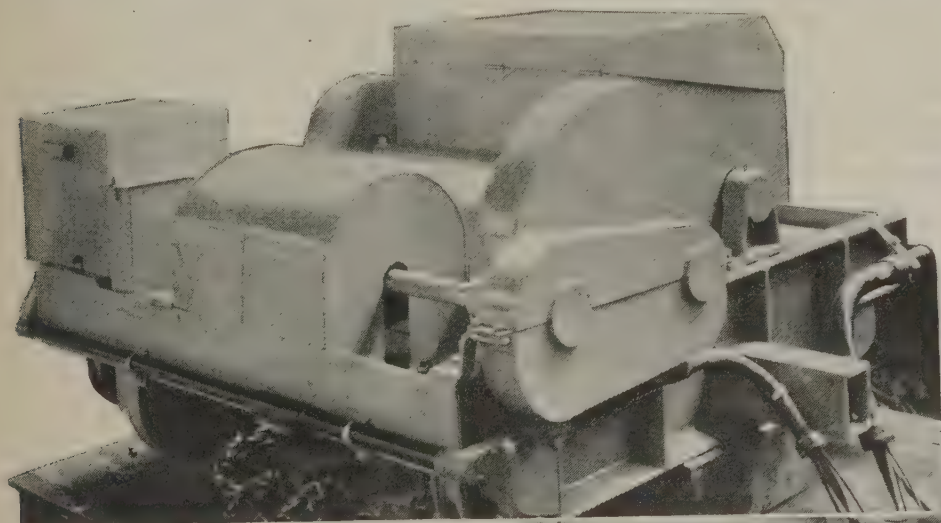
has a central cutout, as shown. This anvil is of special design and is finished to its block, which is fitted with adjusting screws. A 1½-hp. motor is

employed for the drive, the motor being connected to the driving shaft and flywheel by a fiber pinion and large driving gear.

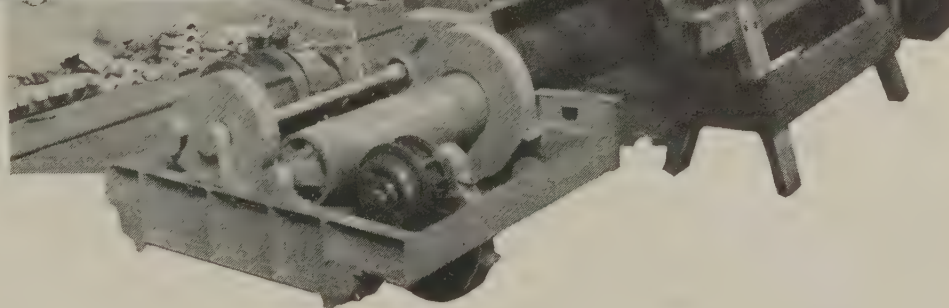
Arc-Welded Overhead Traveling Crane

IN a new design of overhead traveling crane of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, the bridge girders, end trucks and trolley are constructed by arc welding. Illustrations are from a 5-ton

welded to the standard I-beam sections. Riveted girders of similar construction would employ a channel section instead of the two angles. However, this extra material would, it is said, give less strength and rigidity.



Welded Parts for Crane. In addition to the welding shown on housings and guards above, each girder of the crane has angles arc welded the entire length to the standard I-beams. Two smaller arc-welded trolleys are shown at right, their frames being formed by welding the pieces together



crane of the I-beam girder type, with span of 38 ft. 9¼ in.

Each girder is reinforced throughout its entire length by angles arc

The girders are attached to the end trucks by notched or shoulder construction designed to prevent weaving. To facilitate shipping, the gird-

ers and trucks are disassembled. The field connection is made by bolts, but additional arc-welded reinforcement is recommended to secure maximum rigidity. The end trucks themselves are built up of two standard channel sections joined by arc welding. Roller bearings are used on this crane, permitting rapid acceleration and low power consumption.

Two small standard arc-welded trolleys are illustrated. Each trolley frame is made of a standard channel with arc-welded braces under each bearing point. Gear guards are arc welded, as is also the hand rail on the foot bridge and the bearing supports for the bridge drive shafts.

The welding on this crane was done by Lincoln electric machines. The advantage claimed for arc-welded crane construction, other than greater rigidity and strength, is that a more effi-

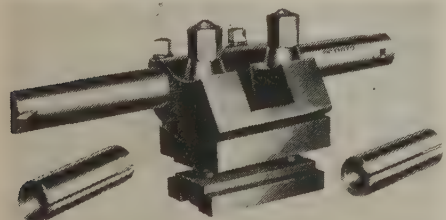
cient distribution of weight is possible, thus making it possible to lighten certain moving parts and thereby to obtain greater acceleration.

Boring and Turning Bars for Use on Lathes

ADJUSTABLE boring and turning bars designed for use on lathes have been placed on the market by Scully Steel & Iron Co., 2364 South Ashland Avenue, Chicago. They are

In addition to boring and turning, the bars can be used for both external and internal threading. They are of one-piece construction and of special alloy steel, with ends heat treated. The holders are arranged so that the bars can be adjusted over a wide

range. Large bearing surface is provided in the holder to assure rigidity of the bar, and the bar is maintained parallel with the center of the lathe. By reversing the holder the largest piece that the lathe will swing can be turned.



By Adjusting the Bar in the Holder Any Desired Rake of the Cutters Can Be Obtained

offered in five sets with bars ranging from ¾ in. in diameter by 14 in. in length to 3 in. in diameter by 30 in. in length, and equipped with ¼ in. to ⅝ in. cutters.

British Association Issues Drill Specifications

A STANDARD specification for twist and straight fluted drills has been issued by the British Engineering Standards Association. Standard diameters, overall lengths and flute lengths for the various types of drills and the dimensions of the Morse taper shanks are given.

Limits are laid down for variation in diameter of the drills, and performance tests are specified for both carbon and high-speed drills from No. 60 to 2-in. diameter, inclusive. The performance tests consist in drilling a series of holes in steel billets of a

given analysis. Penetration per minute and the number and depth of the holes to be drilled are specified, but the r.p.m. and the feed per revolution are left to the discretion of the maker. The drills must withstand these tests without seizing, choking or fusing, and the points of the drills and the lips must be in good condition and fit for further service without regrinding on completion of the tests. Standard nomenclature and definitions for the different types of drills in common use are also included in the specification.

British Pig Iron Exports Improving

Steel Market Affected by Summer Quiet—European Mills Busy with Domestic Orders—Japan Imports Less Finished Material

(By Cable)

LONDON, ENGLAND, Aug. 20.

THE iron and steel markets are quiet as Cleveland plants have closed for the annual holidays. Palmers Steel Co., Ltd., is closing for a period, thus blowing out two blast furnaces, but Dorman, Long & Co. are resuming operation of one furnace at Newport on hematite and one Carlton furnace on ferromanganese.

Demand for hematite has improved, especially in the export market, and makers have advanced prices as stocks have diminished. Foreign ore is quiet.

Finished iron and steel is generally dull but makers are expecting a revival of demand in the early autumn. Shipbuilders' orders are scarce and

export demand for heavy steel is quiet. Building constructors and engineering plants are moderately active.

Tin plate is steadier on improved demand and some fair business has been booked by Welsh mills. A number of mills have decided to begin the agreed period of suspension at the end of the current month, when restriction begins as they are in need of orders for September shipment, but are well booked for October to December delivery.

Galvanized sheets are quiet, but the price is well maintained and Indian demand is expected to revive soon. Black sheets continue quiet.

Continental markets are firm as a result of sustained domestic demand, but sales to British users are small.

try almost self-sustaining in that product. By next spring it is expected that there will be two new privately owned sheet mills in operation in addition to those now in production, which include the largest producer, the Kawasaki Dockyard Co. at Kobe. Japanese galvanizing plants now claim that the product of the Kawasaki company is in every way equal to the best brands of American and British mills. The Imperial Steel Works, as recently reported, is rapidly increasing its production of tin plate, which is still well below the total requirements of the country.

The development of steel production in Japan is changing the character of Japanese buying, resulting in smaller purchases of finished products and a heavier demand for semi-finished materials, as has been predicted for several years. There is a larger demand for billets, blooms and sheet bars, but this material, as in the case of plates, shapes and bars, is bought almost exclusively from European makers, at lower prices than can be obtained from mills in the United States.

Importers of steel in New York report moderate activity in bar-sized angles and still have some substantial tonnages arriving, in most cases of material bought at lower than the current European quotation. Although the price represents only a small sav-

Japan Importing Less Finished Steel

Almost Self-Sustaining in Sheets and Is Increasing Tin Plate Output—Buys More Semi-Finished in Europe

NEW YORK, Aug. 21.—Export trade with the Far East continues decidedly small. No real buying movement has yet developed in the Chinese market, and Japanese merchants and consumers are limiting their purchases because of the low exchange value of the yen. The decrease in Japanese

buying that has been so much in evidence in recent months is viewed by some exporters to Japan as a permanent condition. They are of the opinion that by the end of this year little sheet business can be expected from Japan, as increased domestic capacity has already made the coun-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25	
Bilbao Rubio ore*.....	1 2½		5.48	
Cleveland No. 1 fdy.....	3 3½	to £3 9½s.	16.64	to \$16.89
Cleveland No. 3 fdy.....	3 6		16.04	
Cleveland No. 4 fdy.....	3 5		15.80	
Cleveland No. 4 forge.....	3 4½		15.68	
Cleveland basic (nom.)..	3 5		15.80	
East Coast mixed.....	3 10		17.11	
East Coast hematite....	3 10½		17.23	
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to 40.10
Billets.....	6 0	to 6 15	29.16	to 32.81
Ferromanganese.....	13 15		66.83	
Ferromanganese (export)	13 0	to 13 5	63.18	to 64.39
Sheet and tin plate bars, Welsh.....	6 0		29.16	
Tin plate, base box.....	0 18½	to 0 18¼	4.40	to 4.43
Black sheets, Japanese specifications.....	13 7½		65.00	
Ship plates.....	7 12½	to 8 2½	1.63	to 1.74
Boiler plates.....	9 0	to 10 10	1.92	to 2.25
Tees.....	8 2½	to 8 12½	1.74	to 1.84
Channels.....	7 7½	to 7 17½	1.58	to 1.69
Beams.....	7 2½	to 7 12½	1.53	to 1.63
Round bars, ¾ to 3 in..	7 5	to 7 15	1.55	to 1.66
Steel hoops.....	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage...	9 15	to 10 0	2.09	to 2.14
Galv. sheets, 24 gage...	13 7½	to 13 10	2.86	to 2.93
Cold rolled steel strip, 20 gage, nom.....	16 0		3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):					
Belgium.....	£3 3s.	to £3 5s.	\$15.32	to \$15.80	
France.....	3 3	to 3 5	15.32	to 15.80	
Luxemburg.....	3 3	to 3 5	15.32	to 15.80	
Basic pig iron (nom.):					
Belgium.....	3 1	to 3 2	14.82	to 15.07	
France.....	3 1	to 3 2	14.82	to 15.07	
Luxemburg.....	3 1	to 3 2	14.82	to 15.07	
Coke.....	0 18		4.37		
Billets:					
Belgium.....	4 17½		23.69		
France.....	4 17½		23.69		
Merchant bars:					
Belgium.....	5 17		1.29		
France.....	5 17		1.29		
Luxemburg.....	5 17		1.29		
Joists (beams):					
Belgium.....	4 19		1.09		
France.....	4 19		1.09		
Luxemburg.....	4 19		1.09		
Angles:					
Belgium.....	5 15		1.27		
½-in. plate:					
Belgium (a).....	6 12		1.45		
Germany (a).....	6 12		1.45		
3/16-in. ship plate:					
Belgium.....	6 8		1.41		
Luxemburg.....	6 8		1.41		
Sheets, heavy:					
Belgium.....	6 1		1.33		
Germany.....	6 1		1.33		

(a) Nominal.

ing from the present quotation of domestic makers, some business is still being done in hoops and bands. Another advance has been made by European mills in the price of bars and shapes, and plain steel bars of Thomas grade are quoted today at about 1.85c. per lb., c.i.f. New York, which is too high to permit any sales. No further action on the tariff reclassification of reinforcing bars, bar-sized shapes and the question of marking foreign steel is expected until fall.

Germany Works for Simplification of Shapes

HAMBURG, GERMANY, Aug. 4.—Standardization work in the German steel industry is being further extended. The list of ordinary sections for all structural shapes, including beams, tees and channels, is to be revised, reducing the number of standard sizes by about 40 per cent. German mills are cooperating with the Saar and Austrian industries so that the new standards will be widely accepted. The new list is to be published next month, after which it will be open to general discussion and amendment by the interested mills for a period of three months.

Germans Reduce Price of Magnesium Alloy

HAMBURG, GERMANY, Aug. 4.—Following the recent reduction in the price of aluminum, German makers of "electron" (magnesium alloy) and the Czechoslovakian, Swiss and Italian licensees, have reduced the price by £7 10s. per ton (1.65c. per lb.), to avoid losing business to the aluminum producers. It is expected that a further reduction in the price of electron will be made at a meeting of the Central European producers at the end of this month. Output of the alloy in the first half of 1928 exceeded the production in the first half of 1927 by about 40 per cent.

Belgian Prices Still Rising, with Exports Good

ANTWERP, BELGIUM, Aug. 3.—Despite the recent holiday period, the steel market continues active and prices are becoming firmer. Export demand is good, especially from India and China, and mills are in most cases unable to offer better than October delivery.

Pig iron is in active demand and prices are strong, with ordinary No. 3 phosphoric foundry iron quoted for export at about £5 15s. (\$27.95) per ton, f.o.b. Antwerp. Scarcity of supplies of semi-finished material has caused further strengthening of prices on billets, blooms and slabs. Only a few makers are in the market. Current quotations range from £4 7s. to £4 14s. (\$21.14 to \$22.84) per ton on blooms, £4 15s. 6d. to £4 17s. (\$23.20 to \$23.57) on billets and about

£4 18s. (\$23.81) per ton, f.o.b. Antwerp, on sheet bars.

Orders for finished steel are in good volume, and mills are quite generally quoting deliveries beyond Oct. 1. Prospective buying by foreign consumers has had a good effect on the market, and prices are still advancing in expectation of continued export business. Prices on steel bars show some irregularity, as practically all mills are seeking small tonnages of certain sizes to complete their rolling schedules. Quotations range from £5 15s. to £5 16s. 6d. per ton (1.27c. to 1.29c. per lb.). Beams are slightly less firm as a result of weakness in quotations by French sellers. Beams continue at £4 18s. 6d. per ton (1.08c. per lb.), angles at £5 13s. 6d. per ton (1.25c. per lb.), corrugated bars at £5 19s. per ton (1.31c. per lb.), and hot-rolled hoops at £6 17s. 6d. per ton (1.52c. per lb.), all f.o.b. Antwerp.

Russia Hires German Steel Workers as Foremen

HAMBURG, GERMANY, Aug. 4.—The Russian Soviet Government has apparently changed its policy of excluding foreign workmen from its steel plants and has contracted with a number of German skilled workers, who leave this month to take positions in Russian steel plants as foremen and superintendents. The Germans, 27 of whom are from Solingen, 110 from Dortmund open-hearth plants and about 400 from various other mills in Germany, will receive about two and a half times more in wages than the Russian steel workers.

German Wire Mills Using Fewer Wooden Reels

HAMBURG, GERMANY, Aug. 4.—Wire manufacturers have apparently finally been successful in introducing steel wire reels for barbed wire instead of the usual wooden reels. The steel wire reels reduce the total weight by about 1½ per cent, making the railroad and ocean freight rate on export shipments lower. The wire mills claim that the Latin-American, Asiatic and Indian markets are accepting increasing quantities of wire furnished on wire reels.

Ore Imports by Germany Large in June

HAMBURG, GERMANY, Aug. 4.—Importation of iron and manganese ore was quite active in June, with arrivals of 1,165,000 tons of iron ore and 28,000 tons of manganese. There were practically no arrivals of Swedish iron ore because of the strike at the Swedish mines, which only recently ended. Prices on manganese ore have been about 15d. (30c.) per unit for 48 per cent and 16¼d. (32.5c.) per unit for 52 per cent Caucasian. Bilbao ores have sold at 19s.

(\$4.62) per ton for 50 per cent and French ore at 16s. 3d. (\$3.95) per ton for 48 per cent, c.i.f. Rotterdam or Emden.

Carnegie Company to Build Pittsburgh Warehouse

The new Pittsburgh warehouse of the Carnegie Steel Co. to replace the old one on Eleventh Street, the site of which recently was acquired by the Pennsylvania Railroad, will be located on part of the site of the McCutcheon mills of the company, on Reedsdale Street, North Side. The site contains more than 3 acres. The main warehouse buildings will consist of four parallel buildings or bays covering a space of 287 x 387 ft., of steel construction with corrugated galvanized steel roofing and siding.

In each of three of the bays there will be one 10-ton double-trolley overhead traveling crane, while the fourth bay will have two of this same type. Auxiliary buildings will include the present office of the McCutcheon mill and the machine shop, the latter to serve as a substation, sanitary station and garage. Standard-gage tracks will be provided to connect with railroad trunk lines.

Electric power will be supplied by the Duquesne Light Co. through an 11,000-volt transmission line to the substation, which will be equipped with three 350-kva. power transformers, one 100-kva. lighting transformer and two 200-kw. motor-generator sets.

The plant will be equipped with modern warehouse machines such as friction saws, bar, plate and angle shears, punches, drill presses and riveting machines. The engineering features of this new warehouse have been worked out by that department of the steel company, and it is expected to be ready for operation by the end of the year.

Production Basis of Aircraft

With the recent announcement by the Stout Metal Airplane Co. (Division of Ford Motor Co.) that it has established a production program providing for two tri-motored transports per week, Detroit aircraft production has now reached a total of 50 per week. The Stinson Aircraft Corporation is producing 25 planes per month and the Buhl Aircraft Corporation 18. In addition to these three companies there are in the Detroit area 39 companies producing aircraft motors, parts and supplies.

A newcomer in the field, announced last week, is the Verville Aircraft Co., which is backed by the Briggs Body interests. The new company will occupy the old Rickenbacker plant, having 300,000 sq. ft. of floor space. This will be the largest aircraft plant in the Detroit area and one of the largest in the country. Production will begin at once on small, low-priced planes and flying boats.

Jones & Laughlin Group Insurance

Company Announces Contract Providing Employees with \$25,000,000 of Group Life Insurance and Sickness and Accident Benefits

THE Jones & Laughlin Steel Corporation, Pittsburgh, has announced a contract with the Metropolitan Life Insurance Co., New York, providing the 25,000 employees of the corporation and its subsidiaries with \$25,000,000 of group life insurance. The contract also provides \$25,000,000 of accidental death and dismemberment insurance and substantial weekly benefits for sickness and accident. The insurance is being issued on a cooperative basis, whereby the corporation and its employees share the premium cost. This fixes the worker's share at less than 5c. a day and provides him with insurance at from one-ninth to one-third of the cost he would otherwise pay, depending upon his age.

"After studying the problem," said T. M. Girdler, president of the Jones & Laughlin company, "we decided that the plan should include a life policy for \$1,000 payable at death, which contains a total and permanent disability clause making the amount of the policy payable in monthly installments, with interest, in case such disability resulted before the insured attained the age of 60, benefits of \$12 a week for a period of 13 weeks for employees incapacitated by sickness or non-occupational accident, and a special indemnity of \$1,000 for accidental death or dismemberment.

"The insurance is offered without medical examination to every employee actively at work, irrespective of age, sex or physical condition. This is an important provision, as statistics show that one in every 12 examined for individual insurance is rejected by the insurance companies as unfit.

"In case of total and permanent disability, the insurance provides that after an employee has drawn his temporary benefits of \$12 a week for 13 weeks, he will then draw the face value of his policy in equal monthly installments for the following 40 months. Thus the combined benefits for totally and permanently disabled employees will cover a period of three years and seven months. These benefits in no way interfere with or take the place of any Workman's Compensation benefits.

"In addition to the actual insurance and other protection, each insured employee will receive periodically pamphlets dealing with the preservation of health and the prevention of disease."

More than 15,000 of the Jones & Laughlin employees, who will benefit by this insurance are engaged at the South Side, North Side and Aliquippa works and the remaining 10,000 are distributed throughout the district sales offices and subsidiary companies.

Chairmen Selected for Steel Treating Sessions

Chairmen and vice-chairmen for the 10 technical sessions of the annual convention of the American Society for Steel Treating have been selected and are announced as follows:

Monday, Oct. 8

Morning session. Chairman: R. M. Bird, district sales manager Midvale Co., New York, and chairman Philadelphia convention committee. Vice-chairman: R. H. Patch, research department E. F. Houghton Co., Philadelphia, and chairman Philadelphia chapter.

Afternoon session. Chairman: Albert E. White, director department of engineering research, University of Michigan, Ann Arbor, Mich. Vice-chairman: Victor O. Homerberg, assistant professor of metallurgy Massachusetts Institute of Technology, Cambridge, Mass.

Tuesday, Oct. 9

Morning session. Chairman: J. A. Mathews, vice-president and director of research development Crucible Steel Co. of America, New York. Vice-chairman: Marcus A. Grossmann, metallurgical engineer Central Alloy Steel Corporation, Canton, Ohio.

Afternoon session. Chairman: T. D. Lynch, consulting metallurgical engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Vice-chairman: Edgar

C. Bain, research department United States Steel Corporation, Kearney, N. J.

Wednesday, Oct. 10

Morning session. Chairman of the annual meeting of the American Society for Steel Treating: Fred G. Hughes, president of the American Society for Steel Treating and vice-president and director New Departure Mfg. Co., Bristol, Conn.

Chairman of the Campbell Memorial Lecture: Dr. George K. Burgess, director of United States Bureau of Standards, Washington.

Afternoon session—joint meeting of Institute of Metals and American Society for Steel Treating. Chairman: Dr. Zay Jeffries, consulting metallurgist Aluminum Co. of America, incandescent lamp department of the General Electric Co., Cleveland, and National Tube Co., Pittsburgh; vice-chairman of the Institute of Metals, and vice-president of American Society for Steel Treating. Vice-chairman: R. S. Archer, metallurgist research bureau, Aluminum Co. of America, Cleveland.

Thursday, Oct. 11

Morning session. Chairman: Dr. Albert Sauveur, professor of metallography and metallurgy Harvard University, Cambridge, Mass. Vice-chairman: J. P. Gill, metallurgist Vanadium Alloys Steel Co., Latrobe, Pa.

Afternoon session. Chairman: J. Fletcher Harper, research engineer, Allis-Chalmers Mfg. Co., Milwaukee. Vice-

chairman: Francis H. Clark, metallurgist Western Union Telegraph Co., New York.

Friday, Oct. 12

Morning session. Chairman: Bradley Stoughton, professor of metallurgy Lehigh University, Bethlehem, Pa. Vice-chairman: E. F. Cone, associate editor THE IRON AGE, New York.

Afternoon session. Chairman: W. Trinks, professor of mechanical engineering Carnegie Institute of Technology, Pittsburgh.

Morning sessions will be held in the ball room of the Benjamin Franklin Hotel, the society's headquarters, and the afternoon sessions are scheduled for the assembly room at the Commercial Museum where the National Metal Exposition will be held.

New England Industries Meeting

A New England Industries meeting will be held by the American Society of Mechanical Engineers at Boston, Oct. 1, 2 and 3, with headquarters at the Statler Hotel, that city. The general topics to be covered include materials handling, management, education and training for the industries, machine shop practice and power. Among the papers scheduled are the following:

Apprentice System of Lynn Plant, General Electric Co., Charles K. Tripp, supervisor of apprentices, General Electric Co., Lynn, Mass.

Experience in the Selection of Apprentices with the Aid of Tests, Walter S. Berry, director of training, Scovill Mfg. Co., Waterbury, Conn.

Handling Marine Shipments of Pulpwood; Improved Methods for Large Operation, D. W. Coe, vice-president and general sales manager Canadian Mead-Morrison Co., Ltd., Montreal.

Handling in Sugar Refining, C. G. Spencer, Baker & Spencer, Inc., New York.

Air Transportation in Relation to New England, Sumner Sewell, traffic manager Colonial Air Lines.

Aviation Engines, A. Willgoos, chief engineer Pratt & Whitney Aircraft Corporation, Hartford.

Review of Ball and Roller Bearings in Aircraft, F. W. Mesinger, Norman-Hoffman Bearing Corporation, Stamford, Conn.

Design of Columns of Varying Cross-Section, A. Dinnick, professor of mechanics, Institute of Mines, Dniepropetrovsk, Union of Soviet Socialist Republics.

Mechanics of Plate Rotors for Turbo-Generators, J. P. Den Hartog, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Progress in New England, William J. Fortune, vice-president National Shawmut Bank, Boston.

Proper General Management of Industry, Jerome R. George, vice-president Morgan Construction Co., Worcester.

Tests on Belleville Springs Made by the Ordnance Department, U. S. A., D. A. Gurney.

Belleville Springs, A. M. Wahl, research department, Westinghouse Electric & Mfg. Co.

Developments in Internal Grinding, Alden M. Drake, chief engineer Greenfield Tap & Die Corporation, Greenfield, Mass.

Power Supply for New England Industry, Frank M. Gunby, engineering manager Charles T. Main, Inc., Boston.

Ohio Foundrymen Meet at Cedar Point

Molding Sand Receives Much Attention—Merchandising Foundry Products—Insurance and Compensation

MATTERS affecting the foundry industry were discussed at the eighth annual convention of the Ohio State Foundrymen's Association, held at Cedar Point, Ohio, Aug. 16 and 17. One of the two sessions was devoted to workmen's compensation, insurance and safety, these subjects being discussed by representatives of the Ohio Industrial Commission. There was the usual attendance of over 100.

Announcement was made of the resignation of Arthur G. Tuscany, who has been secretary-manager of the association for the past six years, and who will sever his connection with the organization Sept. 1 to become secretary of the recently organized Gray Iron Institute, which will establish its headquarters in Cleveland. Mr. Tuscany's successor has not yet been named. There is a possibility that the headquarters of the Ohio association will be moved from Cleveland to Toledo.

All the old officers were re-elected: President, C. C. Smith, Toledo Steel Casting Co.; vice-president, Don McDaniel, Hamilton Foundry & Machine Co., Hamilton; treasurer, Edgar Sands, Superior Gas Engine Co., Springfield. The following new members were elected to the board of administration: W. P. Anglemeyer, Star Foundry Co., Troy; Charles E. Dine, Minster Machine Co., Minster; Robert Hopkins, Alliance Brass & Bronze Co., Alliance; E. A. Leary, Cincinnati Steel Casting Co., Cincinnati; Charles Seelbach, Forest City-Walworth Run Foundries Co., Cleveland.

To Change Name of Association

The association is taking steps to change its name to the Ohio Foundries Association and it will be incorporated shortly under the latter name.

Eighteen new members were added during the year and five were lost, according to the report of Secretary Tuscany. He outlined some of the activities of the association during the year, mentioning particularly the establishment of a reader service department, to keep members informed about articles referring to the foundry industry in the trade and technical press. This service, he said, had been favorably received. He announced that the Ohio Industrial Commission has recently reduced the insurance rate for brass and aluminum foundries from 80 to 70c. for each \$100 of payroll.

President Smith in a brief annual report outlined some of the services

rendered members by the association and urged the cooperation of foundrymen. He said that there had been some extensions of the plan of holding group meetings of members located in a city or immediate territory, and he favored the formation of additional groups.

Better Merchandising for Foundry Products

Changes in conditions relating to the sale of castings were pointed out by H. Cole Estep, vice-president Penton Publishing Co., Cleveland, in a discussion of "Merchandising Foundry Products." "It is now necessary to create a market situation which will make it possible to develop profitable trading," he declared. Foundrymen have been thinking in terms of production, but it is now important to think of buying and selling—the trading end of the business. The day castings were bought is gone, he declared; today foundrymen must get out and sell their product.

Group competition by makers of forgings, stampings and other metal products makes it necessary for the gray iron foundryman to adopt better merchandising methods. Foundrymen have not been alert in maintaining the position they are entitled to in the engineering field. The speaker stressed the statement that consumers' specifications for castings have not kept up with the improvement in the quality of castings. He urged foundrymen to impress on buyers the improvement that has been brought about in the quality of castings. This would counteract the effect of the propaganda of some of the makers of competitive products.

Steel and malleable foundries have done good work in extending the use of their products, according to the speaker, but gray iron foundries seem to have lagged. The gray iron industry, because of its excess capacity, needs efforts in this direction more than the steel and malleable foundries.

The speaker made several suggestions regarding merchandising castings. He urged an improvement in the quality of product, saying that too many bad castings are still being made. Foundrymen should do their part in creating a satisfactory price situation. There is no excuse, he said, for selling castings on a base pound price. An equitable price situation should be established, not based on pig iron prices. Every foundryman should preach the gospel of castings. Gray iron foundries are bound to lose some business to competitive products and must develop new out-

lets for castings. He said there are probably 1000 new uses for castings for foundrymen to dig out.

Three Things to Watch in Molding Sand

An interesting talk on foundry sand was given by H. W. Dietert, chief industrial research engineer United States Radiator Corporation, Detroit, who took for his subject, "The Required Foundry Knowledge on Molding Sand." Three things, he said, should be watched in controlling foundry sand. These are the sand grains, clay and water. Grains give permeability and structure and assure a smooth finish on the castings. They also impart uniform color to the castings. The grains also have insulating properties. He favored using as fine a sand as possible, to give castings a fine finish. Clay has various effects, providing strength or bond and reducing permeability. Both clay and water increase scabs. Water increases the amount of sand grains sticking to the pattern, causing a rough finish, and decreases the amount of ramming force necessary.

The speaker listed the various ways of testing sand for temper, permeability and strength. In his opinion dry bond strength has not received enough attention. The methods of changing sand conditions to provide moisture, permeability and strength were outlined. He warned against allowing night gangs to place too much burnt core sand in the heaps. One foundry had increased dry sand strength by adding Bentonite and had reduced losses 40 per cent. The cost of molding sand, he said, could be reduced by the use of high-bonded new sand, the use of a good mixing system in not dumping heap sand, reducing the amount of molding sand entering the cleaning room and reducing the core sand entering the heap sand from castings.

Taxes and Insurance Rates

Probably two-thirds of the Ohio corporations pay more in taxes than in dividends, declared George B. Chandler, secretary of the Ohio Chamber of Commerce, Columbus, in a talk on taxation and public expenditures and their relation to Ohio business. He characterized the corporation franchise tax in Ohio as a pernicious form of taxation and said he hoped that the State would be able to save enough in other ways to permit it to eliminate that tax.

Considerable light was shed on the operation of the Industrial Insurance Department of the State by W. T.

Leonard, member of the Industrial Commission of Ohio, who took for his subject, "Industry's Big Asset." He said that the present Ohio insurance rate for gray iron foundries of \$1.20 for each \$100 of payroll is lower than in many other States, and that the maximum death award of \$6,500 and the weekly indemnity of \$18.75 are higher than in other States. In New York, he said, iron foundries pay a rate of more than \$3 for each \$100 of payroll. Rates in other States he named were: Illinois, \$1.61; Indiana, \$1.67; Michigan, \$1.63; Pennsylvania, \$1.35; Kentucky, \$2.34. The Ohio rates for steel, malleable and brass foundries are lower than those in other States, according to the speaker.

E. I. Evans, actuary of the Ohio Commission, discussed insurance rates and how they affect premiums. H. P. Sutherly, Columbus, in a talk on "What You Should Know About Industrial Claims," gave considerable information relating to rulings of the Ohio commission and statutory regulations regarding insurance claims. He stressed the importance of giving men physical examinations before employment, for the reason that, should an employee make an injury claim, it is important that the employer know of any disability which may have existed previously. This knowledge would protect the employer from claims that might be made for disabilities incurred previous to the man's employment.

Enormous losses that industries are suffering because of industrial accidents were pointed out by Fred G. Lange, special representative of the division of safety and hygiene of the State Industrial Commission, who said that in the industries in Ohio there are 1000 deaths and 200,000 injuries in a year. Employees are paying \$18,000,000 a year directly for these losses, to the State and for self insurance, and an insurance company has figured out that the indirect losses are four times as great as the direct ones.

Most of these accidents, he said, can be prevented. The most important single factor in accident prevention is the attitude of the manufacturer, declared the speaker. He should realize that accidents can be prevented. A man properly qualified should be put in charge of the safety department; this work should not be entrusted to a mere clerk. No expenditure will bring greater returns than accident prevention. Not only will it pay in direct savings, but also in improving the morale of the organization. Safety rules, such as requiring the wearing of goggles, should be strictly enforced. He urged the provision of all proper mechanical safeguards, shop committees on safety and other inter-plant safety committees.

An informal banquet was held Thursday evening, after which there was speaking and dancing. President Smith acted as toastmaster.

Inc., by the Republic Iron & Steel Co. follows a series of absorptions by the latter company over a period of several years, the last previous one being the taking over of the properties of the Trumbull Steel Co., Warren, Ohio. . .

Under the terms of the merger the Republic company will acquire a majority of the Steel & Tubes, Inc., common stock at the equivalent of \$170 a share. Terms provide that for each share of common stock Steel & Tubes stockholders will receive \$50 face amount of 6 per cent debentures of Steel & Tubes; 8/10 of one share of non-par \$4.50 dividend class A preferred Steel & Tubes stock; 5/10 of one share of non-par \$4.50 dividend class B preferred Steel & Tubes stock and 7/20 of one share of common stock of the Republic Iron & Steel Co.

Brown-Fayro Co. Buys Mine Pump Line

The business of the Austin Mine Gathering Pump Co. has been sold by Dravo-Doyle Co., Pittsburgh, to the Brown-Fayro Co. of Johnstown, Pa. The latter will maintain a Pittsburgh office and warehouse at 104 Market Street, in charge of Edward F. Austin as vice-president and manager. Mr. Austin has severed his connection with Dravo-Doyle Co. to take this new position. The Dravo-Doyle Co. has transferred its entire stock of mine pumps and repair parts to the Brown-Fayro Co. In the mining field Dravo-Doyle Co. will continue to handle the equipment of the DeLaval Steam Turbine Co., Shepard Electric Crane & Hoist Co., Cochrane Corporation and the C. H. Wheeler Mfg. Co.

Republic to Acquire Steel & Tubes, Inc. Youngstown Company Will Take Over Cleveland Company Making Electrically Welded Steel Tubing and Other Products

THE consolidation of Steel & Tubes, Inc., Cleveland, with Republic Iron & Steel Co., Youngstown, Ohio, has been effected, subject to the ratification by the stockholders of the former company. This merger will furnish the Republic company important additions to its present line of products, and at the same time will supply it with an outlet for considerable semi-finished steel. Steel & Tubes, Inc., has been buying from 3000 to 4000 tons of steel per month in the open market, largely in the form of billets, but its purchases include a small tonnage of both hot and cold-rolled strip in widths that it does not manufacture.

The principal product of Steel & Tubes, Inc., at present is electrically welded steel tubing, which is made under the Johnson patents, which it controls. The company also makes high carbon butted and brazed pipe and shortly will begin the manufacture of light steel conduit to be used in the building field. It is also a seller of both hot and cold-rolled strip steel when its steel output exceeds the requirements of its tube making departments.

Myron A. Wick, president of Steel & Tubes, Inc., will continue to manage its plants and will become a director and member of the executive committee of the Republic company.

Steel & Tubes, Inc., is the successor of the Elyria Iron & Steel Co., which was organized in 1902 and built a small rolling mill plant in Elyria, Ohio, for rerolling old rails and new billets into structural shapes, tie plates, tubing and other products. In 1915 it built a plant in Cleveland for the manufacture of light welded steel tubing by the oxy-acetylene welding process and moved its headquarters to that city. The demand for light steel tubing from the automotive and other industries grew rapidly and the company expanded to take care of this demand. Last fall it took over the Mohegan Tube Co., Brooklyn, and shortly afterwards the change in name was made. Another recent purchase was the plant of the Standard Steel Tube Co., Toledo, Ohio. It also has plants under construction in Detroit and in Brooklyn, the latter for making conduit.

The acquisition of Steel & Tubes,

American Electrochemists Establish \$100 Prize

An annual prize of \$100 in gold has been established by the board of directors of the American Electrochemical Society for the best paper printed in the two volumes of any year of the *Transactions* by a student or young college graduate under 27 years of age. The judges to pass upon the merits of the manuscript are to be the members of the publication committee, this committee being at liberty to invite the opinion of members not on the committee, if they choose. The first prize of \$100 is to be awarded for the best paper presented at the spring and fall meetings in 1929. This prize is to be known as the American Electrochemical Society prize—to be available to all American or foreign technical schools and colleges, to students and young instructors—the object being to stimulate original work and encourage participation in the proceedings of the society by scientifically and technically trained men at an age when normally modesty keeps them in the background.

This Issue in Brief

Physical examinations for prospective employees would save employers large sums in insurance claims. Ohio industries alone suffer 1000 deaths and 200,000 injuries annually, for which employees are paying \$18,000,000 a year in insurance.—Page 474.

* * *

Blades of stainless steel in steam turbines preserve original polish after 3471 hr. use, while nickel steel blades reveal usual corrosion. Stainless steel valves for airplane engines also prove successful because of non-corrosive elements and high strength at elevated temperatures.—Page 454.

* * *

Cylinder molding unit in automobile foundry has produced 1600 castings in 16 hr. Using old methods without conveyor equipment, only 300 cylinder blocks were produced in 9 hr., with twice the floor space.—Page 450.

* * *

Steel company provides employees with \$25,000,000 of group life insurance. Similar amount is provided in accidental death and dismemberment insurance and sickness and accident benefits, with total cost to worker of only 5c. a day.—Page 472.

* * *

Urges rigid tests of imported structural steel before use in important structures. American Institute of Steel Construction head says foreign product should meet standards specified by Society for Testing Materials before leaving mill.—Page 462.

* * *

Foundrymen should think in terms of buying and selling rather than production, says convention speaker. Improvement in quality of castings should be stressed and new fields for products opened.—Page 473.

Molds made entirely of dry sand cores have displaced green sand molds in manufacture of automobile cylinder block castings at Dodge plant. Castings so made are more uniform in dimensions, in metal thickness and in weight, as mold is said to be held to closer limits.—Page 449.

* * *

Sheet steel industry has expanded sharply in spite of competition of other products. Production increase of 12 per cent in first seven months of 1928, compared with corresponding period last year, with gains of only 6 and 10 per cent respectively in steel ingot and automobile production, indicate success of sheet makers in extending their products into new fields.—Page 476.

* * *

Enlarged dock facilities at Chicago encourage movement of iron and steel on Great Lakes. One new dock has ore-handling capacity of 4000 tons daily, can handle pig iron by means of magnets at rate of 150 tons an hour and has unloaded structural steel sections in lengths up to 90 ft.—Page 453.

* * *

Stainless steel is used in pistons for hydraulic pumps with satisfactory results in England. Piston used continuously for three years was reduced only 0.04 mm. in diameter, while phosphor bronze pistons were 2.8 mm. smaller.—Page 454.

* * *

Outlines method of forging and forming Ford front axles. After cutting to length, a 40-in. forging machine is used to upset and bend each end, and a 5000-lb. hammer and press are employed for blocking, finishing and trimming. Bench inspection follows, after which parts are heated in central section and bent and stretched to proper length in special press.—Page 457.

Homogeneous metal, practically negligible losses of manganese, few non-metallic and gaseous inclusions and the possibility of hotter steel are advantages of making manganese steel in basic electric furnace. Production costs are higher, however, as compared with open-hearth process.—Page 456.

* * *

Some over-capacity is necessary if industry is to go forward, says editorial writer. Labor and mechanical limitations naturally prevent 100 per cent operations, and progress is possible only when old and obsolescent plants are constantly being replaced by new and efficient facilities.—Page 476.

* * *

Good business and prosperity depend upon activity of steel, building and automotive industries, says New England manufacturer. Unfilled orders of Steel Corporation and reports of building contracts enable forecaster to know accurately how much work lies immediately ahead of these two industries.—Page 465.

* * *

Continued growth of United States trade with South America is thought certain by Chilean Ambassador. Says financial and commercial expansion after war resulted largely from the economic potentiality of United States rather than from weakness of Europe.—Page 478.

* * *

Bottom pouring method in making austenitic manganese steels makes for quicker teeming, more uniform pouring conditions and better yield of sound metal, says metallurgist. After teeming, molds should be stripped from ingots as soon as possible and ingots should be delivered to soaking pits at high initial temperature.—Page 456.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Some Over-Capacity Is Normal

SO much has been written about the evils of over-capacity one would almost think it a recently developed ailment. To cite a few late statistics: It appears that the blast furnaces are making about 72 per cent as much pig iron as they could (if all of them ran at rated capacity without interruption); structural steel fabricators are operating at about the same rate; manufacturers of steel barrels, even though they broke all records as to numbers made, operated at only 61 per cent of capacity; steel foundries at 59 per cent; bituminous coal mines at a fractional rate, and so on. It would almost seem that rapid transit (so called) is the only industry without surplus capacity—and even that has seat room in the middle of the day.

As a matter of fact, over-capacity has been with us these many years. Smooth operations demand a certain amount of stand-by plant to "take up slack" and for reserve when those unforeseen emergencies arise. In other words, a certain amount of idle machinery is normal; that amount must be exceeded before there is any real "surplus" capacity, just as there must be an excess over a normal amount of idleness before a state of unemployment can fairly be said to exist. Doubtless there is much surplus capacity in the steel foundries, when they can operate at only 59 per cent. But just as truly there is no over-capacity in open-hearth furnaces when they are operating at 85 to 90 per cent.

As is well known, 100 per cent operation is impossible to maintain, either from labor or mechanical limitations. Perhaps 10 per cent idleness is normal; only when this figure is considerably exceeded should there be cause for concern. Even so, there are other aspects of the situation.

Would an electric furnace company decline to equip another steel foundry? Would a textile machinery manufacturer refuse an order for a new weaving plant? Or even would a rolling mill manufacturer seriously question the business sanity of a customer who wanted to build a sheet mill? Such business not only tends to the prosperity of the machinery and construction industries, but it is clear evidence of vitality in the others. Only by continuously replacing the old and obsolescent with the new and highly efficient can any industry go forward. Only by bringing in new blood, venturesome souls, clear-eyed to see the trend in demand and the opportunities for economies, can any enterprise prosper unless it be a monopoly.

Thus we come to the second point. Before paying too much attention to the cry of over-capacity, find out whether the jeremiad comes from one who expects an old plant and a mid-victorian product to return him

good profits in this year of 1928. If so, cross him off the list. His is the sad situation of the racer left at the post.

Notable Expansion in Sheets

COMPARING the first seven months of last year and this, there were increases of about 6 per cent in steel ingot production, 12 per cent in sheet production and 10 per cent in automobile and truck production. These divergent figures are of special interest and furnish some food for thought. The steel ingot production is known with ample accuracy. Sheet tonnage is computed from the fact that for the seven months of last year the sheet association reported 2,061,776 net tons produced by an average of 72.9 per cent of the industry, and for this year 2,269,823 tons by 71.7 per cent. There is other information indicating that the non-reporting sheet producers had substantially the same increase as those reporting, from which it may be computed that in seven months sheet production was about 2,525,000 gross tons last year and 2,825,000 gross tons this year.

When ingots increase 6 per cent and sheets increase 12 per cent there is a noticeable divergence. When it is considered that for several years strips have been replacing sheets in certain classes of consumption, and for two years past the sheet industry has been concerned over the prospects of the wide strip, the divergence from what one might expect is just so much more pronounced. In passing, it is regrettable that there are not more monthly statistics of production of finished steel lines.

One may say that this is a much better automobile year than last, but the production statistics indicate only about 10 per cent increase, and it is the automobile trade in particular that has been mentioned as tending to replace sheets by strips.

That the sheet producers have made strenuous efforts to dispose of their product is well known. They have pursued an intensive and commendable campaign to introduce their product into new uses and to advertise the new uses so as to make them spread. They have quoted very close and highly competitive prices, at the same time insisting that the market prices so developed do not afford a fair return by way of profit.

The sheet mills have had a high production relative to their capacity. The independent sheet mill reports show for six months an average of 96.5 per cent and for seven months, including the relatively low 82.2 per cent for July, an average of 94.5 per cent. The percentages are computed against an assumed capacity that is evidently somewhat low, for the "mechanical operation,"

in turns worked to turns possible, was lower than the percentage computed by tonnage; but it also was high, apparently the highest in any finished steel line outside of tin plate.

Altogether it would seem that the sheet industry is a thriving one in point of demand relative to capacity, in point of growth of its customers, and in point of its successfully meeting the competition of other materials, the one thing lacking being a financial return in keeping with these conditions.

Gains from Stabilized Prices

THE economic theory of the advantage of transparency in industry leads to stability of prices. Transparency in industry means the ability to look through it, to be able to discern and understand conditions. The greatest agency contributing toward that ability is statistical survey, which means simply the ascertainment of economic facts and making for convenience a numeral instead of a verbal expression of them.

Such an improvement in knowledge tends to eliminate the speculator, who has been defined as a person better gifted for seeing in the dark than are most persons. When there is no darkness that gift becomes valueless. Therefore speculators are not enthusiastic for transparency in industry.

Stability of prices is welcomed, however, by both producers and consumers. They are able to sit around a table in perfect accord as to this. It is welcomed likewise by the engineer who has to build things, and most of all by the laborer, who can easily see in it a symbol and promise for steadiness in employment and maintenance of fair wages.

In life, however, it is seldom that every one can be pleased. There are some interests that are quite averse to price stabilization. Professional speculators feel that way, as we have suggested above. So do brokers, whose functions as intermediaries in a fluxing market are curtailed, perhaps even extinguished. Professional purchasing agents likewise are piqued, for they lose their ability to demonstrate to their superiors how their expertness as buyers has beaten the quotational average. Such grievances may produce a lot of complaining, but as against the general benefit they are quite trivial.

Now, Mr. Ford!

HENRY FORD, a prominent manufacturer of Detroit, has done a number of things which bring him admiration from many sections of the American public. His interests, both personal and delegated, are multifarious, ranging all the way from transportation of living Americans to the preservation of relics of bygone generations. But there is one thing bearing his name which has been started and apparently has grown to considerable stature without his personal supervision. Something should be done about it.

We refer to the Ford apprentice school at the Detroit plant. In a description which has just come to hand is found this "Typical Questionnaire on 'Materials Used in Tool Room'", a questionnaire "to check

up a boy's knowledge." Here are some of the 83 questions asked:

33. Define steel.
12. What kind of steel is best suited for abrasion, impact and fatigue?
59. Which structure in steel is best, coarse or fine?
24. Name three "functions" of the blast furnace.
36. What effect has manganese on steel?
54. When is high-carbon tool steel used to best advantage?
65. What is martensite?

Now, Mr. Ford! Aren't these pretty stiff questions to put to a lad who has been fed some information on "Materials Used in Tool Room"? Professor Sauveur and Doctor Jeffries might be paged for an answer to No. 33 and No. 65, but it would surpass even their wits to know what a blast furnace has to do with a tool room. Something Edisonian in these and other questions makes us think of another and a much controverted test of intelligence, so called.

Or maybe—remembering that Mr. Ford has caused deep researches into the authorship of "Mary had a little lamb" and has verified the authenticity of the celebrated incident—maybe Mr. Ford has had some original investigations made on these matters which have so simplified and even standardized them that a tool-room clerk can grasp them. If so, pray tell us, Mr. Ford, for we have always wondered what kind of steel is best for abrasion, impact and fatigue, ever since the days when some of us helped harden rock drills.

Business and Stock Market Loans

SOME of the discussion over the large amount of borrowings by stock brokers has not given due weight to the influence of the rise in "big business." We have not fully correlated our knowledge. Constantly it is being said that big business is spreading. Now, big business does not borrow money; it lends money. The brokers' loans so much talked of and frequently criticized are largely loans for the carrying of shares of big business. What is more natural? Big business built up great reserves of liquid capital; it must keep the capital liquid and these loans are a good medium. Here are two things that have grown and their natural relation has been overlooked in some quarters.

One criticism of loans on stocks and bonds is that they reduce the opportunity of commerce to borrow money. But we have had two great trends. First, there is the expansion of big business, which lends instead of borrows, and if this expansion has been as large as is assumed, it involves a decrease in the borrowing requirements of business that is not big. Second, we have the great reduction in inventory by practically every one, correspondingly reducing the need of borrowing on the part of smaller business and increasing the amount of loanable funds of big business. An item worth considering in this connection is the movement in the steel trade whereby sellers who have been giving 2 per cent cash discount are disposed to reduce the discount to one-half of 1 per cent.

We shall do well to remind ourselves that this "boom" in the stock market, as it is still called, was originally called "the Coolidge boom." It was sup-

posed to be related to a conviction arising nearly four years ago that there was no danger that Mr. Coolidge would fail to be elected. When practically four years have elapsed there must be much more in it than that. As was pointed out in this department of THE IRON AGE last week, our stock market has become to a degree an intelligent and discriminating affair. There is confidence in the economic outlook. When money rates tighten, some who wish to borrow to carry shares in anticipation of higher values later may not do so, but others who have capital will in time take their place.

It would be foolish to attempt to argue that danger of a stock market collapse has been permanently removed, but it is proper to reflect upon the source of much of the money now being loaned in Wall Street, capital of large corporations whose managements certainly do not want to see their shares caught in a slump. While they may like to have their liquid capital earn a somewhat better return, they surely will be anxious and able to prevent such developments going too far.

In its latest bulletin the Cleveland Trust Co. presents two charts giving a broad view, from two separate angles, of the matter of gold, security loans and all other credit. To the layman, who hears these things talked of from divergent angles and may have difficulty in deciding which is the proper basis for making comparisons, the difference in appearance of these two charts is very helpful. Both charts cover six and a half years, from the beginning of 1922. Both depict gold supply, security loans and all other loans. One deals with relatives and takes 1923 at 100, showing security loans mounting much more rapidly than other credit. Whereas security loans start from less than 90 and wind up at over 180, other credit starts above 90 and ends at 125. Here is apparently a startling difference; but the other chart is quantitative instead of relative and looks quite different. The total bank credit rises moderately and the security loans are small relative to other bank credit, their proportion to the latter merely increasing somewhat. Either diagram alone would give the layman quite a different impression from that given by the other.

Will Latin American Trade Further Increase?

Chilean Ambassador Thinks Continued Growth an Expression of American Potentiality Rather Than Post-War Boom

ANSWERING the question, "Is the financial and commercial expansion of the United States a consequence of the war?" with an emphatic negative, Ambassador Carlos G. Davila of Chile looks upon the continued growth of trade with South America as a certainty. He regards as a normal phenomenon the continued growth of our trade which now enables us to furnish 39 per cent of the total imports of 20 Latin-American Republics, a greater proportion than United Kingdom, Germany and France combined.

"Precisely those years of rapid development that followed the war are those that serve best to illustrate that the commerce of the United States with the nations to the south has not for its basis the unstable factor of the post-war boom, but those factors which create a normal expansion in the commerce of a country: interior wealth, organization, rapid transportation, and productive technic," writes Senor Davila. "And it may also be observed here, that perhaps the dangers to this commerce from the post-war boom were much greater than the benefits. This exaggerated and speculative increase of the 1920-22 period surprised this country without the preparation necessary for adaptation, and launched it into profitable non-competitive markets, which could have created discredit and serious obstacles for the future and normal expansion of its commerce with Latin America. Happily, the period of readjustment that followed demonstrated the capacity of the American exporters to adapt themselves to the situation and to hold their advance in those markets. Furthermore, the reestablishment of the competitive situation between the United States and Europe is beneficial for this country as well as for ours. For ours, because it offers better opportunities of securing quality and of assuring low prices; for the United States, because competition gives a truly solid basis to its commerce, and creates impulses of continuous betterment that are indispensable for its prosperity.

"If we might draw a line to demonstrate the import and export commerce between the United States and Latin

America from 1913-14 to 1927, we should find a continuous and firm increase. It is evident that the war gave a tremendous impetus, but it may be observed that this maximum figure of the war period is \$10,000,000 less than the figure for 1927. It was in the period of feverish activity which followed the war that American commerce with our countries reached a fantastic figure which can be explained only by world speculation, the general inflation of values, and many other factors of commercial exaltation which characterized this post-war period.

"It is easy to note that the greater part of this commerce had a false and temporary basis, and so it may be said that the fall of 1920 to 1922 was as lightning-like as the rise. And here is where it may be clearly proved that the increase of commerce between the United States and the Republics of Latin America follows a normal development even today, in the same terms and proportions as in the years previous to the war.

"After the low post-war figure marked by 1922 trade with Latin America has gained back its normal line of development in the last five years. This is a decided refutation of the idea so strangely generalized that its increase was a consequence of the war, that is to say, due more to the weakness of Europe than to the economic potentiality of the United States."

According to the 1928 edition of the "Tractor Field Book," published by *Farm Implement News*, Chicago, the number of tractors in use on farms in the United States has increased 260,662 in the last five years, the 1928 estimate being 768,825. Increases were shown in every State except Montana. In 1925, according to the Bureau of Census, the total value of farm equipment in the United States was \$2,691,704,000, an average of \$6.87 per acre of crop land. The book contains specifications for various types of farm implements and classified directories of parts, materials, etc.

Analysis of Value of Mergers

The opinions regarding mergers of some 200 commercial and investment bankers were recently collected and analyzed by the Sherman Corporation, 292 Madison Avenue, New York, doing a business as engineer and business manager. Section one of a report, covering the current trend toward mergers and consolidations, has been issued and draws a number of conclusions, including this:

"The potential advantages to be gained from sound merger are today more in distribution than production and perhaps the factor of greatest possible advantage is reduction of selling costs through elimination of duplications in salesmen covering the same territory."

Other advantages proved are: Reduction of costs and overheads; reduction of prices to the consumer; broadened markets; the combination of diversified qualities of managerial abilities in a strong, cohesive organization, etc.

Optical Company Celebrates Seventy-fifth Anniversary

The seventy-fifth anniversary of the Bausch & Lomb Optical Co., Rochester, N. Y., is being celebrated this year. The company was started in 1853 by John Jacob Bausch, who came to this country from Germany in 1849. Henry Lomb, who also came to the United States from Germany in the same year, later became associated with Mr. Bausch as a partner. The early difficulties encountered and the manner in which these were overcome are given in detail in the anniversary number of the company's magazine for July-August. It is attractively illustrated.

Gives Reasons for Lower Sheet Discount

In announcing that, effective on business placed for shipment after Sept. 30, the cash discount will be $\frac{1}{2}$ of 1 per cent for payment in 10 days from date of invoice instead of 2 per cent as heretofore, the American Sheet & Tin Plate Co. says:

"In making this change in our policy we are not unmindful of certain benefits to be derived from a high discount rate, but the condition of the sheet metal business from the manufacturer's standpoint is so unsatisfactory that a high premium for prompt payment can no longer be made.

"There have been heavy reductions in the selling prices of sheets, but, in spite of these, there has been no change in our wage rates, or reduction in the quality of our products. Users of our material are obtaining better service than ever before and are no longer required to carry heavy stocks. These conditions have placed a burden upon the manufacturer

which compels him to look for other legitimate means of protecting his investment, and one of the most logical methods is presented in a reduction of our cash discount from an amount which economic conditions have not warranted for many years past.

"This applies only to sheet mill products and tin mill black plate."

Ohio River Steel Shipments 90,145 Tons in July

The monthly report of the United States Engineers Corps, Pittsburgh office, shows that 90,145 net tons of steel products were moved on the Ohio River during July. That total compares with 96,156 tons in June and 112,818 tons in May. For the seven months ended with July, 644,805 tons of steel products moved on the Ohio River, an average of 92,115 tons per month. In the same period in 1927 the total was 287,677 tons, a monthly average of 41,099 tons.

While the Ohio River figures include some interplant movements, they are primarily a picture of the shipments of finished steel products to lower Ohio and Mississippi River points that go by water, because water rates are much less than those of the railroads.

Tennant Steel Plant to Move to Portland

Tennant Steel Corporation, of which M. G. Tennant, mayor of Tacoma, Wash., is president, will move its plant at Vancouver, Wash., to Portland, Ore., where special attention will be given to alloy steel work. It is announced that two furnaces will be in operation shortly in the new location, and about 50 men will be employed. Harry E. Spieth is manager of the Portland plant. The Tennant Corporation of Washington has plants at Tacoma, Seattle and Everett. Mr. Tennant is president and general manager of the Oregon corporation and M. S. Alexander is assistant manager.

New Film on the Story of Rail Steel

"The Story of Rail Steel," an educational film in three reels produced by the Rail Steel Bar Association, has been released for distribution to architects, engineers, contractors, building officials, engineering students and all those interested in the relation of the steel industry to reinforced concrete construction. It will find considerable use by societies and universities at meetings, conventions and seminars.

The picture shows the manufacture of concrete reinforcement bars, portraying each consecutive operation, from the refining of pig iron to the final use of the bars in reinforced concrete construction. The supplying of the film is one of the educational

activities of the Rail Steel Bar Association, whose offices are in the Builders Building, Chicago, the members of which include rolling mills of the United States and Canada, in part as follows:

Buffalo Steel Co., Tonawanda, N. Y.; Burlington Steel Co., Hamilton, Ont.; Calumet Steel Co., Chicago; Canadian Tube & Steel Products, Ltd., Montreal, Que.; Connors Steel Co., Birmingham; Danville Structural Steel Co., Danville, Pa.; Franklin Steel Works, Franklin, Pa.; Laclede Steel Co., St. Louis; Missouri Rolling Mill Corporation, St. Louis; Pollak Steel Co., Cincinnati; West Virginia Rail Co., Huntington, W. Va.

State Department to Buy Sheet Steel Buildings

Bids will be opened Aug. 29, by the Pennsylvania Department of Highways, Harrisburg, on 23 steel storage buildings to be erected at Butler, Erie, Franklin, Clarion, Clearfield, Towanda, Montoursville, Danville, Pottsville, Selinsgrove, Chinchilla, East Stroudsburg, Honesdale, Beaver, Holidaysburg, Ebensburg, Huntingdon, Indiana, Somerset, York and Media. All buildings are to be 40 x 128 ft., except two at York, which are to be 40 x 112 ft. Suitable foundations for the buildings will be furnished by the Department of Highways.

Bidders for these contracts are required to submit, in addition to designs, shop drawings and illustrations of the buildings, samples of the sheets it is proposed to use, such samples to be not less than 1 ft. square. The successful bidder will be required to include in each shipment of material an extra sheet, so that a sample may be selected at random and used for test.

Linde and Prest-O-Lite Build New Plants

Six new plants for manufacturing cutting and welding gases have been put into operation since July. Four of these are new oxygen-producing plants of Linde Air Products Co. and are located at Harrisburg, Pa., Allentown, Pa., Shreveport, La., and Charleston, W. Va. This makes a total of 52 oxygen plants operated by the Linde company. A separate plant for producing dissolved acetylene has also been erected at the first two localities above mentioned by Prest-O-Lite Co., an associated organization.

Competitive examinations for junior metallurgists, with an entrance salary of \$2,000, are announced by the United States Civil Service Commission. Application must be filed before Sept. 25 with the commission in Washington. Full information may be obtained from the commission or from the board of examiners at the post office or customs house in any city.

Iron and Steel Markets

Market Strength Broadens

Upward Price Trend Extends from Finished Steel to Semi-Finished Products and Primary Materials—Pig Iron Advanced at Cleveland—37,000 Tons of Steel Placed for Pipe Line

THE iron and steel market shows evidences of growing strength in virtually all products, from finished steel to semi-finished products and primary materials.

Pig iron prices, which have been on a downward trend since the middle of March, are stiffening, notably in the Central West. Cleveland producers have raised prices 50c. a ton on foundry iron for shipment to outlying districts, and an advance by Chicago furnaces is expected shortly.

In the Valleys, prices on both basic and foundry iron are firmer and inquiries have been issued by four large melters. Steel companies that ordinarily market surplus iron are no longer seeking business, and one steel interest, finding its own pig iron output short of its requirements, is regarded as a probable buyer. A factor contributing to the revival of interest in basic iron is the recent sharp advance in scrap and its continued scarcity at higher levels.

Sales of merchant pig iron by Cleveland producers totaled 63,000 tons, following bookings of 84,000 tons in the previous week, and Chicago furnaces sold 50,000 tons. Several Central Western stacks are so well booked that they are out of the market for the rest of the year. Two merchant furnaces have been blown in, one at Dubois, Pa., and another at Buffalo, while the lighting of a stack at Chicago is an early possibility.

Price strength extends to furnace coke at Connellsville, which has been favorably affected by a second draft on the spot supply of beehive fuel by a steel producer.

Steel production continues at close to 85 per cent of capacity in the Greater Pittsburgh district and at a 75 per cent rate at Chicago. The average for all Steel Corporation subsidiaries is 77 per cent. New business is light in all products except pipe, but this is not surprising, since consumers are well covered for this quarter. Measured by specifications against contracts, the market is active. Shipping orders for bars and sheets are particularly heavy, and releases of hot and cold-rolled strip steel leave little to be desired.

The sustained volume of mid-season activity has given producers increasing confidence. Most producers of sheets, including the leading interest, have adopted the advances for fourth quarter recently announced, and virtually all sheet and strip mills have reduced the discount for cash payment to one-half of 1 per cent. In addition, sheet mills at Chicago are adding an extra of 10c. per 100 lb. for orders of less than 100 tons.

Bookings of the American Sheet & Tin Plate Co. were the largest for any week since late in 1925, and

independent sheet producers appear to have done correspondingly as well. Whether heavy specifying can be attributed to the lower discount, which becomes effective Oct. 1, or to the clause in third quarter contracts cancelling tonnage not released by Sept. 10 is not clear. Indeed, the Pittsburgh view is that neither of these factors is an important influence. Little evidence that consumers are stocking is seen, and current activity is ascribed to an unusually well-maintained rate of consumption.

That there will be general insistence on the Sept. 10 clause (which has been inserted in third quarter contracts for bars, plates and shapes, as well as for sheets) is indicated by current reports. Buyers who have specified their September quotas with instructions to ship in the last week of that month have met with refusals. The mills propose to ship at their convenience on or after Sept. 10, to protect themselves from the customary carryover tonnage that has resulted from heavy shipping orders in the closing week of a quarter.

Price advances have been announced in cold-rolled strips and sheet bars. The latter product has been raised \$1 a ton to \$33, Youngstown, by a Valley maker, for fourth quarter delivery, and a leading producer of cold-rolled strips has announced an advance, effective immediately, of \$2 to \$4 a ton above recently prevailing prices. Ground shafting was marked up \$2 a ton, effective Aug. 15.

Pending tests of prices announced for fourth quarter, the growing strength of the current market is attested by bids on 25,000 tons of plates, shapes and bars for the Pennsylvania Railroad, which brought out minimum quotations of 1.90c. from Pittsburgh and Ohio mills and 2.10c. from Chicago district producers.

An order for 37,000 tons of 18-in. pipe has been placed for a gas line to run from Fowler, La., to Memphis, Tenn. For an oil line from Oklahoma to Whiting, Ind., for the Sinclair Pipe Line Co., 42,000 tons of 8, 10 and 12-in. pipe will be required.

Structural steel contracts amounting to 53,000 tons include 20,000 tons for a Brooklyn department store and 10,500 tons for Mississippi River barges. At Oakland, Cal., bids are in on 7200 tons of fabricated steel pipe for water mains; alternate bids were taken on 22,000 tons of cast iron pipe.

Unfilled orders of independent sheet mills on Aug. 1 were 550,468 tons, or nearly double the shipments of 278,310 tons in July. The gain in sheet sales in July was 14,455 tons over June, while production fell off 40,000 tons. Sales for the month exceeded shipments by 57,047 tons.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

	Aug. 21, 1928	Aug. 14, 1928	July 24, 1928	Aug. 23, 1927
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$20.76
No. 2, Valley furnace.....	16.50	16.50	16.50	17.50
No. 2, Southern, Cin'ti.....	19.19	19.19	19.19	20.94
No. 2, Birmingham.....	15.50	15.50	15.50	17.25
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.00	16.00	16.00	17.25
Valley Bessemer, del'd P'gh....	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	17.50	17.50	19.50
Malleable, Valley.....	17.00	17.00	17.00	17.50
Gray forge, Pittsburgh.....	18.01	18.01	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.85	1.80

Finished Iron and Steel,				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.90	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.24	2.24	2.19	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

	Aug. 21, 1928	Aug. 14, 1928	July 24, 1928	Aug. 23, 1927
Sheets, Nails and Wire,				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.65	2.65	2.60	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.40	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh....	\$15.50	\$15.50	\$14.25	\$15.50
Heavy melting steel, Phila....	13.00	13.00	13.00	14.00
Heavy melting steel, Ch'go....	12.75	12.75	12.25	12.00
Carwheels, Chicago.....	12.75	12.75	12.75	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	15.50	16.00
No. 1 cast, Ch'go (net ton)....	14.00	14.00	13.50	14.75
No. 1 RR. wrot., Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Ch'go (net)...	11.25	11.00	10.75	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.60	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.75	13.25
Electrolytic copper, refinery....	14.50	14.50	14.50	12.87½
Zinc, St. Louis.....	6.25	6.25	6.20	6.32½
Zinc, New York.....	6.60	6.60	6.55	6.67½
Lead, St. Louis.....	6.00	6.00	6.00	6.30
Lead, New York.....	6.20	6.20	6.20	6.65
Tin (Straits), New York.....	47.87½	48.25	48.00	63.75
Antimony (Asiatic), N. Y.....	10.25	10.00	9.37½	11.62½

Pittsburgh

Increasing Demand for Steel Encourages Stronger Price Stand on Various Products for Fourth Quarter

PITTSBURGH, Aug. 21.—Steel business continues good, and with productive capacity holding to the high rate of engagement recently attained, steel companies are giving more attention to the consolidation of their gains. In addition to the fact that several other makers have followed the lead of the Youngstown Sheet & Tube Co. in raising fourth quarter sheet prices, the recent advance on cold-finished steel bars has become more general and makers of cold-rolled strips will ask from \$2 to \$4 a ton more for fourth quarter tonnages than they are getting on current shipments. More sheet and cold-rolled strip makers are falling in line with the reduced cash discount plan and makers of semi-finished steel and of bars, plates, shapes, hoops and bands are following the Carnegie Steel Co. in the imposition of charges where there is an extra production cost for special elements such as silicon, carbon, manganese, phosphorus, etc. Taking the market as a whole, the weak spots are few and the desire for prices that will net a fair return is stronger and more general than it has been in a long time.

New business is light in all products except pipe, structural shapes on projects that recently have arisen and plates for river barges, but with consumers enjoying very complete coverage for this quarter any other condition would be unusual. As reflected by specifications, the market is really active and only a few products are not sharing. Bar and sheet specifications are particularly heavy and those for strips, both hot and cold-rolled,

leave little to be desired. One local maker of strips finds this month's releases to have been equal to 90 per cent of capacity, against 75 per cent in July. Tin plate specifications are beginning to falter and some letdown in mill operations appears likely in October.

There is not only a continuance of the urgent demand for seamless pipe for California oil fields, but continued activity in line pipe. One order for

36,000 tons is on mill books and another for 42,000 tons of seamless pipe is in prospect.

In view of the contract provision setting Sept. 10 as the last day on which specifications may be entered against third quarter contracts for bars, plates, shapes and sheets and also because buyers of sheets, including tin mill black plate and cold-rolled strips, have only a little more than a month in which to enjoy the 2 per cent discount for cash payment of invoices, there is a suggestion that these factors possibly are influencing the present and unusual midsummer activity, but there is no evidence that consumers are stocking, and more commonly the activity is ascribed to an unusually well maintained rate of actual consumption. The steel market in the final quarter of the year therefore is not in danger of feeling a liquidating movement and, if it quiets down, it will be a reflection of lessened consumption.

The Pittsburgh valley pig iron market finally has caught the swing of other markets and if no more active in point of sales, it is in point of interest by consumers and in showing a stronger tendency. The scrap market has lost some of its recent tenseness, but supplies still are scant and prices very firm.

Pig Iron.—This market finally has begun to reflect the activity and strength of outside markets, and while actual sales of the past week showed no appreciable increase over those of the week before, inquiries are much more numerous. Basic iron, after several weeks of inactivity, now is being sought by the Allegheny Steel Co., the Edgewater Steel Co., the American Steel Foundries for its Alliance, Ohio, works, and it is understood that the Central Alloy Steel Corporation is finding its own production insufficient for its requirements and is a probable buyer. No specific tonnages are mentioned in these inquiries, but based upon the usual takings, it is believed that fully 20,000 tons will be wanted. Steel companies, which ordinarily have some surplus iron for market, are so heavily engaged and are using so much of their production that there is not the recent eagerness for business. As regular merchant producers are not anxious to sell at current prices, the feeling is that these several inquiries will produce higher prices. Scrap has not only had a steep advance over the past few weeks, but is anything but plentiful at the higher levels. This is believed to be a factor in the revived interest in basic iron. A sale of 1000 tons of basic iron to a Middle interest at \$16, Valley furnace, is reported. The Standard Sanitary Mfg. Co. has entered the market for the third quarter requirements of its several plants and is expected to close before another week passes. No definite tonnage is mentioned, but it is assumed that this company will buy all the iron that is offered at what it considers a reasonable figure. With Lake front furnaces well sold up and no longer actively seeking business in the territory tributary to the Valley furnaces, a tendency toward strength is noted in foundry iron. While on current business, \$16.50, Valley furnace, for No. 2 grade still is being done, producers are trying to secure more on iron for later shipment. One company is quoting \$16.75 for No. 2, \$17 for No. 2X and \$17.50 for No. 1X. A Titusville, Pa., melter recently closed for approximately 1000 tons of foundry iron; Valley fur-

naces which shared in this business were obliged to equalize a lower freight rate from Erie. The Carnegie Steel Co. has taken off the one Isabella furnace it had in blast. The Trumbull-Cliffs furnace, Warren, Ohio, is about to be blown out for repairs and relining.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.50 to 16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—The report still is of a good movement on contracts, but a minimum of new business because consumers generally are so well covered by contracts. Prices are unchanged.

Semi-Finished Steel.—Shipments of sheet bars on contracts still are heavy, since sheet and tin mills continue to operate at a high rate and specifications for the finished products are large. Quickening of the operations of strip mills is reflected in an increased movement of billets and slabs. New business in these forms, however, still is light and no negotiations yet have been started for fourth quarter tonnages. The Youngstown Sheet & Tube Co. has named \$33, Youngstown, as its fourth quarter price on sheet bars, and Pittsburgh makers will probably name the same price f.o.b. Pittsburgh. This is an advance of \$1 a ton, and a similar advance in billets and slabs is in prospect. A card of chemical extras covering semi-finished steel has been issued. Wire rods are firm at \$42, base, Pittsburgh or Cleveland. Skelp is moving fairly well on contracts, but there is not much open market activity.

Bars, Plates and Shapes.—Consumers of bars are taking shipments freely against third quarter commitments, and as the mills still are adhering firmly to their intention to cancel tonnages for this quarter not specified by Sept. 10, it begins to look as if there would be much less of a carryover of third quarter business into the final quarter of the year than was true of first and second quarter contracts. As matters have been in the past year or so, a quarterly con-

tract actually has given buyers four months' protection, since it has been possible for buyers to wait until the last day of the last month of a quarterly period before putting in specifications. The mills also are insisting upon specifications by Sept. 10 on shapes and plates, with an idea of cleaning their books of third quarter business as promptly as possible after Oct. 1. Structural lettings in this area continue small, but three local barge builders will share in the award of 92 barges for the Mississippi River Commission, calling for 11,000 tons. Current business is moderate as few buyers are unprotected against their requirements for this quarter. Such new business as is being done in bars and shapes is at 1.90c., base Pittsburgh. Plates also have been sold at that price, but in the gages and sizes competitive with the product of strip and sheet mills even 1.85c., base, has been hard to obtain.

Rails and Track Supplies.—This is usually a quiet period in rails and track fastenings and this year is no exception. Prices show no change, but there is some weakening in the stand of makers for the extra of \$5 a ton on less than carload lots of spikes.

Wire Products.—Business is better than it has been, but is not active and the firmness of prices still stands out as the interesting feature of the situation.

Tubular Goods.—The National Tube Co. has taken an order for 218 miles of 18-in. pipe for gas line to run from the Monroe, La., field to Memphis, Tenn. This means approximately 36,000 tons. Between line pipe business and a continued insistent demand for seamless pipe for oil well work from California and a good demand for the latter for the Seminole, Okla., field, the pipe makers are enjoying comparatively good times. Welded oil country pipe is not moving with much vigor and demand for butt weld pipe is better described as steady than as active. Competition for pipe line business is keen and prices are favorable to buyers, but in other classes the market is firm and the secondary market is reported to be more stable than it was a few months ago. The Sinclair Pipe

THE IRON AGE Composite Prices

Finished Steel

Aug. 21, 1928, 2.348c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.319c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Aug. 21, 1928, \$17.04 a Gross Ton

One week ago.....	\$17.04
One month ago.....	17.04
One year ago.....	18.13
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.75,	Feb. 14;	\$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh	2.65c. to 2.85c.
Strips, 1 up to 3 tons, Cleveland.....	2.90c.
Strips, 1 up to 3 tons, del'd Chicago.....	3.30c.
Strips, 1 up to 3 tons, Worcester.....	3.15c. to 3.30c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.74c. to 2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$2.90
2100 (1½% Nickel)	0.55	3.20
2300 (3½% Nickel)	1.50	4.15
2500 (5% Nickel)	2.25	4.90
3100 Nickel Chromium	0.55	3.20
3200 Nickel Chromium	1.35	4.00
3300 Nickel Chromium	3.80	6.45
3400 Nickel Chromium	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100 Chromium Spring Steel	0.20	2.85
6100 Chromium Vanadium Bars	1.20	3.85
6100 Chromium Vanadium Spring Steel	0.95	3.60
9250 Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1½	45	19½	1½ to ¾..+11	+89			
1½ to ¾..	51	25½	¾	22	2		
1½	56	42½	¾	28	11		
¾	60	48½	1 to 1½..	30	13		
1 to 3....	62	50½					
2	55	43½	2	23	7		
2½ to 6..	59	47½	2½	26	11		
7 and 8..	56	43½	3 to 6....	28	13		
9 and 10..	54	41½	7 to 12....	26	11		
11 and 12..	53	40½					

Lap Weld

2	55	43½	2	23	7
2½ to 6..	59	47½	2½	26	11
7 and 8..	56	43½	3 to 6....	28	13
9 and 10..	54	41½	7 to 12....	26	11
11 and 12..	53	40½			

Butt Weld, extra strong, plain ends

1½	41	24½	1½ to ¾..+19	+54			
1½ to ¾..	47	30½	¾	21	17		
1½	53	42½	¾	28	12		
¾	58	47½	1 to 1½..	30	14		
1 to 1½..	60	49½					
2 to 3....	61	50½					

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4..	57	46½	2½ to 4..	29	15
4½ to 6..	56	45½	4½ to 6..	28	14
7 to 8....	52	39½	7 to 8....	21	7
9 and 10..	45	32½	9 to 12....	16	2
11 and 12..	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 3 in.....	37
3 in.	40
3½ to 3¾ in.....	42½
4 to 13 in.....	46
1½ in.	1½ in. ....+18
1¾ to 2 in.....	1¾ to 2 in.....+8
2 to 2½ in.....	2 to 2½ in.....+2
2½ to 3 in.....	2½ to 3 in.....+7
3 to 4 in.....	3 to 4 in.....+9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over	7 Fives
	1 Ten
	2 Tens
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in..	55	3¼ to 3½ in..	50
1½ in.	39	4 in.	53
2 to 2½ in..	34	4½, 5 and 6 in..	45
2½ to 3 in..	42		

Hot Rolled

2 and 2½ in..	40	3½ and 3½ in..	56
2½ and 2¾ in..	48	4 in.	59
3 in.	54	4½, 5 and 6 in..	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads) ..	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Line Co. will build a new oil line from Oklahoma to Whiting, Ind., in connection with a plan to increase its oil delivery capacity to Chicago by 25,000 bbl. daily. The new line will call for 42,000 tons of 8, 10 and 12-in. seamless pipe.

Sheets.—Business of the past week of the American Sheet & Tin Plate Co. was the largest of any similar period since late in 1925, and independent companies appear to be faring quite as well. Mills generally are insisting that tonnages bought on third quarter contracts not specified by Sept. 10 next will be cancelled, and one important maker is considering the setting of Sept. 3 as the deadline. It is not clear whether this is responsible for the activity, or that buyers want some protection against the lower rate of discount that is to become effective Oct. 1, but the fact remains that business is of unusual proportions for this time of the year. On current business, recent prices are ruling. The American Sheet & Tin Plate Co. has named 2.75c., base Pittsburgh, on black sheets, 3.60c., base, on galvanized, and 2c., base, on blue annealed as its fourth quarter prices. This company also has announced a change of terms to ½ of 1 per cent for cash in 10 days from date of invoice, effective Sept. 30 next.

Tin Plate.—Specifications for tin plate are lighter, and while makers are well supplied with business for the next 30 days, it is probable that there will be open mill capacity before the end of September. October requirements usually are light and there is no prospect that this year will be an exception. No sharp falling off in mill operations is likely, as there will be some production in October and more in November against early 1929 requirements.

Cold-Finished Steel Bars and Shafting.—Business is satisfactory to most makers, but they would like to be get-

ting more money for the product. Most of the orders on the books are at 2.10c., base Pittsburgh, and there has been enough coverage of buyers at that price to make difficult the obtaining of the higher price recently announced. Ground shafting prices have been advanced \$2 a ton, effective from Aug. 15, now being quoted at 3.50c., base mill, for 1½ in.; 3c. for 1 3/16 in. to 1½ in.; 2.85c. for 1 9/16 in. to 1½ in.; 2.70c. for 1 15/16 in. to 2½ in., and 2.55c. for 2 15/16 in. to 7 in.

Hot-Rolled Flats.—There is not only an active demand in the shape of specifications against contracts, but the trend of prices is toward increased firmness. Nothing yet has been said as to fourth quarter contract prices, and strictly new business is not of sufficient proportions to afford much of a test, but a restoration of what had been regarded as the regular market schedules, or 1.90c., base, for wide, 2.10c., base, for intermediate widths, and 2.20c., base, for narrow stock appears to be the aim of most producers.

Cold-Rolled Strips.—A leading producer has announced a base price of 2.85c., effective immediately. It also has announced a new card of extras dated Aug. 21, which incorporates changes in the extras for quantities of less than 3 tons of a size. This company also has opened its books for fourth quarter business. Other producers are expected to follow its lead, which means an advance of \$2 to \$4 a ton from prices recently prevailing, and abolishes the former method of making the base price apply on 1 to 3 tons of a size, with a decrease of 25c. per 100 lb. for lots of 3 tons or more, which caused a good deal of confusion. Cold-rolled strip business maintains its recent improvement.

Coke and Coal.—A steel company which recently took off the market much of the spot supply of beehive furnace coke has repeated the operation on a smaller scale, and the result is that spot offerings remain scant enough to keep prices very firm. General demand for furnace coke is moderate and no exceptional activity is noted in spot foundry coke. Supplies of the latter are ample. The coal market continues dull, except for household sizes, and prices generally are easy.

Bolts, Nuts and Rivets.—There has been some improvement in demand in the past week, but the market is active only in a comparative sense. Prices are held with a good deal of firmness.

Old Material.—There is a somewhat calmer tone to the market this week, as all consumers seem to have secured some supplies recently, and with increased mill operations there is naturally increased supply of mill scrap. Dealers still are buying, and, as offerings are moderate, prices are quite as firm as they have been. The advance, however, appears to have been checked. Dealers still report success in getting heavy melting steel for one

point in the district at \$15, but at other points \$15.50 is the ruling figure, and on fresh sales \$16 is as low as any dealer would be interested.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$15.00 to \$16.00
Scrap rails	15.00 to 15.50
Compressed sheet steel.....	14.75 to 15.25
Bundled sheets, sides and ends	13.75 to 14.25
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	15.50 to 16.00
Heavy breakable cast.....	12.00 to 12.50
No. 2 railroad wrought....	15.00 to 16.00
Heavy steel axle turnings.....	14.00 to 14.50
Machine shop turnings....	16.00 to 10.50

Acid Open-Hearth Grades:

Railr. knuckles and couplers	16.00 to 16.50
Railr. coil and leaf springs	16.00 to 16.50
Rolled steel wheels.....	16.00 to 16.50
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate.....	17.50 to 18.00
Low phos., light grade.....	16.50 to 17.00
Low phos. sheet bar crops.....	17.50 to 18.00
Hvy. steel axle turnings..	14.00 to 14.50

Electric Furnace Grades:

Low phos. punchings.....	16.00 to 16.50
Hvy. steel axle turnings..	14.00 to 14.50

Blast Furnace Grades:

Short shov'l'g steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings.....	11.00 to 11.50
No. 2 busheling.....	10.00 to 10.50

Rolling Mill Grades:

Steel car axles	18.50 to 19.00
No. 1 railroad wrought....	12.00 to 12.50
Sheet bar crops.....	16.50 to 17.00

Cupola Grades:

No. 1 cast.....	14.50 to 15.00
Rails 3 ft. and under.....	16.00 to 16.50

A reduction in freight rates on spelter between Indiana points and sources of supply in Arkansas has been announced by the Indianapolis Chamber of Commerce. The 34½c. rate to Indianapolis has been reduced to 25½c. and corresponding reductions have been made for all points in the State, placing Indiana consumers on the same basis as Chicago.

Employment in Worcester, Mass., industries has shown improvement. According to figures furnished by the 42 plants which report to the Worcester Safety Council in its lost-time accident contest, the average number of employees in June was 23,377. In June, 1927, the same companies reported an average of 20,637 workers. Worcester outbound shipments in June this year were 33,398 cars against 30,540 cars in June, 1927. In July the total was 30,071 cars against 27,120 a year previous.

The Lehigh Structural Steel Co., Allentown, Pa., has rounded out its group insurance program by the purchase of group health and non-occupational accident insurance. According to salary classification, subscribing employees will be paid \$10, \$20 or \$30 a week when unable to work due to sickness from any cause, or injury received while off duty. During this time insured employees are offered the advantages of a visiting nurse service and a health advisory bureau.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1 3/4-in.....	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock.....	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	

Manganese ore, washed, 52% manganese, from the Caucasus.....	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.85 to \$11.00

	Per Gross Ton
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₂ , delivered.....	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens..	8.00
Foundry, by-product, New England, del'd.....	11.00
Foundry, by-product, Newark or Jersey city, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-products, St. Louis, f.o.b. ovens.....	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines...	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines...	1.15 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	\$11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltitium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey.....	50.00 to 65.00	—————
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton.....	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 3/4 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(1/2-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00

Small Rivets

(7/16-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh.....	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago.....	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread.....	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs.....	70 and 5

Chicago

Steel Business Sufficient to Sustain 75 Per Cent Output— 50,000 Tons of Foundry Pig Iron Sold

CHICAGO, Aug. 21.—Ingot operations in this district remain at 75 per cent of capacity and steel mills are making use of 25 of a total of 36 blast furnaces. Bar mill capacity is heavily engaged, but in plates and structurals not over 75 per cent of possible output is being used. Steel orders are numerous but individually small and buying is at close range, so that operators are finding difficulty in arranging rolling schedules, particularly in the last days of each week.

Purchases totaling 15,000 tons of standard-section rails closely follow smaller orders in recent weeks. This business has not only served to raise rail mill production but to sustain the higher rate through this week and give promise of an equal output in the next seven days.

Sheet mills, handicapped by hot weather, have speeded to 85 per cent of capacity and even at that rate orders are piling up faster than shipments can be made.

Producers of wire products are finding stocks low and out of balance in view of the prospects for an active fall trade. This situation is being met by an advance of two to three points in mill output and readjustment of production in various departments.

The trend of prices is in an upward direction. Cold-rolled bars have been advanced to 2.20c. per lb., Chicago, and blue annealed sheets are being quoted for fourth quarter at 2.10c. for widths under 45 in. and at 2.20c. for 45 in. and over.

Sept. 10 has been set as the dead line for specifications against orders for plates, shapes and bars at third quarter quotations of 2c. Producers are making a stand for 2.10c. per lb. for these commodities for fourth quarter.

Pig Iron.—Sales of Northern foundry iron for the week total close to 50,000 tons. Individual orders are not as large as in recent weeks, but buyers over a wider territory and in a greater variety of industries are using larger quantities, and appear better able to judge future requirements. Price advances announced to the east of Chicago are having some influence on activity and strength in this market. In some cases buyers who have made recent purchases are rechecking their requirements with the thought of taking full advantage of present prices. In the meantime, local producers are sending out quotations for immediate acceptance. Chicago furnace stocks are shrinking rapidly and are in unsatisfactory balance. It is considered probable here that a merchant stack will be blown in at an early date. Shipments of Northern foundry iron in the 21 days of August are well ahead of the corresponding periods in either June or July of this year.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	18.00
Malleable, not over 2.25 sil.....	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	21.51
So'th'n No. 2 (barge and rail).....	21.01
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications against last half contracts for ferromanganese are in larger total volume. New business is quiet at \$105, seaboard. Buyers are showing little interest in spiegeleisen, which is being quoted at \$33, Hazard, Pa., for carloads of the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Plate mill engagement in this district continues to hold at a shade above 70 per cent of capacity, in spite of the fact that car shop operations are at low ebb; also there is an increasing use of special shapes, which makes the call for narrow plates from fabricators much less urgent than formerly. Welded gas and oil pipe have taken up part of the slack, and miscellaneous uses for plates have grown to larger proportions. The Texas & Pacific has ordered 3000 tons of tankage material from an Eastern producer. Oil storage projects are being shaped, but definite inquiry is lacking in this market. The Chesapeake & Ohio has closed for 500 gondola cars. The Illinois Traction System will take figures on 100 to 200 50-ton gondola cars and the Great Northern will buy about 6000 tons of steel for a purpose not definitely stated. The Sinclair Pipe Line Co., a joint subsidiary of the Sinclair Consolidated Oil Corporation and the Standard Oil Co. of Indiana, has approved a project that calls for 65,000 tons of steel pipe. It involves a 360-mile line of 8, 10 and 12-in. oil pipe, which will increase pipe line delivery into Chicago by 25,000 bbl. daily. Prices for plates at Chicago are firmer at 2c. per lb. Several small lots have been taken at 2.10c. for delivery in the fourth quarter. Deliveries range from two to three weeks.

Mill prices on plates, per lb.: 2c. base Chicago.

Structural Material.—New structural orders during the last week were confined largely to bridge work. The Mount Vernon Bridge Co. will furnish 4300 tons for a bridge in Louisiana and two bridges in Illinois, calling for 1800 tons. The Rand Building, Minneapolis, requiring 3000 tons, was taken by a Minneapolis shop. Reports that building construc-

tion in Chicago for the first seven months was 38 per cent above the corresponding period a year ago are reflected in the rate at which local shops are engaged. The distribution of orders has not been wholly to the liking of all fabricators, but with the rapid erection common these days it has become necessary for the successful bidder to farm out parts of the larger awards to competing shops. In this way, promised deliveries are met and the rate of shop engagement is quite uniform. In the Northwest and in the West, fabricators are finding orders rather spotty, with the result that some shops are unusually busy while others are complaining because of lack of work. Fresh inquiry includes 1000 tons for the First Regiment Armory, Chicago, and 1500 tons for the Camp Building, Milwaukee. Bids taken on large inquiries at Chicago show prices to be \$6 to \$8 a ton above recent levels. Though the price trend is upward, net returns to fabricators are said to be still extremely narrow. Competition on small jobs is keen and prices on this class of work show no improvement. Chicago producers have in mind naming 2.10c. on structural material for fourth quarter delivery.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Bars.—Shipments of soft steel bars in the first two weeks of August were well ahead of the corresponding period in July. The automotive industry continues the heaviest user. Some promise is given that this pace will continue in that two of the foremost automobile builders are maintaining August production schedules which will establish monthly records for all time. Mild steel bars are steady at 2c., Chicago, for delivery to the end of September. The fourth quarter prices, which are now named at 2.10c., have been used on a few scattered sales. Some unsettling in prices is noted in forging bars, which are reaching this territory from the East. Iron bars are quiet but prices are firm at 2c., Chicago. Shipments of alloy bars remain steady at 80 per cent of local mill capacity. Prices and alloy differentials are holding. Rail steel bar mills have lengthened hours of operation to meet in part a heavier demand and to build up fence post stock, which is small in view of the fact that the fall demand is close at hand. Bed manufacturers are finding need for larger quantities and barn equipment makers show no signs of lessening their pace. Stocks in the hands of users are small and most orders are for immediate delivery. Prices are firm at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Sheets.—Warm weather is checking hot mill output, which is averaging close to 85 per cent of capacity. In the meantime, orders continue to pile up and deliveries are lengthening. For blue annealed sheets for fourth quarter, Chicago producers name

2.10c., mill, for widths under 45 in., and 2.20c. for sheets 45 in. and wider. An extra of 10c. per 100 lb. is being added to quotations on all grades for orders that range from 50 to 100 tons.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Ch'go deliv'd prices.

Rails and Track Supplies.—Two Western railroads have ordered 15,000 tons of standard-section rails and 7500 tons of track supplies. One purchase is by a railroad which usually buys at this time and the other came from a road that bought lightly in the spring and needs additional rails for this year's laying. The advance reported a week ago in rail mill operations is holding.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is low bidder at \$41.90, delivered, on 1920 tons of 8 and 12-in. class B pipe for Chicago. The freight rate from Birmingham to Chicago is \$8.20. Taken as a whole, this market is quiet.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Reinforcing Bars.—Greater activity marks this commodity. Awards are well scattered over the entire territory and prices are firm, except to the south. Indiana and southern Illinois dealers have reached into central Illinois and have taken business below the levels being maintained in and near Chicago. Locally 2.30c. and 2c., base warehouse, respectively, are the ruling quotations on billet steel and rail steel bars, these prices having been re-established after a break about 10 days ago. Architects remain busy, and dealers are awaiting plans on several heavy-tonnage apartment projects. Plans have not been prepared on the Apparel Mart, Chicago, and the tonnage of reinforcing bars required is in doubt. New awards and fresh inquiries are shown on page 498.

Warehouse Prices, f.o.b. Chicago	
Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel.....	2.30c. to 3.00c.
Reinforc'g bars, hard steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb.	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Old Material.—Tendencies in the local scrap market are varied. Heavy melting steel has brought \$13 a gross ton, which is 25c. below prices paid on recent heavy purchases. On the other hand, numerous other grades are advancing in price. Steel foundry grades are active. Short rails and steel angle bars are scarce.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.75 to \$13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and misc. rails	14.00 to 14.50
Hydraul. compressed sheets	11.25 to 11.75
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels	16.00 to 16.50
Railr'd tires, charg. box size	16.00 to 16.50
Railr'd leaf springs cut apart	16.00 to 16.50

Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.25 to 14.75
Coil springs	16.50 to 17.00

Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings.....	14.50 to 15.00
Low phos. plate, 12 in. and under	14.50 to 15.00

Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings.....	9.25 to 9.75
Short shoveling turnings..	9.25 to 9.75
Machine shop turnings...	6.50 to 7.00

Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	15.50 to 16.00

Cupola Grades:	
Steel rails less than 3 ft..	15.75 to 16.25
Angle bars, steel.....	15.25 to 15.75
Cast iron carwheels.....	12.75 to 13.00

Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	11.50 to 12.00

Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	20.00 to 20.50
Iron car axles	24.00 to 24.50
Steel car axles	15.75 to 16.25
No. 1 railroad wrought..	11.25 to 11.75
No. 2 railroad wrought..	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues	8.00 to 8.50

Cupola Grades:	
No. 1 machinery cast....	14.00 to 14.50
No. 1 railroad cast.....	13.00 to 13.50
No. 1 agricultural cast....	12.50 to 13.00
Stove plate	10.75 to 11.25
Grate bars	12.00 to 12.50
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cold-Finished Bars.—Following closely the announcement of higher prices in the East, local producers have named 2.20c. per lb., Chicago, to rule on quotations for all orders that can be delivered before the end of the third quarter. Books have not been opened for the final quarter.

Wire Products.—Producers of wire and wire products look with favor on the substantial volume of business that is reaching them in August, which is usually a dull month, and they are pinning their faith on the outlook for crops and a fair degree of assurance that fall trade will be heavy. Reports from the country, as a whole, indicate that crops will be larger and prices higher than in 1927.

Dealers in rural districts are finding business dull, and this situation is reflected back to the jobbers. Stocks in the hands of distributors are small, and orders to mills are merely to fill in for immediate requirements. On the other hand, the general level of activity in the manufacturing trade is high, especially in the Detroit and Cleveland territories. The demand for bale ties is unusually active when it is considered that the use for this commodity is steadily decreasing. The increased rate of nail shipments noticed 10 days ago has continued. Wire mills, in order to build stocks, have raised operations a point or two above the recent 60 per cent rate. Producers believe that they have enough orders in sight to make certain that the summer of 1928 will be the best mid-year season since 1922.

Coke.—Prices for by-product foundry coke are steady and deliveries are running a shade heavier than in July.

Bolts, Nuts and Rivets.—Output by producers of these commodities remains between 60 and 65 per cent of capacity. Specifications have grown heavier from manufacturers of agricultural machinery.

New Extras Announced by Carnegie Steel Co.

The Carnegie Steel Co. has published, under date of Aug. 1, two new cards, one giving the classification of extras for size, chemical specifications and quality for semi-finished steel and the other giving the extras for chemical specifications and quality of structural shapes, plates, bars, small shapes, hoops and bands.

Except that the extra for copper content in semi-finished steel up to 0.20 minimum is \$3 per gross ton against \$2 per net ton on finished products and that the new semi-finished card extras are expressed in dollars per gross ton and those for finished products in cents per pound, the extras are the same as those published in THE IRON AGE of Aug. 9, last.

Size extras for blooms, billets and slabs are:

Squares under 4 x 4 in. to 1½ x 1½ in., inclusive, or rectangular sections of equivalent areas not less than 3-in. thick, \$1 per gross ton.

4 x 4 in. to under 10 x 10 in., or equivalent area, no extras.

10 x 10 in. to under 14 x 14 in. or equivalent area, \$2 extra.

14 x 14 in. to under 16 x 16 in. or equivalent area, \$4 extra.

16 x 16 in. to under 20 x 20 in., or equivalent area, \$6 extra.

20 x 20 in. and over or equivalent area, \$8 extra.

Weight per piece when ordered 12,000 lb. or over, \$10 extra. (This shall not apply when product of ingot is accepted).

Production of bituminous coal in the United States up to Aug. 11 is reported by the Bureau of Mines at 285,098,000 net tons. This compares with 325,673,000 tons for the corresponding period in 1927 and 324,847,000 tons in 1926.

Philadelphia

Pennsylvania Railroad Bids on Plates, Shapes and Bars Range from 1.90c. to 2.10c., Mill

PHILADELPHIA, Aug. 21.—Bids opened today by the Pennsylvania Railroad on 25,000 tons of plates, shapes and bars, were watched with interest by representatives of steel producers with a view to determining the attitude of various companies on fourth quarter prices. The railroad did not specify when it would take delivery, but it was assumed that, as its inquiry came out in the middle of the quarter, instead of at the beginning, specifications would be spread over the rest of the year. Eastern mills, including those in the Pittsburgh and Ohio districts, quoted 1.90c., mill, and Chicago producers quoted 2.10c., with the single exception that the Republic Iron & Steel Co. quoted 2c. on bars. Some companies stated that their quotations would hold good for specification only until Sept. 30, while others, conspicuously the Carnegie Steel Co. and the Bethlehem Steel Co., made no restriction. A few producers gave Dec. 31 as the final date on which specifications would be accepted.

The price situation is unchanged on orders for early shipment, except on shapes, which are slightly firmer. Present activity is confined almost entirely to specifications against third quarter contracts. The announced advances on plates, shapes, bars, black and galvanized sheets for fourth quarter by some mills will no doubt be followed by Eastern mills.

Pig Iron.—Foundry iron buying is still confined to lots of 100 tons or less. The quotation of \$19.50 per ton, furnace, is firmer, and concession from this base is not considered so likely today as a week or two ago. The Coatesville Boiler Works, Coatesville, Pa., is in the market for about 100 tons of No. 2X and the Baltimore & Ohio Railroad is inquiring for a carload of high manganese foundry. The J. L. Mott Co., Trenton, N. J., has closed with a nearby furnace on about 100 tons of No. 2 foundry. Demand for low phosphorus has improved and prices are quite firm. The Lorain Steel Co., Johnstown, Pa., is inquiring for 1500 to 2000 tons of low phosphorus iron, copper bearing being acceptable. Nearby users of basic iron are well covered for the present.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.	21.26
Basic (del'd east. Pa.)	\$18.75 to 19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Activity is almost entirely in requisitions against last half contracts, consumers evidently not needing any tonnage in addition to their commitments. The price continues at \$105 per ton, sea-board.

Bars.—Most mills are well booked with business and able to maintain a fair rate of operation. Quotations for current delivery are 1.85c. to 1.90c., Pittsburgh, or 2.17c. to 2.22c., Philadelphia, and 2c., Pittsburgh, or 2.32c., Philadelphia, has been named as the fourth quarter price.

Plates.—Shipments are principally of contract specifications, but there is a fair tonnage of such business and

improvement in small orders for prompt shipment is expected after Labor Day. Quotations continue at 2c. to 2.05c., Coatesville, or 2.10c. to 2.15c., Philadelphia; for early delivery and 2.15c., Coatesville, or 2.25c., Philadelphia, is considered as a possibility for fourth quarter business.

Shapes.—Fabricators are well engaged and have a good tonnage of desirable contracts in prospect before the end of the year. This is reflected in a better demand and firmer prices. The producer at Pencoyd, Pa., which has been quoting 1.95c. to 2c., Pencoyd, or 2.01c. to 2.06c., Philadelphia, has begun to ask 2c. to 2.05c., Pencoyd, or 2.06c. to 2.11c., Philadelphia. The market does not show a full \$1 a ton advance, however, as preferred buyers are reported as still able to obtain 1.95c., Pencoyd, on desirable business. On small lots of shapes for prompt shipment, 2c., Bethlehem, or 2.13c., Philadelphia, occasionally applies.

Sheets.—Consumers are well booked with business, particularly the automobile body builders and a local radio

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅝-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅝-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

manufacturer, but in most cases, users are well covered and are not expected to show much interest in fourth quarter contracts until the end of next month. Mills generally are seeking a \$2 to \$4 advance on black and galvanized sheets for last quarter delivery, asking 2.75c., base Pittsburgh, for black and 3.60c. for galvanized. Present quotations for early shipment are 2.65c. on black and 3.40c., Pittsburgh, on galvanized. Blue annealed prices are being fairly well maintained at 2c., Pittsburgh, or 2.32c., Philadelphia, for 45 in. and narrower and 2.10c., base Pittsburgh, on wider than 45 in. Occasional concessions from 2c., Pittsburgh, have been made to preferred buyers.

Warehouse Business.—Buying is light and at the present rate the total will probably be smaller for this month than in July.

Imports.—In the week ended Aug. 18, arrivals of pig iron totaled 2614 gross tons, of which 2500 tons was from the United Kingdom, 59 tons from Sweden and 55 tons from Norway. Ore arrivals totaled 610 tons from Portuguese Africa. In steel products, 262 tons of structural shapes, 61 tons of steel bars and four tons of bands came from Belgium and 103 tons of structural shapes from Germany.

Old Material.—The week's business was featured by the purchase of upward of 10,000 tons of heavy melting steel by the Bethlehem Steel Co. for shipment to Bethlehem. The price was \$13 a ton, which also applied on the last previous purchase by this company. All grades show more firmness and in a few instances prices have advanced on recent sales. Bundled sheets are 50c. a ton higher, based on \$11 a ton paid by a Harrisburg, Pa., consumer, and yard steel is quotable at a similar 50c. a ton advance as a result of a purchase at \$11.50 per ton, delivered Harrisburg. Specification pipe has been bought by a user at Columbia, Pa., at \$13 per ton, delivered, an increase of 50c.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails	12.50
No. 2 heavy melting steel	\$11.00 to 11.50
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.50
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	11.00 to 11.50
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast f'nace scrap	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.50 to 13.00
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Cast iron carwheels	15.50 to 15.75
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

August Steel Orders Exceeding Those of July—Pig Iron Sales in Good Volume

NEW YORK, Aug. 21.—Sales of pig iron in this territory continue in good volume, having totaled 13,000 tons for the week. The General Electric Co. inquiry for 5000 tons is still pending, and a number of other sizable tonnages have come out for figures. The H. B. Smith Co., Westfield, Mass., is in the market for 5000 tons of foundry iron, and the General Fire Extinguisher Co., Providence, R. I., is asking for prices on 2300 tons of No. 1X and No. 2X. The New York Air Brake Co., Watertown, N. Y., is inquiring for 200 tons of low phosphorus and has requested figures on an unspecified tonnage of No. 2 plain. A large proportion of the business placed last week was in relatively small lots. The smaller melters, although they are not covering for fourth quarter to the same extent as some of the large buyers, are placing considerable spot tonnage. Notable among orders placed was 625 tons of Dutch foundry iron, bought by the American Hardware Corporation, New Britain, Conn. Incidentally, it is reported that a cargo of Dutch iron will be afloat for delivery at Bridgeport, Conn., before the end of August. The entire shipment is said to have been sold. The American Car & Foundry Co., which was in the market for 300 tons for Berwick, Pa., has closed for a larger tonnage of various grades. A scarcity of barges resulting from a heavy movement of wheat has interfered with water shipments of pig iron from Buffalo. Furnace stocks at Buffalo have been reduced materially, it is said, and two producers have raised quotations on foundry iron to \$16.50, base. Higher prices have not yet been reflected in sales, however. The Adrian furnace, Dubois, Pa., was lighted Aug. 20.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91 to \$21.41
*Buf. No. 2, del'd east. N. J.	19.28 to 19.78
No. 2, del'd east. N. J. tidewater	19.01 to 19.51
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	20.89 to 22.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Steel Pipe.—For a gas pipe line from Fowler, La., to Memphis, Tenn., 37,000 tons of steel has been placed. The line includes 210 miles of 18-in. pipe and eight miles of another size for river crossings.

Plates, Shapes and Bars.—Steel companies which provided in their third quarter contracts that all specifications for delivery during the quarter shall be entered on or before Sept. 10, are now engaged in checking up on their customers to see that the provision is complied with. One or two companies specified Sept. 15 as the

closing date for specifications, and a few made no change whatever in their contracts, which presumably means that such companies will be obliged to take specifications up to the end of September. However, it appears that the bulk of the tonnage of these

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
	Per Cent
Machine bolts, cut thread: Off List	
¾ x 6 in. and smaller.....	60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

products under contract is covered by the Sept. 10 or Sept. 15 clause, and as the provision is a new one its effect on incoming business in the early part of September will be watched with interest. In a few instances buyers have already specified their September quotas with instructions to ship the last week of September; the mills receiving these requests, however, have declined to accept such shipping instructions and intend to ship at their convenience on or after Sept. 10. The object of the clause is plain—it is to prevent the carryover tonnage from one quarter to another which has resulted from heavy specifying in the final week or two of a quarter, particularly when an advance in price was in prospect. The mills hope to clear their books of third quarter tonnage by Oct. 1 or shortly thereafter, and to make the higher prices announced for the last quarter really effective from the first day of the new period. Just how successful the mills will be in establishing a \$2 advance for the last three months remains to be seen, but it is certain that the groundwork for an advance was never better prepared. Not all mills have announced fourth quarter prices; some apparently are waiting for the effect on buyers of the advances named by a few of the larger interests. Meanwhile, the steel trade is encouraged by the steady gain in specifications and new business, the total for the three weeks of August being well ahead of that for the corresponding period in July. On current business, prices are unchanged. Bars are being sold at 1.90c., Pittsburgh, to consumers and jobbers not covered by 1.85c., contracts, but plates and shapes are to be had at 2c., Eastern basing points, with 2.05c. applying on some small lots. Post & McCord have been awarded the steel contract for an addition to the Abraham & Straus department store, Brooklyn, which will take 20,000 tons. Plans for the Reynolds Tower Building, Lexington Avenue and Forty-second Street, which would take 17,000 tons of steel, may be abandoned.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets.—Almost without exception, makers of sheets have adopted a higher price schedule for fourth quarter. Blue annealed sheets remain at 2c., base, but there is an extra of 10c. per 100 lb. for widths exceeding 45 in., whereas the former dividing line was 40 in. Black sheets are being quoted at 2.75c. and galvanized at 3.60c. Many of the sheet companies inserted a clause in their third quarter contracts providing for final specifications to be in by Sept. 10, and it is stated that this provision will be rigidly enforced.

Warehouse Business.—Present activity compares favorably with that of the same period of July, so that the month's business is expected to reach a fair total. Sheet prices are

slightly firmer, probably reflecting announcements of higher mill prices for fourth quarter.

Old Material.—The strong undertone of a week ago has developed into an upward movement of prices affecting practically all grades of scrap. Brokers are paying higher prices, and in some instances are offering the full amounts received on their contracts. Yard steel is being bought at from \$10.50 per ton delivered Pottsville, Pa., to \$11.50 per ton, delivered Harrisburg, Pa. Steel mill stove plate is quoted by brokers at \$11 to \$11.50 per ton, delivered. The minimum price paid for specification pipe today is \$12.50 per ton, delivered Columbia, Pa. Within the past week the Bethlehem Steel Co. closed on more than 10,000 tons of No. 1 heavy melting steel for Bethlehem, at the previous purchase price of \$13 per ton. This would justify a buying price New York of \$9.85 per ton, but some brokers here are offering \$10 and as much as \$10.45 per ton for No. 1 steel to go to western Pennsylvania, delivering to Butler, Pa., and Weirton, W. Va., at \$15.30 to \$15.75 per ton.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$9.85 to \$10.25
Heavy melting steel (yard)	6.75 to 7.75
No. 1 hvy. breakable cast.	11.25 to 12.00
Stove plate (steel works)...	7.25 to 7.75
Locomotive grate bars....	7.25 to 7.75
Machine shop turnings....	6.25 to 6.50
Short shoveling turnings..	6.25 to 6.50
Cast borings (blast furn. or steel works).....	6.00 to 6.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles.....	15.00 to 15.50
Iron car axles.....	23.50 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.75
Forge fire	6.50 to 6.75
No. 1 railroad wrought....	9.00 to 9.50
No. 1 yard wrot., long....	7.50 to 8.00
Rails for rolling.....	10.00 to 10.50
Cast iron car wheels.....	11.00 to 12.00
Stove plate (foundry)....	8.75 to 9.00
Malleable cast (railroad)...	10.00
Cast borings (chemical)...	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$14.50 to \$15.50
No. 1 hvy. cast (columns, bldg. materials, etc.).	
cupola size.....	12.50 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 13.00

Reinforcing Bars.—Business has continued at a fair rate during the last week, but no awards of outstanding size are reported. Interest is centered in a number of large pending projects on which early action is expected and which will require at least 5000 tons of bars. Foreign steel will be used in a number of fair-sized jobs which have been let recently, and distributors of imported material are actively seeking business in this territory. This has not seriously disturbed the price situation, and quotations are firm on the general run of orders.

Cast Iron Pipe.—Southern makers of pressure pipe continue to quote \$34 to \$35 per ton, Birmingham, but the market here shows some weakness with Northern foundries bidding \$35.60 and \$36.60 per ton, delivered New York, although there is an effort to maintain \$37.60 per ton, delivered, as the minimum. There is a fair volume of private buying in small lots. Amagansett, N. Y., opens bids

Aug. 22, on about 525 tons of water pipe; bids on centrifugal pipe are acceptable. On 3260 tons of 6, 8, 12 and 16-in. pipe for Fairlawn, N. J., a contractor in Orange, N. J., is reported to have been low bidder.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$35.60 to \$37.60; 4-in. and 5-in., \$41.60 to \$42.60; 3-in., \$51.60 to \$52.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Prices are substantially unchanged, with furnace grade ranging from \$2.65 to \$3 per ton, Connellsville, and foundry at about \$3.50 per

net ton, Connellsville. Shipments of foundry grade are reported to be improving. Special brands of foundry coke continue at \$4.85 per net ton, ovens, and delivered prices are \$8.56 per net ton to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. The market on domestic sizes of by-product coke is weak, but the foundry grade appears quite firm and unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06 to \$10.29, New York or Brooklyn.

Cleveland

August Steel Business Shows Upward Trend—Pig Iron Higher Following Large Buying

CLEVELAND, Aug. 21.—Orders for finished steel are holding up to the recent volume, and August business with most of the mills will show a gain over that of July. Contract buyers generally are taking their full monthly quotas. Outside mills are booking a fair amount of business in small lots of steel bars and structural material, nearly all of this business going at 1.90c., Pittsburgh. Most consumers are protected by 1.85c. contracts.

The plate market shows a firmer tone, although 1.85c. is still being named by some producers except for small lots. Cleveland mills show a firmer attitude on steel bars, but are still quoting 1.85c., mill, for desirable orders. One Ohio mill has named 2c., Pittsburgh, and 2.05c., Cleveland, for steel bars for the fourth quarter. Alloy steel bar prices have not been named for that delivery. These continue to move in very satisfactory volume and regular prices are being well maintained.

Consuming industries in this territory are keeping up to recent operations. Forge shops doing automotive work are generally running at full capacity, and the operation of a number of other industries is around 75 to 80 per cent. Activity in the building field is rather slow. Additional Union Terminal work in Cleveland will require 1400 tons and inquiries are out for several highway bridges in New York.

A number of sheet mills have followed in advancing prices for the fourth quarter.

The Cleveland furnace price on pig iron for outside delivery has been advanced 50c. a ton and other Lake furnace prices show a firmer tone.

Pig Iron.—A definite upward price trend developed in the past week on both foundry and steel making grades. The two Cleveland producers of merchant iron marked up their price on foundry and malleable iron 50c. a ton for outside shipment to \$17. While they had been holding rather closely to \$16.50 recently, \$16.25 was for some time a common price in competitive sections. For Cleveland delivery, the price is unchanged at \$17.50, furnace. Another Lake furnace has advanced the price 25c. to 50c. a ton, now quoting \$17 to \$17.50. In the Valley district, \$16.75 seems now to be the ruling minimum price. The market in Michigan, which has ranged recently from \$17.50 to \$18, is now established on an \$18 basis. The waiving or cutting in two of the silicon differentials had been a rather common practice for some time. However, with the price advance producers

announce that full differentials will be maintained. The recent purchase of basic iron by an Ohio steel maker from a Cleveland furnace indicated that grade was firm in the Valley district at \$16. Now Valley producers have advanced their asking price to \$16.50 and it seems doubtful if basic can be had at the lower figure. The American Steel Foundries is inquiring for 3000 to 5000 tons of basic iron for its Alliance, Ohio, plant for delivery up to Dec. 1. Buying of foundry and malleable iron for the remainder of the year continued at a brisk rate during the past week, and Cleveland interests sold 63,000 tons. Several sales in lots up to 500 tons or more were made at the price advance. However, it is expected that the advance will have the tendency of checking the buying movement. The order books of several furnaces are so well filled that they are not soliciting business for the remainder of the year. Shipping orders are heavy and will show considerable gain this

Warehouse Prices f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.40c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'd sheets (No. 10).....	3.25c.
No. 9 ann'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

month over those of July. The automotive industry continues to specify freely and considerable of the recent buying came from that source.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.00
S'th'n fdy., sil. 1.75 to 2.25	21.50
Malleable	18.00
Ohio silvery, 8 per cent....	28.00
Basic Valley furnace.....	\$16.00 to 16.50
Stand. low phos., V'ley furn..	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-finished Steel.—A Cleveland producer announces that it will probably name \$33, Cleveland, for sheet bars, billets and slabs for the fourth quarter, following a Youngstown mill that has announced that price f.o.b. Youngstown. Specifications continue heavy against \$32 to \$33 contracts. A northern Ohio mill has named \$39, Pittsburgh, as its price for forging billets for the fourth quarter.

Iron Ore.—The consumption of Lake Superior ore during July amounted to 4,632,907 tons, a decrease of 34,586 tons from June. The amount consumed in July, last year, was 4,294,215 tons. On Aug. 1, ore stocks at furnaces amounted to 21,823,615 tons and the total at furnaces and Lake Erie docks was 27,208,662 tons, or more than 4,000,000 tons below the stocks on the same date a year ago, when they amounted to 31,331,092 tons. Central district furnaces during July consumed 2,251,779 tons, a decrease of 53,470 tons for the month. Lake front furnaces used 2,205,262 tons, a gain of 14,237 tons for July. Eastern furnaces used 82,327 tons, a gain of 9483 tons. All-rail furnaces used 93,539 tons, a decrease of 4836 tons.

Sheets.—Several more producers have announced that their fourth quarter prices will be 2.75c. for black sheets, 2c. for blue annealed, with a 10c. per 100 lb. extra for 45 in. and wider material, 3.60c. for galvanized sheets and 4c. for auto body sheets, all Pittsburgh base. Consumers are showing no interest in fourth quarter contracts. The one-half of 1 per cent discount for cash within 10 days has also been adopted by additional manufacturers. While specifications continue good, they were not as heavy in the past week as during the previous week. Prices on black sheets are firmer, 2.65c. now being the usual minimum. Blue annealed and galvanized sheets are unchanged for current delivery, the former being available at 1.90c., Pittsburgh, and the latter at 3.45c., Valley.

Strip Steel.—Specifications for hot-rolled strip are fair, but there is little new business, as most buyers are covered through September. There is a tendency to stiffen up prices to 1.90c., Pittsburgh, for wide material for the fourth quarter. However, some of the mills seem willing to take hoop and band sizes at the prices that prevailed during the present quarter, or 2c. to 2.10c. Cold-rolled strip is rather commonly quoted at 2.65c., Cleveland, for 3 tons or over, al-

though mills are able to get 2.75c. for assorted lots.

Cold-Finished Steel Bars.—While makers generally have advanced the price \$2 a ton to 2.25c., Cleveland, some producers are giving their customers an opportunity to place orders for the remainder of the quarter at 2.15c. As most buyers were previously covered at the lower price, the advance will have little effect before October.

Wire Products.—The demand is rather slow. Price shading is still reported to \$2.50 per keg on nails and to 2.35c. per lb. on wire, but this is attributed to some jobbers who have contracts at lower prices that expire Oct. 10.

Reinforcing Bars.—Inquiry is out for 950 tons for the Lakeside Hospital buildings, Cleveland. The market continues irregular, with billet steel bars commonly quoted at 1.85c., Cleveland, or delivered at that price for local work, and rail steel bars at 1.75c., mill.

Warehouse Business.—The demand is well diversified and is about normal for August. Business from the building field is light. Regular quotations are generally being maintained.

Coke.—Specifications against foundry coke contracts show some gain, but new business is light. Prices are unchanged at \$3.50 to \$4.85 oven, for standard Connellsville foundry coke. The price of Ohio by-product foundry coke will probably be reestablished at \$7.75, Painesville, for September delivery. Heating coke is firmer, being quoted at \$2.75, ovens, at which some business has been taken for forward shipment.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues fair. Orders from the automotive industry are quite satisfactory. Rivets are moving rather slowly, but at the recent volume. Prices are well maintained.

Old Material.—Efforts of dealers and producers to get better prices for scrap are meeting with considerable success. Heavy melting steel scrap was advanced 25c. a ton in the past week and machine shop turnings and blast furnace grades were marked up 50c. a ton. These advances follow a 25c. per ton advance on some grades reported a week ago. The only sale to a consumer was 500 tons of No. 1 heavy melting steel taken by a local mill at \$14.50. The higher prices have not been established as yet by purchases by consumers, and dealers having outstanding orders are resisting the advances. However, with an advancing market the supply has become rather scarce and dealers have been forced to pay more for material for which mills are asking shipments. Dealers have paid \$13.50 for heavy melting steel and as high as \$8.25 for machine shop turnings. Those who sold short have been caught by the advance, for the prices they are now paying are as high or higher than the

prices of their outstanding orders with the mills.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$13.25 to \$13.50
No. 2 heavy melting steel.	12.75 to 13.00
Compressed sheet steel....	12.50 to 13.00
Light bundled sheet stamp'gs	11.50 to 11.75
Drop forge flashings.....	11.50 to 11.75
Machine shop turnings....	7.75 to 8.25
No. 1 railroad wrought...	11.50 to 12.00
No. 2 railroad wrought...	13.50 to 13.75
No. 1 busheling.....	10.50 to 11.00
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades	
Low phos. forging crops...	16.00 to 16.50
Low phos., billet, bloom and slab crops.....	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap....	15.50 to 16.00

Blast Furnace Grades	
Cast iron borings.....	9.50 to 9.75
Mixed bor'gs and short turn'gs	9.50 to 9.75
No. 2 busheling	9.50 to 9.75

Cupola Grades	
No. 1 cast.....	16.00 to 16.50
Railroad grate bars.....	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25

Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling.....	16.25 to 16.50

Continental Steel Corporation Acquires New Office Quarters

The Continental Steel Corporation, Kokomo, Ind., recently formed by a merger of the Kokomo Steel & Wire Co., Kokomo; the Chapman-Price Steel Co., Indianapolis, and the Superior Sheet Steel Co., Canton, Ohio, has purchased the former administration building of the Haynes Automobile Co. at Kokomo and has removed its general offices into the new quarters. The building is a two-story brick structure, containing 13,000 sq. ft. of floor space. On the first floor are located the executive, sales, purchasing and traffic departments and the second floor is given over to the accounting, statistical, pay and time and publicity departments, with some space for storage.

Desulphurizing Pig Iron With Alumina Slag

Production of high-alumina slag in the blast furnace is described in Technical Paper 425, Bureau of Mines, by T. L. Joseph, S. P. Kinney and C. E. Wood. (Brief notes on the use of such slags for high early-strength cement were printed in THE IRON AGE for June 21, page 1752.) This 32-page bulletin gives all the particulars concerning the runs and discusses the mutual interactions between slag and metal, with particular reference to desulphurization.

Members of the Electric Hoist Manufacturers Association sold about 11 per cent fewer hoists in July than in June, but the value of such orders increased 13 per cent as compared with June. Shipments were 9.4 per cent less in July than in June.

San Francisco

Alternate Bids on 7200 Tons of Plates and 22,000 Tons of Cast Pipe Taken by Utility District.

SAN FRANCISCO, Aug. 18 (*By Air Mail*).—Demand for steel products, as fall approaches, is showing some improvement and inquiries are becoming more numerous. One of the most important developments of the year is seen in the revival of oil field operations in the Santa Fe district in Los Angeles, and it is estimated that more than 60 new rigs are in the course of construction at present. This activity has resulted in a rather heavy demand for oil country goods.

Construction on the Pacific Coast so far this year has been below that of last year. Seattle, Wash., was the only city to show a gain in the valuation of permits issued in the first half of this year, compared with the total for the same period last year, the gain having been approximately \$7,000,000. Los Angeles and San Francisco showed a decrease of about \$6,000,000, and Portland, Ore., a drop of \$8,000,000.

Pig Iron.—Both sales and inquiries for foundry pig iron this week were restricted to small lots, and foundry operations have shown little or no improvement. No change in quotations has occurred.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Inquiries for reinforcing bars have increased. Awards this week exceeded 800 tons and included 225 tons for an apartment in Los Angeles. Bids will be opened on Sept. 7 for 421 tons for three spillway projects for the East Bay Municipal Utility District, Oakland, Cal. Bids on a bridge at Salem, Ore., requiring 260 tons, will be opened Sept. 4 and the State Highway Commission, at Sacramento, Cal., will let 395 tons for paving work in Sonoma County on Sept. 5. Low prices continue to prevail on out-of-stock material in the San Francisco district.

Plates.—Bids were opened this week on one of the most important projects to come up for figures this year, approximately 7200 tons of 5/16 to 3/4-in. material being called for in water distributing mains for the East Bay Municipal Utility Dis-

trict at Oakland. Alternate bids were also taken on cast iron, welded steel, lock-bar and reinforced, steel-lined concrete pipe. The engineers of the district are now at work tabulating the figures to determine just who is the low bidder. The only award of the week called for 287 tons of 14 to 22-in. welded steel pipe for Uplands, Cal., placed with the West Coast Pipe & Steel Co. of Los Angeles. The general range of prices continues at 2.25c. to 2.30c., with a few of the smaller companies quoting 2.20c., c.i.f. Pacific ports.

Shapes.—Demand for structural steel continues well sustained not only in the San Francisco district but in the Los Angeles district as well. The Pacific Coast Steel Co. was low bidder on 1400 tons for sheds for Pier 45 in San Francisco. Outstanding among new inquiries is 700 tons for an apartment in San Francisco. Mill prices on plain structural shapes are firm at 2.35c., c.i.f. Pacific ports.

Cast Iron Pipe.—Seattle has placed 200 tons of 4 and 6-in. Class B pipe for Thirty-fourth Avenue, N. W., with Fiorito Brothers and 271 tons of 48-in. Class B for a sewer in West Hanford Street, with Geo. Nelson. Bids were opened this week on 22,325 tons of 24 to 44-in. Class C pipe for the East Bay Municipal Utility District, but it is not yet known whether cast

iron or welded, lock-bar or reinforced concrete pipe will be used. The Pacific States Cast Iron Pipe Co. was low bidder on 318 tons of 2-in. Class B pipe for Los Angeles. Bids were opened this week on 114 tons of 8-in. Class B pipe for Santa Cruz, Cal., the Pacific States Cast Iron Pipe Co. being low bidder on Class 150. The United States Cast Iron Pipe & Foundry Co. was low bidder on 23,247 tons of 16 to 36-in. Classes B and C pipe for Dallas, Tex. Santa Ana, Cal., will open bids on Aug. 27 for 320 tons of 2 to 16-in. Class B pipe. San Diego, Cal., takes bids on Sept. 14 for 355 tons of 4 to 10-in. Class B. At Seattle, Wash., Tony Jakoboni was low bidder on 469 tons of 6 to 30-in. Class C pipe for the improvement of Forty-second Avenue, South, and S. A. Moceri was low on 282 tons of 6 to 12-in. Classes B and C for the improvement of Sixth Avenue, N. W.

Standard Pipe.—Distributors of standard steel pipe report a slight improvement in movement, but no outstanding sales or inquiries were noted. A decided revival of interest in oil country goods, especially well casing, has occurred, as a result of the bringing in of several gushers in the Santa Fe field in southern California. Most of the sales have been taken from the stocks of Los Angeles distributors, but it is understood these interests will replace the material at once.

Coke.—Because of the quiet conditions prevailing in the foundry field, movement of coke is by no means heavy and few large sales have been reported.

Youngstown

Specifications and Steel Production Heavy—Sheet Prices Are Uneven—Scrap Is Strong

YOUNGSTOWN, Aug. 21.—The rate of steel output in this district is still 80 per cent or higher, and the flow of specifications is so strong that producers generally feel that a reasonably full engagement of productive capacity is assured for the next 30 days at least. The Republic Iron & Steel Co. has all of its open-hearth furnaces in production, both here and at its Warren, Ohio, works. This is partly explained by the fact that at present it is banking a good many ingots at both plants to have a sufficient supply for the Warren plant for a period of six or eight weeks, when, on account of a suspension of the Trumbull-Cliffs furnace for relining and repairs, the Warren steel works will be operated on cold iron.

Incidentally, a strong market locally for scrap is due in part to some extra demands occasioned by the need of reserve supplies of steel by this company. This demand, coupled with the fact that steel works in the Canton district are so heavily engaged and are taking so much scrap that supplies originating in the Detroit district which move by rail have been going to that point, has made it

hard for either dealers or consumers to get much. The amount of Detroit scrap available for Youngstown is further limited by the fact that Cleveland and Buffalo melters are drawing heavily upon the offerings and shipping by boat. Since the water charge is much less than by rail, the companies able to ship by water are able to pay a higher price than those drawing supplies by rail. Not much scrap can move past Pittsburgh from the East, since dealers there are still actively trying to cover short sales.

The situation in scrap is having a strengthening effect upon the prices of pig iron. While business in the past week has not amounted to much, the feeling is general that pig iron is too low in relation both to costs and to the prices that scrap commands. An effort is being made to put foundry iron back to \$17, Valley furnace, for No. 2 grade, and the steel companies do not appear anxious for more business in basic grade at \$16, although a sale of 1000 tons is reported at that price.

The Youngstown Sheet & Tube Co. has announced \$33 as its fourth quarter price on sheet bars. This is an

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, 3/16-in. and over.....	3.15c.
Small angles, under 3/16-in.....	3.55c.
Small channels and tees, 3/4-in. to 2 1/4-in.....	3.75c.
Spring steel, 1/4-in. and thicker.....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, 1/2-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100-lb. keg.....	3.40

advance of \$1 a ton over the third quarter contract price. There is a good movement of sheet bars on contract, in keeping with the fact that sheet business is good, and the mills are running 85 per cent or more of capacity. An advance of \$2 a ton over what have been commonly regarded as the market prices on sheets is being sought on fourth quarter business. On current business, however, the market is no stronger than it has been and in spots is actually a shade weaker. It is no longer denied that 1.90c., base Pittsburgh, and in some cases f.o.b. Youngstown, has been done on blue annealed sheets; indeed, that price still is being quoted on business that is called desirable and 1.85c., base Youngstown, is reported to have come out on some No. 7 gage material in competition with

light plates. On galvanized sheets, the current market is still 3.40c. to 3.50c., base, and in some cases the price is f.o.b. Youngstown instead of Pittsburgh.

Bars and small shapes are well maintained in price. Contract buyers are still getting supplies at 1.85c., base, but on new business the mills are holding to 1.90c. Pipe business is good in seamless oil country goods and for oil and gas lines, but lap-welded oil well pipe and butt-welded pipe for building and construction are slow. Tin plate and strips are moving well. The outlet of the latter for the Republic Iron & Steel Co. is materially improved by its acquisition of Steel & Tubes, Inc., Cleveland, which has been using 5000 tons a month and, with new plants to be started, will take double that amount.

better than for some time past. The market is firmer at \$34 to \$35 per net ton, Birmingham, for 6-in. and larger. This price has held since early in July. Plant operations are said to be around 75 per cent, and current shipments are in excess of production. Present activity is not up to the level prevailing at this time last year. Last August there was a large carryover from the spring and early summer buying, which did not develop to the same extent this year.

Coke.—Little interest is being shown in coke. Present foundry requirements were booked some time ago, and only a small amount of spot business is coming in. Shipments are at a moderate rate. Quotations of \$5, Birmingham, for both spot and contract coke are being maintained.

Old Material.—Continued improvement in demand for No. 1 cast and steel grades is reported. No. 1 cast has been advanced 50c. a ton to \$14.50. No other price changes have yet been made. The outlook in all lines is somewhat better, and indications have been pointing upward for several weeks.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to	\$9.00
Scrap steel rails.....	11.00 to	11.50
Short shoveling turnings..	7.50 to	8.00
Cast iron borings.....		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	21.00 to	22.00
No. 1 railroad wrought...	10.00 to	10.50
Rails for rolling.....		13.00
No. 1 cast.....		14.50
Tramcar wheels	12.50 to	13.50
Cast iron carwheels.....	12.00 to	13.00
Cast iron borings, chem...	13.50 to	14.00

Birmingham

River Shipments of Pig Iron Feature Quiet Market—Scrap Stronger

BIRMINGHAM, Aug. 21.—Pig iron demand is still largely for spot delivery, with quotations at \$15.50, base. Merchant producers continue to ship in excess of their current output. Interest in the fourth quarter is passive, and practically no attention has been given it. The Tennessee company is reported to be shipping pig iron to the Orient. There have been a number of movements by barge down the Warrior River. The Warrior River service has handled so far this month about 2600 tons. Shipments have also been made on the company's own barges. The only recent change in furnace operations was by the Tennessee company, which switched Ensley No. 6 from basic to foundry. As a result, there are now nine furnaces on foundry, six on basic, one on ferromanganese and one on recarburizing iron, a total of 17. The total has remained the same for six weeks. The Republic Iron & Steel Co. is rebuilding its No. 2 furnace. The rebuilt Gulf States Steel Co. furnace is now scheduled to go back in blast about Sept. 20.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	\$15.00 to 16.00

Finished Steel.—Demand for steel is holding at a favorable rate. August tonnage, through Aug. 17, was ahead of the same period in July and also of August, last year. Sheets are active and prices are steady, no changes in quotations having been made during the past several weeks. Open-hearth furnaces in operation continue to number 14, the Tennessee company having 11 and the Gulf States Steel Co. three. Structural steel fabricators report several orders of fair tonnage. The Nashville Bridge Co. was low bidder last week for the Louisiana State bridges at Chef Menteur and the Rigolets, near New Orleans. The con-

tract, calling for 2800 tons, will be awarded this week. The Birmingham Tank Co. is beginning the manufacture of small pressure tanks and septic tanks, in addition to its principal line of storage tanks.

Cast Iron Pipe.—Some additional tonnage, in small lots, has been placed with all of the local pressure-pipe plants. The volume last week was

Buffalo

Pig Iron and Scrap Markets More Active—Steel Mills Operating at Close to Capacity

BUFFALO, Aug. 21.—Pig iron inquiry and orders have picked up. The General Fire Extinguisher Co. wants 2500 tons of foundry; the H. B. Smith Co. has an inquiry out for 2000 tons; the Whitin Machine Works has issued one for 3000 to 5000 tons; a New York State melter seeks 1000 tons. The American Car & Foundry Co. bought 300 to 500 tons for Berwick, Pa., and the American Hardware Corporation bought 625 tons of foundry and malleable. Buffalo furnaces are adopting a stiffer price policy. Two of the local furnaces will not go below \$16.50 on New England delivery and are asking full differentials. One recently sold a tonnage of No. 1X iron at \$18, furnace, for Eastern delivery. The Hanna Furnace Co. has placed another stack in blast.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic	\$16.50 to 17.00
Lake Superior charcoal.....	27.28

Finished Iron and Steel.—Mills are operating at close to capacity. A tendency toward stiffer prices on bars, shapes, plates and sheets is notice-

able. Strip steel is active and prices on hot and cold-rolled show a firmer tendency. Bins for a cement company will require 150 tons of reinforcing bars, and the flooring for the new Rand Building will take 350 tons of the same material. West Side High School, Erie, Pa., will take 500 to 600 tons of reinforcing steel.

Old Material.—A sale of about 12,000 tons of No. 1 heavy melting steel at \$15 featured a more active week. Another consumer bought 10,000 tons of heavy melting steel in Detroit for \$11.75, which means \$13.50, delivered at Buffalo. This company's previous Buffalo purchase was at \$13.75, and it

Warehouse Prices, f.o.b. Buffalo

Base per lb.

Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Scrap Prices Advance in a More Active Market—Some Fourth Quarter Pig Iron Inquiry Appears

declines to pay Buffalo dealers more than that figure. It is difficult to indicate clearly the exact market on No. 1 heavy melting steel, as two of the largest consumers are paying all the way from \$13.75 to \$15. One is not rigid on inspection in the sense that what is rejected for its purposes as heavy melting steel will be accepted under another classification. Quotations on No. 2 heavy melting steel and on hydraulic compressed are based upon the \$13.75 price for heavy melting steel paid by the largest consumer, its differential on these grades being \$1.50. On the other hand, \$14 has been paid for No. 1 busheling, though the No. 1 busheling price paid by the largest consumer of this grade is \$12.25. There have been some sales of No. 1 machinery cast at \$14.50 and some stove plate was sold at \$14.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$14.00 to \$15.00
No. 2 heavy melting steel	12.25
Scrap rails	13.00 to 13.50
Hydraulic comp. sheets	12.25
Hand bundled sheets	8.00 to 8.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.25
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.00 to 11.50
Acid Open-Hearth Grades	
R'l'd knuckles and couplers	15.00 to 15.50
R'l'd coil and leaf springs	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
Low phos. billet and bloom ends	16.00 to 16.50
Electric Furnace Grades	
Hvy. steel axle turnings	12.00 to 12.50
Short shov. steel turnings	10.00 to 10.50
Blast Furnace Grades	
Short shov. steel turnings	10.00 to 10.50
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.50 to 10.00
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	16.50 to 17.00
Iron axles	19.50 to 20.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.50 to 14.00
Locomotive grate bars	11.25 to 11.75
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	12.00 to 12.50
Malleable Grades	
Industrial	15.00 to 15.50
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50

Scrap Institute Opens Offices in New York

The Institute of Scrap Iron and Steel has opened offices at 11 West Forty-second Street, New York, with Benjamin Schwartz, director general of the new organization, in charge. It is planned to begin work immediately on the establishment of machinery for arbitration of disputes. A national conference for the adoption of a code of business practices is under consideration, the meeting to be under the auspices of the Federal Trade Commission. Efforts will also be made to organize 11 chapters of the institute in various Eastern cities. The director general of the institute is seeking suggestions from interested dealers and others in the iron and steel scrap industry.

ST. LOUIS, Aug. 21.—While purchasing of pig iron continues mainly for the present quarter, some fourth quarter inquiry has appeared, and generally melters are taking more interest in supplies. Prices are asked on 800 tons of foundry by an East Side jobbing plant for delivery through the final three months, and another fourth quarter inquiry calls for about 2500 tons. Shipments continue to make a good showing, despite reduced melt in some quarters because of hot weather. No change in prices has occurred, and the market undertone is, if anything, slightly firmer. Actual sales reported total about 5000 tons, equally divided between the leading district producer and Southern blast furnaces. The largest single transaction was 1000 tons of malleable, taken by a nearby Illinois melter for shipment during the rest of the present quarter. Implement and stove makers continue to order freely, and jobbing plants are figuring more prominently in buying than heretofore.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.
Granite City, Ill.	\$18.50 to \$19.00
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Aside from a slight quickening in demand for domestic sizes, no change has taken place in the coke situation. Deliveries of metallurgical grades are fairly satisfactory, despite curtailed melts at numerous plants, occasioned by the extreme temperatures. Fair contracting by industrial consumers for the rest of the year is reported by by-product plants. The bakery and water gas interests have contracted for slightly heavier ton-nages than at the corresponding period a year ago.

Finished Steel.—The leading district producer of sheets reports all units of its sheet division operating at full time, and a backlog sufficient to insure that pace for the next few weeks. Its plate mill is running at a 65 per cent rate. Sheet demand is above expectations and comes from a diversity of consumers. Tank plate demand suffers from apathy on the part of the oil interests. Warehousemen report August business to date very good, particularly in tubing and the general run of building material. The reinforcing bar market is featured by numerous small lettings, ranging from 25 to 75 tons. The only awards of moment reported were the following: 300 tons for a new St. Louis County building of the Ladies of the Sacred Heart, to the Laclede Steel Co.; 145 tons for Riley sewer, St. Louis, and 120 tons for new Kennard Public School, St. Louis, to the Missouri Rolling Mill Co.

Old Material.—A decidedly firmer tone has developed in scrap, and for the first time in several months specific advances were made in dealers' lists. Among the items marked up were heavy melting and shoveling steel, miscellaneous rails, switches and guards, knuckles and couplers and steel angle bars. Industrial consumers have been booking fair orders, and for the most part their scrap stocks are low. Yard stocks are also generally under the average for this season during the past five years. This fact, coupled with smaller railroad offerings, has caused the melters to take stock of their raw material supplies. Rails and rolling mill grades generally are in better demand, and more activity is noted in foundry stock. While actual buying has not gained heavily in volume, it is more diversified, and generally improved conditions from the seller's viewpoint are looked for by September. Marketing by the carriers fell sharply from totals of recent weeks. The only lists were 700 tons offered by the Gulf Coast Lines and 208 cars advertised by the Chicago, Rock Island & Pacific.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	\$11.00 to \$11.25
No. 1 locomotive tires	11.75 to 12.00
Heavy shoveling steel	11.00 to 11.25
Miscell. stand-sec. rails, includ'g frogs, sw'ches and guards, cut apart	12.50 to 13.00
Railroad springs	13.00 to 13.50
Bundled sheets	7.75 to 8.25
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.00 to 9.50
Cast iron borings	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	18.00 to 18.50
Iron car axles	25.50 to 25.75
Wrot. iron bars and trans.	18.25 to 18.75
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.50 to 13.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.50 to 12.00
No. 1 railroad cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricuilt. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galv. sheets (No. 24)	5.25c.
Blue ann'l'd sheets (No. 10)	3.60c.
Black corrug. sheets (No. 24)	4.50c.
Galv. corrug. sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, 7/16-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq. blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Boston

Further Advance in Scrap Prices—Large Inquiries for Pig Iron Are Pending

BOSTON, Aug. 21.—Although Buffalo pig iron producers have advanced prices 50c. a ton and non-competitive business has been booked at \$17 a ton, furnace, for No. 2X and at \$18 for No. 1X, iron from that district is still offered at lower prices, and there is as yet no perceptible stiffening in prices for irons made east of Buffalo. Sales in the past week were larger than those for the previous week, and indications are they will be still larger this week. The Whitin Machine Works, Whitinsville, Mass., will probably today close on 500 tons of iron, silicon 3 to 3.50 per cent, and on 500 tons of higher silicon iron; the General Fire Extinguisher Co., Providence, R. I., will buy 1000 tons of No. 2X and 1000 tons of No. 1X; a Connecticut foundry is in the market for 1200 tons of No. 2X and No. 1X; four each, mostly 2X and 1X; and several other large consumers seek 1000 tons other melters are inquiring for smaller tonnages. The General Electric Co. is asking for bids on a sizable tonnage for its New England plants.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$20.91 to \$21.41
*Buffalo, sil. 2.25 to 2.75..	21.41 to 21.91
†Buffalo, sil. 1.75 to 2.25..	19.78 to 20.28
†Buffalo, sil. 2.25 to 2.75..	20.28 to 20.78
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	22.41 to 24.27
Ala., sil. 2.25 to 2.75.....	22.91 to 24.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Shapes and Plates.—Mill prices on standard shapes and plates are stiffer than they have been in months. While some material is still being delivered on old contracts at 1.85c. per lb., base Pittsburgh, practically all new business for the current quarter is being

taken at 1.90c. For fourth quarter, 2c., Pittsburgh, is being quoted. The market is bare of sizable fabricated structural steel prospects, but most shops are well filled up with work and a great many small jobs are being taken.

Bars.—The market for steel bars is fairly active and firm at 1.90c. to 2c., base Pittsburgh. Average specifications against contracts are somewhat larger than a month ago, although many consumers continue to buy from hand-to-mouth. Prices on reinforcing steel bars are firm, with 1.90c. per lb., base Pittsburgh, the general asking price for stock lengths by mills. From local stock, less than 10-ton lots are generally 3.01½c. per lb., base, and 10-ton and larger lots, 2.61½c. to 2.71½c.

Cast Iron Pipe.—The feature of the cast iron pipe market is the volume of quiet buying. Open municipal business is scarce; 100 tons of 8-in. pipe wanted by Medford, Mass., bids closing Aug. 24, is the only tonnage reported. The United States Cast Iron Pipe & Foundry Co. has sold 150 tons of 6-in. pipe to Newton, Mass. The range on 4-in. pipe is \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and on 6-in. to 12-in., \$41.10 to \$42.10. The usual \$5 differential is asked on class A and gas pipe.

Coke.—The coke situation is unchanged. New England fuel remains at \$11 a ton, delivered within a \$3.10 freight rate zone. The demand for

foundry fuel is steadily gaining owing to an increase in the current and prospective melt of iron. The announcement that hard coal will be advanced Sept. 1 has stimulated the demand for domestic coke.

Old Material.—A further advance has occurred in prices of heavy melting steel, rails, borings, skeleton, flashings, shafting, axles, pipe and machinery cast. The advance in machinery cast is based on dwindling supplies and increased demand from New England consumers, and that on other materials is due to a better Pennsylvania steel mill demand. Now that prices have recovered somewhat, owners of material are reluctant to sell, and the tonnage of scrap moved out of New England the past week did not increase much. The export market continues fairly active at \$9.25 a ton, on dock here, for No. 1 steel, and at \$8.50 to \$8.75 for No. 2 steel. One steamer is finishing loading for Danzig and another will load next month for the same port.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$9.50 to \$9.75
Scrap T rails.....	8.50 to 9.00
Scrap girder rails.....	8.00 to 8.25
No. 1 railroad wrought...	8.50 to 9.00
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings...	5.00 to 5.50
Cast iron borings (steel works and rolling mill)...	5.50 to 6.00
Bundled skeleton, long....	7.00 to 7.50
Forge flashings.....	7.00 to 8.00
Blast furnace borings and turnings	5.00 to 5.50
Forge scrap	5.50 to 6.00
Shafting	12.00 to 12.50
Steel car axles.....	14.00 to 14.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	8.00 to 8.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$13.50 to \$14.00
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.50 to 14.50
Stove plate	10.00 to 10.50
Railroad malleable	13.50 to 14.50

Canada

Iron and Steel Business Continues at High Level for This Time of Year

TORONTO, ONT., Aug. 21.—The bet-terment that has featured business in the Canadian iron and steel industry since the beginning of this year continues. Demand has been holding at a high level.

The financial report of the Lake Superior Corporation for the year ended June 30, last, shows sales for the year at \$14,740,613, compared with \$10,775,558 for the preceding year, or a gain of 37 per cent. Orders on hand at the close of the fiscal year totaled \$3,277,183.

Ross H. McMaster, president Steel Co. of Canada, Ltd., Hamilton, Ont., has outlined a development program of the company to be carried out during the next two years, which will call for an expenditure of between \$6,000,000 and \$7,000,000, funds for which are available in the company's investment account. It has been decided to dismantle the original open-hearth installation, which was supplemented by the building of No. 2 open-

hearth department in 1915-16. The latter department will be extended. Plans also include the replacement of the present 14-in. and 10-in. rolling mills with a modern combination 10-in. and 12-in. train.

Pig Iron.—Business remains steady and local blast furnace representatives report sales at a high level for this season. Demand for merchant iron in lots from 50 to 200 tons reached a total of approximately 800 tons for the week, while inquiries call for close to 1200 tons for delivery during the next six weeks.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25.	23.10 to 23.60
Malleable	23.10 to 23.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25.	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00

Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carroll	33.00

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Structural Steel.—Sales for the week total more than 10,000 tons for the Toronto and Montreal markets alone. Upward of 35,000 tons of structural steel and 15,000 tons of reinforcing bars are involved in prospective business which is expected to be closed before winter. For the new Customs and Excise building to be erected in Toronto by the Federal Department of Public Works, 4000 tons of reinforcing steel will be required; the T. Eaton Co., Ltd., 190 Yonge Street, Toronto, will call for bids shortly for the erection of a new furniture building at College and Yonge Streets, for which between 7000 and 10,000 tons of structural steel will be needed; the Grand Central Markets Syndicate, Toronto, Ont., has a building construction program for this city requiring the use of 6000 tons of structural steel and 800 tons of reinforcing bars.

Old Material.—Shipments of heavy melting steel and turnings to the Hamilton, Ont., district are large, and although most of this is against old contracts, some new business is included. Local dealers report a steady demand for machinery cast and a few other special lines. In the Montreal territory some improvement has featured demand on domestic consumption account, but export business has declined. Dealers are purchasing both for direct shipment and for winter needs, and yards are fairly well stocked. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00
	Per Net Ton	
No. 1 machinery cast....	15.00	.....
Stove plate	9.00	.....
Standard carwheels	13.00	.....
Malleable scrap	13.00	.....

New Buffalo Plant to Make Cold-Finished Steel Bars

Bliss & Laughlin, Inc., Harvey, Ill., will shortly begin construction of a plant in South Buffalo for the manufacture of cold-finished steel bars and shafting. This plant will be similar to the one now in operation in Illinois. Paul J. Kalman is president of the company and Walter R. Howell is vice-president and general manager. Mr. Kalman is also president of the Kalman Steel Co., which has been established in the Buffalo district for many years, having taken over the plant of the Corrugated Bar Co. in 1923. The new Buffalo plant will cost \$1,000,000.

Cincinnati

Pig Iron Market More Cheerful But Business Is Light—Alabama Coke Sold at Low Prices

CINCINNATI, Aug. 21.—Sentiment in the local pig iron market is somewhat more cheerful, being influenced by the firmer tone of Lake Erie and Valley iron. The Lake Erie producers have until lately been selling freely in the Cincinnati district at \$16.50, furnace, or less, but having announced that their minimum for shipment outside the Cleveland district is now \$17, they are expected to become less of a factor in this market. The iron market is quiet, orders being mostly for small lots, and inquiries are not of outstanding size. The Peerless Mfg. Co., Louisville, Ky., is in the market for 300 tons of Southern iron, 2.25 to 2.75 per cent silicon, and another northern Kentucky melter is inquiring for 300 tons of Northern foundry iron. Both of these inquiries are for fourth quarter. There are a few other inquiries,

including one for 400 tons for an Indiana melter. The report that a Columbus, Ohio, furnace has been quoting \$16.50 in this district is said to be incorrect.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable.....	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25..	19.19
Ala. fdy., sil. 2.25 to 2.75..	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—The coke market in this immediate district and in Indiana as well has been disturbed by sales of Alabama coke at delivered prices lower than Northern competitors are said to be quoting. Prices quoted by local distributors have not been changed to meet the situation.

British Exports Fall Off, Imports Higher Decline of 9 Per Cent in Outward Movement Affected Most Items—Import Gain Was 4 Per Cent

WASHINGTON, Aug. 21.—Reversing the trend of the past few months, imports of iron and steel into Great Britain increased while exports decreased in July, according to a cablegram received by the Department of Commerce from London. Imports totaled 218,957 gross tons, against 210,405 tons in June, while exports declined to 333,079 tons from 365,890 tons.

Twelve of the 19 classifications into which the British trade is divided showed import gains, while only seven registered losses. The largest increase was in ingots and semi-finished steel, with a total of 95,344 tons in July, against 86,866 tons in June.

Losses in exports were made in 18 of the 22 classifications of this movement. The increases, where made,

were only slight, except in rails, which rose to 34,897 tons from 25,388 tons. Tin plate exports dropped to 43,584 tons from 54,615 tons, and pig iron and ferroalloys showed a decline to 32,272 tons from 39,284 tons.

Returns covering the production of pig iron and raw steel in British furnaces during July showed a decided decrease when compared with June figures. In all, 537,800 tons of pig iron was poured during July, a reduction of 25,900 tons from that made in June. The output of steel totaled only 666,900 tons, against 709,500 tons for June. The end of July saw 10 fewer blast furnaces lighted, leaving but 131 in production. The number of open-hearth furnaces in operation also decreased, dropping to 236, a decline of 26.

BRITISH FOREIGN TRADE IN IRON AND STEEL PRODUCTS (In Gross Tons)

	Imports		Exports	
	June	July	June	July
Pig iron and ferroalloys.....	7,515	5,286	39,284	32,272
Ingots, blooms, billets and slabs...	86,866	95,344	1,372	841
Iron bars, rods and angles.....	8,769	13,703	2,232	2,558
Steel bars, rods and angles.....	36,330	37,367	29,874	25,126
Structural steel	12,579	12,326	6,859	6,337
Hoops and strips.....	8,946	12,452	6,176	7,096
Plates and sheets	14,830	10,970	47,290	44,318
Galvanized sheets .....	.....	.....	54,167	51,579
Tin plate .....	.....	.....	54,615	43,584
Cast tubes, pipes and fittings.....	5,935	2,256	8,560	7,541
Wrought tubes, pipes and fittings...	5,361	4,879	22,478	20,237
Rails	861	1,007	25,388	34,897
Other railroad material.....	627	430	21,016	15,838
Wire	5,212	5,215	7,914	6,511
Wire cable and rope.....	.....	.....	1,683	2,326
Wire nails, including staples.....	5,509	5,984	184	169
Other wire manufactures.....	636	767	1,763	1,676
Nails, tacks, rivets and washers....	888	889	1,598	1,185
Bolts, nuts and screws for metal....	1,042	1,401	2,427	2,169
Iron and steel castings.....	1,240	1,618	379	265
Iron and steel forgings.....	1,128	931	140	46
All other	6,131	6,132	30,491	26,498
Total	210,405	218,957	365,890	333,079

Non-Ferrous Metal Markets

Copper Strong But Quiet, Consumers Buying Tin Actively, Lead and Zinc Firm With Buying Mod- erate

Copper.—Buying of copper by both domestic and foreign consumers has been quite heavy. Domestic users have probably contracted for 80 per cent of their September needs thus far this month, and some producers have disposed of all of their copper allotted to domestic consumption for that month. Foreign buying has been confined largely to August deliveries with some September metal sold. Very little October copper has been contracted for. Sales for export have averaged at least 50,000 tons per

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Aug. 21	Aug. 20	Aug. 18	Aug. 17	Aug. 16	Aug. 15
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.....	47.87½	47.75	....	48.30	48.25	48.12½
Lead, New York.....	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

month up to August, but thus far this month probably not more than 30,000 tons has been placed under contract, according to some estimates in the trade. Prices remain firm at the levels which have prevailed since late in May: electrolytic copper at 14.75c., delivered in the Connecticut Valley, and at 15c., c.i.f. usual European ports, as the official quotation of Copper Exporters, Inc. Following a fairly active week, Monday and Tuesday the market was quiet and featureless. Lake copper is quiet but firm at 14.75c. to 14.87½c., delivered.

Tin.—Continued fairly heavy buying by consumers for comparatively nearby delivery is still the feature of the market. Sales for the week ended Saturday, Aug. 18, probably totaled

1500 tons. Sellers regard this movement as indicating that consumers are short of stocks and have postponed their buying until nearly the last moment. Dealers, on the other hand, are nervous and are doing little business. Consumers have been buying principally for spot and August delivery as well as the first half of September. Demand for all September delivery has been light and, up to Saturday, October-November-December delivery had received little attention. This was regarded as significant and as a feature of strength for the future. Monday, however, consumers again became very active, taking 500 to 600 tons, and began to absorb the later deliveries already referred to. On Tuesday at least 500 tons for de-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.00c. to 51.00c.
Tin, bar	52.00c. to 53.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	8.00c.
Lead, American pig.....	6.75c. to 7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	58.00c.
Solder, ½ and ½.....	32.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged. Zinc sheets have been quoted at 9.75c., base, since the advance of July 30, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.

Rods—	
High brass	17.00c.
Naval brass	19.75c.

Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light.....	6.00c.	7.50c.
Hvy. machine composition	9.75c.	10.75c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. turnings.....	5.00c.	5.375c.
Lead, heavy.....	5.00c.	5.375c.
Lead, tea.....	3.75c.	4.25c.
Zinc	3.00c.	3.50c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	19.25c.	
Copper, hot rolled.....	23.50c.	
Copper, cold rolled, 14 oz. and heavier	25.75c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	25.62½c.	
Copper	26.50c.	
Brazed Brass Tubes.....	27.25c.	
Brass Rods	17.00c.	

livery from September to November was sold to consumers with the market again very active. Spot Straits tin was quoted Tuesday at 47.87½c., New York. At London, Tuesday, prices fell again, following a sharp decline on Monday, and spot standard was quoted at £211 17s. 6d., future standard at £207 15s. and spot Straits at £214 17s. 6d. At Singapore, the quotation was £211 10s. per ton, with sales of 325 tons, bringing the total for the last week approximately to 1500 tons, a very large volume for Far Eastern sales. A feature of the market is that consumers have been so active recently that the premium on September over December delivery is now close to 1½c. per lb. Arrivals thus far this month have been 3350 tons, with 7730 tons reported afloat.

Lead.—Following a week of fairly steady buying, mostly of carload and small lots for spot and August delivery, the market Monday and Tuesday has been quite active. Monday is reported as one of the biggest days in some time, with Tuesday's business also active but in smaller volume. Demand on Monday was for September metal. On Tuesday, September as well as some August metal was sold, one inquiry calling for 200 tons for August delivery. Prices are firm and unchanged at 6c., St. Louis. The contract quotation of the American Smelting & Refining Co. is still 6.20c., New York.

Zinc.—Buying of prime Western zinc has been moderate but quotations have been very steady at 6.25c., East St. Louis, or 6.60c., New York. The market is featureless, each day re-

vealing a moderate amount of inquiry and buying. So far this week (Monday and Tuesday) there has been the average amount of business and inquiry. Ore was again \$40 per ton, Joplin, at the close of last week. Sales were about 9000 tons with shipments about 10,500 tons and output about 12,800 tons, leaving stocks at approximately 38,800 tons on Aug. 18, against about 36,400 tons on Aug. 11.

Antimony.—The market is stronger and stocks are becoming scarcer, with not a large amount of metal reported afloat. For spot and future delivery Chinese metal is quoted at 10.25c. and higher, duty paid, New York.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 21.—This market is quiet. Prices for tin and lead have advanced and quotations on zinc are lower. The old metal market is sluggish.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 50.50c.; lead, 6.15c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

AWARDS of only 2900 tons and new projects calling for 3700 tons both dropped below the average of recent weeks. The following awards include no jobs of outstanding size:

QUINCY, MASS., 100 tons, stores and offices, to Morrison-Stevens Co.
NEW YORK, 100 tons, miscellaneous work at Hunt's Point station of Consolidated Gas Co., to McClintic-Marshall Co.
BROOKLYN, 110 tons, Pierpont apartment hotel, to Carroll-McCreary Co., Inc.
STATE OF PENNSYLVANIA, 140 tons, road work in Bedford and Somerset counties, to Truscon Steel Co.
CHICAGO, 450 tons, rail steel, apartment building on Fullerton Parkway, to Calumet Steel Co.
CHICAGO, 360 tons, two public schools; 180 tons, to Concrete Engineering Co., and 180 tons to unnamed bidder.
CHICAGO, 135 tons, bridge for Baltimore & Ohio Railroad, to Jones & Laughlin Steel Corporation.
GALESBURG, ILL., 190 tons, reservoir, to unnamed bidder.
PEORIA, ILL., 100 tons, Young Women's Christian Association building, to Concrete Engineering Co.
SIOUX CITY, IOWA, 200 tons, building for Swift & Co., to Concrete Engineering Co.
OMAHA, NEB., 200 tons, Illinois Central elevator, to unnamed bidder.
SEATTLE, WASH., 150 tons, Second Avenue,

South, viaduct, to Northwest Steel Rolling Mills.

SEATTLE, 100 tons, two bridges for State Highway Department, to Northwest Steel Rolling Mills.

OAKLAND, CAL., 130 tons, office building at Twenty-ninth and Summit Streets, to Pacific Coast Steel Co.

LOS ANGELES, 225 tons, loft building at 1022 Santee Street, to unnamed bidder.

LOS ANGELES, 190 tons, apartment building at 1432 Hope Street, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

WALTHAM, MASS., 100 tons, hospital.

NEW YORK, 110 tons, miscellaneous work in Mott Haven yards of New York, New Haven & Hartford Railroad.

BUFFALO, 350 tons, flooring for Rand Building.

BUFFALO, 150 tons, additional bins for Bessemer Cement Co.

ERIE, PA., 500 to 600 tons, West Side High School.

EAST CHICAGO, IND., 600 tons, plant building for United States Gypsum Co.

CHICAGO, 100 tons, building for Peoples Furniture Co.

PHOENIX, ARIZ., 120 tons, two bridges for Highway Commission, at Cottonwood and Leroux, Wash.; bids Sept. 4.

SALEM, ORE., 260 tons, bridge over Mill Creek; bids Sept. 4.

PORTLAND, ORE., 160 tons, bridge over

Deschutes River near Maupin; Kuckenburg & Wittman, low bidders.

SACRAMENTO, CAL., 100 tons, paving in Sacramento County; L. C. Kaistedt, low bidder.

SACRAMENTO, 395 tons, paving in Sonoma County; bids Sept. 5.

WESTLEY, CAL., 210 tons, West Stanislaus Irrigation District; bids Sept. 1.

OAKLAND, CAL., 420 tons, South Spillway, Jackson Creek Spillway and Pardee Reservoir for East Bay Municipal Utility District; bids Sept. 7.

RAILROAD EQUIPMENT

ORDERS for 500 gondola car bodies for the Chesapeake & Ohio, and an inquiry for 100 to 200 gondola cars from the Illinois Traction System, were the outstanding developments in this market last week. The Great Northern is in the market for 10 locomotives, and six locomotives have been placed for export to three countries. Details of the week's business follows:

Great Northern is in the market for 10 mallet type locomotives.

Chesapeake & Ohio has ordered 300 hopper bottom gondola car bodies and repairs to trucks from Richmond Car Works and 200 similar units from American Car & Foundry Co.

Illinois Traction System, Springfield, Ill., is inquiring for from 100 to 200 composite gondola cars of 50 tons' capacity.

Chilean State Railways is inquiring for 20 passenger coaches.

American Railroad of Porto Rico expects to purchase 100 20-ton cane cars.

Chicago, St. Paul, Minneapolis & Omaha is inquiring for six additional gas-electric rail motor cars.

Kwang Tung Yueh Han, Canton, China, has ordered two 4-8-2-type locomotives from Baldwin Locomotive Works.

Mogyana Railway, Brazil, has ordered two 4-6-0-type locomotives from American Locomotive Co.

National Railways of Mexico has ordered two 4-6-2 locomotives from American Locomotive Co.

Illinois Central has ordered one 600-hp. oil electric locomotive from Ingersoll-Rand, Inc., and General Electric Co.

Reading Railroad is inquiring for two combination passenger and baggage gas-electric cars, three combination passenger, baggage and mail gas-electric cars and three trailers.

Cuyamel Fruit Co., New Orleans, is inquiring for 75 banana cars.

Midland Utilities Co. of Indiana has ordered two steel underframe caboose cars for service on Chicago, South Shore & South Bend from American Car & Foundry Co.

Cities Service Co. has ordered 10 tank cars from American Car & Foundry Co.

Sanitary District of Chicago has taken bids on 54 air dump cars of 30 cu. yd. capacity.

Use of the air mail between its Aurora, Ill., plant and its Pacific Coast factory at Los Angeles has made possible the production and shipment three or four days ahead of schedule of an elevator or conveyor built by the Stephens-Adamson Mfg. Co., according to C. H. Adamson, secretary of the company. The saving in time has been traced directly to the regular use of the air mail.

Fabricated Structural Steel

Brooklyn Department Store Takes 20,000 of Awards of 53,400 Tons—10,580 Tons Go for River Barges

WITH 20,000 tons for a department store building in Brooklyn and 10,580 tons required for 92 Mississippi River barges, awards of fabricated structural steel reported in the last week amounted to 53,400 tons. New projects, calling for 20,800 tons, included 7200 tons of plates for a municipal water undertaking at Oakland, Cal. Awards follow:

BOSTON, 200 tons, theater in Brighton district, to A. L. Smith Iron Works.
CAMBRIDGE, MASS., 250 tons, hospital, to New England Structural Co.
FALL RIVER, MASS., 125 tons, bank, to unnamed local fabricator.
NEW HAVEN, CONN., 1000 tons, high school, to Levering & Garrigues Co.
NEW YORK, 1500 tons, apartment house at Ninety-fourth Street and Central Park West, to Easton Structural Steel Co.
BROOKLYN, 20,000 tons, department store buildings for Abraham & Straus, to Post & McCord, Inc.; 6200 tons in first unit to be erected immediately.
BROOKLYN, 1250 tons, Pierpont apartment building, to Dreier Iron Works.
HARMON, N. Y., 250 tons, shop building for New York Central Railroad, to American Bridge Co.
ERIE RAILROAD, 250 tons, bridge at Rutherford, N. J., to Phoenix Bridge Co.
ATLANTIC CITY, N. J., 350 tons, garage for Chalfonte-Haddon-Hall, to Bethlehem Steel Co.
CARNEGIE, PA., 100 tons, mill building, for Superior Steel Corporation, to Fort Pitt Bridge Works.
PITTSBURGH, 120 tons, warehouse for Pennsylvania Railroad, to Pittsburgh-Des Moines Steel Co.
PITTSBURGH, 150 tons, Brookline public school, to McClintic-Marshall Co.
PITTSBURGH, 500 tons, Dithridge Street apartment building, to Levinson Steel Co., Pittsburgh.
PITTSBURGH, 130 tons, river barge for American Tar Products Co., to Jones & Laughlin Steel Corporation.
PITTSBURGH, 600 tons, post office and garage building, to McClintic-Marshall Co.
TOLEDO, OHIO, 135 tons, Toledo Garage; from Newton-Baxter Co., general contractor, to Massillon Bridge & Structural Co.

DETROIT, TOLEDO & IRONTON RAILROAD, 240 tons, bridge work, to McClintic-Marshall Co.
MARSHALL, ILL., 800 tons, bridge for Pennsylvania Railroad, to American Bridge Co.
WILMETTE, ILL., 100 tons, water tank, to Chicago Bridge & Iron Co.
CHICAGO, 950 tons, bridge, to Gage Structural Steel Co.
CHICAGO, 350 tons, public school, to Vanderkloot Steel Works, Chicago.
HAMMOND, IND., 550 tons, power plant, to Vierling Steel Works, Chicago.
MEMPHIS, TENN., 10,580 tons, 92 barges for Mississippi River Commission; 32 barges, 3680 tons, to Dravo Contracting Co.; 30 barges, 3450 tons, to Riter-Conley Co., and 30 barges, 3450 tons, to American Bridge Co.
BIRMINGHAM, ALA., 115 tons, Lower Tallassee Dam for Alabama Power Co., to Ingalls Iron Works.
NEW ORLEANS, 300 tons, incinerator plant, to Ingalls Iron Works.
BATON ROUGE, LA., 2800 tons, bridges, Nashville Bridge Co., low bidder.
STATE OF LOUISIANA, 4300 tons, bridge over Alchafalala River, to Mount Vernon Bridge Co.
MINNEAPOLIS, 3000 tons, Rand Building, to Minneapolis Steel & Machinery Co.
DENVER, COLO., 500 tons, public service building, to Minneapolis Steel & Machinery Co.
SEATTLE, WASH., 200 tons, Second Avenue, South, viaduct, to Nygren Brothers, Seattle.
VERNON, CAL., 230 tons, oil refining plant for Swift & Co., to McClintic-Marshall Co.
UPLANDS, CAL., 290 tons, plates, 14 to 22 in. welded pipe, to West Coast Pipe & Steel Co.
VENTURA, CAL., 570 tons, Bardsdale bridge, to McClintic-Marshall Co.

LOS ANGELES, 100 tons, studio stage for Fox Film Corporation, to McClintic-Marshall Co.
LOS ANGELES, 100 tons, studio stage on Washington Boulevard for Metro-Goldwyn-Mayer studios, to McClintic-Marshall Co.
LOS ANGELES, 100 tons, studio stage, at Universal City for Metro-Goldwyn-Mayer studios, to McClintic-Marshall Co.
RICHMOND, CAL., 300 tons, warehouse for City and Parr Terminal Co., to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WALTHAM, MASS., 350 tons, State hospital.
STATE OF MASSACHUSETTS, 250 tons, highway bridge.
NEW YORK, 1500 tons, doctor's building on East End Avenue.
NEW YORK, 1000 tons, service station for Packard Motor Co.
NEW YORK, 800 tons, public school No. 187.
NEW YORK CENTRAL RAILROAD, 500 tons, bridges at Cleveland.
PHILADELPHIA, 600 tons, hospital for University of Pennsylvania.
WASHINGTON, 550 tons, Government hangars.
QUANTICO, VA., 500 tons, marine barracks for United States Bureau of Yards and Docks.
CLEVELAND, 1400 tons, additional work for Cleveland Union Terminals Co.
DETROIT, 700 tons, building for Fisher Body Corporation.
CHICAGO, 1000 tons, First Regiment Armory.
MILWAUKEE, 1500 tons, Camp Building.
PORTLAND, ORE., 170 tons, bridge over Deschutes River; Kuckenburg & Wittman, low bidders.
OAKLAND, CAL., 7200 tons of plates, distributing mains for East Bay Municipal Utility District; bids in.
OAKLAND, 250 tons, hangar No. 4, Port Commission; Moore Drydock Co., low bidder.
OAKLAND, 170 tons, Jackson Creek Spillway for East Bay Municipal Utility District; bids Sept. 7.
SAN FRANCISCO, 1400 tons, pier shed at Pier 45; Pacific Coast Steel Co., low bidder.
SAN FRANCISCO, 600 to 700 tons, apartment building on Chestnut Street.
SAN FRANCISCO, 200 to 300 tons, I. Magnin Department Store.

Steel Castings Orders in July at 46 Per Cent Rate

WASHINGTON, Aug. 21.—Bookings of commercial steel castings in July totaled 66,714 net tons, or 46 per cent of the 144,200 tons capacity of the 129 reporting concerns, according to the Department of Commerce. Orders in June amounted to 71,745 tons, or nearly 50 per cent of capacity. July production totaled 78,397 tons, or 54 per cent of capacity, compared with 91,387 tons, or 63 per cent of capacity, in June.

Of the July orders, 20,483 tons was for railroad specialties, being 30 per cent of this class of capacity, against 22,597 tons, or 34 per cent of such capacity, in June. Orders for miscellaneous castings in July totaled

46,231 tons, or 60 per cent of capacity, against 49,148 tons, or 64 per cent of such capacity, in June.

Orders for steel castings for the seven months ended with July, amounted to 573,644 tons, compared with 611,435 tons for the corresponding period of last year.

Production of railroad castings in July totaled 27,501 tons, or 41 per cent of this class of capacity, compared with 30,742 tons, or 46 per cent of such capacity, in June. Production of miscellaneous castings in July amounted to 50,896 tons, or 66 per cent of this class of capacity, against 60,645 tons, or 79 per cent of this class of capacity, in June.

Production of castings for the seven months ended with July totaled 603,327 tons, against 627,949 tons for the corresponding period of last year.

Lebanon and Scranton Mills in New Corporation

Following ratification by stockholders of the Lebanon Iron Co., Lebanon, Pa., it is understood that a new company will be formed, which will include the Lebanon company and the recently acquired Scranton Bolt & Nut Co., Scranton, Pa. The new corporation, to be known as the Wrought Iron Co. of America, will probably be headed by Charles Hart, president Delaware River Steel Co., who has been active in reorganizing the Lebanon Iron Co. and arranging for acquisition of the Scranton company. It is reported that H. M. Clymer, general sales manager of the Lebanon company, will be vice-president of the new corporation.

PERSONAL

GEORGE M. NEWCOMER, who recently retired as first vice-president of F. L. Smidth & Co., New York, after 33 years of service, first became associated with the cement industry in 1893 as sales agent for the Aalborg Cement Co. of Denmark. In 1895 he aided in the formation of the American corporation of the F. L. Smidth Co. and had been prominent in its management until his retirement. HAROLD OSTERBERG, who has been identified with the company for 20 years, most recently as manager of its French and Belgian business, has been elected a vice-president.

JOSEPH H. DILLON, formerly chief engineer at the Coatesville, Pa., plant of the Bethlehem Steel Co., has been made assistant chief engineer at the Wisconsin Steel Works, International Harvester Co., South Chicago.

HORACE C. KNERR, consulting metallurgical engineer, Germantown, Philadelphia, is president of Metallurgical Laboratories, Inc., of Pennsylvania, 1116 West Montgomery Avenue, Philadelphia, which has been formed to specialize in the commercial heat treatment of aircraft parts. A. H. WILSON, JR., is secretary and general manager of the heat treating department, and others associated with the project are John J. Crowe, Arthur L. Collins, Charles William Potts, S. L. Gabel, Donald W. Kent, Horace Drever and Matthew M. Kennedy.

FRANÇOIS DE SAINT PHALLE has resigned as vice-president in charge of foreign sales for the Baldwin Locomotive Works and will devote his entire time to his general partnership in de Saint Phalle & Co.

HOWARD F. KULAS, who has been secretary in charge of production and manufacturing in the Cleveland division of the Midland Steel Products Co. since its formation in 1923, has been appointed vice-president with supervision of sales. J. E. MALONEY, formerly sales manager of the Cleveland plant, has been named general sales manager, succeeding W. G. Langdon, who has resigned.

JOHN W. BRAY, sales manager of the Bullard Machine Tool Co., Bridgeport, Conn., with Mrs. Bray, sailed on the Homeric, Aug. 18, for an extensive European trip. He will visit the Olympia Machine Tool Exhibit in London and will also spend time in Norway, Sweden, Germany, Belgium, Switzerland and Czechoslovakia, returning to this country late in November.

W. G. LANGDON, formerly sales manager of the Midland Steel Products Co., Cleveland, and previously sales manager of the Detroit Pressed

Steel Co., Detroit, has been appointed director of sales of the automotive parts division of the Cincinnati Ball Crank Co., Cincinnati. R. H. WALLACE, formerly manager of the Detroit plant of the Parish Mfg. Co., and more recently works manager of the Detroit plant of the Midland Steel Products Co., has been made director of manufacturing and engineering for the Cincinnati company, which will open a Detroit office at 10-253 General Motors Building on Sept. 1.

DAVID O. STEWART has been appointed St. Louis representative of the Clark Controller Co., Cleveland, and will have headquarters at 619 Bank of Commerce Building.

J. K. WISWELL of Chase, Parker & Co., Boston, dealer in mill supplies and heavy hardware, and Mrs. Wiswell, have sailed for Europe, where they will spend several weeks.

MAX EPSTEIN, founder and president of the General American Tank Car Corporation, has been elected chairman of the board, and ELIAS MAYER, for many years general counsel and vice-president, has succeeded Mr. Epstein as president.

THOMAS W. KENNEDY of the Mystic Iron Works and the Massachusetts Gas Cos., Boston, contrary to reports, is not to sever his connections with these companies. Announcement recently was made in Boston newspapers of the election of Mr. Kennedy as vice-president and secretary of the Boston Whippet Knight Corporation, and the report of his relinquishing his connections with the blast furnace was probably based on this announcement. Mr. Kennedy's connection with the automobile company is purely as an investment.

L. BLAINE SNOW, resident manager at Pittsburgh for Hickman, Williams & Co., and HENRY L. CAULKINS, who serves the company in a similar capacity at Detroit, have been made directors of the firm. Mr. Snow, who has been identified with the company for 12 years, was made Pittsburgh manager in 1919. Mr. Caulkins opened the company's Detroit office in 1923.

G. E. RANDLES, president of the Foote-Burt Co., Cleveland, has returned from a two months' trip to Europe.

WILLIAM JACOBSEN, recently associated with the Asbestos & Mineral Corporation, New York, has been appointed sales manager of the fiber department of the Keasbey & Mattison Co., Ambler, Pa., sales agent for the Bell Asbestos Mines, Inc., Thetford Mines, Quebec, Canada.

JOSEPH THOMPSON, for the last 21 years superintendent of the Steel Car Forge Co., Pittsburgh, has been appointed works manager at Hammond, Ind., for the Standard Steel Car Co., succeeding the late Emil Eiselt. JAMES H. RYAN, who has been located at the Pittsburgh office of the Standard company, has been made assistant works manager.

W. W. DEAL has been elected president of the United States Products Corporation, Birmingham, manufacturer of boiler treatments and distributor of industrial supplies. L. J. SAUERBORN continues as vice-president and general manager.

JOHN N. OSTROM, consulting bridge engineer, Chicago, has removed his office from 547 West Jackson Boulevard to the Engineering Building, 205 Wacker Drive.

ARTHUR L. TUSHBANT has been appointed director of sales for the Great Lakes Chemical Works, 5440 West Jefferson Avenue, Detroit, maker of solder, babbitt metal, lead, zinc, tin and special white metal alloys.

C. W. NIXON, who has been superintendent of the Bessemer, Ala., plant of the Central Foundry Co., has been made assistant general manager of all the company's Southern plants.

C. L. TAYLOR, chief engineer Morgan Engineering Co., Alliance, Ohio, has resigned, effective Sept. 1, to become associated with the Aetna-Standard Engineering Co., Youngstown.

HERBERT J. WATT has been appointed manager of railroad material sales for the Jones & Laughlin Steel Corporation, Pittsburgh, succeeding GEORGE D. BRANSTON. Mr. Watt has been assistant manager of the Pittsburgh district sales department.

THOMAS W. HARDY, for five years chief metallurgist of the Timken Roller Bearing Co., Canton, Ohio, has resigned to become metallurgical engineer in the Department of Mines, Ottawa, Canada.

Group Insurance for Colorado Company

Over 98 per cent of the 11,000 employees of the Colorado Fuel & Iron Co. have been signed, since July 1, for cooperative group insurance. The total amount now approximates \$20,000,000. Since the issuance of the contract, on which the company pays all costs of the insurance in excess of 60c. a month on \$1,000, there have been two death claims, both due to natural causes. The gross premium now is in excess of \$250,000 annually. The maximum protection an employee can take is \$2,000.

OBITUARY

FLOYD E. PATTERSON, secretary and treasurer and a director of the American Steel Foundries, Chicago, died on Aug. 12 at St. Luke's Hospital in that city. He was born at Yorktown, Ill., in 1859 and had devoted his entire business life to the steel and allied industries. At the formation of the American Steel & Wire Co. in 1898 he became assistant secretary and New



F. E. PATTERSON

York office manager, continuing with that company until 1902, when the American Steel Foundries was formed. He was elected secretary and treasurer of that company at its founding and retained that position until his death. He was also vice-president and a director of the Griffin Wheel Co., vice-president of the Damascus Brake Beam Co. and president and a director of the Galesburg Malleable Castings Co.

WILSON L. GOODRICH, Eastern sales representative of the A. Finkl & Sons Co., Chicago, died on Aug. 3, at the

Clinton Hotel, Springfield, Mass., after a short illness. He was born at Southington, Conn., and, when 15 years of age, entered the drop forge industry at that city, learning his trade as a die sinker. He continued in the drop forge industry until 1912, when he retired as superintendent of the Page-Storms Drop Forging Co., Chicopee, Mass. After a short period he entered the die block field and since that time had been engaged in the sale of die block and drop forge supplies. Before becoming Eastern representative for the Finkl organization four years ago, he was vice-president and sales manager of the Union Electric Steel Co.

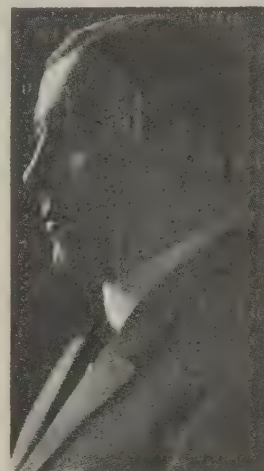
GEORGE O. BERGSTROM, president of the Bergstrom Stove Co., Neenah, Wis., manufacturer of stoves, ranges, etc., died suddenly on July 29. He was 71 years of age and had established the industry more than forty years ago.

CLARENCE H. WAHNER, superintendent Paul E. Mueller Co., Milwaukee, manufacturer of steam and vapor heating plants, died suddenly at Hanover General Hospital on Aug. 13, aged 40 years.

J. B. FORD, for a number of years associated with the Standard Supply Co., Portland, Ind., died recently at his home in Muncie, Ind., aged 69 years. He had been engaged in the sale and manufacture of machinery during the greater part of his business life.

THOMAS G. MEACHEM, for a number of years vice-president and general manager of the New Process Gear Corporation, Syracuse, N. Y., and a pioneer in the development of gears for the automotive industry, died on Aug. 17 at the Mount Sinai Hospital,

New York, following an operation. He had been in ill health for about three months. Born at Onondaga Valley, N. Y., in 1878, Mr. Meachem attended Syracuse High School and St. John's Military Academy. In 1900 he became identified with the New Process Rawhide Co., founded by his father in 1888, which was engaged in cutting rawhide pinions and gears. The company later became the New Process Gear Corporation, and Mr. Meachem was connected with it until 1918, during the greater part of this period as vice-president and general manager. In the automotive field the company first made driving gears for early



T. G. MEACHEM

electric vehicles, but later produced an entire line of timing, transmission, differential and other gears for motor vehicles. The business was taken over by the Willys Corporation in 1918, and Mr. Meachem retired from the company. The following year, with his brother, he founded the Meachem Gear Corporation, of which he was president. When the business was sold to other interests a few years ago, Mr. Meachem retired from active business, but had continued to devote his time to other financial and civic enterprises at Syracuse. He was a member of the Society of Automotive Engineers.

Expansion in Industrial Use of Electricity

Industrial consumption of electricity is placed by *Electrical World* at 120.2 in July, compared with 116.4 in June, both being based on 100 as the monthly average of 1923-1925. Activity is considerably higher than in July, 1927, when 110.6 was reported. The average for the first seven months of 1928 was 119.9, compared with 115.7 in 1927.

An increase was shown in the metal industries group, which went from 122.7 in June to 124.2 in July. This gain came from the metal-working plants, ferrous and non-ferrous,

which advanced from 123.7 to 126.3, while rolling mills and steel plants at 121.2 remained stationary. Automobile plants, including those making parts, advanced from 136 in June to 143.7 in July. Several industries, however, showed drops, those for textiles and shipbuilding being sharp.

Chromium plated metal in sheets or strips, ready for immediate fabrication, will be marketed by the American Nickeloid Co., Peru, Ill., under the trade name "chromaloid." Articles made from this sheet metal are said to have the corrosion resistance, color and durability of the best chromium plated ware.

Sheet Steel Seaplane Hangar in Brooklyn

A sheet steel seaplane hangar, now being built by the Guaranteed Garages Corporation, Richmond Hill, N. Y., for the Brooklyn Air Transport, Inc., at Mill Basin, Brooklyn, is to be equipped with leak-proof interlocking device sheets. Every interlocking joint is equivalent to an upright, strengthening the building to carry roof load and walls and withstand storms. The hangar is designed to meet the requirements of the Dock Department or the Government and can be taken down and re-erected with 100 per cent salvage.

Sheet Sales Increase Heavily in July

Sales of steel sheets showed considerable gain in July over June, being 333,357 tons, as compared with 318,902 tons, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. However, production fell off 44,000 tons during July, and shipments decreased 30,000 tons. Sales exceeded shipments by 57,047 tons and shipments were 10,625 tons in excess of production. Unfilled orders Aug. 1 were 550,468 tons, a gain of 23,670 tons over July 1. The July report and comparisons follow:

	July	June	May
Total number of mills.....	721	721	721
Capacity per month.....	464,422	471,350	506,000
Percentage reporting.....	70.1	72.2	70.1
Sales.....	333,357	318,902	250,316
Production.....	287,885	311,629	349,367
Shipments.....	273,310	308,741	326,324
Unfilled orders	550,468	526,798	527,477
Unshipped orders.....	106,653	100,904	112,664
Unsold stocks.....	55,280	50,702	54,047
Percentages to Capacity			
Sales.....	102.4	96.5	68.5
Production.....	82.2	94.3	95.6
Shipments.....	85.5	93.4	89.3
Unfilled orders	169.1	159.4	170.4
Unshipped orders.....	32.8	30.5	30.8
Unsold stocks.....	17.0	15.3	14.8

Gain of 8 Per Cent in Building Permits

Reports from over 600 principal cities, which represent 80 per cent of the urban population of the United States, show a gain of 8 per cent in building permits during July, 1928, as compared with the same month a year ago, according to the national survey report issued by S. W. Straus & Co. The loss in July from June this year was about 8 per cent. This report does not consider particularly significant, because practically all of the plans for one and two-family houses which are to be erected during the summer months are filed in May or June. In July the total value of building permits was \$338,819,896, compared with \$313,666,388 in July, 1927, and \$368,416,737 in June, this year.

Steel Barrel Production Continued High

WASHINGTON, Aug. 21.—Production of steel barrels in July totaled 647,844 units, or 55.5 per cent of capacity, against 712,779 or 61.4 per cent of capacity in June, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. Shipments in July totaled 645,881 barrels, compared with 717,496 barrels in June, while stocks at the end of July amounted to 55,806 barrels, against 53,868 barrels at the end of June. Unfilled orders at the end of July for delivery within 30 days totaled 341,346 barrels, while at the end of June this total was 319,

443. Unfilled orders at the end of July for delivery beyond 30 days amounted to 891,066, against 840,313 at the end of June.

Production in July was the greatest yet recorded for that month. It was exceeded by the three preceding months, each of which provided, in turn, a new high record. For the seven months, production has been 4,356,436 barrels, a gain of 10 per cent over the 3,969,974 produced in the first seven months of 1927.

Automobile Production Ahead of Last Year

WASHINGTON, AUG. 21.—Production of motor vehicles in the United States in July, according to the Department of Commerce, was 390,445, of which 337,933 were passenger cars and 52,512 were trucks. This compares with 396,967 in June, of which 356,439 were passenger cars and 40,528 were trucks. Production in July of last year totaled 268,485, of which 236,868 were passenger cars and 31,617 were trucks.

For the first seven months the total has been nearly 11 per cent ahead of last year, at 2,592,592 against 2,337,459. The gain was wholly in passenger cars, which totaled 2,303,660 against 2,039,488, an increase of 13 per cent. There was a decline of 3 per cent in production of trucks, which fell from 297,971 to 288,932, despite the fact that last month's output of trucks was the highest since September, 1925.

Sharp Reduction in Foundry Equipment Orders

Orders for foundry equipment in July are reported by the Foundry Equipment Manufacturers Association at 94.8 per cent of the average monthly shipments of 1922-1924. This is a reduction of more than one-third from the 149.1 of June and is the lowest figure since last September. It compares with 89.9 a year ago. Due to exceptionally high orders in May, the three-month moving average has been about 195 for the last three months. This is the highest point which the three-month average has had in some years.

Shipments are reported at 124.8 and unfilled orders at 332.1, both on the basis of monthly shipments as above.

Wage Earners, Horsepower and Production

Study of the census of manufacturers, made by the National Industrial Conference Board, New York, shows that the average number of horsepower for each wage earner has undergone a steady increase from 2.11 in 1899 to 4.27 in 1925. Iron and steel plants are given the highest horsepower rating, at 8.83 for each wage earner, or more than double the

average. Metals and metal products have 4.21, transportation equipment 3.38, machinery 3.16 and railroad repair shops 2.06 hp. for each wage earner.

Production (reduced in each case to dollars of 1914 purchasing value) shows a fairly steady advance from \$2,992 for each wage earner in 1899 to \$4,681 in 1925. This represents an increase of 56 per cent.

Better Employment in Metal Trades

Metal trades employment in July is given an index of 101.3 by the National Metal Trades Association, Chicago. The base of 100 is the monthly average of 1925-1927. The current figure is the highest in 16 months. There was a steady decline from March, 1927, to December, and there has been a steady rise since then. Wages in manufacturing industries are given as just above 100, little change having been shown since February. Cost of living is placed at about 97, having been between that figure and 99 for a full year.

Fabricated Steel Orders and Shipments High

WASHINGTON, Aug. 20.—Orders for fabricated structural steel in July totaled 225,623 tons, or 78 per cent of the capacity of the reporting 201 firms, with monthly capacity of 290,155 tons, according to the Department of Commerce. This compares with 239,540 tons, or 81 per cent of the capacity of the 216 reporting firms, for June. Computed bookings in July were 292,500 tons, against 303,750 tons in June. Computed shipments in July totaled 273,750 tons, or 73 per cent of capacity, compared with 266,250 tons, or 71 per cent of capacity, in June.

Except for June and May, the computed bookings in July were the highest since a year ago, when a total of 345,000 tons was reached. Computed shipments for July were the highest since August, 1927.

Increase in Wholesale Prices of Commodities

Prices of commodities in July are reported by the United States Bureau of Labor Statistics at 98.3, based on the 1926 average of 100 for 550 commodities. This shows an increase from the 97.6 of June and a much greater gain over the 94.1 of a year ago. Six of the 10 major groups of commodities showed increases over June, the largest gain being 2 per cent, in foods. There were small declines in four groups, of which metals and metal products was one. These showed a drop in both iron and steel and non-ferrous metals and a stationary price situation in agricultural implements, automobiles and other metal products.

Machinery Markets and News of the Works

Orders for Machinery Steady

August Business May Not Exceed That of July but
Is Well Above Midsummer Average

AUGUST business in machine tools does not fulfill some expectations for expansion this month in preparation for fall manufacturing activities, but the average is good for midsummer, even though the total for many sellers may be less than that of last month.

Absences of executives on vacations and the growing tendency to shut down plants for one or two-week vacation periods for all employees have tended to delay the placing of orders for machines recently quoted on, but the volume of business in prospect indicates that the slack will be taken up when activities are fully resumed for the fall.

In the Chicago territory the outlook is promising, particularly because of the sustained demand from manufacturers of agricultural equipment. Gasoline engine builders are among those now inquiring for tools. Automobile companies are also prospective buyers. The Studebaker Corporation contemplates issuing a large list at an early date, and the Nash Motors Co., which is building a plant addition, may need additional equipment. Orders are expected by the Chicago trade against lists recently issued by the A. O. Smith Corporation, Milwaukee, and the Chicago, Rock Island & Pacific Railroad.

Production at machine tool plants is being held at a fairly high rate.

New York

NEW YORK, Aug. 21.—Although developments in the first half of August gave promise that machine tool buying might equal that of July, excepting the very large orders placed by the Wright Aeronautical Corporation, the past week has been relatively quiet and a falling off in sales for the month is now indicated. Absences of purchasing executives on vacations and the closing down of some plants for one or two-week vacation periods have had the result of postponing the placing of orders. Outstanding in the week's transactions was the sale of 14 special Ransom grinders by a New York company to a Western manufacturer.

Sales of the Niles-Bement-Pond Co. during the week included 18 Ransom grinders, of which 14 of special design are for a Western manufacturer. Other sales included two 6-ft. and one 4-ft. radial drill and a 48-in. carwheel boring machine. The Pratt & Whitney division reported sales of four No. 2 jig borers, seven lathes and other single tools to various companies.

Plans have been filed by New York Edison Co., Irving Place and Fifteenth Street, New York, for addition to power plant at Fourteenth Street and East River, 106 x 256 ft., to cost close to \$2,000,000. Thomas E. Murray, Inc., 55 Duane Street, is consulting engineer.

Board of Estimate, Municipal Building, New York, is arranging fund of \$37,000,000 for a sewage and garbage disposal plant on Wards Island, including pumping machinery, power equipment, unloading and conveying machinery, and other mechanical equipment, and has authorized President Miller, Manhattan Borough, to carry out preliminary surveys and prepare plans at a cost not to exceed \$650,000. City engineering department, Municipal Building, will be active in project.

Board of Trustees, Children's Village School, Dobbs Ferry, N. Y., has plans for a one-story automobile machine and mechanical shop and trade school at institution, reported to cost in excess of \$75,000 with equipment. P. B. Nichols, Depot Plaza, White Plains, N. Y., is architect.

Texas Co., 17 Battery Place, New York, has approved plans for new oil refining plant near Cody, Wyo., with initial capacity for handling about 5000 bbl. per day, including construction of 12-mile pipe line to Oregon Basin Pool, for crude oil supply. Entire project is reported to cost in excess of \$450,000 with equipment.

Ice and refrigerating machinery, power equipment, conveying machinery and other mechanical equipment will be installed in new addition to ice cream factory of Loft, Inc., Fortieth Avenue and Ninth Street, Long Island City, reported to cost in excess of \$300,000.

International Nickel Co., 67 Wall Street, New York, has arranged a fund of more than \$5,000,000 for new smelting plant of

about 3000 tons per day capacity, and concentrating plant of 4500 tons daily capacity at properties at Sudbury, Ont., to handle output of its Frood mines, and will begin superstructure for various units at early date.

Somerville Iron Works, Somerville, N. J., has work under way on a new factory branch and distributing plant at Bessemer Avenue, S. E. and Seventy-fifth Street, Cleveland, site recently acquired. It will total about 50,000 sq. ft. floor space, and is reported to cost more than \$75,000 with equipment.

Nizinite Metals Corporation, Perth Amboy, N. J., recently organized, has leased property at 303 New Brunswick Avenue, and will install new plant for chrome-zinc plating and other metal-plating work, including metallurgical laboratory. Company is capitalized at \$200,000, and headed by R. L. Tuttle, president, and Emil Stremlau, treasurer. First-noted will be in active charge of plant production.

New Jersey Lamp Works, 21 William Street, Newark, will arrange equipment and facilities at plant for extensive production of new non-glaring headlight for automobiles, recently invented and patented by Asher Maurer, president.

General Tube Co., 49 Empire Street, Newark, manufacturer of sheet iron and other tubing, is having plans drawn for a four-story addition to cost in excess of \$100,000 with equipment. Portion of structure will be used for storage and distributing service. Simon Cohen, 134 Branford Place, is architect.

Stewart Steel Products Co., New York, has removed its offices to 8 West Fortieth Street.

Imp Specialties Corporation, Schenectady, N. Y., has been organized, with capital of \$100,000, to manufacture washing machines and parts. Plant in Schenectady has been rented with privilege of purchase and production will be started this month. Company has received bids on copper and other metal parts but no contracts have been awarded.

Taintor Co., Bayonne, N. J., has let contract for construction of factory building to John W. Ferguson Co., Paterson, N. J., through Lockwood Greene Engineers, Inc., New York.

Progressive Brass Foundry Co., formerly of 3 Ainslie Street, Brooklyn, has moved to larger quarters at 408-10 Park Avenue, Brooklyn.

New England

BOSTON, Aug. 21.—It now develops that of the 50 or more tools on which Boston asked bids for its new Hyde Park district school, only 42 were purchased, the most expensive being discarded owing to lack of funds. Of the tools purchased, Stedfast & Roulston, Inc., sold six; Henry Prentiss & Co., Inc., five; Lynd-Farquhar

The Crane Market

NEW inquiry for overhead cranes is rather limited and prospective buyers are slow in placing orders. The locomotive crane field is slightly more active with fresh inquiry, particularly for crawl-tread equipment, but orders are slow in materializing. About the largest outstanding inquiry for locomotive cranes is the list from Dwight P. Robinson & Co., New York, for export to Argentina.

Among recent purchases are:

Terry & Tench Co., Inc., Grand Central

Terminal, New York, 5-ton truck crane from Browning Crane Co.

Rosenthal Engineering Contracting Co., Inc., 12 East Forty-first Street, New York, 5-ton truck crane from Browning Crane Co.

Sims Construction Co., Philadelphia, 25-ton, 8-wheel, steam-driven, locomotive crane from Browning Crane Co.

Bureau of Standards, Washington, 15-ton, 32-ft. span hand power crane from Roeper Crane & Hoist Works.

Empire Granite Co., Elberton, Ga., 7½-

ton, 30-ft. span, 2-motor, overhead crane from Roeper Crane & Hoist Works.

Canales-Grogan Granite Co., Elberton, Ga., 7½-ton, 30-ft. span, 2-motor, overhead crane from Roeper Crane & Hoist Works.

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., 2-ton, 35-ft. span, 3-motor, cage operated crane from Roeper Crane & Hoist Works.

Link Belt Co., Chicago, a 5-ton electric crane from Manning, Maxwell & Moore, Inc.

Co., 12; Reed-Prentice Corporation, one; J. G. Blount Co., seven; Brown & Sharpe Mfg. Co., five; Hendey Machine Co., three; Joseph Beal & Co., three. Pneumatic Drop Hammer Co., Boston, reports the sale of one small and nine large hammers to New York State, Ohio and Indiana manufacturers. Small tools continue to sell freely.

Homes Products, Inc., Bridgeport, Conn., recently organized to manufacture electric refrigerators under patents of Westinghouse Electric & Mfg. Co., East Pittsburgh, has leased two buildings of local plant of Remington Arms Co., and will occupy at early date for new works.

American Hardware Corporation, New Britain, Conn., has filed plans for a new addition, 30 x 56 ft.

Bird Machine Co., South Walpole, Mass., manufacturer of paper mill machinery, has completed plans for new one-story addition, reported to cost in excess of \$30,000, with equipment.

H. T. McCluskey & Sons, Inc., 525 Grand Avenue, New Haven, Conn., manufacturer of wire cloth, have asked bids on general contract for one-story addition, 42 x 60 ft., Dwight E. Smith, New Haven, is architect.

Chevrolet Motor Co., 110 Cummington Street, Boston, with headquarters at Detroit, has leased two-story and basement building now in course of erection at Vassar and Amesbury Streets, Cambridge, Mass., and will use for parts, service and repair work. Entire project is reported to cost more than \$85,000. Building is scheduled for completion in about four months.

Bids are to close this week for a 41 x 65-ft. manufacturing plant in Kendall Square, Cambridge, Mass., for the Crandall Engineering Co. Ralph T. Jackson, 44 School Street, Boston, is the architect.

Permission has been granted the Julian L'Este Co., 9 Spice Street, Boston, to make alterations and improvements to its brass foundry to cost \$3,500.

Olson Brothers, Plainville, Conn., are to build a one-story, 26 x 82 ft. plant addition for manufacture of screw machine products.

M. S. Little Mfg. Co., New Park Avenue, Hartford, Conn., is to build a one-story, 50 x 120-ft. brass foundry unit.

United States Aluminum Co., Fairfield, Conn., is to build a one and two-story office, laboratory and foundry unit, 625 x 250 ft.

Taylor-Hall Welding Corporation, formerly at 3 May Street, Worcester, Mass., is now located at 99 Hope Avenue, Worcester.

Philadelphia

PHILADELPHIA, Aug. 20.—Edward F. McHugh & Co., Kingston Station, Wilkes-Barre, Pa., have been incorporated with a capital of \$150,000 to manufacture copper moldings for store front construction and to job plate and other glass. Contracts for construction of manufacturing buildings have been let.

Milco Machine Co., Inc., Pottstown, Pa., has been formed to manufacture hat blocking machinery and kindred products. Products will be made in company's own factory and pipe fittings, valves, etc., will be purchased.

Contract has been let by Brown Instrument Co., Roberts Street and Wayne Avenue, Philadelphia, manufacturer of pyrometers and other recording instruments, to Robert E. Lamb Co., 841 North Nineteenth Street, for one-story addition to power house. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Lester C. Bosler, 269 West Rittenhouse Street, Philadelphia, and associates have organized Automatic Appliances Co., to operate local plant for manufacture of tools and other metal appliances, and will begin production at early date. Morris E. Van Vliet, 436 East Mount Carmel Street, Glenside, Pa., is also interested in new company.

Sleight Metallic Ink Co., 538 North Third Street, Philadelphia, has acquired property at 717-19 West Congress Street, Chicago, 50 x 112 ft., and plans early construction of two-story factory branch and distributing plant to cost about \$35,000.

Philadelphia & West Chester Traction Co., Sixty-ninth and Market Streets, Philadelphia, has awarded general contract to John N. Gill Co., City Center Building, for one-story mechanical shop.

Arrangements have been made by Cramp-Morris Industrials, Inc., Richmond and Norris Streets, Philadelphia, for occupancy of portion of former shipyard of William Cramp & Sons Ship & Engine Building Co., one of its subsidiaries, by De La Vergne Machine Co., manufacturer of ice-making and refrigerating machinery, another division of same parent company, which heretofore has operated main plant at foot of East 138th Street, New York. Marine machine shops and adjoining mechanical units at shipyard will be used by last-noted company, which will remove present works to new location and provide additional equipment for increased output. New plant is scheduled to be ready for service early in November. Company has disposed of New York plant to R. Hoe & Co., Inc., 504 Grand Street, that city, manufacturer

of printing presses, saws, etc., which will remodel and improve for new main factory.

Board of Education, Sellersville, Pa., is said to be planning installation of manual training equipment in new two-story high school at Fifth and Church Streets, estimated to cost \$165,000, for which plans will be drawn by William Martin, duPont Building, Wilmington, Del., architect.

Carlisle Engineering Works, Carlisle, Pa., recently organized by Thomas MacDonald, Carlisle, and associates, with capital of \$50,000, plans early operation of local plant for manufacture of machinery, mill equipment and other mechanical products. Walter C. Stephens, Carlisle, is also interested in new company.

American Utilities Co., operated by Gannett, Seelye & Fleming, Inc., 602 North Second Street, Harrisburg, Pa., operating electric light and power properties in Kentucky, Arkansas, Missouri and other States, has arranged for a bond issue of \$1,000,000, portion of proceeds to be used for expansion and improvements including transmission line construction.

Lancaster Airways, Inc., Lancaster, Pa., J. P. Jones, head, has acquired tract of two acres of land on Manheim Pike, adjoining company airport, and plans early construction of new plant for manufacture of airplane motors, including parts and assembling departments, reported to cost close to \$25,000.

Reading Co., Reading, Pa., has authorized removal of its railroad shops at Seventh and Franklin Streets to another location, where increased facilities will be provided. Buildings abandoned will be leased for industrial service.

Pittsburgh

PITTSBURGH, Aug. 20.—Actual business in machine tools still is light, but the common tendency is to ascribe this condition to the vacation period and the absence from their offices of men who place orders rather than to a lack of requirements. The prospect, based upon the inquiries on which dealers are figuring, is considered bright. The Westinghouse Electric & Mfg. Co. has yet to buy some tools on its third quarter list. The Carnegie Steel Co. is expected to be in the market shortly for fabricating equipment for its new Pittsburgh warehouse to replace one which the Pennsylvania Railroad bought to get the site for an extension of its produce yard.

Plans have been filed by Board of Education, Fulton Building, Pittsburgh, for new Clifton B. Connelley trade and vocational school on Bedford Avenue, near Fullerton Street, to cost \$1,500,000 with equipment.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of enameled iron and other sanitary ware, has awarded general contract to Hossler Brothers, Tiffin, Ohio, for three-story addition to plant at Broad Avenue and Fourth Street, Tiffin, reported to cost more than \$75,000 with equipment.

Board of Education of Franklin Township, Greensburg, Pa., is said to be planning installation of manual training equipment in new high school at Newlinsburg, estimated to cost about \$130,000, for which superstructure will soon begin. J. H. Phillips, Pittsburgh, is architect.

David H. Weisberg, 22 Tannehill Street, Pittsburgh, and associates have organized new company to be known as Sun-sine Electric Co., with capital of \$25,000, to operate local plant for manufacture of electrical specialties, and will soon begin production. Morris A. Cooper, 3330 McNeill Place, is also interested in new company.

Board of Education of Hempfield Township, Jeannette, Pa., is considering installation of manual training equipment in new consolidated junior high school on West Newton Road, reported to cost \$140,000, for which plans have been completed by C. H. Sorber, First National Bank Building, Greensburg, Pa., architect.

Goldberg Iron & Steel Co., Columbus, Ohio, operated by Harry and Arthur Goldberg, has acquired an interest in former plant of Becker Steel Co., South Charleston, W. Va., recently sold under receivership proceedings, and will be active in management in connection with proposed operation of works for production of high-speed tool steels. New equipment will be installed at early date. Company will operate under name of Trojan Steel Co.

South Atlantic

BALTIMORE, Aug. 20.—Benedict Stone Co. of Maryland, Inc., Montford Avenue and Boston Street, Baltimore, has taken over one of main buildings formerly used by Bethlehem Shipbuilding Co., Fort Avenue, Locust Point district, and will remodel and equip for new stone-working plant. Present works will be removed to new location and capacity increased. J. Kemp Bartlett is vice-president. Shipbuilding company has work under way on new drydock and shops to cost more than \$1,000,000.

Pollard Cyanite Co., Burnsville, N. C., recently organized by J. A. Pollard, Burnsville, and associates is said to have plans under way for new mining and refining plant to handle capacity of about 1000 tons of raw rock material per day, estimated to cost in excess of \$450,000.

Carolina Power & Light Co., Raleigh, N. C., is concluding negotiations for purchase of municipal electric lighting plant and property at Fremont, N. C., and plans expansion in that district, including transmission line construction.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date stated) for an electric bridge crane for installation at navy yard at San Diego, Cal., specification 5713. Also, until Sept. 5, for steam-generating plant at Quantico, Va., including 400 hp. water-tube boiler, motor-driven pulverizers, pumping machinery, coal and ash

handling equipment with ash tank and traveling weigh larry, ice-making and refrigerating machinery, specification 5602.

School Board, Baltimore, plans installation of manual training equipment in proposed new Northeast junior high school at Shaffer, Sefton and Carter Avenues, where site has recently been acquired, to cost approximately \$500,000, for which William W. Emmart, Union Trust Building, architect, has been engaged to prepare plans.

Maryland Dry Dock Co., Baltimore, is carrying out expansion and improvement program at shipyard in Baltimore harbor, opposite Fort McHenry, and has completed new drydock, 80 ft. wide and 400 ft. long; additional facilities will be provided for repair and reconditioning service in connection with proposed early operation of drydock unit. Hadley F. Brown is vice-president and general manager.

Feldspar Milling Co., Bowditch, (P. O. Micaville) N. C., recently organized, will proceed with construction of new local feldspar mill on tract of land lately acquired, reported to cost more than \$100,000, with machinery, and plans to have ready for occupancy in November. Rudolph Glatly, formerly head of North State Feldspar Co., Micaville, will be in charge of construction and production at new plant. C. P. Rogers, Tryon, N. C., is president.

Drayton Mills, Spartanburg, S. C., are erecting weave building, for which Lockwood Greene Engineers, Inc., is general contractor. Structural steel will be furnished and erected by Carolina Steel & Iron Co., Greensboro, N. C., and sash and glazing will be provided by William Bayley Co., Springfield, Ohio.

Buffalo

BUFFALO, Aug. 20.—A site has been acquired at Buffalo by Bliss & Laughlin, Inc., Harvey, Ill., manufacturer of steel shafting and kindred products, for new branch mill, for which plans will soon be drawn. Initial unit will cost more than \$500,000, with machinery and will provide facilities for employment of about 150 men.

Dupont Rayon Co., River Road, Buffalo, is said to have concluded negotiations for purchase of large tract of land at Waynesboro, near Richmond, Va., as site for new multi-unit mill, to include power house, machine shop, pumping station and other mechanical departments. Entire project is reported to cost more than \$15,000,000.

International Casement Co., Hopkins Avenue, Jamestown, N. Y., manufacturer of steel casements, casement adjustments, etc., is said to have authorized immediate call for bids for new one-story addition to cost more than \$75,000, with equipment, for which plans have been completed by Beck & Tinkham, Bailey Building, architects.

Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, contemplates expansion in plant for considerable increase in present output. It is understood that details will be arranged during fall.

Rochester Empire Power Corporation, Rochester, N. Y., operating Rochester Gas & Electric Corporation and other power utilities in that district, has secured permission to acquire New York Central Electric Corporation, Perry; Elmira Water, Light and Railroad Corporation, Elmira; Marcellus Lighting Co., Geneva; and a number of other light and

power companies in neighboring sections, and will consolidate with its organization. Expansion plans are under consideration, including transmission line construction for connection with different systems, power switching stations and substations.

Department of Public Works, Municipal Building, Buffalo, is arranging for extensions in municipal airport at Cheektowaga, including hangar, repair and reconditioning shop and other units, reported to cost about \$60,000. H. Beck, Huyler Building, Buffalo, is architect.

Cleveland

CLEVELAND, Aug. 20.—Machine tool sales in this territory were quieter the past week than earlier in the month. Orders were confined to single machines. Little new inquiry developed. However, a fair amount of business is in prospect and dealers look for a more active market next month. The demand for turret lathes in single machines is holding up to recent heavy volume.

Ohio Rubber Co., Willoughby, Ohio, has placed contract with Austin Co., Cleveland, for \$50,000 plant extension for manufacture of automobile running boards.

L. D. Round, president Cleveland Chain Co., Cleveland, and associates, have purchased Bridgeport Chain Co., Bridgeport, Conn., and will operate it as a separate company as the Bridgeport Chain & Mfg. Co. Mr. Round will be president of the Bridgeport company and L. D. Hull, secretary and treasurer of the Cleveland company, will hold the same position with the Bridgeport company. Plants now controlled by the Cleveland company in addition to the Bridgeport company include the Krein Chain Co., Wapakoneta, Ohio, and the Seattle Chain & Mfg. Co., Seattle, Wash.

J. C. Virden and several associates, all of whom were connected with the J. C. Virden Co., Cleveland, which was recently moved to Philadelphia and merged with another plant, have organized a new company to manufacture residential and commercial lighting fixtures. This plant will be located in the plant formerly occupied by the Virden company at 6103 Longfellow Street, Cleveland.

Ramsey Chain Co., Albany, N. Y., has opened a branch warehouse and office at 2721 West Twenty-fifth Street, Cleveland. H. M. Davis is district manager.

McKinney Tool Co., Arabella Road and Roseland Avenue, Cleveland, has awarded general contract to A. H. Moss, Berea, Ohio, for one and two-story addition, 60 x 60 ft., and 40 x 40 ft., to cost about \$35,000, with equipment. E. G. Hoefler, Keith Building, is architect. E. W. McKinney is president.

Ohio Public Service Co., Hanna Building, Cleveland, is arranging an expansion and improvement program in plant and system at Elyria, Ohio, and vicinity, to cost about \$500,000. Work will be carried out over a two-year period.

City Council, Marion, Ohio, has acquired tract of about 100 acres of land for municipal airport, and plans construction of hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical units.

National Screw & Mfg. Co., 2440 East Seventy-fifth Street, Cleveland, has plans in progress for new one-story addition, 65 x 85 ft., to cost close to \$45,000 with equipment.

Board of School Trustees, State Normal School, Kent, Ohio, will receive bids until Aug. 31 for manual training equipment

for institution, including drill, bench grinder, lathe and other tools.

Winton Engine Co., 2116 East 106th Street, Cleveland, manufacturer of gasoline engines, Diesel combustion engines, parts, etc., recently organized to take over and expand Winton Engine Works, has arranged for sale of preferred stock to total about \$1,140,000, a portion of fund to be used for expansion and development. Company is said to have plans under way for two one-story units to cost upward of \$60,000 with equipment. George W. Codrington is president.

Board of Education, Newark, Ohio, plans installation of manual training equipment in new junior high school, estimated to cost \$225,000, for which bids are being asked on general contract until Aug. 31.

National Air Transport, Inc., Eastern Division, Riverside Drive, Cleveland, has plans for new hangar, 100 x 120 ft., with repair and reconditioning department, etc., reported to cost close to \$35,000.

Universal Crane Co. has removed its general sales offices from Cleveland to Twenty-eighth and Fulton Street, Lorain, Ohio.

American Fuel Economizer Corporation, 1100 Harter Bank Building, Canton, Ohio, has been formed to manufacture fuel economizer for high and low pressure boilers and to conduct engineering service to ascertain present efficiency of boilers. Company does not contemplate construction of new plant and purchases raw materials in open market.

St. Louis

ST. LOUIS, Aug. 20.—Century Electric Co., 1806 Pine Street, St. Louis, will proceed with construction by day labor on one-story foundry, 240 x 260 ft., at 3937 Market Street, to cost in excess of \$175,000, with equipment. E. S. Pillsbury is president.

City Council, St. Louis, has been authorized to arrange for bond issue of \$2,000,000, for establishment of municipal airport buildings and facilities, including hangars, machine and repair shops, oil storage and distributing buildings, and other mechanical units. City engineering department will be in charge.

Prest Machine Works, 303 East Grand Avenue, Oklahoma City, Okla., has awarded general contract to Reinhardt & Donovan Co., Tradesmen's National Bank Building, for one-story machine shop addition, 100 x 120 ft., for which superstructure will begin at once. Baldwin & Baldwin, Magnolia Building, are architects.

City Council, Lincoln, Neb., has sold bond issue for \$100,000, proceeds to be used for municipal airport, including hangars, repair and reconditioning shops, and other mechanical units.

Muskogee Iron Works, Frankfort and Spaulding Streets, Muskogee, Okla., has plans for new one-story foundry, 140 x 200 ft., reported to cost about \$35,000, with equipment. S. M. McManus is general manager.

Higgin Mfg. Co., 1820 Lydia Street, Kansas City, Mo., manufacturer of weatherstrips, screens, etc., has leased building at 505 West Twenty-fifth Street, and will occupy for expansion. Equipment will be installed at early date.

Radium Springs Water Co., 1316 Oak Street, Kansas City, Mo., is planning construction of new factory and plans

early purchase of sterilizing, bottling, conveying and other mechanical equipment.

Chicago

CHICAGO, Aug. 20.—Miscellaneous orders for machine tools are holding August sales at, or a trifle above, the July rate, making the last two weeks the best early August period a number of Chicago dealers have ever had. Farm implement manufacturers, though heavy buyers in recent months, are now in need of additional equipment, some of which is for special purposes. Gasoline engine builders are also in the market. Studebaker Corporation, South Bend, Ind., has made several small inquiries and contemplates issuing a large list at an early date. Nash Motors Co., Racine, Wis., is building a plant addition. Lists of the A. O. Smith Corporation, Milwaukee, and the Chicago, Rock Island & Pacific are active and orders are expected by the trade at an early date. Fresh inquiry is holding up well and it portrays a favorable outlook for the remainder of this month. Used machines are moving in fair volume and at good prices.

Leinert Valve Co., 310 South Michigan Avenue, Chicago, has received an order from one of the large steel companies in Germany for Leinert patented automatic plate valves for blast furnace blowing engines. The company also received orders from the same source for gas blowing engine piston rings of 1500 mm. diameter, 2000 meters of wire rope 1 11/32-in. diameter and 66,000 kg. tensile strength.

Plans are reported as being under way for the construction of a pipe line to supply El Paso, Tex., with natural gas from Winkler County, Texas, and Lea County, New Mexico.

International Harvester Co., 606 North Michigan Avenue, Chicago, will build factory addition, 180 x 510 ft., to cost \$170,000.

W. H. Hutchinson & Son, manufacturers of bottling machinery, will erect factory building on North Cicero Avenue, between Division and Augusta Streets, Chicago, representing an investment of \$250,000. Construction will be in charge of the Austin Co.

Wilson Steel Products Co., Chicago, will build a one-story plant, 93 x 100 ft. Fred A. Felder, 109 East Twenty-sixth Street, is architect.

Western Packing & Provision Co., 3830 South Morgan Street, Chicago, will install power equipment to cost \$200,000. B. K. Gibson, 3830 South Morgan Street, is architect.

Granger & Bollenbacher, 333 North Michigan Avenue, Chicago, architects, have preliminary plans for a two-story and basement automobile service, repair and garage building, 110 x 160 ft., at Evanston, Ill., to cost in excess of \$150,000 with equipment.

Toledo, Peoria & Western Railroad Co., Peoria, Ill., has work in progress on new engine house with repair facilities at East Peoria, Ill., to cost close to \$85,000 with equipment.

John Deere Harvester Co., Moline, Ill., has awarded general contract to J. H. Hunzinger Co., Security Building, Davenport, Iowa, for four-story and two-story addition to plow shop, estimated to cost in excess of \$200,000 with equipment.

City Council, Chicago, is considering establishment of municipal airport on Lake Michigan, foot of Madison Street,

including hangars, machine and repair shops, oil storage and distributing buildings, and other mechanical units, with entire project to cost more than \$5,000,000.

John W. Henney & Co., Freeport, Ill., manufacturers of automobile bodies, are said to be arranging for purchase of plant and business of Weatherproof Body Corporation, Corunna, Mich., and will consolidate with organization. Purchasing company is increasing capital from 100,000 to 125,000 shares, common stock, and from 25,000 to 50,000, preferred stock, no par value, portion of fund to be used for expansion.

Fox & Fox, 38 South Dearborn Street, Chicago, architects, will soon begin construction of five-story and basement automobile service, repair and garage building, 80 x 140 ft., at Eleventh and State Streets, estimated to cost in excess of \$150,000 with equipment.

Board of Education, Pekin, Ill., contemplates installation of manual training equipment in new two-story high school, estimated to cost \$325,000, for which plans are being prepared by Royer, Danely & Smith, Flat Iron Building, Urbana, Ill., architects.

R. B. Kurzon, 105 West Monroe Street, Chicago, architect, has filed plans for two-story automobile service, repair and garage building at 2546-58 South Michigan Avenue, 140 x 180 ft., to cost about \$100,000 with equipment.

Detroit

DETROIT, Aug. 20.—Contract has been let by Hupp Motor Car Co., East Milwaukee Street, Detroit, to Everett Winters Co., 1651 East Grand Boulevard, for eight-story and basement addition, reported to cost in excess of \$900,000, with equipment.

Bay City Rubber Co., Bay City, Mich., recently organized, has acquired former local plant of Wildman Rubber Co., and will occupy for manufacture of inner tubes and other rubber goods. New equipment to cost more than \$50,000 will be installed.

Pontiac Pattern & Engineering Co., Pontiac, Mich., is said to have plans nearing completion for one-story foundry, 70 x 80 ft., to cost close to \$25,000, with equipment.

Detroit Edison Co., Second Avenue, Detroit, will make extensions and improvements in automatic power switching stations at Marysville, Conners Creek, Waterman, Madison, Walker and other points, to cost more than \$1,500,000, with equipment.

General Motors Corporation, Detroit, will build one-story addition to plant at Walkerville, Ont., to be equipped primarily for manufacture of axles for Chevrolet and Pontiac automobiles, estimated to cost about \$85,000.

Walter O. Briggs, president of Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, will be head of Verville Aircraft Co., recently organized as an interest of Briggs Commercial & Development Co., of which he is president. New company will specialize in light planes for commercial service, and plans early production in former plant of Rickenbacker Motor Co., Cabot Avenue, lately secured at receivership proceedings.

Grand Rapids Store Equipment Co., Grand Rapids, Mich., recently formed by merger of Grand Rapids Show Case Co. and Welch-Wilmarth Corporation, has plans nearing completion for addition to

local plant, reported to cost more than \$75,000. Company will also carry out expansion and improvements at Portland, Ore., plant and is projecting plans for new branch on site to be selected in Texas.

United Steel & Wire Co., Oakland Avenue, Battle Creek, Mich., has awarded general contract without competition to F. J. Skidmore, 59 Guest Street, for new two-story addition, to be equipped largely for storage and distributing service, reported to cost in excess of \$40,000.

Consumers Power Co., Jackson, Mich., will build two new units to steam-operated electric generating plant at Saginaw, Mich., to cost more than \$2,500,000. A new automatic power substation will be built in same city to cost approximately \$200,000.

Wayne County Board of Supervisors, Detroit, has selected tract of land on Pennsylvania Road, about 12 miles from city, as site for new Wayne County Airport, to include construction of hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical units. Entire project is reported to cost more than \$1,000,000.

Monroe Steel Castings Co., Monroe, Mich., has installed Tate-Jones low-pressure, oil-fired, car-type annealing furnace. Car is 6 x 15 ft., with load capacity of 15 tons. Furnace is automatically controlled and is housed in addition built for purpose.

Cincinnati Ball Crank Co., Cincinnati, Ohio, on Sept. 1 will open an office at 10-253 General Motors Building, Detroit, for distribution of automotive parts.

Milwaukee

MILWAUKEE, Aug. 20.—Production of machine tools continues at an unusually high level for the season, and new business is developing in a satisfactory way. Local shops which are engaged in plant enlargement have placed the bulk of their needs, but still have some purchases to make to round out the new tooling. Inquiry from other centers is fairly active and the outlook for continued good demand is undisturbed. Complaint of a shortage of skilled machinists is general.

Globe Steel Tubes Co., 1345 Burnham Street, West Allis, Milwaukee, is starting construction work on rolling mill addition, 110 x 240 ft., one story, to cost about \$50,000. It is to be ready Oct. 1. Frank J. O'Brien is president and general manager.

National Lumber & Creosoting Co., Superior, Wis., has commissioned Roland C. Buck, Inc., local consulting engineer, to design new plant estimated to cost from \$200,000 to \$300,000. Equipment will include boring and perforating machinery, locomotive crane, gasoline locomotive, etc. George P. Rex is vice-president in charge.

Aluminum Goods Mfg. Co., Manitowoc, Wis., contemplates erection of manufacturing addition to its plant at Two Rivers, Wis., to cost \$450,000 complete. Plans are being drawn by Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago. George Vits is president.

Belle City Malleable Iron Co., Racine, Wis., is erecting addition, 77 x 100 ft., to its annealing building. C. S. Anderson is general manager.

MotoMeter Co., Long Island City, N. Y., has decided to defer until early next year the proposed enlargement of its

Western division, National Gauge & Equipment Co., LaCrosse, Wis., according to P. M. Gelatt, president of the division, upon his return from a visit to the general offices.

Wesley Steel Treating Co., 651 South Pierce Street, Milwaukee, is building a one-story fireproof addition, 45 x 51 ft., according to plans by Siebert & Kegler, architects, 230 Wisconsin Avenue, local. Charles I. Wesley is president.

A. J. Simonds, Dayton Co., Dayton, Ohio, manufacturer of cutlery, etc., has acquired controlling interest in R. J. Dowd Knife Works, Beloit, Wis., established in 1857. Enlargement of the Beloit plant is in early prospect. G. A. Dowd is general manager.

Seaman Body Corporation, Milwaukee, plans to install power equipment in connection with additions to its automobile body manufacturing plant. This company is a subsidiary of the Nash Motors Co., Kenosha, Wis.

Follen-Strom Mfg. Co. has purchased a new plant in Kenosha, Wis., where it will continue to make check and bond perforating machines.

Gulf States

BIRMINGHAM, Aug. 20.—Bids will be received by M. G. James, city secretary, Dallas, Tex., until Sept. 7 for power and pumping machinery for municipal waterworks, including two 1000 kw. turbo-generators, complete with accessories; three 300 hp. watertube boilers with auxiliary equipment; two turbine-driven pumping units with rated capacity of 15,000,000 gal. per day, with accessories; and three motor-driven pumping units with capacity of 15,000,000 gal. per day, with accessories; also, for water purification plant with capacity of 32,000,000 gal. daily, including filter piping and accessories. Plans and specifications for latter at office of David Morey, Jr., Praetorian Building, engineer. J. B. Winder, chief engineer of water department.

Board of Commissioners, Mobile, Ala., is asking bids until Sept. 4 for equipment for municipal waterworks, including two 150,000-gal. steel tanks on 75 and 100-ft. towers, respectively; two 100,000-gal. steel tanks, on 75 and 100-ft. towers; and 60,000-gal. tank on 75-ft. tower. Wright Smith is city engineer in charge.

City Commission, Jacksonville, Fla., will receive bids on revised plans on Aug. 27 for municipal machine and repair shop, and service and garage building on West Third Street, reported to cost in excess of \$65,000, with equipment. Bids recently received have been rejected.

Moody-Seagraves Co., Esperson Building, Houston, Tex., is at head of project to construct and operate a 16-in. pipe line from Winkler County, Tex., and Lea County, N. M., adjoining, to El Paso, Tex., and vicinity, about 220 miles, for natural gas supply, reported to cost more than \$2,000,000.

City Council, Oxford, Miss., is asking bids until Sept. 4, for a municipal power plant, and for 2-ton hand-operated traveling crane (recently incorrectly noted in these columns as electric-operated). Frank P. Gates, Edwards Hotel Building, Jackson, Miss., is architect and engineer.

Power equipment, conveying machinery, forced draft equipment and other mechanical equipment will be installed in new packing plant to be erected by Texas Citrus Fruit Growers' Exchange, San Benito, Tex., to cost about \$100,000.

Daltex Spring Bed Co., Dallas, Tex., recently formed by Lyle Marshall, 4905 Swiss Street, and associates, plans early operation of local plant for manufacture of metal bedsteads, springs, etc.

Cincinnati

CINCINNATI, Aug. 20.—Contract has been let by Armleder Motor Truck Co., John and Exeter Streets, Cincinnati, to Frank Hill Smith & Co., Winters National Bank Building, Dayton, Ohio, for one and three-story addition, to cost close to \$100,000 with equipment.

Wilson-Weesner-Wilkerson Co., 422 Front Street, Knoxville, Tenn., manufacturer of contractors' equipment, has plans for new one-story plant, totaling about 10,000 sq. ft. floor space, with storage and distributing unit adjoining, reported to cost approximately \$30,000 with equipment.

Board of Education, Jackson, Tenn., is considering installation of manual training equipment in new three-story and basement high school, estimated to cost \$230,000, for which bids are being asked on general contract until Aug. 27. R. A. Heavener, K. C. R. Building, is architect.

Ohmer Fare Register Co., Dayton, Ohio, is planning production on large scale of new type of ticket printing register for transportation companies, recently invented by John F. Ohmer, president, and will arrange increased facilities for this purpose.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Aug. 27, for quantities of clevis bolts, castle nuts, shear nuts, cowl pins, shackles, studs, turnbuckle assemblies, union nuts, washers, etc., circular 79; for quantity of conduit, cable and wire, circular 85.

R. E. Franklin, commissioner of public utilities, Jackson, Tenn., is asking bids until Sept. 11 for a motor-driven centrifugal deep-well pump, with controls and accessories, as per specifications at office of E. R. Dike, city engineer.

Board of Shelby County Commissioners, Memphis, Tenn., will soon begin construction of general mechanical works, machine shop, and work house, 75 x 260 ft., at Mullins Station, for county equipment, reported to cost in excess of \$100,000 with equipment.

Board of Education, Bowling Green, Ky., is considering installation of manual training equipment in proposed new junior high school, reported to cost in excess of \$250,000, for which plans will be drawn by Marr & Holman, Stahlman Building, Nashville, Tenn., architects.

Indiana

INDIANAPOLIS, Aug. 20.—Additions to cost approximately \$40,000 are being made to plant of Federal Foundry Co., Indianapolis, maker of stove castings and subsidiary of American Stove Co., St. Louis. Improvements include added shipping rooms, machine shops, sand storage bins and other storage facilities.

Portion of former plant of Midwest Engine Co., Nineteenth Street and Martindale Avenue, Indianapolis, has been leased by Eaglesfield-Link Co., Brazil, Ind., manufacturer of woodworking machinery, and new plant will be established. Heretofore company has had its machinery manufactured in outside shops, and will use new works primarily for

assembling plant, with proposed later development to include castings and parts manufacture. For present, foundry work will be given out on contract. Dick Link is president; R. D. Eaglesfield is vice-president.

Bastian-Morley Co., Laporte, Ind., manufacturer of water heaters, parts, etc., has acquired land on East Fifty-ninth Street, near Central Avenue, Los Angeles, and will have plans drawn for a Pacific Coast branch factory, reported to cost more than \$50,000 with equipment. S. J. Lonergan is vice-president in charge of production.

Smithfield Township Board of Education, Waterloo, Ind., contemplates installation of manual training equipment in two-story addition to high and grade school at Ashley, reported to cost in excess of \$300,000. E. I. Brown, First National Bank Building, Fort Wayne, Ind., is architect.

City Council, Anderson, Ind., has authorized purchase of tract of 160 acres of land for municipal airport, and will build hangars, repair and reconditioning shops, oil storage and distributing buildings. A fund of \$75,000 has been voted for project.

Studebaker Corporation, South Bend, Ind., manufacturer of automobiles, has awarded general contract to H. G. Christman & Co., 306 Notre Dame Street, for two-story engineering building unit, 240 x 432 ft., reported to cost in excess of \$200,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect.

Wheeler-Schebler Carburetor Co., Inc., 1302 Barth Avenue, Indianapolis, manufacturer of automobile accessories, has acquired adjoining property, 130 x 140 ft., and will raze present buildings on site for new one-story addition, reported to cost more than \$50,000 with equipment.

Pullman Car & Mfg. Co., Pullman, Ill., is arranging for removal of its entire engineering department to branch works at Michigan City, Ind., early in September.

Pacific Coast

SAN FRANCISCO, Aug. 17.—Los Angeles Ladder Co., 1630 South Central Avenue, Los Angeles, manufacturer of ladders, hardware products, etc., has awarded general contract to L. R. Armstrong, 144 Glendale Boulevard, for new one-story plant, 150 x 160 ft., on Alameda Street, to cost close to \$40,000 with equipment.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has made application for permission to issue preferred stock in amount of \$10,000,000, of which about \$3,500,000 will be used for expansion and improvements in power stations and system.

Arizona Edison Co., Douglas, Ariz., is planning construction of new steam-operated electric power plant at Naco, Ariz., to cost more than \$100,000 with transmission lines. Company will also build a power substation, and ice-manufacturing plant at Lowell, Ariz., to cost in excess of \$75,000.

Safety Step Ladder Co., Spokane, Wash., has filed plans for a new factory at 3301 East Sprague Street.

City Council, Los Angeles, has taken lease on Mines' Field, near Inglewood, as site for municipal airport, and has appropriated \$300,000 for development, to include hangars, machine and repair shops, oil storage and distributing buildings, etc.

Central Arizona Light & Power Co., Phoenix, Ariz., is having plans drawn for two-story equipment storage and distributing plant on South Third Avenue, with repair and mechanical facilities, estimated to cost \$100,000 with machinery. Lescher & Mahoney, Phoenix, are architects.

A Seattle firm, the name of which has not yet been publicly announced, has taken a tract of land in Brooklyn district, the industrial section of Portland, with the idea of building a \$250,000 plant within eight months, according to Dorr E. Keasey, of Keasey, Humason & Campbell, real estate dealers, who handled the transaction. The plant will be used to make logging and railway equipment and steel tanks. The site cost \$30,000.

Canada

TORONTO, ONT., Aug. 20.—Demand for machine tools continues steady and the volume of new business in prospect continues to grow. Current demand is mostly for single tools, with a few orders appearing at intervals for as many as half a dozen tools. A number of lists are being prepared and are expected to appear about the first of next month for equipment for new industrial plants now under construction. Present demand is of a diversified nature and is from many parts of the country. The demand for small tools has been showing improvement of late. Inquiries and sales are reported in better number from the mining fields.

Gale Iron Works, Ltd., A. W. Lau, manager, is asking for prices on equipment for the manufacture of steel sash, pressed steel stairs and ornamental iron work, to be installed at its recently acquired plant at Petrolea, Ont.

Canadian General Electric Co., head office, Toronto, Ont., has awarded contract to R. Sheehy & Sons, 751 George Street, Peterborough, Ont., for the erection of unit No. 1, of addition to its plant at Peterborough, Ont. Bids are now being received by E. G. Paterson, local plant superintendent, Canadian General Electric Co., Park Street, Peterborough, Ont., for the construction of unit No. 2.

Canadian Hydro-Electric Corporation, Gatineau, Que., will start work immediately on construction of a sub-station to cost \$275,000. C. Glidden is engineer.

Gatineau Power Co., subsidiary of the Canadian Hydro-Electric Corporation, Gatineau, Que., proposes to build switching station at Hull, Que., to cost \$275,000.

New Brunswick Power Co., Dock Street, St. John, N. B., has awarded contract to Sanderson & Porter, New York City, for addition to plant on Dock Street there to cost \$760,000, including equipment.

Wyndels Construction Co., Ltd., 654 Aulneau Street, St. Boniface, Man., has been awarded contract for addition to plant of Dominion Wheel & Foundries, Ltd., Archibald Street, St. Boniface, Man. Building to cost \$10,000.

Foreign

PLANS have been approved by General Motors Export Co., General Motors Building, Detroit, operated by General Motors Corporation, same address, for new assembling plant at Bombay, India, to be equipped for initial output of 100 complete automobiles per day, reported

to cost more than \$400,000 with equipment. General Motors India, Ltd., has been organized as subsidiary to carry out project, which is scheduled for completion by end of year.

Embanef Oil Syndicate, Moscow, Russia, operated under direction of Soviet Russian Government Co., is planning construction of new refining plant at Samara, on Volga River, with capacity of about 200,000 tons per year. Amtorg Trading Corporation, 165 Broadway, New York, official buying agency of Soviet Russian Government, has information regarding project.

Town Council, Johannesburg, South Africa, has authorized a fund of about \$2,400,000 for municipal expansion and improvements, including extensions in municipal power department with installation of steam turbo-generating sets and auxiliary equipment; construction of automatic power substation; underground conduit system; sewage disposal works, with pumping machinery and other mechanical equipment; and cold storage and refrigerating plant.

Secretary of Public Works, Supply and Tenders Board, Wellington, New Zealand, is asking bids until Oct. 30 for 110,000-volt transformers, 11,000-volt potential transformers, control panels, control cables, spare parts, etc., as per specifications on file.

South Manchuria Railway Co., Peking, China, is perfecting plans for early construction of new steel mill at Anshan, Manchuria, for manufacture of steel bars, black sheets, railway sleepers, steel poles, and other iron and steel products used in railroad construction and operation.

Koninkijle Nederlandsche Hoogovens en Staalfabriek, in IJmuiden, Netherlands, operating an iron and steel works, is perfecting plans for early construction of a new nitrogen plant, to be operated in conjunction with existing mills. It is purposed to organize a subsidiary company to carry out enterprise. The unit will be equipped for production of ammonia as a by-product of coke-oven gas, with equipment for combining synthetically with nitrogen from air for commercial fertilizer production.

New Trade Publications

Electrical Devices.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin G-2, dealing with groundlets and other safety circuit devices, and Bulletin G-8, describing and illustrating installations in wiring methods.

Foundry Cupola Flux.—Mathieson Alkali Works, Inc., 250 Park Avenue, New York, in a 32-page pamphlet with the title "Why Purite?" presents a series of full-page illustrated expositions of the application of its product. Purite, which is described as a development from the commercial production of sodium carbonate, or soda ash, in fused form, is employed in the foundry cupola as a flux. The text refers to its basic properties, its low melting point and its high chemical activity at cast iron temperatures.

Ventilating and Metering Equipment.—P. H. & F. M. Roots Co., Connersville, Ind. Bulletin 40-B2, dealing with the company's new positive displacement meter. Units are built in sizes with hourly capacities ranging from 100 to 1,000,000 cu. ft. per hr., and are adapted to pressures up to and including 100 lb. per sq. in. Bulletin 10-B1 is of general nature, covering blowers, gas pumps, boosters, exhausters, liquid and vacuum pumps, meters and accessories.

THE IRON AGE

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Metals Studied for Fifteen Years

Review of Achievements Since Organization of Metallurgical Division of Bureau of Standards in 1913—Much Effort Put on Developing Correct Methods of Test

BY H. W. GILLET^T*

IN 1926 the Bureau of Standards celebrated its twenty-fifth anniversary. It was a dozen years after the foundation of the bureau before its metallurgical work became grouped in a separate division, even though sections of various divisions, such as those dealing with pyrometry, were already dealing with problems of metallurgical interest.

The original six divisions of the bureau dealt with electricity, weights and measures, heat and power, optics, chemistry and mechanics, and were indeed organized with the idea of serving all industries concerned with those subjects.

The metallurgical and two other technical divisions of the bureau that were set up later were organized on a somewhat different basis. They are not so much concerned with absolute standards of measurement or facts relating to a particular science as they are with the application of known facts and the finding of new facts of interest to the industries they serve.

Dr. S. W. Stratton (then director of the Bureau of Standards, but now president of the Massachusetts Institute of Technology) selected Dr. George K. Burgess as the chief of the new division. The latter had been working for 10 years on pyrometric problems of very direct metallurgical interest. Trained both as a chemist and a physicist, he had become, from his own

interest in the metallurgical field, a metallurgist as well. He guided the destinies of the new division until he became director of the whole Bureau of Standards in 1923.

Fifteen years have now passed since the metallurgical division was formed. Instead of confining discussion merely to the fiscal year as has been customary in recent reports made to the metal industries through the pages of *THE IRON AGE*,¹ it is proposed to review some of the basic ideals that have guided the division for the past 15 years and some of the accomplishments of that period.

Funds Are Stationary

Obviously the scope of the work is limited by funds, personnel and equipment. For the past few years the direct appropriation, the funds transferred from other Government departments and the overhead expenditures for general bureau purposes have totaled about \$125,000 yearly for the metallurgical division. About this same amount will be available for 1928-29. Since the funds have remained practically stationary for several years, so has the personnel of the division.

Researchers Average Eight Years at Bureau

The division staff consists of 26 employees of professional grade qualified to do research, a small number of research associates (probably four for the coming year), 10 sub-professional assistants, a clerical staff of three and a machine shop staff of three. That is, the group consists of 45 workers.

As a rule there is a rather rapid turn-over of the staff

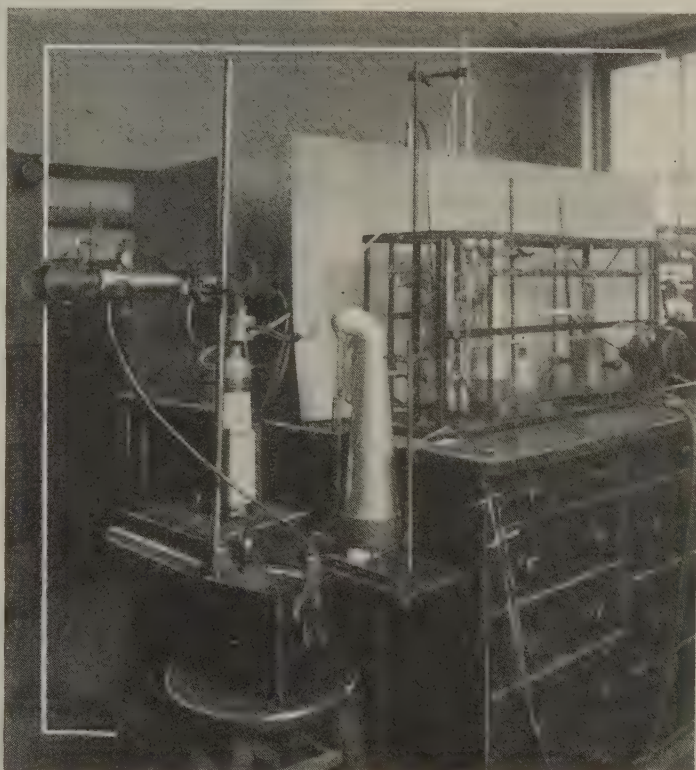


Figure 1—Improved Apparatus for Determining Gases in Metals by Vacuum Fusion. This provides for the determination of oxygen and hydrogen in a metal either gravimetrically or volumetrically, the analysis being made with circulation of gases by a mercury diffusion pump; the determination of nitrogen volumetrically; the melting of the sample under high vacuum; the loading of the furnace without relieving the vacuum

*Chief, Division of Metallurgy. Published with the approval of the director of the Bureau of Standards.

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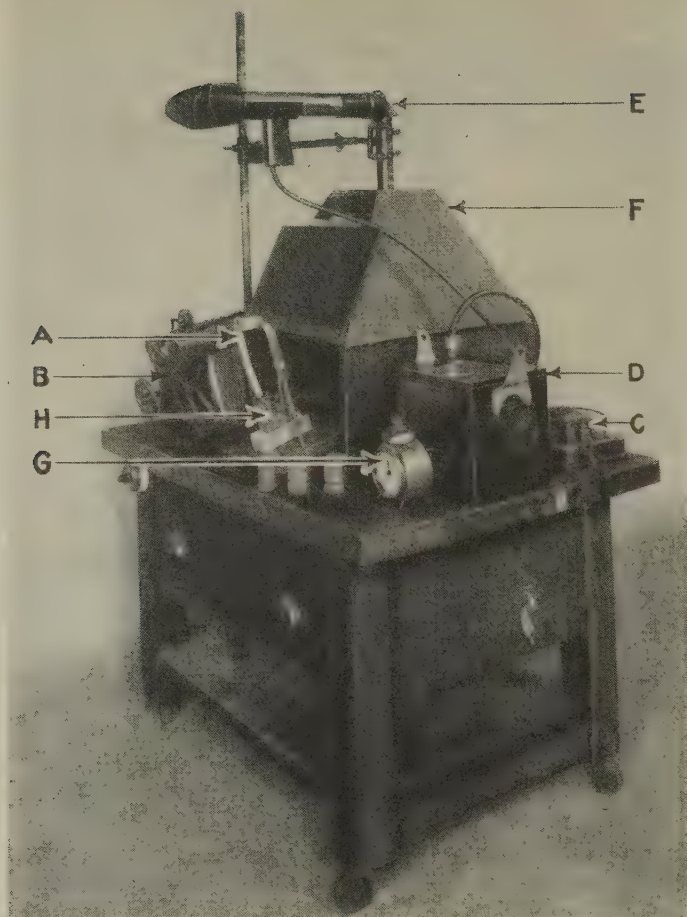


Figure 2—Apparatus for Sintering Test of Molding Sand

- A—Frame carrying platinum resistor ribbon
- B—Carbon plate resistance
- C—Ammeter
- D—Optical pyrometer meter
- E—Optical pyrometer
- F—Light-proof shield
- G—Interval timer
- H—Sand specimen

of a Government laboratory. Yet the 38 technical and clerical employees now on the staff of the metallurgical division have served there an average of six and one-half years. Six have been on the staff over 10 years. The average length of service of the 26 in the professional grade is about eight years.

Two-thirds of the entire experience gained in the work of the division is still being brought to bear on Government work, and over half of it is still available within the division. While most of the staff have spent the better part of their careers in research, they have previously done metallurgical work for 18 different firms.

Much Special Equipment Constructed

In the 15 years of its existence the division has bought much standard equipment. It has various types of electric, gas and oil furnaces and a cupola for melting steel, cast iron and the non-ferrous metals; foundry equipment, extensive furnace equipment for heat treatment and for pyrometric control of the furnaces; a forging press, a trip hammer, a 16-in. rolling mill, two small mills for special work, wire-drawing equipment, with a range from 1½ to 0.001 in. in diameter; two swaging machines with a range of 0.4 to 0.03 in. and a lathe for spinning. Alloys can therefore be made and formed as needed. The division has a variety of tensile testing machines, hardness testing devices, and other common testing machines of its own, besides easy access to the very complete equipment in the engineering mechanics section of the bureau. An especially complete set is available for the study of endurance of metals.

Besides the equipment for study of crystal structure

by X-ray methods, both slit and pin hole, and a densitometer for further study of the X-ray films, the fine radiographic equipment of the optics division has recently been augmented to make radiographs for study of defects in metals. The extensive metallographic equipment has also been augmented by a heavy microtome for preparing soft metals. A mechanical polishing apparatus has also been constructed.

In its particular fields of work it has constructed much special equipment, such as that for study of corrosion, of properties of metals at high temperatures, including bearing metals; for determination of gases in metals and for the production of the special refractories needed in that work and in the study of the properties of pure metals; for determination of critical points and for study of cooling during quenching; for the study of the metal spray process; for study of molding sand and core binders; for study of machinability and the wear of metals.

Individual Attention Given to 3600 Inquiries Yearly

Although sufficient funds, an experienced staff and complete equipment are important, little constructive work will be done by any laboratory unless this work is directed along proper lines and from the proper point of view. First and foremost, the division gets the guidance of Director Burgess, whose long service in metallurgy makes him especially conversant with its problems. Receipt every year of some 3000 letters and of visits from some 600 people asking for metallurgical information gives some idea of the type of information that is needed. For example, such a large proportion of these inquiries deals with the wear of metals that there can be no question of the need for work in that field.

The meetings of the metallurgical advisory committees, at which in 1928 over 60 practising metallurgists spent two

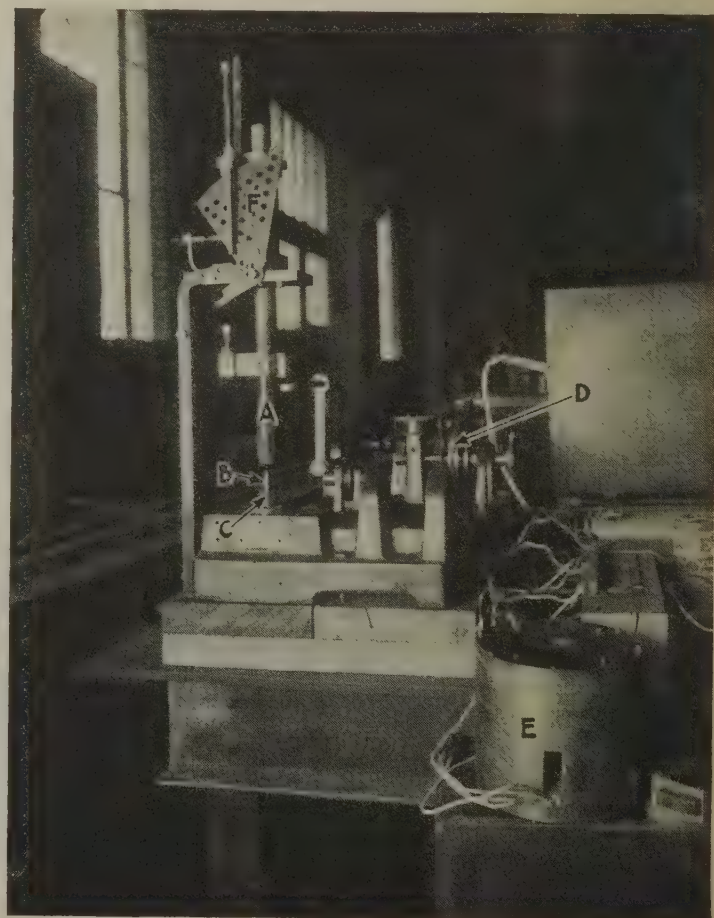


Figure 3—Machine for Repeated Pounding of Bearing Metals

The weight A is repeatedly raised by the mechanism D and dropped on the specimen B mounted on the anvil C. The mechanism F is to prevent auxiliary blows associated with the rebound of the falling weight. Tests at high temperatures are made by placing the furnace E about the specimen

days discussing with the bureau staff what had been done in the previous year and what should be done in the next, are of great service in orienting the work.

A Plant to Produce Information

The product of these men and this plant is metallurgical information. A small proportion of such information is for routine needs of Government departments; much is in the form of replies to inquiries, but the great bulk of the work is on research for publication. The list of metallurgical publications of the division itself has over 400 titles.

Some of the larger projects of the last year are: wear testing of gages, wear and other properties of railroad bearing metals, endurance of rail steel, creep in steel at high temperatures, corrosion test methods, air-hardening rivets, machinability of steel, impurities in high-speed steel, corrosion of duralumin, abnormal carburizing steel, determination of gases in metals, density of carbon steels, crystal structure, microstructure of ferrite, strain lines, protective

metallic coatings, cast iron for enameling, and an extensive revision of the circular on light alloys, besides many minor publications.

Research Associates Utilize Facilities

Inasmuch as there has been no material change in the funds available for research for the past five years and there is a slight diminution for 1928-29, the "research associate plan," by which outside agencies pay the salaries of research associates for cooperative work at the bureau, is the only method by which the available equipment and experience can be applied to a wider range of problems. Six research associates are now in attendance. These are from the American Petroleum Institute, on corrosion of metals in the oil industry; from the American Zinc Institute, aiding in the preparation of a circular on zinc; from the Steel Castings Development Bureau, on properties of steel castings; from the Bunting Brass & Bronze Co., on automotive bearing metals; from the A. M. Byers Co., on properties of wrought iron made by different puddling processes; and from the Midvale Co., on high temperature properties of special steels. This

number could be materially augmented.

Important Achievements of 15 Years

Since all the work of the past 15 years has been aimed to fill the need of science and industry for new facts and most of the problems have been urged by technical societies or groups representing industry, most of the work should have been of some commercial value.

Some accomplishments deserve special mention. The work of Burgess and co-workers (and in all that follows the co-workers deserve credit which space is lacking to give) on pyrometric problems, on the A_2 point in iron, on the manufacture of platinum of high purity, and on sound in-

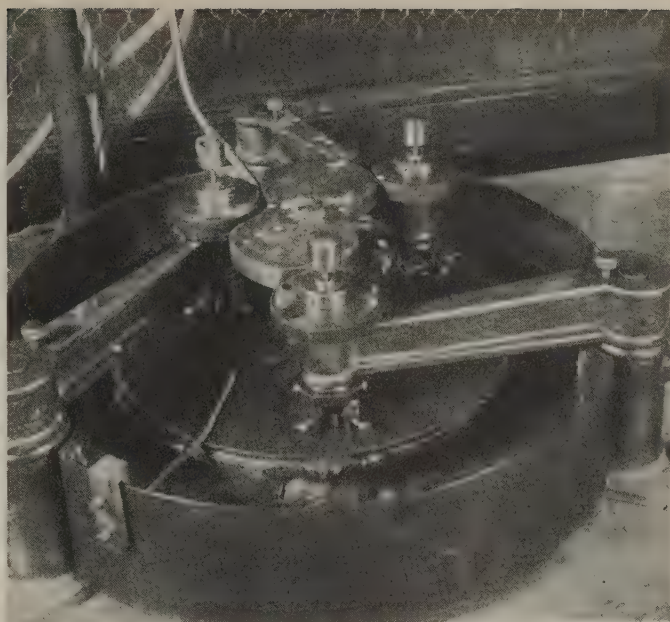


Figure 5—Top View of Automatic Polishing Machine for Metallographic Specimens

Rapidly rotating disk polishes three specimens simultaneously. Slowly moving cam at center traverses specimens across disk and also rotates them to avoid parallel scratches

got's and rails, certainly should be mentioned. Burgess' leadership in the important cooperative work on the effect of phosphorus and sulphur in steel is also well known.

Perhaps the most far-reaching bit of work done in metallurgy at the bureau was that of Merica, Waltenberg and Scott on the mechanism of the heat-treatment of duralumin, which paved the way for an understanding of precipitation-hardening and for the slip-interference theory. Jeffries and Archer have also utilized facts about the dimensional changes of steel on hardening from the work of Scott, and on the hardening of spark-fused iron from the work of Rawdon, as foundation stones in the structure of the theory of the hardening of steel. Merica and Waltenberg straightened out the problem of the malleability of nickel. Merica also added much to the understanding of internal stress and season-cracking of brass. Scott's work on the effect of nickel on the critical points of steel is also of fundamental value.

Rawdon has contributed much to knowledge of inter-crystalline corrosion, and (with Groesbeck) of metallographic methods. The work of Rawdon and Marshall on brittleness in galvanized malleable castings has had useful commercial application. Epstein's work on abnormal steel is highly creditable.

French has done pioneer work on the high-temperature properties of metals and methods of testing, has added materially to knowledge of methods for testing tool steels and machinability, and has done constructive work on wear testing and on gages. French and Klopsch's work on the mechanism of the quenching of steel has been practically applied by Smith to improve the product of the bolt industry.

Freeman has shown the alleged allotropy of zinc to be non-existent and has added to our knowledge of the properties of babbitt metal and of the endurance of rail steel.

Cain has worked on the Ledebur method for oxygen in steel and Jordan has brought close to perfection the vacuum fusion method for determining oxygen, hydrogen and nitrogen in steel and cast iron.

The work of Neville and Cain on the pure iron-carbon-manganese alloys has served as a baseline for the study of the influence of other elements in steel. The successful working by Jordan and Swanger of pure rhodium into wire

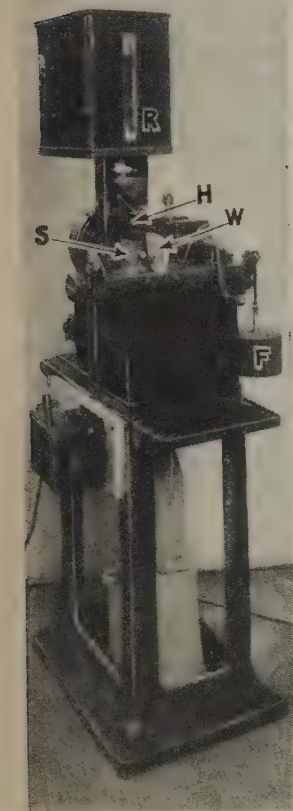


Figure 4—Brinell Wear Testing Machine

Possible application of this machine to shovel materials is now being studied. Sand from reservoir H is fed through hopper H and dragged past specimen S under pressure from weight F by wheel W

has made possible decided improvements in apparatus used by other divisions of the Bureau of Standards.

Saeger has developed methods of testing molding sand for permeability, compression and sintering point. His recent work on rubber as a core bond also deserves mention in any such list. His studies on metal spray led the metallurgical division to try to protect duralumin against corrosion and intercrystalline embrittlement by a coating of pure aluminum, a scheme recently commercialized. In the same connection, Rawdon proved the importance of cold water quenching of duralumin itself as a means of minimizing intercrystalline attack.

In looking back at this research work it is noteworthy that important advances in theory have resulted from work undertaken for purely practical purposes, and vice versa. It is the writer's belief that the distinction between "practical" and "fundamental" (i.e., theoretical) research is an artificial one and that search for experimental facts and the reasons for them is no less "fundamental" because it

happens to have angles of immediate practical importance. Nor should a question apparently of pure theory be avoided because it does not show immediate practical angles.

Present and Future Work

Most of the present work is concentrated upon fields in which the bureau has previously been working and whose importance seems demonstrated.

In all of it as much stress is being laid on the development and appraisal of suitable test methods as on the obtaining of data by those methods. Once superior methods are available, which really tell what one wants to know, producers and users will apply them to the materials they make or use, and the needed data will rapidly be collected. But in many of these fields industry is not getting these data for lack of suitable tests. It seems of more importance to the metallurgical public that the bureau concentrate on test methods rather than on getting masses of test data.

Hot Blast Invented One Hundred Years Ago

ON Sept. 11 there will be celebrated in Glasgow, Scotland, the centenary of one of the most remarkable inventions. On this day, 1828, there was granted to J. B. Neilson, a city gas works manager, patent No. 5701 for "improved application of air to produce heat in fires, forges, and furnaces where bellows or other blowing apparatus are required."

Extracts from the original specification show that Neilson had in mind the principles of good combustion and fuel economy rather than their application to any particular case.

"A blast or current of air must be produced by bellows or other blowing apparatus in the ordinary way. . . . The blast or current of air so produced is to be passed from the blowing apparatus into an air vessel or receptacle, made sufficiently strong to endure the blast, and through and from that vessel, by means of a pipe, tube or aperture, into the fire, forge or furnace. . . . At the commencement and during the continuance of the blast it (the vessel) must be kept heated artificially to a considerable temperature. It is better that the temperature be kept to a red heat or nearly so, but so high a temperature is not absolutely necessary to produce a beneficial effect. The air vessel or receptacle may be conveniently made of iron, but the effect does not depend on the nature of the material. . . . The form or shape of the vessel or receptacle is immaterial to the effect, and may be adapted to the local conditions or circumstances. The air vessel may generally be conveniently heated by a fire distinct from the fire to be affected by the blast or current of air, and generally it will be better that the air vessel and the fire by which it is heated should be inclosed in brickwork or masonry, through which the pipes or tubes connected with the air vessel should pass. The manner of applying the blast to the air vessel is, however, immaterial to the effect if it be kept at a proper temperature."

The far reaching effects of this invention on the iron industry and prosperity of the world in general have frequently been described. It marked the first step in fuel economy and consequent high output of blast furnaces; these in turn have given the world cheap iron and steel.

Stimulated Scotch Iron Making

The immediate effects of hot blast as applied to the early nineteenth century blast furnaces were truly astound-

ing. In 1829 a stove was built at the Clyde Ironworks, giving a preheat of only 300 deg. Fahr., but this resulted in the coal consumption (as coke) being reduced from 8.05 to 5.15 tons per ton of pig, together with a greatly increased output. By 1833 the blast temperature had been raised to 600 deg. Fahr. and the coal consumption (now fed into the furnaces raw to avoid heavy coking losses) had come down to 2.25 tons per ton of pig. It was not until some years later that Faber du Faur's idea (patented in 1832) of using the waste gases from the furnace to heat the blast came into general use, so the above figures include the raw coal burned under the stoves. In practice it was found that 250 lb. of coal burned under the stoves saved a ton of coal in the charge.

The resulting growth of the iron trade in Scotland following the general adoption of Neilson's patent is another indication of its importance. In 1830 the total output of all furnaces was only 37,500 gross tons, but by 1840 this had increased to over 200,000 tons.

A Product of "Industrial Research"

The invention was not a "shot in the dark," but the outcome of scientific observation and reasoning. J. B. Neilson, the son of an engine wright, was a self-educated man. After serving his apprenticeship with the firm that employed his father, he took work at the City Gas Works, Glasgow. Studying in his spare time as best he could, he rose to foreman and finally to manager. In this position he was able to establish one of the earliest industrial laboratories for works control and training his men. It was while experimenting here that he realized the importance of preheated air in combustion, though it is improbable that he realized at the time how far reaching his discovery would be. That its most important application came in another industry illustrates again the value of a sound scientific education with its wide and fruitful results.

"The Employment Interview" is the title of the second of a series of manuals of employment practice, which is being issued by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York. Methods of various companies in conducting hiring interviews are outlined in the booklet, and of particular interest is the policy of the Curtis Publishing Co., Philadelphia, in emphasizing the undesirability of over-stressing the good features of the job.

Carbonizing Dodge Parts Electrically

Parts Quenched from Pot Given 10½ to 16½ Hours' Heat
in Turret Furnace—Pot-Cooled Parts Stay Twice as
Long in Straight-Line Counterflow Furnace

IN a previous article, published in THE IRON AGE Aug. 16, page 389, it was noted that nearly all heat treating operations in the Detroit plant manufacturing Dodge motor cars have been electrified. Not only are forging and finished parts heated electrically, but carburizing is done in special types of furnaces, heated with electrical resistors. The latter equipment will now be described.

It should be understood that this modern installation does all the case hardening required, with the exception of those parts which are heated in cyanide, either for superficial case or merely for a heating out of contact with air. For such purposes 40 oil-fired cyanide pots of conventional type are retained. Parts which are quenched from the box are carburized in furnaces with rotary hearths. Work that is box-cooled is done in counterflow or recuperative furnaces, thus saving considerable heat energy.

Rotary Electric Furnaces

All parts that are to be quenched from the box at carburizing temperature are treated in three rotary-type furnaces built by the George J. Hagan Co. These are 26 ft. 3½ in. in outside diameter, 13 ft. 2 in. high above floor level and extend 5 ft. 8 in. below floor level.

The outside diameter of the rotating table is 22 ft. 8 in. and its inside diameter 12 ft.; its total loaded weight is between 60 and 70 tons. This hearth is supported by 91 1½-in. balls riding in a hardened gear race and supplemented by eight dead eyes and rollers riding on a circular track. The table is connected with a shaft projecting through the center of the furnace, on which is mounted a 6-ft. driving gear. A 1-hp. 220-volt motor, operating through a Foote Brothers speed transformer, gives a predetermined table speed of 10½, 13½ and 16½ hr. per revolution respectively in the three furnaces.

The table is equipped with 27 alloy bucks or piers equally spaced, 26 of which are active, the twenty-seventh being either unloading or loading. (These bucks support the

work 7 in. above the hearth, allowing the heat to strike the under side of the boxes. This elevated position also facilitates loading and unloading). Thus the time cycle is divided among 26 parts in the heated zone and one part for discharging and charging one pier of carburizing boxes.

After removing the hot boxes of carburized charge, the furnace operator presses the motor control button and moves the table forward until the empty buck automatically stops and indexes in front of the charging door. A baffle wall between the discharge and charging doors insulates the incoming from the outgoing boxes.

A lift-platform electric truck is used for loading. It brings five carburizing boxes from the loading platform. The truck moves into position in front of the charging door, its arms carrying the boxes are raised to the proper level, a compressed air cylinder opens the door and the truck moves forward, the arms straddling the pier. The arms are then lowered, depositing the boxes on the pier, and the truck backs away.

An interesting detail is the construction of the three-piece carburizing boxes, 11½ x 16 x 8¾ in. in dimensions. They have cast corners and

rolled alloy sides that are cast into the corners. The Dodge company finds that with this type less breakage occurs than with the more conventional cast boxes. Boxes are made of Q-alloy or a nichrome heat-resisting alloy.

Direct Labor Reduced One-Half

Each rotary furnace requires 500 kw. in five 100-kw., 220-volt, three-phase circuits arranged for three-point control. Settings on three Leeds & Northrup recorders control these circuits through their respective thermocouples; limit stops on these recorders actuate relays that control the power input switches. The first thermocouple, approximately 10 ft. from the loading door, controls two circuits and is set for 1725 deg. Fahr. The second, controlling two circuits, is at approximately one-half the travel and is set at



Fig. 1—Double-Ended Counterflow Carburizing Furnace. Two pot loads of ring gears on a single tray about to be charged into furnace

1700 deg. Fahr. The third is close to the discharge door and is set for 1650 deg. Experience in the Dodge plant has shown that the higher temperatures on the charging side reduce the heating portion of the cycle without danger of overheating the work. A saving of approximately 1½ hr. has been made in the cycle by this arrangement. Heating elements suspended from both side walls are 80:20 nickel-chromium ribbon operating at a density of approximately 8 watts per sq. in., giving a maximum temperature on the ribbon of approximately 100 deg. Fahr. higher than the furnace atmosphere as registered by the thermocouple.

These three furnaces produce the work that formerly required 26 oil-fired 10 x 11-ft. furnaces. While the heat cost is somewhat higher, it is stated that the direct labor cost of the furnace operation has been reduced one-half and that the quality of work produced approaches the ideal condition, i. e., uniform penetration of carbon and no rejects.

Hot carburizing boxes are carried from the furnace by the electric truck to motor-operated dumping machines located back of the furnaces. The box is clamped to the machine and inverted, dumping the contents on a screen, through which the carbonizing compound falls. The work slides down the screen into an oil bath.

Counterflow Carburizing Furnaces

Camshaft, ring gears, pinions and some miscellaneous parts are box-cooled. Such parts are carburized in seven counterflow-type furnaces of 159-kw. capacity, built by the Electric Furnace Co. These furnaces are 71 ft. long and have a hearth 72 in. wide, with no dividing wall. Fig. 1 shows the end door. The furnace is "double-ended," that is, it is loaded and discharged from both ends.

Furnace 11, for instance, is loaded from the near end (Fig. 1) and unloaded from the far end. Furnace 12 (not separated from No. 11 in any way) contains a row of pots moving in the opposite direction. The rows of boxes are pushed forward at a predetermined rate from opposite di-

rections, so that the discharge end of one row is alongside the charging end of the other. With this arrangement the cold boxes absorb heat as they enter from the hot boxes passing by on the other rollers.

Of the 71-ft. furnace length the preheating zone at either end is 16 ft. long. Next comes 6½ ft. of heating zone, and in the center is the holding zone, 26 ft. in length. The power for the holding zone is 49 kw. and for each heating zone 55 kw. These three zones are separately controlled, and are powered top and bottom with T-grid elements. Current is transformed from a 220-volt, three-phase circuit, a single-phase to each zone, to obtain the required current density on the heating element. Fig. 2 shows the automatic control operating from Leeds & Northrup recorders.

Packing and discharging is done on roller tables at the side of the furnaces shown in Fig. 3. As shown at the left, the boxes are packed with work and carbonizing compound and a tight-fitting cover is placed. Then the box is moved forward into a roll-over device and emerges on the far side upside down—the lid now forms the base on which have been cast the lugs necessary to keep the track through the furnace. A narrow-gage truck carrying a roller table then transports one loaded box to the furnace end, as shown in Fig. 1. When the truck is in the proper position at the charging point, it is locked in place, the door is opened and the pot is shoved into the furnace. A cooling box may also be withdrawn from the other row at the same time.

Six rows of Q-alloy rollers are placed in each furnace, as shown in Fig. 1. Each pot-base is attached to the pot just ahead by an inverted U link, and the string is moved through the furnace by a hydraulic pusher mechanism manufactured by the Oilgear Co. Time is regulated by the setting on a Stromberg clock.

Boxes which have passed through the furnace are trucked to the racks shown in the left foreground of Fig. 3. After further cooling, the pots are lifted and contents

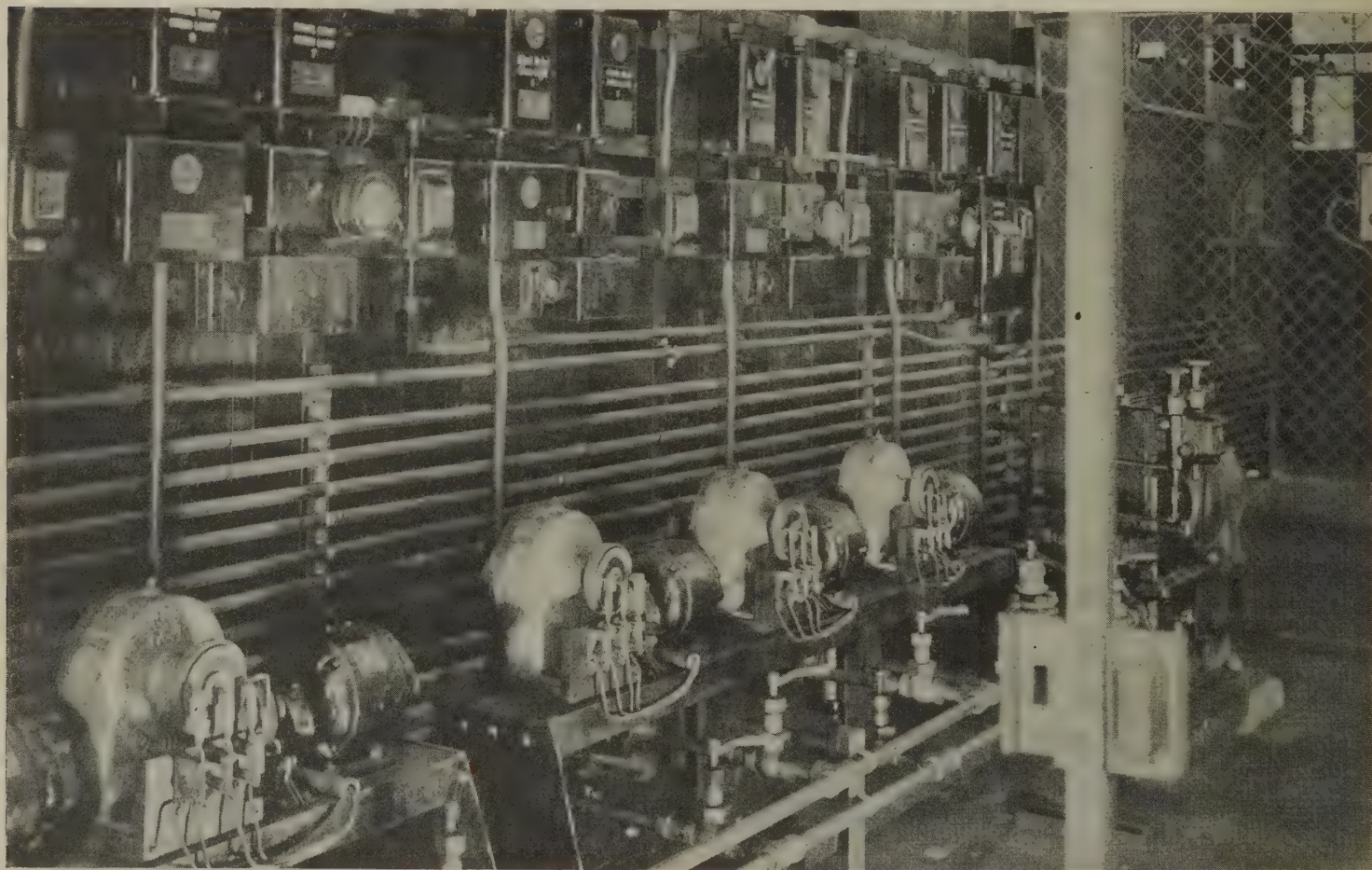


Fig. 2—Control for Battery of Counterflow Carburizing Furnace. Oil gear pushers regulated by motor driven contactors in foreground. Power input regulated by switches above, controlled by recording pyrometers

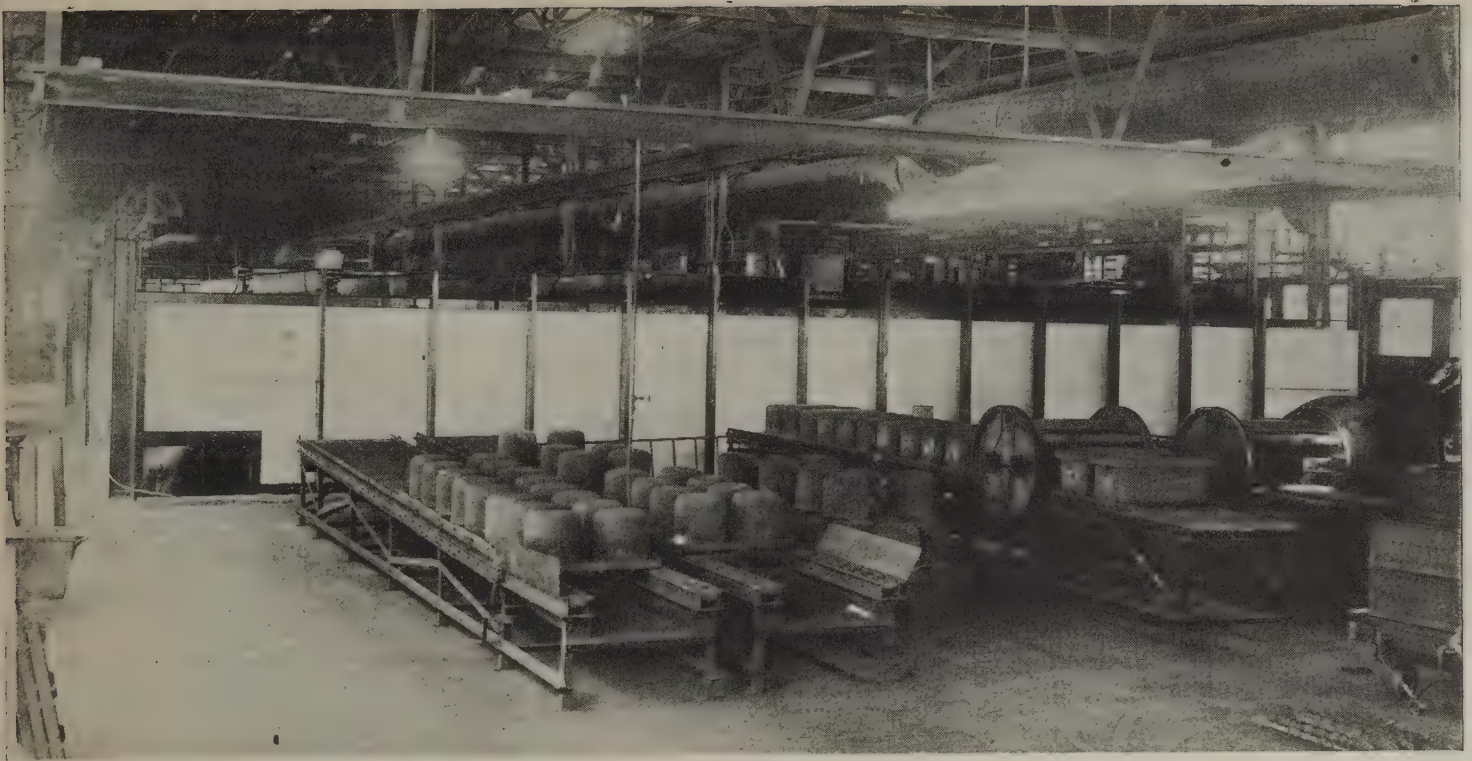


Fig. 3—Loading and Unloading Equipment for Pot Carburizing. Straight-line counterflow furnaces in the rear

dumped on the screen, which catches the metal parts and passes the compound into pans placed beneath.

Long narrow boxes have a capacity of 20 camshafts. Ring gears are packed in round pots, which ride through the furnace in pairs.

Incoming boxes are heated in the preheating zone to a temperature of 750 to 800 deg. Fahr. in the center of the box. The pyrometer settings are for 1650 to 1660 deg. in the heating zones and 1670 to 1680 deg. in the holding zones. A case 0.060 in. deep is obtained in a total time of 32½ hr. Economy in operation is shown by the low power consumption: the output is 16½ lb. per kw. hr. gross on the above cycle.

Definite heat-treating schedules follow:

The rear axle drive pinion, of chrome-vanadium steel, is first annealed at 1700 deg. in a continuous electric furnace,

remaining in the furnace 3 hr., of which one hour is at full temperature. It is then cooled in boxes and machined. Threads are copper-plated to prevent carbon penetration during carburizing. The rest of the pinion is carburized to an average depth of 0.035 in. It is then heated in cyanide for 10 min. at 1320 deg., transferred to a lead pot for 6 min. at 1450 deg., and then quenched. The final operation is drawing 40 min. in oil at 300 deg. The pinion after these successive operations is tested on its teeth for file hardness.

Camshafts, made of series 1020 S.A.E. steel, are rough-machined after forging. Then they are copper-plated all over, the copper is ground off the cams and bearings, and they are carburized to a depth of 0.060 in. After this they are hardened out of a cyanide pot, quenched in a solution and drawn. They are held to a scleroscope hardness of 80 to 90.

Japanese Scientists Study Crystal Lattice of Martensite

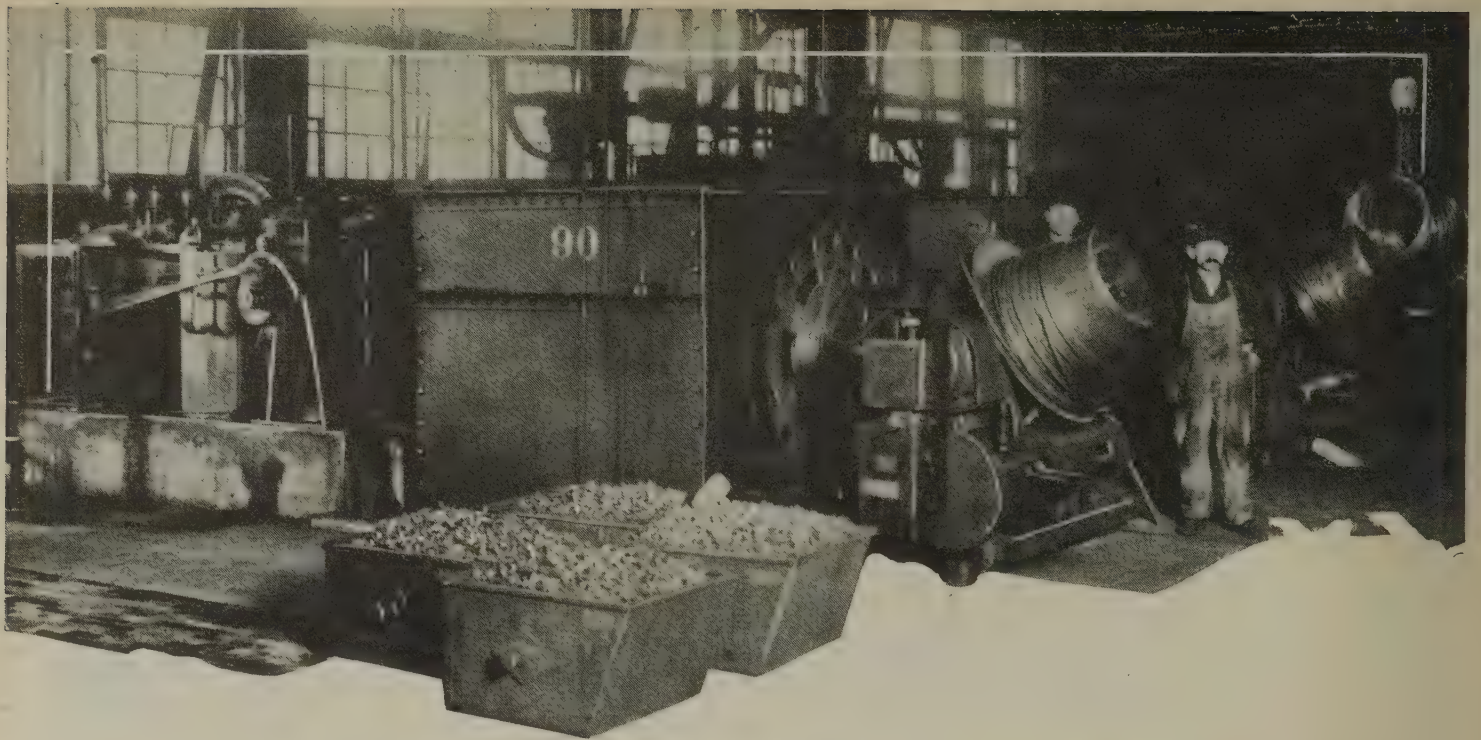
IF the density of quenched steel be measured it will be found to decrease as the carbon goes up, from about 7.860 for quenched Armco iron to 7.757 for quenched 1-per cent carbon steel. The reason for this expansion may be (a) high internal tensile stresses, (b) the presence of sub-microscopic cavities or (c) the expansion of the space lattice.

Sinkiti Sekito has tested the last assumption by means of X-ray analysis, and the results are published in Science Reports of Imperial Tohoku University for June, 1928. He used carefully prepared rods of quenched Swedish steels, varying from 0.1 to 1.0 per cent carbon. Measuring the distance between spectral lines (a function of the space lattice) and interpreting his results he finds that the space lattice of a quenched 1-per cent carbon steel is 0.45 per cent greater than of quenched carbon free iron. Since this agrees with the 0.44 per cent calculated from specific gravity experiments, he concludes that the expansion on quenching is due to a general increase in size of space lattice.

Diffusion of the spectral lines is also more marked in quenched high carbon steels. Breadths of these markings were measured by refined methods and appear to be a func-

tion of the carbon content. Prof. Honda believes this phenomenon indicates distortion of the lattice by balanced internal stresses, some positive, some negative, caused by carbon atoms present in the interspaces between iron atoms. On this assumption, the observed widening of the spectral bands would require an internal stress of 275,000 lb. per sq. in., which is nearly the ultimate tensile strength of quenched high carbon steel.

On the other hand, the Swedish investigator Westgren believes that the broadening of the spectral bands indicates a great refinement in the size of the ultimate crystal grain. Mathematical analysis of the experimental results indicates that an average grain size of 150 Angstrom units would produce the observed effects, a size which is far below the limit of microscopic resolution. The Japanese investigators reject the supposition that the well defined crystals of martensite observed under the microscope are further composed of a large number of elementary crystals, oriented at random, as called for by Westgren's hypothesis, and by Jeffries and Archers' slip interference theory of hardening.



Making Nuts and

BY F. W. MANKER*

SELF-CONTAINED from raw material to finished product, rolling its own steel bars and drawing its own steel wire, the Buffalo Bolt Co., North Tonawanda, N. Y., is one of the country's largest manufacturers of nuts and bolts. These are hot forged or cold headed and then carefully heat treated.

Rolling is done in a mill which includes two stands of 16-in. and six stands of 12-in. in a continuous train and five stands of 10-in. and two stands of 8-in. Belgian trains. These roll down to $\frac{1}{4}$ in. As the hot rods pass from the finishing stand, they are coiled in machines which automatically discharge the coils on to a 125-ft. muffle conveyor for slow cooling. The coils are picked off from the other end and placed on industrial cars for delivery to different departments.

There is also a 240-ft. cooling bed for straight bars and a rotary shear for cutting these bars to length.

A continuous billet heating furnace fired with gas fuel brings the steel to rolling temperature. This furnace is 34 ft. long and 17 ft. wide and is equipped with a 20-ft. charging table and electric pusher. Nine gas burners, located in the discharge end, fire above the hearth. A temperature of 2500 deg. Fahr. is obtained. The waste heat flows back to the charging end, where it passes out through an opening in the roof of furnace, over which is mounted the air preheater. Fresh air, taken in through this heater, is premixed with the gas and this gas-air mixture is fired through the burners.

Steel billets, which range from $2\frac{1}{2} \times 2\frac{1}{2}$ in. to 4 x 4 in., 15 ft. long, lying at right angle to the long axis of the furnace, are pushed through from one end to the other on skids. The side-door discharge principle is employed; another

pusher forces the hot billets out endwise through a small opening at the discharge end, at right angle to their line of travel through the furnace on to a conveyor which takes them directly into the roll train.

Other departments in this plant include the following: wire mill, cold heading and cold nut department, hot forge and hot punch department, pointing and trimming department, bolt threading and nut tapping, tumbling and nut storage, machine shop and tool department, and hot galvanizing and electroplating sections. In addition there is the jobbing department for special work.

Nut Department Laid Out for High Production

In the cold heading and cold nut department are long lines of cold heading machines for upsetting the bolt ends and batteries of punch presses for cold punching nuts. Raw material for the bolts and small sizes of nuts comes in coils, while that for the large work is in bars. This material, delivered on industrial cars, is unloaded and distributed to the individual machines by overhead cranes. Finished work is discharged automatically into buckets and is removed by the same cranes and industrial cars.

In this department there are made, every working day, 2,000,000 nuts and 1,000,000 bolts. Some of these nut machines produce as high as 10,000 nuts an hour.

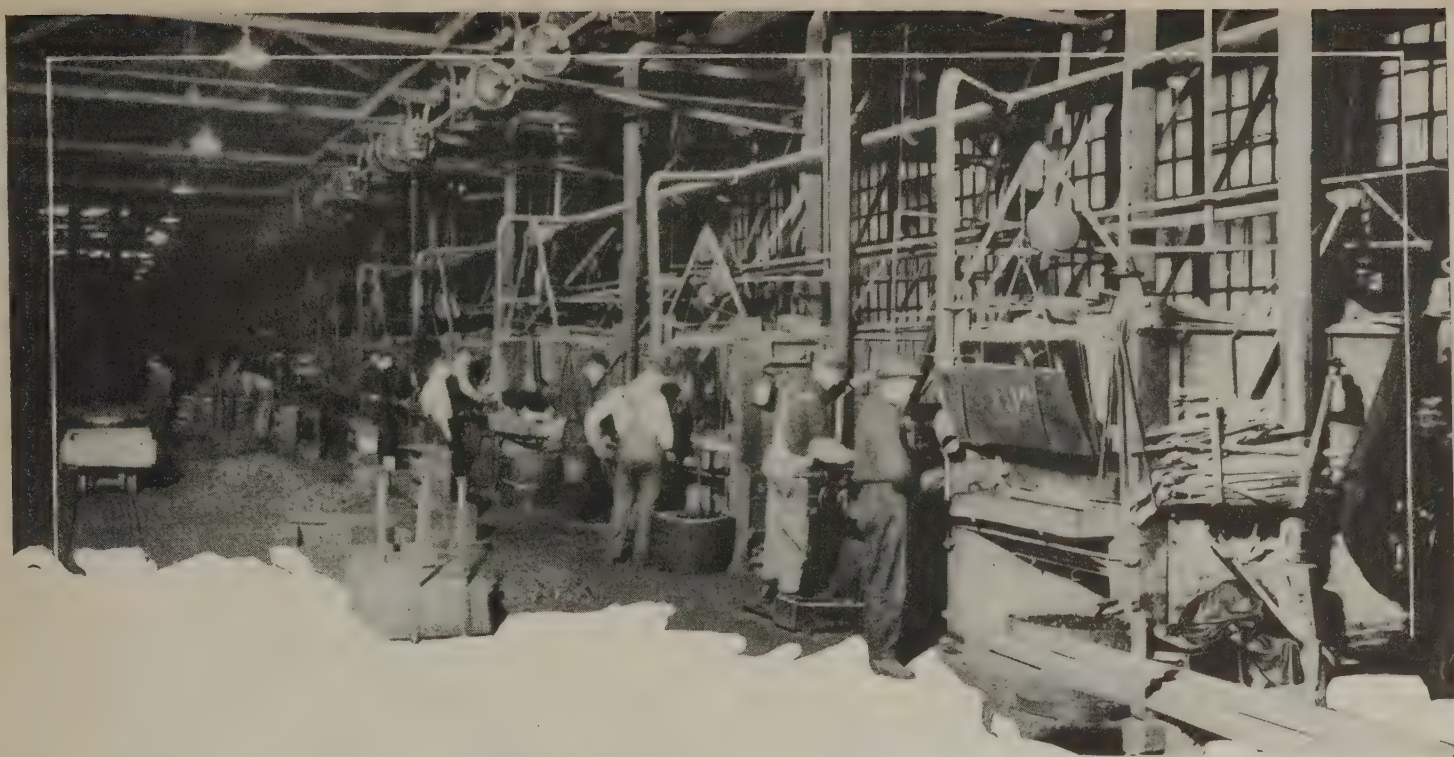
In layout this nut department is typical of the labor-saving methods utilized elsewhere in the plant. The machines are placed in two long parallel rows with an aisle between. A crane spanning this aisle distributes the raw material from the industrial cars to the machines. One man suffices for this work. The finished product is discharged on the other sides of the machines into buckets, which are handled by monorails operating in the outer aisles.

Long lines of mechanical headers for bolts and punch presses for nuts are in the hot forge department, all served with furnaces in which the material is heated. This department is capable of turning out 1,000,000 bolts and 500,000 nuts daily. Most of the furnaces are of the box slot type,

*Vice-president Surface Combustion Co., New York.

At Top of Page Is Shown a Battery of Continuous Automatic, High-Speed Hot Bolt-Heading Machines with Their Heating Furnaces. Wire is fed from coils through the furnaces and thence, properly heated, into the machines.

Section of Forging Department, with Row of Forging Machines, Each Served by Its Own Heating Furnace (top of right-hand page).



Bolts from Billets

and many of them are fired with gas. They are about 6 ft. wide, 5 ft. high and 3 ft. deep. Another type of furnace with about the same cross section, but 28 ft. long, heats 25-ft. bars over their entire length. These bars are then removed and put through automatic and continuous bolt-heading machines.

Combination Furnace and Hot-Heading Machines

Many of the machines in this plant were designed and made by the company engineers and mechanics. There are seven high-speed hot bolt-heading machines fed by wire in coils, the first end of one coil being welded on to the rear end of the preceding coil, so that the machines run without interruption. The principal feature is the forging furnace which is coupled to each. The wire from the coils passes first through the furnace, where it acquires the correct forging temperature, and then directly into the machine, which heads, shears and ejects the bolts automatically.

This is one of the few instances in industry where the two operations of heating and forging have been synchronized into straight-line mechanical production. This necessitated automatizing the heating operation and the designing of a furnace with sufficient capacity to deliver wire at forging heat at a very high speed. How successfully this was accomplished is reflected in the fact that each unit will turn out 85,000 bolts a day. They are served with overhead cranes in front, to bring in the raw material, and a monorail in the rear to remove the finished work.

For pointing and trimming a department is equipped with several types of machines. Here is a battery of automatic pointing machines for carriage bolts and gimlet pointing machines for coach screws. The first are hopper fed and continuous in operation. Automatic flash trimmers shear the flash from the heads of the forged bolts, while others trim cold upset heads, either square or hexagonal. Some of these were designed and built at the plant. One type is provided with a hopper which feeds the bolts into it; rotary cutters trim two sides, the bolt is given a quarter

Automatic Machines, Associated
With Gas-Fired Furnaces, Give
Large Output—Heat Treating
Important

turn and the same cutters trim the other sides. This unit has a capacity for 90,000 bolts daily.

Another group consists of three machines to a unit which point, thread and screw on the nut in three continuous operations. These are equipped with a device which automatically picks out and rejects any bolts which may pass through without being nuted. There is also a battery of full automatic nutters here, which were designed and made by the company.

One Boy Feeds Ten Tapping Machines

Most of the bolt threading and nut tapping is accomplished in another section, where are located batteries of vertical machines designed and built by the company for this purpose. One line of 42 semi-automatic tappers requires the services of only one boy to feed every ten machines. There is also a bank of machines for cold rolling threads on to small bolts. Close by is a group of full automatic tapping and threading machines, while for facing the top and bottom of bolt heads a line of semi-automatics is provided.

Drill presses are used for drilling cotter pin holes and automatic bolt slotting machines for slotting the heads of screws. The finished products all go through a huge rotary washing machine. From this they are discharged on to a long belt conveyor which runs between two lines of girls who inspect the work for imperfect specimens. Ten rotary tumblers located in an overhead gallery are used for pol-

ishing. These are fed by cranes and discharged by gravity into storage bins. In some of these the material is heated, to impart a better polish to the product.

Finished work is all heat treated so that it shall have the greatest possible strength, toughness and resistance to wear. A recent innovation in the heat-treatment room was the installation of a distinctly new type of heat-treating machine or furnace designed expressly for small work on a large scale. Known as the Victor-Peninsular furnace, this unit was built by the Surface Combustion Co., Toledo, Ohio. It is a combination of furnace and traveling conveyor.*

The furnace, of brick, is equipped with an automatic temperature control. The conveyor has motor drive through variable-speed gearing, so that the entire unit is continuous and automatic in operation. It is about 18 ft. long, 4 ft. wide and 3 ft. high, the heating chamber occupying about 12 ft. The conveyor belt is suspended between two steel pulleys, located at either end of the furnace, and rests directly on the hearth. It is made of stainless steel and is about 12 in. in width.

At the charging end a 6-ft. roller table is provided which acts as an aid in loading, while at the other end the product drops by gravity directly into the quench. The burner equipment consists of a number of tunnel burners firing below the hearth. These are manifolded to low-pressure inspirators which automatically proportion the gas and air for perfect combustion and the furnace atmosphere desired.

Motor-driven valves actuated by automatic heat control units are provided, the first to control the temperature in the preheating and heating zones and the second to regulate that in the soaking zone. The rest of the equipment consists of two thermocouples and two recording controllers. In this manner the correct heat gradient is maintained automatically and without attention of a workman. This furnace is so fired and the gradient so regulated that the work is heated gradually to the maximum temperature, with a

minimum temperature differential between the furnace and the work.

Reducing Atmosphere Avoids Scale Formation

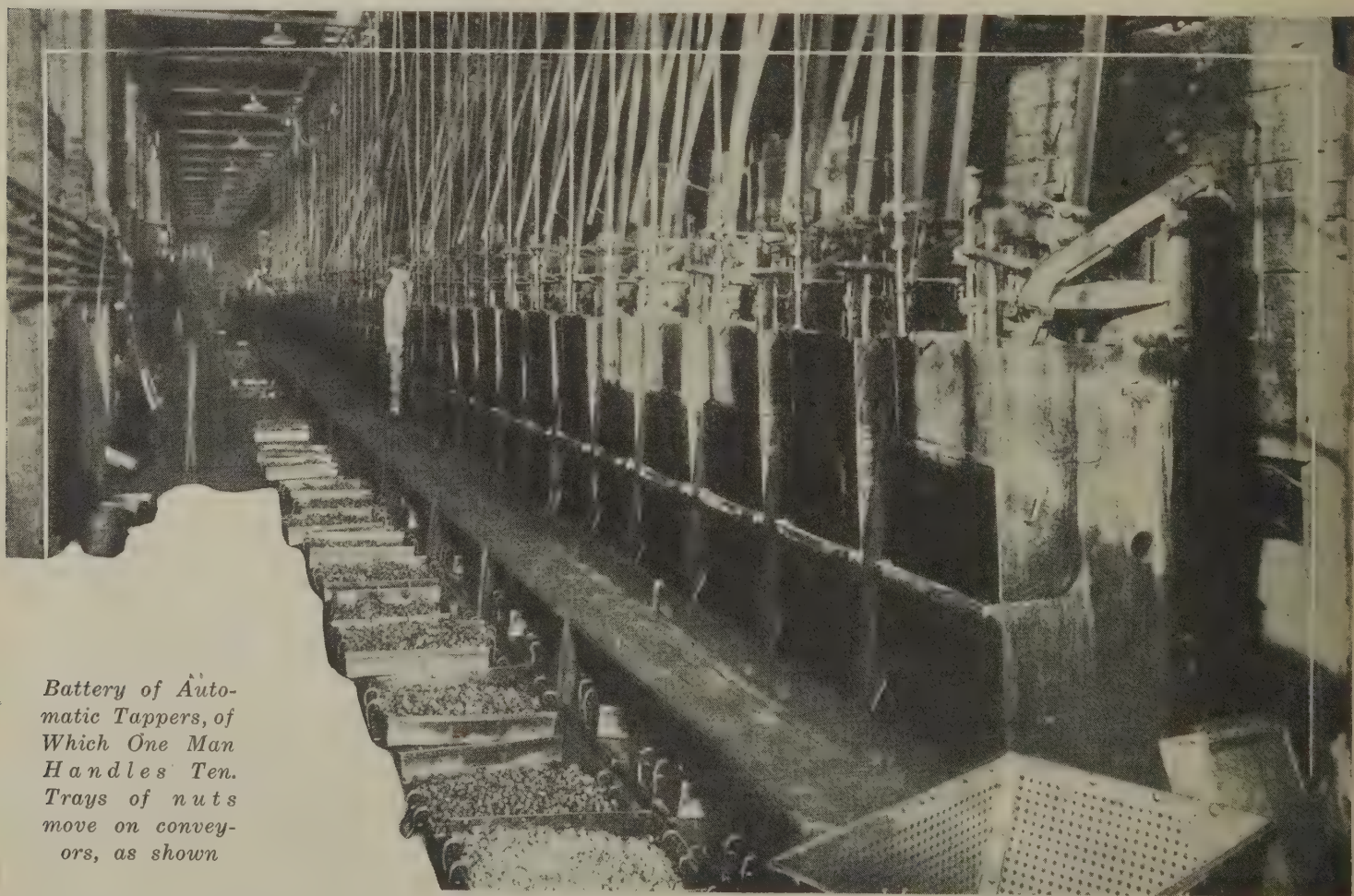
When the inspirators are set so as to provide a reducing atmosphere in the furnace, the work is discharged in a practically scaleless condition. At the unloading end is a quench tank 6 ft. long, 3 ft. wide and 2 ft. deep, into which the work is discharged through a chute or water seal, which prevents contact with the room atmosphere and thus avoids scale. The tank is equipped with a woven wire conveyor, of the rotary elevator type. This carries the work slowly through the quenching fluid and finally removes it from the tank and discharges it into containers. This conveyor is driven by the same motor that drives the furnace conveyor.

Another type of furnace in this plant is used for forging the ends of the oil-well sucker rods. This unit is about 6 ft. long, 3 ft. wide and 4 ft. high and of the slot type. Constructed of brick, it is heated with gas fired through Surface Combustion Co. tunnel burners. There are six of these, grouped in a battery and located in the roof of the furnace, so as to fire down on the work.

Gas is supplied through two manifolds and one inspirator for proportioning the gas-air mixture. This system of firing has resulted in marked fuel saving as compared with the previous method used for this work. An upsetter is placed alongside the furnace and the ends of the rods, which are 25 ft. long, are shaped in it. A unique, hand-operated conveyor consisting of three endless chains is utilized for advancing the rods, and the ends projecting into the furnace, as the work progresses.

There is a completely equipped machine shop for making practically all the machines used here and an engineering and research department where they are designed and improved. A tool room is supplied for making tools, dies, jigs, etc. Laboratories, both chemical and physical, are used to analyze and test all material coming into the plant and finished work going out. All lots of raw material are immediately analyzed on receipt and are tagged with this analy-

*Furnaces of this type were illustrated and described by THE IRON AGE, in the issue of Oct. 27, 1927, page 1158.



Battery of Automatic Tappers, of Which One Man Handles Ten. Trays of nuts move on conveyors, as shown



Long Line of Automatic Threaders, With Boxes of Bolts Ready to Be Threaded

sis. The same tag is put on the material after it is rolled and follows it through the plant. In this manner any de-

fective products can be traced back to the original shipment of raw material.

Using Business Statistics to Improve Business

IN the recently issued publication, "How to Use Current Business Statistics," prepared by Mortimer B. Lane, editor *Survey of Current Business*, published by the Department of Commerce, it is shown how business men can make the best use of current statistics. As pointed out in the foreword by William M. Steuart, director Bureau of Census, the use of current statistics is so widespread and varied that a description of the methods must draw its materials from many sources, and this has been done by Mr. Lane. He deals with a number of specific industries, among them those making metals and machinery. He precedes discussion of use of statistics by the various industries with a rather detailed description of the problems involved and their solution, the different phases of statistics and the results obtained from their use.

In his comment on metals and machinery, Mr. Lane points out that a great range of statistical data is used by steel manufacturers in planning their business policies. One company, it is stated, watches particularly the statistics of agriculture, building construction, automobiles, railroads and exports, to see how the consumption of steel may be affected; while prices, wages and living costs are watched as bearing on wage questions. A manufacturer of sheet steel products compares his new orders with those of allied industries, to find out and improve his weak points. A fabricator of structural steel watches the figures on building construction and the trends of the various industries, to ascertain their prospects for expansion, which would mean larger sales of structural steel.

A manufacturer of steel barrels, Mr. Lane says, uses the monthly steel barrel statistics as publicity material in his monthly price bulletin to companies using steel containers for shipment or storage. This manufacturer also determines regularly the proportion of the total business that he is getting, as well as the proportion in each territory, so that weak spots in the sales organization can be picked out. Another firm in this line has compared its productive capacity with that for the industry as a whole by months

for three or four years, and it has found that its business is becoming more stabilized each year.

Statistics of the iron and steel industry, it is stated, are used extensively by another firm in planning its sales programs and in checking up on the results. A company manufacturing tools and hardware finds that the curve of its sales is preceded by construction figures three months ahead, by speculation nine to 12 months ahead and by money rates, inverted, 12 to 15 months ahead. Study of the proportion of the individual business to the machine tool industry as a whole led two managers in this field to determine the cause for the reduction in their proportionate share of the total business, although gaining in actual value. This study led in one case to a reconstruction of the selling department, this being the weak point in the organization.

Other manufacturers in this same line found from figures of stocks, shipments, etc., that they had locked up a larger amount of capital for each unit sold than had their competitors as a group. This led to revamping their production system, installing better methods of process and inventory control, and the liquidation of stocks, resulting in the accumulation of interest-bearing investments. The sales manager of a machine tool company uses the trade statistics to concentrate his efforts in the prosperous centers, and a distribution of the business statistics throughout the sales department has been found to produce new confidence in business.

Adoption of a commercial standard for 250-lb. iron or steel screwed unions will be the subject of a conference under the auspices of the Commercial Standards Unit, Department of Commerce, on Monday, Sept. 24, at the Commerce Building, Washington. Notification of the conference has been given to producers, distributors and consumers by I. J. Fairchild of the Commercial Standards Unit, and has been accompanied by copies of the proposed standard.

Two Shifts and 88 Hours a Week

Morgan Plan at Worcester, Mass., Gives Each Worker Nearly Half a Day of Daylight Out of the Shop

FOR six years the Morgan Construction Co., Worcester, Mass., builder of rolling mill and wire mill equipment, has been operating its machine shops on a schedule of 88 hours per week, or 4500 hours a year. This unique arrangement is continued with satisfaction to the management and evidently to the 600 employees affected. Company officials state that the double shift has produced economies, particularly in a wider distribution of overhead.

One of the two shifts goes to work at 6:30 a.m. and ends its day at 2:30 p.m.; then it is replaced by the second shift which is on until 11:42 p.m. With 24 minutes out for each shift for a meal, and with the first shift working up to 12:30 noon on Saturday, each shift has a 44-hour week. The first has for five days a daily work schedule of seven hours, 36 minutes, followed by six hours on Saturday. The second shift works five days of eight hours, 48 minutes each. The shorter week does not materially af-

fect the employees' weekly wage, which compares favorably with the average paid in similar lines of manufacturing, locally and the country over, where the hours of the men are somewhat longer.

The Morgan management thus sums up the advantages which time has demonstrated for the plan: Overhead costs are kept much below what they would be were the machinery operated only 48 to 54 hours per week. Investment in equipment is kept down, and machines yield a maximum return during the years when they are still modern; that is to say, before machines of more efficient design are available to supersede them.

The employees have given every evidence that they like the plan. No work is required of them Saturday afternoon or Sunday. As it has worked out, the younger men generally prefer the second shift, with its longer hours but only five days a week, for it gives them a very long week end, from 11:42 Friday night

to 2:30 Monday afternoon. On the other hand, the older men as a rule prefer the first shift with its shorter day, but something to do every week day. Every man has approximately half a day of daylight outside of the shop. Every one has ample time to work a garden or otherwise occupy himself about his home or in recreation elsewhere. Sleeping in the hotter hours of a summer day is never necessary. All the men may travel to and from their work during off-peak hours of local traffic.

Another advantage to the company is a full overlapping hour of supervision. The foremen of the first shift stay on half an hour after their men have departed and the foremen of the second shift go on duty half an hour ahead of their men.

The company regards its two-shift system as a happy medium between the one-shift and the three-shift plans. Naturally where manufacturing processes are continuous the three-shift day is necessary. But studies made by the Morgan Construction Co. have demonstrated that in a machine shop the night shift, from midnight on, is the least productive, and that, all things considered, better results are obtained by eliminating it.

Steel Piling Sections Redesigned

Jones & Laughlin's New Shapes Combine Strength, Stiffness and Hardness by Economical Disposition of Metal

THE Jones & Laughlin Steel Corporation, Pittsburgh, is placing on the market the first two of a series of improved sections, known as the "improved double lock steel sheet piling." The new types, invented by Charles S. Boardman of the Jones & Laughlin organization, take the place of piling sections formerly manufactured by the company.

A saving in weight of as much as 20 per cent is one of the claims made for the new Jones & Laughlin sections. The sections are integrally rolled from blooms of steel selected to give them a tensile strength of 70,000 to 80,000 lb. per sq. in. and a hardness sufficient to prevent upsetting while being driven. The figure shows section C-27. Section EC-23.75 has exactly the same cross-sectional shape except that the wings are bent to 35

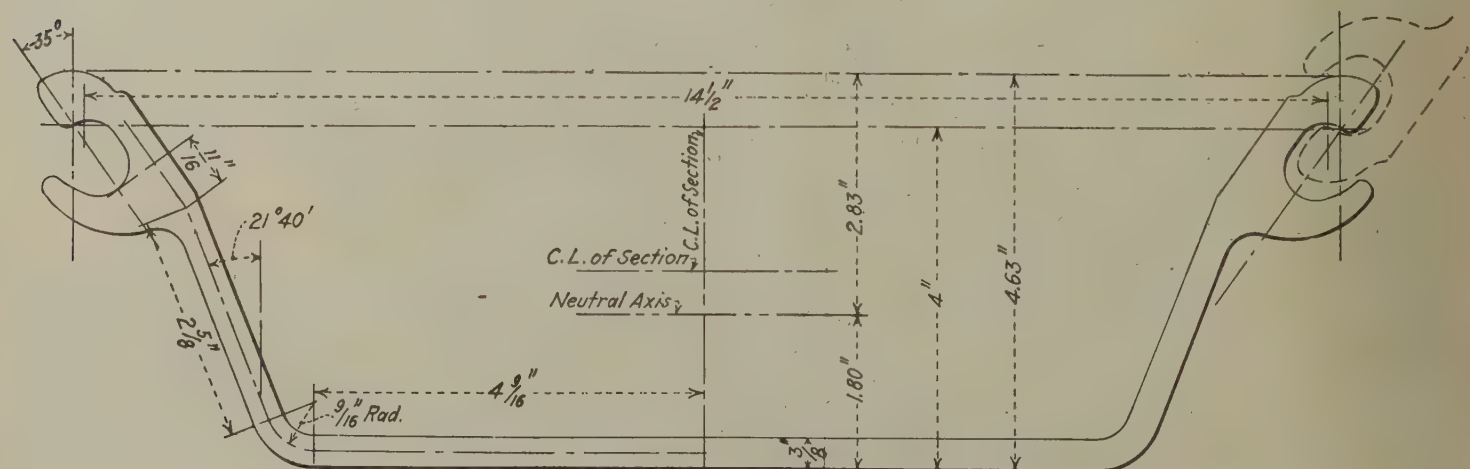
deg. from the perpendicular. Type SW-22 is a straight web or tension section.

The C sections form a deep channel and are primarily intended for dock or bulkhead work, and to be driven for permanent constructions. The EC sections are rolled as extended channel general utility sections for cofferdam, dock and shallow cofferdam work. Sections C and EC may be used in combination as intermediate

sections in order to economize on weight.

All sections have the same compact interlock, of three-line contact, of high tensional strength and watertight qualities, with ample clearance for free driving. Deflection in each interlock can be 20 to 30 deg. each side of center line. Interlocks are so designed that they tighten under stress or pressure. A special engineering department will furnish reports, suggestions and plans to assist in the correct and economical use of Jones & Laughlin steel sheet piling in the many forms of construction for which it is adapted.

A 600-hp. oil-electric locomotive will be used in switching service in Chicago by the Illinois Central Railroad. The locomotive is one of those developed by the Ingersoll-Rand and General Electric companies.



New J. & L. Sheet Piling. Weight 32.5 lb. per linear ft. of bar

Precision Units for Welding Operations

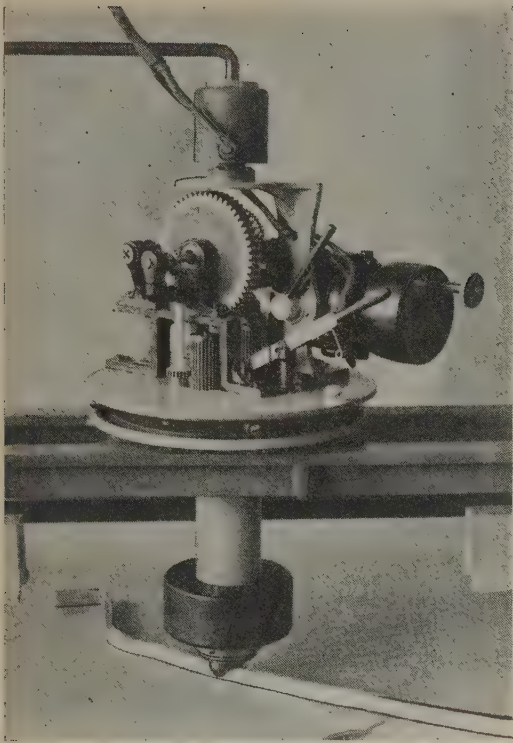


Fig. 1

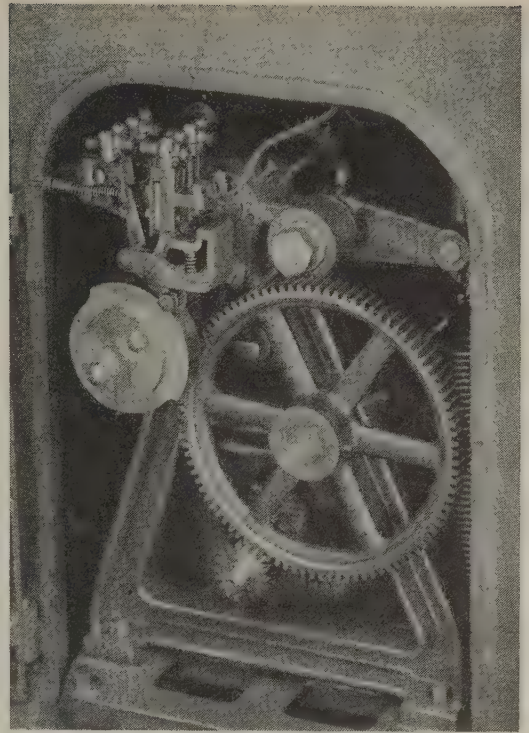


Fig. 2

AUTOMATIC welding or cutting machines are by no means the rough devices which one might expect from the association with such high temperatures. Not only is the greatest ingenuity exhibited in the jigs and fixtures, but self-indexing and automatic control devices worthy of the best quality machine tools are installed on equipment for production work.

Thus, Fig. 1 is a close-up view of the main drive of an automatic shape cutter made by General Welding & Equipment Co., Boston. This drives a parallel motion device, directing the motion of an oxy-acetylene cutting blowpipe. A floating tube mounted on a ball-bearing turntable presses

two sharp cones a-straddle the bent aluminum template strip. The cones are motor driven through a differential, allowing one to slip around square corners.

Automatic drive and current control for a single spot welder (Model No. 275, Thomson Electric Welding Co., Lynn, Mass.) is constructed on entirely different lines. Fig. 2 shows a motor and train of gears which drives a main cam, which through connecting levers opens and closes the welding electrodes at adjustable pressure up to 600 lb. The contactors shown in the view control the welding current through remote-control switches on incoming power lines. One depression of the foot treadle results in one complete cycle and the production of one spot weld.

Even more intricate is the machinery installed by Ford to make steel automobile wheels. Fig. 3 shows the steel rim and ten short spokes placed in a fixture. Welds are made between the rim and the spokes, one at a time, the machine indexing and welding automatically, and stopping when the tenth weld is made.

Flash welding of steel sheets is utilized to join stampings, or even sheets before stamping. The Thomson welder, shown in Fig. 4, will take sheets up to 54 in. wide, and the clamps and dies are designed to weld a 13-in. strip of flat steel (which will later be formed into a windshield post) to the bent side of an automobile cowl. These clamps are shown in closed position from the rear side of the machine. A double cam is necessary on the push-up mechanism because of the extreme width of the platen.

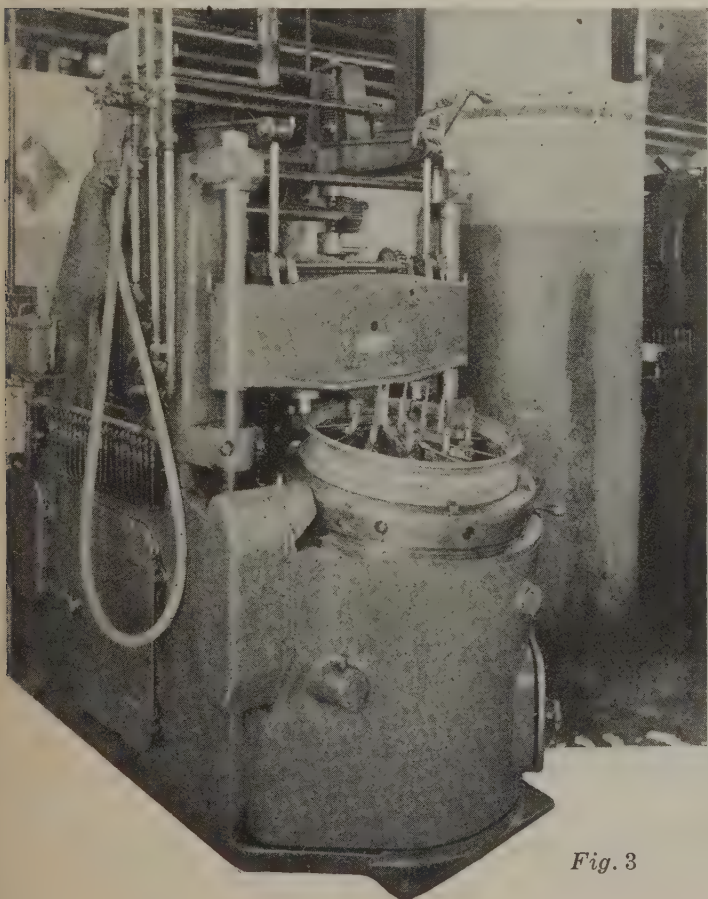


Fig. 3

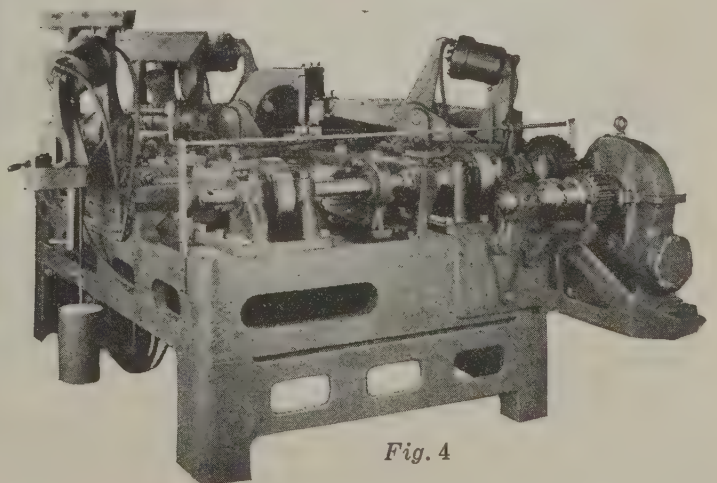


Fig. 4

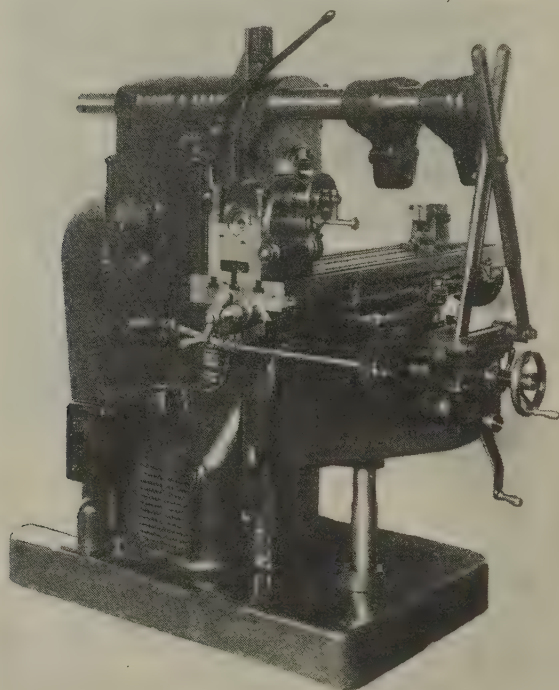
Adds to Line of Standard Milling Machines

TWO new machines, designated as the No. 1A universal and No. 1B plain, have been added to the line of standard milling machines of the Brown & Sharpe Mfg. Co., Providence. They are similar in design to the company's Nos. 2A and 3A standard universal and the Nos. 2B and 3B plain milling machine described in THE

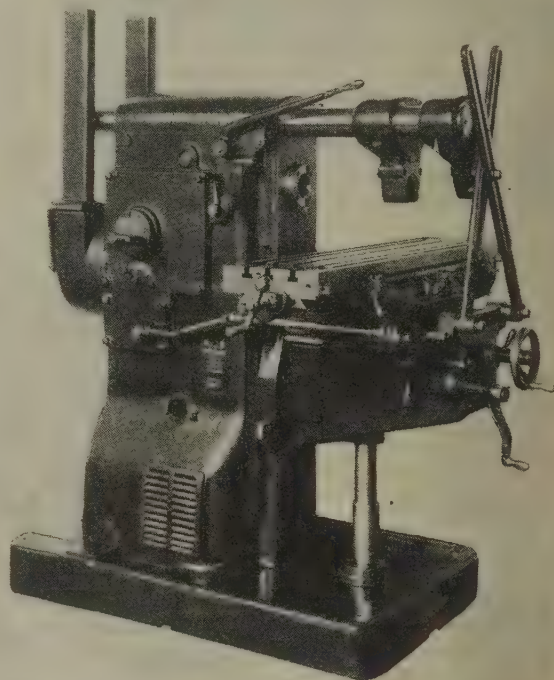
construction, and are provided with automatic longitudinal and transverse table feed. Vertical feed for the table is by hand. Similar to the "standard machines" previously brought out by the company, the Nos. 1A and 1B are of the sliding gear type. They are provided with a single lever, located at the front of the

spindle is mounted on three roller bearings.

Automatic lubrication throughout is another feature, a pump in the column delivering filtered oil to all mechanism within the column and to the driving pulley. Automatic lubrication is also provided for the knee assembly. The knee may be clamped either



The Machines Are of Motor-in-the-Base Type, with Double Overarm and Automatic Longitudinal and Transverse Table Feed. The No. 1A universal, with motor drive, is at the left and the No. 1B plain milling machine, with belt drive, at the right



IRON AGE of Jan. 19, but are of slightly smaller capacity. They are not equipped with the power fast travel feature, dual control for feed changes nor furnished with a pump, although the power fast travel and pump can be provided as an extra, if desired.

The machines are of the motor-in-the-base type, with double overarm

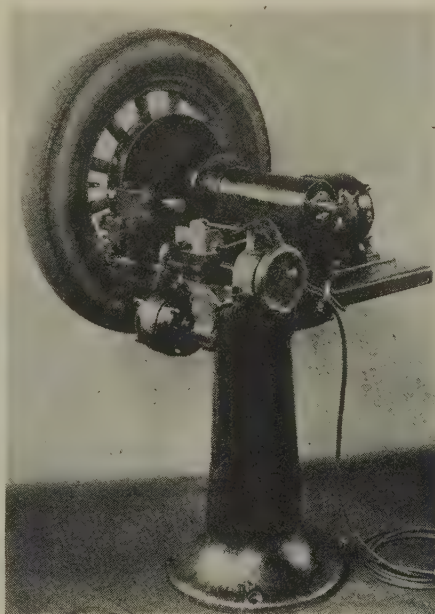
machine, for operating the feed changes. Speed changes in two series are also obtained by means of a single lever, which is on the side of the column. Direct reading dials indicate in both cases the feed or speed for which the machine is set. Feed and speed units are equipped throughout with heat-treated alloy steel gears. The

from the front or rear of the table by a single lever. It is provided with a one-piece knee screw which is completely guarded in all positions and does not extend below the floor. The driving clutch, located outside of the column, is of the dry multiple-disk type, operated by a single lever on the side of the machine.

Brake Drum Turning and Honing Lathe

A MACHINE for turning and honing the brake drums of both passenger cars and trucks has been placed on the market by the Reed-Prentice Corporation, Worcester. The unit for passenger car brake drums is illustrated herewith; for truck brake drums an outboard support attachment with steel floor plate is furnished. Operation of the machine equipped for truck wheels is the same as that for the turning of passenger car drums, and in both cases the brake drums can be turned without removing the tire or rim.

Modern engine lathe standards are followed in the construction of the machine, which is provided with a pedestal base and is equipped with a tapered roller bearing spindle. The spindle drive is through worm and worm wheel, which run in oil, power being supplied by ½-hp. or 50 or 60 cycle, single phase, 110 or 220 volt alternating current, or 115 or 220 volt direct current motor. The tool-slide is actuated by a 1/12-hp. electric mo-



For Turning and Honing the Brake Drums of Trucks an Outboard Support Attachment Is Employed

tor through worm and worm wheel. Both motors are connected with a tumbler switch which automatically controls the feed of the tool-slide through an adjustable rod, the tumbler switch controlling both the drive and the feed motors. Passenger car and truck wheels are applied to the machine by a taper arbor which fits a corresponding taper hole in the spindle. The arbor, in turn, is threaded for a draw-bar. Arbors, bushings and other parts necessary for mounting the various passenger car and truck wheels are regularly supplied.

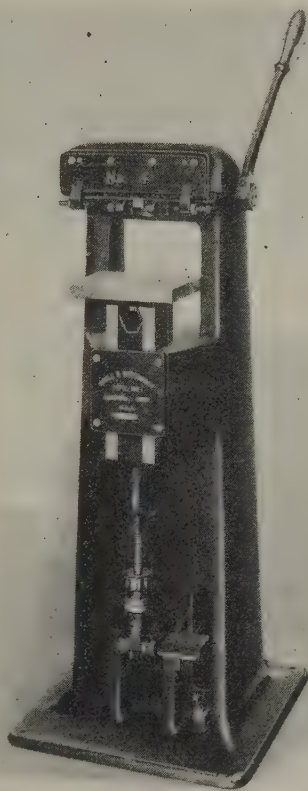
A honing tool, consisting of a bar which fits the tool block in the same manner as the cutting tool and is arranged to hold two honing stones, is available as an extra for use with the machines. The honing attachment is arranged so that it will function both on the outside and the inside of the brake drum. It is intended for use in getting a better finish, although it is stated that in the majority of cases the turned drum is satisfactory.

General-Purpose Marking Machine of Improved Design

INCREASED ease of operation and greater capacity are major features of a new general-purpose hand-operated marking machine, which is being introduced by the Noble & Westbrook Mfg. Co., East Hartford, Conn.

The new machine, designated as the No. 4, supersedes the No. 3 model previously manufactured by the company. It is designed to mark, by means of steel dies, trademarks, names, letters and numbers on flat or round metal parts of various shapes and sizes. The frame is heavier than that of the previous model and projecting parts that might interfere with the operator have been eliminated. The operator stands or sits in front of the machine, instead of at the sides as before, which arrangement enables the operator to put the work in the holding fixture more rapidly and also to observe more conveniently the movement of the marking die.

Parts to be marked are held in a suitable fixture which is fastened to the work table of the machine. Pressure on the foot-treadle raises the table and brings the work in contact with the marking die, this movement being accomplished through a compound lever arrangement. By pulling the handle down the die is moved across the piece to be marked. This handle may be set in the position most convenient for the operator. The



The Machine Is Heavier and Easier to Operate Than the Former Model. Projecting parts have been eliminated

slide is extra heavy and is fitted with roller bearings. It is regularly built

to give a mark $4\frac{1}{2}$ in. long, but can be furnished for making marks up to 6 in. long. Adjustable stops are provided at the front of the machine to control the length of the stroke. Movement of the slide is through heat-treated steel gears. The table is set to the proper height by means of a handwheel on the elevating screw and graduations in increments of 0.001 in. permit close control of the table stroke so that accurate depth of impressions may be obtained. The maximum distance between the slide and the table is $8\frac{1}{2}$ in., and $6\frac{1}{2}$ in. under a round die.

A roll die-holder of new design can be supplied. It is inserted in the machine in a dovetail slot just above the table, and an adjusting screw is provided to facilitate changing the position of the die-holder from front to back, which eliminates the necessity of moving the entire work-holder. The die is returned to position for making the next mark by means of a spring of simple design. The die-holder can be taken out of the machine without lowering the table, which is a new feature. Replacable bronze bushings and a hardened spindle are other features of the die-holder. The starting point of the die is adjustable by means of a thumbscrew.

Floor space occupied by the machine is 20 x 20 in. The weight is 425 lb.

Roller-Bearing Equipped Roll Lathes

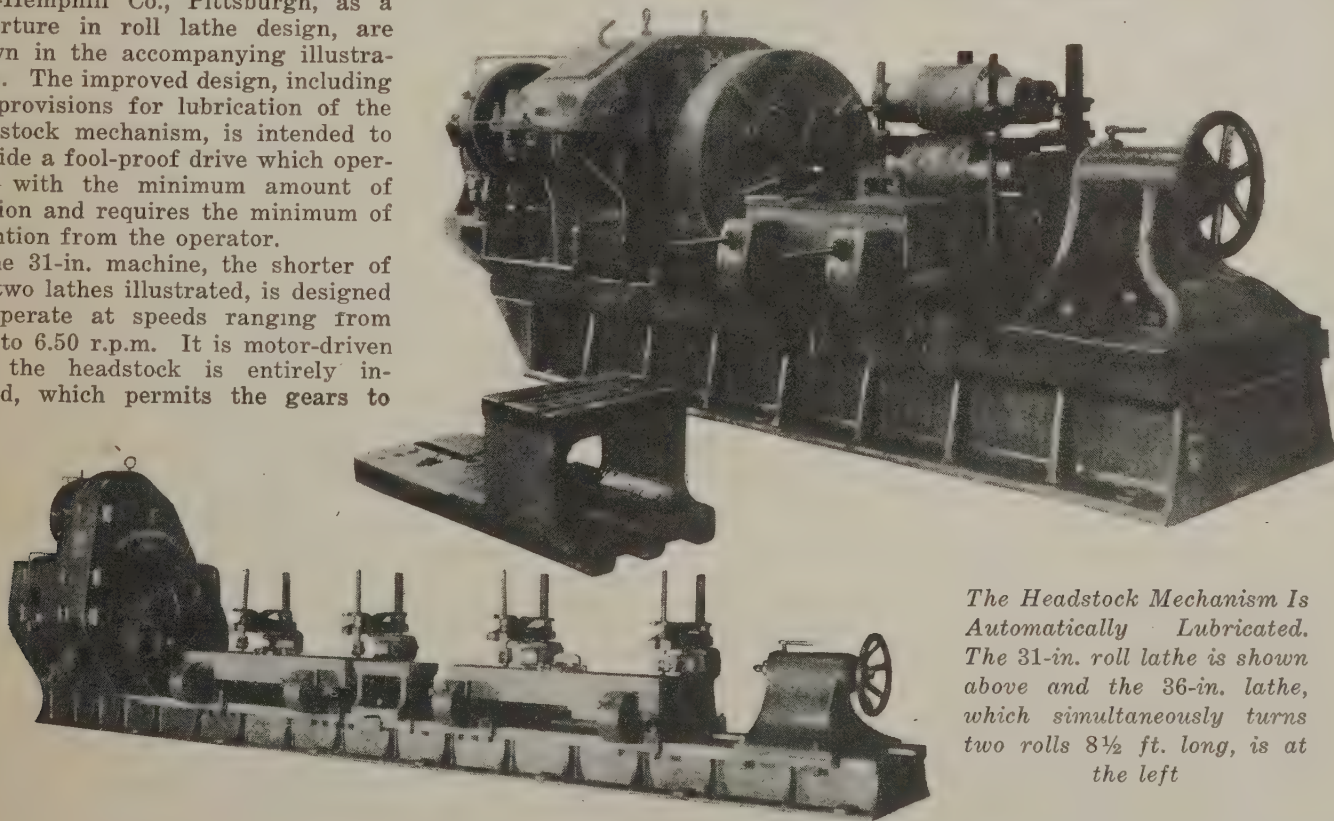
TWO direct motor-driven heavy-duty roll lathes with roller bearings on all gear shafts, which is emphasized by the builders, the Mackintosh-Hemphill Co., Pittsburgh, as a departure in roll lathe design, are shown in the accompanying illustrations. The improved design, including the provisions for lubrication of the headstock mechanism, is intended to provide a fool-proof drive which operates with the minimum amount of friction and requires the minimum of attention from the operator.

The 31-in. machine, the shorter of the two lathes illustrated, is designed to operate at speeds ranging from 0.73 to 6.50 r.p.m. It is motor-driven and the headstock is entirely inclosed, which permits the gears to

dip in a bath of oil. In addition, spray lubrication is provided.

Two rolls 36 in. in diameter and 8 ft. 6 in. in length can be turned simul-

taneously on the second lathe here shown, the headstock of which is also equipped with roller bearings. It has spray lubrication for the gear teeth

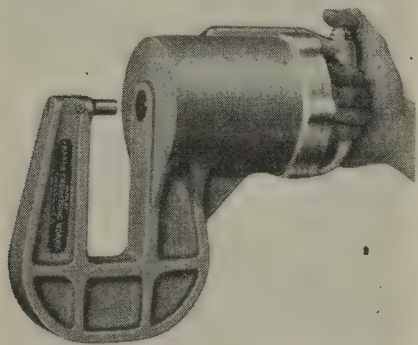


The Headstock Mechanism Is Automatically Lubricated. The 31-in. roll lathe is shown above and the 36-in. lathe, which simultaneously turns two rolls 8½ ft. long, is at the left

and pressure grease lubrication for the bearings. The motor is mounted directly on the headstock and is arranged to drive the machine through a flexible coupling.

Offers New Portable Pneumatic Riveter

THE Hanna Engineering Works, 1765 Elston Avenue, Chicago, has made available the portable pneumatic riveter illustrated, which weighs



Pressure of 1 Ton Is Exerted on the Dies When the Riveter Is Operated at 100-Lb. Air Pressure. The weight of the machine is 15 lb.

only 15 lb. and is designed for driving tubular bronze or steel rivets up to 3/16 in. in diameter. The machine exerts 1-ton pressure on the dies when operated at 100 lb. per sq. in. air pressure. The depth of throat, or reach, is 5 in., the gap, 2 in. and the die stroke, 1 in.

Air supply to the tool is controlled by a thumb-actuated valve in the pistol grip. The rivet driving die is connected directly to the pistons, of which there are two, the return stroke being actuated by springs. The handle may be located at the end of the machine as shown, or at the top, to suit conditions. The machine is said to be particularly adapted for the riveting of automobile hoods, bodies, instrument panels and similar work.

Establish New York-Cleveland All-Water Line

A through water transportation line between Cleveland and New York is being established by the Erie & St. Lawrence Corporation, a subsidiary of the Great Lakes Grain Corporation, Buffalo. This company has five 252-ft. steel ships, driven by Diesel engines and having a capacity of 1500 to 1600 tons at 9½-ft. draft. These boats have been in service carrying grain from Buffalo to New York and Montreal.

The establishment of the new line is the result of negotiations with the Cleveland Chamber of Commerce. The operation of this line will be somewhat experimental this year, but, if it proves successful, regular service will be established next season. It is stated that there will be no difficulty in securing cargoes for west-

bound shipment, but experimental service will be necessary to determine whether there will be sufficient east-bound cargoes.

The route of the line is via Lake Erie, the Welland Canal, Lake Ontario, the Oswego Canal, the New York State Barge Canal and the Hudson River. Boats will make the trip between Cleveland and New York in six days. A cargo of sugar will be delivered in Cleveland on one of these boats at the end of this week, and

some steel products, including wire and rivets, have been lined up for the return cargo. A rate of 30c. per 100 lb. is being made on iron and steel, this including marine insurance and terminal charges. This rate is 10c. per 100 lb. under the rail rate. It is expected that if the line is permanently established considerable tonnage in steel products will be shipped over its boats to New York for reshipment to Gulf ports and the Pacific Coast.

Railroads Protest P., L. & W. Extensions

Intervening Roads Maintain That Proposed Connecting Links Would Give Pittsburgh Coal Co. Monopoly on Coal into Youngstown

WASHINGTON, Aug. 28.—Exceptions to the proposed report of C. V. Burnside, assistant director of the Interstate Commerce Commission, recommending that the commission authorize the Pittsburgh, Lisbon & Western Railroad to establish a new rail route between Smiths Ferry, Pa., and the Youngstown district, were filed with the commission last week by the three intervening Trunk Line carriers, the Pittsburgh & Lake Erie, the Pennsylvania and the Baltimore & Ohio. They contended that the new construction would not be in the public interest, as required by the act under which application for permission to construct the new route was made.

In the course of their numerous exceptions, the three roads protested against the failure to find that the proposed construction and operation by the P., L. & W., under the control of the Pittsburgh Coal Co., would enable the latter company to enjoy a monopoly in the marketing of coal in the Youngstown district. It was maintained that the operation of the new line would enable the Pittsburgh Coal Co. to suppress competition between shippers of commercial coal from the Pittsburgh and Connellsville districts to the Youngstown district and, in effect, limit the operation of the P., L. & W. to the private purposes of the coal company. It was pointed out that the report failed to mention the fact that the P., L. & W. would own no terminal facilities at Smiths Ferry for transferring coal from barges to railroad cars, but that those facilities would be owned and operated by the coal company.

Private Shipping Prevented

Replying to the statement in the report that the Government has expended large sums of money in the improvement of the Monongahela and Ohio rivers for the purpose of encouraging navigation on those rivers, the Trunk Line carriers declared that the Government has not expended this money to encourage private shipping and control by a private industry of the wharves and other facilities giv-

ing access to a railroad owned by that industry.

The purpose, it was stated, is to have the rivers utilized by common carriers so that the general public may receive the benefits.

The Pittsburgh Coal Co. and the Youngstown Sheet & Tube Co., it was explained, have acquired about one mile of the water frontage at Smiths Ferry, "and in view of the testimony that available sites at that location are not plentiful, it is evident that any other shipper would very likely have considerable difficulty in finding a location for terminal transfer facilities of its own." It was declared that the Republic Iron & Steel Co. and the Sharon Steel Hoop Co., which intervened on behalf of the applicant, as did the Youngstown Sheet & Tube Co., would find themselves subjected to the dictation of the Pittsburgh Coal Co. as to whatever terms the latter company might see fit to exact for the privilege of using the proposed new line.

Pittsburgh's Advantage Geographical

It is conceded by the applicant, the Trunk carriers said, that the latter have ample facilities for handling traffic that would be moved over the proposed extensions. A principal reason assigned for the construction of the proposed lines is to enable the publication of certain rates on bituminous coal inbound to Youngstown and on finished steel products shipped from the Youngstown district, the Youngstown district industries claiming that they are at a disadvantage compared with the Pittsburgh district companies as to rates on raw materials used in making steel. The advantage, if any, that may be enjoyed by the Pittsburgh and Aliquippa, Pa., industries, it was declared, is due to geographical conditions, and the commission in many cases has decided that rates cannot be equalized on that account. The carriers also contend that the P., L. & W. would have no assurance that it could legally maintain the proposed rate of 60c. a ton on coal between Smiths Ferry and Youngstown.

Business Analysis and Forecast

Better Business Conditions Predominate

Upturn of P-V Line Indicated, Presaging Improvement in
General Trade—Many Conflicting Factors

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

WHILE the total industrial situation is about normal and, on the average, the demand and supply in the commodity markets are in fair balance, the situation is not definitely bullish. Commodity prices in general have moved somewhat irregularly during the past few months, with no pronounced trend. Weakness in agricultural commodities and in some of the basic raw materials indicates that the supply is in excess of requirements and larger than the demand could take care of at existing prices. We think steel production has been recently somewhat in excess of requirements, an opinion that is confirmed by the sharp decline in unfilled orders during the latter part of July. The total situation is illustrated by the nearly sidewise movement of the P-V line, which shows no great maladjustment be-

tween supply and demand, on the average.

As to the money situation, there is no change to report in fundamentals except that the outward movement of gold has apparently ended, leaving conditions to become adjusted to our reduced gold supply. Commercial loans continue to increase and brokers' loans, in spite of recent small declines, remain too large. The seasonal demand for funds in connection with crop moving and currency requirements has already begun. The member bank borrowings from the Reserve banks remain at over one billion dollars. The banks continue to liquidate securities. Their net demand deposits are declining.

We see no prospects of any considerable gold imports, as, on the one hand, foreign governments are certain to support exchange rates and are pre-

pared to raise their rediscount rates if necessary, while, on the other hand, the Federal Reserve Board's policy is obviously unchanged. We must remember that the yield on invested capital in the United States is now too low to be attractive, and that high short-term money rates can be permanently relieved only by the process of liquidation in those quarters which are responsible for the current stringency.

Influence of Money Rates

TIGHTENING of bank credit is the most immediately active unfavorable factor in the business situation. Ultimately building activity will slow down as a result of this factor. The let-up in July may have been due to high rates for money and may possibly mark the beginning of a decline in building operations. Such an occur-

Factors in the General Business Outlook

Favorable Factors

- (1) *Automobile production and sales large for the season.*
- (2) *Retail trade in good volume and above a year ago.*
- (3) *Merchandise exports and imports increased in July; gold exports reduced.*
- (4) *Payrolls and earnings increased in July; employment held steady.*
- (5) *Moderately favorable agricultural situation.*
- (6) *Earnings statements indicate that average company has been making fair progress.*
- (7) *Strong financial position of leading companies.*
- (8) *Light mercantile inventories.*

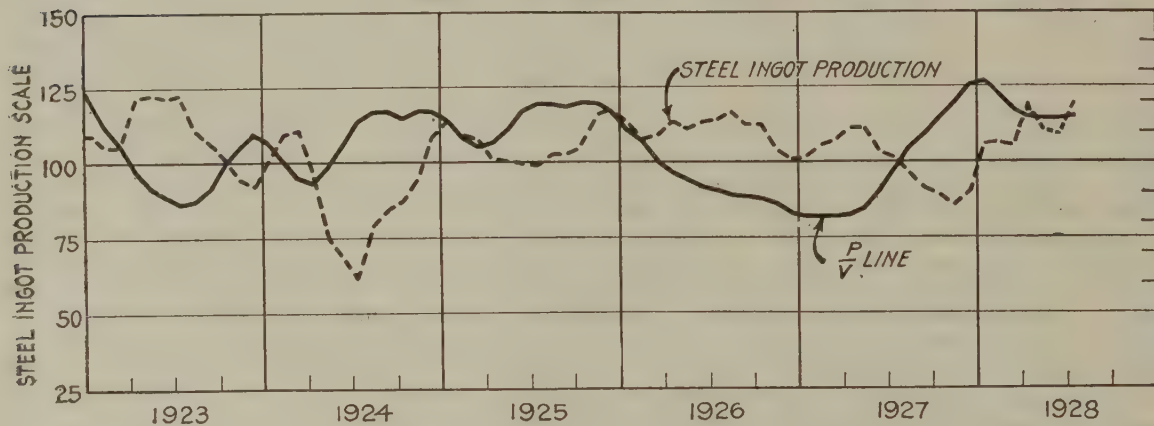
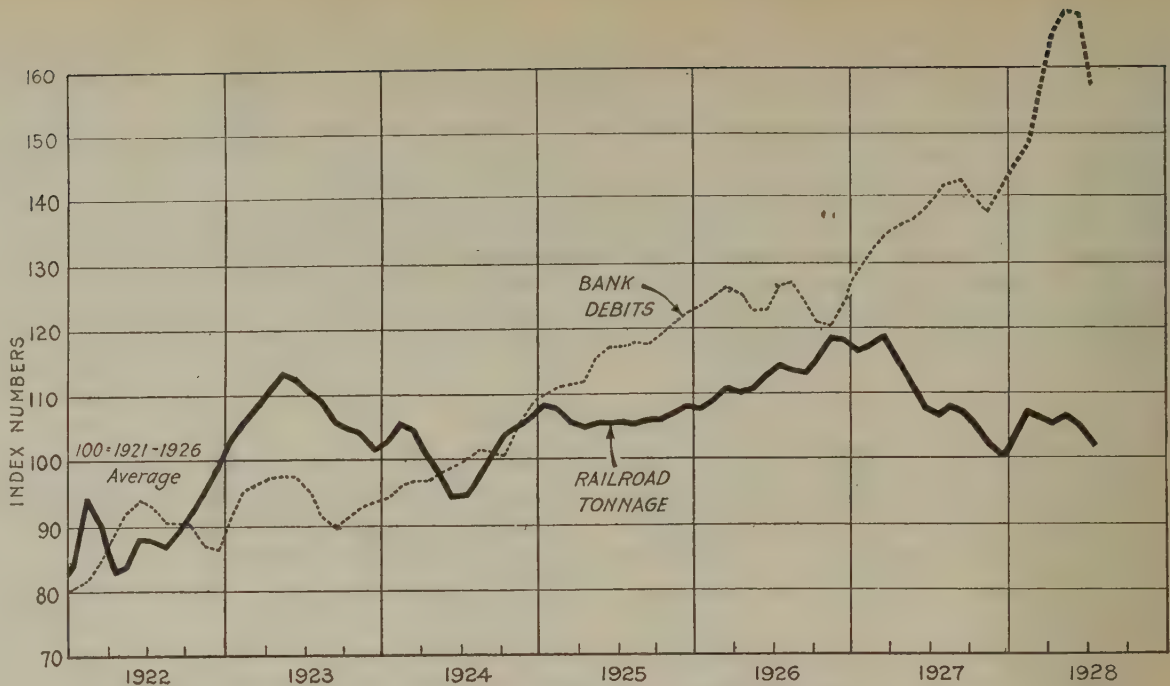
- (9) *Absence of any important industrial maladjustment.*

- (10) *General commodity prices firmer recently; non-agricultural prices in July were the highest in a year and a half.*

Unfavorable Factors

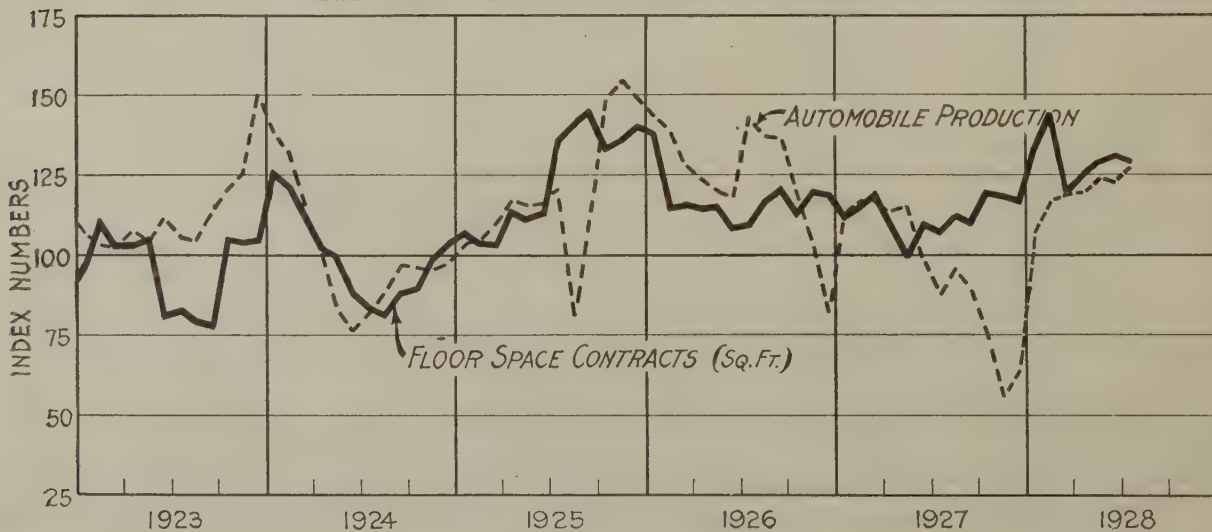
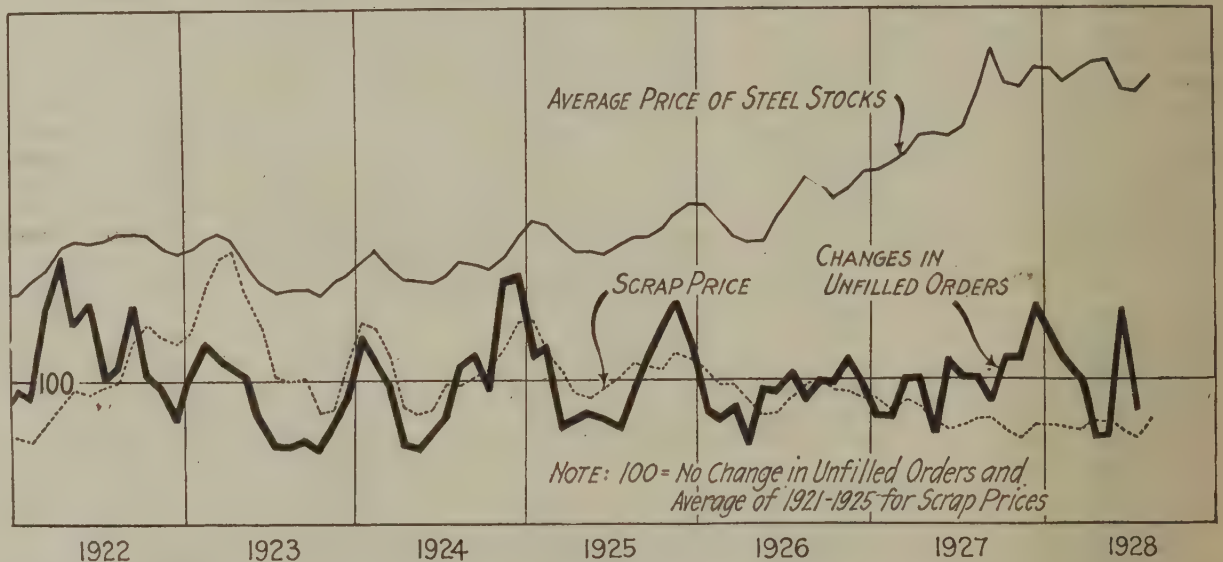
- (1) *Building activity fell off in July; sharp slump in contemplated new construction.*
- (2) *Money tighter and bank credit more strained; net demand deposits declined, while loans continued near record levels.*
- (3) *Decline in unfilled steel orders.*
- (4) *Railroad earnings and traffic relatively low.*
- (5) *Large average stocks of manufactured goods held by producers.*
- (6) *Political uncertainties.*

Freight Traffic Has Dropped to Almost Its Lowest Point Since 1924 and Is Far Below Its Normal Relation to Bank Debits. These have declined after making the highest record ever known, but it is largely speculative



Sidewise Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Seems to Indicate an Early Rise. Steel production (adjusted) has moved upward sharply

Unfilled Orders Have Again Turned Downward, and Are Lower Than in March; Stock Prices, Though at a Higher Level, Are Irregular and Scrap Prices Are Still Weak but Better



Both Building Activity and Automobile Output Showed Continued Strength in July. They are higher than they were at any time during 1927 or the last quarter of 1926

rence would have a considerable effect in retarding all business.

The farm situation appears favorable, but it is too early to appraise it fully, for if wheat and cotton were to fall much lower in price the total receipts from these great cash crops could easily show a decline, in spite of the large yields. Wheat farmers particularly are threatened by the competition of a bumper Canadian crop in the world market. Any favorable developments in the farm situation are likely to be counter-balanced by the bank situation, which promises to continue strained for several months.

Retail trade continues to be a rather uncertain factor, the reported gains being chiefly due to changes in the number of stores included in the reports. Department store sales showed an approximately steady trend last month, considering the season. Factory employment held steady at about the low level of July, 1924. Payrolls and earnings increased sharply, indicating a high percentage of full-time operation.

Weighing all the favorable and unfavorable factors, we incline to the opinion that the money conditions and their effect on building operations hold the keys to the situation, and that at present the outlook is therefore uncertain, with the evidence at hand showing a balance on the unfavorable side. The absence of severe industrial maladjustment, however, aided by the strong financial position of leading companies and light mercantile inventories, and the proved ability of the majority of the leading companies to make fair earnings in the first half of the year, all indicate that business is not likely to decline much.

Ingot Production Remains Very High

AFTER allowing for the usual seasonal change, steel ingot production in July reached a new high for 1928; in fact, even after allowing for estimated normal growth, the index stood at the highest point since July, 1923. This action is in accordance with the tendency for the P-V line to move upward after a sidewise trend for several months. As yet this is only a tendency, but the condition of firming commodity prices and moderate volume of trade, if continued, may lift this barometer in August. Any such rise would have a favorable significance for steel production and business in general. It should be remembered, however, that the decline in unfilled orders in July indicates that the rate of steel shipments was higher than that of sales, and casts doubt on the probability of much further increase in production.

Rampant Speculation Continues Unabated

OUR second chart portrays a situation that has lately become all too familiar. Business activity as measured by an index of the volume of railroad traffic is not quite up to a year ago. Meanwhile, the index of bank

debits, which is influenced by speculation, remains far out of line with the volume of trade, even after a certain amount of liquidation has taken place in the stock market. The latest car loadings statements indicate a volume of trade about equal to that of a year ago, while the renewed public interest in speculation and the consequent increase in the volume of trading will tend to increase the amount of debits and intensify what appears to be a maladjustment.

Building Activity and Automobile Output High

THE third chart is of interest, as it shows the situation in two of the leading key industries (building and automobiles), which ordinarily consume over one-third of all the steel produced. Both of these industries held at a high level in July, and they were largely responsible for the high rate of steel production at a season when conditions are normally dull.

Automobile production in July, according to our estimates for the United States and Canada, was 127.3 per cent of the average of the past seven years. Allowance was made for the usual seasonal changes. This compares with an index of 122.2 in June and 87.5 a year ago. Thus, activity in July reached the highest point since September, 1926. However, current reports indicate a falling off in production which may be more than seasonal. Sales are said to be holding up well, so that no severe decline is looked for. Moreover, Ford plans to step up production through the rest of the year, and this may help to offset the usual seasonal decline from July through December.

Building activity slumped in July. Contracts have declined only slightly more than is usual for the season, but there has been a rounding off tendency for several months, which leaves the

Pig Iron Imports Drop Sharply

IMPORTS of pig iron in July are reported by the Department of Commerce at 6055 gross tons, compared with 11,799 tons in June and 9732 tons in May. As recently as April a total of 20,845 tons was reported. The July figure is 42 per cent lower than that of a year ago, when 10,377 tons came in. For the first seven months there has been an in-

crease of about 15 per cent, the total reaching 81,350 tons. Nearly half of the incoming movement was from the United Kingdom, which supplied almost 35,000 tons in the seven months, against less than 15,000 tons a year ago. British India, which stood first last year, showed a slight decline and is now second. The Netherlands also showed a slight decline and is in third position. Germany has almost disappeared as a supplier of pig iron to the United States.

Steel Shipments Have Outrun Orders

RENEWED drop in unfilled steel orders in July confirms our statement that the sharp June increase was unconvincing. Production and shipments have increased too fast for sales to keep ahead. It is true that, taking the past two months together, unfilled orders have increased, but they are now well below the level of March. Prices of heavy melting steel scrap declined in July, but showed signs of turning. The August average will be up sharply, which action follows the big increase in unfilled orders in June. The effect of the July decline had not yet been felt in the scrap market.

The price of steel stocks has increased rather sharply of late. The stock price index fluctuates in more or less sympathy with that of scrap prices. The recent increase in stocks followed closely upon the marking up of \$1.50 a ton in scrap prices during the past month. The high rate of production, however, has increased the supply of scrap and, in view of the decrease in unfilled orders, a check may be expected in the scrap market. Steel stocks will probably respond to any such change.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT (In Gross Tons)				
	July		Seven Months Ended July	
	1928	1927	1928	1927
United Kingdom	50	3,042	34,777	14,935
British India	2,994	5,405	26,774	28,197
Germany	...	...	95	7,811
Netherlands	2,325	1,025	15,840	17,045
Canada	...	...	378	689
France	300	500	300	523
Belgium	...	...	202	300
Norway	...	...	91	...
All others	386	405	2,893	1,196
Total	6,055	10,377	81,350	70,696

Fabricated Structural Steel

Chicago Apparel Mart Will Take 74,000 Tons—Awards of 37,500 Tons Include 12,000 Tons for Toronto Building

INCLUDING 74,000 tons for the Chicago Apparel Mart, new structural projects reported during the week totaled 104,000 tons. Other large jobs announced were a hotel addition at Toronto, calling for 7000 tons, a warehouse at Akron, Ohio, taking 4000 tons, and an automobile plant building at Weston, Ont., which will require 3500 tons. Awards of 37,500 tons were swelled by 12,000 tons for a furniture building at Toronto and 4000 tons for a rubber plant building at the same city. Awards follow:

BOSTON, 120 tons, George White Fund health unit No. 4, to A. L. Smith Iron Works.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 150 tons, bridge, to Shoe-maker Bridge Co.

STATE OF NEW JERSEY, 200 tons, State hospital work, to Dover Boiler Works.

STATE OF NEW JERSEY, 200 tons, highway bridges, to American Bridge Co.

PENNSYLVANIA RAILROAD, 150 tons, bridges, to Bethlehem Steel Co.

READING RAILROAD, 500 tons, Fifth Street Bridge at Reading, Pa., to Bethlehem Steel Co.

PENNSYLVANIA RAILROAD, 100 tons, electrification work, to Lehigh Structural Steel Co.

BALTIMORE, 300 tons, highway bridge, to Deitrich Brothers.

WASHINGTON, 1500 tons, Lincoln Memorial Bridge, to Phoenix Bridge Co.

ALBERTVILLE, ALA., 150 tons, Saratoga Victory Cotton Mills, to Virginia Bridge & Iron Co.

RANKIN, PA., 220 tons, Monongahela River bridge traffic circle, to John Eichleay, Jr., Co.

CHARLESTON, W. VA., 3000 tons, two Kanawha River bridges, to Independent Bridge Co., Pittsburgh.

TORONTO, 12,000 tons, furniture building for T. Eaton Co., to Dominion Bridge Co.

NEW TORONTO, ONT., 4000 tons, plant building for Goodyear Tire & Rubber Co., to McGregor & McIntyre Structural Steel Co., Ltd.

CLEVELAND, 1400 tons, subway work for Cleveland Union Terminals Co., to Carnegie Steel Co.

CLEVELAND, 545 tons, West 117th Street grade crossing for New York Central Railroad, to unnamed fabricator.

TOLDO, OHIO, 500 tons, addition to Willys-Overland plant, to American Bridge Co.

SPRINGFIELD, OHIO, 600 tons, building for Springfield Metallic Casket Co., to Bellefontaine Bridge Co.

CINCINNATI, 100 tons, Eastern Hills Y. M. C. A. building, to General Iron Works.

DETROIT, 800 tons, furnace bindings for Ford Motor Co. steel works, to Jones & Laughlin Steel Corporation.

DETROIT, 135 tons, car storage building for Chrysler Corporation, to McClintic-Marshall Co.

FLINT, MICH., 150 tons, theater, to Guibert Steel Co.

STATE OF INDIANA, 500 tons, miscellaneous work, to Indiana Bridge Co., Muncie, Ind.

STATE OF ILLINOIS, 3000 tons, lock gates at Brandon Road and Dresden Island for Illinois Waterways Commission, to Independent Bridge Co.

STATE OF ILLINOIS, 575 tons, miscellaneous work in Indiana and Illinois, to Rochester Bridge Co., Rochester, Ind.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD, 900 tons, bridge, to unnamed bidder.

WABASH RAILWAY, 260 tons, bridge, to American Bridge Co.

MILWAUKEE, 500 tons, Bankers' Building, to American Bridge Co. and Milwaukee Bridge Co.

EAST MOLINE, ILL., 800 tons, building for Deere & Co., to Rochester Bridge Co.

ST. LOUIS, 150 tons, freight house for Wabash Railway, to Stupp Brothers Bridge & Iron Co.

OLYMPIA, WASH., 450 tons, Marblemont bridge over Skagit River, to Pacific Car & Foundry Co.

WARDEN, WASH., 400 tons, highway bridge, to Pacific Car & Foundry Co.

SEATTLE, 200 tons, Second Avenue extension, to Hofius Steel & Equipment Co.

OAKLAND, CAL., 1160 tons, office building at Fourteenth and Franklin Streets, to Judson-Pacific Co.

OAKLAND, 250 tons, hangar No. 4 for Port Commission, to Moore Dry Dock Co.

SAN FRANCISCO, 1400 tons, pier 45 for State, to Pacific Coast Steel Co.

SAN FRANCISCO, 100 tons, apartment at Ninth Avenue and Judah Street, to Judson-Pacific Co.

Structural Projects Pending

BOSTON, 250 tons, Back Bay station.

BOSTON, 170 tons, stores on Newbury Street.

BOSTON & MAINE RAILROAD, 100 tons, bridge.

STATE OF VERMONT, 200 tons, highway bridges.

STATE OF NEW YORK, 700 tons, highway bridges.

NEW YORK CENTRAL RAILROAD, 300 tons, bridge at Hastings, N. Y.

BALTIMORE & OHIO RAILROAD, 500 tons, bridges at Chicago.

STATE OF PENNSYLVANIA, 400 tons, highway bridges.

CAMDEN, N. J., 500 tons, safe deposit vaults for Camden Safe Deposit & Trust Co.; Ketcham & McQuade, Philadelphia, general contractors.

WASHINGTON, 150 tons, highway bridge.

BUFFALO, 1000 tons, plant building for Bliss & Laughlin, Inc.

TORONTO, 7000 tons, extension to Royal York Hotel.

WESTON, ONT., 3500 tons, addition to plant of Willys-Overland, Ltd.

AKRON, OHIO, 4000 tons, warehouse for B. F. Goodrich Rubber Co.

MIDDLETOWN, OHIO, 900 tons, warehouse for American Rolling Mill Co.

CINCINNATI, 180 tons, building for St. Louis Parish.

CHICAGO, 74,000 tons, architect's preliminary estimate for Apparel Mart.

CHICAGO, 1900 tons, mill building for Interstate Iron & Steel Co.

CHICAGO, 800 tons, addition to Chicago Club.

ST. LOUIS, 200 tons, Delmar Avenue station for Wabash Railway Co.

ST. LOUIS, 100 tons, St. Michael's and All Angels' Church.

NEW ORLEANS, 1800 tons, American Bank Building.

SAN ANTONIO, TEX., 1300 tons, Nix office building.

SAN ANTONIO, 1300 tons, Alamo National Bank Building.

SAN ANTONIO, 200 tons, Groor National Bank Building.

SEATTLE, WASH., 500 tons, addition to Olympia Hotel.

STATE OF WASHINGTON, 375 tons, two State highway bridges.

OLYMPIA, WASH., 450 tons, Nugents bridge in Whatcom County; Ward Construction Co., Tacoma, Wash., low bidder on general contract.

TACOMA, WASH., 330 tons plates, 32-in. pipe line for city; Birchfield Boiler Co., low bidder.

TACOMA, WASH., 700 tons, addition to Hooker Chemical Co. plant.

RICHVALE, CAL., 170 tons, plant for Pacific Coast Paper & Pulp Co.

Reinforcing Steel

Chicago Apparel Mart Calls for 12,000 Tons

WITH the Chicago Apparel Mart calling for approximately 12,000 tons of reinforcing bars, new projects reported during the week amount to 15,600 tons. The following awards, totaling 5200 tons, include no projects of outstanding size:

NEW YORK, 700 tons, foundations for Western Union Building; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

KEARNY, N. J., 700 tons, plant buildings 51 and 52 for Western Electric Co., Inc., to Joseph T. Ryerson & Son, Inc.

CHICAGO, 140 tons, miscellaneous work for city, to Joseph T. Ryerson & Son, Inc.

COOK COUNTY, ILL., 850 tons of rail steel, road work, to Barton Spiderweb System, Inc.

STATE OF ILLINOIS, 100 tons of rail steel, road work, to Calumet Steel Co.

RIVER FOREST, ILL., 100 tons, reservoir, to Concrete Engineering Co.

EAST CHICAGO, IND., 600 tons of rail steel, plant building for United States Gypsum Co., to Calumet Steel Co.

ST. LOUIS, 600 tons, Terminal Railway Association express terminal for American Railway Express Co., to Laclede Steel Co.

ST. LOUIS, 400 tons, sections 2 and 3 of Southwestern Joint Sewer District, to Missouri Rolling Mills Corporation.

SEATTLE, WASH., 650 tons, Hanford Street sewer, to Pacific Coast Steel Co.

SEATTLE, 175 tons, Cushman spillway, to Northwest Steel Rolling Mills.

SEATTLE, 150 tons, West Waterway bridge, to Northwest Steel Rolling Mills.

SEATTLE, 100 tons, addition to Seattle Ice Cream Co. plant, to Pacific Coast Steel Co.

SAN FRANCISCO, 150 tons, pier No. 45 for State, to Pacific Coast Steel Co.

SACRAMENTO, CAL., 145 tons, State hospital at Eldridge, to Pacific Coast Steel Co.

Reinforcing Bars Pending

RIVERTON, N. J., 200 tons, road work. Cizzienti Brothers, general contractors.

BUFFALO, 300 tons, Genesee garage, Metzger Construction Co., general contractor.

BUFFALO, 200 tons, superstructure for Rand Building; bids in.

CLEVELAND, 950 tons, Lakeside Hospital buildings.

CHICAGO, 12,000 tons, architect's preliminary estimate for Apparel Mart.

WAUKEGAN, ILL., 225 tons, department store building.

SEATTLE, 500 tons, addition to City-County buildings; bids in September.

SEATTLE, 500 tons, addition to Olympic Hotel.

SAN FRANCISCO, 525 tons, Bernal Cut project; bids Sept. 17.

SAN FRANCISCO, 200 tons, warehouse for Simmons Bed Co.

This Issue in Brief

Heating and forging operations are synchronized into straight-line mechanical production in bolt plant. Forging furnace, coupled to each hot bolt-heading machine, is fed by wire passing from coils through furnace and directly into machine. This necessitated automating heating operation and providing capacity for delivering wire at high speed.—Page 517.

* * *

Will observe centenary of invention of hot blast. First step in fuel economy and consequent high output of blast furnaces increased furnace output from 37,500 tons in 1830 to 200,000 tons in 1840.—Page 512.

* * *

Three electrically operated rotary furnaces in automotive plant do work formerly requiring 26 oil-fired furnaces. Heating costs are higher, but direct labor charges have been reduced one-half and quality of product is greatly improved.—Page 514.

* * *

Says tightening of bank credit is most immediately active unfavorable factor in present business situation. Dr. Haney holds that this will ultimately slow down building activity and that let-up in July, resulting possibly from high money rates, may mark beginning of decline in building operations.—Page 525.

* * *

Metallurgical division of Bureau of Standards receives 3000 letters and 600 personal visits requesting information each year. Majority of these inquiries deal with wear of metals.—Page 510.

Carburizing boxes at Dodge plant are of three-piece construction, $11\frac{1}{2} \times 16 \times 8\frac{3}{4}$ in. in dimensions, and are made of Q-alloy or a nichrome heat resisting alloy. Cast corners and rolled alloy sides which are cast into corners help to prevent breakage.—Page 513.

* * *

Cold heading and cold nut department produces 2,000,000 nuts and 1,000,000 bolts daily. Nut machines are placed in parallel rows with aisles between, which are spanned by cranes distributing raw materials from industrial cars to machines. Finished product is discharged into buckets handled by monorails operating in outer aisles.—Page 516.

* * *

Exports and imports of iron and steel both declined in July. Export total was 3.3 per cent under June, but considerably larger than total for corresponding month last year. July imports declined 27.3 per cent.—Page 555.

* * *

Distinction between "practical" and "theoretical" research is artificial, says metallurgist. Important advances have often resulted from work undertaken for purely practical purposes, and vice versa. Search for fundamental facts is not affected by reasons prompting investigation.—Page 512.

* * *

Precision is achieved in automatic cutting and welding machinery. Self-indexing and automatic control devices worthy of best quality machine tools are now installed on equipment for production work.—Page 521.

Raw materials used in bolt plant are analyzed upon receipt and are tagged with this analysis. Same tag is put on material after it is rolled and follows it through plant. In this manner all defective products can be traced back to original shipment of raw material.—Page 518.

* * *

Plant is operated 88 hours a week on two shifts. Plan gives all workers nearly half day of daylight out of shop, reduces overhead costs and keeps down investment in equipment, as each machine is made to yield a maximum return during years when it is still modern.—Page 520.

* * *

Thinks Belgium, Germany and Italy are European countries offering most promising field for American machinery. Machine tool manufacturer predicts boom for automotive industry in Europe and finds widespread adoption of American mass production methods.—Page 559.

* * *

Economist sees prospect of little decline in business activity. Absence of severe industrial maladjustment, strong financial position of leading companies, light mercantile inventories and proved ability of majority of companies to make fair earnings in first half are sound conditions.—Page 525.

* * *

Fabricated structural steel, sheets and corrosion-resisting alloys have profited by well directed publicity. Steel industry as a whole is failing to avail itself of opportunities seized by particular branches in marketing special products.—Page 530.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Publicity Pays

FROM time to time attention has been called in these columns to the fact that the steel industry taken as a whole is failing to avail itself of one of the most powerful business allies, namely, publicity. It has been pointed out also that publicity means much more than advertising; it includes giving facts to the public generally, and to customers particularly, on many matters which not so many years ago were treated as secret trade information. It involves prompt issuance of statistics on production and stocks, and an adequate and accurate expression of market prices and trends. It is closely allied to an enlightened campaign to improve public relations.

Passing aside for the present any consideration of these more subtle phases, consider for a moment the power of advertising—that most obvious publicity effort. It would be trite to dwell upon the meteoric rise of prosperous companies promoting new devices such as automobiles, automatic refrigerators, vacuum cleaners, electric washing machines, safety razors and radios, and to remind the reader of the commanding part effective advertising has had in their development. “But,” it will be objected, “these people had something new, something to catch the attention of the buyer. What is there of similar dramatic appeal in steel?”

Such a reply could come only from a person of small imagination. Structural steel is apparently a humdrum every-day material to those who roll, fabricate and erect it; but it would be a mine of copy for a skilled advertising man. The very bigness of the things done with it would form a most striking series of advertisements. The Hudson River bridge, the Cleveland terminal project, sky-scrapers and massive commercial buildings in all the big cities, subways and a veritable underground world are all made possible by this common grade of steel, apparently so uninspiring to most of its makers. Indeed such possibilities for attractive publicity have already been seized upon by one of the leading steel producers and by an organization of fabricators. More power to them!

And there's sheet steel. A corrugated iron shed or a culvert is probably as prosaic a thing as could well be built. No chance to go into rhapsodies about that applied artistry, beauty and luxurious appointment which seems to permeate the multi-colored advertising pages of our popular magazines. Yet men with a vision of the needs of industry, and an ability to tell the world about the excellencies of their product, have within a generation expanded a small rolling mill into one of the large independent steel-making organizations.

Another impressive example comes in recent years

in the field of corrosion-resisting alloys. An advertising campaign in one popular magazine and 30 trade publications enabled an alloy iron to break all sales records in 1927, whereas the company's other lines were experiencing the recession which was general that year throughout the industry. The same advertising appropriation has been continued for 1928, and it is reported that the satisfactory sales for 1927 are being exceeded by as much as 30 per cent.

Such facts would be cited by advertising men as another instance of the increasing returns from continued and consistent publicity. To us it seems most important as an exhibit of special marketing of an every-day article of commerce, with the aid of proper publicity.

Bureau of Standards Carries On

MORE than once we have commented on the fact that the metallurgical division of the Bureau of Standards is prevented by lack of funds from attacking many problems which have been proposed and which are within its ability and province. A scant \$125,000 is hardly enough to maintain a going organization of 45 workers, and it is a matter of wonderment and congratulation that so much valuable information is actually produced.

Some of the problems on which work has been requested by industry or by technical societies, but which cannot be taken up until current projects are completed or until more public funds or some assistance from industry are available, are these: Study of methods of testing sheet and strip steel for deep-drawing properties and methods of controlling those properties; study of methods of testing cast iron for machinability; resistance of white bearing metals; study of the fundamentals of the hot galvanizing process; life of piping used in building construction; also several problems on malleable cast iron.

All these subjects are large ones and unless and until funds are in sight to allow work sufficiently exhaustive to bring results it would be wasteful to divide further the attention of the present staff by tackling them as side issues. It certainly would be poor policy to leave a current project unfinished and waste the investment already made in it in order to take up a new one, no matter how important the new one may be. The metallurgical division is thus well advised to adhere to the lines of work already in hand until funds are available for branching out.

No increase in Governmental funds is in sight—in fact a slight decrease appears probable for the next

fiscal year—and it seems likely, therefore, that new problems will be approached only as old ones are finished.

This situation makes it imperative to appraise the suggested new projects so they may be placed in the order of their importance and of the justification for expending public funds on them. On this matter the comments and advice of that cross-section of industry consisting of the readers of *THE IRON AGE* would doubtless be gladly received by the director of the Bureau of Standards.

Organizations in the metal-working field with specific problems to solve and yet without well equipped laboratories should also remember that the "research associate plan" may be the quickest and best way to reach an answer. Briefly the plan is this: If the problem is of sufficient general interest, the Bureau of Standards will receive as guest a competent investigator, whose salary will be paid by the commercial organization proposing the problem, but who will be tendered freely the use of the bureau's equipment.

One of the great advantages of this plan is the contacts which the research associate has with the staff at the Bureau of Standards. Every one knows that these men at the bureau have no financial interest in the problems they study and no tendency toward bias. They are interested solely in what the facts may be, irrespective of whether they lead to one conclusion or another. This impartial and unbiased point of view is a precious possession and the one from which a commercial investigator can receive most inspiration.

The Politicians and the Farmers

BOTH Mr. Hoover and Mr. Smith have now made their speeches and among many other things have expressed their views in regard to the agrarian problem. Neither has been satisfactory to the professional exponents of the corn planters and wheat growers, for to them no sound thinking man can possibly be satisfactory; and both Mr. Hoover and Mr. Smith are sound thinking.

The grievance of the Western farmers may be summarized simply as the complaint against low prices. The plain reason for the latter is that so much wheat and corn are being produced that the growers have to accept low prices in order to dispose of them. Indeed they produce an exportable surplus that has to meet the competition of producers everywhere in the world. The only economic method of elevating the world's price is for producers to reduce their output; but that is something that they refuse to do voluntarily, and will do only under economic constraint, which always is painful. In fact, we are now producing larger crops from fewer farms and with fewer men. This compels a certain migration from the farms to the towns. There is no way of preventing that, and there ought to be no thought of trying to prevent it, for it is the natural economic development. Anything like price-fixing or the bestowal of bounties would be like throwing gasoline on a fire.

In respect to demand, supply and price equilibrium the situation in major agricultural products is not unlike that which prevails in petroleum, which is another of our great industries, representing as it does about 11 billion dollars of invested capital. The investors in

that industry, especially in the producing companies, are not getting much return and they too would enjoy higher prices; but if anything artificial should accomplish an elevation of price there would be immediately a reswelling of the flood of oil, which is being but barely checked by the prevailing competitive price.

Neither Mr. Hoover nor Mr. Smith could talk so bluntly as this, but it summarizes what they both know, and they could not therefore discuss the agrarian question in anything but generalities which hold out no hopes for the immediate advent of good times to the tillers of the soil. Increased intelligence in planning, in operating and in marketing is desirable and will be beneficial, and the Government should and will do everything in its power to promote this, but such a program does not greatly intrigue the professional exponent of agrarian ills, who wants a sharply rising market for wheat and corn and farm lands, and wants it soon.

These Money-Saving Reforms!

ADVOCATES of simplified spelling say that the adoption of a phonetic system would save the American people 600 million dollars a year in their printing bills and 900 millions in the education of school children. The advocates of the metric system of weights and measures assert that their ideas would save us 800 or 900 millions a year. The advocates of calendar reform also have optimistic opinions, which they have not yet ventured to express in figures, but probably their estimates would be generous.

It is told that an energetic effort will be made to pass a bill for calendar reform through the next session of Congress. We are led to wonder why the advocates of spelling reform, weights and measures reform and calendar reform do not pool their issues and unite in one grand reforming bill. This would offer some excellent opportunities for log-rolling.

The estimates of the reformers in respect to the great savings they would effect do not apparently make any account of costs. Alas! It has been our experience in this pragmatic world that nobody ever gets anything for nothing. Even the promoters of wild-cat stocks and the vendors of gold bricks discover that apparent paradoxes to the contrary are always illusionary. If spelling, measuring and calendrical reforms would save us two or three billion dollars a year in our national economy, say a matter of 3 or 4 per cent of our national income, that would be indeed like a treasure-trove; but we fear the cost of the expeditions to get it.

Purchasing Agents and Profits

HOW far the buyer and how far the seller should be held to blame for price demoralization, whenever it occurs, has been much argued, generally without any helpful result. Not long ago the *Purchasing Agent* inveighed against the "myth of profitless prosperity." It challenged the common assertion that "manufacturers are making no money" and particularly absolved purchasing agents from responsibility for the condition, to whatever extent it might exist. Following up this article a like disclaimer was put in by George A. Renard, the secretary of the National Association of Purchasing Agents, in a New York

newspaper interview, in which we find this statement:

This charge was definitely refuted at a recent conference attended by the executives of thirty leading industries which do a very large business with purchasing agents. The thought developed at that conference was that, if the question of over-production is eliminated, such criticism of purchasing agents comes more from sellers who are not able to produce economically than from a real basis of complaint regarding unethical practices of buyers, and that for every so-called unethical practice of the latter many more could be cited against the sellers or their representatives.

There is something reminiscent of the old-time tariff debates in this "pot-and-kettle" aspect of the price problem. Your free trader saw a nation made up of two classes—on the one hand industrial employers and employees, and on the other hand the consumers of the products of industry. What was good for the former, it was argued, could not be anything but detrimental to the latter. But as reason entered more and more into the consideration of the issue, it came to be seen that this nation is not made up of two great camps, one containing all the producers and the other all the consumers, but rather that producers in one field are consumers of the products of another, that the members of the great industrial army have an interest as consumers in fair prices for all commodities, and that all of the millions engaged in agriculture profit by the existence of a large and well employed army of industrial workers.

Some of this comment on the comparative culpability of the purchasing agent and those who sell to him, where business is being done without a living profit, ignores the palpable fact that practically all buying by purchasing agents is for companies which in turn are sellers. Thus the secretary of the purchasing agents' organization, in what he says above, is really charging that for every unethical practice of the purchasing agent of a seller many more could be cited against the salesmen of that identical seller. In other words, he seems to say that the act of selling is a much more serious strain upon the ethical fiber of the average human than the act of buying; and as to that there will be general agreement.

On the charge which the *Purchasing Agent* repels—that buyers' agents would "squeeze the last vestige of profits from their suppliers"—fairness compels at least the Scotch verdict. But "profitless prosperity" being so apt a coinage and having so many grains of truth in it, why try to make it out to be altogether a myth?

WITH the end of the great war nearly ten years back, the Russian steel industry is at last getting to its feet again. The National Federation of Iron and Steel Manufacturers in London, England, reports Russian pig iron output for the first quarter of this year at 272,300 gross tons per month, a gain of about 25,000 tons per month over the 1927 rate. In steel the showing is better—354,000 tons per month for the first three months of the year, a gain of 50,000 tons per month over the rate of a year previous. While pig iron output this year is about 20 per cent under its pre-war volume, steel is only 11 per cent below the rate for 1913 when the steel ingot total was about $4\frac{3}{4}$ million tons. That

Russia could have reorganized its steel industry and brought it to a degree of activity so nearly approaching that of pre-war time will surprise many who have looked skeptically upon every effort of Sovietism to bring order out of chaos. On such a record one need not doubt that the country in the near future will be largely self-contained as to steel and that central and western European steel works, those of Germany in particular, will have to look elsewhere for much of the outlet in heavy steel products which they have found for nearly ten years beyond the Baltic and the Dniester.

Light Gains in Automobile Output

RECENT statistics of automobile production are particularly interesting on account of the complications due to the Ford stoppage in May of last year and the recent slow gain, as well as the recent heavy sale of other makes on account of new models. A superficial glance at the statistics may easily mislead to a belief that assumed arrearages are being made up. June and July made large gains over production of a year previous and also made new records for those months, but they gained over the previous records by only about 2 per cent.

It is the longer swing that counts, and the best view is obtained by comparing twelve-month totals. Such totals, of production of passenger automobiles and trucks in the United States and Canada, have been as follows:

12 Months Through July	Total Production
1925.....	4,006,806
1926.....	4,633,353
1927.....	4,120,033
1928.....	3,841,364

No one is likely to attribute to business conditions or the state of general prosperity the decreases in the last 24 months. To be precise, it may be mentioned that it was in October, 1926, that production began to fall below that of a year previous, and thus one may say that decreases began 22 months prior to the present month.

The two influences to be considered are a decrease in the number of new users developing year by year, in an approach to what used to be called "the saturation point," and also that some buyers have been waiting for delivery of the new Ford model. The former can be studied by way of the latter. Exploring the statistics, production in the 12 months through July, 1926, may be taken as a basis, to see what comes of it. Assuming for argument that such production represented a rate, a continuance of that rate during the following 24 months would have given 1,305,000 greater production than has occurred. The arrearage due to people waiting on the new Ford cannot possibly be so great. To produce 1,250,000 Fords in ten months would require 3500 daily in the present month, rising by 500 daily month by month to 8000 next May.

Undoubtedly there is a substantial arrearage, but one cannot avoid the conclusion that the best rate of the past will not in the nearby future be averaged for any great length of time. At present the rate is very high. June showed a total of 425,366 and July 415,671, representing an annual rate of 5,050,000. In the four years, 1923 to 1926, inclusive, June and July production averaged 2 per cent above the calendar year average

rate. Thus it is fair to say that production in June and July of this year typified a 5,000,000 annual rate. We have entered a period of exceptionally heavy production, which is likely to last for quite a while, but a permanent

rate materially exceeding that of two years and more ago is hardly to be expected. What might be called a permanent or regular rate will come when the new Ford is well in and the old Fords are well out.

American Export Ideas Adopted

Mechanical Engineers Act on Cable Code—Greatest Need of Aviation Said to Be Flying Instructors

ST. PAUL, MINN., Aug. 27.—Of prime interest to export competition were the results achieved by the representatives of the American Society of Mechanical Engineers at the recent meeting at the Hague of the International Electrotechnical Commission. The society, which is holding a summer convention in this city, had been appointed secretariat for the mechanical standards—which for the moment at least are receiving major attention.

According to information divulged in the meeting of the council of the Society today, American ideas were accepted to a marked degree, such as the common American provisions for overloads in such machinery as steam turbines. No similar basis in designs for prime movers was offered by European builders.

The organization's representatives in the Holland deliberations were Francis Hodgkinson, Westinghouse Electric & Mfg. Co.; I. E. Moulthrop, Boston Edison Electric Illuminating Co., and C. B. LePage, assistant secretary of the society, in charge of standards.

The council approved the proposed simplification of cable codes, authorizing the secretary to notify the Federal Trade Commission to that effect, with a proviso that cable charges must not be increased and thus add to export costs. The society approves five-letter code words instead of 10-

letter words, provided those foreign countries which so largely own or control telegraph lines do not charge more than one-half the present rate for 10-letter words.

Favorable action was also taken recommending officially the plan of the American Arbitration Association to settle commercial disputes without recourse to law.

W. B. Stout, president Stout Metal Airplane Co., Dearborn, Mich., held the sustained interest of a large audience with an address covering, in part, the future of aviation. In five years, according to Mr. Stout, the airplane will barely be recognized from those in use today. Ten hours suffices for training one to drive an airplane, and so, he said, there is a great need of trainers and of moderately priced training planes, particularly as the present available supply is 15 to 20 times the number of aviators qualified to run them. He looks for the Diesel motor to be applied to aviation.

Automobile Production Still at High Rate

NEW YORK, Aug. 27.—*Automotive Industries* this week will say:

"Continuance of automotive manufacturing in September at a rate exceeding 400,000 cars a month is practically assured by the large number of orders which will be carried over into that month by leading car manufacturers. Orders for models presented during the last two months have run far ahead of factory production capacity, demand in recent weeks having been almost as heavy as in the days immediately following the car introductions.

"Combined production figures of United States and Canadian factories in July show a total output of 415,671, comparing with 425,114 in June and with 279,472 in July last year. All indications at this time are that the August total will surpass July, though the excess over August, 1927, will probably be smaller.

"Reports from the field indicate not only that dealer stocks are small but that they are practically non-exis-

tent. This applies particularly to those dealers handling recent new model cars, though demand for cars of earlier introduction has been consistently large. Used car stocks generally are at much lower figures for the season than in recent years and buying is holding closely to the level of new car buying. Dealers throughout the country express conviction of a maintenance of the buying movement well into the last quarter."

Air Furnace Brick Reduced to Two Dozen Sizes

"Malleable Foundry Refractories" is the title of Simplified Practice Recommendation R79-28 recently issued by the Bureau of Standards. The standards contained have already been accepted by 45 manufacturers of fire brick and 82 malleable iron foundries. They list two sizes of door-opening tiles, three tap-out blocks, five 13½-in. bungs for roofs, six circle bricks for stacks ranging from 24 to 84 in. diameter, and eight shapes for general work, viz., 9-in. straight, soap,

split and large straight, No. 1 and No. 2 arch and No. 1 and No. 2 wedge.

Upon depletion of the present stocks, all other sizes shall be considered by the manufacturers as specials, and extended delivery dates may be expected.

Pittsburgh Shippers to Inspect Water Routes

To focus attention on the importance of wharf and river terminal development in order that the community may benefit by the Ohio River improvements which will be completed next year, the shippers' council of the Chamber of Commerce of Pittsburgh is arranging to take a large group of industrial leaders, business men and public officials on an all-day inspection tour of the three rivers within the Pittsburgh district Thursday, Sept. 6. The steamboat Julia Belle Swain has been chartered for the trip. It will go up the Monongahela River as far as Clairton, down the Ohio to Ambridge and up the Allegheny to Aspinwall. Terminals along the route will be inspected.

Iron and Steel Traffic on Ohio River Surveyed

WASHINGTON, Aug. 28.—The results of a traffic survey to discover the available traffic, in lots of 100 tons and over, into and out of Ohio and Mississippi River points between Pittsburgh and New Orleans, have just been compiled by the transportation division, Department of Commerce. Iron and steel products, exclusive of tin plate, are rated as having available 3,053,279 net tons from 21 cities along or near to the Ohio River, this amount being almost half of the total of 6,638,766 tons for all commodities. Tin plate is rated with 141,020 tons, and coal and coke with 577,000 tons, while the total given for fluorspar is 111,500 tons. Of the 21 cities, Pittsburgh leads the list in the amount of tonnage available, the total being 1,447,477, while Wheeling, W. Va., ranks second, with 1,159,697 ton, and Cincinnati third, with 933,260 tons.

The request for the survey was prompted by the belief that a barge line specializing in freight in quantity lots of 100 tons, or even 500 tons, could operate with a small overhead and the many shippers having such bulk freight available would have their own terminals. This scheme of operation, with large volume and small overhead, it was pointed out, promised water transportation with low rates.

Iron and Steel Markets

Further Advances in Pig Iron

Foundry Iron Prices Raised at Birmingham, Chicago, St. Louis
and Buffalo—Another Rise in Heavy Steel Scrap
at Pittsburgh—Steel Output Maintained

THE upward trend of prices in the iron and steel market has been given further impetus by the growing strength of primary materials. Advances in pig iron have been accompanied by heavy sales, and scrap prices continue to rise. Business in finished steel is mainly in specifications against contracts, and, notwithstanding scattered concessions on large current orders, mills appear determined to establish the price increases announced for the fourth quarter.

Foundry pig iron prices have gone up 75c. a ton at Birmingham, 50c. a ton at Chicago and St. Louis, and 50c. to \$1 at Buffalo. Pig iron sales for the week totaled 73,000 tons at Cleveland, 60,000 tons at Chicago and 50,000 tons in the Valleys, while commitments for the country at large were well over 275,000 tons.

Furnaces are accumulating comfortable backlogs, some of them being booked for the rest of the year. Considerable tonnage in large inquiries is still pending, and an increasing number of small melters who have been limiting purchases to immediate needs are now seeking contracts through the next quarter.

Heavy steel scrap at Pittsburgh has again advanced 50c. a ton, making a total gain of \$2 since the low point was reached in July. The shortage of steel works scrap is still acute, as reflected in competition among dealers for material to fill their orders.

Output of finished steel products remains at a high level. Ingot production at Chicago is now 80 per cent of capacity, compared with 75 per cent last week. In the Greater Pittsburgh area the rate is between 80 and 85 per cent. The average of the various Steel Corporation subsidiaries, at 75 per cent, has shown only slight variation for several weeks.

Shipping orders, although declining in some products, have increased in others. Gains in sheet specifications, as well as fresh orders for delivery this quarter, apparently reflect a desire to take advantage of the 2 per cent discount for cash payment, which expires Oct. 1. In some cases consumers are buying enough to cover all of their probable needs through the rest of the year.

Releases against contracts for shapes, bars and plates are also heavy, and it is likely that little tonnage will remain unspecified on Sept. 10. Following the practice recently established, fourth quarter contracts for plates, shapes, bars and sheets will contain a clause calling for complete specifications by Dec. 10.

Contracting for the fourth quarter is still of negligible proportions. Concessions have been reported on attractive current tonnages of sheets and heavier rolled products, but these do not preclude adherence to the

price advances announced for the next three-month period. The building up of large backlogs before assuming a stronger position on prices is not without precedent.

Price competition has been keen for pipe line tonnage, particularly between makers of lapweld and electrically welded pipe. Three gas and two oil lines, calling for a total of 1500 miles of pipe, are pending.

The latest price advance for fourth quarter delivery is an increase of \$2 a ton on alloy steel bars. While the new price becomes effective immediately, consumers are generally covered for the current quarter.

In tin plate, a product contracted for by the year or half-year, no change in prices can be expected before the end of December. A reduction in the price for 1929 is a possibility, in view of the decline in pig tin. A seasonal recession in specifications points to a tapering of tin plate output within 30 days. Production for the year will probably be a record, however.

A probable offset to the expected decline in tin plate output is the expanding production of wire products. Wire mill operations have increased to 65 per cent of capacity, and a further gain is indicated. Some makers of wire products have announced that present prices will be continued for the fourth quarter.

Chicago structural fabricators have in prospect 150,000 tons of steel work which may be awarded before the end of the year, this including 74,000 tons for the new Apparel Mart. A furniture building and a rubber plant in Toronto, Ont., one taking 12,000 tons and the other 4000 tons, account for nearly half of the 37,500 tons of structural steel awards in the week.

Railroad buying has taken a more prominent place in the steel market through the purchase of 55 locomotives by the New York Central, 6000 tons of rails by the Missouri-Kansas-Texas and 9000 tons of plates by the Chesapeake & Ohio for car repairs. The latter road will also buy 45,500 tons of rails and 14,000 tons of accessories.

Export shipments of steel have gained appreciably and help explain the high rate of output of those mills that specialize in foreign trade. Exports of iron and steel last month were 33 per cent larger than in July, 1927.

THE IRON AGE composite for pig iron has advanced to \$17.34 a ton, a gain of 30c. over the price prevailing in the previous five weeks, the lowest level reached this year. The finished steel composite is unchanged at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron. Per Gross Ton:	Aug. 28, 1928	Aug. 21, 1928	July 31, 1928	Aug. 30, 1927
No. 2 foundry, Philadelphia....	\$20.26	\$20.26	\$20.26	\$20.76
No. 2, Valley furnace.....	16.50	16.50	16.50	17.50
No. 2, Southern, Cin'ti.....	19.94	19.19	19.19	20.94
No. 2, Birmingham.....	16.25	15.50	15.50	17.25
No. 2 foundry, Chicago*.....	18.00	17.50	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.00	16.00	16.00	17.25
Valley Bessemer, del'd P'gh...	18.76	18.76	18.76	19.76
Malleable, Chicago*.....	18.00	17.50	17.50	19.50
Malleable, Valley.....	17.00	17.00	17.00	17.50
Gray forge, Pittsburgh.....	18.01	18.01	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.85	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.90	1.85	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.19	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.85	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Aug. 28, 1928	Aug. 21, 1928	July 31, 1928	Aug. 30, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, Pittsburgh	2.65	2.65	2.60	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, Pittsburgh	3.40	3.40	3.40	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill.	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill.	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh...	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$16.00	\$15.50	\$14.25	\$15.50
Heavy melting steel, Phila....	13.00	13.00	13.00	14.00
Heavy melting steel, Ch'go....	12.75	12.75	12.50	12.00
Carwheels, Chicago.....	12.75	12.75	12.75	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh.....	14.75	14.50	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	15.50	16.00
No. 1 cast, Ch'go (net ton)....	14.25	14.00	13.50	14.75
No. 1 RR. wrot. Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)...	11.25	11.25	10.75	11.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.75	13.25
Electrolytic copper, refinery...	14.50	14.50	14.50	13.00
Zinc, St. Louis.....	6.25	6.25	6.20	6.25
Zinc, New York.....	6.60	6.60	6.55	6.60
Lead, St. Louis.....	6.22½	6.00	6.00	6.30
Lead, New York.....	6.40	6.20	6.20	6.60
Tin (Straits), New York.....	47.50	47.87½	47.75	63.50
Antimony (Asiatic), N. Y.....	10.25	10.25	10.00	12.00

Pittsburgh

Steady Flow of Specifications on Third Quarter Contracts— Heavy Pig Iron Buying—Scrap Prices Higher

PITTSBURGH, Aug. 28.—The flow of specifications on third quarter contracts still is steady and strong to steel manufacturers in this and nearby districts and finishing mill operations remain at a rate that requires an ingot production of between 80 and 85 per cent of capacity. Makers of seamless pipe have enough business to keep them well engaged for the remainder of the year and the situation is much the same in large outside diameter pipe for oil and gas lines. Shipping instructions on sheets are pouring in freely and almost invariably the promptest possible delivery is asked. Tin plate has begun to slow up, as usual at this time of the year, but as a partial offset to that is the fact that wire products are moving a little better than they did last month. There is no let-down in the movement of strips on old orders, nor are cold-finished steel bars yet reflecting any recession in the high rate of activity of the automotive industry, the principal outlet for these products. The shipments of the heavy tonnage products leave little to be desired.

From the standpoint of plant engagement and the way consumers are ordering out their purchases, the situation has rarely been more favorable, especially at this time of the year. But most of the tonnages are moving at what are commonly said to be unsatisfactory prices. In that connection, however, there is a very general effort to bring about an improvement on supplies that will be wanted for the final quarter of the year. It is early

for much of a test, but in the face of the announcement made early in July that the fourth quarter price of bars, plates and shapes would be 2c., base Pittsburgh, there is some concern over the fact that on a railroad inquiry, 1.90c. was the common quotation and only a few mills placed any limitation upon the date of acceptance of specifications on the order.

It develops that quotations of 3.60c., base, on galvanized sheets on fourth

quarter business are for small lots and that the quotation to jobbers and large consumers is 3.50c. No fourth quarter business of consequence yet has been booked in sheets. Makers of alloy steel bars have advanced the base price from 2.65c. to 2.75c., making no changes in alloy differentials.

Higher prices are being sought by at least one maker of foundry iron as a result of good-sized sales of that grade in the past week, one of which was 16,000 tons. Pig iron sales in general have reached the heaviest total in many weeks, but the business was done at recent prices and the market is firmer only to the extent that producers now are well supplied with business and naturally a little less eager for additional tonnage.

Scrap prices again are headed higher; the short interest in the steel works grades has not been materially reduced and with no let-down in steel works operations or requirements, scrap dealers find it necessary to bid high to cover their sales. The rise from the recent low point in heavy melting steel is \$2 a ton or more, and it is predicted that a further advance will be registered on the railroad scrap to be awarded next week.

Pig Iron.—The Valley-Pittsburgh iron market has had the most active

week in several months, with total sales of approximately 50,000 tons, but prices do not appear to have been appreciably strengthened by this large turnover. On the contrary, competition for business was sufficiently active to defeat efforts made by some producers to secure an advance over recent prices and the quotable market is just where it was a week ago. The Standard Sanitary Mfg. Co. figures in the week's business to the extent of 16,000 tons of No. 2 and No. 2X iron for shipment over the next four months to its Pittsburgh and New Brighton, Pa., plants. Most of this was sold at \$16.50, Valley furnace, for both grades, but for a small part of the higher silicon iron \$16.75 was paid. Other sales of foundry iron, including one of 1500 tons to a Greensburg, Pa., melter, and probably reaching a total of more than 5000 tons carried the same prices. Basic iron has figured to an even larger extent in the week's business. The Allegheny Steel Co. was a buyer of 18,000 tons, the Edgewater Steel Co. of 5000 tons and the American Steel Foundries for its Alliance, Ohio, plant of 2000 or 3000 tons. This iron was sold at \$16, Valley furnace, or the equivalent from other points of origin, efforts to obtain more having been unsuccessful. While small lots of Bessemer iron have been sold at \$17.25, Valley furnace, a good deal more has changed hands at the recent quotation of \$17. Several producers now have fair-sized backlogs as a result of the week's business and one merchant producer has announced an advance of 50c. on foundry iron to \$17, Valley furnace, for No. 2 and has renamed the former silicon differentials of 50c. per half point of silicon, quoting No. 2X iron at \$17.50 and No. 1 grade at \$18. This action, however, has not yet been followed by other producers. An inquiry for 4000 tons of malleable iron is reported.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00
Bessemer	17.00
Gray forge	\$16.25 to 16.50
No. 2 foundry	16.50 to 16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Consumers are taking unusually steady shipments against contracts for the various ferroalloys. The occasion does not exist, however, for supplementary tonnages and new business does not amount to much. The Ford Motor Co., recently in the market for 400 tons of 14 to 16 per cent ferrosilicon, is understood to have placed the order with a Western producer.

Semi-Finished Steel.—Shipments of billets, slabs and sheet bars on contracts leave little to be desired either from the viewpoint of steadiness or volume. Tin plate demands are somewhat smaller, and some recession of mill operations is likely toward the end of next month, but sheet mill operations remain high. Strip mill engagement also is fairly full. No announcement yet has been made as to fourth quarter prices of billets and slabs, but several makers of sheet bars have announced \$33, f.o.b. Pittsburgh or Youngstown, on sheet bars. There is an impression that delay in naming last quarter prices on billets and slabs is due to a desire to see whether an advance in strips is going to hold, since it has been pretty clearly demonstrated that prices of semi-finished steel cannot be sustained in a tendency contrary to that in the finished products. Producers, having recently formulated chemical extras, which they want to make part of fourth quarter contracts and which weigh a little more heavily upon billets and slabs than upon sheet bars, no doubt also wish to be certain that the new charges are acceptable to non-integrated manufacturers. Wire rods are firmly held at \$42, base, both for current and fourth quarter business.

Rails and Track Supplies.—A local mill will furnish the 6000 kegs of spikes recently inquired for by the Norfolk & Western Railroad. Otherwise, business in track supplies is moderate, although there is a fairly steady movement on old orders. Standard-section rails are quiet as usual at this time of the year and demand for light-section rails leaves much to be desired.

Wire Products.—August is proving to be a better month in point of sales

than either July this year or August last year. It is said here that most of the low-priced nails and wire shipped earlier in the year have passed into consumption and the competition set up by these tonnages to the efforts of mills to raise prices no longer amounts to much. There are no deviations reported from the July 5 schedule, which has been announced as the one to apply on fourth quarter contracts by several producers. Spring dating terms have been announced on woven wire fence, effective from Sept. 3 in the Southern territory and from Nov. 5 in the North; they call for 2 per cent discount for payment by May 10 in the North and net on July 1, while in the South the terms read net May 1 and 2 per cent discount for cash by March 10, 1929.

Tubular Goods.—Makers of seamless oil well pipe have enough business to keep productive capacity well engaged over the remainder of the year. There is also a backlog of fairly large proportions in line pipe and a good prospect of additions to the order books. But in other classes of pipe, business leaves something to be desired. There is only a moderately active demand for the butt-weld sizes and lap-weld pipe still feels the lack of oil well development work in the fields where lap-weld pipe will fill the bill. Large lap-weld pipe furnaces are running substantially at capacity and that also is the case with seamless pipe mills, but the general average is reduced by the low rate of small pipe mill engagement to about 70 per cent.

Sheets.—Specifications against third quarter contracts still are pouring in freely and an interesting feature is that most of them carry rush shipment instructions. It is not clear whether the requirement is urgent or that, because consumers are going along with a minimum stock, they request prompt shipment to be insured of having supplies constantly en route. The American Sheet & Tin Plate Co. last week had only a few tons less in total specifications than in the two previous heaviest weeks of the year. Demands of the automobile industry and the agricultural implement manufacturers are notably heavy. Not much fourth quarter con-

THE IRON AGE Composite Prices

Finished Steel

Aug. 28, 1928, 2.348c. a Lb.

One week ago	2.348c.
One month ago	2.319c.
One year ago	2.367c.
10-year pre-war average	1.639c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Aug. 28, 1928, \$17.34 a Gross Ton

One week ago	\$17.04
One month ago	17.04
One year ago	18.13
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75, Feb. 14;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh	1.85c. to 2.00c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c.
From 3 to 6 in., Chicago	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle	\$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mill	2.10c. to 2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.65c. to 2.85c.
Strips, Cleveland	2.65c. to 2.85c.
Strips, del'd Chicago	2.95c. to 3.15c.
Strips, Worcester	2.90c. to 3.05c.
Fender stock, Pittsburgh	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage	\$2.40
Annealed fence wire	2.55
Spring wire	3.40
Gal'd wire, No. 9	3.00
Barbed wire, gal'd	3.20
Barbed wire, painted	2.95
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'l Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill	2.75c. to 2.85c.
No. 24, del'd Cleveland	2.74c. to 2.84c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.54c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills	\$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	\$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	\$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$2.90
2100 (1½% Nickel)	0.55	3.20
2300 (3½% Nickel)	1.50	4.15
2500 (5% Nickel)	2.25	4.90
3100 Nickel Chromium	0.55	3.20
3200 Nickel Chromium	1.35	4.00
3300 Nickel Chromium	3.80	6.45
3400 Nickel Chromium	3.20	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100 Chromium Spring Steel	0.20	2.85
6100 Chromium Vanadium Bars	1.20	3.85
6100 Chromium Vanadium Spring Steel	0.95	3.60
9250 Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill	\$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger	\$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Iron	Galv.
1/8	45	19½	1/4 to 3/8	+11	+39
1/4 to 3/8	51	25½	1/2	22	2
1/2	56	42½	3/4	28	11
3/4	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1/8	41	24½	1/4 to 3/8	+19	+54
1/4 to 3/8	47	30½	1/2	21	17
1/2	53	42½	3/4	28	12
3/4	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.	27
2½ to 2¾ in.	37
3 in.	40
3¼ to 3¾ in.	42½
4 to 13 in.	46
1½ in.	+18
1¾ to 1½ in.	+8
2 to 2½ in.	+2
2½ to 3 in.	7
3¼ to 4½ in.	9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.	4 Fives
5000 lb. to 12,000 lb.	5 Fives
12,000 lb. to 21,000 lb.	6 Fives
21,000 lb. and over	7 Fives
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2½ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2½ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

tracting has been done, but on such business makers generally are quoting 2.75c., base Pittsburgh, on black; 3.50c., base, on galvanized; 4c., base, on body sheets; 2c. and 2.10c., base, according to width, on blue annealed, and 2.90c., base, for tin mill black.

Tin Plate.—New business is not keeping pace with completed orders and while mill operations are well up to full capacity, some recession is looked for in the next 30 days. This is merely a seasonal condition, as the requirements for packers' cans are usually well supplied by this time.

Cold-Finished Steel Bars and Shafting.—Consumers and jobbers are specifying very steadily on third quarter contracts. Not much new business is being done, as requirements are being supplied to a large extent from tonnages under order and it is early for fourth quarter contracting, since the price for that period has not yet been announced. Most shipments are at 2.10c., base, with makers asking 2.20c., base, on new business.

Hot-Rolled Flats.—Cooperage stock prices have been somewhat unsettled lately as a result of a cut of \$2 a ton in the Chicago district to 2.40c., base, this resulting in a similar drop to 2.20c., base Pittsburgh. Makers quoting on a Pittsburgh base, however, are again quoting 2.30c., base, and, as it is understood that the Chicago base is to remain at 2.40c., the spread between the two markets becomes \$2 a ton, instead of \$4, as formerly. Makers of strips are quoting 1.90c. for widths of 6 to 12 in., 2c. for 3 in. to less than 6 in., and 2.20c. for less than 3 in. widths on new business for either prompt or fourth quarter shipment. For wide strips the plate or blue annealed sheet bases govern prices, the plate price being taken as 1.90c., base, and the blue annealed sheet base as 2c. These prices are yet to be seriously tested, as new business constitutes

only a small part of the current shipments. Makers still report good specifications on third quarter contracts.

Cold-Rolled Strips.—Makers generally have gone along with the plan to substitute 3 tons or more as the base tonnage for 1 to 3 tons, and the common quotation for new business for either prompt or fourth quarter shipment is 2.85c., base Pittsburgh. Lots of 1 to 3 tons now call for an extra charge of 25c. per 100 lb. Consumers are freely releasing tonnages they have under contract, carrying prices of 2.65c. to 2.75c., base, for lots of 3 tons or more.

Bars, Plates and Shapes.—Prices named on the recent inquiry of the Pennsylvania Railroad for 25,000 tons of bars, plates and shapes have occasioned considerable discussion, and while manufacturers still insist that the fourth quarter price on these products will be 2c., base Pittsburgh, the fact that the railroad was able to get protection for the remainder of the year at 1.90c. has created the idea among buyers that the latter price is more likely to be the ruling one, with 2c. to be the small-lot figure. Specifications on old orders for bars and shapes still are large and plates also are doing well. Strictly new business still is light, because of the general coverage of buyers for this quarter, while only moderate interest yet is evidenced in fourth quarter requirements until it is seen whether the market is actually going to the announced price for that period.

Bolts, Nuts and Rivets.—Production is running close to 60 per cent of capacity. This is an increase of 10 points over the rate of a month ago and in view of close range buying is a fair measure of the increase in demand.

Coke and Coal.—Spot supplies of beehive oven furnace coke still are light and the market is firm at \$2.75 per net ton at ovens. Spot foundry coke is plentiful. The coal market presents nothing in the way of new features. Production is still ample for all requirements and there is not much strength to prices.

Old Material.—Prices have resumed their upward trend and average 50c. a ton higher than a week ago on the open-hearth grades, the strength of which has had a tendency to lift other grades. Renewed pressure on the part of steel makers for deliveries on orders placed some time ago has forced the dealers to buy, and as much as \$16.50 delivered at one point in the district has been paid for railroad heavy melting steel, while other sales to dealers are noted at from \$15.50 to \$16.25, the destination having much to do with the price. The short interest in heavy steel scrap has not been materially reduced, and, as mill stocks are light, there is rather constant pressure for shipments on contracts. Producers of scrap are impressed by the possibility of even higher prices and are not offering much, while prices are too remunerative east and west of Pittsburgh for much scrap

to come through from those directions. In view of these circumstances, there is more than the usual dependence upon railroad lists, and it is expected that the heavy melting steel in September lists will go at \$16.50 or \$17. There are shortages of scrap in this district and in Youngstown, with both dealers' and consumers' yard piles very low; only an abatement of the pressure for deliveries, it appears, will prevent still higher prices. There are suggestions that the ratio of iron to scrap in the open-hearth charge will be increased, but there are no signs of blast furnace resummptions. The September scrap list of the Pennsylvania Railroad contains 41,075 net tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$15.50 to \$16.50
Scrap rails	15.00 to 16.00
Compressed sheet steel....	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	16.00 to 16.50
Heavy breakable cast.....	12.25 to 12.75
No. 2 railroad wrought.....	16.00 to 16.50
Heavy steel axle turnings.....	14.50 to 15.00
Machine shop turnings.....	10.00 to 10.50

Acid Open-Hearth Grades:	
Railr. knuckles and couplers.....	16.50 to 17.00
Railr. coil and leaf springs.....	16.50 to 17.00
Rolled steel wheels.....	16.50 to 17.00
Low phos. billet and bloom ends	19.50 to 20.00
Low phos., mill plates.....	18.00 to 18.50
Low phos., light grade.....	17.00 to 17.50
Low phos., sheet bar crops.....	18.00 to 18.50
Hvy. steel axle turnings.....	14.50 to 15.00

Electric Furnace Grades:	
Low phos. punchings.....	16.50 to 17.00
Hvy. steel axle turnings.....	14.50 to 15.00

Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling.....	10.00 to 10.50

Rolling Mill Grades:	
Steel car axles	18.50 to 19.00
No. 1 railroad wrought.....	12.00 to 12.50
Sheet bar crops	16.50 to 17.00

Cupola Grades:	
No. 1 cast.....	14.75 to 15.25
Rails 3 ft. and under.....	16.50 to 17.00

Acquire Bridgeport Chain Co.

The Bridgeport Chain Co., Bridgeport, Conn., maker of weldless wire and flat metal chain, upholstery and torsion springs, wire specialties and metal stampings, has been purchased by the Round interests of Cleveland, which also control the Cleveland Chain & Mfg. Co. and David Round & Son, Cleveland, the Krein Chain Co., Wapakoneta, Ohio, and the Seattle Chain & Mfg. Co., Seattle, Wash. The Bridgeport company will be operated in the future under name of the Bridgeport Chain & Mfg. Co., with L. D. Round as president and L. D. Cull, secretary and treasurer. The business will be enlarged by the addition of welded chain of all sizes, chain hoists and tire chains. The upholstery and bed spring business will be continued as a separate business at the same location and all spring business will be transacted from the same office.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Back sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1½-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

<i>Lake Superior Ores, Delivered Lower Lake Ports</i>	
	<i>Per Gross Ton</i>
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.44
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
<i>Foreign Ore, c.i.f. Philadelphia or Baltimore</i>	
	<i>Per Unit</i>
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.85 to \$11.00
<i>Per Gross Ton</i>	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
<i>Per Lb.</i>	
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines..	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines....	1.15 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
Per Gross Ton Furnace	
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	\$11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$8.15 to \$8.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium, fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
	First Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	\$40.00
Standard size	\$45.00

Chrome Brick

	Per Net Ton
Standard sie	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*.....	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh..80, 10 and 2½	
Stove bolts in packages, Chicago..75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago..75, 20, 10, 5 and 2½	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base Per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread..	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Production Increased Following Liberal Releases Against Contracts—Pig Iron Advanced 50c.

CHICAGO, Aug. 28.—Steel ingot production in the Chicago district has been increased not less than five points, or to 80 per cent of capacity, following more liberal releases by a broad classification of users. The expansion in specifications promises to sustain output at the new rate. August is proving to be an unusually good summer month from the viewpoint of steel shipments and it is not improbable, according to the views of local steel producers, that it will take its place with the previous seven months to make the first eight months of this year equal to or slightly better than previous records. Heavier specifications are affording better rolling schedules, though some complaint still is heard that mill costs are unduly high because of frequent roll changes.

Larger releases are in part accountable to announcements of advances in prices for the fourth quarter and the resultant anxiety of buyers to make full use of present contracts. At the same time, the fact should not be overlooked that industry in general is at a higher pitch. Less resistance is being offered to prices asked for fourth quarter, but considerable opposition has arisen against the change in the rate of discount on sheets and cold-rolled strip.

Outstanding among prospective purchases of reinforcing bars is 12,000 tons for the Apparel Mart, Chicago. The United States Gypsum Co. has placed an order for 600 tons of rail steel reinforcing bars for a new plant at East Chicago, Ind.

Pig Iron.—Pig iron sales in this district have topped 60,000 tons in the last week. The bulk of this tonnage was placed early last week prior to the announcement by local producers of a 50c. advance in prices for Northern foundry iron. Following three weeks of heavy purchases, it is evident that melters are well covered for the next four months but the increase in melt leads producers to believe that users have estimated requirements too closely. A Federal furnace, ready for blowing, probably will be lighted within the next two weeks. In some quarters the thought is expressed that part of the recent buying was speculative, but this is discounted somewhat by the fact that melters generally report business much improved, this being particularly true of the malleable foundries, and pressure for prompt and increased shipments is insistent.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
So'th'n No. 2 (barge and rail).....	21.76
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Shipments of 50 per cent ferrosilicon to users in this district are measurably heavier than those of a year ago. The last of a cargo of foreign spiegeleisen has been

closed out at \$32, Hazard, Pa., and it is understood that only the domestic commodity is now available.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Oil storage tank orders this week call for 5500 tons of plates, of which 3500 tons will be fabricated and erected in the Southwest. Efforts to control petroleum output in several of the Western States are becoming more effective, but to date this move has had little or no influence on the requirements of storage capacity, largely because much of the new construction is taking place in recently developed fields. The report here last week that the Texas & Pacific had closed in the East for 3000 tons of tankage material appears to have been an error, for it is now asserted that the United Iron Works, Kansas City, Mo., is low bidder on this tonnage. It is understood here that the water pipe project in Denver, Colo., calling for 12,000 tons of steel, will soon come up for figures. The railroad equipment market remains for the second week moderately active in small orders. The North American Car Co. has ordered 100 underframes and the Barrett Co. has purchased 10 tank cars. The American Car & Foundry Co. has taken an order for 10 hopper cars from the Wabash. The Sanitary District of Chicago has rejected all bids on 54 air dump cars and has issued new inquiries for 16 30-yd. cars and 4 of 20 cu. yd. capacity. Chicago prices for plates are steady at 2c. on the general run of business. On specific orders of attractive tonnage, especially when competition among fabricators is keen, 1.90c. is being done. Mill books are open at 2.10c. for tonnages that are to be delivered after Sept. 30.

Mill prices on plates, per lb.: 2c. base Chicago.

Structural Material.—Preliminary estimates of the steel that will be needed for the Apparel Mart, Chicago, place the tonnage at 74,000 tons. It is now planned that construction on this structure is to be begun about Feb. 1, 1929. Taking the above tonnage into consideration and projects that are actively before the local trade, there is not less than 150,000 tons which is reasonably assured for Chicago and Milwaukee shops by Jan.

1. Awards during the week totaled 6000 tons, including 3000 tons for lock gates for the Illinois Waterway Commission. Noteworthy among fresh inquiries is 1900 tons for a new mill building for the Interstate Iron & Steel Co., Chicago. Shops in Chicago are well supplied with work for the next four to six weeks, but output schedules are overbalanced on the side of heavy tonnage orders. Evidence is at hand that prices asked by fabricators for large jobs have stiffened and are holding in the face of strong opposition by architects and contractors. The desire to round out shop operations by booking small tonnages is holding prices low on that kind of work. Specifications to mills for structural materials are heavier as buyers watch the tendency in fourth quarter prices and show greater anxiety to take their full contract obligations for delivery before Sept. 30.

Mill prices on plain material, per lb.: 2c. base, Chicago.

Bars.—Shipments of mild steel bars in August are running well ahead of July and the outlook is that deliveries will be heavier as users issue larger specifications in order to complete third quarter contracts. Reports that the automobile industry is slowing down are not substantiated by orders to local mills. Several new models are still to come out and from those plants orders are running lighter, but in other directions specifications are larger and net result is that from the viewpoint of Chicago producers there is little or no variation in the total output by the automobile industry. Deliveries of bars range from two to five weeks, the more extended time being necessary on a number of the special sizes called for by forgers and automobile parts manufacturers. Several scattered sales are reported at 2.10c. per lb., Chicago, for delivery in the fourth quarter. The iron bar market is quiet. Alloy bar mill schedules are well maintained by a steady flow of orders for practically all classes of users. Orders for fence posts made from hard steel bars have come in more freely and local mills have had to extend hours of operation in order to hold production at a point where stock can be accumulated against the fall demand. Users of rail steel bars are running with minimum stocks and are demanding prompt delivery. Mills are promising shipments in three to four weeks.

Mill prices per lb.: Soft steel bars, 2c. base, Chicago; common bar iron, 2c. base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Sheets.—New orders and specifications continue to grow and rolling schedules are now made up for 10 days to two weeks in contrast with four to six days earlier in the month. Price advances announced for fourth quarter appear not to be of as much concern to buyers as is the change in the rate of discount. Little interest has developed on fourth quarter contracts. Specifications from the roofing trade are large, but manufactur-

ers of light tanks are taking smaller quantities of sheets.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Ch'go deliv'd prices.

Rails and Track Supplies.—The Chesapeake & Ohio is in the market for 45,500 tons of standard-section rails, 9000 tons of tie plates and 5000 tons of angle bars. It is estimated here that not less than 30,000 tons of this rail business will be placed with Western mills. Three Western railroads have ordered a total of 4000 tons of rails for immediate delivery. Output of rails is steady, but production of accessories is variable because of the character of orders. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Chicago is reported as having closed for 1920 tons of 8 and 12-in. Class B pipe at \$33.70, Birmingham, or \$41.90, delivered. The American Cast Iron Pipe Co. has taken 350 tons for Barton, Wis., and 150 tons for Kewaskum, Wis. The E. A. Meyer Construction Co. will lay 500 tons of pipe at Highland Park, Ill., and R. J. Wilson & Co., Appleton, Wis., will supply 300 tons for Winfield, Ill. Lombard and Evanston, both in Illinois, have placed orders in the last week. Several railroads are figuring on fair tonnages through manufacturers of water treating plants.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Wire Products.—Output of wire and wire products has again been speeded up and now stands at close to 65 per cent of mill capacity. With the harvest season well advanced, there comes a larger demand from farm communities and jobbers are ordering more freely. Stocks in the hands of distributors are low and, judging by the character of purchases, they intend keeping them in that condition

Warehouse Prices, f.o.b. Chicago	
Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel.....	2.20c. to 2.80c.
Reinforc'g bars, rail steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

for the time being. More active country trade matches closely with the rate of increase at mills and producers' stocks are not growing as the first impulse of the fall trade is being felt. Mill books will be opened for fourth quarter business about Sept. 1. Prices for wire and wire Products are given on page 537.

Old Material.—Prices in this market remain strong and sales, especially in specialties, are fairly numerous. Small users are more active and are insistent on prompt delivery for immediate use. Shipments of cast iron borings are moderately heavy, but brokers are short and are bidding high for carload lots. An industrial plant has sold 700 tons of this grade. The sustained rate of industrial activity through the summer months has held a check on the accumulation of scrap and this situation, dealers believe, points to higher prices in the early fall. On the other hand, some resistance to prices has developed among the large buyers. The Chicago, Milwaukee, St. Paul & Pacific will sell 5000 tons and the Burlington is offering 3000 tons.

Prices deliv'd Chicago district consumers:	
Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.75 to \$13.25
Shoveling steel.....	12.75 to 13.25
Frogs, switches and guards, cut apart, and misc. rails	14.00 to 14.50
Hydraul. compressed sheets	11.25 to 11.75
Drop forge flashings.....	9.50 to 10.00
Forg'd. cast and r'l'd steel carwheels	16.00 to 16.50
Railr'd tires, charg. box size	16.00 to 16.50
Railr'd leaf spring cut apart	16.00 to 16.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.25 to 14.75
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings.....	14.50 to 15.00
Low phos. plate, 12 in. and under	14.50 to 15.00
Blast Furnace Grades:	
Axle turnings	9.75 to 10.25
Cast iron borings	9.50 to 10.00
Short shoveling turnings..	9.50 to 10.00
Machine shop turnings....	6.75 to 7.25
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	15.50 to 16.00
Cupola Grades:	
Steel rails less than 3 ft..	16.00 to 16.50
Angle bars, steel	15.50 to 16.00
Cast iron carwheels.....	12.75 to 13.00
Malleable Grades:	
Railroad.....	13.00 to 13.50
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	20.00 to 20.50
Iron car axles	24.00 to 24.50
Steel car axles	15.75 to 16.25
No. 1 railroad wrought...	11.25 to 11.75
No. 2 railroad wrought...	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth..	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast.....	14.25 to 14.75
No. 1 railroad cast.....	13.25 to 13.75
No. 1 agricultural cast....	12.75 to 13.25
Stove plate	10.75 to 11.25
Grate bars	12.00 to 12.50
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.—Greater anxiety to share in going business has definitely lowered Chicago warehouse

prices for billet steel reinforcing bars to 2.20c. a lb. for large tonnages. In a few cases even this price has been shaded in recent quotations. The rail steel commodity remains steady at 2c. a lb. for large orders. Although there still is the promise of active new projects, they are slow in developing. Shops are beginning to feel the effect of this, for they are rapidly completing the large contracts on their books and cannot fill in with current small orders. Cook County, Ill., has placed contracts calling for 850 tons of rail steel bars for highway work.

Cold-Rolled Strip.—Producers announce 2.85c. per lb., Cleveland, or 3.15c., delivered Chicago, as the new base price on orders of 6000 lb. and over. The old discounts have given way to extras, which are added for items under 3 tons. Producers are engaged at 75 per cent of capacity.

Bolts, Nuts and Rivets.—Unsteadiness is noticed in prices for large rivets, especially when used for tank construction work in the Southwest. Oil storage tanks contracted for this week call for 500 tons of large rivets. Specifications for bolts, nuts and rivets are steady. Sellers are preparing to submit fourth quarter contracts at prices which it is now said will be unchanged.

Coke.—Shipments of by-product foundry coke are measurably heavier as the melt in this district grows. Prices are steady at \$8, f.o.b. local ovens.

New Sheet Discount Protested

The reduction of the cash discount on sheets and cold-rolled strip from 2 per cent to one-half of 1 per cent, which will be put into effect by virtually all mills on Oct. 1, has brought out protests on the part of some buyers both among jobbers and manufacturing consumers.

In a letter addressed to one of its main sources of supply for steel the Columbian Steel Tank Co., Kansas City, Mo., says in part:

It goes without saying that your ruling will work a hardship on the sheet metal fabricators who pay their bills promptly, to an extent that you may or may not ever learn about, as they cannot so quickly, or will not, change their policy as you did.

We feel hurt! Is there not some other recourse? Why not adopt a better policy: As one of the leaders, figure costs and base your selling price on the results obtained. No fabricator objects to mills making a profit. However, we do object to being classed with the slow-pay fabricator who knows nothing about discounts, and cares less.

One objection raised to the reduction in discount is that it will tend to delay invoice payments and thus make it necessary for the mills to employ more capital. The banks, it is argued, are quite willing to loan money to buyers for the purpose of discounting their bills when the discount is 2 per cent, but they are not likely to be so accommodating if the saving is only one-half of 1 per cent.

Philadelphia

Some Buyers Considering Last Quarter Needs—Specifications Good and Mills Well Occupied

PHILADELPHIA, Aug. 28.—For the first time in many months, deliveries are extended slightly on some products, particularly sheets and plates. This has apparently resulted from the unexpected flow of specifications against current contracts, for which mills, operating at a moderate rate, were not entirely prepared. Small orders for prompt shipment are not receiving the early action that has been usual for some months past. New buying is small, except for some contracts on blue annealed sheets by consumers and distributors who, desirous of taking final advantage of the 2 per cent discount for cash in 10 days, effective until Oct. 1, are placing at least part of their fourth quarter requirements and specifying for delivery in September. There is a moderate volume of pig iron inquiry and some small users of foundry iron, who have been buying carload lots as needed, have recently been asking if the present base price would apply on 100 tons or more to be delivered in the next quarter. Iron and steel scrap prices are still moving upward, although much of the present activity is the result of dealers seeking to cover lower priced contracts.

Pig Iron.—A return to \$20 per ton, base, on foundry grade, the eastern Pennsylvania quotation until several weeks ago, is being considered and some buyers of small lots are showing a willingness to contract for 100 tons or more for delivery in the next quarter. The Coatesville Boiler Works, Coatesville, Pa., has closed on 100 tons of foundry grade with an eastern Pennsylvania merchant furnace. A consumer of basic is in the market for its usual requirements, probably 6000 to 7000 tons, and is understood to have rejected a quotation of \$19, delivered, as too high. The Virginia pig iron producer has sold 10,000 tons of foundry iron to a Virginia cast iron pipe foundry, and is reported to have met the competition of Birmingham furnaces, which had not then advanced their prices. Low phosphorus is in fair demand and prices are firm.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.	21.26
Basic (del'd east. Pa.)	\$18.75 to 19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04 to 24.54
Va. No. 2X, 2.25 to 2.75 sil.	24.54 to 25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Consumers are taking their full contract shipments, but not much additional tonnage has appeared. The quotation continues at \$105, seaboard.

Bars.—A leading producer reports that business in this product for the first seven months of the year was more than 20 per cent greater than in the same period of 1927 and the volume of specifications is continuing at a good rate. Prices are unchanged at 1.85c. to 1.90c. per lb., Pittsburgh, or 2.17c. to 2.22c., Philadelphia, for current delivery. On contracts for the last quarter 1.90c., Pittsburgh, appears as the possible price, although 2c., Pittsburgh, or 2.32c., Philadelphia, is still discussed.

Plates.—Small orders for prompt

shipment are beginning to be delayed and consumers in some cases are pressing for deliveries. The Virginia Bridge & Iron Co., Roanoke, Va., has closed on 5000 to 6000 tons of plates with a Pennsylvania mill, and the Chesapeake & Ohio has purchased about 9000 tons of plates, which also went to a mill in this district. Prices continue at 2c. to 2.05c., Coatesville, or 2.10c. to 2.15c., delivered Philadelphia; 2.05c., Coatesville, appears as the probable fourth quarter contract price, although in some quarters 2.15c., Coatesville, is suggested.

Shapes.—Fabricating shops are well filled with tonnage, but fabricated steel prices show no tendency to advance. One fabricator is booked with sufficient bridge tonnage for the remainder of the year and another shop has orders for delivery over the next seven months. Shape prices are slightly stronger at 2.05c., Pencoyd, or 2.11c., Philadelphia, but 1.95c., Pencoyd, or 2.01c., Philadelphia, has not entirely disappeared.

Sheets.—To secure the last possible advantage from the 2 per cent discount for cash in 10 days, effective only until Oct. 1, buyers are in some cases contracting for all or part of their last quarter requirements of blue annealed sheets and automobile body

sheets, specifying for delivery in September. One maker of highly finished sheets is not yet reported to have announced its intention of reducing the cash discount to one-half of 1 per cent on Oct. 1. Mills are beginning to extend deliveries slightly and show no inclination to recede from their announced intention of contracting for fourth quarter at 2c. to 2.10c., Pittsburgh, for blue annealed; 2.75c., Pittsburgh, for black, and 3.50c. to 3.60c., Pittsburgh, for galvanized, which is an advance from present prices on black and galvanized of \$2 a ton.

Warehouse Business.—Orders for delivery from stock are small and August is not expected to be as good a month as July. With mills in a stronger position, jobbers expect improvement in September.

Imports.—In the week ended Aug. 25, 400 tons of pig iron arrived from Sweden. Ore imports were 7600 tons of iron ore from Algeria and 298 tons from Spain and 2000 tons of manganese ore and 1500 tons of chrome ore from India. Steel arrivals consisted of 635 tons of structural shapes and 67 tons of steel bars from Belgium, 611 tons of skelp and 94 tons of steel plates from France, 228 tons of bars from Sweden, 28 tons of skelp and 4 tons of steel scrap from the United Kingdom and 54 tons of steel ingots from Germany.

Old Material.—Consumer buying of iron and steel scrap has not yet been heavy in eastern Pennsylvania, but the market is beginning to develop a strong upward movement, reflecting the strength of the Pittsburgh district, and dealers are covering on old contracts at continually advancing prices. Bundled sheets and cast borings have been bought at \$11 per ton, delivered Harrisburg, Pa., and shafting at \$17.50 per ton, delivered. Stove plate is quotable at \$11.50 to \$12 per ton, a Harrisburg consumer having offered \$12 per ton, delivered, and obtained only a small tonnage at this price. No. 1 heavy melting steel is unchanged at \$13 per ton and most of the eastern Pennsylvania consumers are apparently well covered for the present.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails	12.50
No. 2 heavy melting steel.	\$11.00 to 11.50
No. 1 railroad wrought.	13.50 to 14.50
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.50 to 11.00
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars.	11.50 to 12.00
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under.	17.50 to 18.00
Couplers and knuckles.	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast f'nace scrap.	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific)	13.00
Shafting	17.00 to 17.50
Steel axles	19.00 to 20.00
No. 1 forge fire.	11.00 to 11.50
Cast iron carwheels.	15.50 to 15.75
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling.	14.50 to 15.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.	2.50c. to 2.60c.
Plates, ⅝-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished.	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats.	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅝-in.	5.50c.
Rolls	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

New York

Large Plate Orders Taken by Eastern Mills— Pig Iron Prices Higher

NEW YORK, Aug. 28.—With continued good demand, pig iron prices are gaining in strength. Buffalo foundry iron has been advanced to a minimum of \$16.50, base furnace, and one producer is asking \$17, while a third has raised its quotation to \$17.50. The trend is indicated by the fact that some orders have been booked at \$17, base Buffalo. Prices of other domestic irons are also stiffening. Sales in this district during the week totaled 17,000 tons. The General Electric Co. closed for about 5000 tons for various plants and there were several large New England sales, but in this territory bookings were predominantly in small lots. For one selling house, which disposed of over 4000 tons, the largest individual order was 400 tons. Although a good share of current business calls for prompt shipment, an increasing number of smaller foundries are asking for fourth quarter contracts. In addition, there are several large new inquiries for foundry iron for the last quarter—one for 6000 tons, a second for 2500 tons and a third for 2000 tons. The New York Air Brake Co. has closed against its inquiry for 200 tons of low phosphorus for Watertown, N. Y. It is becoming increasingly difficult to purchase iron for water delivery. Some furnaces are from 10 days to a month behind on barge shipments. The scarcity of barges resulting from the heavy wheat movement is still acute.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$21.41 to \$21.91
*Buf. No. 2, del'd east. N. J.	19.78 to 20.28
No. 2, del'd east. N. J. tidewater	19.01 to 19.51
East Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02
East Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Eastern mills have booked a large tonnage of plates in the past week or 10 days. The Chesapeake & Ohio Railroad has ordered 9000 tons of plates from one mill, while another mill has booked an order from a Virginia structural fabricator for 6000 tons. The Standard Oil Co. of New Jersey has bought about 1000 tons, of which 400 tons was wide, still-bottom steel for tanks. The Todd shipyard is in the market for 250 tons of plates. Most of the large business placed went at less than prevailing market prices. About 2000 tons or more of plates will be needed by the American Locomotive Co. for 55 locomotives ordered by the New York Central. August specifications against contracts for plates, shapes and bars have been heavier than those of July. Next week most

of the mills will impress upon contract customers the necessity of getting in the balance of third quarter specifications by Sept. 10. Some mills are informing their customers that all tonnage not specified by that date will

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger..	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller.....	.60
1 x 30 in. and smaller.....	.50 to .50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	.60
¾ x 20 in. and smaller.....	.50 to .50 and 10
Coach screws:	
½ x 6 in. and smaller.....	.60
1 x 16 in. and smaller.....	.50 to .50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

be cancelled. Instructions have been given to sales offices of nearly all steel companies that fourth quarter contracts will contain a clause providing for complete specifications by Dec. 10. One or two companies have definitely announced a \$2 advance on fourth quarter contracts, but in a majority of cases no announcements whatever have been made. Buyers have shown little interest in their requirements for that period.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Wire Products.—Some of the leading makers of wire products have announced that present prices will be continued for the fourth quarter. One large producer will open its books on Sept. 1 for contracting.

Strip Steel.—Local sales offices of companies making cold-rolled strip steel have received announcements of a change in quoting prices, wherein the base price will apply on more than 3 tons, with extras for small lots. The price announced is 2.85c., Pittsburgh or Cleveland.

Sheets.—Orders and specifications for sheets are in increasing volume. Some consumers who did not contract for this quarter are taking advantage of the opportunity to make contracts at present prices on which specifications will be accepted until Sept. 10. Some mills have definitely turned down requests for October shipment against third quarter specifications. It is likely that considerable tonnage will be carried over to that month, but shipment will be at mill convenience rather than at buyer's dictation. Tonnage specified for shipment in September, but which in some cases may not leave the mills until after Oct. 1, will take the 2 per cent discount for cash in 10 days, but otherwise the new discount of one-half of 1 per cent will apply.

Reinforcing Bars.—Joseph T. Ryerson & Son, Inc., will furnish 700 tons of bars for two plant buildings for the Western Electric Co., Inc., at Kearny, N. J., and the Jones & Laughlin Steel Corporation is expected to supply a similar tonnage for foundation work on the Western Union Building in New York. Excepting these two jobs, the week's awards have been light, but there is enough pending work to assure considerable activity during September. Prices are unchanged.

Warehouse Business.—Possibly as a reflection of the better position of mills, jobbers are beginning to receive slightly larger orders and inquiries, principally for sheets and structural material. The past week has been considerably better than the earlier weeks of the month and quotations on all products are apparently quite firm.

Cast Iron Pipe.—Southern makers continue to quote on a basis of \$34 to \$35 per ton, Birmingham, which is too high to compete with foundries in the North. Northern producers are endeavoring to maintain the market at about \$37.60 per net ton, de-

livered, New York, but sales have been made down to \$35.60 per net ton, delivered. Buying is in most cases limited to small lots, orders for car-load lots and less being rather numerous. The Department of Water Supply, Gas and Electricity, New York, opens contractors' bids Aug. 31 and Sept. 6, on several hundred tons of water pipe for the boroughs of Queens and the Bronx. The lowest bid for a contract to lay 525 tons of water pipe at Amagansett, N. Y., was submitted by the W. G. Fritz Co., West Orange, N. J., and it is reported that centrifugally cast pipe will be used.

Prices per net ton, deliv'd New York:
Water pipe 6-in. and larger, \$35.60 to \$37.60; 4-in. and 5-in., \$40.60 to \$42.60; 3-in., \$50.60 to \$52.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Quotations on all grades are stronger and on by-product foundry coke producers are well sold ahead. A rapid increase in demand for furnace grade is reported for melters in this district, with a local by-product operation quoting \$7.75 per ton alongside consumer's dock and a northern New York producer \$6.50 alongside dock. Connellsville furnace coke continues at \$2.75 to \$3 per ton, Connellsville, and standard foundry is about \$3.75 per ton, Connellsville. Special brands of foundry coke are \$4.85 per net ton, ovens, and delivered prices are \$8.56 per net ton, to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke prices are unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—With brokers endeavoring to cover themselves on old

contracts in a rapidly rising market, buying prices are in many cases not representative of the latest purchase prices of consumers. Dealers are buying No. 1 heavy melting steel at \$13 per ton and more, delivered to eastern Pennsylvania on \$13 orders, and brokers with contracts at Weirton, West Va., and Butler, Pa., have paid as high as \$10.75 per ton, New York, to which is added a freight rate of \$5.30 per ton to destination. Specification pipe is quoted at \$13 per ton and higher, delivered eastern Pennsylvania, and stove plate is reported to be difficult to obtain at \$12 per ton, delivered, which is the highest price that has been paid by a consumer. Eastern Pennsylvania consumers are pressing for deliveries on their contracts, but apparently are not yet in need of additional tonnage.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$10.35 to \$10.75
Heavy melting steel (yard)	7.25 to 7.75
No. 1 hvy. breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.25
Locomotive grate bars	7.75 to 8.25
Machine shop turnings	6.25 to 6.50
Short shoveling turnings	6.25 to 6.50
Cast borings (blast furn. or steel works)	6.00 to 6.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles	16.00 to 16.50
Iron car axles	23.50 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25
Forge fire	6.50 to 6.75
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrot., long	7.50 to 8.00
Rails for rolling	10.50 to 11.00
Cast iron car wheels	12.00 to 12.50
Stove plate (foundry)	8.75 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	\$15.50 to \$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.)	13.50 to 14.00
cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

prices still show an upward tendency, advances by several furnaces being reported. Sales by Cleveland interests totaled 73,000 tons during the week, or 10,000 tons more than in the previous week. This business was all in foundry and malleable iron for the remainder of the year and was well distributed among the territories served by local sellers. Consumers' stocks are reported low and shipments from several furnaces this month will sharply exceed production. Cleveland furnaces are practically sold up for the remainder of the year. Local prices on foundry and malleable iron are unchanged but another 50c. a ton advance for out of town shipment is probable. Out of town sales during the week were at the recently advanced price of \$17. Another Lake furnace interest, which for a week had been quoting a price range of \$17 to \$17.50, has established a flat \$17.50 price. One Valley producer has marked up its price to \$17, and, with higher Valley prices, the Cleveland price for local delivery, which has not been changed recently, is likely to be advanced. In Buffalo, a 50c. a ton advance to \$17 has been made for New England delivery. In Michigan, the market is unchanged at \$18. A leading producer has advanced Southern foundry iron 50c. a ton to \$16, Birmingham. Sales during the week were largely confined to small lots, one of the largest being 6000 tons placed by the Standard Sanitary Mfg. Co., with a Valley furnace. One of the Toledo furnaces of Pickands, Mather & Co. was blown out during the week.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.00
S'th'n fdy., sil.	1.75 to 2.25	22.00
Malleable		18.00
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace	\$16.00 to	16.50
Stand. low phos., V'ley furn.		26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—There is a good demand for auto body sheets in this territory, but other grades are rather slow. Specifications from the automotive industry in the Detroit territory continue fairly heavy and most mills have enough orders to keep them operating at present schedules from two to four weeks. Nearly all mills have adopted the new advance in prices for the fourth quarter, but consumers are as yet showing no interest in that delivery. Prices for current orders are no higher than they have been. Black sheets are being quoted

Cleveland

August Steel Shipments at a High Rate—Alloy Steel Bars and Cold-Rolled Strip Advanced—Pig Iron Active

CLEVELAND, Aug. 28.—With mill orders holding up to recent heavy volume, August will show an exceedingly good record in the volume of finished steel business. Demand for steel bars is heavy, which is attributed in a large measure to specifications from the automotive industry. Forge shops and other automobile parts manufacturers continue at near-capacity production. Structural shapes are moving well to manufacturing industries. Plates are only moderately active. With the continued good volume of business, there is quite a little slowing up of mill deliveries. There is not much new business in bars, plates and structural shapes, as most consumers are under contract. Buyers generally are taking out all the material they have contracted for and it is not expected that there will be much third quarter tonnage left unspecified on Sept. 10 when specifications must all be in against third quarter contracts. Fourth quarter contracts will require all specifications to be in by Dec. 10.

While steel bars and structural material are generally quoted at 1.90c., Pittsburgh, 1.85c. has not entirely disappeared. On plates, 1.85c. is still rather general, although mills are having less trouble than recently in getting 1.90c. The local mill bar price ranges from 1.85c. to 1.90c., Cleveland.

Alloy steel bars have been advanced \$2 a ton for the remainder of the year. Hot-rolled strip appears to be definitely established at third quarter prices for round-lot buyers for the next quarter, although the recently

announced advances will apply to small-lot consumers. Fourth quarter prices on cold-rolled strip are not yet definitely determined. While one producer has announced an advance, several have not yet named their prices for that delivery.

Pig Iron continues very active, with advancing prices. However, it is believed that prices will have to go still higher to induce idle merchant furnaces to go into blast.

Pig Iron.—The market continued very active in the past week and

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.40c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

at 2.65c. and galvanized at 3.40c., Pittsburgh and Valley; blue annealed at 1.90c., Pittsburgh, and 2c., Valley.

Semi-Finished Steel.—One producer has reestablished for the fourth quarter the present wire rod price of \$42, Cleveland. Sheet bars, large billets and slabs will probably be established at \$33, Cleveland, for the last quarter. Specifications against contracts continue heavy and deliveries are a little slow.

Cold-Rolled Strip.—One producer has announced a 2.85c., Cleveland, base price for the fourth quarter for 3 tons and over. Others have not yet named prices for that delivery, but will make efforts to get the market on a higher basis. If the advance holds, fender stock will probably be marked up \$3 a ton to 4.25c. Current orders for cold-rolled strip are still being taken at 2.65c., but the demand is not very active. The plan of applying the base price to 1 to 3 tons, with a 25c. per 100 lb. reduction for larger lots, never became generally effective in this territory and has been abandoned.

Wire Products.—A leading independent producer has announced for the fourth quarter the present prices to jobbers of 2.40c. Pittsburgh and Cleveland, for plain wire and \$2.55 per keg for nails. Current prices are firmer than in some time.

Reinforcing Bars.—An award of 450 tons for Cleveland Union Terminal work was the only one of size during the week. Rail steel bars are somewhat firmer, although 1.75c., mill, is still being quoted.

Warehouse Business.—August sales show a fair gain over those of July. Jobbers report a better volume of business, particularly in steel bars and plates, from makers of automobile parts and crane and shovel manufacturers. Deliveries by mills have slowed up somewhat, which has caused consumers to rely more on warehouses for material wanted quickly. Demand from the building field is slow.

Hot-Rolled Strip.—The third quarter prices generally will remain in force through the last quarter, as some of the leading producers have informed their regular trade that they will carry them through the quarter at the prices that prevailed during both the second and present quarters. These large consumers are getting strip at a net price that figured back is about an average 1.75c. base price for wide material and higher for narrow strip. Efforts have been made recently to get prices on a higher level or to 1.90c., Pittsburgh, for strip 6 to 12-in. wide, 2c. for 3 to 6-in. wide and 2.20c. for strip under 3-in. wide. However, these prices evidently will apply during the fourth quarter only to small-lot buyers. Some of the producers are working on new cards of extras for hot-rolled strip, which will simplify the present price structure by the elimination of the present classification of material into three price ranges and by the adoption of one base price for all gages and widths. It is planned to issue new list of ex-

tras shortly and to place them in effect with a new base price of possibly 1.90c. on Oct. 1.

Alloy Steel.—A price advance of \$2 a ton on alloy steel bars was announced Aug. 25 to apply to fourth quarter contracts and to all new current business. The advance was made by changing the base from 2.65c. to 2.75c. As consumers generally are covered for this quarter, the advance will have little effect before October. Specifications continue to come out in satisfactory volume.

Iron Ore.—Ore firms are making quite a few small-lot sales of Lake Superior ore for filling in consumers' requirements. Shipments continue in heavy volume.

Coke.—A price advance of 50c. a ton for by-product domestic coke has been made by Detroit producers effective Sept. 1 and an Ohio maker has made a similar advance for Michigan delivery, but is still quoting \$4.50, ovens, for Cleveland delivery. In Detroit, both egg and nut coke are quoted at \$6.50, delivered. Cleveland prices for local delivery are \$5.50, ovens, for egg and \$5 for nut. Foundry coke is dull and unchanged at \$3.50 to \$4.85, ovens, for Connellsville brands and \$7.75, Painesville, for by-product coke.

Bolts, Nuts and Rivets.—Specifications are holding up to recent fair volume and prices are unchanged. There is not much new business.

Old Material.—Dealers have forced prices up 25c. a ton more on No. 1 heavy melting steel and blast furnace scrap and other dealers who are short on scrap have been compelled to pay the advances to fill existing mill orders. Dealers are paying \$14.25 for No. 1 heavy melting steel for shipment to local mills exacting in their specifications and as high as \$10.25 has been offered for blast furnace scrap. There has been no buying by mills since the advance. Some of the scrap lists of Michigan automobile companies for September have been issued and show a sharp decline in offerings compared with the present month. The Dodge list totals 2000 tons and the Chrysler list 2500 tons.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.25 to	\$13.75
No. 2 heavy melting steel.	12.75 to	13.00
Compressed sheet steel....	12.50 to	13.00
Light bundled sheet		
stamp'gs	11.50 to	11.75
Drop forge flashings.....	11.50 to	12.00
Machine shop turnings....	7.75 to	8.25
No. 1 railroad wrought....	11.50 to	12.00
No. 2 railroad wrought....	13.50 to	13.75
No. 1 busheling	10.50 to	11.00
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops....	16.00 to	16.50
Low phos., billet, bloom		
and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	9.75 to	10.00
Mixed bor'gs and short		
turn'gs	9.75 to	10.00
No. 2 busheling	9.75 to	10.00
Cupola Grades		
No. 1 cast.....	16.00 to	16.50
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling.....	16.25 to	16.50

Railroad Equipment

New York Central Buys 55 Locomotives

PURCHASE of 55 locomotives by the New York Central was the outstanding transaction of the equipment market in the last week. Locomotive inquiries include 10 switching engines for the Belt Railway of Chicago. The North American Car Co. has placed 100 steel underframes.

Class I railroads in the first seven months this year installed 35,854 freight cars, according to reports filed with the Car Service Division of the American Railway Association. Compared with the corresponding period last year, this was a decrease of 9289 in the number of freight cars installed and a decrease of 30,404 compared with the corresponding period in 1926. Freight cars on order on Aug. 1 this year totaled 14,830 compared with 19,344 on the same date last year and 29,102 on Aug. 1, 1926. In July, the railroads installed 6137 freight cars compared with 7102 in July, 1927.

Locomotives placed in service by the Class I railroads during the first seven months in 1928 totaled 881, a decrease of 314 compared with the corresponding period last year and of 407, compared with the corresponding period in 1926. Locomotives on order on Aug. 1, 1928, totaled 73 compared with 209 on the same date in 1927 and 517 on the same date in 1926. Locomotives installed in July numbered 116 compared with 155 placed in service in July, 1927.

Details of the week's business follow:

Illinois Terminal Co. contemplates entering the market for 100 box cars. This road inquired recently for 100 to 200 gondola cars.

New York Central has ordered 30 Hudson type passenger locomotives, 25 heavy freight locomotives and five additional tenders from American Locomotive Co.

National Railways of Mexico have ordered six mallet type locomotives from American Locomotive Co.

Algoma Central is inquiring for two 2-10-2 type locomotives.

Erie Railroad has ordered one 300-hp. oil-electric locomotive to be built jointly by Ingersoll-Rand Co., General Electric Co. and American Locomotive Co.

Bangor Aroostook is inquiring for two combination baggage and mail cars.

North American Car Co. has ordered 100 steel underframes from Fressed Steel Car Co.

Wabash Railway has ordered 10 hopper cars from American Car & Foundry Co.

Anglo-Mexican Petroleum Co., Ltd., has made inquiry for eight 7000-gal. tank cars.

South Porto Rico Sugar Co. has ordered 10 cane cars and 20 flat cars of 20 tons' capacity from Magor Car Corporation.

Barrett Co. has ordered 15 50,000-lb. tank cars from General American Tank Car Corporation and 15 from American Car & Foundry Co.

International Railways of Central America has ordered 25 20-ton banana cars from Magor Car Corporation.

Belt Railway of Chicago will buy 10 switching engines.

Pacific Coast

Projected Pipe Line to Call for 25,000 Tons of Steel—Plate Prices Weaken—Foundry Melt Gains

SAN FRANCISCO, Aug. 25.—(By Air Mail).—Iron and steel bookings on the Pacific Coast during the past week, while not especially heavy, continued to show signs of improvement, and a few large projects were placed. Outstanding among these were 1400 tons of structural shapes for Pier No. 45 at San Francisco, booked by the Pacific Coast Steel Co.; 1160 tons for an office building in Oakland, placed with the Judson-Pacific Co., and 1508 tons of cast iron pipe for the Weyerhaeuser Timber Co., Longview, Wash., awarded to the American Cast Iron Pipe Co.

Building operations in Los Angeles during the first 15 days of the month showed an increase over the corresponding portion of July, but were considerably below the total for the first 15 days of August, 1927. The figures are as follows: August, 1928, \$4,200,914; July, 1928, \$2,347,618; August, 1927, \$6,975,679.

Pig Iron.—Although foundry operations in the San Francisco district have shown little improvement of late, reports from melters in the southern part of the State indicate a substantial betterment, due, no doubt, to the revival of activity in the oil fields in that section, especially in the Santa Fe Hills district. A shipment of 800 tons of Indian iron arrived in port today, 400 tons of which will be unloaded later at Los Angeles. Prices of Indian iron now range from \$24 to \$25 a ton, duty paid, f.o.b. cars San Francisco.

Prices per gross ton at San Francisco:
 *Utah basic \$25.00 to \$26.00
 *Utah fdy., sil. 2.75 to 3.25 25.00 to 26.00
 **Indian fdy., sil. 2.75 to 3.25 24.00 to 25.00

*Delivered San Francisco.
 **Duty paid, f.o.b. cars San Francisco.

Bars.—The majority of both sales and inquiries for reinforcing steel bars involve relatively small lots, ranging from 20 to 60 tons. One of the largest inquiries that has come up for figures in this district this year calls for 525 tons for the Bernal Cut project in San Francisco, bids on which open Sept. 17. Out-of-stock prices have shown little signs of strengthening, and 1.85c. to 2c. continues to be the range.

Plates.—Interest in the plate market continues to center around the 7200 tons for distributing mains for the

East Bay Municipal Utility District, Oakland, bids on which were opened last week. As alternate bids were taken on several different types of pipe, including cast iron and concrete steel-lined pipe, the district's engineers have not yet arrived at any decision. The Birchfield Boiler Co. was low bidder on 330 tons for a 32-in. pipe line at Tacoma. The Oregon-Washington Railroad & Navigation Co., Portland, Ore., will open bids Sept. 4 on 150 tons of plates. Plate prices now range from 2.20c. to 2.30c., Pacific ports, the latter figure applying only to small lots.

Shapes.—Structural steel shapes continue actively in demand, and awards this week were the heaviest in over two months. In addition to the two projects mentioned above, the Moore Drydock Co. took 250 tons for Hangar No. 4 at Oakland, Cal., for the Port Commission. Included among new inquiries pending are 700 tons for a factory addition at Tacoma, Wash. Fabricated and erected prices in the section are around \$80 a ton. Prices on plain material remain firm at 2.35c., c.i.f. Pacific ports.

Cast Iron Pipe.—Demand for cast iron pipe has improved. Awards this week exceeded 2500 tons and were the heaviest in over two months. T. Jakaboni secured the general contract for 469 tons of 6 to 30-in. Class C pipe for the improvement of Forty-second Avenue, South, Seattle, Wash., and Fiorito Brothers took the general contract for 188 tons of 4 to 8-in. Classes B and C pipe for the improvement of Thirty-fourth Avenue, N. W., Seattle. Santa Cruz, Cal., placed 115 tons of 8-in. Class B, the Grinnell Co. taking 91 tons and the American Cast Iron Pipe Co., 24 tons. The Pacific States Cast Iron Pipe Co. was awarded 318 tons of 2-in. Class B pipe for Los Angeles. The largest order of the week was booked by the American Cast Iron Pipe Co. and called for 1508 tons of 4 to 12-in. Class C pipe for the Weyerhaeuser Timber Co. at Longview, Wash. El Monte, Cal., will open bids Sept. 4 for 133 tons of 4 and 6-in. Class B pipe. The United States Cast Iron Pipe & Foundry Co. was low bidder on 1210 tons of 32-in. pipe for East Eleventh Street and Taylor Street, Tacoma, Wash., but alternate bids were also taken on welded steel pipe, the price on the latter being considerably below that for cast iron. San Bernardino, Cal., will open bids Aug. 28 for 258 tons of 20 and 30-in. centrifugal pipe, and San Diego, Cal., will take bids Sept. 10 for the improvement of Mountain View Drive, calling for 178 tons of 4 to 10-in. Class B. The Spring Valley Water Co., San Francisco, has taken bids on 1062 tons of 6 and 8-in. Class 150 pipe.

Standard Pipe.—Demand for oil

country goods continues to increase, well casing being principally in demand. The Pacific Gas & Electric Co., the Pacific Lighting Co. and the Southern California Edison Co. are considering the building of a pipe line to transport natural gas from the Ventura Avenue and Buttonwillow Ridge fields in the southern part of the State to the San Francisco district. The cost of this line is estimated at \$20,000,000 and will require from 25,000 to 50,000 tons or more of 12 to 20-in. line pipe.

Coke.—A shipment of approximately 5000 gross tons of English by-product and beehive coke is scheduled to arrive in San Francisco Sept. 20. Most of this material will be unloaded at San Francisco, the remainder to be delivered to Portland and Seattle foundries. Prices on English coke remain unchanged, and beehive coke is quoted at \$16 a net ton, delivered incoming dock, while by-product ranges from \$11.50 to \$13 a net ton.

Sheets.—An eastern Ohio sheet mill recently sold a large tonnage of black and galvanized sheets to a Seattle jobber, and upon arrival they will be put in storage in Seattle and Portland, as well as in Tacoma, where the buyer is now building a warehouse. Reports of an advance of \$2 per ton in prices by Eastern mills have not as yet been reflected in Seattle market, which, if anything, is lower than for some time. Current prices, f.o.b. Seattle, on sheets in carload lots are: 4.10c. per lb. for No. 24 galvanized, 3.30c. to 3.35c. for No. 24 black, and 2.60c. to 2.62½c. for No. 10 blue annealed.

Otis Steel Co. Adds Another Open-Hearth Furnace

The Otis Steel Co., Cleveland, will immediately begin the erection of an additional 125-ton open-hearth furnace. The contract for furnishing and fabricating the steel for the furnace has been awarded to the Wellman-Seaver-Morgan Co., Cleveland, for delivery in 14 days. This will be the second open-hearth furnace to be built by the Otis company this year. On its completion the company will have seven furnaces.

Furnace Company May Liquidate

Stockholders of the Warwick Iron & Steel Co., owner of two furnaces at Pottstown, Pa., have been notified of a meeting early in September, at which disposal of the assets and liquidation of the company will be considered.

Pittsburgh Engineers to Discuss Welding

An all day discussion of welding, under the auspices of the Engineers Society of Western Pennsylvania, will be held at the William Penn Hotel, Pittsburgh, Friday, Nov. 2.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, 3/16-in. and over....	3.15c.
Small angles, under 3/16-in.....	3.55c.
Small channels and tees, ¼-in. to 2 ¼-in.	3.75c.
Spring steel, ¼-in. and thicker....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, ½-in. and larger....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100-lb. keg.....	3.40

St. Louis

Granite City Pig Iron Up 50c a Ton—6000 Tons of Rails Placed—Scrap Stronger

ST. LOUIS, Aug. 28.—Sales of pig iron in this market were heavier during the past week than for some time, the Granite City maker selling about 10,000 tons and a leading Southern producer about 3000 tons. The Granite City maker advanced its price 50c. a ton to \$19 to \$19.50, f.o.b. furnace, on Friday, following the heavy bookings. Southern furnaces have raised prices 75c. a ton to \$16.25, Birmingham, for No. 2 foundry iron. The melt of stove foundries, as well as jobbing and implement foundries, is increasing, and generally there is a stronger feeling regarding the future. The shipments of the local maker have been unusually large so far this month. The largest sale of Southern iron during the week was a 500-ton lot. Outstanding sales by the Granite City maker include 2300 tons to an Illinois specialty manufacturer, 750 tons to a Davenport, Iowa, railroad specialty maker; 1200 tons to an Illinois specialty maker; 800 tons to an Illinois equipment builder; 600 tons to a Rock Island melter; 400 tons to a stove manufacturer and 250 tons to a Louisville melter.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.
Granite City, Ill.	\$19.00 to \$19.50
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd.	20.67
Northern malleable, deliv'd.	20.16
Northern basic, deliv'd.	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Rails.—The Missouri-Kansas-Texas Railroad has purchased 6000 tons of 90-lb. rails, 3900 tons from the Colorado Fuel & Iron Co. and 2100 tons from the Bethlehem Steel Co., the latter to be shipped by water. These orders represent the balance of requisitions issued some months ago but curtailed.

Finished Steel.—The volume of incoming orders received by the Granite City Steel Co. continues at a satisfactory rate, especially in sheets and

tin plate. While tank plates continue slow, prices are firm. The price situation in sheets and plates is greatly improved, and many buyers admit that advances are probable for the next quarter. Warehouse business is improved in the St. Louis industrial district, but orders from the oil fields are so small that they more than offset the gains made here. Reinforcing bar awards for the week total 1000 tons, 600 tons placed with the Laclede Steel Co. for an express terminal building for the Terminal Railroad Association of St. Louis and 400 tons let to the Missouri Rolling Mills Corporation for two sewer projects.

Coke.—The market is quiet. Dealers are not showing much interest in domestic grades, and buying of industrial coke is light, although there has been an improvement in the consumption of pig iron.

Old Material.—Further gains were made last week in the old material market, in which price advances were recorded in the preceding week for the first time in several months. However, the advances have been due almost entirely to the activities of dealers, who have been paying higher

prices to get material with which to fill existing contracts. The higher market has not yet affected consumers, who are buying sparingly. Miscellaneous standard-section rails, bundled sheets, rails for rolling and cast iron carwheels are up 50c. a ton, and railroad springs are \$1 higher. Railroad lists include: Chicago, Burlington & Quincy, 4869 tons; Union Pacific, 380 tons; Missouri Pacific, 113 carloads; Nickel Plate, 28 carloads; Mobile & Ohio, 27 carloads, and Chicago, Milwaukee & St. Paul, eight carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$11.00 to \$11.50
No. 1 locomotive tires....	11.75 to 12.00
Heavy shoveling steel.....	11.00 to 11.50
Miscel. stand-sec. rails	
includ'g frogs, sw'ches	
and guards, cut apart..	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	8.25 to 8.75
No. 2 railroad wrought...	11.00 to 11.50
No. 1 busheling.....	9.00 to 9.50
Cast iron borings.....	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling.....	13.50 to 14.00
Machine shop turnings....	7.00 to 7.50
Steel car axles.....	18.00 to 18.50
Iron car axles.....	25.50 to 25.75
Wrot. iron bars and trans.	18.25 to 18.75
No. 1 railroad wrought...	9.00 to 9.50
Steel rails, less than 3 ft..	15.00 to 15.50
Steel angle bars.....	12.50 to 13.00
Cast iron carwheels.....	13.00 to 13.50
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable	11.50 to 12.00
No. 1 railroad cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and	
under	20.50 to 23.50
Relay. rails, 70 lb. and	
over	26.50 to 29.00

Birmingham

Pig Iron Prices Advanced 75c a Ton—Demand for Finished Steel Sustained

BIRMINGHAM, Aug. 28.—Quotations on No. 2 foundry iron were increased from \$15.50 to \$16.25 on Aug. 24. Furnace books were opened for fourth quarter on that date, and some tonnage has been entered for that period. Several small-lot sales were made last week, but the total volume was not large. There has been a noticeable increase in inquiries in the last few days. The volume of shipments continues good. The Tennessee company changed its furnaces Nos. 1, 2 and 5 at Ensley, Ala., from basic to foundry iron on Aug. 22. The No. 3 Woodward furnace of the Woodward Iron Co. was blown out Aug. 21 for relining. On Aug. 25 the Vanderbilt No. 2 furnace of this company was blown in on foundry iron. No other changes have been made. A total of 17 furnaces are in blast, with 12 on foundry, three on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—Demand shows no signs of diminishing, and sales officials look for an active fourth quarter. Practically all lines show activity

with the exception of steel rails. Sheets are strong, as are plates and shapes. The present mill prices have prevailed for several weeks. Fourth quarter prices are expected to be announced shortly. Structural steel and reinforcing bar tonnages now being booked represent a fair aggregate of small to moderate-sized orders. The Virginia Bridge & Iron Co. will furnish 150 tons for a cotton mill at Albertville, Ala. The Tennessee company reduced the number of active open-hearth furnaces from 11 to six on Aug. 22, when it shut down all open-hearths at Ensley. Six are active at Fairfield, Ala., and the Gulf States Steel Co. is operating three at Alabama City, Ala.

Cast Iron Pipe.—Sales of pressure pipe have been sufficient to sustain plant operations at a rate of 75 per cent of capacity. The market has been supported by small orders only. For the past several weeks August business has been under that of July and also that of August, last year. Private business is holding up well, with sales made largely through quiet negotiations. Shipments approximate the amount of the current make. Quotations have been \$34 to \$35 per net ton, Birmingham, on 6-in. and larger diameters for some time.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw	
stock	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	5.25c.
Blue ann'l'd sheets (No. 10).....	3.60c.
Black corrug. sheets (No. 24)....	4.50c.
Galv. corrug. sheets.....	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, 7/16-in. and smaller, 100	
lb. or more.....	70
Less than 100 lb.....	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped,	
200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped,	
200 lb. or more.....	60
Less than 200 lb.....	50

Coke.—Activity in the market is confined largely to spot sales. Shipments are fair for the season, and a little coke is moving out to the larger centers of the country. Quotations on both spot and contract foundry coke remain at \$5 per net ton, Birmingham.

Old Material.—Demand has been increasing gradually for the past few weeks, but has not yet developed sufficient strength to affect prices. There

is considerable demand for No. 1 cast at \$14.50.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to	\$9.00
Scrap steel rails.....	11.00 to	11.50
Short shoveling turnings..	7.50 to	8.00
Cast iron borings.....		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	21.00 to	22.00
No. 1 railroad wrought...	10.00 to	10.50
Rails for rolling.....		13.00
No. 1 cast.....		14.50
Tramcar wheels	12.50 to	13.50
Cast iron carwheels.....	12.00 to	13.00
Cast iron borings, chem...	13.50 to	14.00

what over those of the previous week, and inquiries being received indicate that consumers may place large orders both for immediate needs and for future delivery. Shipments against old contracts are heavier, and the general movement of scrap is growing. In the Montreal district, scrap sales for the week were the largest in the past two months. Current demand is mostly for domestic consumption, although shipments to United States buyers continue in good volume. Prices are firmer but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast....		16.00
Stove plate		13.00
Standard carwheels		16.00
Malleable		13.00
	Per Net Ton	
No. 1 machinery cast....	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Canada

Demand for Fabricated Structural Steel Is Heavy—Pig Iron Buying on Up-Grade

TORONTO, ONT., Aug. 28.—A more active buying movement features business in the Canadian pig iron markets. Spot sales, however, are most prominent in weekly transactions, and, while some of these run from 50 to 200 tons, a few have recently been closed for as much as 500 to 600 tons for shipment before the end of September. Some contracts for fourth quarter have been closed, but no active buying has developed for that period. Both at Toronto and at Montreal the demand for merchant iron is on the up-grade. The Algoma Steel Corporation, Sault Ste. Marie, Ont., has blown out one of its blast furnaces, leaving two stacks in and reducing the total number of active furnaces in Canada to seven. Two stacks are in at Sydney, N. S.; two at Hamilton, Ont., and one at Port Colborne, Ont. Canadian prices are firm but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25.	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25.	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Structural steel fabricators are experiencing one of the best years in history. Building activities in Canada have reached new high levels and the demand for structural steel and reinforcing bars has been correspondingly large for some time past. The Dominion Bridge Co. has closed a contract with the T. Eaton Co., Toronto, for 12,000 tons of steel for a new furniture building. The McGregor & McIntyre Structural Steel, Ltd., Toronto, has received an order for 4000 tons of steel for the Goodyear Tire & Rubber Co.'s plant addition at New Toronto, Ont. In connection with a proposed 17-story extension to the Royal York Hotel at Toronto 7000 tons of steel will be required, and 3500 tons will be purchased for an addition to the plant of Willys-Overland, Ltd., Weston, Ont. Plans for a bridge over the Saskatchewan River for the Canadian Pacific Railway call for several thousand tons

of steel. According to leading structural steel fabricators there is enough business pending in Canada at present to keep plants running at capacity for three or four years.

Old Material.—With the iron and steel industry in general passing out of the summer depression, business in scrap is taking a turn for the better. Sales for the week advanced some-

Boston

Pig Iron Market Is More Active and Prices Firmer—Scrap Has a Stronger Tone

BOSTON, Aug. 28.—Pig iron sales in this territory exceeded 12,000 tons in the past week, the largest amount for any similar period in months. Approximately 90 per cent of the business was taken by Buffalo, New York and Massachusetts furnaces, the Mystic Iron Works taking about two-thirds. During the first 25 days of August the Mystic Iron Works booked more than 25,000 tons. The past week's business included 2000 tons,

silicon 3 to 3.50 and higher, for the Whitin Machine Works, Whitinsville, Mass.; 2000 tons of No. 2X and No. 1X and 300 tons of malleable for the General Fire Extinguisher Co., Providence, R. I.; 1200 tons of No. 2X and No. 1X for a Connecticut melter; 800 tons for the General Electric Co.; 600 tons for Pittsfield, Mass., and 200 tons for Everett, Mass.; 800 tons of No. 2 plain for a Bridgeport, Conn., plant; 500 tons No. 2X for a central Massachusetts machinery manufacturer; and numerous smaller lots, including Indian No. 2X at \$21.50 and \$21.75 a ton, on dock Boston, duty paid. Two Buffalo stacks have again advanced prices 50c. a ton to \$17, f.o.b. furnace, for No. 2 plain, \$17.50 for No. 2X and \$18.50 for No. 1X. Another stack has advanced from \$16 a ton, base furnace, to \$16.50. Low prices have again been made, however, by furnaces east of Buffalo.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.41 to \$21.91
*Buffalo, sil. 2.25 to 2.75..	21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.28 to 20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Imports.—Receipts of foreign pig iron at this port during the first half of August totaled 1295 tons, of which

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45 to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

600 tons was Dutch and the rest Indian iron. Consignments of both Indian and Dutch iron are coming forward regularly each fortnight. Imports of ore during the first half of August were 16,084 tons.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. intimate there will be no change on Sept. 1 in the price of by-product foundry coke, which is \$11 a ton, delivered within a \$3.10 freight rate zone. Indications are these companies will do a larger furnace and domestic coke business in August than in July, the previous high record month of 1928 on shipments. Owing to the necessity of making minor changes in pipe lines, the new ovens in Connecticut in all probability will not be lighted before Oct. 1, instead of Sept. 1, as originally intended. Comparatively little furnace coke made outside is coming into New England.

Cast Iron Pipe.—Municipalities and industrial companies continue to buy pipe freely. Medford, Mass., has purchased 100 tons of 8-in. pipe from R. D. Wood & Co. The Navy Department, Newport, R. I., closed bids Aug. 22 on 200 tons of 6 to 16-in., but has made no award. On Aug. 27, bids were closed on 150 tons of 6 to 12-in. pipe for Camp Devens, Mass. No other open business is reported. Owing to firmer Alabama pig iron prices, pipe foundries are inclined to lift prices on small dimensions, but the market for large pipe is still subject to concessions. The range on 4-in. pipe is \$45.10 to \$46.10 a ton, delivered common Boston freight rate points, and on 6-in. to 12-in., \$41.10 to \$42.10. The usual \$5 differential on class A and gas pipe is asked.

Old Material.—Prices for No. 1 heavy melting steel for Pittsburgh

district shipment are very firm at \$9.50 to \$9.75 a ton, on cars shipping point, with nine out of every 10 sales at \$9.75. Higher prices are being paid for steel turnings, forge flashings and forge scrap for Pittsburgh district delivery. Little scrap is moving to eastern Pennsylvania consuming points, but the market looks firmer. The local market for rails is easier, presumably because of pending offerings. The Maine Central Railroad on Sept. 5 closes bids on 875 tons of No. 1 rails, 1650 tons scrap rails and miscellaneous material. The Boston Elevated Railway Co. on Aug. 29 closes bids on 1000 tons of girder rails and seven cars of miscellaneous material. New England foundries show more interest in machinery cast, but are buying largely from local or nearby yards. Local brokers are securing few orders. Two steamers with steel scrap cleared from Boston last week, one with 3552 tons for Danzig, and the other with 7200 tons for Genoa. Another steamer will load here about the middle of September for Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$9.50 to	\$9.75
Scrap T rails	8.00 to	8.50
Scrap girder rails.....	7.50 to	8.00
No. 1 railroad wrought...	8.50 to	9.00
No. 1 yard wrought.....	7.00 to	7.50
Machine shop turnings...	5.50 to	6.00
Cast iron borings (steel works and rolling mill)...	5.50 to	6.00
Bundled skeleton, long...	7.00 to	7.50
Forge flashings	7.75 to	8.25
Blast furnace borings and turnings	5.00 to	5.50
Forge scrap	6.00 to	6.50
Shafting	12.00 to	12.50
Steel car axles	14.00 to	14.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	8.50 to	9.00
Rails for rolling.....	9.50 to	10.00
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$13.50 to	\$14.00
No. 1 machinery cast.....	15.00 to	15.50
No. 2 machinery cast.....	13.50 to	14.50
Stove plate	10.00 to	10.50
Railroad malleable	15.00 to	15.50

black and 3.60c. for galvanized are in prospect. Alloy steel business is good and production is running ahead of last year. Bolt and nut business also is good and the market is firm. Prices on reinforcing bars have stiffened, with 2.515c. being quoted by one concern on bars delivered from warehouse.

Old Material.—No large sales have been made during the week, but there has been a strong effort by dealers to fill existing contracts. The mill which last week bought at \$15 is still in the market, but No. 1 heavy melting steel of the grade specified is difficult to get and shipments are being made slowly. A large producer whose last purchase of No. 1 heavy melting steel was at \$13.75 states that it will not enter the market as long as No. 1 steel is held at present prices. With 10,000 tons of scrap coming in each week by boat and having a stockpile larger than it was in November of last year, its needs for the present are supplied. Some No. 1 machinery cast has been sold at \$14.75 and some at \$14.50. Stove plate sales have been made at \$14 and railroad malleable at \$14.75. Scrap supplies available for purchase and sale by dealers are light and practically all dealers are sold short and are offering as much as they are receiving. As high as \$12.50 is said to have been paid by some dealers for No. 2 steel.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.00 to	\$15.00
No. 2 heavy melting steel.		12.25
Scrap rails	13.00 to	13.50
Hydraulic comp. sheets...		12.25
Hand bundled sheets.....	8.00 to	8.50
Drop forge flashings.....	12.00 to	12.50
No. 1 busheling.....		12.25
Hvy. steel axle turnings...	12.00 to	12.50
Machine shop turnings....	7.00 to	7.50
No. 1 railroad wrought...	11.00 to	11.50
Acid Open-Hearth Grades		
R'l'r'd knuckles and couplers	15.00 to	15.50
R'l'r'd coil and leaf springs	16.00 to	16.50
Rolled steel wheels.....	15.50 to	16.00
Low phos. billet and bloom ends	16.00 to	16.50

Electric Furnace Grades		
Hvy. steel axle turnings..	12.00 to	12.50
Short shov. steel turnings.	10.00 to	10.50

Blast Furnace Grades		
Short shov. steel turnings.	10.00 to	10.50
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings.....	9.50 to	10.00
No. 2 busheling.....	9.00 to	9.25

Rolling Mill Grades		
Steel car axles.....	16.50 to	17.00
Iron axles	19.50 to	20.00

Cupola Grades		
No. 1 machinery cast....	14.50 to	15.00
Stove plate	13.50 to	14.00
Locomotive grate bars....	11.25 to	11.75
Steel rails, 3 ft. and under.	16.00 to	16.50
Cast iron carwheels.....	12.00 to	12.50

Malleable Grades		
Industrial	15.00 to	15.50
Railroad	15.00 to	15.50
Agricultural	15.00 to	15.50

Examination for associate highway bridge engineers, with entrance salary of \$3,200, is announced by the Civil Service Commission, Washington. Applications must be filed with the commission by Sept. 26. Full information may be obtained from the commission, or from the board of examiners at the post office or custom house in any city.

Buffalo

Higher Pig Iron Prices Announced by Furnaces—Steel Mills Operating at Near-Capacity Rate

BUFFALO, Aug. 28.—Buffalo pig iron producers today announced an advance in prices, effective immediately, of 50c. a ton. The new schedule, which, it is said, will be quoted by all Buffalo producers, is \$17.50 for No. 2 plain, \$18 for No. 2 X, \$19 for No. 1 X and \$18 for malleable. The Buffalo furnaces have for some time been quoting on a \$17 base for delivery in the immediate district, but for

shipment to New England and to lower New York State and New Jersey quotations of \$16 and \$16.50, furnace, have been made. Last week, however, prices for outside shipment were increased to a \$17 basis, though some outstanding quotations at the former prices have not been closed.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$17.00 to	\$17.50
No. 2X fdy., sil. 2.25 to 2.75	17.50 to	18.00
No. 1X fdy., sil. 2.75 to 3.25	18.50 to	19.00
Malleable, sil. up to 2.25..	17.50 to	18.00
Basic	16.50 to	17.00
Lake Superior charcoal...		27.28

Finished Iron and Steel.—With mills operating at close to 90 per cent and business brisk, the market is in a very healthy condition. The movement for higher prices is general. Though formal announcement is being withheld, it is said that fourth quarter bars and shapes will be 2.10c., Buffalo. Sheet prices of 2.75c. for

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg....	\$3.65
Black wire, base per 100 lb.....	3.90

Detroit

Employment Record Broken for Third Consecutive Week— Automobile Output at High Rate

DETROIT, Aug. 28.—Business in the Detroit area continues its steady advance. All-time records of Detroit employment have been shattered for the third consecutive week, according to the barometer of the Employers' Association, which reflects the status of the combined payrolls of firms constituting about two-thirds of the city's working population. The increase for the past week was 7504. This brings the total to 287,503, which is the highest employment ever recorded for this city. The corresponding figure of a year ago was 206,074, or 81,529 below the present total.

July production for all General Motors Corporation cars showed a recession from the peak previously reported. Consumers' sales for July dropped to 177,728 units from 206,259 in June. The July figure of 1927 was 134,749. Dealers' sales for July were 169,473, compared with 186,160 in June and 136,909 in July of 1927. July daily output averaged 7400 cars against 7900 in June. For the first seven months of the current year consumer sales totaled 1,240,461, compared with 975,230 for the same period a year ago. The parallel figures for dealer sales were 1,252,789 for 1928 and 1,020,386 for 1927.

The Buick Motor Co., Flint, Mich., is arranging to put on night shifts to increase the production schedule to 1300 cars, which will be a new record for the Buick organization. E. T. Strong, president of the company, states that since July 28 more business has been booked by his company than ever before in the same period of time.

During the past three weeks, production of Dodge cars under the new Chrysler management has been increased from 800 to 1000 a day, with a sufficient increase in unfilled orders to guarantee capacity operation throughout the next three months.

It is said that the new Chrysler organization is aiming at an output of 750,000 cars in 1929, and more than a million in 1930. The Chrysler company as a whole is now running from 50,000 to 60,000 cars behind orders.

The Ford Motor Co., Detroit, plans to triple its production of tri-motor aeroplanes. Since last May the production has averaged one a week. This plane is equipped with a Wasp engine, has a wing span of 78 ft., a capacity of 14 passengers and costs \$65,000.

A new record for one day's production was made by the Graham-Paige Motors Corporation, Detroit, Aug. 14, with a total of 516 cars. This company is feeling no seasonal slump as yet.

Sales of Oakland and Pontiac sixes by the Oakland Motor Car Co., Pontiac, Mich., in July amounted to 22,704 units, a gain of 35½ per cent over the figure for July of the pre-

vious year. The records of this company show 184,252 units shipped in the first seven months of the current year, as compared with 112,888 for a like period of 1927. In fact, the total output of 1927 was only 192,966 units. At the end of July the production total was within 9000 units of the entire 1927 production and the 1927 production was an increase of 40 per cent over that for 1926.

For the first seven months of this year the production of the Olds Motor Works, Lansing, Mich., exceeded all previous full year records.

Sales of the Willys-Overland Co., Toledo, Ohio, for the first seven months totaled approximately 225,000 units, compared with a production of

171,743 units in the entire year 1927. It is expected that total 1928 production will be nearly twice that of 1927.

The production schedule for Nash Motors Co., Kenosha, Wis., is approximately 22,000 units for August. The September schedule will probably be 23,000 units. August deliveries on order amount to 32,360 units.

The market on old material has registered several increases during the past week, with the result that dealers are disinclined to sell at present prices. Mills and furnaces have not been able to cover all of their requirements at present prices. The market is decidedly strong.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$11.50 to \$12.00
Borings and short turnings	7.50 to 8.00
Long turnings	6.00 to 6.50
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast.....	19.00 to 20.50
Hydraul. comp. sheets....	11.25 to 11.75
Stove plate	11.00 to 12.00
No. 1 busheling	9.00 to 9.50
Sheet clippings	7.00 to 7.50
Flashings	9.75 to 10.25

Cincinnati

Heavy Pig Iron Buying Precedes 75c. a Ton Advance by Alabama Producers—Firmer Tone in Scrap

CINCINNATI, Aug. 28.—Alabama pig iron makers have announced an increase of 75c. a ton to \$16.25, base Birmingham, while the one furnace interest in Tennessee has advanced prices 50c. a ton and is now adhering to a minimum of \$16, base Birmingham. As a result of heavy buying immediately preceding the advance, pig iron sales fell only slightly short of 25,000 tons in the past week and were the largest this year. Both Southern and Northern irons are showing greater strength from the standpoint of prices. A leading district furnace has raised its quotations an average of \$1 a ton and is getting the full silicon differentials. Northern Ohio sellers evidently have booked sufficient tonnages recently to relax somewhat the pressure for business in this territory so that the situation, so far as nearby producers are concerned, is the most favorable in months. Purchases of Southern iron have included several sizable orders. A district consumer has taken 1500 tons of Northern foundry iron, and a Michigan melter has contracted for 500 tons of Jackson County silvery. A large percentage of bookings consists of small lots ranging from single carloads up to 300 tons. The only important inquiry before the trade calls for 500 tons of foundry for delivery to a Springfield, Ohio, company.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89
So. Ohio malleable.....	\$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25 ..	19.94
Ala. fdy., sil. 2.25 to 2.75 ..	20.44
Tenn. fdy., sil. 1.75 to 2.25 ..	19.69
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Warehouse Business.—Prices are holding well in this territory in ware-

house products, being unchanged except on hoops, which have been reduced from 4.40c. to 4.25c. per lb. Steel and iron bars are still holding well at 3.30c.; reinforcing bars are in fair demand at 3.15c. Structural shapes and plates are quiet. Sheets are in good demand.

Coke.—Shipments of by-product foundry coke this month have been from 10 to 15 per cent greater than in July, but demand for domestic grades has lagged. By-product egg coke has gone up 50c. a ton at Detroit, the new schedule being \$6.50 per net ton, delivered in Detroit, and \$6, ovens, for outside delivery. Nut size, however, will remain unchanged at \$6, delivered in Detroit, and \$5.50, ovens, for outside shipment. Prices in this district, especially in southern Indiana, are still being somewhat disturbed by low quotations made by a Southern by-product coke maker.

Old Material.—There is a firmer tone to the scrap market traceable almost directly to a better feeling among dealers. District steel plants are accepting moderate tonnages on contracts, while movement of foundry grades remains sluggish. Prices have not changed.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.00 to \$11.50
Scrap rails for melting....	10.75 to 11.25
Loose sheet clippings.....	8.50 to 9.00
Bundled sheets	9.00 to 9.50
Cast iron borings.....	8.00 to 8.25
Machine shop turnings....	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	12.50 to 13.00
No. 1 locomotive tires....	12.75 to 13.25
No. 2 railroad wrought....	11.00 to 11.50
Short rails	15.75 to 16.25
Cast iron carwheels.....	11.00 to 11.50
No. 1 machinery cast.....	15.00 to 15.50
No. 1 railroad cast.....	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable ...	10.50 to 11.00

Non-Ferrous Metal Markets

Copper Quiet and Firm, Tin Actively Bought, Lead Prices Advanced, Zinc Unchanged

Copper.—Buying of copper is generally light both for domestic and foreign consumption. Domestic consumers have covered for close to 90 per cent of their September requirements and foreign users can buy on short notice out of stocks. Naturally, under such conditions the market is quiet and not much activity is looked for until after Labor Day. During the past week foreign buying has been normal, but domestic demands have fallen off, with no interest in October metal. Monday and Tuesday domestic business was somewhat more active due to unconfirmed reports of a pos-

	THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Aug. 28	Aug. 27	Aug. 25	Aug. 24	Aug. 23	Aug. 22	Aug. 22
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.....	47.50	47.25	....	47.25	48.00	47.75	47.75
Lead, New York.....	6.40	6.40	6.30	6.30	6.30	6.30	6.20
Lead, St. Louis.....	6.22½	6.22½	6.10	6.10	6.10	6.10	6.00
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

sible shortage, but not much credence was given to these. Quotations are firmly unchanged at 14.75c., delivered in the Connecticut valley, at 14.87½c., delivered in the Central West and at 15c. c.i.f. usual European ports, the official quotation of Copper Exporters, Inc. Lake copper is quiet and steady at 14.75c. to 14.87½c., delivered.

Tin.—Sales for the week ended Saturday, Aug. 25, were the largest in some time, totaling approximately 2000 tons. The most active days were Aug. 20 and Aug. 21, when at least 700 tons changed hands on each day, followed by 300 tons on Aug. 22, about 100 tons on Aug. 23 and about 200 tons on Aug. 24. Consumers were very liberal buyers for all positions, with dealers buying only sparingly. Opinion is general that there is still a large quantity to be purchased by consumers for the last quarter. On Mon-

day about 300 tons changed hands, but Tuesday the market was quiet and firm with spot Straits tin quoted at 47.50c., New York. On Monday most of the buying was done by dealers, the first time they have been active in some time. Straits shipments to all countries up to Aug. 25 are reported as about 8200 tons, with the total for the month estimated at over 9000, indicating that supplies are coming liberally. Arrivals thus far this month have been 5605 tons, with 8385 tons reported afloat. Quotations in London Tuesday were lower than a week ago, with spot Standard quoted at £210, future Standard at £206 15s. and spot Straits at £213. The Singapore price was £210 15s.

Lead.—Two advances in the price of lead have been made by the American Smelting & Refining Co. in the last week. On Aug. 23 it raised its

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	49.00c. to 50.00c.
Tin, bars.....	51.00c. to 52.00c.
Copper, Lake.....	15.75c.
Copper, electrolytic.....	15.50c.
Copper, casting.....	14.75c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	12.50c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	32.00c. to 33.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.25c.
Tin, bar.....	57.25c.
Copper, Lake.....	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting.....	14.00c.
Zinc, slab.....	8.00c.
Lead, American pig.....	6.75c. to 7.00c.
Lead, bar.....	9.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	56.50c.
Solder, ½ and ½.....	31.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier.....	25.75c.
Seamless Tubes—	
Brass.....	24.12½c.
Copper.....	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods.....	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since May 25. Zinc sheets are quoted at 9.75c., and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.25c.
Copper, hot rolled.....	23.50c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass.....	24.12½c.
Copper.....	25.00c.

Rods—	
High brass.....	17.00c.
Naval brass.....	19.75c.

Wire—	
Copper.....	16.75c.
High brass.....	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.	
Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.625c.	14.00c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms.....	10.75c.	11.75c.
Brass, heavy.....	7.00c.	8.25c.
Brass, light.....	6.00c.	7.50c.
Hvy. machine composition.....	9.75c.	10.75c.
No. 1 yel. brass turnings.....	8.75c.	9.50c.
No. 1 red brass or compos. turnings..	9.00c.	10.00c.
Lead, heavy.....	5.00c.	5.50c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.00c.	3.50c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....		19.25c.
Copper, hot rolled.....		23.50c.
Copper, cold rolled, 14 oz. and heavier.....		25.75c.
Zinc.....		10.00c.
Lead, wide.....		9.75c.
Seamless Tubes—		
Brass.....		25.62½c.
Copper.....		26.50c.
Brass Rods.....		17.00c.
Brazed Brass Tubes.....		27.25c.

contract price from 6.20c. to 6.30c. and on Monday, Aug. 27, from 6.30 to 6.40c., New York. Buying during the past month has been quite heavy, and the statistical position of the market as to world production and as to stocks has been favorable to the advance. Most consuming lines have been buyers, all quite heavily for September, with some sales for October. The Western market also is active and higher at 6.22½ to 6.25c., St. Louis, for September-October, with some spot metal available at 6.20c., St. Louis.

Zinc.—Demand for prime Western zinc continues normal but is not particularly heavy. The total month's business will average pretty close to that of recent months. Inquiry is not active, but evidently business is being done daily between producers and consumers, which makes the zinc

market somewhat different in character from that of the others, formal inquiries often being dispensed with. Firmness of prices continues a feature, with prime Western available through October at 6.25c., East St. Louis, or 6.60c., New York. Ore prices at Joplin were unchanged Saturday, Aug. 25, at \$40, with production about 12,800 tons. Sales were about 8340 tons and shipments were about 10,600 tons, bringing stocks on Aug. 25 to about 40,900 tons, against 38,700 tons the week before.

Antimony.—With consumer buying light, the market is a little easier and Chinese metal is quoted at 10.25c., New York, duty paid, for all positions.

Nickel.—Wholesale lots of ingot nickel are available at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

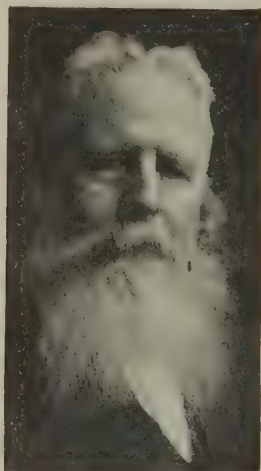
CHICAGO, Aug. 28.—Purchases of copper are of moderate size but steady. Demand for zinc and lead is more active, following advances in prices. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 48.50c.; lead, 6.35c.; zinc, 6.35c.; in less-than-carload lots, antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

OBITUARY

JAMES BOWRON, chairman of the board of the Gulf States Steel Co., Birmingham, died suddenly at his home in that city on Aug. 25, of heart disease, aged 84 years. He was born at Stockton-on-Tees, Durham County, England, and, before coming to the United States in 1877, he was engaged in a number of business enter-

prises in that country. Here he became associated with the South Pittsburgh Pipe Works, South Pittsburgh, Tenn., and nine years later became its president. Later he was identified for many years with the Tennessee Coal, Iron & Railroad Co., having left that company to become associated with the Southern Iron & Steel Co. He served as president of this company and later as receiver, prior to its reorganization as the Standard Steel Co. in 1913. In December of that year the company became the Gulf States Steel Co. and Mr. Bowron served as its president until 1921,



JAMES BOWRON

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when he retired to the less active duties of chairman of the board.

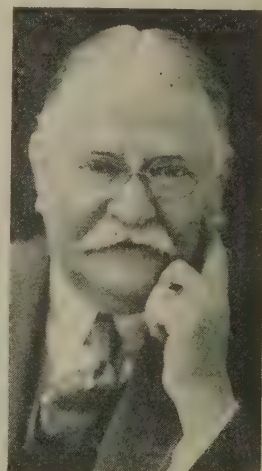
In the eighteen-nineties, when N. Baxter, Jr., was president of the Tennessee Coal, Iron & Railroad Co., Mr. Bowron was secretary of the company, later treasurer and still later first vice-president and treasurer. In recounting on various public occasions the stressful conditions under which pig iron manufacture was carried on in the South, Mr. Bowron spoke feelingly of the financial anxieties of officers of the Tennessee company. Now and then when checks went out from the company headquarters at Nashville the treasurer took an early train for New York to arrange the financing necessary to meet them. Speaking at the Birmingham meeting of the American Iron and Steel Institute in October, 1914, Mr. Bowron said of those times:

Heavy tonnages of iron were carried in warrant yards on borrowed money. Pig iron brokers made more money than the producers, either out of their sales commissions or by interest on the money which they advanced to the shippers against their bills of lading, sometimes every week and sometimes every day. Abnormal prices were made, which only covered in some places the cash out of pocket cost. The writer can remember one sale of 5000 tons of No. 2 foundry at \$6.25 spot cash, immediate delivery in one block, to meet a pay roll; another commercial transaction, a cargo of No. 4 foundry for Japan at \$5.75, the remainder of the sailing ship being filled up with coke. Needless to say such prices provided nothing for the depreciation of the plants which were standing still, or for the replacement of minerals which were being taken from the richest and most accessible points.

Mr. Bowron's stalwart figure will be recalled by many attendants at foundrymen's conventions in the eighteen-nineties and early nineteenthundreds, and by his fellow members of the American Iron and Steel Institute in more recent years. He took

a pride in referring to his athletic proclivities in his younger days in England, and in his seventies his erect form and ruddy countenance made the common appraisal of his age many years younger.

A. C. RULOFSON, of the A. C. Rulofson Co., San Francisco, Portland and Los Angeles, Pacific Coast representative for the Pittsburgh Steel Co., Illinois Malleable Iron Co., United States Chain & Forge Co. and other companies, died on Aug. 11 at the age of 74,



A. C. RULOFSON

at his home in Oakland, Cal. He was one of the pioneers in the hardware and iron and steel business on the Pacific Coast, his first connection having been with the old firm of Huntington-Hopkins Co., San Francisco. For many years he was connected with Baker & Hamilton and resigned from that company as manager in 1904 to form his own company.

ERNEST J. BOSSERT, proprietor of the Bossert Machine Co., Cincinnati, died at his home in that city on Aug. 27. He was 59 years of age and had been engaged in the manufacture of machinery for 20 years.

PERSONAL

WILLIAM J. TEEMER, for the last 18 years associated with the National Tube Co. both in the operating and sales departments, has been appointed manager of sales of the Delaware Seamless Tube Co., Auburn, Pa., subsidiary of the Allegheny Steel Co.

CHARLES J. ARTHUR, recently sales engineer for the A. R. Amos, Jr., Co., Philadelphia, has been added to the Philadelphia sales organization of the Wagner Electric Corporation, St. Louis. Since his graduation from the University of Pennsylvania in 1923 he has had experience in construction, inside maintenance and operation, with the American Telephone & Telegraph Co.; in transmission, distribution, design and layout, with the Philadelphia Electric Co.; in laboratory research work, with the Western Electric Co., and in industrial sales engineering, with the Amos organization.

W. FRANK ROBERTS, for 10 years general manager of the Sparrows Point, Md., plant of the Bethlehem Steel Co., has resigned. He has been succeeded by **STEWART J. CORT**, who has been identified with the company's Bethlehem, Pa., plant for a number of years.

A. E. HERZBERG, manager of the transformer sales division of the Wagner Electric Corporation, St. Louis, who has been a major in the United States Army Reserve, has been promoted to the grade of lieutenant-colonel.

WILLIAM FAIRFIELD WHITING, president of the Whiting Paper Co., Holyoke, Mass., who has been appointed by President Coolidge to succeed **HERBERT HOOVER** as Secretary of Commerce, has been a prominent figure in New England industrial, railroad and financial organizations for many years. He was born at Holyoke in 1864 and attended Williston Seminary and Amherst College, having been graduated from the latter institution in 1886. He immediately became associated with his father in the paper manufacturing concern, which had been founded in 1865, and has been identified with the business ever since. In accepting the appointment Mr. Whiting stated that he expected to pursue the policies inaugurated by Mr. Hoover.

P. S. MENOUGH has been made assistant to the president of the Duralloy Co., Pittsburgh. He is a graduate of Cornell University, and was for nine years chief engineer of the Eastern Malleable Iron Co., Bridgeport, Conn.

FRANK W. CRAMER has been appointed general electrical superintendent of the Republic Iron & Steel Co., Youngstown. He was formerly as-

sistant superintendent of the electrical department at the Cambria works, Bethlehem Steel Co., Johnstown, Pa., and is a graduate of Pennsylvania State College. He was identified with Pennsylvania power companies before going with the Midvale Steel & Ordnance Co. at Johnstown in 1917. Mr. Cramer is first vice-president of the Association of Iron and Steel Electrical Engineers, in the affairs of which he has been very active.

GEORGE BATTY, recently a consultant on steel foundry practice at Detroit, has been appointed research director of the Steel Castings Development Bureau, 500 Stock Exchange Build-



GEORGE BATTY

ing, Philadelphia, and will be available for consultation at that address on Fridays and Saturdays. The bureau, which is financing an investigation of the manufacture of steel castings with view toward improving the quality of the product, is supported by the following companies: Atlantic Steel Castings Co., Chester, Pa.; Crucible Steel Casting Co., Lansdowne, Pa.; Treadwell Engineering Co., Easton, Pa.; Pennsylvania Electric Steel Castings Co., Hamburg, Pa.; Dodge Steel Co., 6501 Tacony Street, Philadelphia; Riverside Steel Castings Co., Newark, N. J.; Deemer Steel Casting Co., New Castle, Del., and Empire Steel Castings Co., Reading, Pa. Mr. Batty attended the Sheffield Scientific School, which later became a part of Sheffield University, Sheffield, England. For the next 11 years he was engaged in capacities of steel maker or works manager in a number of Sheffield companies manufacturing tool and special steels by the crucible and electric processes. In 1920 he spent five months in Detroit in a consulting capacity with the Ford Motor Co., and upon his return to England, entered upon the production of steel castings. In 1923 he was ap-

pointed works manager of the National Steel Foundry, Ltd., in Scotland and later became technical director of that company. He returned to Detroit to engage in private consulting work in 1927.

H. C. BUSCH, who has been president of the Cisco Machine Tool Co., Cincinnati, since its inception, has retired and has been succeeded as president by **RALPH B. BUSCH**, who has been vice-president. H. C. Busch was also president of the Cincinnati Iron & Steel Co., which was consolidated with Joseph T. Ryerson & Sons, Inc., several years ago, but has been retiring from his active business interests in recent years to devote more time to travel. Ralph B. Busch joined the Cisco organization after leaving Cornell University seven years ago.

A. S. GOULD, for 10 years sales manager of the Oster Mfg. Co., Cleveland, has been elected secretary of the company and will continue in charge of sales. He succeeds **ROGER TEWKSBURY** as secretary, the latter having been elected vice-president and treasurer. R. B. TEWKSBURY continues as president of the company.

LOUIS K. LIGGETT, heretofore chairman of the board of directors of the Winchester Repeating Arms Co., New Haven, Conn., has been made chairman of the executive committee in place of **FRANK G. DREW**, president, who becomes president of the board of directors. **WILLIAM A. TOBLER**, vice-president and general manager, is now president. **LESLIE R. THOMPSON** is vice-president and treasurer.

C. L. WARWICK, secretary-treasurer American Society for Testing Materials, Philadelphia, will visit in October the principal industrial and engineering centers of the Pacific Coast to discuss the development of the society's interests in that territory and to establish closer contacts with Western members. Despite the 3000 miles separating the Pacific Coast from the society's headquarters, that district stands fourth among nine into which the country is divided, in proportion of A. S. T. M. membership to population and to capital invested in manufacturing industries.

WILLIAM B. PRESCOTT, formerly manager of the raw materials department, Youngstown Sheet & Tube Co., has been appointed manager of sales for the Koppers Coal Co.; a subsidiary of the Koppers Co., 379 Union Trust Building, Pittsburgh.

STANLEY GRAND-GIRARD, formerly electrical engineer for the Republic Iron & Steel Co., Youngstown, has been appointed electrical superintendent of the Sharon Steel Hoop Co., Sharon, Pa., succeeding the late John Barker.

W. A. MAXWELL, Jr., who has been production manager of the Colorado Fuel & Iron Co., Denver, since May 1, 1927, has been elected vice-presi-

dent and production manager and will have charge of all manufacturing, mining and related activities of the company. He has also been elected vice-president of the Rocky Mountain Coal & Iron Co., the Colorado Supply Co. and the Colorado Realty Holding Co., subsidiaries of the Fuel & Iron company. Before going with the Colorado company Mr. Maxwell was general superintendent of the Inland Steel Co., Chicago.

THORSTEN Y. OLSEN, vice-president and treasurer Tinius Olsen Testing Machine Co., 500 North Twelfth Street, Philadelphia, will sail from



TINIUS OLSEN

New York for Europe on Sept. 1, to attend the unveiling on Sept. 16, of a statue of his father, TINIUS OLSEN, at the latter's birthplace, Kongsberg, Norway. The cost of the statue has been met by popular subscription in Norway in recognition of Mr. Olsen's philanthropy in the city of his birth, and his assistance to engineering progress in Norway. He has already been tendered many honors and has been knighted by the King of Norway and made a member of the Order of St. Olaf. Tinius Olsen is living, but because of his advanced age, 83 years in September, it was deemed best for him not to make the long journey to his birthplace. Thorsten Y. Olsen, his son, will therefore go as representative of his father and will be accompanied by his wife and brother. They will be abroad about 30 days, and will also visit Sweden and Denmark.

A. E. LEWIS has been appointed vice-president in charge of the Cleveland district of the Great Lakes Chemical Works, Detroit, and will have headquarters at a new office which is being opened at 2509 Terminal Tower Building, Cleveland.

J. M. CURLEY has been appointed Eastern sales representative of the A. Finkl & Sons Co., Chicago, manufacturer of die blocks and drop forge shop accessories, and will maintain headquarters at 292 Main Street, Cam-

bridge, Mass. He succeeds the late W. L. GOODRICH, with whom he was closely associated for many years in the sales of the company's products.

CHARLES BOND, president of the Charles Bond Co., Philadelphia, maker of power transmitting machinery and leather belting, sailed for England on Aug. 11. JOHN R. GRUNDY, vice-president of the company, also sailed for England on Aug. 24 and will probably return in October.

Steel Treating's Western Metal Congress and Exposition

The American Society for Steel Treating will hold a semi-annual meeting in Los Angeles, Jan. 14 to 18, 1929. In connection with this, there will be held the Western Metal Congress and the Western States Metal and Machinery Exposition.

Five days will be devoted to technical sessions on the making, working and treating of metals. The exposition will include displays of machinery, materials and appliances, which will portray the cycle of the metal industry from the raw material to the finished product. In many respects it will not be unlike the society's annual metal exposition to be held in Philadelphia, Oct. 8 to 12.

The meetings and exposition will be held in the Shrine auditorium in Los Angeles. A dozen or more technical societies of the Western part of the country will take part in the program in presenting papers.

New England Industries Meeting Oct. 1 to 3

Materials handling, machine shop practice, management, education and training for industries, aeronautics and applied mechanics are among the topics that will be discussed at the New England Industries meeting, which will be held in Boston, Oct. 1, 2 and 3.

Simultaneous sessions on education and training for the industries, and materials handling, will be held on the afternoon of Oct. 1. Speakers at the training session, according to announcement by the American Society of Mechanical Engineers, include C. K. Tripp, supervisor of apprentices General Electric Co., Lynn, Mass., and W. S. Berry, director of training Scovill Mfg. Co., Waterbury, Conn. D. W. Coe, vice-president and general sales manager of the Canadian Mead-Morrison Co., Ltd., Montreal, Canada, and C. G. Spencer, Baker & Spencer, Inc., New York, will speak on materials handling.

The morning session of Oct. 2 is to be devoted to aeronautics, with papers by Sumner Sewall, traffic manager of the Colonial Air Line, A. Willgoos, chief engineer Pratt & Whitney Air-

L. GERALD FIRTH, general manager Firth-Sterling Steel Co., McKeesport, Pa., sailed last week on a European trip, a month of which will be spent at the Sheffield works of the associated company, Thomas Firth & Sons, Ltd., Sheffield, England.

ROBERT H. IRONS, president Central Iron & Steel Co., Harrisburg, Pa., sailed for Europe last week on the Aquitania and will not return until November.

craft Corporation, and F. W. Mosinger, Norma-Hoffman Bearing Corporation. Papers by A. Dinnick, professor of mechanics, Institute of Mines, Dniepropetrovsk, Soviet Russia, and J. P. DenHartog, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., are planned for the applied mechanics session. A second session on applied mechanics will be held Oct. 3, with D. A. Gurney, ordnance department, United States Army, and A. M. Wahl, research department, Westinghouse Electric & Mfg. Co., as speakers.

J. H. George, vice-president Morgan Construction Co., Worcester, and W. J. Fortuno, National Shawmut Bank, Boston, will be among the speakers at the management engineering session.

The machine shop session will feature a symposium on machine shop work for textile mills. There will also be a separate paper on internal grinding by A. M. Drake, chief engineer Greenfield Tap & Die Corporation, Greenfield, Mass. R. J. Cullen and H. S. Walton of the Boston & Albany Railroad, will be speakers at a railroad session.

Varied Program for National Fuels Meeting

Study of fuel characteristics, the industrial applications of fuel, heat transfer, powdered fuel uses, refractories and stokers, marine practice, central station methods and smoke abatement are the principal topics scheduled for discussion at the second national fuels meeting to be held Sept. 17 to 20 at the Hotel Cleveland, Cleveland, under the auspices of the fuels division of the American Society of Mechanical Engineers.

The meeting will be opened by an address by Thomas T. Baker, president Carnegie Institute of Technology, Pittsburgh, on Monday morning, Sept. 17, which will be followed during the remainder of that day and Tuesday by technical sessions of the various divisions. The final day of the meeting will be given over entirely to smoke abatement. Plant inspection trips include visits to the Fairmont pumping station of the Cleveland Water Works, the Avon station of the Cleveland Electric Illuminating Co. and to the three Cleveland plants of the American Steel & Wire Co.

Exports and Imports Both Decline

July Exports, with Loss of Only 3 Per Cent, Were Far Above 1927—Import Reduction Was 27 Per Cent

WASHINGTON, Aug. 27.—Exports of iron and steel products from the United States in July aggregated 253,336 gross tons, a drop of 8716 tons or 3.3 per cent under June, when the total was 262,052 tons. Imports in July, amounting to 47,830 tons, showed a large decline, falling off 17,989 tons or 27.3 per cent from June's total of 65,819 tons. The daily export movement in July averaged 8172 tons, compared with 8735 tons in June. The average daily import movement for July was 1543 tons, against 2194 tons in June.

Exports in July, however, were considerably larger than those for July of last year, when the total was 190,532 tons. For the seven months ended with July, the total was 1,612,078 tons in 1928, against 1,323,959 tons in 1927. Imports in July of last year, amounting to 61,112 tons, were 13,382 tons above the movement of July, 1928. For the seven months ended with July, imports totaled 437,725 tons in 1928, against 444,596

United States Imports of Iron and Steel Products in July

From	Gross Tons
Austria	26
Belgium	10,593
Czechoslovakia	16
Denmark	1
France	10,882
Germany	8,917
Italy	139
Netherlands	2,659
Norway	400
Sweden	1,972
United Kingdom	3,028
Europe	38,632
Canada	6,010
Mexico	64
Other British West Indies	100
America	6,174
British India	2,994
Japan	30
Total	47,830

tons for the corresponding period of last year.

Although the July export movement was less than that of June, decreases were registered in only 18 of the 39

classes into which the trade is divided, 21 having shown gains. The largest gain was made in ingots and semi-finished steel, which increased 10,822 tons to 16,020 tons over the June total of 5198 tons. Galvanized sheets, whose July total of exports was 15,341 tons, showed a gain of 4821 tons over the 10,420 tons exported in June. The decreases were small, with two exceptions. Exports of scrap in July, the largest movement of any of the classes, totaled 43,783 tons, a drop of 21,135 tons from the 64,918 tons exported in June. Plain structural shapes to the amount of 14,509 tons were exported in July, a decline of 4847 tons from the 19,356 tons exported in June.

Exports of scrap in July went principally to Poland, Canada, Italy and Japan, the amounts being in the order named. Next to scrap the largest class exported in July was boiler tubes and welded pipe, with a total of 24,214 tons. Of the 10,189 tons of casing and oil line pipe exported, 2797 tons

Exports of Iron and Steel from the United States

	(In Gross Tons)		Seven Months Ended July	
	July		July	
	1928	1927	1928	1927
Pig iron	8,598	4,182	33,927	26,721
Ferromanganese	1,137	98	5,998	391
Scrap	43,783	17,499	294,238	122,209
Pig iron, ferroalloys and scrap	53,518	21,779	334,163	149,321
Ingots, blooms, billets, sheet bar, skelp	16,020	10,616	72,950	49,951
Wire rods	3,638	679	22,117	9,291
Semi-finished steel	19,658	11,295	95,067	59,242
Steel bars	13,899	9,345	84,667	65,921
Alloy steel bars	1,102	423	8,594	3,452
Iron bars	471	597	2,289	3,113
Plates, iron and steel	14,648	11,209	86,374	81,561
Sheets, galvanized	15,341	15,095	90,417	101,050
Sheets, black steel	19,150	16,173	109,461	106,402
Sheets, black iron	1,355	1,248	8,843	10,143
Hoops, bands, strip steel	4,988	3,176	32,685	28,547
Tin plate; terne plate	21,528	19,845	146,627	172,612
Structural shapes, plain material	14,509	13,144	104,382	79,366
Structural material, fabricated	14,156	4,263	56,450	37,428
Steel rails	11,079	14,728	120,665	112,645
Rail fastenings, switches, frogs, etc.	2,487	2,365	30,061	20,517
Boiler tubes, welded pipe and fittings	24,214	24,779	145,327	172,668
Plain wire	3,265	3,637	26,966	19,540
Barbed wire and woven wire fencing	5,542	5,385	43,969	28,634
Wire cloth and screening	216	240	1,062	1,370
Wire rope	386	318	2,964	2,724
Wire nails	1,425	1,193	10,032	4,765
Other nails and tacks	837	819	6,102	4,818
Horseshoes	64	38	269	285
Bolts, nuts, rivets and washers, except track	1,262	1,206	7,762	6,959
Rolled and finished steel	171,924	149,226	1,125,968	1,064,520
Cast iron pipe and fittings	2,533	3,010	19,895	16,130
Car wheels and axles	944	1,422	8,568	11,027
Iron castings	776	930	7,162	6,729
Steel castings	1,097	545	6,337	4,732
Forgings	1,168	540	6,029	3,269
Castings and forgings	6,518	6,447	47,991	41,887
All other	1,718	1,785	8,889	8,989
Total	253,336	190,532	1,612,078	1,323,959

Imports of Iron and Steel into the United States

	(In Gross Tons)		Seven Months Ended July	
	July		July	
	1928	1927	1928	1927
Pig iron	6,055	10,377	81,350	70,696
Ferromanganese*	2,891	2,724	27,296	15,152
Ferrosilicon†	332	193	2,424	5,856
Ferrochrome‡	59	...	397	382
Scrap	3,688	3,260	26,529	37,182
Pig iron, ferroalloys and scrap	13,025	16,554	137,996	129,268
Steel ingots, blooms, billets and slabs	1,217	1,111	13,083	7,656
Iron blooms, slabs, etc.	...	...	4	...
Wire rods	595	891	10,012	7,490
Semi-finished steel	1,812	2,002	23,099	15,146
Rails and splice bars	1,534	600	11,180	10,714
Structural shapes	11,192	12,606	99,878	87,942
Boiler and other plates	198	188	3,355	2,728
Sheets and saw plates	1,160	1,645	15,999	9,068
Steel bars	4,992	5,697	55,304	56,522
Bar iron	35	425	1,385	2,807
Hoops, bands and cotton ties	893	5,447	11,423	20,139
Tubular products (wrot.)	2,918	6,693	23,973	39,185
Nails, tacks, staples	1,020	832	4,863	4,006
Tin plate	159	31	751	923
Bolts, nuts, rivets and washers	11	47	154	184
Round iron and steel wire	408	372	2,430	2,723
Barbed wire	226	125	1,975	2,971
Flat wire; strip steel	132	185	1,294	1,606
Steel telegraph and telephone wire	10	1	163	31
Wire rope and strand	168	157	971	1,520
Other wire	42	36	320	291
Rolled and finished steel	25,098	35,087	235,418	243,360
Cast iron pipe	7,731	7,381	39,248	54,926
Castings and forgings	164	88	1,964	1,796
Total	47,830	61,112	437,725	444,496
Manganese ore*	21,447	27,948	105,364	207,833
Iron ore	183,256	252,162	1,415,669	1,575,594
Magnesite (dead burned)	3,912	3,937	31,386	53,524

*Manganese content only.
†Silicon content only.
‡Chromium content only.

Destination of Iron and Steel Exports from the United States (In Gross Tons)

Country of Destination	July, 1928	January Through July		Country of Destination	July, 1928	January Through July	
		1928	1927			1928	1927
<i>North and Central America and West Indies</i>				<i>Europe (Continued)</i>			
Canada and Newfoundland	121,340	771,929	653,574	Italy	8,274	52,375	37,142
Cuba	100,341	635,519	501,258	Netherlands	99	1,432	1,821
Mexico	6,289	37,524	51,999	Russia	407	1,976	4,196
Guatemala	6,976	46,774	52,609	United Kingdom	5,010	31,464	43,181
Panama	264	6,099	4,750	Other Europe	16,365	80,971	20,008
Salvador	1,192	9,700	12,550				
British West Indies	307	2,193	2,924	<i>Far East</i>	60,189	391,178	324,442
Other West Indies	514	4,882	8,642	British Malaya	442	3,856	6,487
Other Central America	4,398	19,433	11,194	China	6,723	64,258	35,751
	1,059	9,805	7,648	Dutch East Indies	3,690	17,741	23,701
				India and Ceylon	764	14,326	16,059
<i>South America</i>	38,366	257,891	219,120	Japan and Chosen	28,589	210,161	167,503
Argentina	6,544	57,743	51,289	Kwangtung	1,498	4,479	15,578
Brazil	9,527	50,935	46,594	Philippine Islands	11,093	55,128	33,962
Chile	4,157	40,292	19,879	Australia	1,610	9,195	16,556
Colombia	7,391	42,597	37,323	New Zealand	164	1,211	725
Peru	900	14,288	22,239	Other Asia and Far East	5,616	10,823	8,119
Uruguay	354	5,438	7,161				
Venezuela	9,239	43,209	32,974	<i>Africa</i>	1,140	9,045	12,113
Other South America	254	3,389	1,661	British South Africa	333	3,814	5,258
				Egypt	323	3,406	2,861
<i>Europe</i>	32,301	182,035	114,710	Mozambique	311	790	3,189
Belgium	1,690	8,987	2,604	Other Africa	173	1,035	805
France	440	2,946	3,361				
Greece	16	1,884	2,397				
				Total	253,336	1,612,078	1,323,959

went to Venezuela, 1640 tons to Colombia, 1008 tons to the Dutch West Indies and 957 tons to Java and Madura. Of the 6603 tons of welded black pipe exported, 2701 tons went to Japan, 803 tons to Venezuela, 687 tons to Canada and 500 tons to Mexico. Galvanized welded pipe exports were 4777 tons, of which 1601 tons went to the Philippine Islands.

Exports of steel plates in July amounted to 14,648 tons, of which 12,160 tons went to Canada, 433 tons to Japan and 125 tons to Cuba. Of the galvanized sheet exports, 2857 tons went to the Philippine Islands, 2728 tons to Canada, 1347 tons to Colombia and 859 tons to Mexico. Japan took 8342 tons of the 19,160 tons of black steel sheets exported, while Canada took 8009 tons and the Philippine Islands, 548 tons. Of the 11,079 tons of steel rails exported, Canada took 2863 tons, Brazil, 2638 tons, the Philippine Islands, 2424 tons, and Cuba, 776 tons. Japan took only 418 tons. Canada was the destination of 7663 tons of 13,899 tons of steel bars exported, while the United Kingdom took 2215 tons. Exports of tin plate, amounting to 21,528 tons, were widely distributed throughout the world. Canada took 5601 tons; Japan, 4807 tons; China, 2930 tons; and Argentina, 1937 tons. Canada was the destination of 12,918 tons of heavy plain structural material.

As usual, Canada was the principal export market for American steel, taking a total of 100,240 tons, while Japan ranked second, taking 28,093 tons.

The drop in imports was reflected in 18 of the 27 classes into which the import trade is divided. It is believed that the decline was due, partially at least, to the rising prices in Europe, making it more difficult to penetrate the American market. There was a reduction of 5744 tons in imports of pig iron in July, which amounted to 6055 tons, against 11,799 tons in June. British India supplied 2994 tons, while 2325 tons came from the Netherlands. Scrap imports were

3688 tons, a drop of 4027 tons from the 7715 tons imported in June. Imports of structural shapes, amounting to 11,192 tons, showed a decline of 3246 tons from the 14,438 tons imported in June. But for the seven months ended with July the total imports of structural shapes were 99,898 tons, an increase of 11,936 tons over the 87,942 tons imported during the corresponding period of 1927.

Of the July imports of structural material, 5432 tons came from Belgium, 3472 tons from Germany and 2166 tons from France. Cast iron pipe, ranking second to structural shapes in July, showed a movement of 7731 tons, of which 5933 tons came from France and 1791 tons from Belgium. Of the 4992 tons of steel bars

imported, 1554 tons came from Belgium, 1522 tons from Germany, 876 tons from France and 686 tons from Sweden. Of the 2891 tons of ferro-manganese imported, 1739 tons came from Canada, 757 tons from the United Kingdom and 279 tons from Norway. Soviet Russia supplied 15,592 tons of the 21,447 tons of manganese ore imported, while 3512 tons came from Brazil and 1799 tons came from India.

France was the source of the largest imports in July, furnishing 10,882 tons. This was the first time in many months that Belgium was exceeded as the principal source of importations. Imports from Belgium amounted to 10,592 tons. Germany was third, with 8917 tons.

Continued Shrinkage in Iron Ore Imports

IMPORTS of iron ore into the United States in July are reported by the Department of Commerce at 183,256 gross tons, compared with 188,892 tons in June and 211,270 tons in May. The July imports are the smallest since March and are 27 per cent lower than the 252,162 tons of July, 1927. Imports in the first seven months of the year have been 1,451,669 tons, a reduction of about 8 per cent from the 1,575,594 tons of last year.

In spite of the reduction in the to-

tal, imports from Chile, which is the leading source of supply, showed a gain of nearly 6 per cent, reaching 817,500 tons. French Africa in second position showed a gain also, as did Canada and Spain. The bulk of the loss was felt by Sweden and was due undoubtedly to the strike at the Swedish mines. The reduction of Swedish imports in the seven months was about 87 per cent. There was a falling off also of about one-quarter in imports from Cuba.

Details of the July shipments and of those of the first seven months, with comparisons for last year, are shown in the table.

SOURCES OF AMERICAN IMPORTS OF IRON ORE (In Gross Tons)

	July		Seven Months Ended July	
	1928	1927	1928	1927
Chile	102,000	104,400	817,500	772,300
Cuba	11,000	27,613	190,286	250,613
Spain	4,300		16,203	3,919
Sweden		57,125	19,614	153,253
French Africa	40,760	44,013	282,131	263,044
Canada	1,596	3,581	44,322	7,790
Other countries	23,600	15,430	81,613	124,675
Total	183,256	252,162	1,451,669	1,575,594

German Domestic Business Declines

Exports Increasing—French Mills Well Filled and Seeking More Labor—British Exports Small Except in Pig Iron

(By Cable)

LONDON, ENGLAND, Aug. 27.

THE outlook for Cleveland iron is regarded more favorably, although business generally is still quiet. Buyers in Scotland, however, are reported negotiating for a large tonnage. Prices are firm and recession is considered unlikely as Palmer's Shipbuilding & Iron Co., which is outside the Cleveland makers' association, has closed its Jarrow works and is out of the market.

Hematite demand has improved slightly and prices are tending to higher levels. Foreign ore is quiet, with quotations steady.

Finished iron and steel in heavy sizes is generally dull, especially for export, but domestic users are supplying works with numerous orders for engineering and structural materials. Robert Heath & Lowmoor is closing the Stafford Iron & Steel Co. plant Sept. 8, the company being controlled by a receiver.

Welsh tin plate makers have raised the minimum price to 18s. (\$4.37) per base box f.o.b. works port, largely to combat the efforts of some buyers to obtain lower prices. Consumers' interest is increasing and good business is expected to develop. The report that 1,000,000 boxes of oil can tin plate had been placed with Welsh makers by Eastern consumers lacks confirmation.

Galvanized sheets are quiet in the Indian trade, but other markets are fair buyers of small quantities. Black sheets are inactive.

Continental markets are strong, although buying by traders in this country is light. Continental mills are reported to have booked large orders for direct export and order books are well filled.

Luxemburg production in July was 224,800 tons of pig iron and 207,600 tons of raw steel. The German steel output in July was 1,311,000 tons.

ders because they cannot execute them for sufficiently early delivery.

The domestic pig iron market is strong and demand is good, but export prices are lacking in firmness as a result of continued competition from British producers. In September, the Société des Acieries de France expects to blow in a new blast furnace at its Isbergues works, where a new light-gage sheet mill has been constructed.

Export demand for semi-finished steel is good, and some shortage of supplies is beginning to appear. It is difficult to obtain blooms at less than £4 13s. (\$22.60) per ton, and billets are firm at £4 15s. (\$23.09) per ton, with £4 15s. 6d. (\$23.21) per ton being asked by some mills. Sheet bars are quoted at £4 18s. (\$23.82), f.o.b. Antwerp.

Prices on beams have receded slightly on some sizes, and current quotations range from £4 17s. 6d. per ton (1.07c. per lb.) for normal specifications to £4 18s. per ton (1.08c. per lb.) for British material. Steel bars are quoted at £5 16s. 6d. per ton (1.28c. per lb.), but mills are well booked with orders and when early September delivery is specified 1s. (24c.) per ton is more usually asked.

In the domestic market the trend of prices continues upward, and some large transactions completed early this month have served to strengthen this movement. Certain mills, which recently appeared willing to accept comparatively low prices to obtain a

French Market Much Stronger

Domestic Prices Still Advancing—Exports Good Except in Pig Iron Where British Competition Is Keen

PARIS, FRANCE, Aug. 13.—All iron and steel markets are quite active despite the midsummer holiday period. Prices continue to advance, and pro-

ducers are beginning to complain of a shortage of labor, voicing some objection to the 8-hr. day law, which they claim forces them to refuse or-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25	
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35	to \$5.48
Cleveland No. 1 fdy.....	3 8½	to £3 9½s.	16.64	to \$16.89
Cleveland No. 3 fdy.....	3 6		16.04	
Cleveland No. 4 fdy.....	3 5		15.80	
Cleveland No. 4 forge... 3 4½			15.68	
Cleveland basic (nom.).. 3 5			15.80	
East Coast mixed..... 3 10			17.11	
East Coast hematite.... 3 10½			17.23	
Rails, 60 lb. and up.... 7 15	to 8 5		37.66	to 40.10
Billets..... 6 0	to 6 15		29.16	to 32.81
Ferromanganese..... 13 15			66.83	
Ferromanganese (export) 13 0	to 13 5		63.18	to 64.39
Sheet and tin plate bars, Welsh..... 6 0			29.16	
Tin plate, base box.... 9 18	to 0 18¼		4.37	to 4.43
Black sheets, Japanese specifications..... 13 7½			65.00	
Ship plates..... 7 12½	to 8 2½		1.63	to 1.74
Boiler plates..... 9 0	to 10 10		1.92	to 2.25
Tees..... 8 2½	to 8 12½		1.74	to 1.84
Channels..... 7 7½	to 7 17½		1.58	to 1.69
Beams..... 7 2½	to 7 12½		1.53	to 1.63
Round bars, ¾ to 3 in.. 7 5	to 7 15		1.55	to 1.66
Steel hoops..... 9 0	to 10 0		1.92	to 2.14
Black sheets, 24 gage... 9 15	to 10 0		2.09	to 2.14
Galv. sheets, 24 gage... 13 7½	to 13 10		2.86	to 2.93
Cold rolled steel strip, 20 gage, nom..... 16 0			3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium.....	£3 3s.	to £3 5s.	\$15.32	to \$15.80	
France.....	3 3	to 3 5	15.32	to 15.80	
Luxemburg.....	3 3	to 3 5	15.32	to 15.80	
Basic pig iron (nom.):					
Belgium.....	3 3	to 3 4	15.41	to 16.38	
France.....	3 3	to 3 4	15.41	to 16.38	
Luxemburg.....	3 3	to 3 4	15.41	to 16.38	
Coke.....	0 18		4.37		
Billets:					
Belgium.....	4 18		23.81		
France.....	4 18		23.81		
Merchant bars:					
Belgium.....	5 19	to 6 0	1.30	to 1.31	C. per Lb.
France.....	5 19	to 6 0	1.30	to 1.31	
Luxemburg.....	5 19	to 6 0	1.30	to 1.31	
Joists (beams):					
Belgium.....	5 0	to 5 1	1.10	to 1.11	
France.....	5 0	to 5 1	1.10	to 1.11	
Luxemburg.....	5 0	to 5 1	1.10	to 1.11	
Angles:					
Belgium.....	5 15		1.27		
½-in. plate:					
Belgium (a).....	6 12½	to 6 14	1.44	to 1.48	
Germany (a).....	6 12½	to 6 14	1.44	to 1.48	
3/16-in. ship plate:					
Belgium.....	6 8		1.41		
Luxemburg.....	6 8		1.41		
Sheets, heavy:					
Belgium.....	6 1		1.33		
Germany.....	6 1		1.33		

(a) Nominal.

backlog, are refusing to offer any concessions and in some instances have advanced their base prices by as much as 20 fr. (78c) per ton. Increases of 40 and 50 fr. (\$1.56 and \$1.95) per ton have been asked by some makers, who are particularly well booked with orders.

Open-hearth steel continues scarce and shows even greater firmness than Thomas grade, with a number of mills quoting considerable advances when open-hearth material is specified. Compared with prices ruling in May, the present market shows a general increase of from 60 to 70 fr. (\$2.34 to \$2.73) per ton on Thomas grade and 90 to 100 fr. (\$3.51 to \$3.90) per ton on open-hearth grade.

Foundries are fairly well occupied with business. Wire and nail prices are beginning to show more firmness than for several months, and many

wire drawing mills are booked with sufficient tonnage to carry them for three to four months.

Contracts for railroad rolling stock are in prospect in consequence of the recent railroad accident at Le Mans, where five post office officials were killed. The French Post Office Administration has decided to call for immediate tenders on 90 to 114 steel-frame railroad mail cars, each 20 meters long, bids to be opened the latter part of September. It is reported that the Chemin de Fer du Midi has placed an order for 100 electric locomotives and 15 "automotrices" with the Siemens-Schuckert Werke, G.m.b.H., Berlin, and the Ateliers de Constructions Electriques de France. The German company is filling its share of the contract on reparations account.

that an agreement for introduction on the French railroads of Kunze-Knorr brakes has been signed by the railroads and sanctioned by the Reparations Commission, payment being on reparations account.

Statements have been made that French and British contractors have received large railroad concessions in Afghanistan, but according to German reports the Allgemeine Bau-Gesellschaft Lens of Berlin has secured an option on all Afghan public railroad construction and a further concession to operate the roads when built. It is understood that this company will work with the firm of Dysckerhoff & Widmann, both corporations belonging to the A. G. für Verkehrswesen. Several German engineers are reported to have left for Afghanistan recently. The financing of the railroad construction is to be international.

German Domestic Business Declining

Unemployment Greater Than a Year Ago—Export Trade Is Better
—Locomotive Shops Seek Government Aid

BERLIN, GERMANY, Aug. 10.—Business continues to decline slowly and the number of unemployed is larger than in August, 1927, although there has been some improvement in seasonal industries. The coal market is more active, but chiefly because the Ruhr Coal Syndicate is selling at lower prices in the districts where British, Polish and Dutch exporters compete.

Reports of an impending agreement on coal with British producers are generally disregarded. It is pointed out that preliminary discussions have taken place in the past, but that no agreement is possible until the British mines have organized a syndicate that is representative and has authority in the industry. Five years were required to create the Ruhr syndicate, which has unified practically the entire German coal industry, and it is suggested here that it may take as long to establish a similar British syndicate. Only a far-reaching organization could enforce international price agreements. At present the Ruhr Coal Syndicate is seeking lower railroad rates, especially to the North Sea Coast, where British coal is entering Germany in large quantities.

The domestic market on iron and steel is quiet, and in pig iron British material is a considerable factor, particularly in North Germany. The iron and steel scrap market is dull and imports of scrap have declined considerably, dropping from 54,000 tons in April to 12,500 tons in June. At the same time exports of scrap have increased from 16,700 tons in April to 26,700 tons in June. About the most active product in the domestic field is steel bars. Export business has shown considerable improvement recently, and export prices, following a slight decline in the early part of July, are again quite firm. The Stahlwerksver-

band has advanced its price on bars by 2 to 3s. (48c. to 73c.) per ton, f.o.b. Antwerp, since the beginning of August.

Production of pig iron in July was 1,034,694 metric tons, compared with 1,021,350 tons in June and 1,108,893 tons in July, 1927. The increase in July over June was partly because of the greater number of working days.

Mills Fairly Well Booked

Mills rolling semi-finished material are booked with orders sufficient to carry them for four to five weeks; bar mills have two months' work, structural mills about six weeks' work and band and sheet mills about four weeks' work. New business, however, is small, with foundries and machine shops rather inactive. Output of pig iron and steel ingots in Upper Silesia has declined more rapidly than in West Germany. Output in the first part of this year was considerably less than in the same period of 1927.

The foreign trade balance in heavy iron and steel is much better this year than in 1927, but not so good as in 1926, which was a poor year for domestic business. Imports of machinery in the first half of this year totaled 35,318 tons, and exports were 253,669 tons. Domestic demand for most types of machinery has declined, but some good foreign orders are being booked, several for payment on reparations account.

Germans to Electrify French Railroad

The Southern Railroad of France has decided to electrify 1100 km. of its line and has placed a contract with the Siemens-Schuckert Werke, G.m.b.H. and the Ateliers de Constructions Electriques de France. It is understood that the Maffei A.G., Munich, will supply the mechanical parts of the electric locomotives to be furnished. From Paris it is reported

Locomotive Plants Ask State Aid

The locomotive builders have requested the Government to make a loan of 50,000,000 m. (\$11,905,000) to the Railroads Corporation to enable it to order needed locomotives, and has also asked the state to collaborate in a plan for reorganizing the 20 existing locomotive companies. The plan calls for elimination of the less efficient plants and state credits to them to permit adaptation of their shops to other products. The Government has rejected this suggestion and states that the industry must solve its own problems. In justification of its claims, the industry has submitted statistics showing the decline in the number of locomotives sold to three classes of buyers since 1912. Of 4052 sold in 1912, state railroads took 1367, private railroads 1330 and 1355 went for export. In 1926 only 615 locomotives were sold, of which 72 went to state railroads, 143 to private railroads and 400 were exported. In 1927, of 870 locomotives, 119 went to state roads, 321 to private roads and 430 were exported. For 1928 the Railroads Corporation is buying only 100 locomotives, while it is estimated that the normal requirement of the corporation should be about 800 a year. In some pre-war years the state railroads took as many as 1600 locomotives. The decline in requirements is attributed to loss of territory, electrification and the more efficient use of old locomotives. Even if export trade improves, many of the present plants will be forced to suspend operation.

Czechoslovakian Mills Advance Prices

WASHINGTON, Aug. 25.—An increase of 10 per cent in the domestic price for steel has been announced by the Czechoslovakian producers, says a report to the Department of Commerce from Prague. The new prices became effective July 20 and apply only to non-special steel. No revision of prices on special grades is contemplated at this time.

European Plants Adopting Our Methods

Mass Production Being Studied by Progressive Manufacturers Abroad—Demands for American Machinery of Improved Design

AMERICAN machine tool builders who have kept in the lead in designing improved tools will have a good field for their product in the European market for a long time, but those who have not revamped their lines of machinery will find it difficult to compete with foreign machinery. American machinery manufacturers must keep improving their machines so that they will keep ahead of their foreign competitors.

These are some of the conclusions drawn by F. H. Chapin, president National Acme Co., Cleveland, who has just returned from an extended European trip. While he went abroad for pleasure, he made some study of industrial conditions in England, France, Belgium, Germany and Italy. The most promising European countries for American machinery at present, in his opinion, are Belgium, Germany and Italy. Though labor is cheap in Europe, he found a tendency among manufacturers to get costs down in order to reduce prices, so that consumers will buy manufactured products more freely.

Mr. Chapin predicted a boom in the automotive industry in Europe, predicting this on the desires of the people for modern conveniences and the very small percentage of the people in Europe who now own motor cars. He discovered considerable tendency among European metalworking plants to adopt American mass production methods. In an Italian plant he met two American engineers who had been engaged to introduce our methods of mass production and he said that Germany is sending young men to this country to work in shops and learn American production methods.

The people in France, Mr. Chapin found, have money and are taking a more liberal attitude toward spending it. This is evidenced by a great deal of building going on outside of areas devastated by the war. He also found that manufacturing industries are picking up in that country. France is buying merchandise on price and is not deterred by war animosities from buying German goods.

England still has her problems, he said, but has always shown the ability to solve them. While England has her hand firmly on the trade in her colonies, the minor industries in her colonial possessions are owned by the colonies themselves.

While Belgium is still suffering from the effects of the war, its metalworking industries, particularly the automotive industry, are expanding. Germany, he said, has accumulated what is equivalent to two billion dollars in savings accounts since the war, compared with four billion dollars before the war, and can and will pay her reparations.

In Italy he found an industrial awakening and a decided impetus in metalworking industries.

Foreign Competition Slows Up Scottish Plants

WASHINGTON, Aug. 25.—The iron and steel works of the west of Scotland were moderately well employed throughout the second quarter of 1928, conditions generally being somewhat better than a year ago, according to G. E. Chamberlain, consul general at Glasgow, Scotland. Owing to the increased output of the shipyards of the district there has been a fairly steady demand for heavy plates and shapes, and some plants engaged in the production of these materials have been busy.

Light sheet makers, although maintaining a good volume of production, have found it more difficult to obtain orders both for home consumption and export. There has been a moderate demand for galvanized sheets. Bar iron makers are reported to be greatly in need of business, and there is still slackness in the demand for re-rolled steel. Some improvement was noted in the tube trade of the district during the closing weeks of the quarter, especially in demand for butt-welded pipe, and considerable quantities of this material are being exported.

The pig iron market experienced little activity, and at the close of the quarter only 21 furnaces were in blast. The production of light castings, which is chiefly confined to Falkirk and vicinity, has been considerably below normal, and much unemployment is reported in this branch of industry. Foreign competition both in the domestic and the export market is blamed for the present condition, and an effort is being made to reduce production costs by lowering wages.

Foreign Steel Imports Small —Export Trade Quiet

NEW YORK, Aug. 28.—Arrivals of European steel for sale to American consumers have begun to diminish, as, with the exception of a few importers in New York who still have some small tonnages of low-priced material coming in, there is little possibility of selling foreign material at the present high prices. Steel bars have been at a prohibitive level for some time and shapes, except in cases where distress tonnages had been purchased abroad by importers, represent but little saving from the price of American mills. Until recently importers were selling some small

tonnages of hoops and bands, but, with Continental prices higher, a Southern mill has met the quotations of the importers on this material. This occurred in the past week on about 800 tons of hoops bought by a Southern maker of barrels, the material being for delivery into Georgia and Florida.

Exports of iron and steel are confined almost entirely to small lots of material going to the Far Eastern and South American markets. There is some demand for tin plate for shipment to South American meat packing plants, and there are a few inquiries from Japan for small lots of tin plate, including about 20,000 base boxes of canners' tin plate for the provision department of the Imperial Army. Japanese demand for light-gage black sheets continues at a low level with the price in Japan considerably reduced, galvanizing plants having curtailed operations since the inception of the Chinese boycott that grew out of the Manchurian situation. Among recent inquiries from Japan is a small list of railroad car material for the Imperial Government Railways.

American Metallurgists to Hear Hatfield

As has been customary, the distinguished foreign guest who delivers the annual lecture before the American Society for Steel Treating will tour the Eastern States and speak at various places before returning to his home. This year Dr. W. H. Hatfield, who will present the Campbell Memorial lecture in Philadelphia, Oct. 10, will arrive in this country the first of that month. In addition to the memorial lecture he comes prepared to discuss the following subjects:

"Application of Science to the Steel Industry."

"Ingot Making, Manipulation and Treatment."

"Heat Resisting Alloys of Iron."

"Rust and Acid Resisting Steels."

"Steels of Special Physical Characteristics."

"Tool Steels, both Carbon and High Speed."

One or more of these lectures are now scheduled to be given at the following times and places:

Oct. 2; Hartford Chapter, A. S. S. T.
Oct. 3; Providence Chapter, A. S. S. T.
Oct. 4, 5 and 6; Yale University, Hammond Laboratory.
Oct. 7; Boston Chapter, A. S. S. T.
Oct. 8, 9 and 10; Massachusetts Institute of Technology.
Oct. 12; New York Chapter, A. S. S. T.
Oct. 15; Washington Chapter, A. S. S. T.
Oct. 17, 18 and 19; Carnegie Institute of Technology.
Oct. 22; Canton Chapter, A. S. S. T.
Oct. 24; Detroit Chapter, A. S. S. T.
Oct. 26 and 27; University of Michigan.
Nov. 5; Syracuse Chapter, A. S. S. T.

A new municipal barge line terminal at Dubuque, Iowa, was officially opened on Aug. 16. A number of other cities on the Mississippi River have established barge terminals, providing convenient connection between rail and water carriers.

Machinery Markets and News of the Works

Machinery Outlook Good

Brisk Midsummer Business Indicates to Trade a Healthy Fall Demand—Prospects Are Plentiful

HAVING enjoyed one of the most active midsummer periods in years, the machine tool industry now looks forward to a healthy, steady fall business, an expectation which is based partly on the fairly large volume of pending inquiries, on many of which action has been delayed by prospective purchasers because of vacation absences.

For the country as a whole, August business will probably equal that of July. In the New York district, where there was unusually heavy buying in July, the August total may not equal that of the preceding month, but reports from Chicago indicate that the present month may be one of the best of the year in that market.

Inquiry for tools is steady from nearly all branches of the metal-working industry. Railroads have bought lightly, but the prospects of increased business from that source appear somewhat more promising. The Rock Island and the Burlington are expected to place orders shortly at Chicago against recent inquiries. The Missouri Pacific and the New York Central have each inquired for a number of tools. The Missouri-Kansas-Texas has bought a few machines.

In the automotive field, the plans of the Lancia Motors of America, Inc., N. Y., are interesting the machine tool trade. The company is figuring on equipment for a production of 10 to 25 cars a day. The Kissel Motor Car Co., Hartford, Wis., will manufacture taxicabs, and it is reported that plant facilities will soon be doubled. In the accessory field, the purchase of a number of machines by the Gabriel Snubber Mfg. Co., Cleveland, featured the week's business in the Cleveland market.

New York

NEW YORK, Aug. 28.—The General Electric Co., Schenectady, N. Y., was again the principal buyer of machine tools in the past week, its orders totaling \$25,000 or more. The New York Central has inquired for a number of machines. Business continues at a fairly steady pace, though the August totals for many sellers may be lower than those of July. The Lancia Motors of America, Inc., which recently took over the former Fiat automobile plant at Poughkeepsie, N. Y., for the manufacture of Lancia automobiles in this country, is getting initial figures on equipment for a production of 10 to 25 cars per day. Some of the parts will be brought over from Italy at first, but the company expects to make the entire car in this country eventually. Anthony M. Flocker is president and Ralph De Palma, racing driver, is interested in the company in an executive capacity.

Among the week's sales of the Niles-

Bement-Pond Co. were a 144 x 96 x 32-in. planer, a 90-in. heavy driving wheel lathe, a 100-ton bushing press, a 20-in. Niles-Acme shaper and an 18-in. x 16-ft. Boye & Emmes lathe. The Pratt & Whitney division had an exceptionally active week, its sales including 12 lathes of various sizes, six jig borers, two die sinkers, three drilling machines, two universal bench millers, four gear shavers, two vertical surface grinders, a rotary surface grinder, two vertical shapers and six profiling machines.

Porter-Cable Machine Co., Syracuse, N. Y., has received order from Poland for 16 Porter-Cable high-speed production lathes.

Scully Mfg. Co., 208 Broad Street, Elizabeth, N. J., has been organized with capital of \$125,000 to manufacture stoves, gas and coal ranges and hot water heaters. Company will also operate jobbing foundry to make brass, bronze, aluminum and gray iron castings. Plant will be built and equipment purchased.

Zarkin Machine Co., Inc., temporarily at 99 John Street, New York, has been organized to manufacture lithographing and printing press machinery, specializ-

ing on Zenith graining machine. Plant is located at 363 Cherry Street, New York, and company is in market for raw materials.

Boylnton Perco Boilers, Inc., 245 West Broadway, New York, has been organized to manufacture under contract line of steam, vapor and water boilers. Company also expects soon to place on market new type of radiator valve.

International Nickel Co., 67 Wall Street, New York, has authorized sale of new stock to total about \$12,000,000, and will use in part for proposed expansion at Frood properties, Sudbury, Ont., for which a fund of about \$14,000,000 will be required during next 36 months for hydroelectric power equipment, concentrating machinery, additions to smelting plant, installation of electrolytic processes, and underground and surface machinery.

Superintendent of lighthouses, Staten Island, will receive bids until Sept. 6 for 300 acetylene cylinders complete, each with capacity of 88 cu. ft.; proposal 27830.

Department of Mental Hygiene, Capitol Building, Albany, N. Y., will receive bids until Sept. 12 for machinery for two double-end steel Diesel-electric ferries for Manhattan State Hospital, Wards Island, New York, as per specifications at office of Department of Public Works, Division of Architecture, Albany; and Flatiron Building, New York.

Officials of Swan-Finch Oil Corporation, 522 Fifth Avenue, New York, a unit of Standard Oil Co., 26 Broadway, have organized a subsidiary to be known as Swan-Finch Refining Co., with capital of \$500,000, to establish and operate a new refining plant for gasoline production. Parent company operates plants at Bayonne, N. J., Buffalo, N. Y., and Chicago, for manufacture of lubricating oils, greases, etc.

International Paper Co., 100 East Forty-second Street, New York, has approved construction of new newsprint mill near Dalhousie, N. B., to cost close to \$2,500,000 including machinery.

Consolidated Instrument Co. of America, Inc., 41 East Forty-second Street, New York, manufacture of air speed indicators, oil pressure gages and other precision instruments, plans establishment of new assembling plant, as well as new laboratory for experimental and research work, for production of present and new instruments. Company will also secure substantial interest in Aircraft Control Corporation, and will expand such line of production. A stock issue of 40,000 shares will be sold to carry out program. Joseph Leopold is president.

Greenburgh School District No. 9, Elmsford, N. Y., is considering installation of manual training equipment in new two-story high and grade school to cost about \$250,000, for which plans are being drawn by Knappe & Morris,

The Crane Market

VERY little new inquiry for overhead or locomotive cranes has appeared in the past week, and not much activity seems to be expected by sellers until after Labor Day. Several inquiries for prices on used locomotive cranes are in the market. An inquiry for nine small capacity hand power cranes is reported current, the buyer unnamed. A 10-ton hand power

crane for Lehigh University, Bethlehem, Pa., is still pending, and the General Electric Co., Schenectady, N. Y., is not yet reported to have closed on several small capacity electric cranes. Bids are being received until Sept. 10 by the Colombian Government for the Ferro Carril Central Del Norte, Section 2a, on a 20-ton electric overhead crane.

Among recent purchases are:

Elmira Foundry Co., New York, 22-ton, 8-wheel, gasoline engine operated locomotive crane from Orton Crane & Shovel Co.

St. Louis Municipal Waterworks, St. Louis, 20-ton crane for pumping station from Shaw Crane Works.

171 Madison Avenue, New York, architects.

R. H. Macy & Co., Inc., Thirty-fourth Street and Broadway, New York, department store, has engaged Robert D. Kohn, 56 West Forty-fifth Street, architect, to prepare plans for multi-story storage and distributing plant, with mechanical handling-equipment, 325 x 350 ft., on Frelinghuysen Avenue, Newark, N. J., estimated to cost about \$200,000.

T. A. Meyer, 150 East Forty-first Street, New York, architect, has plans in preparation for fifteen-story automobile service, repair and garage building at 319-25 East Thirty-ninth Street, to cost close to \$650,000 with tools and equipment.

Consolidation plans have been arranged by Improved Equipment Co., 24 State Street, New York, and Russell Engineering Co., St. Louis, both manufacturers of coal gas plants, carbonizing equipment, etc., under name of Improved Equipment-Russell Engineering Corporation. Company plans expansion and development program for increased production of gas benches, ovens and kindred machinery. It will be operated under direction of Henry L. Doherty & Co., 60 Wall Street, New York, engineers and operators of public utility properties.

Triplex Safety Glass Co. of North America, Inc., Hoboken Terminal Building, Hoboken, N. J., manufacturer of non-shatterable sheet glass products, is concluding arrangements for purchase of factory property at Clifton, N. J., and will remodel and equip for new plant. Company will also carry out expansion and improvement program for larger output, and has arranged for increase of \$1,000,000 in capital, bulk of fund to be used for such purpose. Amory L. Haskell is president.

Burstyn & Heftler Corporation, 404 Thirty-eighth Street, Jersey City, N. J., is planning construction of eight-story automobile service, repair and garage building at 871 Bergen Avenue, to cost in excess of \$500,000 with tools and equipment.

Pioneer Iron Works, Inc., 317 Frelinghuysen Avenue, Newark, plans construction of addition on adjoining site to cost close to \$30,000 with equipment. L. J. Siegler is president.

Bayonne Bolt Corporation, Second Street and Trask Avenue, Bayonne, N. J., has filed plans for one-story plant, 150 x 235 ft., to cost in excess of \$75,000 with equipment.

Board of Education, South River, N. J., plans installation of manual training equipment in two-story and basement high school addition, to cost about \$150,000, for which bids have been asked on general contract. Alexander Merchant, 52 Paterson Street, New Brunswick, N. J., is architect.

Philadelphia

PHILADELPHIA, Aug. 28.—Wiley-Ellis Co., 210 North Thirteenth Street, Philadelphia, manufacturer of laundry machinery and parts, will soon begin work on new one-story plant at 1223 South Tallman Avenue, Chicago, reported to cost close to \$150,000, with equipment.

United Engineers & Constructors, Inc., 1401 Arch Street, Philadelphia, has been engaged to make surveys and prepare plans for a municipal power project at Austin, Tex., and will carry out entire program, including purchase of necessary equipment.

Philadelphia Gas Works Co., operated by United Gas Improvement Co., 1401 Arch Street, has purchased property, 480 x 480 ft., on block bounded by Fifty-seventh and Fifty-eighth Streets, Eastwick Avenue and Lindbergh Boulevard, as site for new storage and distributing plant, to cost approximately \$1,000,000, with equipment.

Hamilton Township Board of Education, Trenton, N. J., is considering installation of manual training equipment in new high school at Clinton and Park Avenues, to cost \$650,000, in which amount fund has been authorized by public vote. Plans will soon be drawn.

American Brown Boveri Electric Corporation, Camden, N. J., manufacturer of heavy electrical machinery and operating former local shipyard of New York Shipbuilding Co., is in negotiation with City Commissioners, Newark, N. J., regarding proposed establishment of plant at municipal airport, Port Newark, for production of dirigible aircraft, primarily for assembling work, reported to cost more than \$1,000,000.

Armstrong Mfg. Co., Waterloo, Iowa, manufacturer of well-drilling machinery and parts, has acquired property at Sixteenth and Mayflower Streets, Harrisburg, Pa., and plans new factory branch and distributing plant, one-story, 100 x 300 ft., reported to cost in excess of \$40,000, with mechanical equipment.

State Prison Department, Harrisburg, Pa., plans replacement of rock-crushing plant at Rockview penitentiary, near Bellefonte, Pa., destroyed by fire, Aug. 20, with machinery loss reported at \$15,000.

Reading Railroad, Reading Terminal, Philadelphia, has work under way on new engine house with repair facilities at Shamokin, Pa., reported to cost more than \$200,000, and is scheduling completion at early date.

Pennsylvania Water & Power Co., Holtwood, Pa., has begun preliminary surveys for hydroelectric power development at Safe Harbor on Susquehanna River. Entire project is reported to cost more than \$3,500,000.

Board of Trustees, Lafayette College, Easton, Pa., will soon take bids on general contract for new mining engineering building at institution, to cost more than \$200,000, with mechanical equipment. Charles Z. Klauder, 1429 Walnut Street, Philadelphia, is architect.

City Council, Monessen, Pa., has secured property on Pricedale Road and plans municipal airport, including hangar, repair and reconditioning shop and other buildings.

Spicer Mfg. Co., Norristown, Pa., manufacturer of universal joints, automobile shafting, etc., has begun work on one-story addition, reported to cost more than \$35,000, with equipment.

Davis Brothers, Inc., 4250 Wissahickon Avenue, Philadelphia, manufacturer of spikes, nails, etc., has taken out permit for a one-story addition, reported to cost about \$18,000.

Norman Aircraft Co., Burlington, N. J., recently organized, has taken over property at Barclay and Stacy Streets, and plans early establishment of new plant for production of airplanes, with initial operations devoted primarily to assembling.

Pittsburgh

PITTSBURGH, Aug. 27.—Machine tool inquiries are more numerous than they have been. In sales, most of the trade have done better in the past week than in the first two weeks of the month. The Westinghouse Electric & Mfg. Co. has awarded some more orders against its third quarter list.

Allegheny Gear Works, Inc., 1013 Empire Building, Pittsburgh, forgings manufacturer, has changed name to Allegheny Forging Co.

S. Keighley Metal Ceiling & Mfg. Co., 15 Third Avenue, Pittsburgh, maker of steel lockers, has changed firm name to Keighley Mfg. Co.

Scientific Materials Co., 717 Forbes Street, Pittsburgh, manufacturer of pressure and vacuum gages, recording instruments, optical benches, pyrometers and hardness testing machines, has changed name to Fisher Scientific Co.

Contract has been let by United States Aluminum Co., operated by Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, to C. A. Fritz, Pittsburgh general contractor, for new plant on Post Road, Fairfield, Conn., comprising main one-story unit, 220 x 477 ft., and two auxiliary structures, one-story, 65 x 140 ft., and two-story, 30 x 120 ft., to cost in excess of \$200,000, with equipment.

Oliver Iron & Steel Works, Pittsburgh, has filed plans for one-story addition to plant at Tenth and Muriel Streets.

West Virginia Hydro-Electric Co.,

Charleston, W. Va., recently organized by Thomas Richardson and L. W. Van Bibber, both of Charlottesville, Va., where main offices will be established, is reported planning early development of hydroelectric power facilities in Raleigh and Summers Counties, W. Va.; sites are being selected. Project is reported to cost more than \$350,000.

West Virginia Rail Co., Seventeenth Street, Huntington, W. Va., has approved general expansion and improvement program to cost more than \$450,000. Company has recently secured local property heretofore held by Huntington Sash, Door & Trim Co., and will remove fabricating plant to that site, where capacity will be increased with additional equipment. Mill No. 2 will be electrified and new machinery installed for production of steel mine ties, spike rods, reinforcing steel bars, etc. It is proposed to build a new unit for this department of the plant next year. Mill No. 1 will be extended and improved. H. Z. Zeller is vice-president and general manager.

South Atlantic

BALTIMORE, Aug. 28.—Bids will soon be asked by United Railways & Electric Co., Continental Building, Baltimore, for one and two-story service, repair and garage building for motor buses, reported to cost in excess of \$175,000, with equipment. W. H. Emory, 18 East Lexington Street, is architect.

Supervising architect, Treasury Department, Washington, will receive bids until Sept. 18 for motor-generator sets and auxiliary equipment for United States Mint at Philadelphia.

American Chatillon Corporation, Rome, Ga., has awarded general contract to Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, for new local rayon mill to cost about \$3,000,000, including power house, machine shop, filter plant and other mechanical units. Headquarters are at 393 Seventh Avenue, New York.

Standard Oil Co., St. Paul and Franklin Streets, Baltimore, has plans nearing completion for additions to refining plant on Eighth Street, Canton, comprising three buildings, 55 x 105 ft., and two 32 x 60 ft., with installation of gasoline refining equipment, tanks, etc., reported to cost \$200,000. Headquarters are at 26 Broadway, New York.

Commission on Public Improvements, Municipal Office Building, Baltimore, is considering installation of manual training equipment in proposed new four-story junior high school on Barrington Road, near Garrison Boulevard, reported to cost close to \$1,000,000, with equipment. Smith & May, Calvert Building, are architects.

Burns Bottling Machine Works, 2329 Taylor Street, Baltimore, manufacturer of automatic bottling machinery and parts, is planning one-story addition, about 43 x 65 ft., to cost about \$30,000, with equipment.

General Purchasing Officer, Panama Canal, Washington, is asking bids until Sept. 10 for 4,000 ft. galvanized chain, 53,100 ft. wrought iron or steel galvanized pipe, 100 engine lubricators, 15,000 ft. rubber insulated copper wire, 30 electric drills, 50 water heaters, staybolts, boiler tubes and other mechanical equipment, Panama circular No. 1898.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to F. L. Wagner, Inc., 1336 New York Avenue, N. W., Washing-

ton, for one-story motor truck factory branch, service and repair works on Bladensburg Road, N. E., Washington, to cost about \$100,000, with equipment. C. B. Rafter, Barr Building, Washington, is consulting engineer.

Officials of Diez-Roemer Brass Co., 212 Fallsview Street, Baltimore, manufacturer of brass castings, etc., have organized a new company under name of American Brass & Fire Equipment Corporation to take over and expand present organization. New company has acquired American Fire Extinguisher Co., Baltimore, and will consolidate with Diez-Roemer organization. An expansion program will be carried out for increased production. Conrad J. Diez is company official and chief engineer.

Simmons Co., Kenosha, Wis., manufacturer of metal bedsteads, springs, mattresses, etc., has acquired controlling interest in Rosemary Mfg. Co., Roanoke Rapids, N. C., and will continue operation of mill as factory branch for production of mattress specialties and other products. An expansion and improvement program is said to be under consideration.

Great Northern Utilities Co., 3933 Drexel Boulevard, Chicago, plans construction of artificial gas plant and system at Piedmont, S. C., and vicinity, including pipe lines to more than 40 communities in this section. Initial plant will include water-gas machinery, gas compressors, purifiers, and auxiliary equipment, with number of storage and distributing plants in different districts. Entire project reported to cost more than \$4,000,000. Arthur J. Smith is head.

Buffalo

BUFFALO, Aug. 27.—Continental Can Co., Rochester, N. Y., has concluded negotiations for purchase of New Orleans Can Co., New Orleans, La., and will consolidate with organization. New Orleans plant will be continued in production as branch factory and expansion is being considered. Company recently acquired Southern Can Co., Baltimore, and is maintaining branch plant in that city.

Old Forge Electric Corporation, Old Forge, N. Y., has applied for permission to take over local municipal power plant as well as municipal utility properties at Webb, heretofore served from first noted station. Petition states that upon acquisition, extensions and improvements will be made in power plant, including installation of additional equipment.

Likly Luggage Co., Lydell Avenue, Buffalo, manufacturer of metal trunks etc., has acquired group of buildings at Fitchburg, Mass., heretofore held by Amoskeag Mfg. Co., and used for textile production, and will remodel and improve for main plant. Entire Rochester works will be removed to new location and additional equipment provided for increased output.

Binghamton Light, Heat & Power Co., Binghamton, N. Y., is planning extensions in power plant, transmission lines and other operating facilities, including installation of additional equipment. Company has arranged for increase in capital from 175,000 to 275,000 shares of stock, the majority of proceeds to be used for program. It is operated under direction of General Gas & Electric Co., 50 Pine Street, New York.

Department of Public Works, Municipal Building, Buffalo, will receive bids until Sept. 4 for construction of new hangar at Buffalo airport, Cheektowaga,

with repair and reconditioning facilities, as per plans and specifications on file. George F. Fisk is commissioner.

Pierce Arrow Motor Car Co., Buffalo, has been chartered under State laws with capital of 8,000,000 shares of preferred and 427,375 shares of common stock, to take over and expand company of same name with local plant on Elmwood Avenue, particularly in connection with increase in motor truck output. New company is affiliated with Studebaker Corporation, South Bend, Ind., which has secured a controlling interest. A. R. Erskine, head of last noted company, will be chairman of board; M. E. Forbes, president; and B. H. Warner of Studebaker organization, vice-president in charge of manufacturing.

Cleveland

CLEVELAND, Aug. 28.—Machine tool dealers did a fair volume of business, mostly in single machines, in the past week and the August volume may show a slight gain over that of July. Business is coming almost wholly from manufacturers of automobile parts. Die sinkers are in very active demand from this source. Among orders placed during the week was one from the Transue & Williams Steel Forging Corporation, Alliance, Ohio, for four die sinkers. The Gabriel Snubber Mfg. Co., Cleveland, has purchased quite a number of machines for the manufacture of shock absorbers. The Perfection Stove Co., Cleveland, which is getting into the manufacture of automatic refrigerators, purchased a jig boring machine. Automatic screw machines are moving in fair volume and deliveries on these and some other lines of machine tools have slowed down considerably.

Charles T. Topping Machinery Co., manufacturer of excavating machinery, has removed its general offices from Dayton, Ohio, to 4403 St. Clair Avenue, Cleveland. Company has also completed arrangements providing enlarged manufacturing facilities, but will purchase no additional equipment. It is expected that new types of excavating equipment will be announced as soon as development work is completed.

Bell Metal Stamping Co., Cleveland, has been organized and has established a plant at 1784 East Thirty-seventh Street, where it is engaged in the manufacture of light metal stampings. Herbert L. Bell is manager.

Contract has been let by Grabler Mfg. Co., 6565 Broadway, Cleveland, manufacturer of hangers, clamps, etc., to S. W. Emerson Co., 1836 Euclid Avenue, for one-story addition, 40 x 80 ft., estimated to cost \$40,000 with equipment. Christian, Schwarzenberg & Gaede, Euclid Building, are architects.

Midland Steel Products Co., Madison Avenue and West 106th Street, Cleveland, manufacturer of automobile frames, four-wheel brakes, and other automotive equipment, is arranging an immediate expansion program for extensive increase in present output, reported to cost more than \$200,000 with equipment. It is proposed to develop increase of close to 2000 frames and more than 1000 brake sets over present capacity. E. J. Kulas is president.

Triplex Screw Co., 6112 Central Avenue, Cleveland, has awarded general contract to J. L. Hunting Co., Guarantee Building, for one-story addition, 40 x 122 ft., to

cost approximately \$35,000 with equipment. A. F. Weber is head.

Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated paper board products, has approved plans for new mill at Winnipeg, Man., consisting of several units with boiler plant, machine shop, and other mechanical buildings, reported to cost close to \$1,000,000. O. H. Moore, general manager, will supervise erection.

Aetna Rubber Co., 815 East Seventy-ninth Street, Cleveland, manufacturer of hard and soft molded mechanical and other rubber goods, has begun construction of new plant addition at Ashtabula, Ohio, to consist of two manufacturing units, 60 x 180 ft., and 60 x 92 ft., and one-story machine shop, to cost close to \$125,000 with equipment. Webster Co., Ashtabula, is general contractor. S. T. Campbell is president and general manager.

Board of County Commissioners, Painesville, Ohio, L. J. Spaulding, clerk, will receive bids until Sept. 4 for hydraulic-operated stokers for two boilers, with capacity for handling 800 lb. per hour.

Chicago

CHICAGO, Aug. 27.—Fresh inquiry from widely scattered and miscellaneous sources holds steady and lends support to dealers' hopes that this will be one of the best months of the year. New sales, though not individually large, are numerous. It is reported that the Rock Island Railroad is prepared to place orders against recent inquiries and that the Burlington will soon issue purchase orders. Forgers, gasoline engine builders and tractor manufacturers are among the most active buyers. The Kissel Motor Car Co., Hartford, Wis., will manufacture a line of taxicabs and it is reported that plant facilities will soon be doubled. Used machines are in good demand, but the supply of certain types is limited.

John Deere Tractor Co., Waterloo, Iowa, has filed plans for one-story power house to cost \$35,000.

City Service Gas Co., Wichita, Kan., will expand its gas compressor plants at Mooreland, Okla., Corwin, Kan., and Higgins, Tex.

New power house to cost \$175,000 is being constructed at the Great Lakes Naval Training Station.

Autorad Electric Corporation, Muskegon, Mich., newly organized, has leased space in plant of the Evans-Miller Cedar Products Co., where it will manufacture radio parts and possibly small automobile parts.

American Forge Co., 2621 South Hoyne Avenue, Chicago, will build one-story brick foundry, 80 x 140 ft., to cost \$50,000.

Mohr Mfg. Co., Inc., Marshalltown, Iowa, has been organized to manufacture electric automatic door operator and kindred equipment. Equipment has been purchased and company will buy malleable castings and steel, the most of which has been contracted for.

Central Steel Products Co., Clinton, Iowa, incorporated in 1924 to manufacture pipe nipples, spacers and fabricated pipe, plans to add complete line of plumbing and heating supplies to Clinton plant and to increase production of manufactured products. Company has recently in-

creased capital to \$500,000 to take over business of Cedar Rapids Pump & Supply Co., Cedar Rapids, Iowa, jobber of plumbing, heating and mill supplies, and later main office of Central company will be located at Cedar Rapids. At present offices are maintained in that city at 1018 Merchants National Bank Building. C. A. Depue is president.

Construction Machinery Co., Waterloo, Iowa, has purchased plant and business of Marsh-Capron Co., Chicago Heights, Ill. Both plants will be operated at present and R. C. Weller, president of Chicago Heights concern, will become sales manager of Waterloo company. Harry B. Lichty is president.

Meadows Co., Bloomington, Ill., has sold its patents, rights to manufacture and patterns for blowers, portable elevators and bucket elevators to Hayes Co., Galva, Ill., which will begin immediate production. In future Meadows Co. will confine its activities to manufacture of washing machines.

Contract has been let by Victor Mfg. & Gasket Co., 5750 Roosevelt Road, Chicago, manufacturer of metallic gaskets, etc., to Schmidt Brothers Construction Co., 22 East Huron Street, for four-story addition, 100 x 160 ft., to cost about \$150,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Boulevard, is architect and engineer.

Nordenberg Trunk Works, 406-8 North Clark Street, Chicago, manufacturer of metal trunks, etc., plans rebuilding of portion of factory destroyed by fire Aug. 16, with loss reported at close to \$50,000 including equipment.

Western Electric Co., 11 South La Salle Street, Chicago, manufacturer of telephone apparatus, cables, radio equipment, etc., is said to have plans under way for a new non-ferrous metal mill at Twenty-sixth Street and Cicero Avenue, Cicero, Ill., to cost more than \$2,000,000 with machinery.

Central States Power & Light Corporation, Davenport, Iowa, is disposing of preferred stock issue to total about \$2,167,000, a portion of proceeds to be used for extensions and improvements in power plants and system. H. C. Orton is president.

Water Department, Cedar Rapids, Iowa, plans installation of pumping machinery, power equipment and accessories in connection with extensions and improvements in municipal waterworks, with new source of supply from Prairie Creek, estimated to cost in excess of \$500,000. H. R. Green Co., Bever Building, is consulting engineer.

Durango Natural Gas Co., Durango, Colo., has made application for permission to construct natural gas distributing plant and pipe line, estimated to cost \$200,000.

Board of Education, Minot, N. D., plans installation of manual training equipment in new three-story addition to junior high school, estimated to cost \$250,000, for which bids will soon be asked on general contract. Bugenhagen M. Molander, Union National Bank Annex, is architect.

Cadillac Motor Car Co., 2301 South Michigan Boulevard, Chicago, has awarded general contract to Patterson & Havtich, 140 South Dearborn Street, for two-story service, repair and sales building at 5201-9 Broadway, reported to cost more than \$100,000 with equipment.

Northern Pacific Railway Co., St. Paul, Minn., is completing plans for new steel car repair shop, 110 x 250 ft., at Laurel,

Mont., reported to cost in excess of \$175,000 with equipment, latter to include traveling cranes. T. F. Lowry is general superintendent.

Elco Tool & Screw Corporation, 1800 Broadway, Rockford, Ill., has announced plans for plant addition to cost \$10,000. New building will be two-story brick construction, 26 x 88 ft., and will be used chiefly for shipping and receiving departments.

St. Louis

ST. LOUIS, Aug. 27.—The Missouri-Kansas-Texas Railroad has purchased two Putnam combination car axle and journal and axle lathes, and a Warner & Swasey No. 1A turret lathe. The Wabash has purchased a heavy-duty railroad internal grinder and 34-in. and 40-in. drill presses. The Missouri Pacific is in the market for the following machine tools: 4-ft. radial drill, nipple machine, portable boring bar, small floor grinder and several smaller machines.

Plans are being considered by Chan-deysson Electric Co., 4092 Bingham Avenue, St. Louis, manufacturer of plating electric units and other electrical equipment, for one-story addition, totaling about 10,000 sq. ft. floor space, to cost approximately \$60,000 with machinery. Work is now under way on one-story unit of smaller size, to cost about \$40,000 with equipment. Widmer Engineering Co., Roosevelt Building, is engineer.

City Council, Stanberry, Mo., will soon take bids for municipal light and power plant, including oil engine and other equipment. Henrici-Lowry Engineering Co., Security Building, Kansas City, Mo., is consulting engineer.

Board of Public Service, City Hall, St. Louis, is said to plan early call for bids for addition to power house at Koch, Mo., estimated to cost \$50,000 with equipment; installation will include 500-hp. boiler unit, stoker, etc. J. L. Rilliet, Jr., City Hall, is engineer.

Public Service Co. of Oklahoma, Tulsa, has disposed of bond issue of \$5,000,000, a portion of proceeds to be used for acquisition of additional properties and extensions and improvements in generating and transmission line facilities.

Detroit

DETROIT, Aug. 28.—City Council, Allegan, Mich., is having plans drawn for municipal power plant on Kalamazoo River, to cost about \$500,000, with transmission lines. Ayres, Lewis, Morris & May, Cainwell Building, Ann Arbor, Mich., are architects and engineers.

Wilcox-Rich Corporation is being organized to take over and consolidate Wilcox Products Corporation, Saginaw, Mich., manufacturer of engine valves and other mechanical equipment, and Rich Steel Products Co., Battle Creek, Mich., manufacturer of similar specialties. Merger will include Intra Steel Products Division of Wilcox organization, heretofore operating with headquarters at Detroit. New company will be capitalized at 92,000 shares preferred stock, and 135,000 shares common stock, and plans expansion program for enlarged output.

Board of Water Commissioners, 176 East Jefferson Avenue, Detroit, will receive bids until Sept. 5 for one motor-

driven centrifugal pumping unit with auxiliary equipment, rated capacity of 6,000,000 gal. per day, as per plans and specifications on file. George H. Fenkell is general manager and chief engineer.

Vorclone Corporation has been organized under Delaware laws to take over and consolidate Detroit Laundry Machinery Co., Detroit; Power Brothers Co. and Vorclone Co., Milwaukee, manufacturer of fan equipment and devices, drying tumblers, etc. New company has arranged for preferred stock issue to total \$1,600,000, a portion of proceeds to be used for expansion in production. Monte J. Power is president.

Wisconsin-Michigan Power Co., Iron Mountain, Mich., plans construction of hydroelectric power plant on Sturgeon River, Baraga County, Mich., where tract of about 15,000 acres of land was recently acquired, estimated to cost close to \$3,000,000, scheduled for completion in about 36 months. Headquarters are at Appleton, Wis. Company is operated by North American Edison Co., Cleveland.

Federal Stamping Co., Holland, Mich., manufacturer of stamped metal products, is planning extensions to double, approximately, present capacity, reported to cost more than \$350,000, with machinery.

Copeland Products, Inc., 630 Lycaste Street, Detroit, manufacturer of electric refrigerators and refrigerating equipment, has taken over a building adjoining plant and will use for expansion; it is proposed to double present capacity with new unit.

Keller Tractor & Shovel Co., Inc., 5124 Braden Avenue, Detroit, has been organized by Carl H. Keller and associates to distribute tractors of the Caterpillar Tractor Co., San Leandro, Cal.; gas and air shovels, cranes and draglines made by the Bucyrus-Erie Co., South Milwaukee, Wis., and earth moving machinery and snow plows manufactured by Baker Mfg. Co., Springfield, Ill.

Locklite Co., Iron Mountain, Mich., has been formed to manufacture patent electric light socket. Company has small plant at Iron Mountain, but will have some work done by outside manufacturers. Additional equipment and supplies will be purchased soon.

Olds Motor Works, Lansing, Mich., is preparing for an increase in floor space of 163,150 sq. ft. The new construction will cost about \$1,500,000. It is said that calls from the dealers, following the introduction of the DeLuxe models, equalled the entire production schedule for the remainder of the year.

After Sept. 1 all Chrysler "65" cars will be built in the company's Jefferson Avenue plant in Detroit, where the "75" and Imperial "80" cars are now made. This will leave the entire Highland Park plant devoted to the manufacture of the Chrysler-Plymouth and the new De Soto six line, announced recently. A new building, 1000 ft. long, has been added to the Jefferson Avenue plant to make room for this change, which will be effected without interruption in production.

The Gorham Tool Co., manufacturer of high-speed machine tools, is building an addition to its plant No. 2 on Woodrow Wilson Avenue, Detroit, which includes a second unit on its plant there and a modern office building. After Oct. 1, when it is expected the buildings will be completed, the executive offices will be located at plant No. 2 and a major portion of the tool manufacturing will be done at the new plant.

Gulf States

BIRMINGHAM, Aug. 27.—Plans have been completed by Central Power & Light Co., Frost National Bank Building, San Antonio, Tex., for hydroelectric power project on Devil's River, reported to cost in excess of \$350,000, with transmission line.

Big Spring Pipe Line Co., Big Spring, Tex., recently organized, will soon begin construction of pipe line from that place to Roberts pool district, about 15 miles, with power station and booster plant. It will have capacity of 7500 bbl. per day and will cost in excess of \$300,000. Joseph Edwards is president.

Board of Education, Dallas, Tex., will install mechanical equipment for vocational instruction at high school on Bryan Street, including foundry for aluminum and brass castings, sheet metal shop equipment, automobile repair equipment, welding apparatus, etc. Denman Kelley, principal, is in charge.

Tangipahoa Parish School Board, Independence, La., contemplates installation of manual training equipment in new two-story high school, estimated to cost about \$165,000, for which bids will be asked on general contract early in September. Robert H. Goodman, Bank of Baton Rouge Building, Baton Rouge, La., is architect.

Todd Engineering, Dry Dock & Ship Repair Co., New Orleans, La., is completing construction of new dry dock and ship repair unit to cost approximately \$1,000,000, and will provide equipment and place in service at early date.

Davison-Pick Fertilizer Co., Inc., New Orleans, La., is planning extensions and improvements in plant at Gretna, La., including installation of additional machinery, with two electric traveling cranes for handling cargoes from dock to plant. Entire project will cost close to \$180,000. W. W. Pickens is president.

City Commission, Daytona Beach, Fla., plans installation of pumping machinery and other power equipment, including water-softening apparatus, in connection with proposed extensions and improvements in municipal waterworks, estimated to cost close to \$400,000. Metcalf & Eddy, 14 Beacon Street, Boston, Mass., are consulting engineers.

Asiatic Petroleum Co., 65 Broadway, New York, is reported planning construction of new oil storage and distributing plant at Tampa, Fla., to cost more than \$100,000, with equipment.

Weber-King Mfg. Co., Leesville, La., manufacturer of mechanical equipment, is considering rebuilding of portion of machine shop recently destroyed by fire with loss estimated at close to \$25,000, with equipment.

Southern Natural Gas Corporation, First National Bank Building, Birmingham, Ala., is perfecting plans for extensive pipe line system, with compressor stations, etc., for natural gas supply to a number of cities in Alabama, Mississippi, and adjoining States, with ultimate project to total more than 850 miles, estimated to cost in excess of \$30,000,000. Arthur L. Mullergren, Kansas City, Mo., is consulting engineer. Robert C. Sharp, president and general manager, Oklahoma Natural Gas Corporation, Tulsa, will be in charge of operations.

Phillips Petroleum Co., Bartlesville, Okla., is planning new gasoline refining plant in vicinity of Odessa, Tex., reported to cost in excess of \$100,000, with equipment.

Auto Service Systems, Inc., Houston, Tex., has leased a building at Travis and Calhoun Streets for new service and repair plant, including brake testing and parts departments, and will equip at early date. A one-story addition will be built, 115 x 120 ft. Entire project will cost more than \$90,000. Walter Puckett is vice-president and general manager.

Southwest Tool Supply Co., Big Spring, Tex., plans new factory branch and distributing plant at Forsan, Tex.

New England

BOSTON, Aug. 28.—Although dealers are securing little business, New England machine tool builders generally are operating plants on a normal or better than normal schedule. Some of them are far behind on deliveries. In several instances manufacturers have good export orders. Small tool sales are holding up remarkably well, and indications are those for August will run considerably ahead of the corresponding month last year. The crane market continues lifeless. There is a moderate amount of light conveying equipment selling. It has been a good year for road and concrete machinery, as well as for lifting equipment.

Saco-Lowell Shops, Boston, has practically completed transfer of equipment from Lowell, Mass., to the Biddeford, Me., plant.

Eastern Massachusetts Street Railway Co., 38 Chauncy Street, Boston, has awarded contract for remodeling its South Main Street, Brockton, Mass., repair shop.

Stacy Machine Works, West Springfield, Mass., is about to start a one-story, 40 x 40-ft. plant addition. A. O. Carroll is president.

Work has been started on a one-story and basement, 50 x 125-ft. manufacturing plant addition by Metal Craftsmen, Inc., 101 Georgia Avenue, Providence, R. I.

St. Albans, Vt., is to erect a two-story, 97 x 193-ft. high school to cost, with equipment, \$200,000. It will have manual training and other shops. William H. McLean, 88 Tremont Street, Boston, architect, has completed plans.

Bids closed Aug. 23 on a three-story, 65 x 140-ft. junior high school at Main Street, Agawam, Mass., to contain shops. D. J. Phelps, 57 Reed Street, is superintendent of schools. Paul B. Johnson, 1562 Main Street, Springfield, Mass., is the architect.

Central Maine Power Co., Augusta, Me., will soon begin work on hydroelectric power plant at Burnham, Me., reported to cost in excess of \$500,000 with transmission line.

Aeronautical Products Corporation, Naugatuck, Conn., recently organized with capital of \$500,000, has taken over former local plant of Dunham Mills, Inc., manufacturer of textile products, and will occupy for new works for production of airplane motors. Proposed to provide equipment for initial output of 25 motor units per day. Clarence Austin is secretary; Harris Whittemore, Jr., is treasurer.

Thompson Wire Co., Mildred Avenue, Mattapan, Boston, has awarded general contract to Clark & Smith, Inc., 13 Temple Street, Quincy, Mass., for one-story addition, 60 x 125 ft., reported to cost close to \$50,000 with equipment.

New England Flexible Door Corporation, Winsted, Conn., recently organized,

has concluded negotiations for purchase of former local plant of New England Pin Co., and will improve and occupy for new factory for manufacture of metal and other doors. A fund of \$50,000 has been raised to establish plant and purchase equipment. New England Pin Co. was acquired a number of months ago by Star Pin Co., Derby, Conn., and plant was removed to latter location.

Royal Typewriter Co., New Park Avenue, Hartford, Conn., will begin superstructure for five and six-story and basement addition, L-shaped, 70 x 190 ft., and 70 x 70 ft., to cost more than \$175,000 with equipment. Greenwood & Noerr, Hartford, are consulting engineers.

Colonial Utilities Corporation, Chester, Vt., has been organized to take over Chester Water & Light Co., and 15 other electric light and power, and ice utilities in this vicinity, including Exeter, Rochester and Somersworth, N. H. Properties will be consolidated and expansion program carried out, comprising increase in generating and distributing facilities. New company has arranged for bond issue of \$750,000, considerable portion of proceeds to be used for purpose noted.

Cincinnati

CINCINNATI, Aug. 27.—Bids will be asked early in September by General Aeronautical Corporation, 3336 Trimble Avenue, Cincinnati, for one-story aircraft manufacturing plant at Luken airport, initial unit to be used primarily for assembling, reported to cost more than \$45,000, with equipment. H. Neilson Jackson, Mercantile Library Building, is architect.

Berger Brothers Boiler Works, 257 West Spring Street, Columbus, Ohio, has leased one-story building, 92 x 105 ft., to be erected at 312-22 West Spring Street, for new storage and distributing plant, estimated to cost about \$60,000, with equipment. Bassett & Treselt, 257 East Broad Street, are architects.

Louisville Gas & Electric Co., Louisville, has authorized increase in capital from \$45,000,000 to \$90,000,000, a considerable portion of the fund to be used for expansion in generating and transmission line facilities. T. B. Wilson is vice-president and general manager.

M. D. Larkin Co., 115-21 East Third Street, Dayton, Ohio, manufacturer of machinery and mill supplies, will carry out an expansion and improvement program for increased production. Arrangements are being made for increase in capital from 15,000 to 60,000 shares of stock, no par value, a portion of proceeds to be used for program. Maurice D. Larkin is president.

Armstrong Furnace Co., London, Ohio, is considering plans for new plant unit on Fenninniken Road, Columbus, Ohio, comprising two one-story units, reported to cost more than \$40,000, with equipment. F. B. Armstrong is president.

United States Engineer Office, Chattanooga, Tenn., is asking bids until Sept. 21 for Diesel engine units, complete with generators, exciters, propulsion controls, motors and switchboard, and spare parts.

Formica Insulation Co., 4614 Spring Grove Avenue, Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Cincinnati, for new three-story plant unit reported to cost more than \$80,000, with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids un-

til Sept. 5 for one sheet metal cutter, circular 93; for 9000 steel balls, 35,000 asbestos-copper annular gaskets, and quantities of brass chain, steel nails, lead seals, etc., circular 87; until Sept. 4 for 195 sets shielding ignition units, circular 91; for three transformers, four cutouts, knife switch, cable, etc., circular 92; for 100,000 lb. ferrosilicon, circular 88; and until March 7, 1929, for furnishing from two to 200 airplanes.

State Department of Public Welfare, Ninth and Oak Streets, Columbus, Ohio, J. E. Harper, director, will soon take bids for one-story power plant at welfare institution at Apple Creek, estimated to cost \$58,000. H. B. Briggs, Hartman Hotel Building, is architect and engineer.

Milwaukee

MILWAUKEE, Aug. 27.—While machine-tool business lacks some of the snap which has characterized its progress in recent weeks, the rate of inquiry continues active and there is considerable business in prospect. Meanwhile, production is maintained at a rate limited only by the ability of tool builders to secure skilled help, which is unusually scarce in the machinist trade. Order books are well filled and with new business developing at a moderate rate, output schedules doubtless will continue at the present high rate for some time to come.

McNally-Tollefson Foundry Co., Stoughton, Wis., is about to take bids for the erection of a shop addition costing about \$35,000. Work is to start about Sept. 17. John McNally is president.

Gurney Refrigerator Co., Fond du Lac, Wis., is converting its entire tool drive to electric motors and has purchased a 300-hp. Ridgeway engine and generator. E. G. Vail is president and treasurer.

Indiana

INDIANAPOLIS, Aug. 28.—Plans are being considered by Auburn Automobile Co., Connersville, Ind., for a new one-story addition, reported to cost more than \$70,000, with equipment.

State Line Generating Co., Hammond, Ind., operated by Commonwealth Edison Co., 72 West Adams Street, Chicago, has made application for permission to issue notes for \$14,000,000, proceeds to be used in connection with new local steam-operated generating plant, now in course of construction and which is scheduled for completion early in 1929. Entire project will cost \$28,500,000, including transmission lines.

Board of Education, Gary, Ind., is considering installation of manual training equipment in new high school at Twenty-fifth and Harrison Streets, estimated to cost \$850,000, for which plans will be drawn by William B. Ittner, 911 Locust Street, St. Louis, architect.

City Council, Indianapolis, is planning establishment of municipal airport, with hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical units, reported to cost about \$500,000, in which amount bond issue is being arranged. A mayor's committee has been appointed, headed by Fred C. Gardner, chairman, to arrange for project.

Midland Utilities Co., Fort Wayne, Ind., operating Indiana Service Corpora-

tion and other electric light and power utilities at South Bend, East Chicago, Gary, Kokomo, Logansport and other cities, is disposing of bond issue of \$6,000,000, a portion of proceeds to be used for extensions and betterments in plants and system.

Northern Indiana Public Service Co., Lafayette, Ind., plans construction of pipe line to vicinity of Crawfordsville, Ind., about 30 miles, reported to cost in excess of \$175,000. Work is now under way on pipe line between South Bend and Elkhart, Ind. Application has been made for permission to issue preferred stock in amount of \$300,000, portion of fund to be used for expansion.

Canada

TORONTO, ONT., Aug. 27.—At the Canadian National Exhibition, which opened in Toronto on Aug. 24, machine tool builders and dealers from many parts of the world are showing their various lines of equipment. The exhibition of tools and machinery has, as a rule, a stimulating effect on sales during the two weeks they are on display and also tends to strengthen the fall demand. Canadian builders and dealers report a steady demand for tools. More extensive buying is expected from the automotive industry as a result of building plans announced by several companies. Railroads are buying for replacement in car shops, and a few lists are coming out for Canadian National shops at Point St. Charles, Que., and for Western Canada shops of both the Canadian National and Canadian Pacific.

Dominion Lightning Rod Co., Dundas, Ont., is having plans prepared for factory at 63 Main Street.

Chaleur Bay Power Co., Quebec, Que., has awarded contract to T. E. Rousseau, Ltd., 42 Second Avenue, for the construction of power house and dam on Hall River near Bonaventure to cost \$150,000. Langlais, Ricard & Royer, 126 St. Peter Street, Quebec, are the engineers.

Dominion Forge & Stamping Co., Walkerville, Ont., has awarded contract for addition to plant at cost of \$14,000.

Gudie Motor Mfg. Co., 105 Sherbourne Street, Toronto, has awarded contract for \$25,000 plant addition.

Webber Machine Co., 848 Dupont Street, Toronto, Ont., has awarded contract for erection of \$30,000 factory on Birch Avenue.

Flint Paint & Varnish, Ltd., Perth Avenue, Toronto, has awarded contract to Anglin-Norcross, Ltd., Temple Building, for erection of \$150,000 plant addition.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has started work on an addition to its plant there.

New Brass Ware Co. of Canada, Ltd., 2320 Aird Street, Montreal, Que., has awarded contract to the Dakin Construction Co., 270 Beaumont Street, for the erection of a foundry addition, 43 x 100 ft. Foundry equipment not yet purchased.

Willys-Overland, Ltd., Weston Road, Weston, Ont., will build an addition to its plant to be four stories, 60 x 260 ft., for which bids are being received by M. J. Streiffert, engineer.

Jem Rubber Co., 3723 Dundas Street West, Toronto, intends to start work about Sept. 15 on the erection of a manufacturing plant.

Dominion Truck Co., South Street,

Kitchener, Ont., is having plans prepared by B. A. Jones, Ontario Street South, for addition to its plant to cost \$10,000.

Bids are being received by E. G. Patterson, superintendent Canadian General Electric Co., Peterborough, Ont., until Aug. 31 for the construction of a punch press building on Park Street, to be one story, 110 x 328 ft., steel and brick construction. Tenders for tools and equipment will be called later.

Plans are being prepared for the erection of a paper plant at Winnipeg, Man., by the Hinde & Dauch Paper Co., Toronto, Ont., to cost \$1,000,000. Company is looking for a suitable site. O. H. Moore, president and general manager, in confirming the report, said that nothing will be done in the line of construction work until spring.

Canadian Industries, Ltd., Toronto, Ont., is having plans prepared for the erection of a factory at Regina, Sask.

Pacific Coast

SAN FRANCISCO, Aug. 24.—Permission has been secured by Yuba River Power Co., 225 Bush Street, San Francisco, to proceed with hydroelectric power development on North and Middle Forks of Yuba River, consisting of five generating stations near Sierra City, near Downieville, near Ramshorn, Garden Valley and in vicinity of Narrows, to develop total capacity of 261,000 hp. Entire project is estimated to cost more than \$35,000,000, including transmission lines.

Fluid Packed Pump Co., Los Nietos, Cal., has plans for a new one-story machine shop at Norwalk and Puente Mills Roads, Santa Fe Springs district.

Baash-Ross Tool Co., 5512 South Boyle Avenue, Vernon, Cal., has awarded general contract to Modern Iron Works, 4850 Pacific Boulevard, for a one-story addition, to be equipped as a machine shop.

Northwest Lead Co., 1742 Fourth Avenue, South, Seattle, has awarded general contract to H. D. Stewart, 702 First Avenue, South, for one-story plant unit, reported to cost about \$25,000, with equipment.

Pacific Woodenware Co., Marysville, Wash., manufacturer of utensils, etc., is considering rebuilding of portion of plant destroyed by fire Aug. 15, with loss reported at \$70,000, including equipment.

Golden Gate Iron Works, San Francisco, recently organized by Charles S. Hoffman and L. W. Fleigner, plans operation of general iron-working plant at 1541 Howard Street.

United Engineering & Drydock Co., San Francisco, has concluded negotiations for purchase of shipbuilding and repair plant of Daniel J. Hanlon Co., Oakland, for reported consideration of \$750,000, and will operate new shipyard at that location. Extensions and improvements are planned, with installation of additional equipment. George Armes, head of purchasing company, was formerly chief engineer of Union Iron Works, San Francisco, acquired by Bethlehem Steel Co., Bethlehem, Pa., a few years ago.

Department of Public Utilities, Spokane, Wash., Charles Hedger, commissioner, is planning establishment of municipal airport, including hangars, repair and reconditioning shop, oil storage and distributing building, and other mechanical units, estimated to cost about \$75,000.

An appropriation in such amount is being arranged.

Board of Education, Los Angeles, has filed plans for one-story addition to vocational training shop at George Washington High School, Normandie Avenue, to cost more than \$50,000, with equipment. W. J. Dodd and William Richards, Architects Building, are architects.

Foreign

PROPOSITION is being considered by State Government, Melbourne, Australia, recommended by Victorian Electricity Commission, for construction of new steam-operated electric power plant at Yallourn, comprising three 25,000 kw. generating units and auxiliary equipment to cost more than \$9,000,000. Of this sum, power station machinery will represent about \$6,000,000, switch gear and accessories \$1,000,000, and transmission lines, \$1,500,000, remainder being used for miscellaneous work.

Company in Czechoslovakia is planning construction of new railroad line between Pilsen and Brunn, with locomotive terminals and repair shops, coaling stations and other facilities, to cost close to \$18,000,000. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Czechoslovakia, No. 71567.

Victor Talking Machine Co., Camden, N. J., has approved plans for new branch plant at Sao Paulo, Brazil, to cost close to \$500,000, with equipment. Unit is scheduled to be ready for service early in coming year. A subsidiary interest

under name of Victor Talking Machine Co. of Brazil, Ltd., is being formed to carry out the project. Wilson R. Buie will be in charge of construction.

Following completion of new power plant at Congella, Durban, South Africa, with capacity of 36,000 kw., now in progress, Government of Union of South Africa, Durban, plans an early expansion in output in connection with proposed electrification of Government railways from Durban to Pietermaritzburg.

Municipal Government, Medellín, Colombia, has secured approval for a loan of \$13,000,000, a considerable portion of the fund to be used for purchase of materials and supplies for municipal public utilities, including the development of a hydroelectric power project at Guadalupe.

Government of Afghanistan, Cabul, is considering construction of railroad line from that city to Indian frontier, to include locomotive terminals and repair shops, coaling stations and other mechanical facilities. Surveys are projected at early date. Estimates of cost and preliminary details now under advisement.

Khimugol Syndicate (Chemical Coal Trust), Petrograd, Russia, has arranged an appropriation of \$8,800,000 for capital construction during coming fiscal year, fund to be used in part for construction of hydroelectric power plant at Don Basin, and glass manufacturing works. Information at office of American-Russian Chamber of Commerce, 145 West Fifty-seventh Street, New York.

Front of Factory Ornamented with Samples of Its Iron Work

THE entire front of the plant of the William E. McConologue Co., San Francisco, has been decorated with samples of the ornamental iron work built within the

plant. Window gratings are placed over the windows with wire screen, as shown to the right, while other samples are arranged on the remaining section of the building.



THE IRON AGE

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Fusion Welds on Heavy Plate

Swiss Firm Uses Oxy-Acetylene and Electric Welding on Important Pressure Vessels—Welders, Joints and Completed Work Tested Continuously

BY R. W. MILLER*

WELDING was introduced into the shops of Sulzer Brothers, Winterthur, Switzerland, at the beginning of the present century. This firm's main production has always been the construction of steam boilers, pressure vessels and sundry apparatus for the chemical and textile trades. Oxy-acetylene welding has changed the working practices to such an extent that numerous objects, some of them of very large size, are now constructed by welding instead of by riveting. Shop methods have not yet been fully developed, but to judge by the stage which both oxy-acetylene and arc welding have now reached, it would appear that they are bound to supplement rather than to compete with each other. On some work it is more advantageous to adopt one type of welding rather than the other; there are of course numerous other cases in which either method can be employed. One essential condition is that the design should be suitable for the chosen method of welding.

Types of Welding Equipment Installed

As to the equipment: Acetylene is made in a large carbide-to-water generator (as is usual in European practice) and, after passing through a purification plant, is piped to various outlets in the shops. Oxygen is piped through lines, leading from a manifold drawing a supply from a group of cylinders. About 35 welders are employed; blow-pipes are of the injector type. Fig. 1 shows the interior of one of the shops, and illustrates the first-rate working conditions.

Electric welding has been much more recently installed, and the equipment has been by no means standardized. Direct-current machines with constant voltage, supplying current to several workmen simultaneously, require a high investment in generators and series-resistances, and also are wasteful of energy. To avoid these drawbacks some individual motor-generator sets are installed. The most economical solution, so far as initial cost of plant and current consumption is concerned, appears to be in adopting

alternating current for welding. A single transformer is then sufficient for transforming the supply voltage down to the required welding voltage. Experience at the Sulzer plant indicates that direct-current welding is easier to learn, does not need such special welding wire and, in many places, is easier to carry out than alternating-current welding. On the other hand, the electric energy required for the latter is less.

Heavy Pipe Work Gas-Welded

Experience of 20 years indicates that oxy-acetylene welding is as yet unrivaled for making pipe connections. As an instance, Fig. 2 shows a steam-distributor which has 19 welded connections on the upper side alone. It was submitted to a test pressure of 350 lb. per sq. in. It can be seen that such work can be carried out so as to avoid any distortion.

Boilers with helical joints have often been built by Sulzer Brothers. By utilizing a helical weld, the circumferential stresses in the welded joint are reduced, and it is also possible to utilize the full length of the rolled plates, irrespective of the diameter of the boiler.

A large field for the use of oxy-acetylene welding is found also in the construction of piping and sundry other parts for pumping plants and hydroelectric power houses. Examples of this class of work are shown in Fig. 3 and Fig. 4. The former shows a part of the penstock for a Swiss hydroelectric plant. The longitudinal joints are welded with gas, the circumferential joints electrically. The flange rings are electrically welded internally and externally, and the arc is also used on the stiffening pieces. This is an example of the combination method often adopted. Fig. 4 shows a distributing piece before being fitted to the pipe line. Two hemispherical pieces were welded together in the middle and flanged out for the connections. These pieces successfully withstood a test pressure of 925 lb. per sq. in.

For such heavy plate, in either process of welding, the edges of the pieces to be joined together are beveled and the single Vee or double Vee thus formed is filled up with welding rod. This practice is quite similar to that observed



Fig. 4—Oxy-acetylene Welded Distributing Piece for Water Wheels. Tested to 925 lb. per sq. in.

*Witten, Ruhr, Germany.

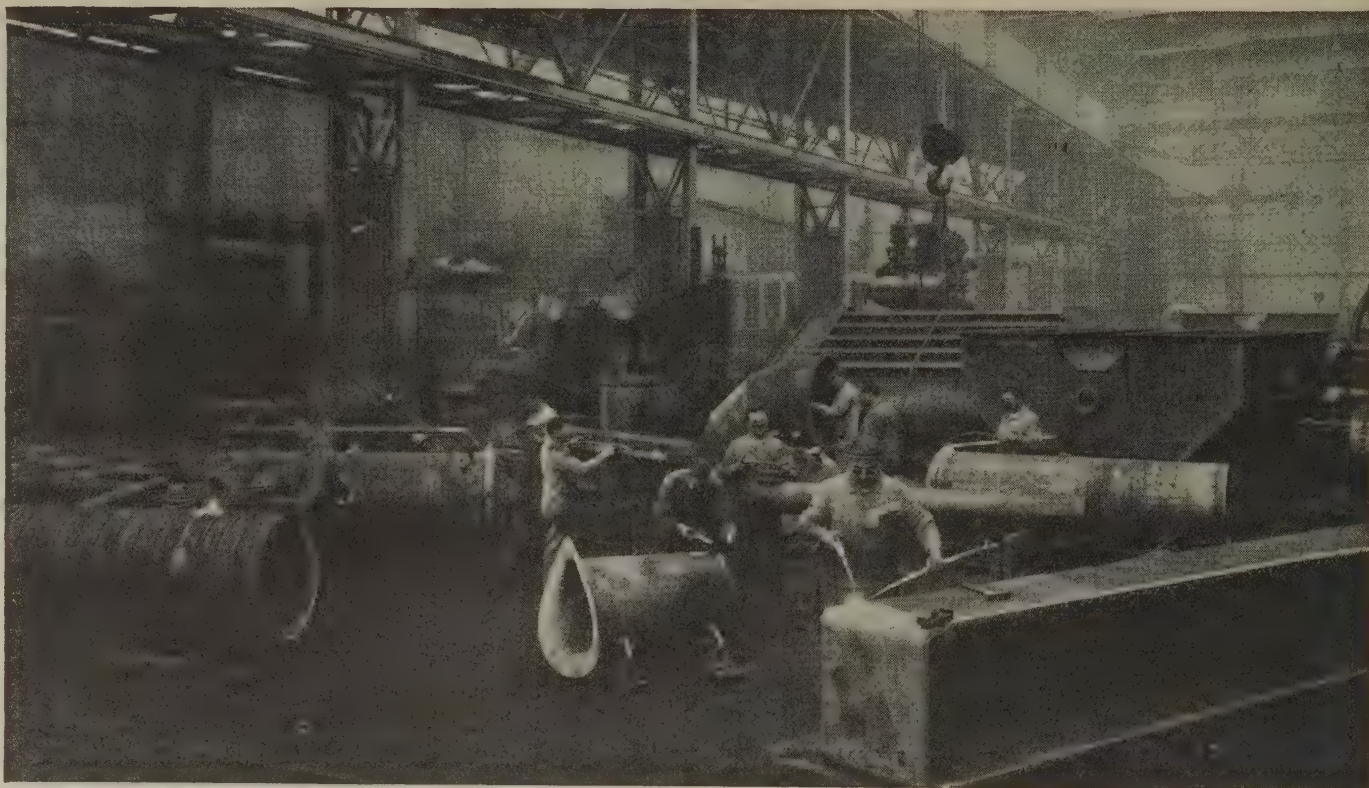


Fig. 1—Oxy-Acetylene Welding on Heavy Plate Work in Sulzer Brothers Shops, Winterthür, Switzerland

Fig. 2—Steam Distributer with 68 Welded Joints. Tested to 350 lb. per sq. in. (at right)



in the United States. After the joint material has been deposited in this manner, it is similar in quality to cast steel of the same composition. In steel works this is improved by rolling or forging; and Sulzer Brothers obtain the same effect in their important gas-welded joints by hammering them when red hot. The edges are slightly bent inward, the joint is also slightly reinforced externally, and, as indicated in Fig. 5, the reinforced weld so obtained is practically symmetrical. Thus the joint is compensated amply for the lower strength of the welding material (because of its lower carbon content) as compared with the boiler plate used, which is of unusual quality. Careful annealing after welding is finished improves the microstructure of the metal at the union and, when properly carried out, eliminates any residual stresses due to the fabrication process.

Tests of Completed Work

Frequently a purchaser is disinclined to accept welded pipe or vessels, basing his refusal on the statement that it is impracticable to inspect the work after it is finished. It must be admitted that more dependence must frequently be put on the trustworthiness of the welders than on workmen engaged in most methods of construction. Furthermore, welding is often carried out by incompetent persons. From the failures which result, an observer who knows little about welding is inclined to blame the welding process itself instead of the persons using it. Only because of such circumstances and ideas can it be explained why

some clients must still be supplied with the more expensive hammer-welded joints, even when the tanks must merely be leak-proof and are not required to withstand pressure.

Boilers, high-pressure pipe lines and similar articles, when finished, are submitted to severe tests at pressures 50 to 100 per cent greater than the working pressure, during which time the welded joints are hammered. After this test both the inner and outer sides of all seams are inspected.

Quality is harder to judge when the arrangement of the weld is such that it cannot be stressed by ordinary test methods. Magnetic and electric tests have been tried by the Sulzer organization to determine the homogeneity of the weld in a finished piece of work, but none of these has as yet proved satisfactory. Testing by means of Roentgen rays has lately been introduced for laboratory study, but is still far from a shop method. It must be always remembered that the cross-section of a weld may vary considerably, with a corresponding variation in its transparency to the X-rays, so that the resulting photograph has light and dark tones even when there is no fault in the workmanship. Photographs must also be taken in a room lined with lead, in order to save the operators from the rays—conditions difficult to fulfill in workshop practice.

When manufacturing a large number of boilers, high-pressure pipe lines and similar articles, pieces are chosen at random and submitted to thorough tests until ruptured. Yet in a considerable number of cases it is possible to

make only a superficial examination of the weld. In a single Vee-joint, where the under side is easily accessible, an inspection can be made to see if the weld has been made right through. In a double Vee-joint (when the cross-section is X-shaped) this inspection must be done after the first side is finished. In electric welding, an opinion as to the quality of the weld is formed from the appearance of the surface of the joint, so long as the plates are not too thick, i.e., so long as only one layer of the welding wire is required.

Selection and Test of Welders

The more difficult it is to control a piece of welded work, the more necessary it is to exercise particular care in selecting the welders who are to carry it out. As much consideration should be given to their personal character as to their skill in welding. In the Sulzer works pieces are always taken from the work under construction and submitted to

thorough tests. In addition, a number of special test pieces are constantly welded, either to test the skill of a welder or to investigate a new welding wire or a new method of welding. On certain important contracts, full-sized sections of the work are constructed and their behavior is studied while being tested to rupture.

When pieces are cut with the weld extending across the middle and tested in tension, the figures obtained for elongation must be regarded with caution, since they are greatly affected by the position of the rupture—whether in the weld metal, immediately alongside, or some distance back from the joint. A much better idea of the qualities of the steel



Fig. 5 (Above)—Single Vee Weld Is Hammered Vigorously While Hot to Refine Grain and to Produce Slight Reinforcing Effect on Under Side

Fig. 3 (Below)—Penstock Piping for Swiss Hydro-Electric Project. Longitudinal seams oxy-acetylene welded; circumferential seams and bracing arc welded

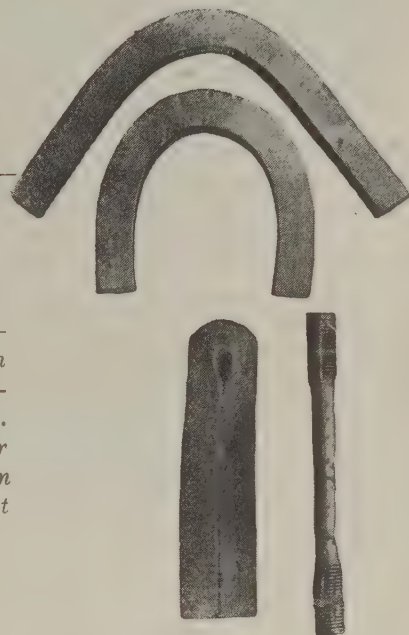
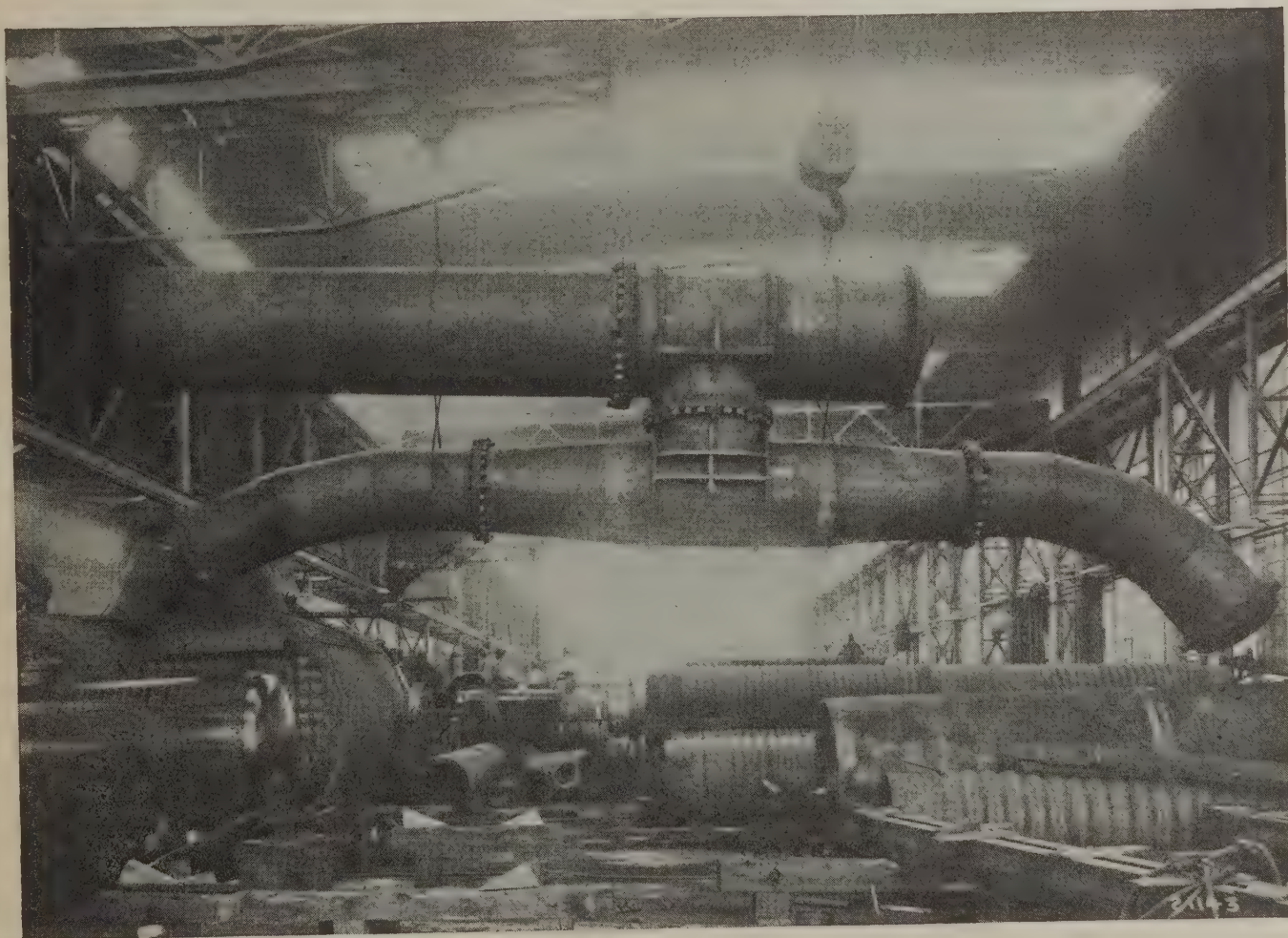


Fig. 6 (at Right)—Test Pieces Cut from Electric Arc Weld-Metal in Heavy Plate. Cold bend on upper two. Hot bend on lower left. Tensile test on lower right

deposited in a joint can be obtained from test pieces made solely of the filling material. The preparation of such test pieces is, of course, rather an expensive operation and is representative of conditions only when welding very thick metal. Results of such studies are given in Table I. Typical test specimens are shown in Fig. 6. Although the test pieces are somewhat porous, the figures quoted for tensile strength and (with one exception) for elongation are fairly

Table I. Tension Tests of Electric Weld Metal

Electrode	Elastic Limit, Lb. per Sq. In.	Ultimate Strength, Lb. per Sq. In.	Elongation (a)
A.....	50,000	58,200	14.4
B.....	41,500	53,000	9.4
C.....	40,000	53,000	17.4
D.....	48,100	52,000	17.6
E.....		55,000	18.0

(a) Expressed as a percentage of the gage length, punch-marked half the usual length, i.e., one-half of 11.3 times the square root of the area of the bar.

uniform. Higher tensile strengths involve lesser elongations.

A more simple way of evaluating welded joints is by the bend test. The Swiss practice is to express the results in Tetmajer units, which vary directly with the thickness of the piece and inversely as the radius of curvature of the bend. The value of this bending unit is 100 when both ends lie flat on each other, and it is zero when rupture takes place without any permanent bending; thus the figures correspond to the percentage elongation of the outer fibers. Tetmajer bending units for gas and electric welds, as ordinarily encountered in Sulzer's production, are given in Table II.

Much importance is ascribed to the results of the deep etch on cross-sectioned welds, wherefrom the structure may be judged with the naked eye. Places not faultlessly joined together are very clearly recognized. Different tones at the joint are caused by variations in composition.

Oxy-Acetylene Welds More Closely Approximate Properties of Boiler Plate

A comparison is given in Table II between the tensile strengths of oxy-acetylene and of electrically welded joints. These tests were made in the Swiss Federal Testing Laboratories at Zurich. The gas welding was done by Sulzer Brothers, and the electric welding by a leading interest using electrodes of its own manufacture. From Table II it may be observed that the properties of the weld material taken from oxy-acetylene welds correspond more closely to those of the plate than in the case of electric welding.

Table II. Tests on Gas and Arc-Welded Joints

Material	Elastic Limit	Ultimate Strength	Contraction	Elongation	Tetmajer Bend
Oxy-acetylene weld	30,000	51,000	16.5	12.0	91
Oxy-acetylene weld	27,200	50,000	49.0	21.0	58
Arc weld	54,500	64,500	13.6	7.0	20
Arc weld	56,000	65,000	13.6	4.2	16
Unwelded plate	30,500	53,000	....	25.0	100

This also indicates the basis of use in the Sulzer Brothers' plant. When the finished work must be as uniform throughout as possible, oxy-acetylene welding is given the preference. If it is only desired that the weld should have a high elastic limit or high tensile strength without regard to toughness or ductility, electric welding is preferred.

New Determination of Austenite Boundaries

AREDETERMINATION of two important lines in the iron-carbon equilibrium system has been made by Prof. Honda and H. Endo of the Imperial Japanese Research Institute (147th report). Metal samples were packed in magnesia powder in a double-walled silica container, and heated in an atmosphere of nitrogen; microscopic investigation showed no decarburization under these conditions. As the temperature increased, determinations of the magnetic susceptibility were made at frequent intervals, and the results plotted, locating the point where fusion first starts (the "solidus") by breaks in the curve. *Arcm* was located

on a very slow cooling in a similar manner. The metal used was Swedish steel. Former investigations on steel synthesized with electrolytic iron and sugar carbon indicated that the minor impurities of Swedish steel do not appreciably affect the magnetic characteristics.

Results are shown in the figure. *Arcm* coincided with the curves determined by other authors using other methods, but no trace was found of the line *a-b'*, supposed to represent the solubility of graphite in austenite.

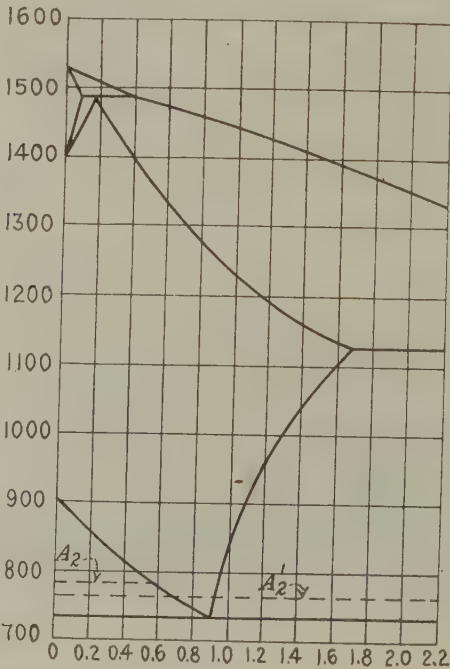
Quartz for Calibrating Pyrometers

Frederick Bates and Frances P. Phelps, physicists, Bureau of Standards, Washington, have studied the changes occurring in clear quartz at 573.3 deg. C. When cooling through this temperature the material changes its crystal lattice with liberation of so much heat that it can be used as a fixed point in pyrometer calibration.

In the present temperature scale there are six reference points covering the range from liquid oxygen to the freezing point of gold. The region from steam, 100 deg. C., to silver, 960.5 deg. C., is covered by sulphur, 444.60 deg., and antimony, 630.5 deg. The temperature of quartz inversion (573.3 deg. C.) comes between the boiling point of sulphur and the melting point of antimony. In view of the many advantages connected with the quartz inversion for temperature scale purposes, the authors propose abandoning the antimony point.

Use of quartz is the most convenient and simple method for the calibration and control of thermocouples in the average laboratory. It is sufficient to select a small piece of clear crystalline quartz and if not convenient to drill a small hole for the insertion of the thermocouple, merely place it in contact with the quartz. The investigation is covered in scientific paper No. 557 of the bureau.

Borders of Austenite Region in Iron-Carbon Equilibrium Diagram, as Determined by Various Investigators



Steering Gear Plant Arranged for Economical Operation

*Production Lines Start at Raw
Material Receiving Bay and
Extend to Assembly Conveyor
—Assembly Progressive*

MARKED economies in handling raw material and in moving work in process have been effected in the new plant of the Gemmer Mfg. Co., Detroit, maker of automobile steering gears. Production has been speeded up, manufacturing costs have been lowered and a more uniform product is obtained. All these gains are attributed to the convenient arrangement of the plant, which, with no other products than steering gears, is a highly specialized one.

Near the center of the plant there is a 50 x 500-ft. receiving bay with monitor-type roof, served by an overhead electric traveling crane. There is room for spotting 10 cars of stock on the track in this bay. Each car is delivered to a point adjoining the department in which the material is to be used. After being unloaded, the material is inspected and placed at the end of the production line along which it is to be processed. There is ample space between



the unloading track and the production lines for the storage of sufficient raw stock to insure lines of material at all times.

Plant Laid Out for 5000 Units a Day

A brief description of the plant layout will make clear the routing of material in process. The production lines are at right angles to the receiving bay, and all are located



The Method of Handling Raw Material Is Unusually Convenient and to a Large Extent Eliminates Trucking. From the railroad cars on the track at the side of the receiving bay, the stock is placed at the head of the production line along which it is to be processed. The production lines are at the right

In the Section of the Assembly Line Shown at the Top of the Page, the Steering Gears Are Adjusted and Inspected. The parts are stored in the racks at the left, which are covered to keep out the dust

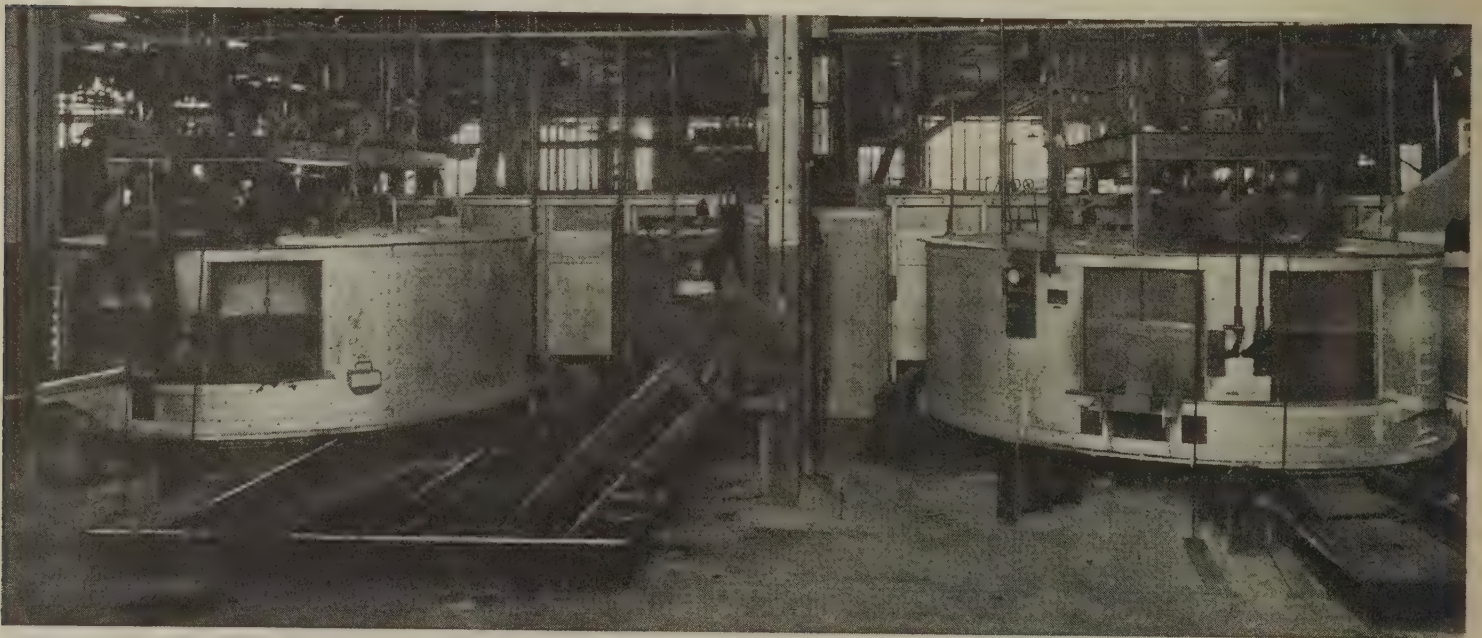
at one side of that bay. These lines extend to the side of the plant and terminate adjoining an assembly conveyor, which travels along the outer wall. Progressive assembly on the conveyor is a feature of the plant, which is laid out for a daily production of 5000 steering gears and is equipped at present for a daily output of 4000 units. The latter rate of production has been attained for extended periods.

Each production department has from two to nine lines of machines, which are practically duplicates, and open spaces are left between the lines in each department for the placing of additional machine lines, which will permit an increase of capacity. The lines are so arranged and equipped that it takes approximately 95 min. for a part, except one that is heat treated, to go from first operation until it is ready for assembly. Inspectors are placed along the lines to inspect parts between operations; they also inspect the first pieces that come from the machines when the drills, reamers, taps or other tools employed are sharpened or changed. All pieces are checked for count and inspected for quality at the end of the production line before being washed. The departments and production lines are arranged according to sequence of operations, so that completed parts of the

made up principally of a worm, shaft, column, jacket, housing, cover, adjusting nut and control.

The heat-treating department is located in the center of the plant adjacent to the departments that make parts requiring heat treatment. There are two 75-kw. electric heat-treating furnaces for normalizing and annealing operations. These were built by the George J. Hagan Co. and are equipped with automatic heat control and temperature registering instruments. They are used mostly for heat-treating shafts and ball arms. The furnaces can be adjusted for any heat or cycle of time. They are also equipped with automatic dumping mechanism, which dumps the work through a water-sealed chute into a water quenching tank, from which a power driven conveyor carries the parts.

Carburizing is done in one 280-kw. capacity Hagan counterflow regenerative type furnace, which is 18 ft. wide and 51 ft. long. Loaded pots are charged into each end alternately by means of a motor-operated pusher. A temperature of 1650 deg. Fahr. is maintained in the heating zone, and the material is kept in the furnace an approximate time cycle of 18 hr. Control of the furnace is entirely automatic and the doors are automatically operated. The time cycle is regulated by a clock. On leaving the furnace the car-



Parts Are Heat Treated in Two Rotary-Hearth Electric Furnaces from Which the Work Is Dumped Automatically into a Quenching Tank

steering gears reach the point adjoining the assembly line where they are needed for the assembly operations.

Stock such as rough castings and some forgings, although most of the latter are produced in the plant, are placed in steel boxes 36 x 48 in. x 30 in. high. The boxes are handled in the receiving bay by the overhead crane, and space is conserved by stacking loaded boxes one on top of another. Trucking in the plant has been very largely eliminated, no material in rough stock or in process, except parts that require heat treating, being trucked. Parts to be heat treated are carried to the furnaces on racks.

Cars Held in Receiving Bay for Disposal of Scrap

The receiving bay with its railroad track also serves as a loading bay for turnings. An open top car is spotted at the end of the track and remains there until it is filled, usually about two days, thus serving as a storage bin. The scrap in the form of turnings is put in standard scrap boxes, 6 ft. long and 3 ft. deep, which are set alongside each machine in the worm department and at the turning lathes in the shaft department. When the boxes are filled, the overhead crane dumps the scrap into the railroad car.

There is a production department devoted exclusively to the manufacture of each part of the steering gear, which is

burizing boxes are conveyed by an overhead hoist to a roller conveyor at the side of the furnace and from this conveyor the carburizing compound is dumped through a grate. The work remains on the grate and the compound is drawn by suction up through a cleaner to a storage space, from which it is fed by gravity to the point where the pots are loaded.

All carburized work is hardened in two rotating-hearth gas-fired furnaces having electric control.

The usual routing of the shafts is through the normalizing furnace, to prepare the steel for machining, and then through the production line. They are then returned to the heat-treating department for carburizing and hardening. After quenching, following hardening, parts go to lead pots for drawing when this is required. They are then returned to the process departments for finishing operations. Practically all operations except finish grinding on the shafts are done before carburizing. The ball arms are heat-treated but not carburized.

Electrically Heated Continuous Enameling Oven a Feature

Finishing the column cover or jacket is an important step in the manufacture of the unit, as the finished appearance of the column must be in keeping with the finish of

the car on which the steering gear is to be used. The jackets are sawed to length from steel tubing, burred at both ends, given the additional operations that are required on some types and then transported on a gravity conveyor to a continuous enameling oven. This is a conveyor-type electrically heated oven, electrically controlled and has several interesting features. The oven is in the form of an inverted "U," occupying a floor space of only 8 x 15 ft.

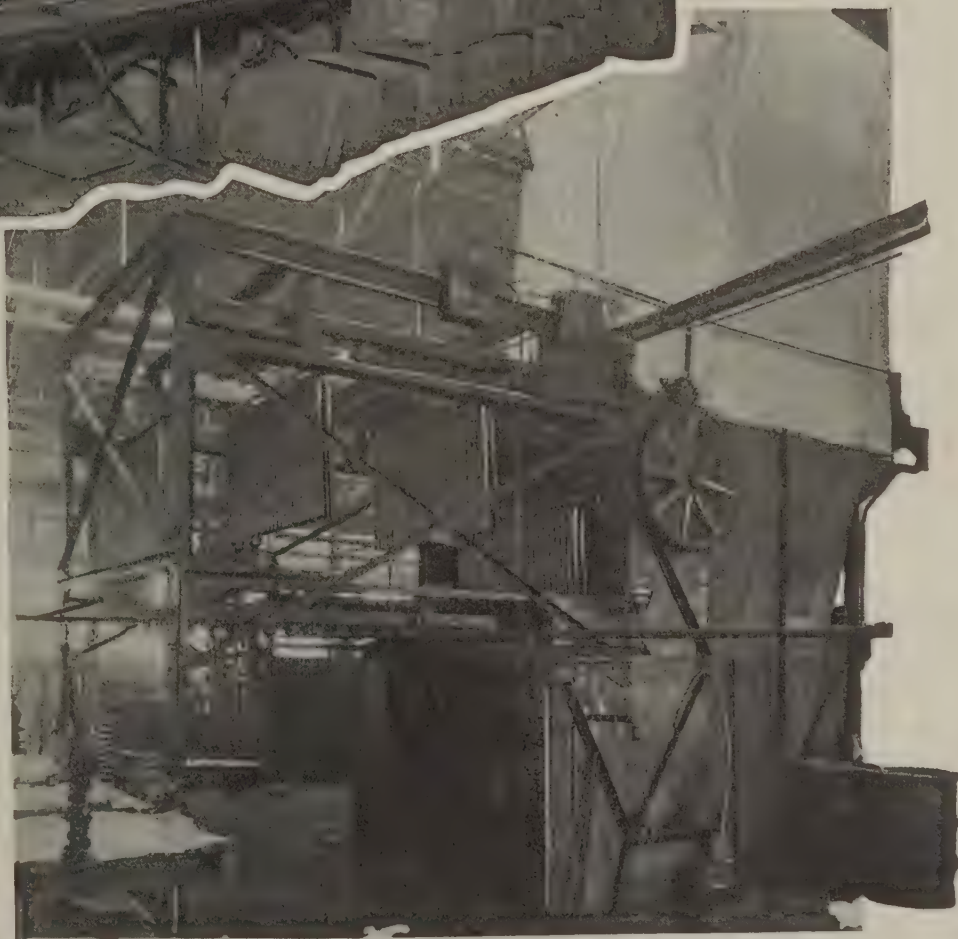
of 70 deg. to the oven, where it is baked for 45 min. at a temperature of 500 deg. Fahr. The entire time cycle is 90 min. Approximately 1800 jackets are on the conveyor at one time. The dipping tank and oven are entirely inclosed and, in having the work enter and come out perfectly dry, the necessity of a dust-proof room is eliminated.

With more uniform dip, drip and heat secured from the continuous enameling unit, the work comes out with a uni-



THE Double Chamber Electric Carburizing Furnace Is Shown Above. On leaving the furnace the carburizing pots are placed on the roller conveyor at the side and the compound dumped through a grate

Steering Column Covers Are Enamelled and Baked in the Continuous Type Electric Oven Shown at the Right. The oven is vertical and occupies small floor space. The work is suspended on racks and carried through a dip coating tank and the baking section of the oven



The top is insulated with a 4-in. layer of rock wool. The heat flows in a direction counter to the direction of the work. The finished work is cooled by intake air and the incoming work is preheated by what otherwise would be waste heat. Baking heat is reached at the apex of the "U." Fumes are drawn off by a small fan.

The jackets are suspended from racks on hooks attached to a small handling hole at the end of the jacket. One man feeds the work to the conveyor. It goes through the dipping tank, drains 20 min. and is then carried up at an angle

form finish, and it is stated that rejections have been practically eliminated. The oven was designed and built by the Kirk & Blum Mfg. Co., Cincinnati, and the conveyor and structural steel by the Mechanical Handling Systems, Detroit.

Assembly Is Progressive

The assembly line along the side wall extends the greater part of the length of the plant. Finished steering columns are placed on rollways, from which they pass to an endless

chain conveyor, 230 ft. long and 18 in. wide, along which the column is assembled. Machines for certain work required in assembling are located at the side of the conveyor. The column is placed on a rotating fixture for making the worm thrust adjustment.

The assembled column on leaving the first conveyor is greased in the open housing and then placed on a plate conveyor having special holding fixtures on 30-in. centers. On this the shaft and cover and minor parts used in adjusting the gear are assembled. Then the unit is taken from the conveyor to adjoining individual vises for adjustment and inspection. After inspection the uncompleted assembly goes back to the conveyor line and additional minor parts are added to complete the unit.

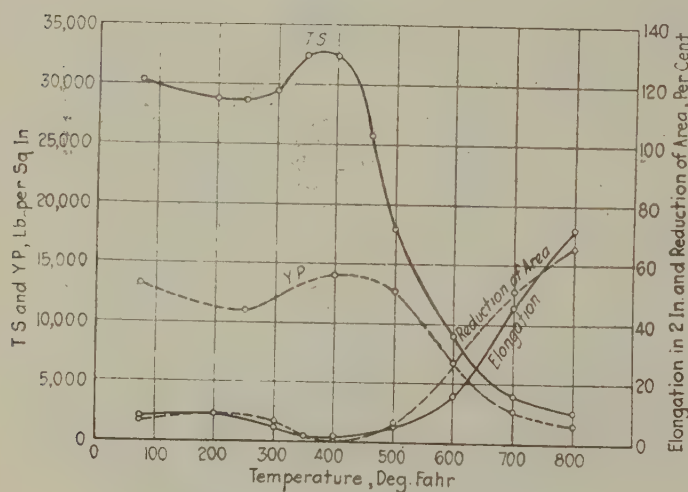
At the end of the second conveyor the steering gear is dip-painted and placed on a third conveyor, which is of sufficient length to allow it to become dry. From this conveyor the gears are put on standard racks, 100 to a rack,

on which they are carried to the shipping room, located a short distance below the assembly line. They are delivered to Detroit customers in these racks. Controls, ball arms, jackets and some miscellaneous parts that are not assembled until the gear is placed on an automobile are inspected after the finishing operations, boxed and shipped separately from the gear assembly. These go from a point near the end of the assembly line to the shipping department, which is equipped with a depressed track for carload shipments and a depressed driveway for local deliveries.

Extreme care is exercised in cleaning finished parts and in keeping them clean before assembling. At the end of each department is a washing machine in which the parts are cleaned after final operations. Shafts are washed before heat treatment and washed and oiled after finishing operations. The main parts of the gear are placed in covered racks at the side of the assembly line after cleaning in order to keep them free from dust.

Aluminum Alloy Replaces Steel Castings on Field Gun Mounts

AT the spring meeting of the American Society of Mechanical Engineers, held in May at Pittsburgh, F. M. Brauer of the Watertown Arsenal announced that heat-treated aluminum alloys were being installed in anti-aircraft mounts.



Alloy No. 195 Heat Treated

"Three or four months ago," Mr. Brauer said, "the Ordnance Department found a metal that was light, yet with physical properties that would permit its use in mobile anti-aircraft mounts. After spending considerable time in investigations, analyzing numerous tests, and consulting engineers and other experts, a metal having specifications known as No. 195, heat treatment No. 4, was found, which with but a few modifications would be adaptable. Six per cent elongation, 13,000 lb. per sq. in. yield point with 28,000 lb. per sq. in. ultimate strength, was established. Further than that, an order was placed for this metal to be used in very important components of gun carriages.

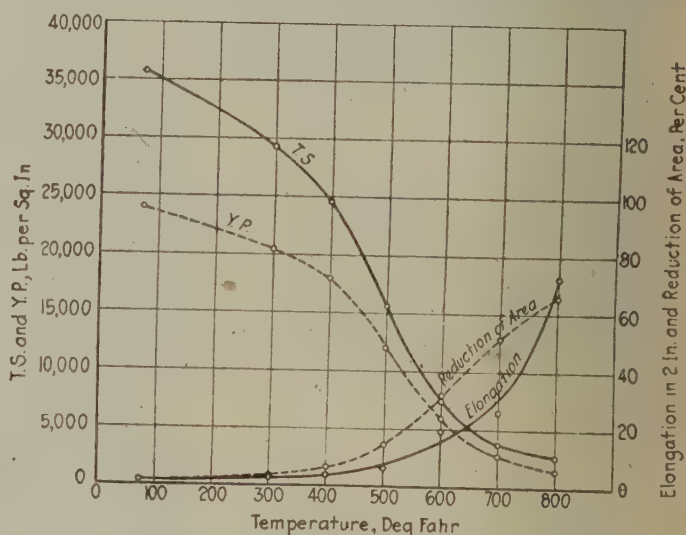
"It may appear singular that the department should introduce a metal of this kind and put it into a gun carriage; however, there was no hesitancy in so doing, and we are firmly convinced that not only these components, but also in the near future other parts, will be changed over from cast steel having a 30,000-lb. yield point and 70,000-lb. ultimate strength to aluminum-alloy casting No. 195. Not only are specifications as to physical properties carefully checked, but also an actual test is made and each member subjected to a load equal to that which will produce a fiber stress of 80 per cent of the strength of the metal at the yield point."

From a paper presented at the same meeting by Messrs.

Templin, Broglio and Marsh of the Aluminum Co. of America, the analysis of this alloy is as follows:

Silicon	0.75 per cent
Iron	0.57 per cent
Copper	4.40 per cent
Manganese	0.02 per cent
Zinc	0.25 per cent
Aluminum	94.01 per cent (by difference)

Properties developed by this alloy after heat treatment and upon being tested at room temperatures and at elevated



Alloy No. 195 Heat Treated and Aged

temperatures are given in the curves. Heat treatment was not specified. Aging consisted of holding one week at 400 deg. Fahr.

Studies on Migration in Industry

Taking a quarter-century range, a study of the wage earners in manufactures in the United States, made by George D. Ogden, traffic manager Pennsylvania Railroad, showed gains in numbers in all nine of the sections of the United States. These gains, however, varied markedly between sections. New England gained only 32 per cent and the Middle Atlantic States 55 per cent, compared with 237 per cent for the Pacific group and 118 per cent for the East North Central States. Rapidly increasing total population in the Pacific States accounted for much of the gain in that area. In numbers its advance was scarcely greater than in New England, despite the sharp disparity in percentage of gain.

Increasing the Utility of the Bend Test

Rapid, Accurate and Consistent Quantitative Results Are Obtained by
Measuring Extension of Outer Fibers at Failure
by New Bend Extensometer

BY A. B. KINZEL*

PHYSICAL testing of iron probably dates back to the discovery of processes for making the material, and it may be imagined that the first test at the disposal of the smelter man was the bend test. The use of the bend test is still universal and no doubt each of us has at some

ance, the bend test has probably received less careful thought from metallurgists and engineers than any of the other tests, and these facts warranted the development of a method for quantitative evaluation¹ and a study of the various factors involved.

Angle of Bend Not a True Measure of Ductility

The original method of making a bend test was simply to bend the piece and note the angle of bend. This of course varied considerably with the thickness of the piece and the tendency to bend locally, allowance being made for this in the mind of the investigator. However, no accurate evaluation was attempted. The next step in bend testing was to adopt a standard radius about which to bend the piece and again note the angle of bend. This is illustrated by two of the methods of bend testing used today, namely, forcing the piece between two fixed parallels by means of a tup with a given radius (Fig. 1) and wiping the piece around a pin of a given diameter (Fig. 2).

One great objection to these tests is that they do not give comparative results, simply because the material does not hug the tup or the pin. The reason for this is that,



Fig. 1—American Welding Society Standard Bending Fixture Mounted in Tension Testing Machine

time or other seen a blacksmith or mechanic bend a piece of iron or steel to find out whether it was "tough." In the field of engineering the test is also of considerable use and practically all specifications for flange plate, rivets, and medium-carbon steels, contain a bend test. Moreover, due to the ease of performance, this test is generally carried out by the consumer as well as by the manufacturer.

However, the fact that the test has not been quantitative has probably restricted its further use. It has long been recognized that the bend test gives information which is not obtained from the tensile test, because the bend test measures the ductility of the material under two-dimensional stress. But as usually carried out, consistent results are difficult to obtain and no satisfactory method of quantitative evaluation of the performance of the material has been developed. In spite of its age and ease of perform-

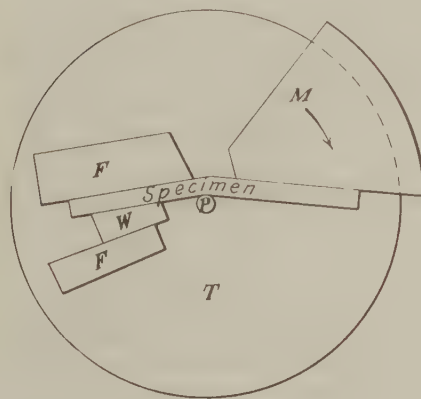


Fig. 2—Schematic Drawing of Bending Fixture

T is stationary table.

F, F are fixed blocks on table.

W is wedge for holding specimen.

M is movable block rotating about *P*.

P is a fixed pin.

Fig. 3—Rapid Local Elongation Kinks Specimen Away from Pin



as the fibers under greatest stress reach the yield point, they elongate or compress very rapidly without any further increase in stress and the piece bends locally or kinks, leaving the pin or tup, as indicated in Fig. 3. Moreover, there are additional strains introduced by the tup or pin which probably affect the results, although generally this

*Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. Chairman, American Society for Testing Materials, sectional committee on bend testing.

¹Critical Study of the Bend Test as Applied to Iron and Steel, by A. B. Kinzel. *Journal, American Society for Steel Treating*, November, 1927, page 778.

effect is not serious. The measure of the performance—i.e., the angle of bend—is a function of both the local effect at the kink and the progressive bending at either side of it.

Stresses occurring on bending a piece are indicated graphically in Fig. 4. Compression takes place on the inside and tension on the outside of the bend, and final failure occurs when the outside fibers are stretched to their limit. No measure is made of the actual force necessary to do this, so that obviously the bend test is a measure of ductility only, and not of strength in any sense. Moreover, as the final breaking point is determined by the ductility or elongation of the outside fibers, this factor, namely, the percentage elongation of the outside fibers, is the logical measure of the performance on bending. By bending the piece in a vise or other suitable press, all external stresses except the direct bending moments are constant. In such an event, the piece takes its own free bend and finally breaks at a definite outside fiber elongation. By evaluating this fiber elongation, a quantitative measure of the bend performance of the piece is obtained. This evaluation may be affected by direct measurement or by measurement of the radius of curvature and computation.

Method of Bending in a Vise

Even large bars may be readily bent in the manner outlined above by first kinking the ends and then placing the specimen in a vise or press. Such a test gives information on the limit of fiber elongation of the material. This is an absolute figure and is independent of the thickness of

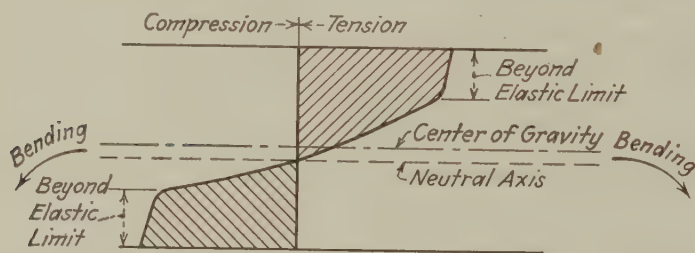


Fig. 4—Graphical Representation of Stress Distribution Across a Bent Bar

the piece when the specimen tested is at least three times as wide as it is thick. (This minimum width is necessary to eliminate the edge effect and to bring into play the full two-dimensional stress.) In certain bars—particularly of round rods—it is not practical to have the required widths. Such a specimen may be bent and the test applied in exactly the same way, but the results will be comparative rather than absolute.

It might appear on first thought that there would be some difficulty in noting when the incipient failure takes place. Actually there is no difficulty, for the failure takes place in shear across the outside plane and at the instant of failure a decided slip occurs which is readily visible. A few tests will suffice to show the ease of determining this point.

From the foregoing it is obvious that certain precautions in the actual performance of the bend test are advisable. First, the piece to be bent should be at least three times as wide as it is thick, as remarked above. Second, in bending the piece care should be taken to avoid tensile forces. It is recommended that the piece be bent in a vise or press, although the use of the usual wiping machine or tup should be satisfactory provided the fiber elongation is measured to evaluate the performance of the piece.

In the direct measurement of fiber elongation, a given gage length is laid off on the specimen so as to include the final point of fracture. The piece is bent and the length

at which the material first shows signs of incipient fracture is measured. The ratio of the increase in length to the original length is the percentage fiber elongation.

This method is open to the objection that it measures the average elongation over the gage length chosen, rather than the actual elongation at the point of failure. Due to the nature of the bending moments, which increase as the central point of the bend or point of failure is approached, there is often a decided discrepancy between the local and the average values. Moreover, the gage marks are apt to affect the results, although with care this can be avoided.

Direct Reading Bend Extensometer

The author has developed a bend extensometer for the rapid evaluation of tests, shown in Fig. 5. It consists essentially of two fixed points with a movable point between them. The movable point actuates a needle, the position of which may be read on the dial. By simply applying the fixed points to the outside surface of the bent specimen, as shown, a reading is obtained on the outside scale of the dial. This reading multiplied by the thickness of the piece and converted from the inside to the outside scale gives the percentage fiber elongation of the specimen at the place where the instrument is applied. For example, in the photograph the dial reads 45, the bent specimen being $\frac{7}{8}$ in. thick. The product of 45 and $\frac{7}{8}$ gives 39, and 39 on the inside dial is opposite 65 or 66 on the outside dial. Thus, there is 65 or 66 per cent elongation on the outside fiber of the specimen.

The instrument may be used regardless of the degree of curvature, within practical limits, as is demonstrated in the mathematics given in the appendix. However, it should not be applied to ductile sheet or to material which causes the needle to rotate more than one revolution on the dial, because the approximations involved in the derived formula are then not sufficiently accurate. In general, an accuracy of better than 5 per cent of the final figure is obtained when using the extensometer. This has been checked against carefully measured short-gage lengths on a number of specimens.

It may appear that the bend extensometer is open to the same objection as the use of a fixed gage length. This is not true for two reasons. First, the gage length used may be made very much shorter than would be practical

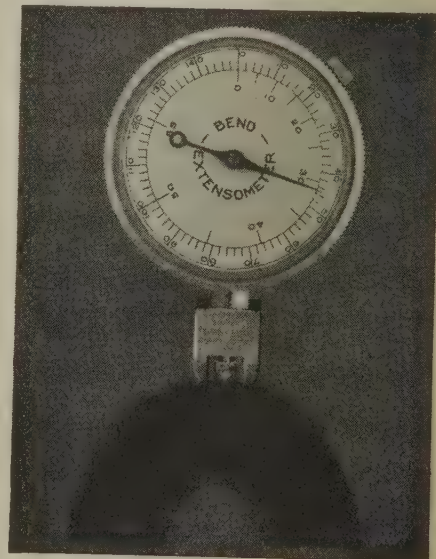


Fig. 5—Extensometer for Direct Reading Stretch at Outside of Bent Specimen

in direct measurements (0.322 in. for the present instrument), and second, by moving the points along the arc, the rate of change of the radius may be noted and the exact

radius at the point of failure obtained by extrapolation. However, the latter method is usually not necessary, as the gage length on the meter is so short that it gives satisfactory practical results. It may be made shorter if occasion demands.

A number of tests have been made with the bend extensometer and it has been found to give consistent, accurate results. For a comprehensive discussion of the bend testing of welds, the reader is referred to a paper by W. B. Miller.³ The test has been applied to various types of steels

³Bend Test as Applied to Welds, by W. B. Miller. *Journal, American Welding Society*, September, 1927.

with a wide range of thicknesses and of characteristics. The following list gives some of the results obtained:

Material	Per Cent Bend Elongation
Cast iron	0.2
Structural plate.....	23
3 per cent nickel steel plate.....	29
Boiler plate	100
Chrome-vanadium bar (hard).....	10
Chrome-vanadium bar.....	31

Introduction of a quantitative evaluation of bend performance, together with an easy method of obtaining this figure, should give impetus to the use of the bend test, particularly in cases where ductility is an important factor.

Supplement Giving Mathematical Basis of Dial Graduation

IN evaluating fiber elongation from a measurement of the radius of curvature it is necessary to consider the geometry of the bent specimen. In Fig. 6 a longitudinal cross-section of a bend is shown. It is apparent that the fiber elongation is $\Delta L \div L$. From the similar triangles in the figure,

$$\frac{\Delta L}{L} = \frac{\frac{t}{2}}{R - \frac{t}{2}}$$

from which it may be deduced that e , the ratio of elongation to unit length, is equal to $t \div (2R - t)$. In cases where the bar is bent almost completely upon itself, a shift of the neutral axis occurs from the center of gravity toward the inside surface.

This modifies the above formula, but in most cases this modification may be neglected. (For a discussion of this point, those interested are referred to the author's previously mentioned study.¹) Thus, by measuring the thickness of the piece and the radius of curvature of the outside surface at the point of failure, the elongation may be evaluated. The measurement of the radius of curvature presents some difficulties. It may be accomplished by tracing the arc and applying compasses to the section under discussion or by constructing a circle to match the arc in the usual geometric way. Both methods are comparatively laborious.

The bend extensometer is based on the principle of the usual dioptometer, used by oculists to measure curvature

on lenses. The motion of the central point measures the distance from the top of the arc to the chord between the fixed points. The functional relation between the radius of curvature of an arc, its chord and the maximum normal distance from the chord to the arc, is given in the following equation:

$$H = \frac{1}{2R} \left(\frac{C^2}{4} + H^2 \right)$$

where H is the distance from chord to arc, C is the length of the chord, and R is the radius of curvature.

The meter is so constructed that H is always very small compared with C , so that the term H^2 is of minor importance. C , the chord length or distance between the outside points, is 0.322 in., so that for practical purposes H^2 may be dropped when the

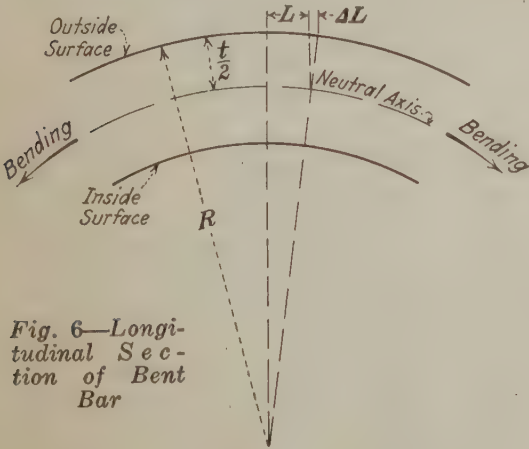


Fig. 6—Longitudinal Section of Bent Bar

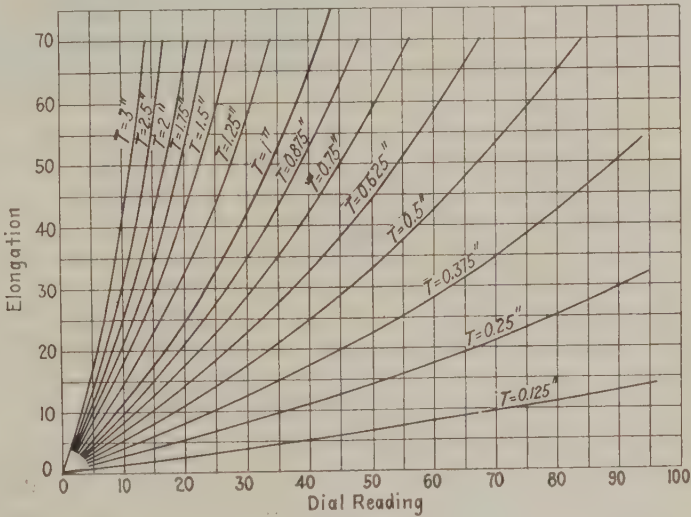
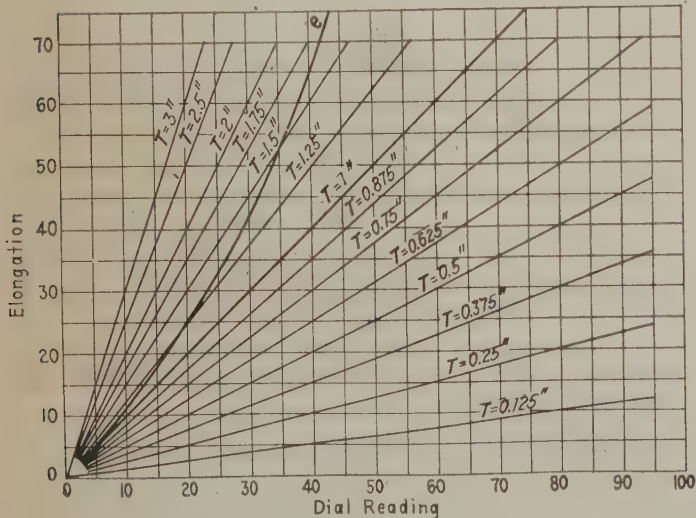


Fig. 7 (Above)—Chart to Convert Middle Ordinates (Dial Readings) into Fiber Elongations

Fig. 8 (At Left)—Nomographic Chart for Any Plate Thickness. Method of use: Rule a straight line corresponding with the required thickness. From the dial reading at hand go up to the thickness line, then across to the $t = 1$ line, then up to the e line, then across to the left-hand scale for percentage elongation

¹See footnote 1, page 575.

radius of curvature is $\frac{1}{2}$ in. or greater, and the formula becomes

$$\frac{1}{2R} = \frac{4H}{C^2}$$

In very sharp bends where the radius is less than $\frac{1}{2}$ -in. the correction should be applied or another bend extensometer should be used in which the distance between the fixed points is less than on the present* meter. This will apply only to thin material with high ductility.

If the fiber elongation, based on the final length rather than the original length, be designated as F , then from Fig. 6, the relation

$$F = \frac{100 \Delta L}{L + \Delta L}$$

ensues, and from the above formula

$$F = \frac{400 HT}{C^2}$$

The factor 100 is introduced for a percentage basis. The dial of the meter is so calibrated that the factor

$400 H \div C^2$ is read directly. It will be seen from Fig. 6, that there is a definite relation between F and e , the true fiber elongation, the relation being $e = F \div (1 - F)$. As has been shown, F is the dial reading times the thickness of the piece and the value of e may then be obtained by this equation.

In order to simplify this process for actual use, the writer has prepared Fig. 7. By simply obtaining the dial reading of the bend extensometer on the bent specimen, the fiber elongation may be read from the curve on the chart corresponding to the thickness of the specimen at hand. The curves are given for usual thicknesses. However, it is conceivable that some particular thickness may be desired, for example, a shop testing $13/32$ -in. plate regularly would need the corresponding curve. The following shows how the curve may be graphically obtained.

In the nomographic chart (Fig. 8), going from the dial leading to the straight line corresponding to the thickness automatically performs the multiplication, so that a value for F results. Now the correction factor from F to e for any given value of F is independent of the thickness, so that by adding the requisite amount in any case, the final value of e is obtained. Thus, the chart would be used as noted in the caption. By doing this for a number of dial readings, a special curve may be readily plotted.

In special cases where a great deal of work is being done with one thickness of material, a special dial for that thickness may be easily constructed by changing the figures on the dial to correspond with the percentage fiber elongation, as shown by the curve just indicated. The bend extensometer scales have been so worked out that all charts are eliminated for usual conditions.

To Standardize Finished Bars and Shafts

Several new standardization projects have been proposed to the American Engineering Standards Committee, including bars, shafts, studs and gages. The American Society of Mechanical Engineers has become sponsor for these four projects. Comments or requests for information should be sent to the first-mentioned organization at 29 West Thirty-ninth Street, New York.

In developing standards for iron and steel bars the following items would be considered: stock sizes, shapes and lengths for iron and steel bars, including flats, squares, rounds and other shapes. The standardization of Woodruff keys, a project now under way under American Engineering Standards Committee auspices, has convinced that body of the necessity of standardizing the sizes and shapes of iron and steel bars, particularly with reference to the dimensions and tolerances of hot and cold-finished bars.

Under the subject of splined shafts and splines, it is recommended that a study be made of the relations between keys and shafting of various kinds; square and flat keys, both parallel and taper; splines and double keys. Both solid and hollow shafting would be considered.

Standardization of dimensions of stud bolts, including thread dimensions and working tolerances, is also contemplated.

A matter of some interest to the metal fabrication industries is a project for organizing a committee of technical experts to undertake the work of gage standardization. It is expected that the work will benefit manufacturers and purchasers of gages by replacing the great number of sizes and types now being manufactured by a comparatively small number of sizes and types. The United States Navy has done much

important work in establishing gage standards for naval use, and several private concerns, such as the Firestone Tire & Rubber Co., the General Electric Co. and the Pennsylvania Railroad, have established specifications. These and other specifications will be studied and coordinated in a national way.

Gray Iron Institute Makes Cleveland Its Headquarters

The Gray Iron Institute, recently organized, has established permanent headquarters in the Terminal Tower Building, Cleveland. An announcement issued by Arthur J. Tuscany, manager of the institute, stated that the executive committee had picked Cleveland as its headquarters because of its central location, making it possible to reach overnight from that city most of the important foundry centers of the country. The Terminal Tower Building adjoins the site of the new Union Station that is now being erected in Cleveland. Details of the organization of the institute and its objects were printed in THE IRON AGE May 24, 1928, page 1476.

Booklet on Iron Ore

Considerable statistical and other data on the Lake Superior iron ore industry is included in an annual booklet issued by the Lake Superior Iron Ore Association, Union Trust Building, Cleveland. The mining companies, the mines they operate and their sales agents are listed; as well as the individual mines grouped by ranges and their shipments for the past 10 years. Total annual shipments are given by ranges for 20 years. Included also are receipts at Lake Erie ports, shipments from mines in other States outside of the Lake Superior district and imports by countries.

Program of Metals Section of Safety Council

Industrial safety in steel plants will receive particular emphasis at a meeting of the metals section of the National Safety Council to be held in New York, Oct. 1 to 5. A review of accidents and progress in the steel industry will be given by Dr. L. W. Chaney, Bureau of Labor Statistics, Department of Commerce. J. A. Voss, safety director Central Alloy Steel Corporation, Canton, Ohio, and Mike Grady, president Stark County, Ohio, Foremen's Club will debate on the subject, "The Foreman Is Responsible for the Accidents That Occur in His Department." The debate will be followed by presentation of slides by John A. Oartel, chief of the safety bureau, Carnegie Steel Co., Pittsburgh.

"The Placement of Men, or What the Surgeon Can Do," will be the subject of a paper by Dr. A. W. Colcord, plant surgeon Clairton works, Carnegie Steel Co., and further information derived from experience in the steel plant will be offered in an address on "Safety from the Viewpoint of Supervision," by Dominic Samuels, foreman Youngstown Sheet & Tube Co., Youngstown.

R. M. Roosevelt, vice-president Eagle-Picher Lead Co., New York, will talk on "Safety from the Viewpoint of Management," and accident prevention in the foundry will be taken up in a paper on "Correction of Unsafe Practices in Foundries," by Nelson H. Kyser, safety engineer Studebaker Corporation, South Bend, Ind., and in another paper on "Developing a Safe Human Factor in Our Industries," by L. A. Hartley, director of the educational department, National Founders Association, Chicago.

A new 13-in. skelp mill to be installed at the National works, National Tube Co., McKeesport, Pa., is to be a four-high roller-bearing mill.

Automatic Furnace Control for Hardening

Rotating Hearth With Speed Varied to Suit Requirements—Gas Fuel Used for Two Heating Zones

UNIFORMITY in hardening gears and pinions has been obtained by the Automotive Gear Works, Inc., Richmond, Ind., by the installation in its heat-treating department of a gas-fired rotary furnace (by Holcroft & Co., Detroit) capable of handling 900 lb. an hour. The furnace has two heating zones the temperatures of which are held within plus or minus 10 deg. Fahr. by means of a Leeds & Northrup automatic recorder controller and a Dixon control valve.

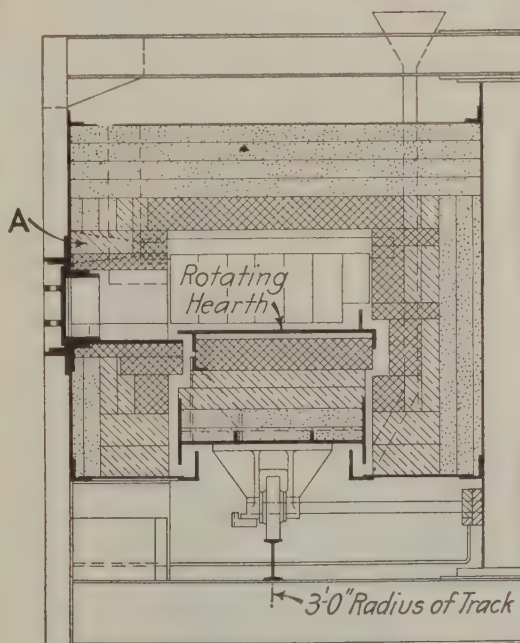
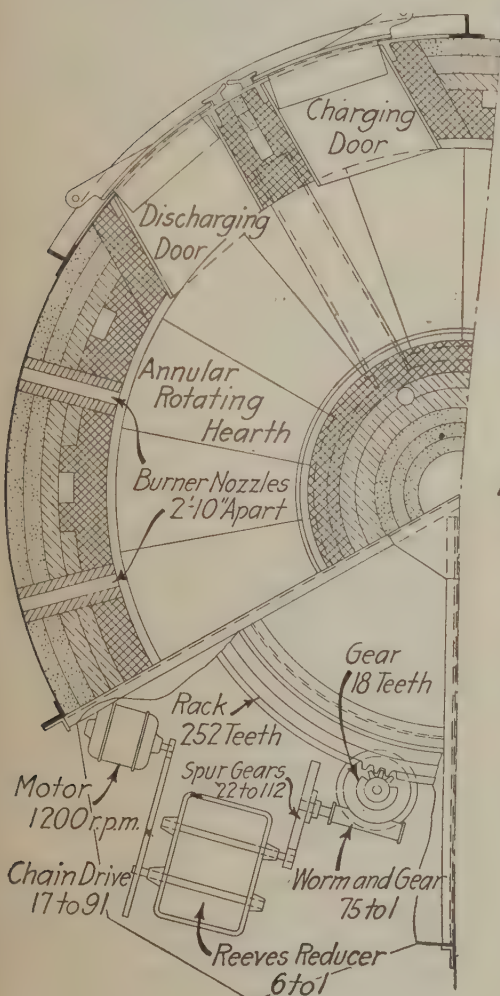
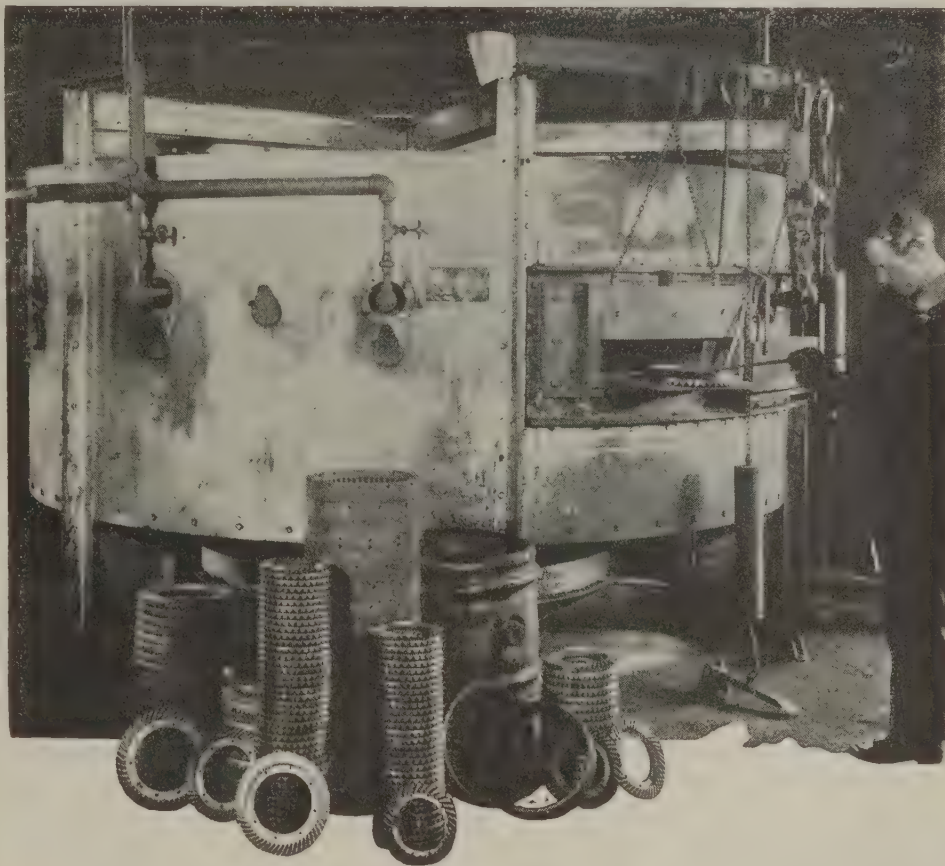
Heat is supplied by 10 McKee burners spaced at 2 ft. 10 in. apart. In addition there are two manifolds, one for each zone. Three outer flues located 35 deg. apart have been provided. The hearth is of nickel chrome alloy, the inside diameter measuring 4 ft. It is of the revolving type and is operated by a ½-hp. 3-phase 60-cycle motor running at 1200 r.p.m. and equipped with a Reeves variable speed transmission. The time required for a complete revolution of the hearth ranges from 20 min. to 2 hr. The hearth pan is made of cast iron and has bearing brackets.

On a structural steel base, the fur-

nace is lined with 4½ in. of firebrick, which is reinforced with 4½ in. of insulating calcined brick and 8 in. of natural brick. A steel plate casing ¼ in. thick forms the exterior shell. The furnace is sand-sealed to

prevent infiltration of air into it. Since a reducing atmosphere can be maintained at all times by the use of gas, the gears and pinions are free from scale when they are removed from the hearth.

To maintain the temperature within the furnace at 1600 deg. Fahr., 1.2 cu. ft. of 570 B.t.u gas suffices for each pound of work. Equipment includes an Ingersoll-Rand vertical reciprocating gas compressor with a



cylinder 8 in. in diameter, operating at 375 r.p.m. The compressor produces 2820 cu. ft. of gas an hour, delivered at 10 lb. pressure.

Tinting Metal Fence Beautifies Fountain Setting

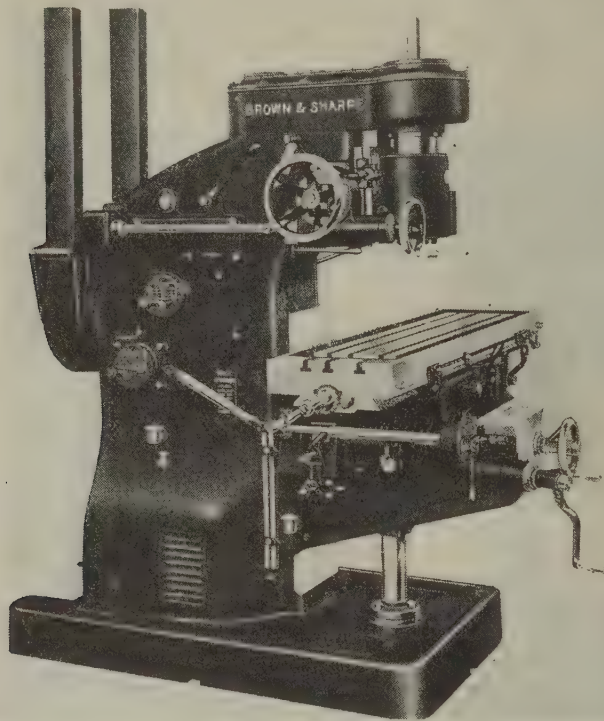
The coloring or tinting of exterior metal work has been carried out successfully on the heavy rod fence which surrounds the Buckingham Memorial Fountain in Chicago. Interior metal work has long been colored to harmonize with its surroundings, and to effect the desired color the fence was built of copperweld rod. This is a steel cored metal having a heavy layer of pure copper molten welded to it in the original ingot. A special solution was applied by brush, and successive applications were made until the desired tint was reached and the greenish color has become a part of the copper, with no tendency to flake or scale.

Half Section Through the Furnace Vertically (Right) Shows Support and Rotating Elements of the Rotating Hearth. At A is shown the relative location of one of the gas burners. The horizontal section (left) gives details of the great speed reduction from 1200 r.p.m. in the motor to 1 revolution in 143 min. Insulation and firebrick are shown sectioned. Reproduction of the photograph shows gears being fed into the furnace for hardening

New Vertical Spindle Miller

A NO. 2 vertical spindle unit has been added to the "standard" milling machine line of the Brown & Sharpe Mfg. Co., Providence. The machine is intended for both produc-

tion and tool-room work. It is all-gear driven, with anti-friction bearings from the driving pulley to the spindle and in the feed and power fast travel mechanisms. Two operating positions are provided, one at the



*Automatic
Disengage-
ment of the
Power Fast
Travel with
Engagement
of Feed Is a
Feature*

front and one at the rear of the table, with all control levers readily available from either position. Dual control is provided for feed changes and speed changes in two series are ob-

tained by means of a single lever at the side of the machine. The rates of feed or speed for which the machine is set are indicated by direct reading dials located above the control levers. Power fast travel for

longitudinal, transverse and vertical movements, operated by a single lever, is provided.

Automatic disengagement of the power fast travel with simultaneous engagement of the cutting feed, without attention on the part of the operator, is feature emphasized as making possible considerable saving in operator's time in that the work can be run up to a point close to the cutters before the cutting feed is engaged. It also prevents injury to the work and cutters through accidentally jamming the work into cutters. After the fast travel is engaged and until the cut is completed the operator is free to attend another machine.

Automatic lubrication with filtered oil is provided for all mechanisms within the column and for the driving pulley, oiling of the knee assembly being also automatic by means of a separate pump in the knee. A single oil well lubricates the saddle and table bearings. The knee elevating screw is one piece and does not extend below the base of the machine.

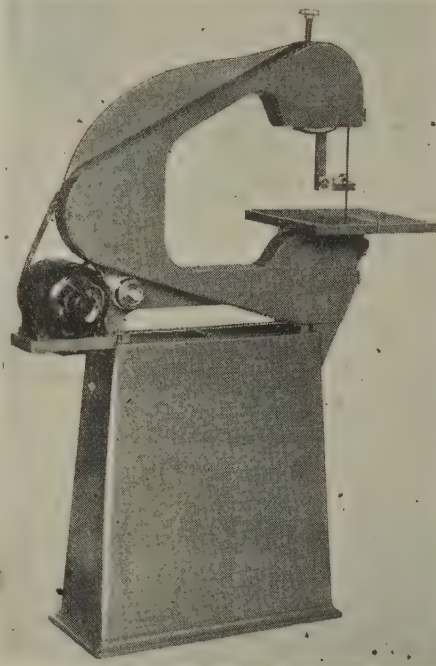
An automatic feed, which can be readily controlled from either operating position and has automatic release at any point, is provided for the spindle. The spindle has a telescoping guard and the spindle head is counterbalanced and has a micrometer stop for controlling the depth of cut. The machine is available either as belt drive, fitted for motor, or equipped with motor. When motor driven, the motor is located in a ventilated compartment in the base and drives by chain and sprocket.

Portable Band-Saw for Material Up to 7 In.

THE De Walt Products Co., Leola, Pa., has brought out the band-saw here illustrated, which is designed to provide in a portable machine the power and capacity of a stationary production band-saw. Although intended for use as an individual motor-driven unit with floor stand, the machine may be used independently of the floor stand and motor. It can be employed in connection with the company's Wonder Worker woodworking machine simply by attaching the pulley to the arbor of the Wonder Worker and swinging the arm to the rear. By replacing the V-drive pulley of the band-saw with a flat pulley, the band-saw may be driven from a line-shaft.

The capacity of the band-saw is for material 7 in. in thickness. The base of the machine carries the head casting within which is contained three tracking pulleys and the saw blade. The pulleys are of aluminum and are ball-bearing mounted. It is pointed out that the use of three tracking pulleys instead of two large pulleys to separate the two sections of a revolving saw blade has made it possible

to design a compact machine with 20-in. throat clearance between the saw blade and the frame. The saw



blade is entirely inclosed by the one hinged cover, except for 8 in. at the cutting point.

Features include a compact roller saw guide which is adjustable for various thicknesses of material up to 7 in. The table of the machine is 13½ in. square and is arranged so that it may be tilted 45 deg. to the right and 30 deg. to the left, the positioning of the table being indicated on a dial which is graduated in degrees. A stop is also provided so that the table may be brought rapidly to the exact horizontal position. The machine is driven by a ½-hp. motor through a V-belt. The weight of the machine with floor stand, complete, is 210 lb. Without the motor and floor stand the weight is 120 lb.

Substantial improvements in the plant of the Globe Steel Tubes Co., Milwaukee, are reported by the company. One tube rolling mill unit is being replaced and modern machines are being installed for piercing, rolling and reducing, all having electric drives. This involves additions to the electric power plant and some building changes.

Special Machine for Drilling and Spot-Facing Implement Parts

THE drilling and spot-facing of four holes of the same size in seven different malleable castings is accomplished on the machine illustrated which was built recently by the Millholland Sales & Engineering Co.,

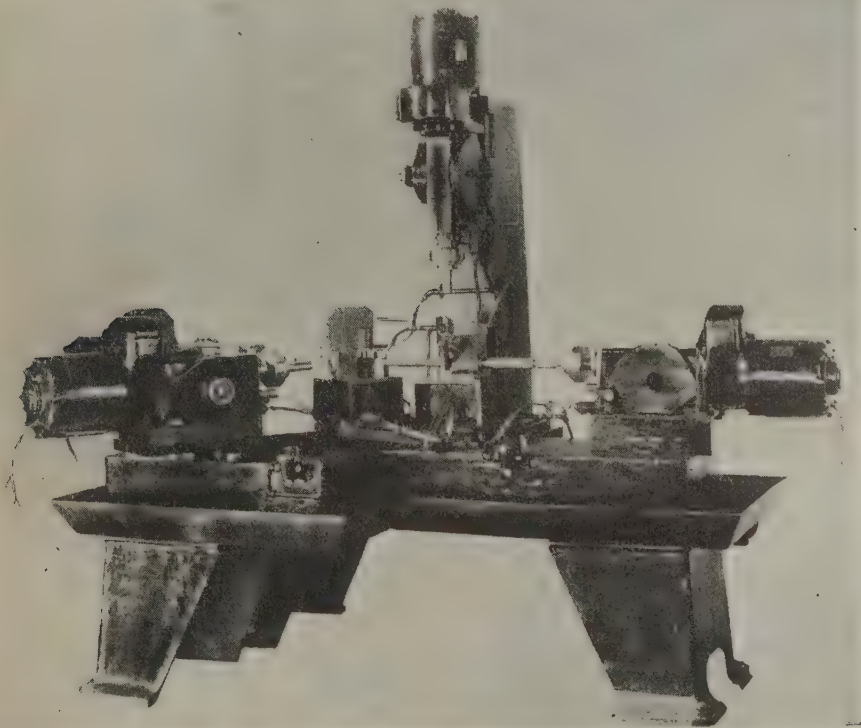
not only work of seven different sizes, but on one end of each piece two holes intersect at an angle of 45 deg., and some of the "Ys" so formed were left-hand and some were right-hand. The parts also varied in length

to a swivel plate which carried the "Y" bushing block and quick-acting work clamp. By swiveling the plate carrying the two saddles and bushing block, either right or left-hand "Y" ends can be machined. To compensate for variations in length of work the swivel plate is mounted on a false table which is located on the centerline by means of a large key sliding in a keyway cut in the bed proper. This false table is adjusted in and out by means of a handwheel and screw and is located at the proper distance from the vertical spindle centerline by a dowel pin and bolts.

Directly under the vertical spindle is a screw-type drill bushing which is also used for clamping the work. This bushing has an Acme thread, and a pinion pressed on the end of the bushing meshes with a hand clamping gear having two heavy pins in the upper face for inserting a hand lever. Rotation of the gear clamps and unclamps the work. The two air control valves are arranged at the operator's right and left hand, respectively, to avoid confusion in controlling the sequence of operations.

The automatic drill units have separate driving motors and are independent of each other. The tools used are combination-type drills and spot facers, and feed of the cutting tools is by means of a plate cam. The feed cams are designed to give drill feeds of 0.015 in. and spot-facing feed of 0.005 in. per revolution. The cam is designed so that its contour changes at the point where the spot-facer comes in contact with the work.

It is claimed that compared with former methods the machine saves three operators. Formerly each of the pieces had a separate group of vertical spindle drilling machines which were operated intermittently, these machines now being used for other work.



Seven Malleable Castings of Different Lengths Are Drilled and Spot-Faced on the One Machine

Indianapolis, for a manufacturer of agricultural implements.

The machine is made up of four of the company's automatic drill head units, mounted on a base and controlled by the compressed air valves located on the front edge of the bed. Problems of tool application involved

as much as 6 in., and the employment of a common jig and holding fixture for all parts, short, long, right and left-hand, was desired.

The intersecting holes were taken care of by arranging two individual motor-driven drill units in saddles. These saddles were doweled and bolted

Decimal Sample Weigher for Pieces Ranging from 1/10,000 to 1 Lb.

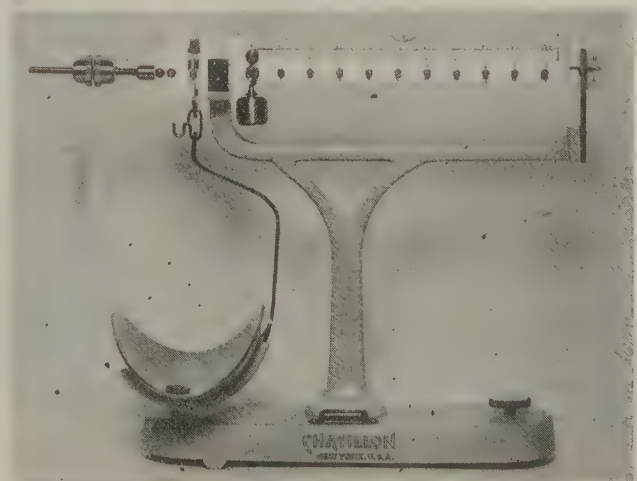
SAMPLE weighing scales of direct-reading type and arranged so that all readings are in decimal parts of a pound, thus obviating the necessity for mental calculation in converting pounds to ounces, have been brought out by John Chatillon & Sons, 89 Cliff Street, New York.

The device has capacity for weighing to one ten-thousandth part of a pound and is available with the scale calibrated either in pounds or grams. It is intended for wide application in the weighing or counting of small castings and machine parts, nails, rivets, screw machine products, stampings and numerous other pieces under 1 lb. in weight. The beam is of aluminum, with figures and graduations in black, and bearings are of polished agate. The knife-edge pivots are of tool steel, hardened and polished. A level is provided on the base, as shown in the illustration, and also

a level adjusting screw. The finish is in gray lacquer and all fittings are of brass, durably lacquered. A glass case with glass on all four sides and the top, to assure ample light, is

available. The case, also finished in gray, is equipped with a sliding front door so that it is unnecessary to remove the scale from the case when the scale is to be used.

The Setting for the Weighing of Nut, 52/10,000 Lb., Is Shown Above. The upper scale is read in ten-thousandths, the next in hundredths, and the lower in tenths of a pound

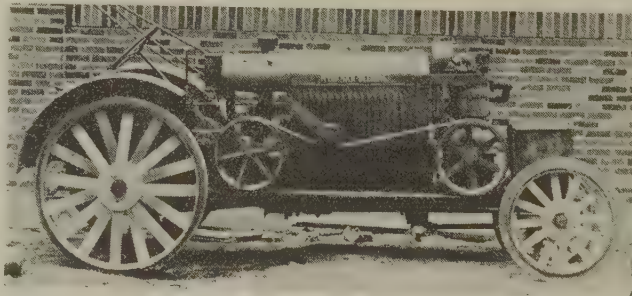


Self-Propelled Air Compressor

A SELF-PROPELLING four-wheel air compressor capable of handling heavy loads behind itself is being manufactured by the Pontiac Tractor Co., Pontiac, Mich. The com-

Penn unloader with hand unloader attachment. The compressor with air tank and tool box is mounted on a frame which attaches to either the McCormick-Deering or Fordson trac-

The Compressor Is Driven from the Tractor Engine. It has a radiator which is separate from the motive-power radiator



pressor is a Quincy type W-4, of 124 cu. ft. displacement. Features include a separate compressor radiator with pump-driven circulation; three-bearing crankshaft and force feed lubrication. The unit is controlled by a

tors. Power from the tractor to compressor is transmitted through a "power take-off" pulley and a clutch. The "ahead" drive of the belt brings the belt tightener into the correct relation with the belt.

Industrial Crane on Tractor Base

HANDLING materials by a locomotive crane, either in a factory or in a yard, is taken care of by a

front wheels are located close together. To start the engine, there is an extension rod with a hook on one



Short Turning Radius Is Provided by the Close Tread of the Small Wheels

California plant by means of a crane equipment mounted on a Fordson tractor. To permit the equipment to be turned in a very short radius, the

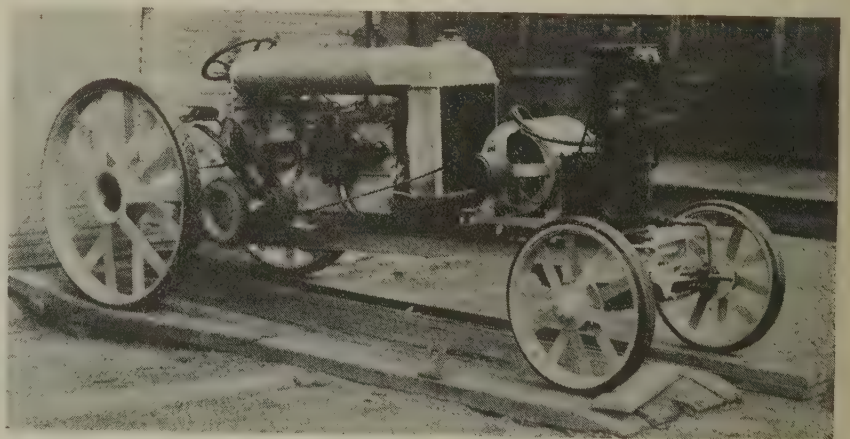
end, so that it can be hooked into the crank of the Fordson, and thus provide for cranking. Power for use in hoisting comes from the engine.

Gas Engine Driven Welders

THE Lincoln Electric Co., Cleveland, has placed on the market a 300-amp. welder (Model S-1964) direct-connected with a six-cylinder Buda gas engine, operating at 1500 r.p.m. and developing 41 b. hp. This set is entirely self-contained, and is mounted on a channel iron base, which incloses and protects the gasoline tank.

Similar electrical equipment, suitable for pipe line welding and structural fabrication, has been mounted into a self-propelled unit by the Pontiac Tractor Co., Pontiac, Mich. As shown in the view, the tractor has rubber tires (although for soft ground work crawlers are furnished and recommended) and is capable of hauling heavy loads when traveling from place to place. Similar mount-

ings are made for McCormick-Deering or Fordson tractors.



The Equipment Is Suitable for Pipe Line and Structural Welding

Foremanship Training Courses Offered at Indianapolis

TO develop and direct a systematic program of foremanship training through regular conferences of foremen in the plants of the Indianapolis members of the National Metal Trades Association and in other Indianapolis metal trades shops, the national association, in conjunction with the Indianapolis branch, will conduct a three weeks' course of daily classes, beginning Oct. 15, to train conference leaders. Each Indianapolis company employing eight or more foremen and department heads has been invited to send not more than two representatives to the classes, which will be in session 2½ hr. daily.

The classes will be conducted by A. R. Peirce, director of industrial education for the national association. The local committee in charge of this educational program consists of George P. Torrence, Link-Belt Co., chairman; Guy A. Wainwright, Diamond Chain & Mfg. Co.; Arthur R. Baxter, Keyless Lock Co.; L. C. Breunig, Vonnegut Machinery Co.; Fred Hoke, Holcomb & Hoke Mfg. Co.; V. E. McMullen, Fairbanks, Morse & Co.; Ulysses S. Leedy, Leedy Mfg. Co.; O. B. Iles, International Machine Tool Co.; Ferris T. Taylor, Dean Brothers Co., and W. D. Hamerstadt, Rockwood Mfg. Co. This committee will cooperate with the national committee headed by Louis Ruthenburg, assistant general manager General Motors Truck Corporation, Pontiac, Mich.

To discover just what the industries of the United States are doing to insure scientific handling of their traffic problems is the principal purpose of an industrial traffic management survey being made by the transportation division, Department of Commerce. Questionnaires are being distributed by the division. Present plans call for compilation of the results according to general industrial groups, among them iron and steel and hardware.

Machinery Exports Largest in 7½ Years

July Total Best Since January, 1921—Highest Record Ever
Made in Agricultural Implements

WASHINGTON, Aug. 27.—Making a gain of \$4,616,091, exports of machinery from the United States in July aggregated \$47,814,163, against \$43,098,072 in June. The increase was \$7,844,702 compared with July of last year, when the total value was \$39,969,461. For the seven months ended with July, exports of machinery were valued at \$287,579,089 in 1928, representing the large increase of \$45,658,669 over the \$241,920,420 for the corresponding period of last year. The gains in July were applicable to most lines, but were most marked in agricultural implements, which attained a record never before equaled, with a total of \$13,996,996. This was more than \$3,700,000 greater than similar exports in June and in excess of \$4,300,000 over July of last year. For the seven months ended with July, exports of agricultural implements totaled \$68,007,000, an increase of more than \$16,000,000 over the corresponding period of 1927.

Exports of industrial machinery in July, 1928, were valued at \$21,094,582, against \$20,031,155 in June, an increase of approximately \$1,060,000. In July of last year this class of

exports was valued at \$18,503,084. For the seven months ended with July, the value was \$130,313,023, against \$118,624,326 last year, an increase of almost \$12,000,000.

Exports of power-driven metal-working machinery in July were valued at \$2,562,201, compared with \$2,358,324 in June and \$1,780,313 in July of last year. For the seven months ended with July, these exports were valued at \$14,711,723, against \$10,509,046 for the corresponding period of 1927. Exports of other metal-working machinery in July were valued at \$565,100 as compared with \$512,000 in June and \$425,085 in July of last year, and for the seven months ended with July of the present year the value was \$3,535,575 compared with \$2,744,966 for the corresponding period of last year. Exports of such power-driven metal-working machinery as is listed in THE IRON AGE table was 1111 units in July, valued at \$1,734,060, against 871 units, valued at \$1,479,944, in June.

The outstanding feature of the July exports of agricultural machinery was the extremely large movement to Canada, which reached a value of \$5,958,-

603, making a total of \$29,377,201 worth of American implements which have gone to Canada during the first seven months of the year. The bulk of the Canadian purchases consisted of tractors and harvesting equipment. More than 1800 tractors were shipped to Canada during the seven months, of which 1422 were wheel tractors of from 15 to 32 hp. Other large items among the Canadian purchases were 3945 harvesters and binders, 914 combines and 552 threshers.

Decline in Imports

Imports of machinery and vehicles in July were valued at \$2,306,665, against \$2,532,494 in June and \$1,677,812 in July of last year. For the seven months ended with July the total was \$16,241,244 against \$17,009,335 for the corresponding period of last year. Imports of industrial, office and printing machinery in July were valued at \$1,516,328, against \$1,745,826 in June and \$1,052,192 in July of last year. For the seven months ended with July the value was \$9,947,108, compared with \$10,111,025 for the first seven months of 1927, a drop of 1.6 per cent.

Exports of Power-Driven Metal-Working Machinery					Machinery Exports from the United States (By Value, in Thousands of Dollars)				
					Seven Months Ended July 31				
					July				
					1928	1927	1928	1927	
					No.	Value	No.	Value	
Engine lathes	52	\$93,350	85	\$195,814	Locomotives	\$625	\$216	\$1,650	\$4,157
Turret lathes	36	103,363	43	92,788	Other steam engines.....	90	82	640	857
Other lathes	115	341,636	42	139,257	Boilers	114	113	695	1,097
Vertical boring mills and chucking machines	11	14,297	6	7,427	Accessories and parts.....	27	31	363	290
Thread-cutting and automatic screw machines	65	87,811	91	123,397	Automobile engines	1,354	837	9,347	7,973
Knee and column-type milling machines	28	74,931	47	116,260	Other internal combustion engines	876	717	4,989	3,617
Other milling machines.....	62	280,113	115	133,227	Accessories and parts.....	303	277	2,253	2,269
Gear-cutting machines	35	105,066	38	110,014	Electric locomotives	36	51	1,069	582
Vertical drilling machines.....	109	136,196	52	49,641	Other electric machinery and apparatus	805	587	4,608	4,723
Radial drilling machines.....	6	12,903	15	41,837	Excavating machinery	470	483	4,480	2,637
Other drilling machines.....	375	108,626	89	81,876	Concrete mixers	104	85	614	719
Planers and shapers.....	24	40,461	44	76,082	Road-making machinery	252	188	1,755	1,404
External cylindrical grinding machines	99	216,122	88	218,415	Elevators and elevator mach'y	477	424	2,624	2,894
Internal grinding machines...	39	85,537	56	57,672	Mining and quarrying mach'y	1,120	1,276	8,133	8,069
Metal-working tool-sharpening machines	55	33,648	60	36,237	Oil well machinery.....	1,587	1,971	8,406	11,924
Total.....	1,111	\$1,734,060	871	\$1,479,944	Pumps	754	712	4,628	3,739
					Bending and power presses...	208	128	1,124	699
					Forging machines	57	71	464	546
					Machine tools*	1,731	1,206	9,089	6,414
					Other metal-working machinery	565	425	3,536	2,745
					Textile machinery	1,094	1,069	7,924	6,258
					Sewing machines	726	781	5,198	5,456
					Shoe machinery	106	193	1,053	962
					Flour-mill and gristmill ma- chinery	46	84	277	318
					Sugar-mill machinery	340	475	2,500	1,804
					Paper and pulp-mill machinery	227	179	1,931	2,422
					Sawmill machinery	92	93	550	481
					Other woodworking machinery.	128	177	1,044	845
					Refrigerating and ice-making machinery	1,088	684	5,315	4,745
					Air compressors	660	587	4,135	3,564
					Typewriters	1,507	1,745	13,189	12,425
					Power laundry machinery.....	93	207	679	978
					Typesetting machines	435	487	2,704	2,402
					Printing presses	464	428	3,515	3,451
					Agricultural machinery and im- plements	13,996	9,666	68,007	51,914
					All other machinery and parts.	15,257	13,234	99,091	76,490
					Total.....	\$47,814	\$39,969	\$287,579	\$241,920
Total.....\$1,606,365 \$1,139,946 \$12,241,695 \$12,432,189					*Principal details in another table.				

Offers Description of Scrap

Shippers' Committee Defines Scrap Iron and Steel and Suggests Hearings for Further Consideration by Manufacturers and Carriers

ARTICLES or pieces of iron or steel that have been discarded as unfit for the uses originally intended and cannot be damaged in transportation—and are so certified in the bill of lading—are defined as scrap iron and steel in a report by a shippers' subcommittee appointed last April at the instance of the Consolidated Classification Committee. The subcommittee was appointed, following hearings in New York, Chicago and Atlanta, Ga., and a subsequent joint meeting of representatives of the carriers and shippers at Washington, to prepare a description of scrap iron and steel.

Murray N. Billings, traffic manager Illinois Steel Co., Chicago, is chairman, and the other members are H. M. DeGroat, vice-president A. M. Wood & Co., Philadelphia; H. F. Masman, National Association of Waste Material Dealers, Inc., New York; E. R. Griffith, traffic manager Sharon Steel Hoop Co., Sharon, Pa.; H. D. Rhodehouse, traffic manager Republic Iron & Steel Co., Youngstown; A. L. Dreher, traffic manager Hyman-Michaels Co., Chicago, and W. J. Hammond, traffic manager Inland Steel Co., Chicago.

The subcommittee's description of scrap, in detail, is as follows:

1-A.—Pieces or particles of iron or steel having value chiefly for remelting purposes and so certified in the bill of lading (per paragraph 1-C).

1-B.—Shipments which are an aggregate are commercially known as "scrap iron or scrap steel," and may include articles or pieces of iron or steel that have been discarded as unfit for the uses originally intended, and which cannot be damaged in transportation, and are so certified in the bill of lading (per paragraph 1-C).

1-C.—The shipper is required to certify on the bill of lading as follows: "This shipment is scrap iron or scrap steel and cannot be damaged in transportation; any articles, pieces or particles of iron or steel included therein have been discarded as unfit for the uses originally intended and the aggregate is commercially known as scrap iron or scrap steel."

.....
(Shippers Signature.)

2.—Articles, pieces or particles of iron or steel not described as required in Section 1, or articles, pieces of particles of iron or steel described as scrap iron or scrap steel but shipped without certificate as required in Section 1-C, will be subject to rate or ratings elsewhere provided therefor.

An alternate description submitted by E. R. Griffith defined scrap iron or scrap steel as "material having value chiefly for remelting purposes, which cannot be damaged in transit."

The shippers' committee suggested that the Consolidated Classification Committee set definite dates at New York, Chicago and Atlanta during the October session, so that all shippers

who desire may be heard and that greater publicity and a wider and more complete discussion may be had for the benefit of the various freight associations.

Steel Ships to Be Built Under Provisions of Mail Contracts

WASHINGTON, Sept. 1.—Under authority conferred on him by the Jones-White merchant marine act, Postmaster General New has awarded contracts for ocean mail service on seven routes on the Atlantic and Pacific Oceans. These awards will become effective Oct. 1, and will run for 10 years. The successful bidders obligate themselves to construct new vessels during the term of the contracts. The ships must be of steel and built in domestic shipyards. The materials must be purchased in the United States.

All told, the contracts just awarded will call for the construction of 17 vessels: eight of 4800 gross tons each, three of 4000 gross tons or more, four of 4000 gross tons each, one of 6000 gross tons and one of 3000 gross tons. Previously mail contracts were awarded under the Jones-White act that will call for the construction of four vessels of not less than 3000 tons each. These latter mail contracts were awarded to the Export Steamship Corporation, New York. Those just awarded went to the American Scantic Line, New York; the American West African Line, New York; the Atlantic & Caribbean Steam Navigation Co., New York; the New York & Cuba Mail Steamship Co., New York, and the States Steamship Co., Portland, Ore.

Reduction in Number of Iron and Steel Workers

Employment reports of the United States Bureau of Labor Statistics show a reduction of about 1 per cent in the number of employees in 197 establishments making iron and steel in July, as compared with the total for the same establishments in June. The drop was from 264,399 to 261,843. Payrolls for one week suffered a considerably greater decline, falling from \$8,238,688 to \$7,764,125, a loss of 5.8 per cent.

Foundry and machine shop establishments to the number of 975 showed similar but less marked declines. The drop in number of employees was from 239,545 to 239,007, and in payroll from \$7,288,821 to \$7,052,358, a loss of 3.2 per cent.

Machine tool establishments to the number of 151 showed a gain of 1.5

per cent in number of employees, but a loss of 2.6 per cent in aggregate payroll. That was the only classification of the eight in the iron and steel group that showed a gain in employees. All of the eight showed a loss in total payroll, the maximum loss having been 12.8 per cent in stove manufacturing, accompanied by a decline of 8.1 per cent in employees in that industry.

Waterborne Commerce of New England Ports

The board of engineers for rivers and harbors, War Department, has issued Port Series No. 18, constituting one of a series of 22 volumes on the ports of the United States. Prepared in cooperation with the bureau of operations of the United States Shipping Board, the report covers New Bedford and Fall River, Mass.; Providence and Newport, R. I., and New London, New Haven, Bridgeport, Norwalk and Stamford, Conn. Statistics contained in the report show that, during six recent years, the waterborne commerce of the nine ports has averaged 11,225,613 tons annually. Bridgeport surpasses the other ports in the tonnage of brass and copper, pig iron, scrap, iron and steel, and machinery and vehicles.

Concrete Steel Institute to Meet Oct. 1 to 3

The semi-annual meeting of the Concrete Reinforcing Steel Institute will be held at the Buckwood Inn, Shawnee-on-Delaware, Pa., Oct. 1 to 3. Charles J. Graham, president Bolt, Nut and Rivet Manufacturers' Association, Pittsburgh, will address the first session of the meeting on "Constructive Selling." At the morning session on Oct. 2 Walter C. Conger, vice-president Truscon Steel Co., Youngstown, will speak on "Control of Selling Costs," and Frank Burton, former city building commissioner at Detroit, will talk on "A History of Building Codes."

Other sessions of the meeting will be given over to open discussions of unusual construction jobs and concrete ribbed floor construction. A feature of the convention will be the semi-annual golf tournament. M. A. Beeman, Tribune Tower, Chicago, is secretary of the institute.

Victor A. Dorsey & Co., First National Bank Building, Chicago, have been organized to continue the business formerly conducted by Hagenah & Dorsey, consulting engineers specializing in appraisals, cost analyses, rate studies, economic surveys and investigations of public utilities. Mr. Dorsey has been associated with Mr. Hagenah as junior partner for 18 years. The latter recently severed his connection with the company to become associated with public utility interests.

This Issue in Brief

Oxy-acetylene and arc welding do not compete, but supplement each other, according to Swiss manufacturer's experience. When finished work must be uniform throughout he prefers oxy-acetylene welding, believing that the properties of the weld material then correspond closely to those of the plate.—Page 570.

* * *

Full benefits of bend test are obtained by use of new bend extensometer. Formerly quantitative results were not obtainable. New instrument measures extension of outer fibers at failure, which, when calculated against degree of curve and thickness of specimen, gives the percentage of fiber elongation.—Page 575.

* * *

Aluminum alloy found to be sufficiently strong for use in anti-aircraft gun mounts, displacing steel castings. The alloy has 6 per cent elongation, 13,000 lb. per sq. in. yield point, with 28,000 lb. per sq. in. ultimate strength. Aging consists of holding one week at 400 deg. Fahr.—Page 574.

* * *

Wage earner population comparison shows shift of industry. In quarter-century New England has gained 32 per cent, Pacific Coast 237 per cent, Middle Atlantic States 55 per cent, and East North Central group 118 per cent.—Page 574.

* * *

Will undertake to standardize gages. Manufacturers and users of gages will gain by replacing the great number of sizes and types now being manufactured by a comparatively small number of sizes, A. S. M. E. committee believes.—Page 578.

* * *

Suggests quartz take the place of antimony in calibrating pyrometers. Government physicists find that changes occurring in clear quartz at 573.3 deg. C. are so marked that it can be used as a fixed point in pyrometer calibration.—Page 570.

Study X-ray photographs of welds with care. Even if there is no fault in the weld, the photograph may show light and dark lines, owing to the fact that the cross section of a good weld can vary considerably.—Page 568.

* * *

Proposed mileage scale would disintegrate industrial centers. Increases in short-haul freight rates on iron and steel and elimination on short hauls of groups of origin and destination would make it advantageous for consumers to move as close as possible to sources of supply.—Page 612.

* * *

Hammers gas-welded pipe joints when red hot to increase strength. Edges are slightly bent inward, the joint is reinforced externally, and the reinforced weld is practically symmetrical. Steel plate fabricator then anneals the joint to improve the microstructure of the metal at the union and to eliminate residual stresses due to fabrication process.—Page 568.

* * *

Direct-current welding is easier to learn, Swiss manufacturer believes, and it does not require such special welding wire. However, alternating current uses less electrical energy.—Page 567.

* * *

Machinery exports highest in seven years. July shipments totaled close to 48 million dollars, a gain of 11 per cent over those of June, and best month since January, 1921.—Page 583.

* * *

Hardening furnace has variable-speed rotating hearth. Hearth makes a complete revolution in from 20 min. to 2 hr., depending upon the character of the work. The furnace has two heating zones. A temperature of 1600 deg. Fahr. may be maintained with 1.2 cu. ft. of 570 B.t.u. gas for each pound of work.—Page 579.

Cuts enameling costs by use of inverted U-shaped oven. Steering gear parts are suspended from racks attached to a conveyor, which travels up a grade of 70 deg. to the oven. Parts are baked for 45 min. at 500 deg. Fahr. Air flows through the oven counter to the direction of the work. Thus the finished parts are cooled by intake air, and the incoming parts preheated by what would otherwise be waste heat.—Page 573.

* * *

Consider the personal character of the welder, as well as his skill, if he is to be given important work difficult to control. In Swiss plant pieces are always taken from the work under construction and submitted to thorough tests. In addition, a number of special test pieces are constantly welded, to test the skill of a welder.—Page 569.

* * *

Scrap is defined by shippers' committee. "Pieces or particles of iron or steel having value chiefly for remelting purposes and so certified in the bill of lading . . . including articles or pieces of iron or steel which have been discarded as unfit for the uses originally intended, and which cannot be damaged in transit. . . ."—Page 584.

* * *

New credit stringency will do more harm to commercial business than it will do good in checking stock market speculation, says editorial writer. This seems to be the only cloud now gathering on our economic horizon, and none of our forecasters seems able to give a convincing explanation of what it means.—Page 586.

* * *

Pig iron daily output gained 2.1 per cent in August. Production averaged 101,180 tons a day, an advance of 2089 tons over July average. On Sept. 1 there were 183 furnaces in blast, with 98,730 gross tons daily capacity, against 185 furnaces in blast Aug. 1, with a capacity of 98,445 tons a day.—Page 590.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Labor, Income and Credit

IT will be agreed that the total national income is a function of labor. Irrespective of division between what is commonly called capital and labor, which may give each party a varying command upon goods and services, the proceeds must be expended for labor in one way or another. The landlord receives rent for the use of what is a fixation of labor of the past, but what he receives is going to be expended for future labor, unless it be converted into gold, jewels or something else representing past labor.

The national income is therefore essentially a function of the number of workers, the number of hours they work, and their efficiency in working. In 1926 the United States had about 46 million workers. We may generalize a working time of 50 hours per week and 50 weeks per year, or 2500 hours per year, which would indicate a maximum of 115 billion man-hours.

It seldom happens, however, that all of the workers are employed. A certain proportion is always idle owing to sickness, unwillingness, and inability owing to economic maladjustments or seasonal difficulties. We think of 97 per cent occupation as extraordinarily high, 95 per cent as high and satisfactory, 90 per cent as reflecting hard times, 85 per cent as the index of extraordinary depression, as in 1921. We believe that the rate of American employment in 1925-27 has been about 95 per cent. There are not, however, definite data as to this.

Assuming, nevertheless, a rate of 95 per cent of employment, the total number of work-hours may have been about 109 billion. Allowing for economic maladjustments, such as exist in the textile and bituminous coal mining industries, and seasonal idleness such as exists constitutionally in boot and shoe manufacturing, in building and construction work, etc., let us think of a total of 100 billion work-hours. If the national income of 1926 were 75 billion dollars, this would correspond with an average of 75 cents per worker per hour, or about \$1,875 per year. Probably a figuring for 1927 and the first half of 1928 would not be greatly different as to that quotient.

With this broad sketch of the creation of our national income it is easier to comprehend how it is affected by changes in fundamental conditions. Increase in population swells it automatically. Similarly does increase in percentage of employment. Likewise does increase in the degree of exertion per man per hour. Most important of all, however, may be increase in managerial efficiency, especially by the introduction of new inventions and the improvement of

organization, enabling units of production to be made with fewer workers, which is equivalent to increasing the number of workers available.

Diminishers of production, and consequently of national income, are contraction in percentage of employment, decrease in number of hours worked per year, reduction in performance per man per hour.

In each one of the foregoing respects, plus and minus, there are developments all the time. Increased population is the only factor that holds fairly steady. Percentage of employment varies from month to month and from year to year. Hours of employment also vary; but in general the trend is downward, so that what was 55 hours per week only a few years ago is now but 50, with only 40 hours' work in some trades and with the declaration of organized labor that a 40-hour week is its goal. We may also entertain the belief that managerial efficiency is constantly improving. The problem of quantitative economics is to weigh and measure these counteracting factors. We are not yet able to do this very well, wherefore there is more or less controversy and some uncertainty.

While the national income and consequently prosperity are therefore a direct function of the employment and efficiency of labor there are many causes that affect the degree. The greatest of these is the position of credit, which may be impaired by lock-up in goods as in 1920-22, or by lock-up in unproductive construction, which is much worse. At the present time we are experiencing a contraction of credit for reasons different from either of these, and indeed for reasons that we do not understand perfectly. Among the reasons, however, is clearly the surrender of a great quantity of gold to Europe. The thing that causes us concern is whether this new stringency in credit is going to be short or long, for the harm it will do to commercial business is likely to be more than the good it can do in checking stock market speculation. This seems to be the only cloud that is now gathering on our economic horizon. Unfortunately, none of our economic forecasters has been able to give us a convincing explanation of what it means.

VERY literally aircraft manufacture in the United States is an infant industry, probably the youngest in that class, yet its infancy has not prevented its participation to an increasing extent in international trade. Our exports of airplanes in the first six months of this year were 87 as against 19 in the like period of 1927—an increase of more than 350 per cent—while of aircraft engines the number exported

increased from 23 to 65. On a similar scale was the expansion in foreign demand for aircraft parts and accessories. To July 1, this year, the value of exports of these descriptions was \$527,095, as against \$189,178 for the first half of last year. Considering that this export trade is but a fraction of the remarkable domestic development in aircraft in the eventful 15 months since May, 1927, there is ample reason for an optimistic view of the future demand for light metals, special steels and alloys in the mechanism of air transport.

Tubular Goods for Oil and Gas

WHILE the oil and gas field demand for tubular goods has been disappointing in the last year and more, there is no sound basis for assuming that it will require a period of years for recovery, as has been intimated in some quarters. There are various considerations outside the point that production became excessive two years ago. Even the sharp increase in total production that came in the latter part of August should not be disconcerting, for that was due to a rise of flush production in Oklahoma, now practically at an end.

The large orders placed within the last ten weeks for line pipe for natural gas transportation brought a large tonnage to the steel industry, and there is more of this business to come. No great effect was felt by the producers of pipe and tubes, since demands for oil and gas line have lately expanded into two relatively new types. For a long time line pipe was all fire-welded pipe. Then seamless pipe made a place for itself, also electrically welded, so that now there are three producers instead of one, but steel is involved just the same.

The Bureau of Mines petroleum report for July shows substantially uniform supply, in production plus imports, for somewhat more than a year, and it shows stocks at their maximum in April, with a growing decline in the three months following.

As a matter of fact last year was not so poor a tubular goods year as common report had it during the year. Indeed, production of "oil country goods" in welded and seamless combined decreased from 1926 to 1927 by less than 1 per cent, whereas there was 8.9 per cent decrease in ordinary standard or merchant pipe. The first half of last year was fairly active in demand for oil and gas well tubular goods, the second half being poor, as has been this year to date, although some improvement has been observed recently in demand from California.

Some measure of the changing activity is furnished by statistics of the number of producing oil wells completed in seven months of four years, as follows:

1925	9,711
1926	10,139
1927	9,318
1928	6,623

It will surprise many to learn of the small average production of the oil wells of the United States. One hears of the heavy production of new wells, but little of the smaller output as they grow old, whereby new wells are constantly needed, in the long run, to maintain production, while the old wells frequently require some additional material. In 1925, the average daily production of the 306,100 oil wells in the United States was 6.5 barrels; for 1926, the figures are 318,600 wells and 6.8 barrels; for 1927, 323,300 wells and 7.7 barrels.

Last year the average in the whole State of Pennsylvania was only three-tenths of a barrel daily. The highest producers, in daily rates per well, were: Gulf Coast of Louisiana, 56.5 barrels; California, 55.9 barrels; Colorado, 51.7 barrels; Gulf Coast of Texas, 50.3 barrels.

Motives in Pension Systems

WRITING for *Industry*, the publication of the Associated Industries of Massachusetts, E. Grosvenor Plowman makes an analysis of motives governing the establishment of pension systems in manufacturing industries. The most popular old age pension method in this country, he says, has been some modification of the United States Steel Corporation's plan, which gives the employees a retirement allowance based upon the total years of service multiplied by an agreed percentage of average pay. The management has usually attempted to control the selection of those to be pensioned, at least within certain limits.

The effect of this control, the author shows, has been to introduce three distinct grounds on which pensions are now being granted. One is that of need, which "frequently has resulted in sharp discrimination between the comparatively unworthy employee who needed a pension and the comparatively unworthy employee who had saved enough to make the pension unnecessary." The second ground is the "reward basis, many employers regarding the pension as a reasonable payment to their older workers." Concerning the third reason, operating efficiency, Mr. Plowman makes this comment:

This reason for granting old age pensions is of comparatively recent origin. It was developed by the personnel managers of large corporations about four years ago. It has grown out of the intense efforts made by these companies to develop efficiency. It has been calculated that a company saved money by pensioning older workers instead of keeping them as concealed pensioners. The concealed pension often amounts to more than the actual pension. The concealed pensioner was also the cause of general reduction of speed and efficiency of an entire operation or a whole group of workers.

None of the well-established industrial pension systems, so far as we can learn, discriminates between those employees who need assistance in their old age and those who do not. The unworthy employee seldom figures, for the gaining of a place on the pension list involves long years of work and the unworthy drop by the wayside. Certainly the Steel Corporation's system makes no distinction. Everyone in the organization, high or low, is entitled to a pension if he has continued in employment up to the established age limit.

The motives behind these systems are complex. It is a combination reward for long and faithful productive service. It is an expression of desire that the veterans round out their lives in decent comfort. But there is also, as frankly expressed, the belief that a pension system is profitable to the owners, in its effect upon labor turnover, esprit de corps, and in a measure the elimination of the concealed pension, so-called.

Employers of labor long ago realized that paternalism, whether expressed or implied, is poor business in its reactions upon the self-respecting worker; that to make a success of any pension system it must be made clear to every one affected that it is established

for the good, not alone of the man who gets the pay envelope, but of the organization that pays him and reaps a profit from his labor.

Great Loss in Union-Mined Coal

FINAL statistics of coal production, by counties and use, in the State of Pennsylvania, have come from the Geological Survey. A comparison with the figures issued four years ago for the year 1923 shows remarkable changes, chiefly as a result of some fields in the State having been union. Quite significant is the change whereby the Connellsville region now makes relatively little coke, but ships a larger quantity of by-product coal. Our present references are entirely to bituminous coal, anthracite not being considered.

From 1923 to 1927 the country's total decreased 8 per cent, but that of Pennsylvania decreased 22 per cent. The manner in which the change came about is depicted by giving production of those counties which ran over 5,000,000 net tons in either year. The comparison, arranged in the sequence, by percentage, of gains and losses, is given below:

Coal Production, Pennsylvania Counties			
	1923, Net Tons	1927, Net Tons	Change, Per Cent
Greene	3,982,003	6,742,579	+69.4
Somerset	8,530,618	10,230,220	+20.0
Armstrong	5,061,732	5,618,029	+11.0
Fayette	32,165,961	30,259,320	-5.9
Indiana	10,475,299	9,414,644	-10.1
Westmoreland	25,408,870	19,825,394	-22.0
Cambria	19,751,465	14,562,378	-26.2
Clearfield	7,546,058	4,462,547	-40.8
Allegheny	20,224,239	10,348,468	-48.7
Washington	24,499,103	12,029,128	-50.9

Greene county is at the southwest corner of the

State, containing a portion of the Lower Connellsville region, while Fayette covers much of the remainder of the Connellsville region, including some of the oldest workings. The whole section has been non-union almost from time immemorial. Greene county, being largely new, had a great increase, while Fayette almost broke even, exhaustion of old mines preventing an increase. Westmoreland county, chiefly union until a few years ago, lost somewhat heavily, not so much as if the change to non-union had been more recent.

Allegheny and Washington counties, representing by far the greater portion of the Pittsburgh union district, lost heavily. Together they fell off almost precisely 50 per cent. Last year they had three months of production under the difficult conditions of the Jacksonville scale, with some open shop operation by the Pittsburgh Coal Co. In the remaining nine months they had more open shop operation by that company and the beginning of open shop operation by others. This year they are making up some of the loss. Clearfield and Cambria will make up some of their losses. Coal has grown so difficult to market that the old alignment will probably never be restored. The fields once union and now non-union can hardly have a complete recovery.

In 1923 Pennsylvania coked (beehive) at mines 23,738,340 tons of coal, chiefly in Fayette county (15,963,254 tons) and Westmoreland (5,582,979 tons). In 1927 the State coked at mines 8,444,935 tons, or a decrease of 64 per cent. Fayette dropped to 6,199,220 tons and Westmoreland to 1,789,050 tons. In total coal production Fayette lost only 5.9 per cent, the county's coal shipments increasing 55 per cent, chiefly for by-product purposes.

CORRESPONDENCE

Purchasing Agents and a "Better Price"

To the Editor:—The editorial in your issue of Aug. 23 on "Gains from Stabilized Prices" includes purchasing agents with brokers and professional speculators in opposition to stability of prices. I am sure this is unjust to a considerable percentage of your readers or subscribers, if you mean stability by lawful methods. No group has been more willing to secure proper stabilization than representative purchasing men.

Inclusion in this opposition group, although entirely wrong, is not as serious as the reason you give for the inclusion of purchasing agents in this group. If the value of purchasing agents is to be measured by their expertness to beat the quotational average, as you say, no ability would be required, as orders would go to the lowest bidder on every inquiry. Twenty-five years ago that statement might have been true, for then price and sentiments were about the only elements entering into a purchase or sales transaction. The elements entering into a purchase contract and the order of their importance are now generally accepted to be:

1. Suitability of material to requirements,
2. Availability of the material,
3. Credibility of the supplier,
4. Price.

On this basis I think you will agree that purchasing agents by their attitude have contributed very much to our

economic stability and the purchasing policy of our representative commercial organizations is very sound and practical.

G. A. RENARD.

Secretary-treasurer, National Association of
Purchasing Agents, Inc.

New York, Aug. 28.

Outdoor Recreation for Employees

The widespread development of outdoor recreation for employees is dealt with in a booklet recently brought out by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York. Attention is called to the work of the National Cash Register Co., Dayton, Ohio, which has given to the city Hills and Dales Park, of 325 acres, and provides many other recreational activities for its employees. The American Rolling Mill Co., Middletown, Ohio, developed four playgrounds which were later turned over to the city, and at present owns and maintains a 400-acre park, providing tennis courts, a golf course, a swimming pool, camping grounds and other facilities. The United States Steel Corporation, whose work in this field is well known, has provided playgrounds for children in 125 communities.

The advantages of competitive sports are set forth, particularly as developed in the Janesville, Wis., works of the Chevrolet Motor Co. and the Schenectady, N. Y., plant of the General Electric Co. Various other subjects are discussed, such as annual outings, gardening, noon-hour games, country clubs and summer camps. An appendix provides data on standard sizes of fields for various games and further information regarding programs for outings and field days is included.

Mechanical Engineers at Twin Cities

Mechanization of Iron Mines One of the Topics Discussed at St. Paul-Minneapolis Meeting

MECCHANICAL engineering in iron mining came in for special attention at the summer meeting which the American Society of Mechanical Engineers held this year, Aug. 27 to 30, inclusive. The main sessions of the meeting took place at St. Paul, at the St. Paul Hotel, but visits to points of interest, including industrial plants, were made in both Minneapolis and St. Paul. Besides the iron mining session the program provided, among others, for aeronautics, applied mechanics, apprenticeship, fuels, materials handling, power, printing and research, all under the auspices of corresponding divisions and committees of the society, and in addition a joint session with the American Society of Agricultural Engineers and a session on flour milling.

In all there were some 23 papers scheduled, a full series of social affairs for the evenings, including a banquet Wednesday, and a long list of industrial and other establishments open for conducted visits. The convention was well attended and made particularly attractive to Eastern members through a tour arranged by the society with the New York Central Lines. Some 96 thus participated in a group which traveled from Buffalo to Duluth by way of Lakes Erie, Huron and Superior, made a sortie by special train to Winnipeg, Manitoba, before reaching St. Paul and Minneapolis, and took the Duluth-Buffalo water trip for the return journey.

Among the plants visited were those of the William Bros Boiler & Mfg. Co., the Minneapolis Steel & Machinery Co., which was turning out tractors on a mass production basis of 23 to 25 daily of a moderate size and several of a large size, and the Ford Motor Co., which besides assembling motor cars and trucks was manufacturing plate glass by the continuous process and in sufficient quantity to supply the general commercial market. The tour party en route was shown through the Cadillac automobile plant at Detroit, the power plant at the Soo locks and, in part, the carbide works there of the Union Carbide & Carbon Co.; the copper country centered at Houghton, Mich., including studies of the mine hoists, the ore stamping plants and the development for recovering copper from the sands hitherto wasted, and the mines at Hibbing, Minn., particularly the Hull-Rust-Sellers-Mahoning pit, which now has an area of 875 acres, a maximum depth of 275 ft. and contains 58 miles of railroad track.

The iron mining papers were contributed by Anton Tancig, mechanical superintendent of the Shenango Furnace Co., Chisholm, Minn., who told of the almost complete mechanization of the mines on the iron range of Minnesota, and by A. C. Butterworth, electric

cal engineer, mining department, Pickands, Mather & Co., Duluth, who discussed the applications, possible as well as developed, of electric power in the Lake Superior district. Jonathan A. Noyes, district manager, Sullivan Machinery Co., and president Duluth Engineers' Club, presided at the session.

What Mechanical Devices Have Done for Railroads

The improved operations of the railroads and the industrialization of the farm were the topics of the banquet. Ralph Budd, president Great Northern Railroad, dwelt particularly on the increased efficiency with which the railroads were now handled and attributed it largely to the broad introduction of various mechanical devices. In the eight years since the railroads were returned to private control, they have spent more (some six billion dollars) than in any like period of railroad history, and this expenditure has been done with substantially no expansion in the way of new tracks. One-half of the expenditure of the eight-year period, he estimated, had gone for mechanical improvements. Through the working of the restriction of the immigration law, he pointed out also that the railroads now have a large percentage of what may be called preferred labor, and one result is that the number of ton-miles of freight moved per employee has increased since 1920 from 202,000 to 247,000. For the Great Northern itself, the ton-miles per man in 1920 was about 206,000 and in 1927, some 300,000.

Economic Farm Unit

The speaker on the farm question was Thomas D. Campbell, president Campbell Farming Corporation, Hardin, Mont., which operates a 95,000-acre farm. He argued that a guaranteed price for wheat has always proved a failure and it would again. He held that a 2000-acre farm is the economic unit, and that aggregations of land of this order will go far toward solving the farm problem. He believes that the tariff can solve the farmers' troubles without new legislation, and urged particularly that business men study the farm problem. The view is too commonly accepted that farming is essentially unprofitable, whereas, he argued, it was entitled to a dignified position and offered itself as a profitable study for the mechanical engineer; that more power could properly be used, or, in a word, that the farm should be industrialized.

Committees

The local committees proved that they had done careful planning and were especially active in caring for the needs and comfort of the visitors.

J. J. Summersby, Jr., sales manager at St. Paul for the Worthington Pump & Machinery Corporation, was the general chairman of the local executive committee. Lawrence Washington, University of Minnesota, was secretary. There were various special committees, with E. W. Ashenden, mechanical engineer William Bros Boiler & Mfg. Co., Minneapolis, chairman of the finance committee, and Paul Doty, chairman Minnesota State Board of Registration, St. Paul, chairman of the committee on technical events.

New Members, Iron and Steel Institute

Seventeen officers and others connected with American iron and steel companies are on the list for election to membership at the meeting of the (British) Iron and Steel Institute to be held on Sept. 25. The names are as follows:

James A. Farrell, president United States Steel Corporation, New York; Charles W. Heppenstall, president Heppenstall Forge & Knife Co., Pittsburgh; Harold L. Hughes, assistant to president United States Steel Corporation, New York; J. Stewart Huston, metallurgist Lukens Steel Co., Coatesville, Pa.; Hjalmar W. Johnson, general foreman blast furnaces, Illinois Steel Co., Chicago; Dr. John Johnston, director of research, United States Steel Corporation, New York; Selwyne P. Kinney, metallurgist United States Bureau of Mines, Minneapolis; Lawrence S. Marsh, manager department of inspection and metallurgy, Inland Steel Co., Chicago; William W. Scott, Jr., president Laclede Steel Co., St. Louis; Erwin Sohn, director research division, Standard Sanitary Mfg. Co., Pittsburgh; John A. Succop, chief of research, Heppenstall Forge & Knife Co., Pittsburgh; William J. Sullivan, secretary to the president United States Steel Corporation, New York; Thomas E. Taylor, European manager United States Steel Products Co., London; Thomas L. A. Taylor, manager wire department United States Steel Products Co., London; Robert C. Thompson, Bessemer superintendent, Carnegie Steel Co., Mingo Junction, Ohio; William H. Warren, general manager Lukens Steel Co., Coatesville, Pa.; Ralph H. Watson, general superintendent Homestead works, Carnegie Steel Co., Munhall, Pa.

The Ex-Cello-O Tool & Mfg. Co. is moving to its new plant on Oakman Boulevard, Detroit, where it is expected additional new machinery and equipment will enable this company to cope with a steadily growing demand for its products. A new drill bushing catalog has been issued by the company, which offers a new feature. By turning to the pages covering the hole size desired, one finds there, all in one place, all of the bushings offered in that size with dimensions, code words, etc.

Gain in August Iron Output

Daily Rate Last Month Gained 2089 Tons or 2.1

Per Cent Over July—Net Loss of
Two Furnaces

PRODUCTION of pig iron in August, from data collected largely by wire on Sept. 4, show an increase in daily rate over July but a net loss in furnaces. In most cases actual data were furnished by the producing companies.

Total August coke pig iron output was 3,136,570 gross tons or 101,180 tons per day for the 31 days as contrasted with 3,071,824 tons or 99,091 tons per day for the 31 days in July. This is an increase for August of 2089 tons or 2.1 per cent. In July there was a decrease of 3642 tons per day or 3.2 per cent. The August daily rate last year was 95,073 tons,

which was a decline from July of that year of 126 tons per day. Thus August this year showed an increase over July while last year there was a decrease.

Capacity Active on Sept. 1

There were 183 furnaces active on Sept. 1, with an estimated operating rate of 98,730 tons per day. This compares with an operating rate of 98,445 tons per day for the 185 furnaces active on Aug. 1. The apparent contradiction of a slightly higher operating rate for the 183 furnaces than for the 185 furnaces is probably due to the fact that some large steel pro-

ducing companies drove their furnaces very hard during the month.

Of the seven furnaces blown in, one was a Steel Corporation stack, with the remaining six equally distributed between independent steel making companies and merchant furnaces. Four Steel Corporation stacks, three independent steel company furnaces and two merchant stacks were shut down. This is a net loss of three furnaces for the Steel Corporation and a gain of one merchant furnace.

Steel and Merchant Iron

Steel-making iron in August was made at the rate of 82,642 tons per

Daily Average Production of Coke Pig Iron in the United States
by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May.	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year....	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,978	95,199	99,091
Aug.	60,875	87,241	103,241	95,073	101,180
Sept.	68,442	90,873	104,543	92,498	.....
Oct.	79,907	97,528	107,553	89,810	.....
Nov.	83,656	100,767	107,890	88,279	.....
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107,043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	August (31 days)	July (31 days)	June (30 days)	May (31 days)
New York and Mass.	183,399	192,126	199,045	212,333
Lehigh Valley	72,648	64,921	60,640	77,195
Schuylkill Valley	52,231	53,855	52,434	53,162
Lower Susq. and Lebanon Valleys	33,153	30,079	29,207	32,019
Pittsburgh district	623,471	586,923	606,223	700,880
Shenango Valley	86,691	88,366	101,543	114,779
Western Pennsylvania ..	138,253	120,389	117,833	126,790
Maryland, Va. and Ky. ...	112,555	111,741	116,691	100,508
Wheeling district	157,507	154,636	145,717	124,948
Mahoning Valley	307,547	287,688	291,174	309,842
Central and North'n Ohio	376,706	379,277	349,952	357,900
Southern Ohio	46,367	44,339	40,810	26,380
Illinois and Indiana	625,452	636,961	635,201	694,636
Mich., Minn., Mo., Wis., Colo. and Utah	113,737	122,875	127,085	137,987
Alabama	188,896	189,383	200,643	207,045
Tennessee	7,957	8,265	7,802	7,452
Total	3,136,570	3,071,824	3,082,000	3,283,856

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
August, 1927	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931
June	81,630	21,103	102,733
July	79,513	19,578	99,091
August	82,642	18,538	101,180

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

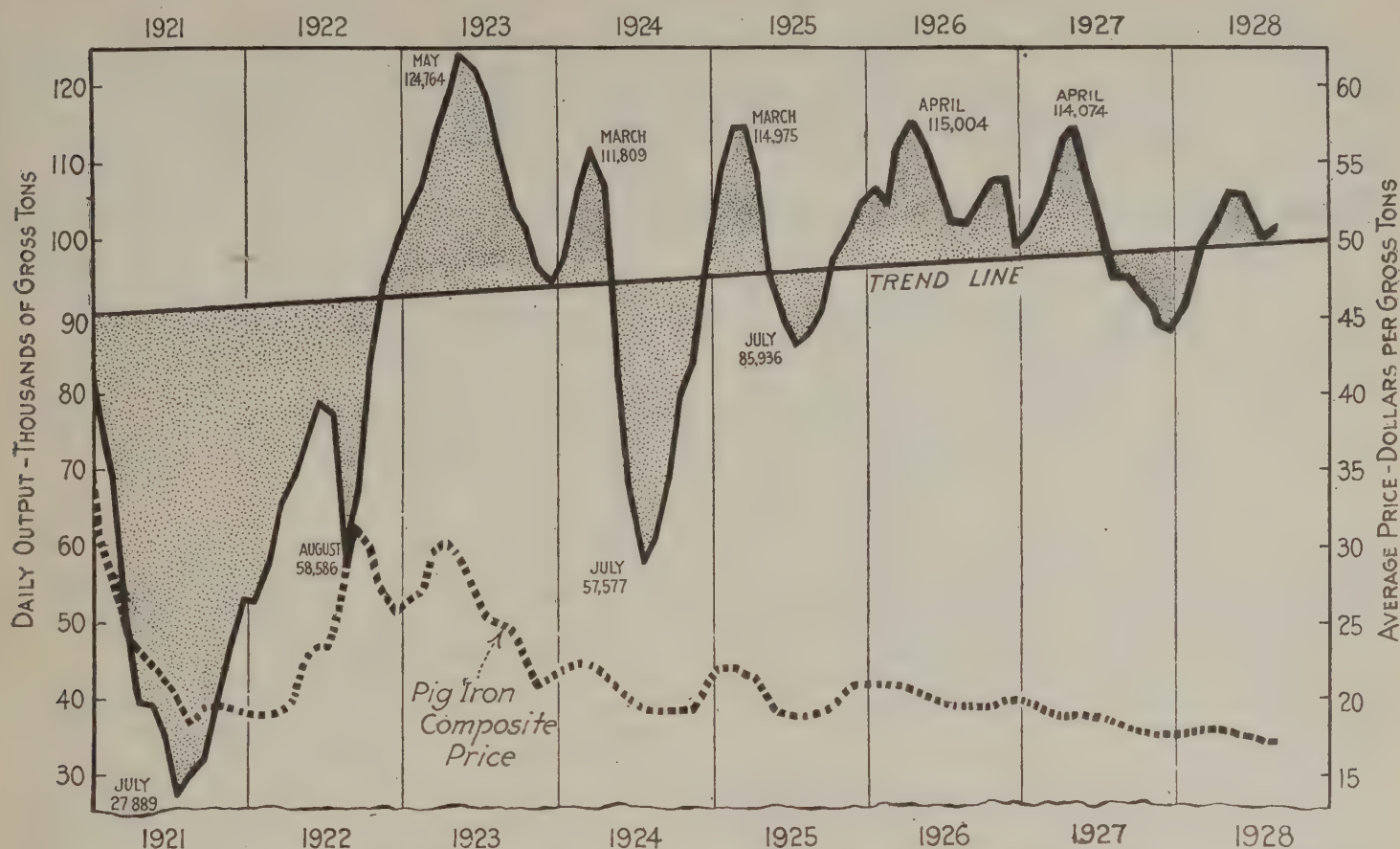
	Sept. 1		Aug. 1	
Furnaces	Number in Blast	Capacity per Day	Number in Blast	Capacity per Day
New York:				
Buffalo	10	5,380	9	5,000
Other N. Y. and Mass.	2	835	2	825
New Jersey	0	.....	0	.....
Pennsylvania:				
Lehigh Valley	6	2,350*	6	2,460*
Schuylkill Valley	4	1,685	4	1,730
Susquehanna Valley	2	990	2	910
Ferromanganese	0	.....	0	.....
Lebanon Valley	0	.....	0	.....
Ferromanganese	1	75	1	60
Pittsburgh District	31	19,190	30	18,600
Ferromanganese	2	300	3	465
Shenango Valley	5	2,780	5	2,750
Western Pennsylvania ..	9	4,300	7	3,660
Ferromanganese	1	180	2	370
Maryland	5	2,620	5	2,610
Wheeling District	8	5,070	8	4,970
Ohio:				
Mahoning Valley	17	9,650	16	9,250
Central and Northern	18	11,700	20	12,340
Southern	4	1,490	4	1,410
Illinois and Indiana	28	19,660	29	19,900
Mich., Wis. and Minn.	5	2,170	5	2,150
Colo., Mo. and Utah	3	1,150	4	1,650
The South:				
Virginia	1	220	1	150
Ferromanganese	1	80	1	85
Kentucky	2	680	2	725
Alabama	15	5,840	16	6,030
Ferromanganese	1	70	1	80
Tennessee	2	255	2	265
Total	183	98,730	185	98,445

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months,
Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	3,082,000
½ year....	19,848,461	19,430,678	18,520,921
July	3,223,338	2,951,160	3,071,824
Aug.	3,200,479	2,947,276	3,136,570
Sept.	3,136,293	2,774,949	.....
Oct.	3,334,132	2,784,112	.....
Nov.	3,236,707	2,648,376	.....
Dec.	3,091,060	2,695,755	.....
Year*	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in August Was 2.1 Per Cent More Than in July; Composite Prices Substantially Unchanged
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

day as compared with 79,513 tons per day in July, a gain of nearly 4 per cent. Merchant iron in August was produced at the rate of 18,538 tons per day as compared with 19,578 tons per day in July, a loss of 1040 tons per day.

Furnaces Blown In and Out

During August the following furnaces were blown in: One Susquehanna stack of the Hanna Furnace Co. in the Buffalo district; one Bethlehem furnace of the Bethlehem Steel Co. in the Lehigh Valley; one Monongahela stack of the National Tube Co. in the Pittsburgh district; one Cambria stack of the Bethlehem Steel Co.

and the Adrian furnace in western Pennsylvania; the Grace furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley, and one Vanderbilt stack of the Woodward Iron Co. in Alabama.

Furnaces blown out or banked during the month were as follows: One Bethlehem furnace of the Bethlehem Steel Co. in the Lehigh Valley; one Isabella stack of the Carnegie Steel Co. in the Pittsburgh district; one Cambria stack of the Bethlehem Steel Co. in western Pennsylvania; one Central stack of the American Steel & Wire Co. and one Toledo furnace of Pickands, Mather & Co. in northern Ohio; one Gary furnace of the

Illinois Steel Co. in the Chicago district; one furnace of the Colorado Fuel & Iron Co. in Colorado, and one Bessemer stack of the Tennessee Coal, Iron & Railroad Co. and one Woodward stack of the Woodward Iron Co. in Alabama.

Carnegie Steel Co. Adds Strip Pickling Equipment

The Carnegie Steel Co. has added pickling, oiling and liming equipment at its McDonald, Ohio, works, and thus technically enters the ranks of strip steel manufacturers. Actually the company has long manufactured hot-rolled flat steel, but has designated its product as hoops and bands. Uses for hoops and bands have changed so materially in the past 10 years, notably in the case of hoop steel, only a small amount of which now is used for cooperage, that the only distinction between hoops and bands and strips has been that makers of the latter have been expected to be able to pickle, oil and lime their products.

The Indianapolis Chapter of the American Society for Steel Treating will open its 1928-1929 program Sept. 10 with an address on "Pyrometry" by Claude S. Gordon, president Claude S. Gordon Co., Chicago.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron, Spiegel and Ferromanganese			Ferromanganese*		
	1926	1927	1928	1926	1927	1928
Jan.	2,599,876	2,343,881	2,155,133	29,129	31,844	22,298
Feb.	2,272,150	2,256,651	2,274,880	22,309	24,560	19,320
Mar.	2,661,092	2,675,417	2,588,158	24,064	27,834	27,912
Apr.	2,677,094	2,637,919	2,555,500	24,134	24,735	18,405
May	2,687,133	2,619,078	2,652,872	23,159	28,734	29,940
June	2,465,583	2,343,409	2,448,905	25,378	29,232	32,088
½ year.....	15,362,933	14,876,355	14,675,448	148,173	166,939	149,963
July	2,461,161	2,163,101	2,464,896	26,877	26,394	32,909
Aug.	2,424,687	2,213,815	2,561,904	23,557	21,279	24,583
Sept.	2,436,733	2,090,200	.....	25,218	20,675	.....
Oct.	2,578,830	2,076,722	.....	28,473	17,710	.....
Nov.	2,484,620	1,938,043	.....	31,903	17,851	.....
Dec.	2,322,180	1,987,652	.....	31,627	20,992	.....
Year	30,071,144	27,345,888	.....	315,828	291,840	.....

*Includes output of merchant furnaces.

Iron and Steel Markets

Heavy Steel Specifications

Large Releases Against Contracts Point to Postponement
of Fourth Quarter Price Test—Pig Iron Buying
Movement Still Under Way

BUYERS of both pig iron and steel are covering their needs more liberally. To escape price advances pig iron consumers generally have been contracting for their fourth quarter requirements. Users of finished steel are accomplishing the same purpose, in a measure, by specifying heavily against expiring contracts.

In shapes, bars, plates and sheets the higher quotations announced for next quarter, together with the fixing of Sept. 10 as the closing date on releases against current contracts, have had the effect of driving in an unusually large volume of specifications. In sheets, specifying has been further stimulated by the reduction in the cash discount, which goes into effect Oct. 1.

It is beginning to appear that an earlier closing date for specifications will fail to achieve its purpose of preventing a large carryover into the next quarter. The full extent to which buyers will anticipate their forward requirements will depend on the amount of steel released for rolling in the next four days. If present indications are borne out, buyers not only will specify fully but, in some cases, will overspecify.

For sheets, as well as the heavier rolled products, there has been a rather steady increase in specifications since Aug. 1. While steel consumption may have gained in the same period, it is likely that a growing tonnage has been going into stock. At Chicago it is estimated that many consumers of sheets will be able to supply their needs from stock through October and possibly November.

A real test of price advances for fourth quarter is necessarily deferred. While there is little interest in contracts for that period, some of the large buyers who have sounded out the mills on prices are confident that business in bars, plates and shapes will be accepted at 1.95c., and possibly 1.90c., Pittsburgh, as contrasted with the announced quotation of 2c. Although a failure to achieve advances aimed at would be repeating previous experiences of the mills this year, a price of 1.90c. would be \$1 higher, and of 1.95c., \$2 a ton higher, than the prevailing contract figure for the present quarter.

In strip steel, also, announced advances for the final quarter cannot be taken at face value, since large-tonnage buyers were allowed to cover their requirements through the year at third quarter prices.

The extent to which mills may succeed in increasing prices remains in doubt, but the volume of bookings, chiefly in specifications, leaves little to be desired. Although tin plate output has shown a seasonal decline to 75 per cent of capacity, steel production as

a whole is holding its own and may possibly gain in the course of the month. In sheets the American Sheet & Tin Plate Co. had the largest August bookings and shipments since 1917.

Taking into account the rising scale of demand and production in July and August and the assured high rate of operations this month, a record third quarter steel production is looked for.

Contrasted with evidences of buying to circumvent higher prices are pressing demands for steel for early consumption, notably from automotive plants. Several Michigan motor car builders have increased production on new models and are taking more steel. The industry as a whole has set out to make 400,000 cars and trucks this month.

Rising consuming needs are seen in mounting business in machine tools. August sales were larger than in July, and some Cincinnati plants are operating at the highest rate since 1919.

Another sign of expanding industrial activity is the increasing melt of foundries, as indicated by shipments of coke and pig iron. The buying movement in pig iron is still under way, for both large and small foundries.

Sales of foundry and malleable grades at Cleveland totaled 40,000 tons, following bookings of 310,000 tons in the month of August. Buffalo reported 60,000 tons of pig iron sold, while the totals for the week at Philadelphia and Chicago were close to 50,000 tons each. At Chicago, where the market was raised to \$18, furnace, last week, another increase of 50c. a ton is an early possibility. In the Valleys advances of 25c. to 50c. a ton have not yet been tested, since there was general coverage at the previous prices.

Pig iron production in August, compiled from returns to THE IRON AGE, was 3,136,570 tons, or 101,180 tons per day, against 3,071,824 tons, or 99,091 tons per day in July—a gain of 2089 tons or 2.1 per cent in the daily rate. There was a net loss of two active furnaces in the month. However, the daily operating rate of the 183 active furnaces as of Sept. 1 is estimated at 98,730 tons, compared with 98,445 tons for the 185 stacks in blast Aug. 1, indicating a higher output per furnace. The loss in active furnaces was wholly in steel works stacks, merchant furnaces having shown a net gain of one.

Structural steel awards, at 30,000 tons, were considerably smaller than the totals of previous weeks in August.

Both of THE IRON AGE composite prices remain unchanged, that for pig iron at \$17.34 a ton and that for finished steel at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 4, 1928	Aug. 28, 1928	Aug. 7, 1928	Sept. 6, 1927
No. 2 foundry, Philadelphia....	\$20.26	\$20.26	\$20.26	\$20.26
No. 2, Valley furnace.....	16.50	16.50	16.50	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.19	20.94
No. 2, Birmingham.....	16.25	16.25	15.50	17.25
No. 2 foundry, Chicago*.....	18.00	18.00	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.00	16.00	16.00	17.25
Valley Bessemer, del'd P'gh....	18.76	18.76	18.76	19.76
Malleable, Chicago*.....	18.00	18.00	17.50	19.50
Malleable, Valley.....	17.00	17.00	17.00	17.50
Gray forge, Pittsburgh.....	18.01	18.01	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rail, Billets, Etc., Per Gross Ton:	Sept. 4, 1928	Aug. 28, 1928	Aug. 7, 1928	Sept. 6, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.24	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 4, 1928	Aug. 28, 1928	Aug. 7, 1928	Sept. 6, 1927
	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.40	3.85
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$16.00	\$16.00	\$15.00	\$15.50
Heavy melting steel, Phila.....	13.00	13.00	13.00	14.00
Heavy melting steel, Ch'go....	12.75	12.75	12.75	12.25
Carwheels, Chicago.....	12.75	12.75	12.75	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh.....	14.75	14.75	14.25	15.00
No. 1 cast, Philadelphia.....	15.50	15.50	15.50	16.00
No. 1 cast, Ch'go (net ton)....	14.25	14.25	13.50	14.75
No. 1 RR. wrot. Phila.....	13.50	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)..	11.25	11.25	10.75	11.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.75	13.25
Electrolytic copper, refinery..	14.50	14.50	14.50	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	6.27½
Zinc, New York.....	6.60	6.60	6.60	6.62½
Lead, St. Louis.....	6.22½	6.22½	6.00	6.05
Lead, New York.....	6.40	6.40	6.20	6.40
Tin (Straits), New York.....	48.00	47.50	47.87½	63.75
Antimony (Asiatic), N. Y....	10.12½	10.25	10.00	11.75

Pittsburgh

Further Heavy Steel Specifications Expected to Result From Adherence to Sept. 10 Deadline—Pig Iron Prices Advanced

PITTSBURGH, Sept. 4.—The steel market has lost little of its recent activity, either in specifications or in plant operations. New business can show some shrinkage without greatly cutting into this month's mill engagement as so much momentum has been created by last month's activity, which far outstripped that of the month before in almost all finished products. Tin plate lately has been faltering in point of demand and this week has seen some recession in mill operations, but in sheets the American Sheet & Tin Plate Co. reports last month to have been the heaviest August in point of orders and shipments in the history of the company, with the possible exception of 1917, a war year. Some additional acceleration to this month's plant activities seems likely from the firm adherence to the Sept. 10 deadline for the receipt of specifications on third quarter contracts for bars, plates, shapes and sheets.

The automobile industry has set out to make 400,000 cars and trucks this month. It is not only taking steel freely, but demands prompt deliveries.

Taking into account the rising scale of demand and production in July and August and the assured high rate of plant engagement this month, it begins to look as if the third quarter of this year would set a new high record production mark for such a period.

Strip steel makers do not appear to have been successful in their efforts to lift prices on fourth quarter business, at least not on the larger tonnages, and the fear is expressed in some quarters that sheet makers have taken a little too much business at current price to profit greatly by the higher prices named for fourth quarter tonnages. An Eastern railroad has secured what amounts to fourth quarter coverage on 25,000 tons of bars, plates and shapes at 1.90c., but

in spite of that fact local mills are preparing to set up 2c., base, early next week as the fourth quarter price.

Higher prices generally are being asked on pig iron following the recent activity. Advances announced range from 25c. to 50c. a ton.

There continues to be much tension in the scrap situation, owing to the fact that almost all melters want supplies at the same time and in recent years it usually has been necessary to rotate deliveries that all might be supplied. This condition causes strong competition among dealers for the offerings and a very firm price situation.

Pig Iron.—The recent large sales have been followed by a general advance in quotations. Most producers now want \$17, Valley furnace or Valley furnace base, for No. 2 foundry, while basic iron is held at \$16.25 to \$16.50, Bessemer, at \$17.25 to \$17.50 and malleable at \$17.25. For the most part, however, the new quotations are asking rather than sales prices. Small sales of foundry iron are reported at \$17 for the base analysis, but there are still some outstanding quotations on fairly large lots of \$16.50. Some producers have refused bids of \$16 for basic iron, but no sales have

come to light at a higher price. A price of \$17.25 is supported by only a few sales, the largest of which was 200 tons. There was one sale of 100 tons of malleable iron at \$17.25. So many of the large requirements of this district were covered in the past week or two that dependence of producers for additional tonnage is entirely upon the small melters. The higher prices now sought have not been out long enough to have been given much of a test or to have become fully established. W. P. Snyder & Co. make the August average prices of Valley basic and Bessemer iron the same as those of the month before, or \$16 and \$17 respectively.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.00 to \$16.50
Bessemer	17.00 to 17.50
Gray forge	16.25 to 16.75
No. 2 foundry	16.50 to 17.00
No. 3 foundry	16.25 to 16.75
Malleable	17.00 to 17.25
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Consumers still are specifying freely against contracts for the commonly used ferroalloys. Some of the steel companies are finding it necessary to increase their releases of ferromanganese, since the rate of steel works operations is higher than they had expected. The movement of ferrosilicon also is heavy. New business is light. Prices are unchanged.

Semi-Finished Steel.—Almost all makers of sheet bars have announced a fourth quarter price of \$33, Pittsburgh and Youngstown, but as yet nothing has been said authoritatively as to the contract price for that period on billets and slabs. It is known that several producers are dissatisfied with the present contract price of \$32 and would like to add \$1 or \$2 a ton to the price for the final quarter of the year. Delay in making an announcement as to the price is probably accounted for by the fact that the proposed chemical extras will mean higher prices for the steel for a good many strip specifications, and it is yet to be determined whether non-integrated strip manufacturers can secure sufficient advance on the finished product to enable them to pay more for the semi-finished steel. The record of many years discloses that the prices of sheet bars, billets

and slabs are governed by the prices of the finished products rather than the reverse. Some spot sales of billets, including one for Eastern shipment of 300 tons, are noted at \$33, Pittsburgh. Wire rods are being specified quite actively. Most makers have announced \$42, base, Pittsburgh or Cleveland, as the fourth quarter price.

Bars, Plates and Shapes.—Makers still report heavy specifications on third quarter contracts, and because it looks as if obligations for this quarter will have been pretty well liquidated by the end of the month, some manufacturers already have announced an intention to make 2c., base Pittsburgh, their minimum price on Sept. 10. Specifications on third quarter contracts must be in by that date or the tonnage unspecified will be cancelled. The stage is being set for a highly interesting contest. The new price means an advance of \$3 a ton over the ruling contract price for this quarter and an even steeper advance over what preferential buyers have been called upon to pay. Full specifications are likely to mean some accumulation of stocks by consumers in trying to delay paying the advance. The fact that an Eastern railroad has been covered for the remainder of the year at 1.90c. is not considered helpful to setting 2c., base, as the final quarter price.

Rails and Track Supplies.—Except for the inquiry of the Chesapeake & Ohio Railroad for 45,000 tons of standard-section rails, there is little of interest in rail and track supplies. It is expected that, as usual, the C. & O. rail business will go to Chicago mills. Spikes, bolts and tie plates are moving on old orders, but new business is very light. Light-section rails are slow.

Wire Products.—Business is making a satisfactory showing compared with this time last year, and while prices are irregular in some consuming centers in which competition converges more sharply than in others, the more general condition is of marked firmness.

Tubular Goods.—It is said here that if all the pipe line projects that have been discussed recently materialize into actual orders, they will be nearer

3000 than 1500 miles. But there are a good many pipe lines that never get beyond the conversational stage, because of the huge investment those of considerable length involve, to say nothing of the securing of rights of way and of franchises for the sale of gas in municipalities. Spang, Chalfant & Co., Inc., has taken 45 miles of 18-in. pipe for the gas line of the Memphis Natural Gas Co., which recently awarded the National Tube Co. 218 miles of the same size of pipe for the Fowler, La.-Memphis line. The former also has taken 66 miles of 10-in. seamless pipe for the Arkansas Natural Gas Co., amounting to 7600 tons. There is still a good demand for seamless casing and drill pipe from the Santa Fe Springs, Cal., field and some makers have six to eight weeks' business on their books, chiefly for that field. Welded oil country pipe is slow and fall heating demands have not yet begun to show in the demand for butt welded sizes.

Sheets.—With the exception of 1917, one of the years of the World War, August shipments of sheets by the American Sheet & Tin Plate Co. were the largest on record. The reports by independent companies, though less specific, suggest that they also enjoyed an unusually active August in shipments. The answer is found in the unusually high summer rate of operation of several of the larger consuming industries, coupled with the fact that sheets can be stocked, and many distributors and consumers have considered it an economy to do so to get the advantage of 2 per cent cash discount, which all sheet manufacturers have announced will be replaced by one of one-half of 1 per cent, effective Oct. 1 next. Higher prices recently announced appear to be in a fair way of being deferred by the willingness of mills to take more business than can be shipped this month at the prices ruling on third quarter tonnages.

Tin Plate.—Makers are beginning to reach the end of their orders for tin plate for packers' cans and some recession in mill operations already is noted. As against substantially full physical operations, or approximately 90 per cent of capacity, for the past four months, mill engagement has

THE IRON AGE Composite Prices

Finished Steel

Sept. 4, 1928, 2.348c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.348c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c.	Feb. 14;	2.314c., Jan. 3
1927	2.453c.,	Jan. 4;	2.293c., Oct. 25
1926	2.453c.,	Jan. 5;	2.403c., May 18
1925	2.560c.,	Jan. 6;	2.396c., Aug. 18
1924	2.789c.,	Jan. 15;	2.460c., Oct. 14
1923	2.824c.,	Apr. 24;	2.446c., Jan. 2

Pig Iron

Sept. 4, 1928, \$17.34 a Gross Ton

One week ago.....	\$17.34
One month ago.....	17.04
One year ago.....	18.04
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75,	Feb. 14;	\$17.04,
1927	19.71,	Jan. 4;	17.54,
1926	21.54,	Jan. 5;	19.46,
1925	22.50,	Jan. 13;	18.96,
1924	22.88,	Feb. 26;	19.21,
1923	30.86,	Mar. 20;	20.77,
			July 24
			Nov. 1
			July 13
			July 7
			Nov. 3
			Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland.....	2.04c. to 2.09c.
F.o.b. Cleveland.....	1.85c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c. to 2.08c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, stock lengths.....	1.90c.
F.o.b. Pittsburgh mills, cut lengths.....	2.15c.
F.o.b. Birmingham.....	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Bethlehem.....	2.00c. to 2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c. to 2.20c.
Bars, Cleveland.....	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.65c. to 2.85c.
Strips, Cleveland.....	2.65c. to 2.85c.
Strips, del'd Chicago.....	2.95c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.05c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.74c. to 2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.10c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.54c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 21, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20.....	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00.....	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30.....	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (¼% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.30	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel.....	0.25	3.00
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ¼ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel		Iron	
Inches	Black	Inches	Black
1½ to 2.....	45	1½ to 2.....	+11
2½ to 3.....	51	2½ to 3.....	+22
3½ to 4.....	56	3½ to 4.....	28
4½ to 5.....	60	4½ to 5.....	30
5½ to 6.....	62	5½ to 6.....	30

Lap Weld		Butt Weld	
Inches	Black	Inches	Black
2.....	55	2.....	28
2½ to 3.....	59	2½ to 3.....	26
3½ to 4.....	56	3½ to 4.....	28
4½ to 5.....	54	4½ to 5.....	26
5½ to 6.....	53	5½ to 6.....	26

Butt Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends	
Inches	Black	Inches	Black
1½ to 2.....	41	1½ to 2.....	+19
2½ to 3.....	47	2½ to 3.....	+21
3½ to 4.....	53	3½ to 4.....	28
4½ to 5.....	58	4½ to 5.....	30
5½ to 6.....	60	5½ to 6.....	30
6 to 8.....	61	6 to 8.....	30

Lap Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends	
Inches	Black	Inches	Black
2.....	53	2.....	28
2½ to 3.....	57	2½ to 3.....	29
3½ to 4.....	56	3½ to 4.....	28
4½ to 5.....	52	4½ to 5.....	21
5½ to 6.....	46	5½ to 6.....	16
6 to 8.....	44	6 to 8.....	16

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	1½ in. +18
2½ to 3 in.....	1½ to 1¾ in. +8
3 in.....	2 to 2½ in.....—2
3½ to 4 in.....	2½ to 3 in.....—7
4 to 18 in.....	3½ to 4½ in.....—9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives

Standard Commercial Seamless Boiler Tubes

Cold Drawn	Hot Rolled
1 in.....	3 in.....
1½ to 1¾ in.....	3½ to 3¾ in.....
1¾ in.....	4 in.....
2 to 2½ in.....	4½, 5 and 6 in.....
2½ to 3 in.....	

2 and 2½ in.....	40	3½ to 3¾ in.....	55
2½ and 3 in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

fallen to about 75 per cent. All indications, however, point to the year being larger than 1927 in both production and shipments. The downturn in mill operations last year occurred in July, and shipments for the year to date are equal to the production for two to three weeks later in 1927. Mill operations are likely to hold at or at worst only slightly under the present rate over much of the remainder of the year, as general line tin plate demands promise to be up to the average, and in November and December there will be some production against early 1929 requirements.

Cold-Finished Steel Bars and Shafting.—There seems to be no appreciable decline in the requirements of the automotive industry as measured by the specifications from that industry. There are too few consumers or distributors who are not covered for this quarter for new business to amount to much; consequently, the higher price announced three weeks ago has not yet become very well established as a sales price. It is expected that books will be opened for fourth quarter business soon and the impression exists that the price will be 2.20c., base Pittsburgh or Chicago.

Reinforcing Steel Bars.—Mills in this area have made a change in the mode of quoting, and on mill shipments now are naming 1.90c., base, for stock or random lengths and 2.15c. for cut lengths.

Hot-Rolled Flats.—Business is really good in strips, some makers finding August bookings to have gone as much as 35 per cent ahead of those in the month before. But the satisfaction over orders is lessened by the fact that the effort to obtain higher prices is not meeting with success. After books had been opened for fourth quarter tonnages and higher prices named, it developed that some of the large consumers had been previously covered for the remainder of

the year at the same prices that ruled in the third quarter.

Cold-Rolled Strips.—The recently announced fourth quarter price of 2.85c., base Pittsburgh, for lots of 3 tons or more appears more likely to apply on small than large-lot business. The large consumers, at least, are being given an opportunity to add some tonnage to third quarter contracts. This may partly explain the common report of good business, although it may also be due to the fact that the automobile and truck production schedules for this month call for 400,000 units, and there is a good deal of anxiety for shipments of steel, since few car builders expect sales to be as good 60 days from now as at present. Ford production is gaining and this means an increasing demand for strips and sheets, which the Ford company does not produce itself.

Bolts, Nuts and Rivets.—Demand is fairly active, but no tax upon the country's productive capacity. Prices generally are firm, but there are reports that \$2.90, base, per 100 lb. on large rivets is more of a small than a large-lot price.

Coke and Coal.—Light supplies rather than a big demand are responsible for continued firmness in spot beehive oven furnace coke prices. The price also gains some help from the fact that the demand for coke for household purposes is beginning to expand and this provides an outlet for coke that might otherwise seek an outlet for metallurgical uses. There is plenty of spot foundry coke. The coal market still is easy under abundant offerings. On account of larger demands for household coal, the supply of slack is on the increase and prices are weaker on that grade.

Old Material.—The market is very firm, but no higher than it was a week ago, except on sheet scrap and on the railroad specialties. There has been moderate buying of the latter by steel foundries, which are finding deliveries on old orders insufficient for their present needs. Rolled steel wheels have been sold at \$17.50 and dealers want the same price for couplers and knuckles and coil and leaf springs. Dealers who are short of heavy melting steel are bidding from \$15.50 to \$16.25, depending upon the destination, but none would take a new order for railroad grade at less than \$16.50, if, indeed, they would sell at that price. The awarding of the Pennsylvania Railroad scrap late this week is awaited with unusual interest, because offerings from other sources are light on account of the common impression among producers that the market has not yet gone as high as it will go. A very strong market exists in blast furnace scrap, particularly short shoveling steel turnings in the Youngstown district, where on actual deliveries of the latter \$13 to \$13.50 has been paid. Steel companies there, anxious to increase pig iron production without putting on blast furnaces, have been charging

short steel turnings and have found it necessary to go well above the market to get supplies. The September scrap list of the Norfolk & Western contains approximately 5000 gross tons. As much as \$16.75 is reported to have been paid for compressed sheets by a local steel maker who bought in Detroit. First quality heavy melting steel is so scarce that the next choice of melters is compressed sheet scrap and again the condition here is that the two grades command the same prices. The September scrap list of the Baltimore & Ohio Railroad amounts only to 7164 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$15.50 to	\$16.50
Scrap rails	15.00 to	16.00
Compressed sheet steel....	15.50 to	16.50
Bundled sheets, sides and ends	14.50 to	15.00
Cast iron carwheels.....	15.00 to	15.50
Sheet bar crops, ordinary....	16.00 to	16.50
Heavy breakable cast.....	12.25 to	12.75
No. 2 railroad wrought....	16.00 to	16.50
Heavy steel axle turnings....	14.50 to	15.00
Machine shop turnings....	10.00 to	10.50
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	17.00 to	17.50
Railr. coil and leaf springs	17.00 to	17.50
Rolled steel wheels.....	17.00 to	17.50
Low phos. billet and bloom ends	19.50 to	20.00
Low phos., mill plates.....	18.00 to	18.50
Low phos., light grade.....	17.00 to	17.50
Low phos., sheet bar crops.	18.00 to	18.50
Hvy. steel axle turnings..	14.50 to	15.00
Electric Furnace Grades:		
Low phos. punchings.....	16.50 to	17.00
Hvy. steel axle turnings..	14.50 to	15.00
Blast Furnace Grades:		
Short shoveling steel turnings	11.00 to	11.50
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	11.00 to	11.50
No. 2 busheling.....	10.50 to	11.00
Rolling Mill Grades:		
Steel car axles	18.50 to	19.00
No. 1 railroad wrought....	12.00 to	12.50
Sheet bar crops	16.50 to	17.00
Cupola Grades:		
No. 1 cast.....	14.75 to	15.25
Rails 3 ft. and under.....	16.50 to	17.00

Exports of agricultural implements from the United States in the first half of 1928 were larger than in any previous six months' period. Shipments to Canada had never been equaled in any similar period, according to the Agricultural Implements Division, Department of Commerce. Total shipments to Canada during the first six months amounted to \$23,418,598, which was 43 per cent of the shipments to all countries. Argentina was the second largest buyer.

The western Massachusetts branch of the National Metal Trades Association, the Springfield Chamber of Commerce, and the Springfield chapter of the American Society for Steel Treating have combined to make available this fall a course in the treatment of steel. The course will comprise six lectures by Professor John F. Keller, Purdue University, will be illustrated, and delivered in the assembly room of the Chamber of Commerce. The first lecture will be given Thursday evening, Sept. 6.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Back sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown			
Billets and Blooms		Slabs	Wire Rods
	<i>Per Gross Ton</i>	<i>Per Gross Ton</i>	<i>Per Gross Ton</i>
Reroiling, 4-in. and over.....	\$32.00 to \$33.00	8 in. x 2 in. and larger.....	*Common soft, base.....
Reroiling, under 4-in. to and in- cluding 1½-in.	33.00 to 34.00	Smaller than 8 in. x 2 in.....	Screw stock.....
Forging, ordinary.....	38.00		
Forging, guaranteed.....	43.00		
Sheet Bars		Skelp	
	<i>Per Gross Ton</i>	<i>Per Lb.</i>	
Open-hearth or Bessemer.....	\$32.00	Grooved	*Chicago mill base is \$43. Cleveland mill base, \$42.
		Sheared	
		Universal	

Prices of Raw Material

Ores		Ferromanganese		Fluxes and Refractories	
Lake Superior Ores, Delivered Lower Lake Ports		Per Gross Ton		Fluorspar	
	Per Gross Ton	Domestic, 80%, furnace or seab'd.....	\$105.00		Per Net Ton
Old range Bessemer, 51.50% iron.....	\$4.55	Foreign, 80%, Atlantic or Gulf port, duty paid	105.00	Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
Old range non-Bessemer, 51.50% iron.....	4.40	Spiegeleisen			
Mesabi Bessemer, 51.50% iron.....	4.40	Per Gross Ton Furnace			
Mesabi non-Bessemer, 51.50% iron.....	4.25	Domestic, 19 to 21%.....	\$33.00	No. 2 lump, Illinois and Kentucky mines..	\$18.00
High phosphorus, 51.50% iron.....	4.15	Domestic, 16 to 19%.....	32.00	Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Foreign Ore, c.i.f. Philadelphia or Baltimore		Electric Ferrosilicon			
	Per Unit	Per Gross Ton Delivered			
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.	50%	\$83.50 to \$88.50	Fire Clay	
Iron ore, Swedish, average 66% iron.....	9.25c. to 9.50c.	75%	130.00 to 140.00		Per 1000 f.o.b. Works
Manganese ore, washed, 52% manganese, from the Caucasus.....	39c.	Per Gross Ton Furnace		First Quality	Second Quality
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.	10%	\$35.00	Pennsylvania ...	\$43.00 to \$46.00
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.85 to \$11.00	11%	37.00	Maryland	43.00 to 46.00
Per Gross Ton		Bessemer Ferrosilicon			
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00	F.o.b. Jackson County, Ohio, Furnace			
	Per Lb.	Per Gross Ton			
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.	10%	\$30.00	12%	\$34.00
		11%	32.00	12%	45.00
Coke		Silvery Iron			
	Per Net Ton	F.o.b. Jackson County, Ohio, Furnace			
Furnace, f.o.b. Connellsville prompt	\$2.75	Per Gross Ton			
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25	6%	\$23.00	10%	\$28.00
Foundry, by-product, Ch'go ovens.....	8.00	7%	24.00	11%	30.00
Foundry, by-product, New England, del'd	11.00	8%	25.00	12%	32.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40	9%	26.00	Other Ferroalloys	
Foundry, Birmingham	5.00	Ferrotungsten, per lb., contained metal, del'd			
Foundry, by-products, St. Louis, f.o.b. ovens	8.00	Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....			
Foundry by-prod., del'd St. Louis..	9.00	Ferrovanadium, per lb. contained vanadium, f.o.b. furnace			
Coal		Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....			
	Per Net Ton	Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....			
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80	Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....			
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75				
Gas coal, ¾-in., f.o.b. Pa. mines..	2.00 to 2.10				
Mine run gas coal, f.o.b. Pa. mines ..	1.75 to 1.90				
Steam slack, f.o.b. W. Pa. mines..	90c. to 1.00				
Gas slack, f.o.b. W. Pa. mines.....	1.00 to 1.20				

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts		Bolts and Nuts		Small Rivets	
Per 100 Pieces		Per Cent Off List		(⅞-In. and Smaller)	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)				Per Cent Off List	
Per Cent Off List		Semi-finished hexagon nuts.....	70	F.o.b. Pittsburgh	70 and 10
Machine bolts	70	Semi-finished hexagon castellated nuts, S.A.E.....	70	F.o.b. Cleveland	70 and 10
Carriage bolts	70	Stove bolts in packages, Pittsburgh 80, 10 and 2½	70	F.o.b. Chicago	70 and 10
Lag bolts	70	Stove bolts in packages, Chicago .75, 20, 10 and 2½	70	Cap and Set Screws	
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70	Stove bolts in bulk, Pittsburgh.....	80, 10 and 5	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Hot-pressed nuts, blank or tapped, square....	70	Stove bolts in bulk, Chicago..75, 20, 10, 5 and 2½	70	Per Cent Off List	
Hot-pressed nuts, blank or tapped, hexagons..	70	Tire bolts	60, 5 and 5	Milled cap screws	80, 10 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	70	Large Rivets		Milled standard set screws, case hardened,	80 and 10
Washers*.....	6.75c. to 6.50c. per lb. off list		Base Per 100 Lb.	Milled headless set screws, cut threads.....	80
*F.o.b. Chicago, New York and Pittsburgh.		(½-In. and Larger)		Upset hex. head cap screws, U.S.S. thread,	85 and 5
†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.		F.o.b. Pittsburgh or Cleveland.....	\$2.90	Upset hex. cap screws, S.A.E. thread..	85 and 5
		F.o.b. Chicago	3.00	Upset set screws.....	80, 10 and 10
				Milled studs	70 and 5

Chicago

Steel Buying and Contract Specifications Continue at High Rate—Pig Iron Demand Increases

CHICAGO, Sept. 4.—Buyers in the Chicago district continue to issue heavy drafts against past commitments and to make liberal purchases for their needs in the near future. New sales, the bulk of which are for delivery at the earliest convenience of mills, are the largest since June 22 and compare favorably with the seven-day period ended March 23. Specifications, reflecting the more rapid pace of industry and the desire of buyers to take full advantage of present prices, are heavier than in any week since March 23. Fourth quarter purchases at a \$2 a ton advance are more numerous but are individually small and have not afforded a real test of the market. Total sales and specifications for plates, bars and shapes for August topped the aggregate for July by a fair margin.

No. 10 furnace at Gary has been banked, leaving the leading producer with 15 stacks in blast. For the district as a whole 24 steel mill furnaces out of 36 are active. Notwithstanding that furnace operation has been curtailed, ingot output remains at 80 per cent of capacity. Increased use of scrap and larger production by individual furnaces account for the apparent discrepancy between furnace output and ingot tonnage.

Building permits have declined 10 per cent in Chicago since July. Awards for the Patterson Estate Building and the plant for the United States Gypsum Co., requiring a total of 5000 tons, may be let this week.

The Chicago, Burlington & Quincy has ordered 5200 tons of rails from the Colorado Fuel & Iron Co.

Pig Iron.—The recent advance of 50c. a ton on Northern foundry iron appears to have had no retarding effect on purchasing, total bookings for the week being comparable with those of the previous seven-day period, after taking into account the Monday holiday. No. 2 iron is firm at \$18 a ton, local furnace, and it is said that another 50c. advance is in the offing. The No. 4 Iroquois furnace will be blown in Sept. 6 and the second Federal stack will be put in service as soon as repairs are completed, probably in a week or 10 days. There are now in blast the Zenith, one Federal and three Iroquois furnaces. The rising demand for pig iron and the reduced stocks in the hands of sellers are the causes underlying the increase in the rate of output. The ratio of spot sales to total sales in August was the largest for any month on record. This is a reflection of the rapid pickup in foundry operations. Total shipments in August ran 10 per cent above those of July, which was a record month.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	22.26
So'th'n No. 2 (barge and rail)	21.76
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet in new sales. Specifications are steady and prices are unchanged.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Plates.—This has been a quiet week for large sales of plates, but miscellaneous orders bulk heavy from a wide variety of users. Specifications and new orders from the car builders are light, covering only needs for small orders of new equipment and miscellaneous repair work. Shipments to pipe makers remain large and prompt delivery is being urged. Oil storage tank programs, though under way, are slow in reaching the stage where prices will be asked for plate requirements. Universal mills are moderately busy. Plate mills are engaged at close to 80 per cent of capacity. Deliveries range from two to five weeks. Prices for delivery to Oct. 1 are steady at 2c., Chicago. A few scattered orders for delivery in the last quarter have been booked at 2.10c. a lb., Chicago.

Mill prices on plates, per lb.: 2c. base Chicago.

Structural Material.—Structural awards in the last week totaled over 8000 tons. The American Bridge Co. has taken 3000 tons for a bridge across the Mississippi River at Quincy, Ill., and 1000 tons for a railroad bridge at Byron, Ill. A Milwaukee shop will fabricate 1900 tons for a new mill building for the Interstate Iron & Steel Co., Chicago, and 1300 tons for a Methodist Hospital in Indianapolis will be fabricated in an Indianapolis shop. This week has brought awards of a fair number of small jobs, serving to round out shop schedules which are overbalanced on the side of heavy tonnage orders. The pending list in this district is impressive but it is quite noticeable that many new projects are dragging. In recent weeks fabricators have raised prices from \$6 to \$8 a ton on large inquiries. In some quarters it is believed that on many projects this move has placed architects and contractors in an awkward position for the reason that asking prices by the shops are now greater than the figures used in laying these projects before the promoters. At the moment fabricators are taking a firm stand for the higher prices. Shipments are

heavy from mills to fabricators and to miscellaneous users of shapes. Deliveries range from two to five weeks. Scattered lots have been taken at 2.10c. a lb., Chicago, for delivery in the fourth quarter.

Mill prices on plain material, per lb.: 2c. base, Chicago.

Bars.—Bar mill products are in heavy demand and output averages close to 85 per cent of capacity. Deliveries of soft steel bars are slowing up under the influence of heavy specifications in recent weeks. Additions to farm implement manufacturing plants are being put in production, and steel requirements are on the increase, especially for the manufacture of tractors. Shipments to road machinery builders are steady, as this industry gives further evidence of having readjusted its plan of production, so that its need for steel is no longer influenced in any marked degree by the seasonable demand for its product. Forging plants in this district are extremely busy. Mild steel bars are firm at 2c. a lb., Chicago, for delivery prior to Oct. 1. Chicago producers have adopted the \$2 a ton advanced on alloy steel bars. Output by local mills is steady and specifications indicate a sustained rate of production well into September. Rail steel bar producers have not officially opened books for the fourth quarter, but it is generally conceded that final period contracts, if offered now, would be taken at 1.85c. a lb., Chicago Heights, which is the price unchanged that has held in the third quarter. Specifications are equal to production, which continues on a double turn basis. Rail steel reinforcing bars are drawing heaviest against mill output.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Sheets.—Specifications for sheets are unusually heavy and deliveries are lengthening, the range now being from four to five weeks on all grades. Hot mills, though scheduled full are not able to produce above 85 per cent of capacity, partly because of the character of orders and partly owing to hot weather. The holiday this week has cut output and producers expect loss of production in the first two weeks of September, during which time hot weather usually prevails. The rush for deliveries against third quarter contracts, with the resulting delays in deliveries, leaves sellers with no alternative but to send out after Oct. 1 many invoices carrying the 2 per cent discount. This practice will be followed, it is said, only on old contracts and on new business which is fully specified and on which delivery cannot be made prior to Oct. 1. Contracts made now for delivery as specified over the fourth quarter will be invoiced 30 days net or one-half of 1 per cent for cash in 10 days. Future buying is light because purchasers in taking advantage of present contracts will accumulate tonnage above immediate requirements and thus in many cases will take their

needs from stock in October and possibly in November.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Ch'go deliv'd prices.

Cast Iron Pipe.—A seasonable dullness has settled over the cast iron pipe business. Most municipalities have completed their programs for the season. Contractors who have been unusually busy during the past five months are now anxious to take extra work that will keep them occupied until cold weather. Buying for winter manufacture is still two months away and so promises nothing in the way of adding life to this market. Several railroads have taken small lots through manufacturers of water treating plants, and public utilities are finding needs for a few car lots. The American Cast Iron Pipe Co. has taken 500 tons of 6, 8 and 10-in. pipe for Highland Park, Ill. Centerline, Mich., will receive bids up to Sept. 11 on 200 tons of 6 and 8-in. pipe. Prices remain steady at \$34 to \$35, Birmingham, for 6-in. diameters and larger, or \$42.20 to \$43.20 delivered Chicago. Deliveries are improving, some sizes now being offered for prompt shipments. Stocks of pipe at foundries are a trifle smaller than a year ago at this time.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Wire Products.—Spring terms on woven wire fencing for the Southern trade were announced Sept. 3. Producers also set that date for the opening of fourth quarter books at unchanged prices. Demand for nails is of moderate proportions but fully up to expectations at this time of year. Jobbers in the South and Middle West are buying more liberally, but in the Northwest, where the harvest season is not so far advanced, business is comparatively light. The character of orders from distributors leads to the opinion that their stocks are light.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.20c. to 2.80c.
Reinforc'g bars, rail steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank.....	60
Hot-pressed nuts, hex., tap. or blank.....	60
No. 8 black ann'l'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Wire mills continue to operate at 65 per cent of capacity and at that rate are building stocks slowly. A few scattered contracts, placed this week, foretell the opening of the fall trade, which should be well under way in the next 15 days. Orders from the manufacturing trade appear not to have diminished in total volume. In fact, in a few industries requirements have increased a trifle. Prices for wire and wire products are given on page 595.

Old Material.—Prices for a number of specialties continue to move upward. Steel mills, the purchasers of heavy tonnage grades, are well covered on requirements and there is no easing in the rigidity of inspections. The short position of dealers is forcing them to pay higher prices to the railroads. At a closing this week a railroad obtained \$20.50 per gross ton on track for iron arch bars and \$16.50 per gross ton for steel angle bars. Demand for cast iron wheels is light except from small users. Malleable foundries are busy, and while not making large purchases, they are entering the market freely for current requirements. Steel mills are rejecting offers of heavy melting steel at \$13.25 a gross ton, delivered.

Prices deliv'd Chicago district consumers: Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.75 to \$13.25
Shoveling steel.....	12.75 to 13.25
Frogs, switches and guards, cut apart, and misc. rails	14.00 to 14.50
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'd steel carwheels.....	16.00 to 16.50
Railr'd tires, charg. box size.....	16.00 to 16.50
Railr'd leaf spring cut apart.....	16.00 to 16.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.25 to 14.75
Coil springs.....	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings.....	12.75 to 13.25
Low phos. punchings.....	15.00 to 15.50
Low phos. plate, 12 in. and under.....	15.00 to 15.50
Blast Furnace Grades:	
Axle turnings.....	9.75 to 10.25
Cast iron borings.....	9.50 to 10.00
Short shoveling turnings.....	9.50 to 10.00
Machine shop turnings.....	6.75 to 7.25
Rolling Mill Grades:	
Iron rails.....	14.00 to 14.50
Rerolling rails.....	15.50 to 16.00
Cupola Grades:	
Steel rails less than 3 ft.....	16.50 to 17.00
Angle bars, steel.....	15.50 to 16.00
Cast iron carwheels.....	12.75 to 13.00
Malleable Grades:	
Railroad.....	13.50 to 14.00
Agricultural.....	11.50 to 12.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heav.....	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms.....	20.00 to 20.50
Iron car axles.....	13.25 to 13.75
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	11.25 to 11.75
No. 2 railroad wrought.....	11.50 to 12.00
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth.....	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast.....	14.25 to 14.75
No. 1 railroad cast.....	13.25 to 13.75
No. 1 agricultural cast.....	12.75 to 13.25
Stove plate.....	10.75 to 11.25
Grate bars.....	12.00 to 12.50
Brake shoes.....	10.25 to 10.75
*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.	

Rails and Track Supplies.—Purchases of standard-section rails in the last week have been confined to scattered and small lots, but releases to mills are affording a steady rate of output. Rolling schedules late this summer have not given producers an opportunity to overhaul equipment, a move which usually comes at this time of the year. It is reported that several large buyers have fall rail programs well under way and in some quarters an early buying movement is expected. Orders for light rails are small in the aggregate. Shipments of track supplies are in smaller volume.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. **Per lb.:** Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—Following several weeks of light awards, over 2000 tons of reinforcing bars has been placed. Outstanding among new contracts in Chicago are 900 tons for the Sheridan Towers Building and 800 tons for a flume on Western Avenue. Awards this week are well scattered among fabricators and will serve to sustain shop operations, which were tending to taper following heavy shipments against old orders. Fresh inquiry in Chicago includes 600 tons or more each for a hotel, two apartment buildings and a store and office building. The Waltonian, a new \$5,000,000 hotel project for Chicago's north side, is being designed for reinforced concrete construction. The price situation is not clearly defined except that quotations lean toward the weak side. New contracts and fresh inquiry are shown on page 611.

Warehouse Business.—August sales have mounted well above the total for the same month a year ago. Quotations on all commodities are steady. Warehouses and jobbers of steel sheets and cold-rolled strip are closely watching efforts of mills to establish on Oct. 1 discounts of one-half of 1 per cent in 10 days instead of 2 per cent. Warehouses are considering passing this reduction in discount along to their customers.

Bolts, Nuts and Rivets.—Although definite announcement has not been made concerning fourth quarter prices, it is the general impression here that there will be no changes. Specifications are steady and the industry continues to operate at 65 per cent of capacity. Last quarter contracts may be offered to buyers the early part of next week.

Coke.—Shipments of this commodity are growing heavier as the melt of pig iron in this district expands. Prices are firm at \$8, f.o.b. local ovens, and \$8.75, delivered in the Chicago switching district.

The Interstate Commerce Commission has found justification for the cancellation of rates on car material from Chicago to the St. Louis territory, Mount Vernon, Ill., and Bettendorf, Iowa, except on carwheels and car axles. New tariffs will be published on or before Sept. 14.

Philadelphia

About 50,000 Tons of Pig Iron Bought in 10 Days—Steel Deliveries Slightly Extended

PHILADELPHIA, Sept. 4.—Pig iron has been decidedly active and total purchases of foundry and basic iron in this district during the past 10 days are estimated at 40,000 to 50,000 tons. Iron and steel scrap prices show a further upward trend, but consumers have not yet made any sizable contracts at the higher prices brokers are asking. Mill deliveries on bars, plates and sheets are becoming extended, ranging from 10 days to three weeks, contrasting with four to five-day deliveries less than a month ago. Buyers have not yet shown much interest in contracts on bars and plates for fourth quarter, but sheet mills have booked some fair tonnages covering last quarter requirements, but specified for September delivery, so that the buyer may take advantage of the present 2 per cent discount for cash in 10 days.

Pig Iron.—Practically all eastern Pennsylvania users of basic iron have covered or are about to close on tonnage estimated to be sufficient for their requirements for a large part of the next quarter. A Pottsville consumer has taken about 7500 tons, a Claymont, Del., mill about 6000 tons, a Phoenixville user about 1200 tons, a Trenton, N. J., company about 1000 tons and a Coatesville consumer is about to close on 12,000 to 15,000 tons. On these purchases the current range of \$18.75 to \$19.25 per ton, delivered, is understood to have applied. A large number of the small foundry iron users in this district, expecting advances before the end of the next quarter, have covered at least part of their requirements, buying 300, 500 and as much as 1000-ton lots for delivery in the next few months. One contract for fourth quarter called for 2500 tons of foundry iron. Furnaces are now asking \$20 per ton, base, for fourth quarter delivery, but the recent buying movement was at \$19.50 per ton and there are still outstanding quotations at this price. The Virginia producer will blow out its furnace about Sept. 21, with about 50,000 tons of iron on its yard. The blast furnace, ore mines and coal mines are included in the suspension. The Brooke furnace, Birdsboro, Pa., which has been out of blast for rebuilding, is scheduled to go into blast at the end of this month. There has been some heavy buying of low phosphorus, the Lorain Steel Co., Johnstown, Pa., closing on about 3000 tons of the copper-free grade.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X.	21.26
Basic (del'd east. Pa.)	\$18.75 to 19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	25.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Requisitions for shipments on contracts are large, and as some consumers are not fully covered for the last half, some additional buying is expected to develop before

long. The price is firm at \$105 per ton, seaboard.

Bars.—Specifications against contracts have been heavy, and for the first time in many months mills are in some instances able to close rolling schedules as far ahead as a fortnight. New business for prompt shipment is small, but quotations are developing firmness at 1.90c. per lb., Pittsburgh, which will apparently be the fourth quarter contract price, at least to preferred buyers, with 2c., Pittsburgh, the small-lot price.

Plates.—Mills are fairly well booked with tonnage and deliveries range from 10 days to two weeks, in contrast with four to five days less than a month ago. Local shipyards are bidding for the construction of two ships; one requiring 3700 tons of plates is for the W. R. Grace Steamship Co., another requiring 2500 tons is for the Di Giorgio Fruit Co. In each case the contract may be for two ships. Prices on plates are evidently firmer at 2.05c., Coatesville, although a large tonnage might bring out quotations \$1 a ton lower. For fourth quarter, 2.05c. to 2.15c., Coatesville, or 2.15c. to 2.25c., Philadelphia, are the prices considered by mills.

Shapes.—Prices still lack the strength exhibited by other products, but the volume of business is good and mills are well filled. A ship for the W. R. Grace Steamship Co. will require about 1500 tons of shapes and

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅜-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

one for the Di Giorgio Fruit Co. about 900 tons. Prices continue to range from 1.95c. to 2.05c. per lb., Pencoyd, Pa., or 2.01c. to 2.11c., delivered Philadelphia.

Sheets.—Most mills have plenty of tonnage on their books. A good volume of specifications has been received, partly on current contracts and partly on new contracts for fourth quarter requirements specified early so as to take advantage of the 2 per cent discount for cash in 10 days which expires Oct. 1. All producers have now adopted the new one-half of 1 per cent discount for cash in 10 days. For fourth quarter delivery, black sheets are quoted at 2.75c. and galvanized at 3.50c. to 3.60c. per lb., base Pittsburgh. Blue annealed sheets are firmer and for prompt or fourth quarter delivery 2c. to 2.10c., Pittsburgh, applies with most mills. While 2c. is apparently the level for the next quarter on blue annealed sheets up to 45 in. wide, which encounter competition from continuous sheets, it is suggested that on 45-in. and wider the present extra of 10c. per 100 lb. may be increased.

Warehouse Business.—Jobbers in this district have advanced prices on cold finished steel \$2 a ton to 3.45c. per lb. on rounds and hexagons and to 3.95c. per lb. on squares and flats.

Imports.—In the week ended Sept. 1, 1200 tons of pig iron arrived at this port, 800 tons from India and 400 tons from the Netherlands. Iron ore arrivals totaled 7400 tons, all from Algeria. Steel imports consisted of 422 tons of structural shapes, of which 264 tons came from Belgium, 128 tons from France and 30 tons from Germany; 1002 tons of steel bars from France and 50 tons of hoops and bands from the United Kingdom.

Old Material.—Buying by eastern Pennsylvania consumers is still light, but dealers and brokers are paying higher prices to fill contracts. Users are apparently delaying further obligations until they have received delivery on their present contracts at lower than present asking prices. Stove plate is quoted at \$11.50 to \$12 per ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
Scrap T rails	12.50
No. 2 heavy melting steel.	\$11.00 to 11.50
No. 1 railroad wrought.	13.50 to 14.50
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	11.00
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars.	11.50 to 12.00
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under.	17.50 to 18.00
Couplers and knuckles.	14.50 to 15.00
Rolled steel wheels.	14.50 to 15.00
No. 1 blast f'nace scrap.	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific)	13.00
Shafting	17.00 to 17.50
Steel axles	19.00 to 20.00
No. 1 forge fire.	11.00 to 11.50
Cast iron carwheels.	15.50 to 15.75
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling.	14.50 to 15.00

New York

Large Buyers May Get Plates, Shapes and Bars for Fourth Quarter at 1.90c.

NEW YORK, Sept. 4.—In another active week pig iron bookings by local selling offices totaled 15,000 tons. Both large and small buyers are covering at least part of their last quarter needs. Recent purchases by the American Radiator Co. for its Eastern plants total 31,000 tons. Much of the large-tonnage business was closed prior to the recent advance in prices at Buffalo. An inquiry from the Central Foundry Co. for 6000 tons for its Dundalk, Md., plant is still pending, but is expected to be closed shortly. Other business actively before the trade totals 2000 to 3000 tons. New inquiries are preponderantly for relatively small tonnages. Small foundries, accustomed to limit their purchases to spot requirements, are placing fourth quarter contracts. Although there are still a few outstanding quotations on foundry iron at \$16, base Buffalo, the minimum price on new inquiries is \$16.50 and some orders are being taken at \$17. On malleable iron, one Buffalo producer is quoting \$17.50, furnace. Eastern Pennsylvania foundry iron is also stronger, following advances of 50c. a ton announced by two producers. While rising prices have doubtless driven in considerable business, there are also evidences of increasing melt in this district. The Lorain Steel Co., Johnstown, Pa., has closed for a round tonnage of low phosphorus, and there have been other sizable purchases of that grade. A New York producer of low phosphorus contemplated shipping by rail to Albany, N. Y., and thence by barge to various Great Lakes and seaboard points.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$21.41 to \$21.91
*Buf. No. 2, del'd east.		
N. J.	19.78 to 20.28	
No. 2, del'd east. N. J.		
tidewater	19.51 to 20.01	
East Pa. No. 2 fdy., sil.	1.75 to 2.25	20.39 to 21.52
East Pa. No. 2X fdy., sil.	2.25 to 2.75	20.89 to 22.02
East Pa. No. 1X fdy., sil.	2.75 to 3.25	21.39 to 22.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Indications now point to the likelihood that large or preferential buyers of plates, shapes and bars will not be asked to pay higher than 1.90c., Pittsburgh, on fourth quarter contracts. Very little, if any, contracting has been done, but some buyers have been sounding out the mills to learn their attitude in view of the frequent reports that 2c. is to be the fourth quarter price. It is probable that the smaller buyers will be asked to pay 2c., or a \$2 a ton premium, but as similar efforts in the past have not been wholly successful the outcome of the present undertaking will be watched with interest. The uppermost topic

of discussion between buyers and sellers this week is not fourth quarter prices, however, but the Sept. 10 closing date for specifications against third quarter contracts. Not all steel companies inserted this clause in their

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter hard.....	
Hoops.....	5.15c. to 5.40c.
Bands.....	4.50c.
Blue ann'd sheets (No. 10).....	4.00c.
Long terme sheets (No. 24).....	3.85c. to 3.90c.
Standard tool steel.....	5.60c. to 5.80c.
Wire, black annealed.....	12.00c.
Wire, galv. annealed.....	4.50c.
Tire steel, 1½ x ½ in. and larger.....	5.15c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.30c.
Open-hearth spring steel, bases.....	3.65c.
Machine bolts, cut thread:	4.50c. to 7.00c.
¾ x 6 in. and smaller.....	Per Cent Off List
1 x 30 in. and smaller.....	60
Carriage bolts, cut thread:	50 to 50 and 10
½ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—		
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass		Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

contracts, but those that did so are engaged in urging customers to get in specifications before the final date and are giving notice that all unspecified tonnage will be cancelled. The effect of this is expected to be very heavy specifications this week and the early part or next week. Some buyers probably will overspecify against their contracts, in which case the mills may have sufficient tonnage on their books to carry them well into October. There has been a fairly steady increase in the volume of specifications since Aug. 1. In keeping with higher asking prices for structural shapes, fabricated steel prices are working toward higher levels. In some quarters it is expected that the money situation may have a tendency to curb building operations. The total of building awards for the first eight months of the year was 8 per cent ahead of the corresponding period of 1927, but in August there was a falling off of 11 per cent compared with the figure for August, 1927. New construction contemplated but for which no awards have been made increased slightly during the last week of August. The principal structural steel awards of the week were 6200 tons for the Pennsylvania-Lehigh Valley railroad bridge over Newark Bay and 4500 tons for an office building at Herald Square, New York.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Reinforcing Bars.—No sizeable awards have been reported during the last week, but the volume of small orders continued satisfactory. A large aggregate tonnage is pending, and among the large projects which have come out recently are a plant for the Brooklyn Ash Removal Co., Inc., in Brooklyn, requiring 500 tons, and a Packard automobile service station in Manhattan, which will take a considerable tonnage. Prices are unchanged, but the Pittsburgh mill warehouse price of 2.15c. per lb. is expected to be advanced \$2 a ton in the near future.

Cast Iron Pipe.—Business has not been active during the last week, but there is considerable work in prospect. Bids have been taken on 150 tons of 4 to 8-in. Class C pipe for Camp Devens, Ayer, Mass. Southern makers continue to quote \$34 to \$35 per ton, Birmingham, but these prices are too high to compete with Northern producers, who are quoting about \$37.60 per ton, delivered New York, and occasionally lower.

Prices per net ton, deliv'd New York: Water pipe 6-in. and larger, \$35.60 to \$37.60; 4-in. and 5-in., \$40.60 to \$42.60; 3-in., \$50.60 to \$52.60; Class A and gas pipe, \$4 to \$5 extra.

Sheets.—The fact that the reduction of the cash discount from 2 per cent to one-half of 1 per cent goes into effect Oct. 1, together with the clause in many sheet contracts requiring buyers to specify third quarter tonnage in full by Sept. 10, is expected to bring heavy specifications to local selling offices this week. On some full-finished sheets, such as metal furni-

ture sheets, the mills cannot promise deliveries before October, and in such cases contract buyers will get the 2 per cent discount regardless of the time shipment is made. On new business, however, which cannot be produced or shipped this month, the new discount rate will apply. Ordinary sheets can be shipped by most mills in two weeks, but deliveries of three to five weeks are quoted on the special finishes.

Warehouse Business.—Effective Sept. 1, jobbers in this district advanced cold finished shafting and screw stock 10c. per 100 lb. to 3.50c. per lb., base, for rounds and hexagons and 4c., base, for flats and squares. Business has been increasing, particularly in black and galvanized sheets, orders for which are larger and more numerous.

Coke.—Furnace coke prices continue to show strength and this tendency is reflected to a somewhat lesser degree in foundry coke. A healthy increase in demand is noted and it is sometimes difficult to get spot shipments when desired. Furnace coke is quoted at \$2.75 to \$3 per ton, Connellsville, and the standard foundry grade at \$2.75. Special brands of foundry coke are firm at \$4.85 per net ton, ovens, and delivered prices are \$8.56 per ton, to northern New Jersey, Jersey City and Newark, and \$9.44, to New York and Brooklyn. By-product foundry coke prices are unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Prices of all grades still show a strong upward tendency. Dealers and brokers are buying material at advances to cover old contracts and to add to stocks in the belief that a generally higher market level is de-

veloping. No. 1 heavy melting steel is still being bought at \$13 per ton, delivered eastern Pennsylvania, or \$10.35 per ton, New York, but for shipment to Weirton, W. Va., and Butler, Pa., some brokers are offering up to \$10.70 per ton, New York, to which is added a \$5.30 per ton freight rate to destination. Yard grade of heavy melting steel ranges from \$10.75 per ton, delivered to a Pottsville, Pa., consumer, to \$11.75 per ton, delivered to Harrisburg, Pa. Eastern Pennsylvania users of heavy melting steel are reported to have offered to buy additional tonnage at \$13 per ton, but brokers are not inclined to enter into contracts at this price in view of the increasing strength of all grades. Specification pipe is now being bought by brokers at \$13.50 per ton, delivered Lebanon, Pa., a further advance of 50c. per ton. Machine shop turnings have also been increased 50c. a ton.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$10.35 to \$10.75
Heavy melting steel (yard)	7.25 to 8.00
No. 1 hvy. breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.25
Locomotive grate bars	7.75 to 8.25
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	6.50 to 7.00
Cast borings (blast furn. or steel works)	6.00 to 6.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles	16.00 to 16.50
Iron car axles	23.50 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25 to 9.75
Forge fire	6.75 to 7.25
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrot., long	8.00 to 8.50
Rails for rolling	10.50 to 11.00
Cast iron car wheels	12.00 to 12.50
Stove plate (foundry)	8.75 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	\$15.50 to \$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.)	13.50 to 14.00
cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

and inquiries having declined. However, Cleveland interests sold 40,000 tons in foundry and malleable iron during the week. Sales by these interests in August aggregated 310,000 tons. Considerable business was also taken during the early days of the buying movement in July. Sales in the past week included fewer large lots than during the few previous weeks. Most buyers are now covered for the remainder of the year. The tone of the market is very firm. Local prices are definitely established by several sales at the recent advance in prices to \$17 for foundry and malleable iron for outside shipment. One Lake furnace that recently advanced to \$17.50 is now getting \$18 for shipment to points where it has a freight advantage. In the Valley district prices are firmer. It is claimed that no more Valley foundry iron is available at \$16.50 and not much at \$16.75, the more common price being \$17. In Michigan, the price is unchanged at \$18, furnace. A Valley producer is attempting to get better prices for low phosphorus iron and sold 250 tons in the Pittsburgh district at \$27, a 50c. a ton advance. A 1000-ton lot in Chicago went to another producer. A Tennessee furnace has advanced Southern foundry iron 25c. a ton, putting it on the same \$16.25 basis as Alabama iron. The Lake steamer Henry Cort, which sailed from Cleveland last week with 3300 tons of pig iron for Milwaukee, went ashore during the trip, but it is believed that most or all of the cargo can be salvaged. The American Steel & Wire Co., Cleveland, blew out one Central furnace during the week.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.00
S'th'n fdy., sil.	1.75 to 2.25	22.25
Malleable		18.00
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace	\$16.00 to	16.50
Stand. low phos., V'ley fur.	26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Shipments of Lake Superior ore were larger in August than during any previous month this year. The Lake movement last month amounted to 9,252,869 tons, an increase of 467,376 tons over that of the same month last year. Shipments to Sept. 1 were 32,517,693 tons, or 2,636,223 tons less than during the corresponding period last year.

Sheets.—Specifications have increased somewhat from the automotive industry and from other consumers. Mills are being crowded for

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.40c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Cleveland

Steel Specifications Continue in Heavy Volume—Pig Iron Buying Movement Is Declining

CLEVELAND, Sept. 4.—Specifications for finished steel continue to come out in heavy volume. According to present indications a majority of third quarter contracts for steel bars, plates and shapes will be specified in full by Sept. 10, the last day that some mills will accept specifications for the current quarter. While some of the orders evidently are in anticipation of higher prices, most of the tonnage seems to be wanted for early consumption. New business is light. For current orders, the market is now well established at 1.90c., Pittsburgh, for steel bars and structural material. Plates are still available at 1.85c. Local mill prices on steel bars range from 1.85c. to 1.90c. Consumers are showing no interest in fourth quarter contracts. While outside mills have named 2c., Pittsburgh, as their price for that delivery for steel bars, plates and shapes, there is some belief that the market may become es-

tablished at 1.95c. for round lots with 2c. for small lots, or a \$2 a ton advance over the present quarter. Several of the Michigan automobile manufacturers have increased production on new models and are taking steel more liberally than a month ago. Activity in the building field has declined, there having been no awards or inquiries of any size during the week. A Detroit fabricator has taken an order for the erection of a factory building at Sao Paulo, Brazil, for the Fisher Body Corporation.

Semi-Finished Steel.—A local mill is quoting sheet bars, billets and slabs at \$33, Cleveland, for the fourth quarter. A Youngstown producer has named the same price at Youngstown. However, the market has not yet been tested by any sales. Specifications still tax the capacity of the local producer.

Pig Iron.—The buying movement appears to have passed its peak, sales

shipments of auto body sheets and some cannot promise deliveries before the middle of October. As consumers are showing no interest yet in fourth quarter contracts, there has been no test of the higher prices named for that delivery. For current orders, prices are unchanged at a minimum of 2.65c., Valley, for black, 3.40c. for galvanized and 1.90c., Pittsburgh, for blue annealed.

Strip Steel.—Irregularities that have existed in prices on hot-rolled strip will continue during the fourth quarter. Most producers are naming to their regular trade for the fourth quarter the prices that prevailed during the present and second quarters and contracts are being closed on that basis, or a maximum of 1.85c., Pittsburgh, for strip 6 to 12-in. wide. To other buyers the higher prices recently named are being quoted. Specifications are heavy. Most producers have named 2.85c., Cleveland, on cold-rolled strip for the last quarter. However, the market has not yet been tested and there is some indication that 2.75c. may be named for round lots. Fender stock has been advanced \$3 a ton to 4.25c. for No. 20 gage. Buyers are not yet showing interest in contracts.

Reinforcing Bars.—Inquiry is light, being confined to small lots. Warehouse prices on billet steel bars are irregular, 2.25c. being the usual maximum. Rail steel bars are unchanged at 1.75c., mill.

Wire Products.—Specifications are fairly good, but there is not much new business. Wire is firm at 2.40c., Cleveland. Some shading to \$2.50 per keg on nails is still reported.

Warehouse Business.—Orders for steel bars, plates and structural material are somewhat more numerous and for larger quantities than recently. This is evidently due partly to the fact that mill deliveries are slower than a few weeks ago. Prices are being well maintained.

Coke.—New demand for foundry coke is very slow, as most consumers are under contract. Prices are unchanged at \$3.50 to \$4.85, ovens, for standard Connellsville foundry coke and \$7.75, Painesville, for Ohio by-product coke. There is a moderate movement in domestic by-product coke, which a local producer quotes at \$6, Cleveland, for egg and \$5.50 for nut sizes.

Old Material.—The market has a slightly easier tone, but is holding firmly at the price levels of the past week. Attempts were made during the week to boost prices further, but met with success in only a few cases. Some No. 1 heavy melting steel was sold at as high as \$14.50 and blast furnace scrap at \$10.50. However, dealers having orders to fill have balked at paying further advances and sellers have come down at least 25c. a ton in their asking prices. Some of the mills that have been taking heavy shipments have notified their sources of supply that they will again regulate shipments, and this action is perhaps having some effect in prevent-

ing further advances in prices. Quotations are unchanged, the higher prices in the price table generally representing the dealers' market today.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.25 to	\$13.75
No. 2 heavy melting steel.	12.75 to	13.00
Compressed sheet steel....	12.50 to	13.00
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	11.50 to	12.00
Machine shop turnings....	7.75 to	8.25
No. 1 railroad wrought....	11.50 to	12.00
No. 2 railroad wrought....	13.50 to	13.75
No. 1 busheling	10.50 to	11.00
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops....	16.00 to	16.50
Low phos., billet, bloom and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	9.75 to	10.00
Mixed bor'gs and short turn'gs	9.75 to	10.00
No. 2 busheling	9.75 to	10.00
Cupola Grades		
No. 1 cast.....	16.00 to	16.50
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling.....	16.25 to	16.50

Youngstown Valley Mills Maintain 80 Per Cent Operating Rate

YOUNGSTOWN, Sept. 4.—Sentiment is cheerful among steel makers in this district, because orders and specifications still are sufficient to sustain an 80 per cent of capacity ingot production. The interesting feature of the market is that, while outward movement of finished products is heavy, there is enough new business to keep order books comparatively full, and, except in tin plate, there is enough business in sight to warrant the expectation that September will be another month of high rolling mill engagement. The decline in tin plate business is purely seasonal and rarely fails to develop at this time of the year, when the can makers usually have completed their orders for containers for perishable foods.

Sheet business still is heavy, new commitments being about even with completed obligations. Buyers seem disposed to lay in stocks in anticipation of the lower cash discount which all manufacturers will allow on invoices dated on and after Oct. 1, next. An important sheet manufacturer was at first disposed to refrain from going along with the movement to reduce the discount has in the past few days announced that it will cut the discount. Little business is being booked at the fourth quarter prices announced two weeks ago, and there is a fear in some quarters that more orders are being taken at prices \$2 a ton or more below fourth quarter quotations than can be produced and shipped before Oct. 1, and that this course is impairing the chances of success in the effort to secure higher prices in the final quarter of the year.

Strip business is good, and while

manufacturers have written some fourth quarter contracts at the recently announced prices of 1.90c., base, for widths of more than 6 in., 2c., base, for 3 in. to less than 6 in. and 2.20c., base, for less than 3 in., a recent bulge in orders is believed to be largely due to the fact that the large tonnage buyers have been allowed to contract for the final quarter of the year at third quarter prices. In the flat steels, therefore, the mills seem more concerned in getting enough business for economical operations than in getting better prices.

Makers are firmer in their price ideas on bars than on the flat steels and 1.90c. is as low as is being quoted in this district. On plates, outside of the dimensions and gages that compete with strips and blue annealed sheets, the market also is firm at 1.90c.

Line and seamless pipe business is good with local producers, but they admit room for improvement in other classes of tubular goods. A report that the Republic Iron & Steel Co. is negotiating for the acquisition of another company producing small tubing from strip steel finds no confirmation. The report probably grew out of the fact that this other small tube producer controls patents that would supplement those owned by the Steel & Tubes, Inc., recently acquired by the Republic company.

Sheet bars are moving well on contracts, with \$32, Youngstown, the price for this quarter and both local makers asking \$33 for fourth quarter.

Scrap prices are very firm in this area, particularly short shoveling steel turnings, which are wanted to increase pig iron production without putting on additional furnaces. To get actual deliveries, steel companies have paid \$13 to \$13.50 for this grade of blast furnace scrap.

German Export Prices Rise —Rail Orders Total 550,000 Tons

BERLIN, GERMANY, Aug. 31 (*By Radio*).—Domestic prices of pig iron and rolled steel products are unchanged for August, but the export market is strong and the Stahlwerksverband has advanced export quotations on most products. Steel bars have been increased to £6 per ton (1.30c. per lb.), the highest level in the past two years.

It is suggested by some steel sellers that a decline in export trade may result from the decision of the Railroads Corporation to advance freight rates an average of 11 per cent. The corporation has just placed an order with the Stahlwerksverband for 550,000 tons of rails and ties. Engineering plants report an increase in foreign buying.

Negotiations have been started by 65 steel casting companies to form a selling syndicate, which will allocate both domestic and export orders to its members on the basis of fixed quotas.

San Francisco

Steel Business on Coast Well Sustained—Active Fourth Quarter is Expected

SAN FRANCISCO, Sept. 1 (*By Air Mail*).—Bookings of iron and steel products on the Coast continue well sustained. Those in close touch with the situation are of the opinion that fourth quarter business will be of large proportions.

Pig Iron.—Little of importance transpired in the local market for foundry pig iron during the past week, both sales and inquiries involving spot lots. No changes in prices.

Prices per gross ton at San Francisco:

*Utah basic \$25.00 to \$26.00
 *Utah fdy., sil. 2.75 to 3.25 25.00 to 26.00
 **Indian fdy., sil. 2.75 to 3.25 24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars this week were the lightest in seven weeks, totaling less than 300 tons. About 160 tons for the Deschutes River bridge in Oregon was placed with an unnamed company, as was 105 tons for the Kittitas project at Ellensburg, Wash. No new inquiries of importance have developed. Out-of-stock prices in the bay district continue weak; 1.85c. to 2c. is the range.

Plates.—No action has yet been taken on the 7200 tons for the East Bay Municipal Utility District, Oakland, distributing system. The Lacy Mfg. Co. was awarded a number of small tanks for Swift & Co.'s refining plant at Vernon, Cal., calling for 200 tons of material. Bids were opened by Tacoma, Wash., this week on 174 tons for a riveted pipe line. Plate prices are unchanged, the range being from 2.20c. to 2.30c., c.i.f.

Shapes.—Included among the larger structural shape awards of the week, which exceeded 1600 tons, were 860 tons for an apartment in Oakland, booked by the Pacific Coast Engineering Co., and 444 tons for a bridge at Nugents, Wash., placed with unnamed interests, the general contract going to the Ward Construction Co. No new inquiries of importance have developed. Prices on shapes remain firm at 2.35c., c.i.f.

Cast Iron Pipe.—An unnamed company was awarded 202 tons of 2 to 8-in. Class B pipe for Phoenix, Ariz. The inquiry of the Monterey County Water Co., Pacific Grove, Cal., calling

for 532 tons, has been withdrawn. Bids were opened this week on 320 tons of 2 to 16-in. Class B pipe for

Santa Ana, Cal., also on 147 tons of 6 to 10-in. Class C pipe for the improvement of Garnet Street, San Diego, and on 258 tons of 20 and 30-in. centrifugal pipe for San Bernardino, Cal. Pending business calls for more than 48,000 tons. Edmonds, Wash., will open bids on Sept. 4 on 1236 tons of 4 to 10-in. Class B pipe.

Canada

Railroad Equipment Orders In Large Volume Expected—Building Construction Setting a Record

TORONTO, ONT., Sept. 4.—The Canadian National Railways have announced plans for the spending of between \$10,000,000 and \$15,000,000 on equipment before the end of the year. The Canadian Pacific will also make large expenditures. During the eight months of this year Canadian steel mills have been in continual operation almost on a capacity basis, and with the new business in prospect, present activities will not cease for some time to come. Rail mills and various other departments of steel plants of this country have experienced greater activity this year than at any time since 1920. Recently published financial reports of the steel companies at Sydney, N. S., and Sault Ste. Marie, Ont., show net earnings greatly in excess of those of most years since the war, and these reports dealing with fiscal years take in only a few months of the present year's operations.

Pig Iron.—Sales for the week marked a new high level for summer business. Melters are placing spot orders in larger tonnages and some forward contracts have been closed. While individual orders range from 50 to 500 tons, average sales for the week were between 200 and 300 tons for spot delivery, and a few contracts for delivery during September and early October involved from 500 to 1000 tons. While the average daily melt in Canada is about 70 per cent, there is a feeling among leading iron and steel officials that this may jump another 10 points before the end of the year. With prices in the United States' markets gaining strength, Canadian melters and producers are looking for higher prices in the Canadian markets.

Prices per gross ton:

Delivered Toronto
 No. 1 fdy., sil. 2.25 to 2.75. \$23.10 to \$23.60
 No. 2 fdy., sil. 1.75 to 2.25. 23.10 to 23.60
 Malleable 23.10 to 23.60

Delivered Montreal
 No. 1 fdy., sil. 2.25 to 2.75. 24.50 to 25.00
 No. 2 fdy., sil. 1.75 to 2.25. 24.50 to 25.00
 Malleable 24.50 to 25.00
 Basic 23.50 to 24.00

Imported Iron, Montreal Warehouse
 Summerlee 33.50
 Carron 33.00

Structural Steel.—Canada is experiencing one of the best years in its history in building construction. It is estimated by some leading men in the industry that this country will reach

the record total of \$500,000,000 in building construction by the end of the year. Fabricators of structural steel report capacity operations. Approximately 500 tons of reinforcing bars and 2500 tons of structural steel will be required for the proposed Bayview Avenue bridge over the Don ravine in York County; 500 tons of steel and 200 tons of reinforcing bars are required for bridge and dam at Arnprior, Ont.; 1000 tons of steel is needed for proposed building in Toronto for National Life Assurance Co. of Canada. The Hamilton Bridge Co., Hamilton, Ont., has contract for 300 tons of steel for apartment house on Ottawa Street, Hamilton.

Old Material.—In keeping with improvement in other iron and steel markets, scrap sales for the week have gained. Melters are showing interest in the market both for spot and future needs, and current orders show improvement over those of former weeks this summer. Heavy melting steel and turnings are in good demand from the Hamilton district, and large tonnages are moving that way both on contract and new order account. Prices are firm, but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast....	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00

Per Net Ton

No. 1 machinery cast....	15.00
Stove plate	9.00
Standard carwheels	13.00
Malleable scrap	13.00

The Keystone Steel & Wire Co., Peoria, Ill., for the year ended June 30, reports net profits of \$1,388,193, after all charges, taxes and preferred dividends, equivalent to \$6.16 a share on the 202,284 shares of no-par common stock. This compares with \$1,015,591 in the previous year. Net sales for the fiscal year just ended were \$10,224,376, against \$9,054,022 in the previous year.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, 3/16-in. and over....	3.15c.
Small angles, under 3/16-in.....	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.....	3.75c.
Spring steel, 1/4-in. and thicker...	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, 1/2-in. and larger....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100-lb. keg.....	3.40

Boston

August Sales of Pig Iron are Record for Year—Scrap Market Continues to Gain Strength

BOSTON, Sept. 4.—Pig iron sales in New England the past week totaled slightly more than 8000 tons, making August business the largest for any month this year. The Mystic Iron Works alone sold 30,600 tons in August. Practically all sales made in the past week were in small lots, ranging from carloads up to 500 tons. Buffalo furnaces obtained \$17.50 a ton, furnace, and other New York State stacks and the Mystic Iron Works got better prices than heretofore. Alabama, western and eastern Pennsylvania, Indian and Dutch irons and a small amount of malleable were sold. Buffalo iron can still be bought at \$16 a ton, furnace, in large tonnages, but how much longer this quotation will hold good is uncertain. The Mystic Iron Works has obtained a reduction in rail freight rates from Everett, Mass., to Connecticut points competitive with Troy, N. Y., iron. The rate was \$3.30 a ton; it is now \$3.05.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.41 to \$21.91
*Buffalo, sil. 2.25 to 2.75..	21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.23 to 20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. have made no change in their price on by-product foundry coke for September delivery. It remains at \$11 a ton, delivered within a \$3.10 freight rate zone. These ovens did a larger foundry coke business last month than

in July, this year, but just about broke even with August, last year.

Shapes and Plates.—Specifications against third quarter shape and plate contracts increased noticeably during the latter part of August, and it is reported that shipments at less than 1.85c. per lb., base Pittsburgh, have been practically completed. The market for standard shapes and plates apparently is now steady at 1.90c. per lb. on desirable tonnages, and at 2c. per lb. for small lots.

Cast Iron Pipe.—The last week in August brought a decided slowing up in private pipe business. A Massachusetts municipality privately purchased 200 tons of 6 and 8-in. stock, the largest individual transaction reported. The Navy Department, Newport, R. I., has purchased 200 tons of 6 to 16-in. pipe from the Warren Foundry & Pipe Co. The National Cast Iron Pipe & Foundry Co. and R. D. Wood & Co. were the low bidders on 150 tons of 6 to 12-in. pipe for Camp Devens, Mass. Revere, Mass., closed bids Aug. 30 on 100 tons of 6 and 8-in. pipe, but has made no award. Prices are steady at \$45.10 to \$46.10 on 4-in., and at \$41.10 to \$42.10 on 6 to 12-in. pipe. Large pipe prices remain unsettled. The usual \$5 differential is asked on class A and gas pipe.

Old Material.—The movement of old material out of New England, espe-

cially into the Pittsburgh district, is gathering momentum, that for the past week being the largest for any similar period in months. Eastern Pennsylvania mills also are in a more receptive mood, but there has not been any material increase in shipments there. No. 1 heavy melting steel is now \$9.50 to \$10 a ton, on cars shipping point, compared with \$9.50 to \$9.75 a week ago. The bulk of current business is at \$9.75 to \$10 a ton. Specification pipe and steel mill borings are easily 50c. a ton higher, and T rails have recovered 25c. of the recent 50c. setback. Comparatively little machinery cast was taken by New England foundries the past week, presumably because of the recent activity in pig iron. The export market likewise was rather inactive, but this week may bring a resumption of buying.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$9.50 to \$10.00
Scrap T rails.....	8.25 to 8.75
Scrap girder rails.....	7.50 to 8.00
No. 1 railroad wrought....	8.50 to 9.00
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings....	5.50 to 6.00
Cast iron borings (steel works and rolling mill)...	6.00 to 6.50
Bundled skeleton, long....	7.00 to 7.50
Forge flashings.....	7.75 to 8.25
Blast furnace borings and turnings.....	5.00 to 5.50
Forge scrap.....	6.00 to 6.50
Shafting.....	12.00 to 12.50
Steel car axles.....	14.00 to 14.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$13.50 to \$14.00
No. 1 machinery cast....	15.00 to 15.50
No. 2 machinery cast....	13.50 to 14.50
Stove plate.....	10.00 to 10.50
Railroad malleable.....	15.00 to 15.50

Birmingham

Advance in Pig Iron Prices Has Stimulated Market—Steel Prices Firm—Scrap More Active

BIRMINGHAM, Sept. 4.—Pig iron buying has been stimulated by the advance in price on Aug. 24 to \$16.25, base. Some consumers have contracted for the rest of the year at that figure. New business during the past week has been confined to local trade. Inquiries have increased and more interest is being shown in the market than in some time. Shipments continue heavy. The No. 2 Bessemer furnace of the Tennessee company, which had been producing recarburizing iron, was banked on Aug. 21. No other changes have been made. Sixteen furnaces are now in blast. Of this number, 12 are on foundry, three on basic and one on ferromanganese. Work will be completed the latter part of this month on the rebuilding of the Gulf States Steel Co. furnace at Alabama City.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic.....	16.25

Finished Steel.—The tonnage booked last month was unusually

large for August and exceeded that of July. Sheet specifications are placing a heavy demand on mills. Prices are firm and unchanged. The rod mill of the Gulf States Steel Co. is in full operation, having been down since July 15 for power change. Reinforcing bars show greater activity in awards, though individual lettings are small. Local demand for structural steel is light. Plants are keeping busy on recent orders. Only nine open-hearth furnaces in the district have been active since Aug. 22, the Tennessee company having six in operation at Fairfield and the Gulf States Steel Co. three at Alabama City.

Cast Iron Pipe.—The market has been quiet for several weeks. Makers are depending largely on private business to keep operations up to the average. Stocks on yards are being worked off as customers continue to demand prompt deliveries. Mobile, Ala., will open bids Sept. 4 on a fair-sized tonnage and Bonifay, Fla., has called bids for the same date for around 18,000 ft. of 6-in. pipe. Prices

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45 to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

show firmness, with quotations at \$34 to \$35 on 6-in. and larger sizes.

Coke.—The coke market shows a slight improvement with a little forward buying under way. Prices remain at \$5 for both spot and contract.

Old Material.—The market is steadily developing strength, following the unusually low period during the summer. An improved demand is noted in all lines. Railroad wrought has developed considerable activity during the week. Prices on No. 1 cast

have advanced another 50c. to \$15. No other changes have been made in quotations.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$8.50 to	\$9.00
Scrap steel rails.....	11.00 to	11.50
Short shoveling turnings..	7.50 to	8.00
Cast iron borings.....		8.00
Stove plate.....		13.50
Steel axles.....	19.00 to	20.00
Iron axles.....	21.00 to	22.00
No. 1 railroad wrought...	10.00 to	10.50
Rails for rolling.....		13.00
No. 1 cast.....		15.00
Tramcar wheels.....	12.50 to	13.50
Cast iron carwheels.....	12.00 to	13.00
Cast iron borings, chem...	13.50 to	14.00

is taking No. 2 steel at a reported price of \$12.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel..	\$14.00 to	\$15.00
No. 2 heavy melting steel..	12.25 to	12.50
Scrap rails.....	13.00 to	13.50
Hydraulic comp. sheets...		12.25
Hand bundled sheets.....	8.00 to	8.50
Drop forge flashings.....	12.00 to	12.50
No. 1 busheling.....	12.25 to	12.50
Hvy. steel axle turnings..	12.00 to	12.50
Machine shop turnings....	7.00 to	7.50
No. 1 railroad wrought...	11.00 to	11.50

Acid Open-Hearth Grades		
Knuckles and couplers...	16.00 to	16.50
Coil and leaf springs.....	16.50 to	17.00
Rolled steel wheels.....	15.50 to	16.00
Low phos. billet and bloom ends.....	17.00 to	17.50

Electric Furnace Grades		
Hvy. steel axle turnings..	12.00 to	12.50
Short shov. steel turnings..	10.00 to	10.50

Blast Furnace Grades		
Short shov. steel turnings..	10.00 to	10.50
Short mixed borings and turnings.....	9.50 to	10.00
Cast iron borings.....	9.50 to	10.00
No. 2 busheling.....	9.00 to	9.25

Rolling Mill Grades		
Steel car axles.....	16.50 to	17.00
Iron axles.....	19.50 to	20.00

Cupola Grades		
No. 1 machinery cast....	14.50 to	15.00
Stove plate.....	13.50 to	14.00
Locomotive grate bars....	11.25 to	11.75
Steel rails, 3 ft. and under.	16.00 to	16.50
Cast iron carwheels.....	12.00 to	12.50

Malleable Grades		
Industrial.....	15.00 to	15.50
Railroad.....	15.00 to	15.50
Agricultural.....	15.00 to	15.50

Buffalo

Pig Iron Orders Taken Just Prior to Price Advances Totaled 60,000 Tons

BUFFALO, Sept. 4.—Just prior to the recent price advances on pig iron, approximately 60,000 tons was booked by local makers, it is estimated. A considerable number of melters have not yet covered for fourth quarter and a continuance of the buying movement is expected. The American Radiator Co., whose furnace at Tonawanda is out for repairs, has been inquiring for foundry and malleable iron. The company's total requirements for all plants are upward of 30,000 tons. A central New York melter purchased 2000 tons of foundry and a Buffalo radiator manufacturer placed 1500 tons. Numerous 1000-ton lots were booked, the bulk of the buying centering in New York State. Makers say the present situation is the healthiest in years.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25..	\$17.00 to \$17.50
No. 2X fdy., sil. 2.25 to 2.75	17.50 to 18.00
No. 1X fdy., sil. 2.75 to 3.25	18.50 to 19.00
Malleable, sil. up to 2.25..	17.50 to 18.00
Basic.....	16.50 to 17.00
Lake Superior charcoal...	27.28

Finished Iron and Steel.—Operations are being maintained at about 90 per cent, with the outlook excellent. Bars, shapes and plates are firm, with the probability that a 2.10c. Buffalo price will be formally announced soon. New billet steel is being quoted at 2.415c., warehouse, and 2.515c., delivered at the job. Wire business is good and alloy steel mills report increasing business. One 300-ton reinforcing job, a garage, was awarded in the week.

Old Material.—The principal activity has been caused by dealers in covering old orders. Difficulty is being experienced, as there has been no accumulation of scrap in yards and, with

heavy operation by mills, the available supply is low. No further buying in volume has taken place since the No. 1 heavy melting steel purchases at \$13.75 and \$15 by two of the local mills. Some long rails have been bought at \$14.50. Small lots of knuckles and couplers have been sold at \$16 to \$16.50 and coil and leaf springs have brought \$16.50 to \$17. Stove plate is scarce; there have been a few sales at \$14. One of the mills

St. Louis

Pig Iron Buying Falls Off Following Price Advances—Steel Buying Continues at Active Pace

ST. LOUIS, Sept. 4.—Following the recent advances of 50c. a ton by the Granite City maker and of 75c. a ton by Southern interests, buying of pig iron in this market has fallen off. The St. Louis Gas & Coke Corporation sold 2600 tons of foundry iron, including 800 tons to a Springfield, Ill., specialty maker; 250 tons to a Louisville melter and 300 tons to a local melter. Sales of Southern iron were small. A Louisville company is in the market for 3000 tons of foundry iron for fourth quarter shipment; this is the only sizable inquiry in the market. The melt in the district is increasing, jobbing foundries and stove manufacturers showing greater activity. Shipments by the Granite City maker in August were ahead of any other August, and melters have agreed to take their full quotas for September.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$19.00 to \$19.50
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd.....	20.67
Northern malleable, deliv'd.....	20.16
Northern basic, deliv'd.....	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel.—The Granite City Steel Co. has announced that it will adopt a discount for cash in 10 days of one-half of 1 per cent on all sheets shipped on and after Oct. 1. The discount will be allowed on the value of the material f.o.b. mill. The move by

the Granite City mill follows the example of virtually all of the leading producers of steel sheets. Galvanized sheets continue active, with a very noticeable tendency toward price stabilization. Orders for black sheets and tin mill black are reaching the Granite City mill in heavy volume, and it is several weeks behind in production. The tin plate situation is without change. Specifications reaching the Granite City Steel Co. are in large volume, and it is having difficulty in supplying the demand. While

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	5.25c.
Blue ann'l'd sheets (No. 10).....	3.60c.
Black corrug. sheets (No. 24)....	4.50c.
Galv. corrug. sheets.....	5.30c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, 7/16-in. and smaller, 100 lb. or more.....	70
Less than 100 lb.....	65
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

plates are not especially active, there is a fair volume of miscellaneous requirements. August warehouse business will show a gain over that of the same month last year, St. Louis business showing gains and the oil fields a loss. Structural business is light.

Old Material.—Although consumers are buying very little old material and have given no indication as to when they will buy on any sizeable scale, the market continues to advance so far as dealers' prices are concerned. Dealers' advances are based on strength in the market elsewhere and on anticipated purchases by consumers. Lists of railroads in this section have been small, and shipments from country dealers light. Heavy melting steel, heavy shoveling steel, miscellaneous standard section rails, No. 1 and No. 2 railroad wrought, rails for rolling and steel angle bars are 25c. higher, while steel rails less than 3 ft. are 50c. higher, and No. 1 locomotive tires are 75c. higher. Rail-

road lists follow: Pennsylvania Lines, 41,175 tons; Big Four, 1250 tons; Missouri Pacific, 75 carloads; Frisco, 30 carloads; Mobile & Ohio, 26 carloads; St. Louis-Southwestern, 20 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$11.25 to \$11.75
No. 1 locomotive tires....	12.50 to 13.00
Heavy shoveling steel.....	11.25 to 11.75
Miscel. stand.-sec. rails	
includ'g frogs, sw'ches	
and guards, cut apart...	13.25 to 13.75
Railroad springs.....	14.00 to 14.50
Bundled sheets.....	8.25 to 8.75
No. 2 railroad wrought...	11.25 to 11.75
No. 1 busheling.....	9.00 to 9.50
Cast iron borings.....	8.25 to 8.75
Iron rails.....	13.00 to 13.50
Rails for rolling.....	13.75 to 14.25
Machine shop turnings....	7.00 to 7.50
Steel car axles.....	18.00 to 18.50
Iron car axles.....	25.50 to 25.75
Wrot. iron bars and trans.	18.25 to 18.75
No. 1 railroad wrought...	9.25 to 9.75
Steel rails, less than 3 ft.	15.50 to 16.00
Steel angle bars.....	12.75 to 13.25
Cast iron carwheels.....	13.00 to 13.50
No. 1 machinery cast....	13.50 to 14.00
Railroad malleable.....	11.50 to 12.00
No. 1 railroad cast.....	13.00 to 13.50
Stove plate.....	11.00 to 11.50
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and	
under.....	20.50 to 23.50
Relay. rails, 70 lb. and	
over.....	26.50 to 29.00

Cincinnati

Greater Activity in Pig Iron—Scrap Market Gains Strength—Steel Demand Steady

CINCINNATI, Sept. 4.—With sales totaling about 12,000 tons and with buyers manifesting interest in covering requirements over the remainder of the year, the pig iron market has continued active for a second week. That the large users deem it advisable to make fourth quarter purchases now is indicated by the fact that bookings in the past few days have included orders for 3500 tons, 1500 tons and 1200 tons. One of the main developments has been the sizable sales of Jackson County silvery iron, one local dealer reporting transactions totaling 1500 tons. Prices continue to show a firm tendency. Northern Ohio furnaces are quoting No. 2 foundry iron at \$20.40, delivered in Cincinnati, although attractive tonnages probably can be obtained at 50c. a ton less. Two Iron-ton, Ohio, sellers have been quietly disposing of small lots of foundry iron from their yard stocks at prices which are reported to range from \$17 to \$18, base furnace. Little Southern iron has been sold since the recent advance in quotations became effective.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to	
2.25.....	\$18.89 to \$19.89
So. Ohio malleable.....	20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25...	19.94
Ala. fdy., sil. 2.25 to 2.75...	20.44
Tenn. fdy., sil. 1.75 to 2.25	19.69
So'th'n Ohio silvery 8 per cent.....	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Sheet steel companies in August booked considerably more business than in July, a prominent district mill reporting an increase of approximately 40 per cent. Orders and specifications have been

well distributed among consuming industries, although automobile manufacturers have been the largest buyers. A sheet maker nearby has announced the following prices for the fourth quarter: black sheets, 2.85c., base Pittsburgh; blue annealed, 2c.; long terme, 4c. for primes with seconds assorted; and automobile body stock, 4c. These quotations also are being adhered to for current business, although practically all contract customers are covered through the present quarter at 2.75c. for black and 1.90c. for blue annealed. This company has about a three weeks' backlog for its various plants, which are operating at 100 per cent of capacity. Bars, plates and shapes are quoted at 1.90c., base Pittsburgh, for spot orders and 2c. for fourth quarter contract tonnage. Agricultural implement manufacturers have a large volume of unfilled orders and consequently are running at full capacity, their

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfoc. bars.....	3.15c.
Rail steel reinfoc. bars.....	3.00c.
Hoops.....	4.00c. to 4.25c.
Bands.....	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.....	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.....	39.00

steel requirements amounting to an appreciable tonnage. Fabricators are fairly busy on numerous small jobs, but have little work ahead. The wire market is rather quiet, with prices firm. A producer of cold-rolled strip steel has announced quotations of 2.85c., base Pittsburgh, for fourth quarter.

Coke.—The price of by-product foundry coke will remain at \$7 per net ton, f.o.b. ovens, or \$9.14, delivered Cincinnati, during September. The schedule for domestic grades is \$4.50, ovens, for egg size and \$3.50 for walnut. At Detroit, by-product foundry coke is selling at a delivered price of \$9 to local users and at \$10 to outside consumers. Specifications for by-product foundry coke have been liberal and indications are that shipments this month will be satisfactory in volume. New River beehive foundry coke is steady at \$6.50 to \$7, ovens.

Old Material.—The scrap market shows increasing signs of strength and dealers are willing to pay more for material than a few weeks ago. As a consequence, heavy melting steel is up 75c. a ton and many other items have advanced 50c. or 75c. District steel plants are taking sizeable tonnages on current contracts and also have bought a fair amount of scrap. Railroad lists closing this week include the Norfolk & Western, 6000 tons; Big Four, 3000 tons, and Chesapeake & Ohio, a special offering of 1200 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.75 to \$12.25
Scrap rails for melting....	11.50 to 12.00
Loose sheet clippings.....	9.00 to 9.50
Bundled sheets.....	9.50 to 10.00
Cast iron borings.....	8.25 to 8.50
Machine shop turnings....	8.00 to 8.50
No. 1 busheling.....	10.50 to 11.00
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires....	12.75 to 13.25
No. 2 railroad wrought...	11.00 to 11.50
Short rails.....	15.75 to 16.25
Cast iron carwheels.....	11.50 to 12.00
No. 1 machinery cast....	15.50 to 16.00
No. 1 railroad cast.....	13.00 to 13.50
Burnt cast.....	8.00 to 8.50
Stove plate.....	8.25 to 8.75
Brake shoes.....	9.50 to 10.25
Railroad malleable.....	11.50 to 12.00
Agricultural malleable ...	10.50 to 11.00

The supervisory and executive staffs of the Interstate Iron & Steel Co., Chicago, have been provided with group life insurance exceeding \$350,000. The plan is being underwritten on a cooperative basis, the employer sharing the cost with its employees. Each participating supervisor receives \$5,000 of life insurance and each executive \$7,000. Included in each contract are total and permanent disability benefits.

The United States Civil Service Commission, Washington, announces an open competitive examination for junior patent examiner to fill vacancies in the Patent Office, Washington. Application must be made prior to Oct. 10.

Youngstown Industries Defend Rail Spur

Reply to Trunk Line Carriers' Objections Brings Out Plans of Sheet and Tube Company to Utilize Projected Road

WASHINGTON, Sept. 4.—A reply was filed last Saturday with the Interstate Commerce Commission to exceptions of trunk line carriers to the proposed report of Assistant Director C. V. Burnside, which recommended that the commission give the Pittsburgh, Lisbon & Western Railroad permission to establish a new rail route between Smith's Ferry, Pa., and the Youngstown district, giving Youngstown rail connection with the Ohio River.

The declaration is made in the answer that industrial control of the proposed railroad by the Pittsburgh Coal Co. does not violate the commodities clause. It is asserted that the commission has many times granted certificates to industrially owned carriers, even where the prospective tonnage was to be furnished largely by the controlling industry. The answer also declared to be without merit the contention of the trunk line carriers, the Pittsburgh & Lake Erie, the Pennsylvania and the Baltimore & Ohio, that the ownership and operation by the Pittsburgh Coal Co. of the river terminal facilities at Smith's Ferry will give rise to "injustice to the shipping public." It was pointed out that a river coal transfer terminal would cost about \$250,000 and that the Youngstown Sheet & Tube Co. and the Pittsburgh Coal Co. each contemplate the erection of such a terminal should the proposed construction be authorized. The proposed practice at Smith's Ferry, it was asserted, is exactly in accord with the rule on the river. Contrary to the trunk lines' contention, the answer said, the Youngstown Sheet & Tube Co. and the Pittsburgh Coal Co. have by no means preempted the river front at Smith's Ferry. It was shown, the answer declared, that other lands both east and west of the Little Beaver River at Smith's Ferry are accessible to the proposed Lisbon line and available to the public.

Sheet & Tube Company's Plans

It is the intention of the Youngstown Sheet & Tube Co., it was pointed out, to construct not only a river-to-rail coal transfer at Smith's Ferry, but also a rail-to-river steel transfer. Other Youngstown shippers, with no definite plans at the moment as to how they will use the river-and-rail route, nevertheless support the project, expecting that the future will more definitely develop its service for them, it was stated. The Lisbon must and does encourage the development of river transfer terminals, it was declared, because the financial success of the project depends upon the development of river-and-rail and rail-and-river tonnage. The claim that the Pittsburgh Coal Co. will monopolize river transportation with its private craft is declared to be entirely

groundless by the applicant, which pointed out the large number of craft operated on the river by steel and other companies of the Pittsburgh and Wheeling districts.

Lower Coal Rates Contemplated

The answer also said that the trunk lines are entirely in error in the view that back of the proposal is a desire to overcome the effect of the commission's condemnation of the assembling cost theory of rate making. The Pittsburgh Coal Co., it was pointed out, is not concerned one way or another in the assembling cost theory, and the Youngstown iron and steel manufacturers who intervened in the case gave no evidence to indicate these proposals were supported by them in the belief that the assembling cost basis of rates would be revised. Attack is made on the trunk lines for assuming that the Lisbon will have an average rate on coal of 60c. per ton between Smith's Ferry and Youngstown. The answer said the Lisbon did present a probable future income amount wherein it was contemplated that, as extended, its total freight business would earn an average rev-

enue of 60c. per ton. What was contemplated, it was stated, was that coal from Smith's Ferry to Youngstown would probably pay a rate within the range of 50c. to 75c. per ton.

Replying to the charge of the trunk lines that the applicant is merely planning to divert a substantial tonnage from existing lines, the answer said:

The real "plan" here is to utilize a Government waterway, the effective use of which is impossible under the long established policy and practice of existing railroads. That some tonnage would be diverted from the existing railroads is true; it would doubtless be admitted even by the trunk lines that our inland waterways would handle no more than the figurative plug-hatful of business, were they to be denied all that the existing railroads can handle.

The refusal of the railroads, including the trunk lines, the answer said, voluntarily to establish joint river-and-rail rates with water lines in the past has compelled Congress to legislate as it did in the barge line bill, "but that is obviously no reason why a railroad that seeks to establish its business as part and parcel of the Government waterway routes should not be granted the right so to do." The Denison or barge line bill excepted the Ohio River system from certain provisions of that bill that seek to extend the common carrier service of the Government barge line.

Wood Underframes For Railroad Cars To Be Banned

Notice has been given by the arbitration committee of the American Railway Association that, effective Jan. 1, 1929, a new rule will be adopted which will bar existing wood underframes in cars in interchange between roads after Jan. 1, 1931. It is stated that this rule may have to be extended if it is found at that time that too many wood underframes are then in use. Two years ago this committee adopted a ruling that steel underframes would be required on all cars built new on or after Jan. 1, 1927.

Luxemburg Steel Production Exceeds Quota by 55,166 Tons

Production of pig iron and steel in the Grand Duchy of Luxemburg during the first six months of 1928 showed an increase over the output for the corresponding period of last year, according to a report prepared by James E. Parkes, vice-consul in Luxemburg. Pig iron produced during this period totaled 1,381,223 metric tons, a gain of 73,225 tons over the 1,307,998 produced during the first six months of 1927. Raw steel production increased 100,396 tons, amounting to 1,270,576 tons as compared with 1,170,180 tons. Iron ore

production decreased to 3,560,412 tons from 3,676,180 tons.

The report points out that, considering that Luxemburg is a member of the Continental Steel Entente, the figures covering the output of steel take on particular significance in so far as surplus production over the allotted tonnage is concerned, since penalties must be paid for overproduction. According to arrangements recently entered into by members of the entente, beginning with the third quarter of 1928, a transgression of the allotted tonnage by 7.5 per cent is to be punishable at the rate of \$1 a ton; 7.5 to 10 per cent, \$2 a ton and over 10 per cent \$4 a ton. This latter amount was the penalty in force until the end of June for production over the allotted tonnage. The production quota allotted to Luxemburg amounted to 1,215,410 tons for the first half of 1928, and as this was exceeded by 55,166 tons the industry had to pay a fine of \$220,664.

Common stock of the Chain Belt Co., Milwaukee, has been made available to the public through new financing, and listed on the Chicago Stock Exchange. Proceeds of the sale of additional shares of common stock will be used to retire all preferred stock, and the 120,000 shares of common stock to be outstanding will represent the company's entire capitalization. Stock is being offered at \$41 a share and has been placed on a \$2.50 annual dividend basis.

Non-Ferrous Metal Markets

Copper Quiet and Steady, Tin Active and Higher, Lead and Zinc Un- changed

Copper.—Domestic copper sales were heavier in August than foreign sales but the total probably was less than that of some previous months. Practically all of the domestic consumers have contracted for their September requirements, but foreign users still have considerable nearby metal to purchase. The last week of August was only moderately active. Sales of October metal have been light thus far. September opens with foreign sales quite large, but with very little activity in the domestic market. Prices continue very firm at the levels which have prevailed since late in

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	49.00c. to 50.00c.
Tin, bars	51.00c. to 52.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingots for re- melting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commere'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½	32.00c. to 33.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.25c.
Tin, bar	57.25c.
Copper, Lake	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting.....	14.00c.
Zinc, slab	8.00c.
Lead, American pig.....	6.75c. to 7.00c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	56.50c.
Solder, ½ and ½	31.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 4	Sept. 1	Aug. 31	Aug. 30	Aug. 29
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.....	48.00	...	48.25	48.25	47.62½
Lead, New York	6.40	6.40	6.40	6.40	6.40
Lead, St. Louis	6.22½	6.22½	6.22½	6.22½	6.22½
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

May: Electrolytic copper at 14.75c., delivered in the Connecticut Valley, at 14.87½c., delivered in the Central West, and at 15c. c.i.f. European ports as the official quotation of Copper Exporters, Inc. Lake copper is quiet but firm at 14.75c. to 14.87½c., delivered.

Copper Averages.—The average price of Lake copper for August, based on daily quotations in THE IRON AGE, was 14.75c., delivered. The average price of electrolytic copper was 14.50c., refinery, or 14.75c., delivered in the Connecticut Valley.

Tin.—Last week was again very active, total sales to Saturday, Sept. 1, having been about 2000 tons. Consumers bought liberally and dealers were active, each taking about half of the total. September-October deliveries were principally involved and there is more interest in November-December. Statistics for August show that the Straits shipments were

very large at 9309 tons and that the visible supply at the end of the month was 18,456 tons, an increase of 434 tons since July 31, which is less than was expected. American deliveries into consumption were 7200 tons, or larger than the early estimates. There was 1718 tons in stock and landing on Aug. 31. The market here today has been quiet, with spot Straits tin quoted at 48c., New York. In London, quotations today were higher than a week ago, with spot standard quoted at £213 10s., future standard at £210 and spot Straits at £216 15s. The Singapore price today was £213 5s.

Lead.—Sales of lead were fairly large in the last week and the total for August was heavy. Prices were advanced twice in the past month and continue very firm. The quotation of the leading interest is unchanged at 6.40c., New York, while prices in the outside market range from 6.22½c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged. Zinc sheets are still being quoted at 9.75c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.

Rods—	
High brass	17.00c.
Naval brass	19.75c.

Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10, gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	11.75c.
Brass, heavy	7.00c.	8.25c.
Brass, light.....	6.00c.	7.50c.
Hvy. machine composition	9.75c.	10.75c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. turnings..	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	3.75c.	4.25c.
Zinc	3.00c.	3.50c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass		19.25c.
Copper, hot rolled		23.50c.
Copper, cold rolled, 14 oz. and heavier		25.75c.
Zinc		10.00c.
Lead, wide		9.75c.
Seamless Tubes—		
Brass		25.62½c.
Copper		26.50c.
Brass Rods		17.00c.
Brazed Brass Tubes.....		27.25c.

to 6.25c., St. Louis, all for September-October delivery.

Zinc.—Following the holidays, this market, like the others, was inactive but firm on Tuesday. The feature for some weeks has been the firmness of prices which continue at 6.25c., East St. Louis, or 6.60c., New York, for prime Western through October. Producers report a satisfactory business for August and state that the month will compare favorably with recent ones as to total business.

Antimony.—Chinese metal is a little easier at 10.12½c., New York, duty paid, for all positions.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c., per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 4.—Purchases of non-ferrous metals are small and few in number. Prices for tin and lead have advanced. The old metal market is dull.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 49c.; lead, 6.40c.; zinc, 6.35c. in less-than-carload lots, antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

Large Increase in Telephone Long Distance Lines

An additional expenditure of \$11,042,000 for construction of long distance telephone facilities during 1928 has been authorized by the American Telephone & Telegraph Co., according to announcement by T. G. Miller, general manager of the long lines department of that company. Most of the material required will be furnished by the Western Electric Co., which has arrangements under way for an extensive increase in plant facilities to keep pace with the enlarged construction program.

The additional appropriation brings the total for new construction this year to \$49,038,000, compared with \$36,406,000 expended during 1927, the previous record year in construction. About \$32,400,000 will be spent on additions and extensions to long distance lines and more than \$12,000,000 for central office equipment used in connection with long distance calls. Estimates at the beginning of 1928 called for 1367 miles of new telephone cable construction, and this estimate is now increased to 1600 miles planned for completion by Dec. 31.

About \$4,000,000 will be required for additional aerial wire circuits through the less populated sections. A considerable sum will be used for installing virtually stormproof cables

between all important centers. Radio program transmission circuits to supplement those already in use are also to be provided.

During the first half of 1928, as compared with the same period in 1927, telephone users increased their use of the long distance circuits of the American Telephone & Telegraph Co. an average of 20 per cent.

Stock Sizes of Turnbuckles Reduced from 248 to 115

Stock sizes of turnbuckles adopted by a general conference of representative manufacturers, distributors and users, held Oct. 19, 1927, for promulgation by the United States Department of Commerce are given in Simplified Practice Recommendation R71-28. The simplification as approved by the conference cuts the number of turnbuckles manufactured from 248 to 115.

The recommendations cover turnbuckles with and without stubs, and turnbuckles with hook, eye and jaw ends. They are to be effective from Jan. 1, 1928, for new production and April, 1928, for the clearing of existing stocks and are subject to annual revision by a conference of the standing committee of the industry. Copies of the simplified practice recommendation may be obtained from the Superintendent of Documents, United States Government Printing Office, Washington. The price is 5c.

Sharp Reduction in Machinery Imports Into Italy

WASHINGTON, Sept. 1.—Imports of machinery into Italy during 1927 showed an abrupt decline when compared with 1926 and 1925, according to A. A. Osborne, commercial attaché at Rome. During the past three years Germany has supplied approximately one-half of the machinery imported into Italy, but suffered in 1927 a decrease of 41 per cent as compared with 1926 and 36 per cent as compared with 1925. The United States, which supplies only 8 per cent of the tonnage and 12 per cent of the value of the machinery imported into Italy, lost 36 per cent in tonnage and more than 41 per cent in value as compared with 1926 and 17 per cent in tonnage and 37 per cent in value as compared with 1925.

Imports entering Italy under the classification "Machinery, Apparatus and Parts," including industrial machinery, agricultural machinery, sewing machines, electrical machinery and typewriters, amounted to 74,448 metric tons in 1927, with a total value of about \$35,637,000, against 114,083 tons, valued at \$42,437,000, in 1926. The loss in 1927 was 35 per cent in tonnage and nearly 37 per cent in value when compared with 1926.

Importations of strictly industrial machinery showed decreases in practically all classes, owing to the industrial depression which began in 1926

and continued throughout the following year. The three leading classes of industrial machinery entering Italy, machine tools, spinning machinery and weaving equipment, suffered particularly heavy declines. The total tonnage of machine tools imported in 1927 represented only 53 per cent of the imports of 1926 and 40 per cent of the trade of 1925. Imports of spinning machinery in 1927 were only 41 per cent and weaving machinery 35 per cent as great as the imports of 1926, and 36 and 26 per cent respectively of the imports of 1925.

Hardware Testing Laboratory in Germany

HAMBURG, GERMANY, Aug. 18.—An inspecting and testing laboratory for the German hardware industry, which has been planned for several months, has been established and will open in November. The laboratory is financed by the hardware industry, but outsiders may have material tested for a moderate fee. Modern testing equipment has been purchased, including a few testing machines from the United States.

Obituary

JOSEPH ANDREW JEFFREY, chairman of the board of the Jeffrey Mfg. Co., Columbus, Ohio, died at his home in that city on Aug. 27. He was one of the founders of the company bearing his name and served as its active head until his partial retirement in 1922. He was in his ninety-second year. Mr. Jeffrey was born at Clarksville, Clinton County, Ohio, and after attending the schools of Clinton and Auglaize counties he went to Columbus and engaged in the banking business, having been one of the founders of the Commercial National Bank. He became associated with Francis Lechner in 1877 in the manufacture of mining machinery and six years later disposed of his banking interests to devote his entire time to manufacturing. The company became the Jeffrey Mfg. Co. in 1887. Robert H. Jeffrey, a son, is president and general manager of the company, and two other sons, Joseph W. and Malcolm D. are vice-president and assistant sales manager respectively.

JOSEPH C. GASKILL, vice-president of the Pierce, Butler & Pierce Mfg. Corporation and general manager of its Ames plant at Oswego, N. Y., died at his home in that city on Aug. 30, after an illness of two weeks, aged 52 years. He was born at Mount Holley, N. J., and had been identified with the Ames plant for 35 years.

WILLIAM H. EVANS, secretary-treasurer of the Illinois Pure Aluminum Co., Lemont, Ill., died on Aug. 18, following a week's illness. He had been associated with the company for 18 years.

Fabricated Structural Steel

Awards of 30,000 Tons and Only 15,200 Tons in New Projects Up for Bids

FABRICATED structural awards, amounting to slightly more than 30,000 tons, were considerably less than the weekly average during August. The largest jobs were a railroad bridge at Newark, N. J., calling for 6200 tons, and an office building in New York which took 4500 tons. New projects, totaling only 15,200 tons, included 3300 tons for four public schools in New York and 3000 tons for an office building in Chicago. Awards follow:

BOSTON, 250 tons, Back Bay station, to New England Structural Co.

EASTHAMPTON, MASS., 195 tons, State bridge, to an unnamed fabricator.

NEW YORK, 4500 tons, Herald Square Building, to Taylor-Fichter Steel Construction Co.

NEW YORK, 1200 tons, two apartment buildings for Bing & Bing, Inc., to Taylor-Fichter Steel Construction Co.

NEW YORK, 800 tons, column cores for Packard service station in West Fifty-fourth Street, to McClintic-Marshall Co.

NEW YORK, 700 tons, apartment building in Park Avenue, to Hedden Iron Construction Co.

NEW YORK, 625 tons, Dugan Brothers bakery building in Queens, to National Bridge Works.

NEW YORK CENTRAL RAILROAD, 750 tons, two bridges; 500 tons at Cleveland, to Mount Vernon Bridge Co., and 250 tons at Nepperhan, N. Y., to Fort Pitt Bridge Works.

NEWARK, 6200 tons, bridge over Newark Bay for Pennsylvania and Lehigh Valley railroads, divided equally between American Bridge Co. and Bethlehem Steel Co.

STANDARD OIL CO. OF NEW JERSEY, 1000 tons, 10 tanks in Texas, to unnamed fabricator.

STATE OF NEW JERSEY, 150 tons, bridge at Cape May, to Phoenix Bridge Co.

PHILADELPHIA, 600 tons, building for the Congoleum Co., to American Bridge Co. MARCUS HOOK, PA., 400 tons, warehouse for Congoleum-Nairn, Inc., to Lackawanna Steel Construction Co.

BALTIMORE & OHIO RAILROAD, 800 tons, bridge at Chicago, to American Bridge Co.

PONTIAC, MICH., tonnage not stated, foundry for Oakland Motor Co., to Mahon Structural Steel Co., Detroit.

FERNDALE, MICH., 990 tons, factory for Steel & Tubes, Inc., to Whitehead & Kales Co.

HAMILTON, ONT., 300 tons, apartment building on Ottawa Street, to Hamilton Bridge Co.

MIDDLETOWN, OHIO, 950 tons, warehouse for American Rolling Mill Co., to McClintic-Marshall Co.

INDIANAPOLIS, 1300 tons, Methodist Hospital, to Insley Mfg. Co., Indianapolis.

CHICAGO, 250 tons, building for Industrial Mfg. Co., to Butler Street Foundry, local.

CHICAGO, 330 tons, building for Spiegel, May, Stern Co., to New City Iron Works, local.

CHICAGO, 208 tons, garage at 925 Fair Oaks Street, to Midland Structural Steel Co.

CHICAGO, HEIGHTS, ILL., 250 tons, school, to A. Bolter's Sons, Chicago.

CHICAGO, 100 tons, building for Igoe Printing Co., to Hansell-Elcock Co., local.

CHICAGO, 1900 tons, mill building for Interstate Iron & Steel Co., to Worden Allen Co., Milwaukee.

QUINCY, ILL., 3000 tons, bridge across Mississippi River, to the American Bridge Co.

ROCKFORD, ILL., 250 tons, factory building, to Midland Structural Steel Co., Chicago.

BYRON, ILL., 1000 tons, bridge for Chicago,

Milwaukee, St. Paul & Pacific Railroad, to American Bridge Co.

MAUPIN, ORE., 170 tons, bridge over Deschutes River; general contract to Kuckenberg & Wittman, steel to an unnamed fabricator.

OLYMPIA, WASH., 444 tons, Nungent bridge; general contract to Ward Construction Co., steel to an unnamed fabricator.

OAKLAND, CAL., 860 tons, apartment building at Bellevue and Staten Avenues, to Pacific Coast Engineering Co.

VERNON, CAL., 200 tons plates, small tanks for Swift & Co., to Lacey Mfg. Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NORTH EASTON, MASS., 200 tons, Ames Shovel & Tool Co. plant.

REINFORCING STEEL

Atlantic City Hotel Addition Takes 2300 Tons

INCLUDING 2300 tons for an addition to an Atlantic City hotel, reinforcing bar awards reported to THE IRON AGE during the last week amounted to 6800 tons. New projects calling for 3900 tons, included no jobs of outstanding size. Awards follow:

BURNHAM JUNCTION, ME., 150 tons, power house for Central Maine Power Co.; from Ambursen Construction Co., general contractor, to Truscon Steel Co.

NEW YORK, 100 tons, bakery building for Dugan Brothers, Inc., to McClintic-Marshall Co.

ATLANTIC CITY, N. J., 2300 tons, Haddon Hall extension, to Jones & Laughlin Steel Corporation.

PHILADELPHIA, 250 tons, Strawbridge & Clothier Co. department store, to Jones & Laughlin Steel Corporation.

PHILADELPHIA, 100 tons, Penn Hospital, to Jones & Laughlin Steel Corporation.

BUFFALO, 300 tons, Genesee Motoramp garage, to a local maker.

CLEVELAND, 450 tons, medical arts and other buildings for Cleveland Union Terminal, to Truscon Steel Co.

CLEVELAND, 100 tons, Randolph exchange, for Ohio Bell Telephone Co., to Bourne-Fuller Co.

STATE OF WISCONSIN, 300 tons, miscellaneous work, to Concrete Engineering Co.

CHICAGO, 900 tons of rail and billet steel bars for Sheridan Towers, to an unnamed bidder.

CHICAGO, 800 tons, flume on Western Avenue, to Barton Spiderweb System, Inc.

ROCKFORD, ILL., 200 tons, store and office building, to Olney J. Dean & Co.

RIVERSIDE, ILL., 250 tons of rail steel bars for bridge across Desplaines River, to Inland Steel Co.

ST. LOUIS, 200 tons, Alabama Avenue bridge over River Des Peres, to Laclede Steel Co.

BOSTON, 150 tons, Woolworth Co. store, Tremont Street and Hamilton Place.

BOSTON, 104 tons, bank building on Newbury Street.

STATE OF VERMONT, 200 tons, highway bridge.

NEW YORK, 3300 tons, four public schools; 1000 tons in No. 227, 700 tons in No. 12, 750 tons in No. 200 and 750 tons in No. 94.

NEW YORK, 200 tons, Government barracks on Governor's Island.

BROOKLYN, 150 tons, incinerator plant.

PHILADELPHIA, 1000 tons estimated, 25-story addition to Lewis building; bids being taken by contractors.

TORONTO, 1000 tons, for National Life Assurance Co. of Canada.

TORONTO, 2500 tons, for Bayview Avenue bridge over Don River.

ARNPRIOR, ONT., 500 tons for bridge and dam.

STATE OF ILLINOIS, 500 tons, highway bridges.

CHICAGO, 3000 tons, Patterson Estate building; general contract awarded to Hegeman Harris Co.

GRAND FORKS, N. D., 1200 tons, bridge.

KANSAS CITY, MO., 2000 tons, Professional Building.

TACOMA, WASH., 174 tons plates, 51 to 54-in. riveted pipe line; bids opened.

ELLENSBURG, WASH., 105 tons, canal, south branch of Kittitas project, to an unnamed interest.

MAUPIN, ORE., 160 tons, Deschutes River bridge; general contract to Kuckenberg & Wittman, steel to an unnamed interest.

Reinforcing Bars Pending

NEW YORK, unstated tonnage, Packard service station at Fifty-fourth Street and Eleventh Avenue.

BROOKLYN, 500 tons, plant for Brooklyn Ash Removal Co., Inc.

TORONTO, 500 tons of bars for Bayview Avenue bridge over Don River.

ARNPRIOR, ONT., 200 tons of bars for bridge and dam.

CHICAGO, 600 tons, store and office building at Grand Avenue and Michigan Boulevard; Dilks Construction Co., general contractor.

CHICAGO, 122 tons, Nurses Home for city. CHICAGO, tonnage not stated, armory for 124th Field Artillery.

CHICAGO, 600 tons, apartment building at 507 Oakdale Avenue; Maurice L. Bein, architect.

CHICAGO, 550 tons, apartment building at 1032 North Dearborn Street; Maurice L. Bein, architect.

CHICAGO, 600 tons, hotel at 1234 South Wabash Avenue; Maurice L. Bein, architect.

ST. LOUIS, 200 tons, addition to St. Mary's Hospital.

Railroad Equipment

Texas Co. has ordered one six-wheel switching locomotive from Baldwin Locomotive Works.

Pennsylvania Railroad is building 10 4-6-0 type passenger locomotives for service on Long Island at its Altoona, Pa., shops.

Southern Pacific is in market for 25 dining cars.

Chesapeake & Ohio is inquiring for two steel dining cars.

Solvay Process Co., Syracuse, N. Y., has ordered two 0-4-0 type tank locomotives from American Locomotive Co.

Mileage Scale Would Concentrate Industry

Would Draw Manufacturing Consumers Closer to Steel-Making Centers, Say Chicago Producers

CHICAGO, Sept. 4.—That increases in short-haul freight rates on iron and steel and the elimination on short hauls of groups of origin and destination, as outlined in the proposed mileage scale recommended by the Interstate Commerce Commission, will tend to draw industry nearer centers of iron and steel production is the belief of Illinois interests. It is contended that the present spread of industry is the result of the application of freight rates to groups, which have been established in Illinois in one form or another for 50 years or more. Under the proposed mileage scale, origin grouping would not be permitted for points of destination less than 150 miles distant and destination groups would not be allowed for points closer than 450 miles. This opens the way for the formation of groups in competitive territories, but denies the privilege on short hauls that fall within the district that local shippers claim as their natural territory and in which, they say, over 50 per cent of their iron and steel tonnage moves.

It is pointed out that on the short-haul point-to-point mileage scale industrial competitors in centers that are now grouped together would no longer be on a par with one another in the matter of freight charged on manufactured iron and steel. This, it is said, would lead to a slow but sure disintegration of these industrial centers, since manufacturers would find it to their advantage from a rate standpoint to move as close as possible to the sources of their supplies. With the shifting of industries would follow

losses of revenue to the railroads, not only because of the stoppage of manufactured iron and steel movements, but also on account of a decline in the movements of other commodities consumed by the smaller industrial centers. Thus the shippers are pointing out to the carriers that the group system of freight rate application in Illinois has spread industry to the advantage of the railroads, and that the retention of groups of origin and destination without regard to distance will forestall a concentration of manufacturing at points of iron and steel production.

Reviewing results that might be expected from the proposed scale, interests in Illinois and Indiana feel that the proposed mileage scale, if put into effect without modification, would result in heavy handicaps to Western shippers. It would eliminate groups in Illinois and Indiana on short hauls, it would decrease rates from Eastern centers of production into the Illinois-Indiana territory, and it would further decrease the long-haul rates by establishing groups of destination.

Would Aid Pittsburgh Mills

An analysis of the proposed scale for 31 points within a radius of 285 miles from Chicago shows that it would increase freight rates to 23 points. Considering the same points of destination with Pittsburgh as the point of origin, the point-to-point mileage scale would reduce 20 rates, raise six and leave five unchanged. To those points where the distance from Pittsburgh is more than 450 miles the

formation of groups would further reduce rates. With grouping applied, it would follow, according to local opinion, that four of the five unchanged rates from Pittsburgh would have their status altered so that they would be lower than under the Jones & Laughlin scale. Five of the six rates that are above those under the J. & L. scale without grouping applied might be expected, if groups were arranged, to be at least equal to the latter, making the new line-up from Pittsburgh to the 31 points of destination within a radius of 285 miles from Chicago as follows: Twenty-four rates would be lowered by the application of the mileage scale, six would remain unchanged and only one would be raised above the J. & L. scale.

St. Louis, a principal consuming point, is 279 miles from Chicago and 612 miles from Pittsburgh. Under the new plan Chicago producers can form an origin group but not a destination group. Pittsburgh, at a distance of more than 450 miles, may set up a destination grouping. The present rate from Chicago to St. Louis is 22c., and the proposed rate 25c. The present rate from Pittsburgh is 40½c., which would be reduced to 39c. on a point-to-point basis, or, as computed by some, 37c. if groupings were established. The present differential between Chicago and Pittsburgh with St. Louis as the destination is 18½c., while under the mileage scale this might be cut to 12c.

The table shows proposed and present freight rates on manufactured iron and steel from Chicago and Pittsburgh to 31 points in Illinois, Indiana, Michigan, Iowa, Missouri, Ohio and Wisconsin.

Stoker Sales Much Larger

July sales of mechanical stokers by the 12 leading manufacturers in the industry were 192, with 59,859 hp., compared with 166, with 43,212 hp., in June, according to the Department of Commerce. Of the July sales, 73 of the stokers, with 11,993 hp., were installed under fire-tube boilers, while 120, with 48,487 hp., were installed under water-tube boilers. For the first seven months 860 stokers, with 286,459 hp., were sold, against 865, with 318,403 hp., for the corresponding period of last year.

July was the heaviest month since August of last year, when sales totaled 60,977 hp. It compared with 41,504 hp. in July, 1927.

Orders were placed in July for 1615 steel boilers with 1,528,053 sq. ft. of heating surface, against 1611 with 1,469,617 sq. ft. in June, according to reports received by the Department of Commerce from 72 manufacturers. Orders in July of last year represented 1516 boilers with 1,777,598 sq. ft. Of the orders in July of the present year 1597 were for stationary boilers, with 1,478,034 sq. ft.

PRESENT AND PROPOSED CARLOAD RATES ON IRON AND STEEL
IN CENTS PER 100 LB. TO WESTERN CONSUMING POINTS
(Increases Shown in Boldface, Decreases in Italics)

TO	From Chicago			From Pittsburgh		
	Class Miles	Pres.	Prop.	Class Miles	Pres.	Prop.
Decatur, Ill.	170	18	19½	524	36	36
Jacksonville, Ill.	216	20	22	597	40½	38
LaSalle, Ill.	99	13	15½	552	38½	37
Moline, Ill.	167	17	19½	632	43	39
Peoria, Ill.	154	16½	19	561	36	37
Quincy, Ill.	263	20	25	680	43	41
Rockford, Ill.	87	12	14½	555	38½	37
Springfield, Ill.	185	18	20½	563	38	37
Evansville, Ind.	286	23½	26	535	37	36
Fort Wayne, Ind.	148	16½	18½	320	26	27
Indianapolis	184	18	20½	371	29	30
Kokomo, Ind.	140	16½	18	375	29	30
Michigan City, Ind.	55	8	11	428	31	33
South Bend, Ind.	86	12½	14½	391	30	31
Terre Haute, Ind.	178	18	20	468	34	34
Vincennes, Ind.	236	22	23	489	35	35
Detroit	272	27½	25	302	29	27
Grand Rapids, Mich.	184	25½	20½	420	33	32
Holland, Mich.	159	23½	19	453	34½	34
Muskegon, Mich.	192	26	21	467	35	34
Saginaw, Mich.	296	29½	26	389	32½	31
Clinton, Iowa	137	17	18	605	43	39
Dubuque, Iowa	172	17	20	640	43	40
Keokuk, Iowa	249	20	23½	674	43	41
St. Louis	279	22	25	612	40½	39
Cincinnati	285	28	26	311	27	27
Hamilton, Ohio	269	27½	25	297	27	26
Toledo, Ohio	234	26½	23	244	26	23½
Beloit, Wis.	91	12	15	559	44	37
Madison, Wis.	130	14	17½	598	46	38
Milwaukee	85	9½	14	553	37	37

PERSONAL

J. R. LINNEY, vice-president Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., will deliver an address on Chateaugay ore and the manufacture and use of Chateaugay pig iron, before the New England Foundrymen's Association at Boston, Sept. 12. His remarks will be illustrated by stereopticon views.

BENJAMIN F. FAUNCE has resigned as superintendent of the car department at the Cambria works, Bethlehem Steel Co., Johnstown, Pa., to devote his entire time to the Brown-Fayro Co., Johnstown, manufacturer of mining machinery. He has been succeeded by LINDSAY C. PRITNER, who has been assistant manager of the car department since 1916 and identified with the company for 37 years. Mr. Faunce has been with the Cambria plant since 1919 and was previously associated with a number of steel plants in western Pennsylvania. In 1921 he was one of the founders of the Fayro Machine & Engineering Co. and served as its president until its consolidation with the Brown Equipment Co. in 1925 when he became chairman of the board of the merged company.

ADOLPH RIDER, JR., has been appointed manager of the new Atlanta, Ga., office of the Lukens Steel Co., Coatesville, Pa.

CURTISS R. WATERS, formerly with the Cambria Clay Products Co., Black Fork, Ohio, is now associated with the Ferro Enameling Co., Cleveland.

RICHARD H. DANA, who has been vice-president and treasurer of Hodge & Dana, Inc., New York, is now associated with the Robins Conveying Belt Co., New York, and will specialize in the engineering and sale of vibrating screens.

HENRY D. SHARPE, president Brown & Sharpe Mfg. Co., Providence, R. I., who was formerly chairman of the foreign commerce advisory committee of the Chamber of Commerce of the United States, will continue to serve on that committee for the ensuing year. Mr. Sharpe represents foreign commerce on the chamber's board of directors and is also chairman of the civic development department advisory committee. Other members of the foreign commerce committee are HARRY A. BLACK, president Black Hardware Co., Galveston, Tex.; E. A. EMERSON, vice-president and general manager Armco International Corporation, Middletown, Ohio; JULIUS GOSLIN, president Joubert & Goslin Machine & Foundry Co., Birmingham; HENRY H. MORSE, sales export manager Florence Stove Mfg. Co., Boston; H. H. RICE, assistant to the president General Motors Corporation, Detroit; HAROLD F. SEY-

MOUR, vice-president Columbian Vise & Mfg. Co., Cleveland, and L. P. THAYER, vice-president International Harvester Co., Chicago.

C. E. PLUMMER has been appointed chief chemical and metallurgical engineer for the Robert W. Hunt Co., engineer, 2200 Insurance Exchange Building, Chicago. He was graduated in chemical engineering from the University of Michigan and received his master's degree in chemical and metallurgical engineering from the University of Minnesota. Recently he has been engaged in research work at the laboratories of the Union Carbide & Carbon Co., Long Island City, N. Y., and was previously associated with the Bureau of Mines and the Bureau of Standards.

W. W. RUNYON, formerly associated with the Max Solomon Co., Pittsburgh, has joined the Jay G. Stephens Corporation, Pittsburgh, which is engaged in the scrap iron and steel business. Mr. Runyon for a number of years was a member of the sales organization of the Whitaker-Glessner Co., Portsmouth, Ohio, and during the war was in the Ordnance Department. He had charge of the scrap depot at Neville Island, Pittsburgh, after the Armistice.

A. W. VAN BUREN, district manager of sales at Chicago for the Consolidated Machine Tool Corporation of America, has tendered his resignation to take effect Oct. 1.

JOHN J. EHRHARDT, Jersey City, N. J., has been appointed United States trade commissioner at Tientsin, China. Mr. Ehrhardt, a graduate of the Stevens Institute of Technology, Hoboken, N. J., is a mechanical engineer of wide experience.

Coming Meetings

September

Canadian National Exhibition. Sept. 4 to 7. Second steel and power show, University of Toronto Arena, Toronto, Canada. C. Bradshaw, 24 Front Street, West, Toronto, executive director.

Institute of Metals. Sept. 4 to 7. Fall meeting, Liverpool, England. G. Shaw Scott, 36 Victoria Street, London, S. W. 1, England, secretary.

Lake Superior Mining Institute. Sept. 7 and 8. Joint meeting with iron and steel division of the American Institute of Mining and Metallurgical Engineers, Crystal Inn, Crystal Falls, Mich., starting place. A. J. Yungbluth, Ishpeming, Mich., secretary.

American Manganese Producers' Association. Sept. 10 and 11. Annual meeting, Mayflower Hotel, Washington. J. Carson Adkerson, Metropolitan Bank Building, Washington, president.

American Society of Mechanical Engineers. Sept. 17 to 20. Second national fuels meeting, Hotel Cleveland, Cleveland. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Electrochemical Society. Sept. 20 to 22. Fall meeting, Hotel Kanawha, Charleston, W. Va. Colin G. Fink, Columbia University, New York, secretary.

American Society of Mechanical Engineers. Sept. 24 to 27. Machine shop practice meeting, Cincinnati. L. C. Morrow, 29 West Thirty-ninth Street, New York, chairman of division.

October

American Society of Mechanical Engineers. Oct. 1 to 3. New England Industries meeting, Statler Hotel, Boston. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Concrete Reinforcing Steel Institute. Oct. 1 to 3. Fall meeting, Buckwood Inn, Shawnee-on-Delaware, Pa. M. A. Beeman, 2112 Tribune Tower, Chicago, secretary.

National Safety Council. Oct. 1 to 5. Seventeenth annual meeting, Metals Section at Waldorf-Astoria Hotel, New York. John P. Eib, 108 East Ohio Street, Chicago, secretary Metals Section.

American Society for Steel Treating. Oct. 8 to 12. National Metal Exposition, morning sessions at Benjamin Franklin Hotel; afternoon sessions and exhibition at Commercial Museum, Philadelphia. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary.

American Institute of Mining and Metallurgical Engineers, Institute of Metals. Oct. 9 to 11. Fall meeting, Benjamin Franklin Hotel, Philadelphia. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

American Welding Society. Oct. 8 to 12. Fall meeting, Bellevue-Stratford Hotel, Philadelphia. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Gear Manufacturers Association. Oct. 11 to 13. Semi-annual meeting, Statler Hotel, Buffalo. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

Society of Industrial Engineers. Oct. 17 to 19. Fifteenth national convention, Hotel Seneca, Rochester, N. Y. George C. Dent, 205 West Wacker Drive, Chicago, secretary.

American Iron and Steel Institute. Oct. 26. Fall meeting, Commodore Hotel, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

Coke Output for Seven Months and By-Products for a Year

Total coke production for the first seven months of the present year was 30,123,618 tons, against 30,656,781 tons for the corresponding period of 1927, according to the Bureau of Mines. Of the 1928 production, 27,582,618 tons was by-product coke and 2,541,000 tons was beehive coke, while for the 1927 output, 25,770,781 tons was by-product coke and 4,886,000 tons was beehive coke.

By-products obtained from coke oven operations in 1927, according to a bureau statement, had a total sales value, exclusive of breeze production, of \$138,903,882. Production of gas amounted to 700,894,799,000 cu. ft., of which 408,389,357,000 cu. ft. was sold for \$70,092,168, or an average of 17.2c. per 1000 cu. ft. Steel or affiliated plants used 244,969,339,000 cu. ft.

Production of tar totaled 546,859,205 gal., of which 305,898,176 gal. was sold for \$16,095,478, at an average price of 5.3c. a gal. Ammonia sulphate production was 1,216,141,460 lb., which was exceeded by sales, amounting to 1,267,753,969 lb., valued at \$24,802,926, an average price of 2c. a lb. Crude light oil production was 164,488,233 gal., which made 161,072,729 gal. of derived products. Sales totaled 9,265,948 gal., valued at \$1,077,957, or an average price of 11.6c. a gal. Crude and refined benzol production was 22,007,760 gal., of which 21,193,807 gal. was sold for \$4,371,519, at an average price of 20.6c. a gal. Motor benzol production was 86,995,343 gal., of which 86,802,745 gal. were sold for \$14,629,999, at an average price of 16.9c. a gal. Crude and refined toluol production totaled 12,093,590 gal., of which 11,784,984 gal. was sold for \$3,999,820 at an average price of 33.9c. a gal.

World Manganese Output 3,318,773 Tons

Approximate world output of manganese ore, with a metallic content of 30 per cent or more, was 3,318,773 gross tons during 1926, according to the minerals division of the United States Department of Commerce. Of this total 93 per cent was produced by five countries which consume annually but a comparatively small portion of their own output; 40 per cent by Russia, 30 by India, 11 by the Gold Coast, 8 by Brazil and 4 by Egypt. At the same time 1.4 per cent of the world's total was produced in the United States, 1.33 in Spain and 1.26 in China. The remaining proportion was produced by 20 other countries.

Approximately 68 per cent of the total world output of manganese ore is consumed by seven industrial nations. The approximate percentage of total world production consumed by these countries is as follows: United States 22, France 17, United Kingdom 10, Belgium 8, Germany 6,

Japan 3 and Italy 2 per cent. Although the above percentages are based on 1926 statistics, the relative positions of producing and consuming nations have varied little in recent years.

Canada Made Less Steel and Pig Iron in July

TORONTO, ONT., Aug. 31.—Production of pig iron in Canada in July amounted to 95,422 gross tons, a decline of 2 per cent from the record for the year of 97,379 tons produced in June. In July of last year 50,997 tons of pig iron was produced. Compared with the figures for the previous month, the totals for July show that more foundry iron was made, but the gain was not sufficient to offset the decline in the production of basic and malleable grades.

For the seven months ended July 31, production of pig iron in Canada totaled 563,435 tons in 1928, an increase of 24 per cent over the 454,710 tons of 1927, which in turn was 4 per cent better than that reported for the first seven months of 1926.

Active blast furnaces in Canada July 31 had a daily capacity of 2775 tons, or 67 per cent of the total capacity of all blast furnaces in Canada.

Production of ferroalloys in July was 2855 tons, or 31 per cent under the 4157 tons reported for June. For the year to date production totaled 28,869 tons, against 33,244 tons for the first seven months of last year.

Production of steel ingots and direct steel castings in July, at 82,807 tons, was 29 per cent under the output of 116,530 tons for the previous month, but 50 per cent above the 55,250 tons reported for July, 1927. Decreased output of basis open-hearth steel ingots accounted for the decline; this grade dropped from 111,324 tons in June to 78,528 tons in July.

For the seven months ended with July, production of steel ingots and direct steel castings totaled 731,145 tons, against 542,560 tons produced during the corresponding period of 1927, and 496,031 tons made during the first seven months of 1926.

The Dominion Bureau of Statistics index number for the group "Iron and Steel and Its Products" (1913 = 100) declined slightly in July, being 139.4 as compared with 139.7 in June. Minor price declines occurred in steel bars and steel sheets.

The Dominion Bureau of Statistics has revised the list of Canada's installed blast furnace capacity. Figures formerly included a number of obsolete furnaces which were not likely to be put into blast again, and, therefore, could not be regarded as representing available capacity. The new figures show 11 stacks in Canada, which can be called upon to produce a total of 4125 gross tons a day. Four of these furnaces, with a capacity of 1400 tons, are owned by the Dominion Iron & Steel Co. (British Empire Steel Corporation), Sydney, N. S.; four, with

a capacity of 1800 tons, by the Algoma Steel Corporation, Sault Ste. Marie, Ont.; two, with a capacity of 800 tons, by the Steel Co. of Canada, Ltd., Hamilton, Ont.; and one, with a capacity of 300 tons, by the Canadian Furnace Co., Port Colborne, Ont. Furnaces not in blast at present time are capable of producing 1350 tons a day.

Malleable Castings Orders Gain in July

WASHINGTON, Aug. 31.—Production of malleable castings in July was 54,384 tons, or 59.9 per cent of capacity, against 60,779 tons, or 67 per cent of capacity in June, according to reports received by the Department of Commerce from producers.

Shipments in July amounted to 54,056 tons, compared with 58,992 tons in June, while July orders were 53,882 tons, against 51,388 tons in June.

For the seven months ended with July, production aggregated 410,686 tons, against 399,298 tons for the corresponding period of last year. The rate of operations for the seven months of the present year was 64.2 per cent, against 53.9 per cent for the first seven months of 1927.

Shipments were 393,124 tons, against 390,362 tons, while orders were 382,110 tons, compared with 360,398 tons.

Smaller Production of By-Product Coke in July

Production of by-product coke in July is placed by the United States Bureau of Mines at 3,911,082 net tons, a reduction of 1¼ per cent from the 3,961,268 tons of June. The figure is considerably higher, however, than the 3,657,706 tons of July, 1927. Beehive coke output totaled only 271,000 tons in July, compared with 302,000 tons in June and with 467,000 tons a year ago.

Total coke production in July was 4,182,082 tons, while total pig iron output was 3,071,824 gross tons. The ratio was 1.36 net tons of coke for each gross ton of pig iron, compared with 1.38 tons in June and with 1.40 tons in July, 1927.

Hours and Wages in Non-Ferrous Plants

Recent studies by the Bureau of Labor Statistics, Department of Labor, show the hours of labor and earnings of employees engaged in the manufacture of aluminum, brass and copper wares, and in mills making brass and copper sheets, rods, tubes, wire and shapes. In the first industry the average full-time hours a week of male and female employees combined were 52.3 and the average full-time weekly earnings were \$26.83; in the copper and brass mills the average full-time hours per week were 53.8 and the average full-time weekly earnings, \$29.70.

Improvement in European Markets

Better Tone in Great Britain and Advancing Prices on Continent—Production Continues High in Germany

(By Cablegram)

LONDON, ENGLAND, Sept. 3.

DEMAND for British steel is improving, particularly as Continental prices are stiffening. Export inquiry for pig iron is increasing, though actual sales as yet are small, while foreign pig iron is not competitive in the British domestic market. Hematite makers are increasing production by starting up one Newport Iron Works (Middlesbrough) furnace and one Carlton blast furnace on ferromanganese. Foreign ore is quoted on the basis of the termination of the Swedish strike; little important change is expected this year.

There is good demand for British semi-finished steel and prices are advancing. Export demand for finished iron and steel is generally quiet, but domestic consumers are more interested, especially in small-section materials. Heavy plate mills are badly in need of orders.

Clyde shipbuilding output in August was 22 vessels launched, aggregating 73,500 gross register tons.

Tin plate sales have been moderate in amount, but there are important inquiries still under negotiation and makers anticipate renewal of activity.

Galvanized sheets are active. Merchant buyers have placed substantial contracts and, considering India and other markets, a large export business is expected to develop before long. Black sheets are quiet.

On the Continent of Europe

Continental iron and steel prices are strong, particularly in the finished materials. Works are well sold up and a fair volume of overseas export business has been transacted direct. Many works are now off the market.

Belgian output in July was 324,000 tons of pig iron and 311,000 tons of raw steel (steel ingots and castings).

a further advance in export prices is considered probable. Domestic quotations of the Big Iron Syndicate for August are unchanged, and it is assumed that the Ingot Steel Syndicate will continue its present schedule of prices.

Reports that formal negotiations have been instituted among the members of the International Steel Cartel to develop means of meeting the threat of export competition from United States mills are evidently exaggerated. It is suggested that some change in the cartel is worthy of discussion, in view of the formation of the American steel export association, but apparently Western German producers are not yet much concerned over the possible danger to Continental export trade. It is proposed, however, that formation of selling syndicates for the various products controlled by the steel cartel again be discussed.

Domestic business in machinery shows a further decline, but export sales continue in fair volume. Both domestic and export sales of machine tools have increased, but business in agricultural machinery is unsatisfactory. Machinery exports in the first half of the year totaled 42,551 metric tons, compared with 44,340 tons in the first half of 1927. Russia is still Germany's best customer for machinery, but is buying less than formerly, and Italy has reduced purchases. This decline has been partly

German Production Still High

Better Exports Offset Decline in Home Trade—Machinery Imports Large, Especially From United States

BERLIN, GERMANY, Aug. 17.—Increased steel export business has made it possible for German mills to maintain a fair production schedule, despite the decline in domestic demand. Export prices are rising, and

it is reported from Belgium that works there have sufficient tonnage booked to keep them occupied until late in the fall. German export sales are at present at slightly higher prices than French and Belgian, and

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25	
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35	to \$5.48
Cleveland No. 1 fdy.....	3 8½	to 3 9½	16.64	to 16.89
Cleveland No. 3 fdy.....	3 6		16.04	
Cleveland No. 4 fdy.....	3 5		15.80	
Cleveland No. 4 forge...	3 4½		15.68	
Cleveland basic (nom.)...	3 5		15.80	
East Coast mixed.....	3 10		17.11	
East Coast hematite....	3 10½		17.23	
Rails, 60 lb. and up....	7 15	to 8 5	37.66	to 40.10
Billets.....	6 2½	to 6 15	29.77	to 32.81
Ferromanganese.....	13 15		66.83	
Ferromanganese (export)	13 0	to 13 5	63.18	to 64.39
Sheet and tin plate bars, Welsh.....	6 0		29.16	
Tin plate, base box....	0 18	to 0 18½	4.37	to 4.43
Black sheets, Japanese specifications.....	13 7½		65.00	
Ship plates.....	7 12½	to 8 2½	1.63	to 1.74
Boiler plates.....	9 0	to 10 10	1.92	to 2.25
Tees.....	8 2½	to 8 12½	1.74	to 1.84
Channels.....	7 7½	to 7 17½	1.58	to 1.69
Beams.....	7 2½	to 7 12½	1.53	to 1.63
Round bars, ¾ to 3 in..	7 5	to 7 15	1.55	to 1.66
Steel hoops.....	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage...	9 15	to 10 0	2.09	to 2.14
Galv. sheets, 24 gage...	13 10		2.93	
Cold rolled steel strip, 20 gage, nom.....	16 0		3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):				
Belgium.....	£3 3s.	to £3 5s.	\$15.32	to \$15.80
France.....	3 3	to 3 5	15.32	to 15.80
Luxemburg.....	3 3	to 3 5	15.32	to 15.80
Basic pig iron (nom.):				
Belgium.....	3 3	to 3 4	15.41	to 16.38
France.....	3 3	to 3 4	15.41	to 16.38
Luxemburg.....	3 3	to 3 4	15.41	to 16.38
Coke.....	0 18		4.37	
Billets:				
Belgium.....	4 19½		24.18	
France.....	4 19½		24.18	
Merchant bars:				
Belgium.....	6 0	to 6 3	1.30	to 1.33
France.....	6 0	to 6 3	1.30	to 1.33
Luxemburg.....	6 0	to 6 3	1.30	to 1.33
Joists (beams):				
Belgium.....	5 3	to 5 5	1.12	to 1.14
France.....	5 3	to 5 5	1.12	to 1.14
Luxemburg.....	5 3	to 5 5	1.12	to 1.14
Angles:				
Belgium.....	6 0		1.30	
½-in. plate:				
Belgium (a).....	6 12½	to 6 14	1.44	to 1.48
Germany (a).....	6 12½	to 6 14	1.44	to 1.48
3/16-in. ship plate:				
Belgium.....	6 8		1.41	
Luxemburg.....	6 8		1.41	
Sheets, heavy:				
Belgium.....	6 1		1.33	
Germany.....	6 1		1.33	

(a) Nominal.

offset by increased business from Poland and the Baltic countries.

Imports of agricultural machinery are increasing, having totaled 6652 tons in the first half of this year compared with 3921 tons in the same period of 1927. Of the total received in the first half of this year the United States furnished 2796 tons.

As a result of the refusal of the Government to extend aid to the locomotive builders, several mergers and partial mergers are reported. Henschel & Co., at Cassel, have entered into an agreement with the Maschinenfabrik Buckau-Wolf, to take over

the latter's locomotive building shops. The Stettin Vulcan Co., it is reported, is about to abandon all locomotive construction. Even the present low level of locomotive exports is being maintained only by selling at exceedingly low prices. It is said that locomotives that bring 1700 m. (\$404.60) per ton in Germany are exported for 1000 m. (\$238) per ton.

Pipe and tube mills are inactive, but expect some future business following the development of present plans for long-distance gas lines. Orders for pipe to be used for this purpose already total 35,000 tons.

Japanese Steel Market Quiet

Curtailment of Trade With China and Decline In Value of Yen Are Factors—Wire Rod Output Increases

EXPORTS of sheets to China by Japanese sellers have almost ceased, says the monthly report of A. Cameron & Co., Kobe, Japan. In addition, local demand is light because of the usual summer depression. In August the Kawasaki Dockyard Co. reduced its prices on light-gage sheets 1 yen (45.2c.) per ton. Foreign black sheets, 13 to the bundle, are unchanged at 73.50 sen (33c.) per sheet for American material and 72.50 sen (32c.) per sheet for British sheets. Imports of sheets to Japan in June increased 1623 tons compared with the preceding month, when the total was 14,918 tons. The imports were distributed as follows: British, 9387 tons; American, 3500 tons; German, 1822 tons; Belgian, 189 tons, and Swedish, 20 tons. This brings the total arrivals of sheets in the first half of the year to 85,386 tons.

The tin plate market was inactive throughout July, because of the rains during the first two weeks, and local holidays in the latter half of the month. Weakness in the exchange value of the yen caused some slight advances in the quotations on foreign tin plate in this period. Stocks of British material in Japan are reported small. Latest quotations on tin plate are 12.50 yen (\$5.65) per 100-lb. base box for American, 12 yen (\$5.42) per base box for British, and 11.25 yen (\$5.09) per base box for Yawata (Government Steel Works).

Despite arrivals of small quantities of wire rods in an inactive market, no depression of prices is evident, and quotations are fairly steady. Weakness in the exchange value of the yen has resulted in some strengthening of prices, so that latest quotations are about 106 yen (\$47.90) per ton for foreign wire rods. The price of the Government Steel Works for October delivery is 94 yen (\$42.49) per ton, a decline of 1 yen (45.2c.) per ton from the previous level. There is still much business in wire rods in prospect, as the Government Steel Works is not yet equipped to furnish all the requirements of Japanese consumers. The following comparison of domestic production and imports of

wire rods, in metric tons, shows a steady increase in Japanese output and large imports:

	Government Steel Works	All Other Domestic	Imports
1922....	14,691	12,903	54,078
1923....	21,446	18,178	54,327
1924....	21,797	9,898	88,242
1925....	35,668	12,968	51,319
1926....	43,800	6,204	117,971
1927....	49,018	16,719	109,090

Exports of wire nails to China have almost ceased, so that, although local production is limited, the local market has become slightly overstocked. Prices sagged early in July, but later some strength developed as small orders began to come in from the country districts and the wire rod market became firmer. Latest quotations are 8.55 yen (\$3.86) per keg. Galvanized wire prices followed the trend in the wire nail market and showed slight weakness, later recovering when a steadier tone developed in the wire rod market.

Foreign Steel Prices High— New Marking Decision Awaited

NEW YORK, Sept. 3.—Importers are receiving higher quotations from Continental steel mills on bars, shapes, hoops and bands than a week ago, and, except for occasional lots of material placed at slightly lower prices with mills seeking certain sizes to complete rollings, the market is too high to permit much business. The most recent prices quoted on ordinary Thomas steel bars are 1.85c. per lb., duty paid, New York, and on shapes, 1.72c. to 1.77c. per lb., duty paid.

The United States Treasury Department is continuing its investigation of the question of marking imported steel with the country of origin, and some importers suggest that its decision may be made retroactive. This, however, is doubted by many, as the previous decision of the department clearly stated that billets, blooms, plates, shapes and bars were "material," and as such were not subject to marking. A recent decision on marking imported cigars, however, is

suggested as the possible basis for retroactive measures.

Export business is quiet, but, although mills are apparently in a better position on tonnage to be rolled, no upward revision of export quotations is reported. About 20,000 boxes of canner's tin plate for the provision department of the Japanese Army are understood to have been placed with one of the three important Japanese export houses in New York. About 275 tons of channels for car frames, bought by the Imperial Government Railways in Japan, went to a New York exporter for execution by an American mill, and 542 tons of mild steel plates for car building was also placed with an American mill by the South Manchuria Railway Co.

United States Large Buyer of German Wire Netting

HAMBURG, GERMANY, Aug. 18.—The United States has become Germany's second largest customer for wire netting, having taken 1971 tons in the first half of this year, compared with 1356 tons in the first half of 1927 and 907 tons in the first half of 1926. The total exports of wire netting in the first half were 10,784 tons, compared with 9573 tons in same period of 1927. The largest market for wire netting was South Africa, which took 3420 tons in the first half, and South America was a large buyer, Argentina having taken 731 tons, compared with 495 tons in the same period of last year.

Krupp Erecting Two New Furnaces on Rhine Canal

HAMBURG, GERMANY, Aug. 18.—Two blast furnaces, with a combined capacity of about 850 tons a day, are being erected on the Rhine-Herne Kanal by the Friedrich Krupp A. G. These will replace three old furnaces, which are to be dismantled. The first of the new furnaces will be blown in about Oct. 1. Open-hearth steel mills at the same site are being modernized.

American Company Licensed for German Sheet Process

HAMBURG, GERMANY, Aug. 18.—According to current reports, a license to manufacture aluminum plates and sheets under the "Feran" process has been sold by the German inventors to an unnamed American company for about \$1,000,000. Negotiations with British, French and Italian companies interested in securing licenses for this process are continuing.

The Interstate Commerce Commission has granted an extension from Sept. 15 to Nov. 1 for filing briefs and from Oct. 1 to Dec. 1 for filing reply briefs on the application of the mileage scale recommended by the examiners in Docket 17,000, Part 6.

Machinery Markets and News of the Works

August Tool Sales Large

Month's Business Was Surprisingly Good and for Some Sellers Exceeded That of July

MACHINE tool business in August was surprisingly good, and for some sellers was in excess of that done in July. The total sales for June, July and August have undoubtedly been considerably ahead of those for any summer in recent years.

In addition to the business closed, inquiries were numerous and a sufficiently large volume is pending to give force to expectations that the present buying rate will be equaled if not surpassed in September.

Cincinnati machine tool builders report that their August sales were 10 to 15 per cent greater than those of July, this high level having been brought about by liberal purchases by three or four automobile companies in the Detroit district. Some of the Cincinnati machine tool plants are now operating at the highest rate since 1919.

The first eight months of 1928 have shown a substantial gain over the same months in 1927. One Cincinnati builder reports an increase of 35 per cent, but 20 to 25 per cent is probably nearer the average. A number of companies state that business has come from a greater diversification of sources than in many years.

An order from a Detroit automobile manufacturer for special machines, totaling about \$100,000 in value, was probably the largest transaction of the week. In the East, inquiries have been numerous and include one for about \$100,000 worth of tools. Several sizable lists are pending in the Chicago market.

New York

NEW YORK, Sept. 4.—The past week has brought a greater number of inquiries for machine tools than orders, indicating to the trade that business in September will equal and perhaps exceed that of August, which for some sellers was the second best month of the year. The Niles-Bement-Pond Co. reports that its August sales exceeded those of any other month of the year, the business of the Pratt & Whitney division being particularly good. Included in the inquiries of the week is one which calls for about \$100,000 worth of new equipment. In addition, the call for single tools was larger than in any recent week. Some machine tool builders are handicapped in quoting because of inability to make early deliveries.

Niles-Bement-Pond Co. reports sales of a combination journal turning and axle lathe, a 60-in. x 41-ft. lathe and other smaller machines, while the Pratt & Whitney division sold eight lathes, three vertical surface grinders, two jig borers, 12 ball-bearing testing machines, three automatic lathes, a vertical shaper, two universal bench milling machines and a production hand milling machine.

Bart and John P. Walther, 103 East 125th Street, New York, architects, have

plans under way for a one-story plant at 539-53 East 118th Street, to be equipped as a wire annealing works, for a company whose name is temporarily withheld, estimated to cost about \$40,000.

Radio Corporation of America, Woolworth Building, New York, has approved plans for extensions and improvements in its transmitting plant at Riverhead, L. I., to cost about \$200,000, with power and other equipment.

Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, has begun work on a new airport at Lac a la Tortue, Que., consisting of airdrome, repair and reconditioning shops, oil storage and distributing buildings and other mechanical units, reported to cost more than \$100,000.

Union Railway Co. of New York, 2396 Third Avenue, has filed plans for one-story equipment storage and distributing plant, 50 x 115 ft., at West Farms Road and 172nd Street, to cost close to \$30,000. E. H. Faile & Co., 441 Lexington Avenue, New York, are architects.

General Cable Corporation, 420 Lexington Avenue, New York, has acquired Detroit Insulated Wire Co., 4647 Wesson Avenue, Detroit, and will consolidate as a unit in its organization, operating in future as Detroit Insulated Wire Division of parent company.

R. Hoe & Co., 504 Grand Street, New York, manufacturers of printing presses,

saws, etc., are arranging for a note issue of \$800,000, and stock issue of 16,000 shares, the majority of proceeds to be used for proposed purchase of factory of De La Vergne Machine Co., on East River, from 137th to 138th Street, and consolidation of manufacturing operations at that location, including removal of present Grand Street and Dunellen, N. J., works there, and additional facilities for increased output. H. R. Swartz is president.

New York Central Railroad Co., Grand Central Terminal, New York, has authorized plans for extensions and improvements in its yards, shops and commissary buildings at the Mott Haven yards, including erection of new five-story building, aggregating about 85,000 sq. ft. floor space, entire project to cost in excess of \$2,000,000, with equipment.

Andrews Lead Co., 36 Greenpoint Avenue, Long Island City, has awarded general contract to M. J. Irwin & Son, 48-70 Thirty-seventh Street, for a one-story addition to cost close to \$45,000, with equipment. G. B. Webb, 10 East Forty-third Street, New York, is architect.

Conveying machinery, refrigerating apparatus, power equipment, and other mechanical equipment will be installed in new three-story plant to be erected by Armour & Co., Chicago, on Seventh Street, near Monmouth Street, Jersey City, N. J., 120 x 130 ft., reported to cost more than \$700,000, with machinery.

Western Electric Co., 195 Broadway, New York, manufacturer of wire and cables, radio equipment, etc., has awarded general contract to Austin Co., 120 Broadway, for new seven-story unit at plant at Kearny, N. J., to cost more than \$1,000,000, with equipment.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has acquired property on Blazing Star Road, Port Reading, near Perth Amboy, N. J., and is reported planning construction of new large steam-operated electric generating plant at that place.

Arcturis Radio Co., 247-55 Sherman Avenue, Newark, manufacturer of radio devices and equipment, tubes, etc., has leased two-story factory at 141-43 Frelinghuysen Avenue, and portion of building at 218-26 Elizabeth Avenue, and will use for expansion. It is understood that portion of present plant will be removed to first noted location and capacity increased.

Paige & Jones Chemical Co., New York and Hammond, Ind., has purchased patent rights and good will pertaining to lime soda water softening business of American Water Softener Co., Philadelphia, and will manufacture and sell this equipment in future. W. T. Runcie and H. C. Waugh, formerly sales manager and engineer respectively of American company, have been added to Paige & Jones organization.

Grant Home Heater Corporation has removed its New York offices to factory and demonstrating rooms at 123 Montgomery Street, Jersey City.

Air Reduction Co., Inc., 342 Madison

The Crane Market

MORE inquiries for overhead and locomotive cranes have appeared in the market during the past week and there has been some buying of both locomotive and overhead cranes. A 10-ton hand power crane for Lehigh University and a 10-ton, 40-ft. span, 3-motor crane for the University of Illinois, are still pending. The De La Vergne Machine Co., which recently disposed of its New York plant to R. Hoe & Co., New York, and moved to the plant of the I. P. Morris Machine Works, Philadelphia, is reported to have placed an order with a Philadelphia crane builder for six electric traveling cranes. Inquiry for locomotive cranes is increasing and several purchases are reported to have been made in

this district during the past week. A sand and gravel company, subsidiary of the Eastern New Jersey Power Co., South River, N. J., is reported to have closed on a 10-ton crawl-tread locomotive crane and the Standard Oil Co. of New York on two crawl-tread locomotive cranes for export. The Borough of Richmond, New York, has been taking bids on a 10-ton crawl-tread locomotive crane.

Among recent purchases are:

Stevens & Wood, Inc., 120 Broadway, New York, reported to have closed on 100-ton, 72-ft. 6-in. span overhead crane, with Niles Crane Corporation.

N. P. Nelson Mfg. Co., Allwood, N. J., 5-ton, 27-ft. span, hand power crane from Box Crane & Hoist Corporation.

Asiatic Petroleum Corporation, 65 Broadway, New York, three 7½-ton crawl-tread locomotive cranes and one 7½-ton stationary crane for mounting on a barge, from Industrial-Brownhoist Corporation.

Rosenthal Engineering Contracting Co., 12 East Forty-first Street, New York, 5-ton truck crane, the second in a fortnight, from Browning Crane Co.

Cullen Friestedt Co., Chicago, 15-ton, 60-ft. span, 3-motor, overhead crane from builder in Middle West.

Bendix Corporation, South Bend, Ind., overhead electric crane of unstated capacity from Cleveland Crane & Engineering Co.

Avenue, New York, has purchased business and property of Ohio Oxygen Co., Niles, Ohio. Former company now controls 37 oxygen plants located in principal industrial centers.

Pittsburgh

PITTSBURGH, Sept. 3.—Machine tool business maintains its recent improvement. In addition to a steady sprinkling of orders, inquiry continues to expand. The Carnegie Steel Co. is in the market for a lathe, a bending machine and a saw for one of its Pittsburgh district plants. The Westinghouse Electric & Mfg. Co. still has a few machines to award on its third quarter list.

Officials of Mackintosh-Hemphill Co., Pittsburgh, manufacturer of rolling mill machinery, with plant at Twelfth and Etna Streets, have organized a new company of same name under Delaware laws, with capital of 100,000 shares of stock, no par value, to take over and expand present company.

Swan-Finch Refining Co., recently formed as subsidiary of Swan-Finch Oil Co., 522 Fifth Avenue, New York, an interest of Standard Oil Co. of New York, 26 Broadway, has concluded arrangements for purchase of Seneca Oil Works, Inc., Franklin, Pa., with local refinery. New owner plans early expansion in existing plant to develop output of 10,000 bbl. per day, including large division for gasoline production. Purchasing company is capitalized at \$500,000.

Board of Education, Erie, Pa., plans installation of manual training equipment in new two-story senior high school on West Sixth Street, estimated to cost \$1,000,000, for which bids have been asked on general contract. Meyers & Johnson, Commercial Building, are architects.

Ralph F. Dawson, care of J. D. S. Truxall, 144 Union Trust Building, Pittsburgh, and associates are organizing Dawson Aircraft Corporation, to establish and operate local plant for manufacture of airplanes and parts, for which site has been selected and work will soon begin.

In connection with new warehouse and distributing plant on Eleventh Street, Pittsburgh, Carnegie Steel Co., Carnegie Building, plans installation of five 10-ton double-trolley overhead electric traveling cranes and other material conveying and handling equipment. A machine shop will be installed, including electric-oper-

ated friction saws, punches, drill presses; bar, plate and angle shears; riveting machines and other tools. Unit is scheduled for completion by end of year.

Joseph F. Doven, 241 Catalpa Place, Mount Lebanon, Pittsburgh, and associates have organized American Tile Fixture Co., and plans operation of local plant for manufacture of soda fountains and fixtures, lunch counters, etc. Charles J. Brody, 1007 Flemington Avenue, Pittsburgh, is interested in new company.

Philadelphia

PHILADELPHIA, Sept. 3.—Contract has been let by A. H. Fox Gun Co., Eighteenth Street and Wagner Avenue, Philadelphia, to Van Asdlen Construction Co., Stock Exchange Building, for a new one story addition to cost close to \$20,000 with equipment.

Cramp-Morris Industrials, Inc., Richmond and Norris Streets, Philadelphia, has awarded general contract for one-story unit to Fred A. Havens, Inc., 845 North Nineteenth Street, to be equipped as a machine shop. It will be used in connection with removal of De La Vergne Machine Co. division, manufacturer of ice-making and refrigerating machinery, from New York to Philadelphia works.

Marshall Brothers & Co., Front Street and Girard Avenue, Philadelphia, sheet metal products, tinner's supplies, roofing, etc., has leased a portion of the former pottery of John Maddock Co., Muirhead Avenue, Trenton, N. J., and will improve and equip for a new factory branch and distributing plant. S. F. and F. W. Marshall are heads.

Iroquois Electric Refrigeration Co., a subsidiary of General Asphalt Co., Insurance Company of North America Building, Philadelphia, manufacturer of electric refrigerating equipment, is planning to discontinue operations and will dispose of its property and assets by the end of the year.

Cadillac Motor Car Co., Broad Street and Ridge Avenue, Philadelphia, has asked bids on general contract for a new service, repair and sales building at 164 West Chelton Avenue, reported to cost in excess of \$100,000 with equipment. Philip S. Tyre, 114 South Fifteenth Street, is architect.

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has approved plans for new coal pier on Terminal Avenue, near Delaware Avenue, with ele-

vating, conveying and other mechanical handling equipment, estimated to cost \$325,000.

Atlantic Radiator Shield Co., Philadelphia, has leased building at 4317 Walnut Street, and will remodel and occupy for new plant.

Officials of Girard Smelting & Refining Co., Tioga and Richmond Streets, Philadelphia, have organized a new company of same name, to take over and expand present plant and business. Joseph Axelrod and Louis Schwab, 5231 Gaynor Road, head new organization; last noted will be treasurer.

Williamsport Airport Co., Williamsport, Pa., has been formed with capital of \$100,000, to establish and operate local airport, including hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical units. Company is headed by A. W. Siegel and S. T. McCormick, Jr., Williamsport; and J. A. Heim, Montoursville, Pa.

Lehigh Valley Railroad Co., 143 Liberty Street, New York, will carry out an expansion and improvement program at yard at Pittston, Pa., to cost about \$200,000, including installation of automatic car retarders, new mechanical dumping equipment and other equipment.

Harvey S. Billheimer, 810 North Sherman Street, Allentown, Pa., and associates have organized a new company to be known as Bethlehem Mfg. Co., to establish and operate a plant at Fountain Hill (Lehigh County) for manufacture of tools, castings and kindred mechanical equipment. William A. Buss, 1218 Broadway, Fountain Hill, is also interested in new organization.

United States Air Transport, Inc., Camden, N. J., recently formed under Delaware laws to take over Camden airport, Gettysburg, Pa., flying field, and other properties, is planning an expansion and improvement program, including establishment of airports at Harrisburg, Pa., New Market, Va., Baltimore and Luray Caverns, Va., in connection with trimotored airplane service, with hangars, repair and reconditioning shops, oil storage and distributing buildings, and other structures. Company is disposing of stock issue to total \$625,000, proceeds to be used for developments noted. Robert E. Funkhouser is president.

American Bridge Co., Ridge and Wisahickon Avenues, Philadelphia, has approved plans for installation of crane runway at its local Pencoyd works, estimated to cost about \$50,000.

South Atlantic

BALTIMORE, Sept. 3.—Plans are being drawn by Hutzler Brothers Co., 212 North Howard Street, Baltimore, for six-story automobile service, repair and garage building to cost close to \$500,000, with equipment. Parker & Shaffer, 280 Madison Avenue, New York, are architects.

Board of Education, Easton, Md., is said to be considering installation of manual training equipment in new three-story high school, estimated to cost \$130,000, for which plans are being drawn by H. Powell Hopkins and Allan C. Burton, 374 North Charles Street, Baltimore, architects.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Sept. 11 for one portable grinder, 60 metal-cutting band saws, 12 sets of dies, one air compressor and other mechanical equipment; until Sept. 20 for wire cloth, wire lath, pumps, cable clips, pressure gages, etc., schedules 2466 and 1900, respectively.

Carolina Tractor & Equipment Co., Salisbury, N. C., is planning purchase of two or more Diesel type locomotives, 20 to 25 tons capacity, 36-in. gage.

Asiatic Petroleum Co., Ltd., 65 Broadway, New York, is perfecting plans for construction of new storage and distributing plant on Patapsco River, Fairfield, Baltimore, where tract of land recently was acquired, including pumping plant, boiler house and other mechanical units, reported to cost close to \$500,000 with equipment. Initial plant will be extended at later date.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until Oct. 3 for one electric bridge crane at naval air station, San Diego, Cal., specification 5713.

Board of Aldermen, Columbia, N. C., is asking bids until Sept. 10, for municipal electric power plant, including fabricated steel building complete, mechanical and electrical equipment and high tension distributing system. W. H. McClees is city clerk.

Newman Machine Co., Jackson Street, Greensboro, N. C., is said to be planning early installation of additional equipment, including turret lathe, metal-cutting saw and other tools.

Farmville Furniture & Cabinet Co., Farmville, Va., has work under way on new plant to cost approximately \$70,000 with equipment.

Buffalo

BUFFALO, Sept. 3.—Contract has been let by Genesee Motoramp Garage, Inc., Buffalo, to Metzger Construction Corporation, 676 Genesee Street, for six-story service, repair and garage building on Pearl Street, near Genesee Street, to cost about \$600,000, of which more than \$200,000 will be expended for equipment. Completion is scheduled by close of year.

Ward & Dickinson, Inc., Silver Creek, N. Y., manufacturer of dining cars and accessories, is disposing of a preferred stock issue of \$560,000, a portion of fund to be used for expansion in output. Lee F. Dickinson is president.

Charles O. Maxwell, 430 University Block, Syracuse, N. Y., and associates have organized Canastota Sherwood Stamping Corporation, with capital of 1000 shares of stock, no par value, and plans operation of plant at Canastota, N. Y., for manufacture of stamped metal goods, in-

cluding toys and other novelties. Howard H. Francis is also interested in company.

J. A. Reynolds, 8416 West Riverside Drive, Niagara Falls, N. Y., is at head of project to construct and operate automobile service, repair and garage building on Prospect Street, near Niagara Street, to cost about \$100,000 with equipment. W. W. LaChance, Trust Company Building, architect, has been engaged to prepare plans.

Liberty Playthings, Inc., Niagara Falls, N. Y., has concluded arrangements for purchase of Liberty Toy Mfg. Co., East Aurora, N. Y., and will merge with organization. Expansion program is planned at Niagara Falls plant for toy manufacture.

Chicago

CHICAGO, Sept. 3.—Leading machine tool dealers in Chicago variously report that August from the viewpoint of sales was even better than July or the best month of the year. In any event there is little room for doubt that purchases in the three summer months were the largest enjoyed by local dealers in many years. Reports are to the effect that the Studebaker Corporation will move its Detroit plant to South Bend, Ind., and that when this move is made additional machine tool equipment will be needed. The Allis-Chalmers Mfg. Corporation, Milwaukee, has postponed action until Sept. 15 on a list which will total \$100,000. A list of similar size for the A. O. Smith Corporation, Milwaukee, is still before the trade. A sizable list is expected soon from the International Harvester Co. A Western drill manufacturer has sold 34 drilling machines for use in an automobile plant at Detroit. A jig boring machine will be purchased for the Rock Island Arsenal. Inquiry is active and the outlook for September is favorable.

Water Works Department, Cedar Rapids, Iowa, H. F. Bloomquist, superintendent, will install pumping machinery and power equipment to cost \$500,000. H. R. Green Co., Beaver Building, Cedar Rapids, Iowa, is consulting engineer.

Progressive Brass Co., formerly located in Kansas City, Mo., will move its plant to 1702 East Sixth Street, Tulsa, Okla.

Globe Steel Tube Co., 1345 Burnham Street, Milwaukee, will build a plant addition, 110 x 240 ft. to cost \$50,000.

Northeastern Iowa Power Co. is planning extensions and betterments to its plant at Independence, Iowa.

Construction Machinery Co., Waterloo, Iowa, has acquired the plant and business of the Marsh-Capron Co., Chicago Heights, Ill., makers of concrete mixers. For the time being operations will be continued at both the Waterloo and Chicago Heights plants, but it is the intention of the new owner gradually to work the products of the East Chicago plant into the factory at Waterloo.

Board of Trustees, University of Chicago, 189 West Madison Street, Chicago, has plans nearing completion for new two-story power plant. P. B. Maher, 157 South Dearborn Street, is architect.

Rockford Stamping & Tool Co., Rockford, Ill., care of W. W. Aditz, 625 North Independence Avenue, recently organized with capital of \$30,000, by Mr. Aditz and associates, is arranging for lease of local property for establishment of new plant

to manufacture stamped metal goods, engineering parts and tools.

International Harvester Co., 606 North Michigan Avenue, Chicago, is planning an addition to plant on Forty-third Avenue, Rock Island, Ill., reported to cost in excess of \$100,000, with equipment.

O. D. Jennings & Co., 4329 Lake Street, Chicago, manufacturer of coin vending machines and parts, is planning construction of new addition to cost in excess of \$100,000, with equipment.

Board of City Commissioners, Yankton, S. D., will receive bids until Sept. 11 for two low head deep well turbine type pumping units, and for three high head centrifugal pumps, with auxiliary equipment, for municipal waterworks. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Union Carbide & Carbon Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, welding apparatus, etc., has awarded general contract to G. H. Lounsberry, 322 East Superior Street, Duluth, Minn., for new one-story plant on Thirty-ninth Avenue, West, Duluth, reported to cost in excess of \$50,000, with equipment.

Aetna Auto Parts Co., 2107 South State Street, Chicago, has filed plans for a one-story repair shop addition at 2115 South State Street. H. E. Gallup, 646 North Michigan Avenue, is architect.

Board of Education, 650 South Clark Street, Chicago, E. E. Withall, business manager, is said to be planning installation of manual training equipment in new four-story junior high school at Berteau Avenue and North Major Street, reported to cost in excess of \$1,000,000. J. C. Christenson is school architect.

Streator Cold Storage Door Co., 903 La Rue Street, Streator, Ill., is considering erection of new one-story, addition to cost close to \$40,000, with machinery. W. M. Harsch is president.

Reynolds Engineering Co., Rock Island, Ill., manufacturer of special machinery, tools, jigs, dies, etc., has asked bids on general contract for a one and two-story L-shaped addition, to cost close to \$45,000, with equipment.

Cleveland

CLEVELAND, Sept. 3.—Machine tool business is holding up fairly well, although sales in August were slightly below those in July. In this territory business is coming almost wholly from manufacturers of automobile parts and there are few orders for more than single machines. No lists of any size are pending. Locally, there is a considerable amount of used machinery on the market at present and many prospective purchasers of new equipment wish to trade in old machines for new.

Bids will be asked by Board of Education, Sixth and Rockwell Streets, Cleveland, at early date for addition to foundry at school on Eagle Avenue, estimated to cost about \$45,000, with equipment. G. M. Hopkinson is school architect.

DeVilbiss Co., Toledo, Ohio, manufacturer of spraying equipment and devices, has plans under way for new addition, reported to cost about \$65,000, with equipment.

Willys-Overland Co., Central Avenue, Toledo, Ohio, has awarded general contract to A. Bentley & Sons Co., 201 Belmont Avenue, for new addition to auto-

mobile plant to cost close to \$100,000, with machinery.

Leubee Brothers, Inc., Zanesville, Ohio, recently formed by Joseph and Lee Leubee, to manufacture machinery and parts, has engaged John P. Schooley, Zanesville, architect, to prepare plans for a one-story foundry and machine shop, 100 x 280 ft., reported to cost in excess of \$45,000, with equipment.

Willard Storage Battery Co., 246 East 131st Street, Cleveland, has awarded general contract to S. W. Emerson Co., 1836 Euclid Avenue, for one-story addition, 65 x 215 ft., to cost approximately \$80,000, with equipment. R. C. Norberg is president and general manager.

Goodrich Rubber Co., South Main Street, Akron, Ohio, manufacturer of automobile tires, mechanical rubber goods, etc., has asked bids on general contract for two new additions, reported to cost in excess of \$125,000. One of units will be used for manufacturing and other for storage and distributing service.

Ferro Enameling Co., Keith Building, Cleveland, has awarded contract for two-story plant addition, 54 x 66 ft., to P. Kirschner Co., 2725 Pittsburgh Avenue, Cleveland.

Detroit

DETROIT, Sept. 3.—Buhl Aircraft Co., Marysville, Mich., is working on the largest single order it has ever received, 11 airplanes costing \$12,000 each, to be used by the Canadian National Transport Co., Ltd., Toronto, on its air passenger lines in Canada. Canadian National Transport Co. is also the Toronto distributor for the Buhl Aircraft Co.

A steel roofed, brick addition to plant of Monroe Steel Castings Co., Monroe, Mich., had to be built to accommodate a Tate-Jones automatically controlled, low-pressure, oil-fired annealing furnace, car type. The car of the furnace is 6 x 15 ft. and has a loading capacity of 15 tons.

Plans are being drawn by Oldberg Mfg. Co., 2661 East Grand Boulevard, Detroit, manufacturer of automobile mufflers, etc., for a one-story top addition to cost close to \$30,000. C. W. Brandt, 2111 Woodward Avenue, is architect.

American Chain Co., Adrian, Mich., is planning for increase in capacity in local plant, used for production of automobile bumpers, and will provide additional facilities for this purpose. J. M. Reifsnider is factory manager. Headquarters are at Bridgeport, Conn.

Bay City Electric Casting Co., Bay City, Mich., is considering early rebuilding of portion of plant destroyed by fire, Aug. 19, with loss reported at close to \$100,000 with machinery.

Chrysler Motor Car Co., Massachusetts Avenue, Detroit, has awarded general contract to R. H. Hidey, General Motors Building, for a one-story addition, 80 x 536 ft., on Oakland Avenue, reported to cost in excess of \$150,000 with equipment.

Olds Motor Works, Lansing, Mich., division of General Motors Corporation, Detroit, has awarded general contract to Reniger Construction Co., Lansing, for four new additions, comprising two-story tool works, 130 x 480 ft.; one-story addition to sheet metal plant, 100 x 185 ft.; two-story extension to enameling works, 25 x 200 ft., designed to increase output in this division by 70 per cent; and one-story heat treating plant, 70 x 145 ft. Work will be carried out in connection with expansion program to cost close to \$1,000,000. Irving J. Reuter is president and general manager.

Knight Screw Products Co., 6510 Epworth Boulevard, Detroit, is said to be planning a one-story machine shop addition to cost in excess of \$25,000 with equipment.

Shwayder Trunk Mfg. Co., Denver, Colo., manufacturer of metal trunks, etc., has leased former plant of Hinckley Motors, Inc., Ecorse, Mich., and will improve and equip for branch plant.

Decker Screw Products Co., Mulberry and Huron Streets, Albion, Mich., has engaged P. T. Sharp, 111 West Ash Street, architect, to prepare plans for a new one-story addition, reported to cost close to \$30,000 with equipment.

Steel & Tubes, Inc., 224 East 131st Street, Cleveland, is taking bids on general contract for new one-story plant, 210 x 500 ft., at Ferndale, Detroit, reported to cost more than \$250,000 with machinery. Sessions Engineering Co., 228 North La Salle Street, Chicago, is engineer.

Board of Education, Pontiac, Mich., has approved plans for extensions and improvements at central high school, including new industrial building for manual training service and power plant, entire program to cost \$416,000.

St. Louis

ST. LOUIS, Sept. 3.—Bar-Rusto Corporation, 1808 Locust Street, St. Louis, operating a metal plating works, is planning expansion and improvement program, with installation of equipment to more than triple present capacity. Company has arranged for increase in capital from \$30,000 to \$130,000, majority of proceeds to be used for work. R. M. McCandish is president.

Ferro Concrete Construction Co., Third and Elm Streets, Cincinnati, has plans nearing completion for new multi-story automobile service, repair and garage building at Ninth and Chestnut Streets, St. Louis, to cost approximately \$400,000, with equipment.

Star Aircraft Co., Phillips Flying Field, Bartlesville, Okla., is said to be planning new one-story airplane manufacturing plant, with initial operations primarily for parts and assembling of planes, with motors to be purchased from outside interests, reported to cost close to \$40,000, with equipment.

Heck Electric Lawn Mower Co., Inc., 618 Pioneer Trust Building, Kansas City, Mo., has been organized to manufacture electric lawn mowers. Company will use considerable sheet steel and various electrical parts which will be purchased directly from manufacturers. Production is expected to begin within 30 days and some manufacturing equipment will be purchased. H. L. Heck is president and general manager.

A. Leschen & Sons Rope Co., 5909 Kennerly Avenue, St. Louis, manufacturer of wire rope, has filed plans for a two-story power house addition, reported to cost about \$35,000. Trueblood & Graf, Chemical Building, are architects.

New England

BOSTON, Sept. 3.—General feeling is that September will bring marked improvement in business. In the new tool market quite a large number of prospects give indications of being closed soon. Numerous inquiries for used tools, involving large shears down to small tool room lathes, are pending, many

of them running well into four figures. It is certain most of these prospects will materialize with the ending of the vacation season. New England shops generally are well employed. There is no surplus of skilled mechanics in Springfield, Worcester, Boston, Hartford, New Britain, and Providence. Worcester shops are advertising in Boston for such help. Small tools continue to sell well. August sales ran ahead of those for the same month last year. There remains a good demand for machine parts. Some of the used tool trade report difficulty in securing certain parts, and attribute this condition to the activity of tool builders.

Ralph E. Strand, Strand & Sweet Mfg. Co., Winsted, Conn., plans to organize a wire manufacturing company.

Work has started on a one-story, 100 x 360-ft. manufacturing plant addition for the Raybestos Co., Stamford, Conn.

Bridgeport Hardware Co., Bridgeport, Conn., is to build a one-story, 44 x 102-ft. manufacturing plant addition.

On Aug. 29 ground was broken for a 60 x 400-ft. blade manufacturing plant for the Ames Shovel & Tool Co., North Easton, Mass.

Fred T. Ley & Co., Boston and Springfield, Mass., have been awarded contract to make extensive plant improvements for Franklin County Power Co., Franklin, Mass. Charles T. Main, Inc., 201 Devonshire Street, Boston, is the engineer.

Work has been started on a one-story, 50 x 120-ft. brass foundry addition for M. S. Little Mfg. Co., Hartford, Conn. W. W. Dolliver, Hartford, Conn., is the architect. Conveying and miscellaneous equipment will be required.

Bids closed on Aug. 29 on an engine testing laboratory for Massachusetts Institute of Technology, Cambridge, Mass. Coolidge & Carlson, 89 State Street, Boston, are the architects.

Work has started on a four-story, 58 x 154-ft. chemistry building, State of New Hampshire, Durham, N. H., for which miscellaneous metalworking and testing equipment is required. E. T. Huddleston, Durham, is the architect.

Plans have been filed by Prairie Window Ventilator Co., 141 Georgia Avenue, Providence, R. I., manufacturer of metal window adjustments, etc., for a one-story addition, reported to cost in excess of \$25,000, with equipment. General contract has been let by C. I. Bigney Corporation, Providence. Company succeeded to plant and facilities of Metal Craftsmen, Inc., a number of months ago.

R. E. Goodman Co., Lynn, Mass., manufacturer of portable and fold-up tables and other furniture specialties, has leased Wason Building, Tanner and Lincoln Streets, Lowell, Mass., totaling about 30,000 sq. ft. floor space, and will equip for new factory. R. E. Goodman and Edward F. Wolff are heads.

New Departure Mfg. Co., Bristol, Conn., has acquired land and buildings on James Street and will use for future expansion of ball-bearing manufacturing plant.

Grafton Light & Power Co., Grafton, Vt., an interest of New England Power Association, Worcester, Mass., has secured permission to proceed with two hydroelectric power developments on Connecticut River at Fifteen Mile Falls, near Littleton, N. H., with power dams about 160 ft. high, to develop a capacity of close to 200,000 hp., reported to cost more than \$15,000,000, with transmission lines.

Hemphill Co., City Street, Central Falls, R. I., manufacturer of textile mill ma-

chinery, has work under way on a one-story addition to be used as a forge shop, reported to cost about \$20,000.

City Council, Pittsfield, Mass., has arranged fund of \$40,000 for new municipal airport, with hangar, repair and reconditioning shops, oil storage and distributing buildings and other mechanical units.

Board of Public Works, Park Department, Boston, is planning construction of municipal airport on 240-acre tract of land at Jeffries Point, to include hangars, machine repair and reconditioning shops, oil storage and distributing buildings, and other structures, with 8-ft. chain-link steel fence to enclose entire field. Initial investment will approximate \$125,000, and ultimate expenditure about three times that sum. Arthur A. Shurtleff is architect for department.

Indiana

INDIANAPOLIS, Sept. 3.—Negotiations have been concluded by Berghoff Properties, Inc., Fort Wayne, Ind., for purchase of Wayne Home Equipment Co., with local plant for manufacture of oil burners for domestic service, etc., formerly a division of Wayne Co. Purchasing company will remove works to its plant, where space totaling about 100,000 sq. ft. will be given over to oil burner and kindred production. An expansion program will be carried out. Gustave A. Berghoff is president of purchasing company.

Davidson Machine Co., Sullivan, Ind., has leased its present building and will remove works to a new local structure, where capacity will be increased.

Indiana Sanitary Pottery Co., Hammond, Ind., manufacturer of sanitary ware, is considering rebuilding of portion of plant recently destroyed by fire with loss reported in excess of \$200,000, including machinery. Structure will be two-stories, about 150 x 150 ft.

Central Indiana Power Co., Indianapolis, is perfecting plans for a merger with Terre Haute, Indianapolis & Eastern Traction Co., Terre Haute & Indianapolis, and will carry out expansion and betterment program, including transmission line construction.

Highland Iron & Steel Co., Terre Haute, will begin work immediately upon additional plant unit, increasing capacity 25 per cent. Building will be completed about Nov. 1.

Diamond Chain & Mfg. Co., Indianapolis, has completed plans and placed contracts for additional factory unit four stories high that will add 40,000 sq. ft. of floor space to plant. Additional capacity has been made necessary because of the greater use of Diamond roller chain on machinery, and more particularly the high-speed power drive applications. Production of Diamond timing drive chain for motor cars has increased to the point where additional manufacturing space is required for this department also.

Cincinnati

CINCINNATI, Sept. 3.—August proved to be a surprisingly good month for local machine tool builders, sales having been from 10 to 15 per cent greater than in July, which was also above normal for a midsummer month. The high level at which bookings have been sustained in the past 30 days has been caused by lib-

eral purchases by three or four automobile companies in the Detroit district. These transactions, added to orders which have accumulated from companies in many other metalworking industries, lifted an otherwise good month to a high point not approached in any August in recent years. As a result of the heavy buying of equipment, local plants are operating on a large scale and in several instances are employing the greatest number of men since 1919. Indications are that this favorable condition will continue in the near future, because of the impressive volume of unfilled orders.

The first eight months of 1928 have shown a substantial gain over the same period in 1927 from the standpoint of sales. One large builder reports an increase of 35 per cent, although this is considerably above the average for the local market, which is nearer 20 to 25 per cent. Several machine tool executives go so far as to describe this year as a boom period. A number of companies state that their business has come from more diversified sources than at any other time in many years. This naturally is taken as an indication of the determination of manufacturers in many lines to replace tools long obsolete.

An order for special machines, calling for an expenditure of \$100,000 by a Detroit automobile maker, was the largest transaction of the week.

Bids have been asked on general contract by Leland Electric Co., 222 North St. Clair Street, Dayton, Ohio, manufacturer of fractional horsepower motors, armatures, etc., for one-story addition, 165 x 485 ft., with boiler plant, reported to cost in excess of \$225,000, with equipment. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer. G. H. Leland is president.

Henry Vogt Machine Co., Tenth Street, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded general contract to H. A. Doll Co., Louisville, for eight-story and basement addition to cost \$350,000, portion of structure to be used for storage and distributing service. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

Memphis Natural Gas Co., Memphis, Tenn., recently organized, is perfecting plans for construction of pipe line from natural gas fields near Monroe, La., to Memphis and vicinity, about 215 miles, where service will be furnished to Memphis Power & Light Co., and other interests, reported to cost close to \$8,000,000. Ford, Bacon & Davis, Inc., 115 Broadway, New York, is engineer. Project will include two compressor stations with capacity of 6100 hp.

Tennessee Copper & Chemical Co., Copperhill, Tenn., has awarded general contract to Ferro Concrete Construction Co., Cincinnati, for addition to plant, 210 x 420 ft., reported to cost more than \$400,000, with equipment. Portion of unit will be used for storage and distributing service.

War Department, Washington, has approved plans for general machine and repair shop, 200 x 300 ft., at Fairfield air depot, near Dayton, Ohio, estimated to cost \$243,000, with auxiliary structures and equipment. Appropriation is expected to be available in near future.

City Council, Paducah, Ky., will secure vote at general election, Nov. 7, for bond issue of \$800,000, for municipal electric light and power plant, for which preliminary plans are being arranged by Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., engineer.

Gulf States

BIRMINGHAM, Sept. 3.—War Department, Washington, has accepted a tract of 2400 acres of land donated by citizens of San Antonio, Tex., as site for aviation school and primary flying field, and will arrange for appropriation of about \$12,000,000, for construction of hangars, machine and repair shops, reconditioning shops, oil storage and distributing buildings and other permanent mechanical units.

Smith Motor Co., Birmingham, Ala., has leased one-story building, 100 x 140 ft., to be erected on local site, for new service, repair and garage building, reported to cost about \$70,000, with tools and equipment. Charles H. McCauley, Jackson Building, is architect.

Milam Chevrolet Co., 435 Milan Avenue, San Antonio, Tex., local representative for Chevrolet automobile, has plans for two-story service, repair and garage building, 100 x 150 ft., reported to cost in excess of \$65,000, with tools and equipment.

Southern Carbon Co., Ouachita Bank Building, Monroe, La., is planning early construction of pipe line for natural gas supply, with compressor stations and other mechanical equipment, in vicinity of Winnfield and Rochelle, La., reported to cost more than \$175,000.

Menefee Motor Co., 2111 Burgundy Street, New Orleans, La., will soon take bids on general contract for new two-story service, repair and garage building to cost close to \$100,000, with tools and equipment. Favrot & Livaudais, Hibernia Bank Building, are architects. James C. Menefee is head.

Pacific Coast

SAN FRANCISCO, Aug. 30.—Contract has been let by Pacific Coast Pulp & Paper Co., Richvale, Cal., to T. B. Hunt, 1510 Thirtieth Street, Sacramento, Cal., for proposed local pulp and paper mill, comprising one, two and three-story units, with power station, machine shop and auxiliary buildings, estimated to cost \$1,000,000, with machinery.

Perfect Caster Mfg. Co., Long Beach, Cal., has awarded general contract to W. Jay Burgin, 1100 Redondo Avenue, for new two-story addition at 3517 East Eleventh Street, 77 x 115 ft., reported to cost about \$25,000, with equipment.

Sweetwater Union High School District, Sweetwater, Cal., plans installation of manual training equipment in new junior high schools, for which fund of \$250,000 has been arranged. T. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Grand Rapids Store Equipment Co., Portland, has awarded general contract to Stebinger Brothers, Worcester Building, for one-story machine shop at 752 East Twenty-second Street.

Caterpillar Tractor Co., San Leandro, Cal., with branch plant at Peoria, Ill., is perfecting arrangements for consolidation with Western Harvester Co., Stockton, Cal., manufacturer of agricultural machinery. An expansion program will be carried out. Each company will continue to operate present plants.

Simmons Co., 295 Bay Street, San Francisco, manufacturer of metal bedsteads, springs, etc., with main plant at Kenosha, Wis., has awarded general contract to Barrett & Hilp, 91 Harrison Street, San Francisco, for three-story fac-

tory branch and distributing plant on Bay Street, estimated to cost \$200,000, with equipment. Ellison & Russell, Pacific Building, are engineers.

Board of Education, Herald Building, Bellingham, Wash., has plans under way for extensions and improvements in vocational shops at Whatcom County high school, with installation of additional equipment. George Christensen, 2012 G Street, is in charge.

Amateur Screw Products Co., 1265 Sixty-seventh Street, Emeryville, Cal., is considering new one-story addition, reported to cost about \$30,000, with equipment.

Canada

TORONTO, ONT., Sept. 3.—Dealers and tool builders report satisfactory results in sales from machine tools and machinery on exhibition at the Canadian National Exhibition, Toronto. Buyers are showing keen interest in the modern lines of equipment, especially those of high-speed and labor saving types. The fall demand for machine tools is expected to surpass that of spring or summer sales. Small tools are in strong demand.

Interstate Fuel & Light Co., Benton Harbor, Mich., is negotiating with the city of Port Arthur, Ont., for certain concessions and if these are granted the company will build a coke plant there to cost approximately \$3,500,000 for plant and equipment. Fred W. Freese, consulting engineer, Chicago, Ill., is in Port Arthur in the interests of the company.

Bids are being received by W. P. Near, city engineer, London, Ont., until Sept. 11, for the supply and erection of a 400-hp. boiler with underfeed stoker, to be installed in boiler house of Victoria Hospital.

Bids are being received by A. Gray, general manager St. John Harbor Commissioners, West St. John, N. B., until Sept. 12, for construction of superstructure of the \$2,500,000 grain elevator and pier there. Engineers, John S. Metcalf & Co., 460 Helen Street, Montreal, Que.

Border Construction Co., Imperial Block, Walkerville, Ont., has been awarded contract for \$75,000 addition to plant A of General Motors of Canada, Ltd., Walkerville, Ont. Hutton & Souter, 6 James Street, South, Hamilton, Ont., are architects.

Domill Construction Co. of, Canada,

Ltd., 10 Cathcart Street, Montreal, Que., has been awarded contract for construction of a \$12,000,000 pulp and paper mill at Dalhousie, N. B., for the Canadian International Paper Co., Ltd., 100 Forty-second Street, New York.

Quebec Power Co., 229 St. Joseph Street, Quebec, Que., is having plans prepared by the municipal engineering staff for the erection of a gas plant to cost \$175,000.

Steel Containers, Ltd., Victoria and Vancouver, B. C., are making arrangements for erection of plant at Ogden Point piers, Victoria, to cost \$110,000.

Bids are being received by the City of Saskatoon, Sask., until Oct. 10, for steam turbine generator unit of 10,000 or 7,500 kw., alternative capacity complete with condenser and auxiliary equipment. Tender forms and specifications with City Commissioner, Saskatoon, to whom all bids should be forwarded. Andrew Leslie is city commissioner.

Foreign

PLANs are being arranged by General Motors Corporation, General Motors Building, Detroit, for two new assembling plants at Warsaw, Poland, and Bombay, India, respectively, each reported to cost more than \$300,000 with equipment. J. D. Mooney, vice-president, has left for a trip abroad to arrange details of sites, etc.

In connection with hydroelectric power project on Uhl River, State of Mandi, India, Public Works Department, Punjab Government, Punjab, plans extensive increase in initial development, now in progress. The first power station will be equipped for capacity of 36,000 kw., which is to be increased in near future to 70,600 kw., with additional transmission lines to Simla, Patiala, Sialkot and vicinity. Upon completion of the second unit, work will be started on third stage of development, comprising another generating station at neighboring site, with capacity of 48,000 kw., and construction of transmission lines to Meerut, Delhi, Saharanpur and neighboring points. Bids will be asked at intervals for about 400 miles of transmission lines, including towers, cables, etc., to be followed by call for bids for hydraulic pipe lines, waterwheels, transformers, switchgear and other machinery. Specifications will be available at office of Lieut.-Col. Basil C. Battye, Public Works Department, Punjab, chief engineer in charge.

slide type doors for large openings, vertical folding doors, vertical lift and lift-swing doors, fire department doors and doors for airplane hangars.

Charcoal Iron.—Ernst B. Westman, Ltd., London, England. Pamphlet on "Charcoal Iron and Steel, Made in Sweden." The manufacture, purity, resistance to corrosion and other qualities are discussed with illustrations and tables.

Nickel Steel.—International Nickel Co., New York. First of four folders, entitled "Pictorial Panorama of Progress," outlining the use and applications of nickel steel in various industries.

Hoists and Cranes.—Harrington Co., Seventeenth and Callowhill Streets, Philadelphia. Catalog "O" of 84 pages illustrates and describes a wide range of materials-handling equipment, including hand chain hoists, electric hoists, trolleys and traveling cranes. Many particulars are given, including rated loadings, prices, etc., as well as clearance diagrams and other dimensions. Many of the illustrations are from equipment in use.

Handling Equipment.—Northwest Engineering Co., 28 East Jackson Boulevard, Chicago. Bulletin of 40 pages devoted principally to crawler equipment and illustrating a large variety of uses both in excavating and other handling of materials in bulk. Details are given of operating units, as well as drawings and photographs of portions of the machines, showing construction and design details.

Heating Equipment.—Ross Heater & Mfg. Co., Buffalo. Loose-leaf bulletins 133 to 145 inclusive, varying from two to eight pages, all in a folder. These deal with expansion joints and loops of various types, water-heaters, both for storage and feed water, heat exchangers, air pumps, steam jets, etc. Dimensions are given for a wide variety of products, with list prices.

Radiant Oven Heaters.—H. O. Swo-boda, Inc., 3400 Forbes Street, Pittsburgh. Bulletin 130, of eight pages, is devoted to specialties for electric ranges, including heating elements of various designs. Dimensions, capacities, and prices are given.

Motor Control.—General Electric Co., Schenectady, N. Y. Bulletin GEA-451A, of 28 pages, is devoted to control for steel mill auxiliary motors. Illustrations include characteristics, diagrams, wiring diagrams, and photographic reproductions both of installations and of instrument records. The advantages of this type of control are set forth in detail.

Automatic Switches.—Penn Electric Switch Co., Des Moines, Iowa. Loose-leaf catalogs in a folder, illustrating and describing a wide variety of automatic switches and other current controlling apparatus. Sectional views are given, with general specifications.

Air Filters.—Midwest Air Filters, Inc., Bradford, Pa. Folder stressing the advantages of automatic horizontal air filters for industrial purposes.

Steel Containers.—Geuder, Paeschke & Frey Co., Milwaukee. Catalog of 24 pages devoted to container problems and their solution. Maximum shipping safety of contents is stressed, in connection with convenience in use and storage. The containers are designed for a wide variety of liquids, pastes, powders and granulated products, including paints, oils, leads and chemicals.

New Trade Publications

Drop Forging Manufacture.—Interstate Drop Forge Co., Capitol Drive and Twenty-seventh Street, Milwaukee. Four-page folder describing briefly the process of die sinking, allowances for draft and shrinkage, checking the lead cast, and manufacture and cleaning of the drop forging.

Spot Welders.—Federal Machine & Welder Co., Warren, Ohio. Bulletins No. 250 and 260 on "Junior" and "heavy duty" spot welders, respectively. The former have throats up to 24 in. deep and 15 kw. transformer capacity, thus being able to weld two pieces of ½ in. steel or iron together. Heavy duty welders start with 20 in. throat, 20 kw. capacity, capable of handling two pieces of ¾ in. metal, and from there on up. Universal welding point holders increase the ability of the regular line of equipment to handle a wide variety of work.

Speed Transmissions.—Reeves Pulley Co. of New York, Inc., 76 Dey Street, New York. Leaflet briefly describing variable speed transmission units, dealing in particular with new designs which have recently been developed.

Concrete.—Celite Products Co., Los Angeles. Folder 338 devoted to Celite concrete. Instruction for mixing and various other information is included.

Unit Heaters.—Bishop & Babcock Sales Co., Cleveland. Catalog dealing with Massachusetts modified unit heaters. Illustrations, diagrams, tables of specifications and full construction details are included.

Steel Doors.—Truscon Steel Co., Youngstown, Ohio. Catalog devoted to copper alloy steel doors. Illustration of various types and specifications and drafting room standards are included. The line embraces industrial swing and

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Single Stamping Makes Sedan Side

Larger Units Simplify Production, Increase Accuracy and
Enable All-Steel Body to Function as Stress-
Carrying Portion of Chassis Frame

BY E. E. THUM

IN an article in THE IRON AGE of Sept. 22, 1927, an account was given of the steel requirements for the manufacture of all-steel automobile bodies. A pioneer in this method of construction, the Edward G. Budd Mfg. Co., Philadelphia, has found it necessary to meet and solve many problems, not only in steel qualities but in fabricating machines and methods, in which its own staff has received hearty cooperation from steel makers and equipment manufacturers.

As in many other modern developments, the trend is from the complex toward the simple. All-steel automobile bodies, even in their early developments, contained fewer parts than the composite body, which is a skeleton made of a number of pieces of wood, mortised and framed together, and covered with thin sheet metal. In fact, by virtue of the ability to weld together various sheet metal stampings into larger assemblies, the all-steel body could be looked upon as an assemblage of a dozen sub-assemblies, so arranged that the joints blended into the striping and beading decorating the exterior.

Steel Body Now a Stress-Carrying Unit with Chassis

It was apparent, however, that the full value of steel as a structural member was not being utilized in these designs. The older steel bodies were in effect self-supporting inclosures bolted to the chassis frame, which latter was de-

signed to carry the stresses, warping and weaving, of the moving car. The logical development is suggested by the question: Why not throw some of this work upon the steel of the body, instead of carrying it along as so much dead weight?

Analysis of this problem indicated that such a design would require a one-piece side, considerably stiffer against buckling than the older design, and attached securely to the side of the chassis frame so as to transmit the necessary forces. It also required that the rear body, the cowl, even the instrument board, be fixed into the structure and act as cross bracing against sidewise forces, and make both sides of the structure carry stresses originating from any pair of wheels. When this idea was carried to its ultimate conclusion and all parts of the body were designed to carry a proportionate share of stress, it was found that the weight of body plus chassis frame was reduced, that the center of gravity was lowered, vibration was lessened, and the "balance" of the moving car improved.

Such material and intangible advantages are the direct result of a determination to use the steel in a car body as a stress-carrying material, in addition to its original functions of keeping the weather out and providing a foundation for a pleasing color scheme.

This advance has also brought about a considerable simplification in manufacturing operations. The outer side sheet

of a steel body itself (as well as the cowl) used to be an assemblage of several smaller stampings welded together. Now each side is pressed from a single large sheet. Final assembly now consists essentially of erecting two sides, a rear, a cowl, and rear seat pan. (The floor and front seat are carried by the chassis.) In this manner, as is so often the case, an improvement in utility has resulted in a change from the complex toward the simple.

As an instance of the older method, take the sketch of a cabriolet side (Fig. 1). It could readily be made of three stampings, the roof panel *A* welded to the rear quarter *B* by a flash weld at seam *K*, and this part then fixed to the side panel *C* along an inner lap seam *a* by a number of spot welds, as shown in section *x-x*. This side unit, properly fitted with hinges, upholstery lugs, seat brackets and miscellaneous hardware, would then be connected to the cowl *D* by welds *f* at the top of the windshield frame and by a sill *E* at the bottom.

Large Sheets Simplify Manufacturing Problems

In the new design parts *A*, *B*, *C*, *E*, and their strengthening flanges, are in one piece, as shown by the photograph of the sedan side sheet, Fig. 2. Not a single joint in this piece. While such a production requires a line of very large presses, with correspondingly large dies, it avoids much making and fitting of smaller pieces, and expensive filing and smoothing of exposed welds. It might appear that the door and window openings would make an undue

amount of scrap, but on account of the heavy flange forming the door frame, clearly shown on the inside view of Fig. 2, the actual opening punched from the flat sheet is not excessive and much of the metal is utilized in making smaller parts. Some of the steel apparently missing has been turned inward where it will be useful in carrying load. Furthermore, the amount of losses through edge trimmings on a single large piece is much less than the edge trimmings for a number of smaller pieces, welded together to make the large one.

At any rate, the alternative of making a single big stamping or welding together a number of smaller ones had to be decided by balancing the cost of welding jigs, plus the welding and finishing labor, against a possible increase in tool cost in the press shop. Apart from a comparison of costs, a one-piece stamping is better able to withstand the stresses of service than a jointed piece, even though the joints are "100 per cent" welds.

It has not been easy to build up a set of dies that will make such a stamping as is shown in Fig. 2 without splitting or wrinkling the sheet at a corner (nor has it been a simple matter for the steel makers to produce deep-drawing stock with excellent surface in sizes as wide as 66 by 100 in.). But the Budd tool engineers have succeeded so well that they now find other production problems to be simplified by handling a few large stampings rather than a greater number of small ones.

A collateral advantage of importance has been found in final assembly and shipment, which can be explained as follows: Some variation in size is inherent in any fabricated piece. Thus, each stamping has a tolerance of a small fraction of an inch (which may be denoted plus or minus *T*) largely due to the varying "springiness" of in-

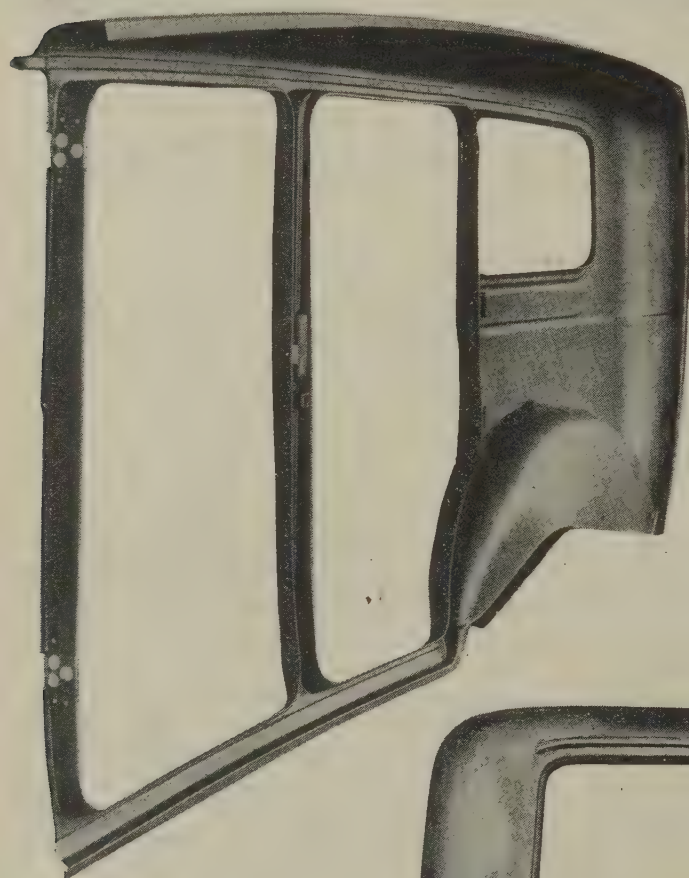


Fig. 2—Outside and Inside View of Sedan Side Sheet Made From a Single Sheet, 66 x 100 x 0.043 In. Drip molding and a few door fittings have been welded in place. An inner reinforcing wall of smaller parts will later be welded on, to give rigidity against lateral buckling

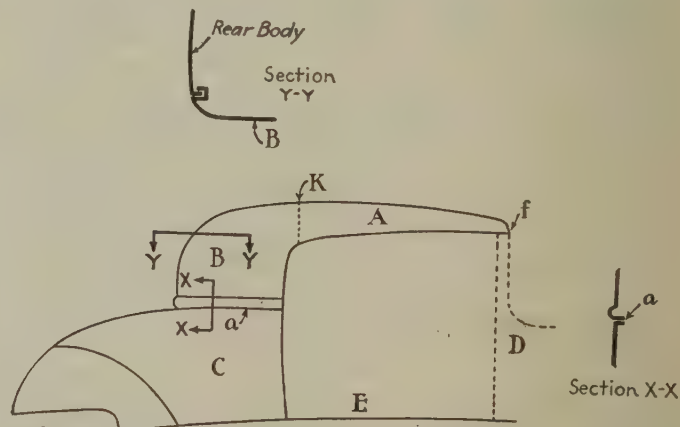
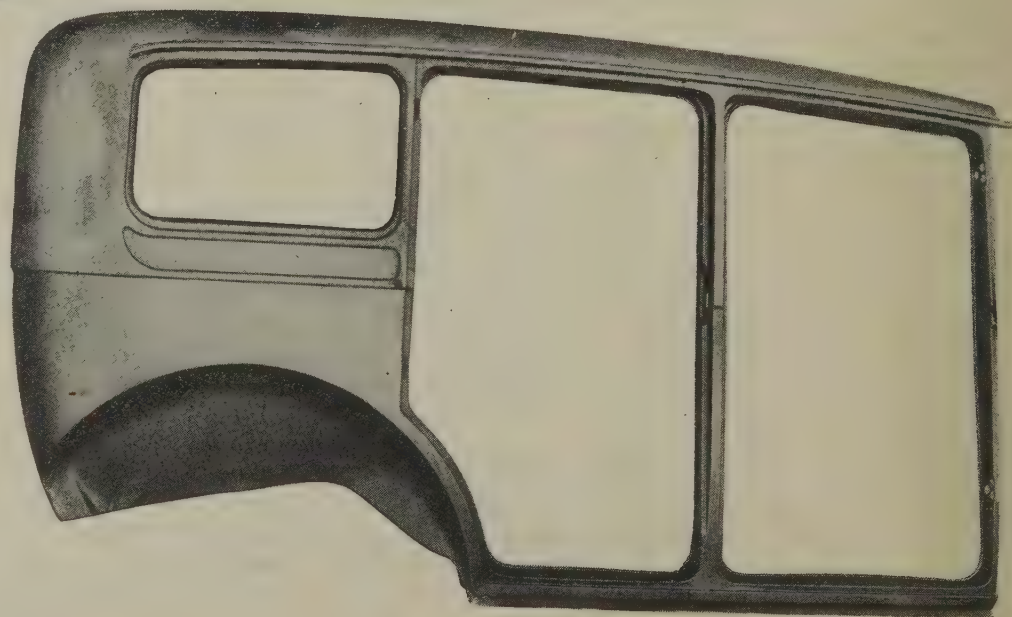
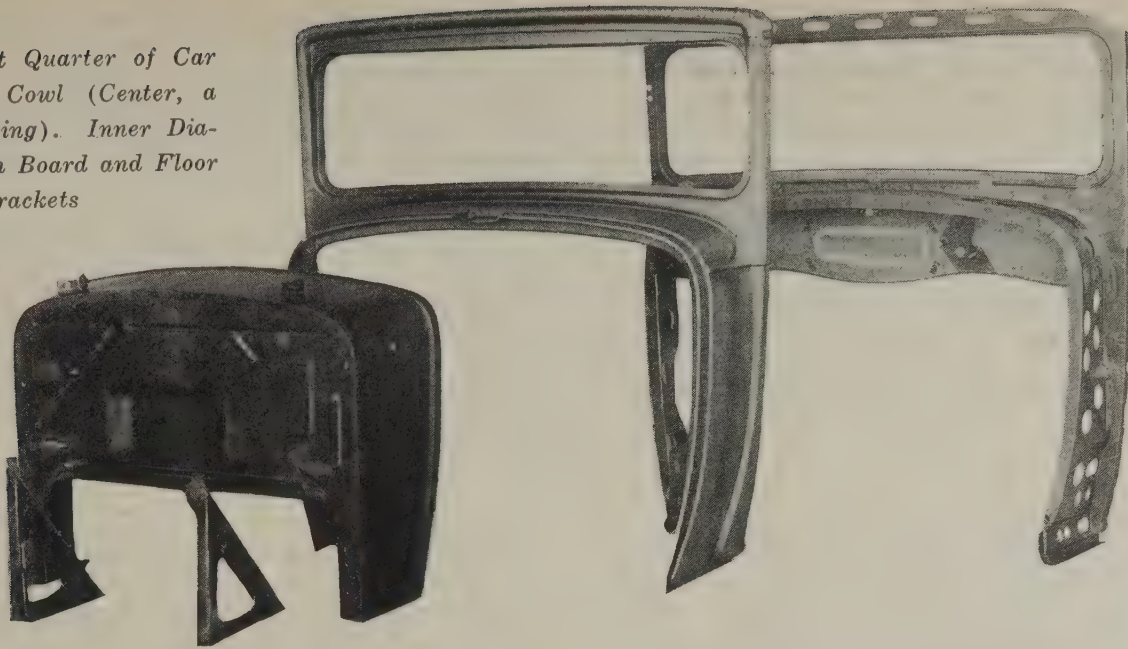


Fig. 1—Older Method of Making Side Sheet from Several Small Stampings

Fig. 3—Front Quarter of Car Is Made of Cowl (Center, a Single Stamping). Inner Diaphragm, Dash Board and Floor Brackets



dividual sheets. Each welding operation has a tolerance (plus or minus t) due to play in the fixtures, clearance between work and fixture, and varying shrinkage from varying welding heat. Sometimes in assemblies such as shown in Fig. 1 these plus errors cancel the minus errors, and the side sheet is close to theoretical size. But there is the possibility that the errors may be cumulative, and the final tolerance of the cabriolet side sheet, consisting of three stampings and two welds, must be plus or minus $(T_1 + T_2 + T_3 + t_1 + t_2)$.

Obviously such accumulations in errors are avoided in single stampings. A single tolerance governs. This means not only that a steel door made of a single stamping will fit the opening and hang accurately in its frame (also a single stamping) with a minimum of fitting—and a large amount of expensive skilled labor is saved on this item alone—but that the four units which now make up a body—namely right and left side, rear, and cowl—may be nested in a freight car, shipped in maximum carloads and assembled economically elsewhere.

In Shops Smaller Units Are Placed Near Big Presses

Manufacturing operations at the Budd works follow the routine seen in any well ordered metal fabrication plant, somewhat magnified by the size and quantity of material handled. Presses range in size from a line capable of working the 66 x 100-in. sheet for a sedan side to small ones for the minor fittings. Many of the important machines are double acting, with finger dies mounted on air cushions to aid in alining the work and equalizing the pressures on all parts of the die and throughout all parts of the stroke.

The press shops are roomy, and the massive units are spaced far enough apart so that smaller machines can be moved up to the proper place to put in a hole or two or make a bending operation as required. In this way much back-tracking is avoided, while wide aisles and side bays permit grouping of machinery without interfering with transport of material in process.

Materials Handled in Variety of Ways

Metal in process is handled in a variety of ways adapted to its shape and size. Flat sheets are carried on flat-bottomed four-wheeled wagons. Scrap is loaded into metal box cars with open tops and small casters. Stampings that nest closely together are stacked on raised platforms and moved by electric lift tractors. Door frames are hung on special truck bodies with appropriate cross-arms. Storage battery motors are used for transport; elevators are large enough to handle two two-car trains. Such equip-

ment is most flexible, and can be adapted with ease to the requirements of changing production.

All Joints Made by Welding

Steel doors are made in such quantities that a special shop is utilized for door construction exclusively, complete with press department, welding machines, inspection and finishing floor. Another section of the plant is devoted to cowl. In the most advanced design the cowl is made as shown in Fig. 3. The cowl proper and windshield frame, which carries the exterior finish, is a single piece. It is stiffened into a load-carrying structure by an inner diaphragm, punched for lightness and made of several smaller stampings. Welds in the latter are placed where they will be covered by inner trim, and in this way some scrap from door and window openings is utilized. The same may be said of the dash board or false cowl, which strengthens the front assembly against racking.

These various sub-assemblies are welded to the combined cowl and windshield frame by a series of resistance spot welds, made in specially developed fixtures and machines, leaving no mar on the exterior surfaces. In this way the front end of the all-steel body is manufactured into a single rigid unit.

Minute inspection is given such units as they progress and also before shipment, not only for size and shape, but also for surface finish. Minor defects are corrected by hammering and filing. To avoid an undue amount of such work it is essential that the outer sheets come from the presses without wrinkles, and that much care be exercised in handling the metal in all further stages. There are ample opportunities for sheet metal to meet the protruding edge or corner of a machine, a truck, or another piece, and each such collision leaves a small dent, sometimes almost too small to see, but one which must be removed before the panel can be given the smooth mirror-like finish demanded by motorists.

Finishing Operations Require Scrupulous Cleanliness

To prevent rusting in transit, the bodies or body-sections ("in the white," as they are termed) are oiled inside and out with a fine spray. After reaching the finishing departments they are again inspected for any damage that might have occurred in transit.

Subsequent finishing operations first require scrupulous cleanliness. The body goes through an electric oven to burn off the oil. Then it is washed with a chemical cleanser, scrubbed with steel wool, doused in cold water and again in hot water. After drying, the body gets a coat of priming paint, a 2-hr. journey through an oven, and then a second priming coat and drying. Then the body is carefully and

thoroughly smoothed with fine emery and running water—the most laborious process in the whole course of manufacture. Three double coats of lacquer are then sprayed on, each coat being followed by a trip through a long drying oven. Then comes a second rubbing with fine emery paper and oil, and a last spray of colorless solvent to remove scratch marks.

After the upholstery is placed, the interior panel work done, the top covered, the hardware placed and the glass set in the trim shop, the body is polished all over with a powdered abrasive in wax, and rubbed down with woolen cloth. Reaching final assembly, it is lowered over the chassis frame, and connected with it by a series of horizontal bolts.

Chinese Nail Mill Proves Profitable

Kung Chin Iron Works Operated for Eight Years Despite Civil War
—Employees Receive Bonuses Based on Output

BY K. F. HWAN*

DESPITE the civil war in China, which, with poor management, has contributed to the lack of financial success of most of the Chinese iron and steel plants, such as the great Hanyang Iron & Steel Works, Hankow; a small nail mill at Shanghai, the Kung Chin Iron Works Co., Ltd., has managed to maintain operation since 1920 with a fair degree of success.

Following graduation from a German technical institute in 1920, the writer determined to promote the iron and steel industry in his native country to the best of his ability and, with the aid of family and friends, was able to establish this plant with capital stock of \$200,000 (Mexican). In 1925, financial aid was required and a prominent merchant of Shanghai came forward with assistance, which has permitted the gradual increase of capacity for nail making to 49 nail machines and 18 blocks of various sized wire-drawing machines.

In establishing the mill, the writer was aided by his instructor at the German technical school from which he was graduated, Professor Berrus, who shipped eight German nail-making machines to the plant for trial. A year and a half of production proved that a nail mill could not operate profitably without its own wire production. So, with considerable difficulty, a wire-drawing machine of simple construction was built with belt drive and a block 20 in. in diameter, permitting the drawing of No. 5 gage wire rods into No. 10 gage wire. At that time, however, our knowledge of pickling was rather incomplete, so that many mistakes were made during the ensuing year. The results, however, were finally quite satisfactory, so that today the plant is operated on a full 24-hr. day schedule with 130 workmen on 11-hr. shifts, in addition to which there is a small group employed in the keg-making plant, which has a capacity of 500 kegs a day.

The pickling department of the plant consists of three acid tanks, 5 x 7 ft. x 4½-ft. deep, a rotary steam hoist at the center of these acid tanks for handling the cleaned and uncleaned rods, a lime pot, two water tanks, a rusting frame and three annealing furnaces, all served with a monorail system equipped with a 1-ton electric hoist, which delivers rods directly to the storage section.

Being immediately adjacent to the wire-drawing plant, the rods are easily carried to the wire-drawing machines by an overhead crane and chain hoists equipped with strippers for lifting the finished drawn wire. The wire is then bound with wire shorts and piled on a small truck on a shop railroad, from which the bundles are taken and weighed separately according to gage. The plant railroad is laid directly to the nail-making plant, in which there are 10 Sleeper & Hartley machines, eight German crank presses, three German Malemedie-type machines, 26 Wood spring machines and two new German Jacob machines.

The Jacob machine is a recent German development in

nail-making machinery, which, we have found, saves us from 2½ to 3 per cent of waste in producing nails of two-point chips, as the machine has round cutter and gripping dies to press the chips and form the heads of the nails following the blow of the heading die. The machines cost \$600 for the patent and \$800 for the smallest machine, making the total cost \$1,400 for each unit for nails of 1¼ in.

The nail machines are secured to a heavy timber floor, and nails as they come out drop through a hole in the floor into nail bunkers, from which they can easily be removed by opening a sliding door. From the bunker the nails are removed with a special scoop handled by an electric hoist and are placed on a scale for weighing, a coolie recording the weights by stamping them on a daily production sheet. The nails are then carried directly to the polishing department.

The cleaning barrels in the polishing department are arranged on a second floor of the room, and under this floor at each barrel there is a large nail bunker with a capacity of 15,000 to 20,000 lb. of nails. When the nails are polished, the doors of the nail bunkers are opened and the nails drop into the kegs, which are then headed and delivered into the "godown" (warehouse) ready for shipment.

A brief mention of our method of handling labor may be of some interest to Western readers. The fitters, foremen, operators and coolies are all entitled to a special monthly bonus for their diligence. The wire drawer, in addition to a fixed rate of wages, may receive a certain amount of his production in addition, based on the daily production sheets for his machine, and an extra bonus on savings in defective wire if he draws none more than 5 mm. in gage in a day.

Each nail operator, in addition to his regular wage, is in a position to receive a daily production bonus, a continuous production bonus and a small premium on saving cutters and dies. Every nail machine operator is given a monthly allotment of 10 pairs of cutters and 15 pairs of gripping dies. The repair foreman and his fitters also receive premiums on reducing repairs to machines, and the production foreman receives a bonus on maintaining a high rate of output. The works manager has a bonus based on direct savings in manufacturing costs.

We have every reason to believe that the personnel of our plant is well satisfied with this system, which has been gradually developed with the intention of benefiting both the workmen and the company. In consequence of our success in handling our labor and their general satisfaction, we feel that the charge of cheap and slow-moving Chinese labor cannot be brought against us. Of course, our wage rates are low, but our high efficiency is a large factor in our costs.

When our Nationalist Government has finally unified the South and the North of China, we believe that there will be a decided shortage of materials, such as wire and nails, and that a general improvement of Chinese industry will ensue, in which our plant will participate.

*Works manager Kung Chin Iron Works Co., Ltd., 53 Linching Road, Shanghai, China.

Stainless Iron for Naval Aircraft

Suitability of Two Types Investigated—Physical and Anti-Corrosion Properties Reported on Favorably—
Good Fabricating and Machining Qualities

BY EDWIN JOYCE*

STAINLESS iron and steel alloys have for some time been attracting the attention of metallurgists because of the excellent physical properties combined with excellent resistance to corrosion which manufacturers claim for these products. In order to ascertain the suitability of these alloys for naval aircraft construction purposes, an investigation was made at the Naval Aircraft Factory with the results recorded in this article.

A preliminary study of the properties of a number of alloys of the stainless iron and steel class resulted in the conclusion that stainless steel would not have sufficient ductility and, if heat-treated to have the properties of S.A.E. No. 2330 nickel steel, would not resist corrosion by salt water. Stainless steel is more difficult to machine and fabricate than stainless iron and would require an excessively high heat-treating temperature (1850 deg. Fahr.), which would almost preclude the use of brazed joints.

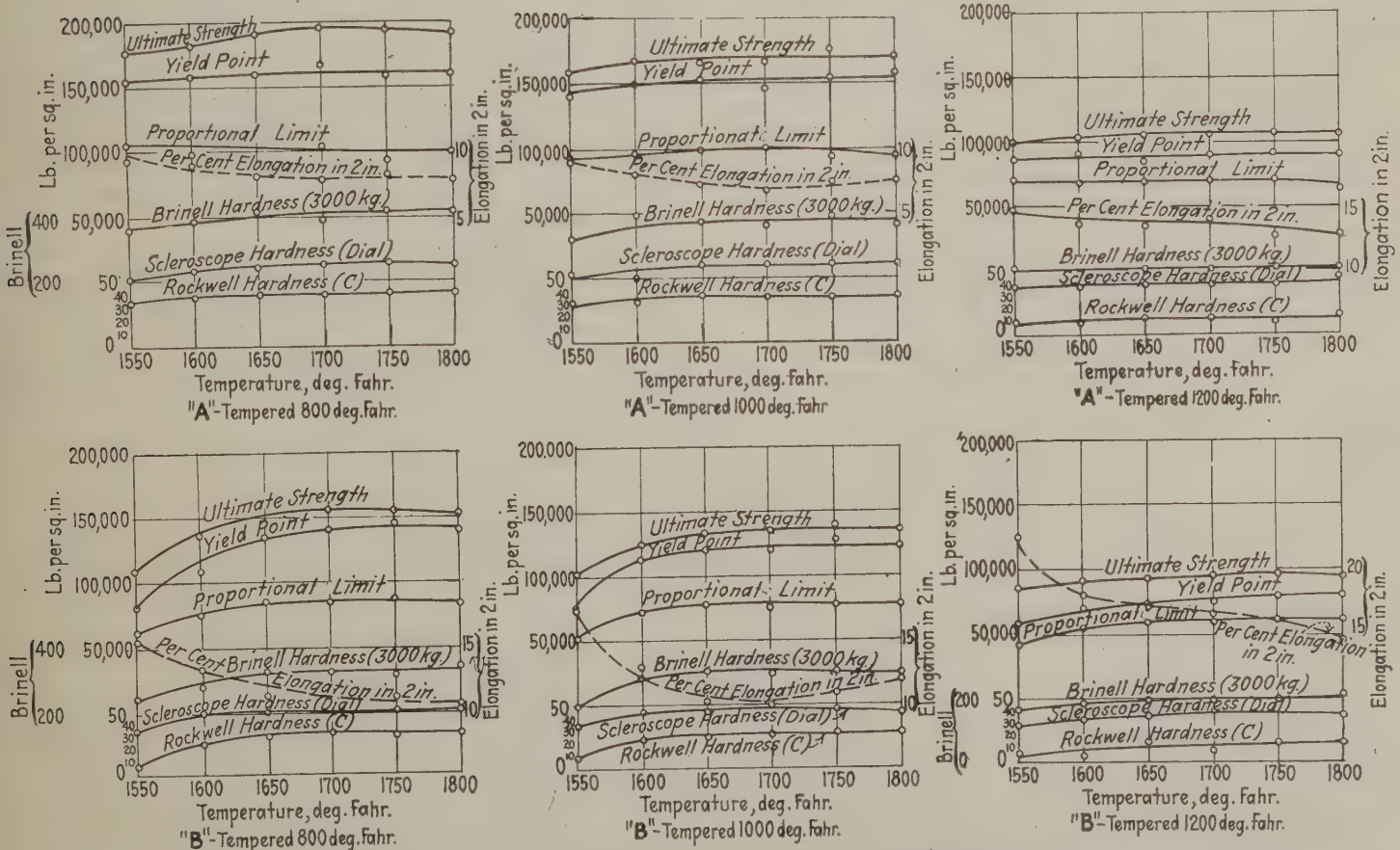
There are several types of stainless iron on the market, differing to some extent in composition, and certain dis-

tinctive advantages are claimed by the manufacturers of each. However, there exists a difference of opinion among manufacturers as to the merits of the modifications and decisive data are desirable. From the types available, two were selected for test work because of their more promising qualities and because both bar and sheet stock of the same composition were available from each source. One of these alloys is designated "A," and the second "B," both made by the electric process. Typical analyses of these, in percentages, are as follows:

	Carbon	Manganese	Phosphorus	Sulphur	Silicon	Chromium	Nickel
"A"....	0.10	0.42	0.017	0.018	0.23	12.3	0.19
"B"....	0.04	0.22	0.016	0.016	0.33	13.4	0.13

The carbon content of stainless iron alloys is low—not exceeding 0.12 per cent. By common consent among manufacturers, when the carbon content of such alloys does not exceed the above amount, the product is sold under the trade name of stainless (or rustless) iron. Most of these, however, are capable of being hardened and tempered and

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Relation of Physical Properties of Stainless Iron Sheet, 1/16 In. Thick, to Quenching Temperatures (Oil). See tables IV and V

Table I.—Result of Tensile and Bend Tests of Air-Quenched "A" Stainless Iron Specimens

Quenching Temperature, 1775 Deg. Fahr.; Tempering Temperature, 1015 Deg. Fahr.

Thick- ness, In.	Hardness			Tensile Strength			Elonga- tion, Per Cent Failure, in 2 In.	Bend Failure, Deg.
	Hb*	Hr	Hs	P. L.	Y. P.	U. S.		
1/32....	391	C39	65	70,900	123,100	171,300	5.3	90
1/16....	391	C40	65	69,300	100,000	179,400	6.3	90
1/8....	391	C40	65	80,900	153,700	175,500	8.3	80

*1500 kg. Brinell load. Specimens held for 30 min. at quenching and tempering temperatures. Average of results of two specimens given.

[In the tables Hb indicates Brinell hardness; Hr, Rockwell hardness; Hs, Scleroscope hardness.]

are therefore more properly steels, but the custom in nomenclature is now fairly well established.

Standard tensile test specimens were prepared and subjected to various heat-treatments before being tested in tension. Stainless iron "A" is air-hardening, and the values given in Table I are the average results of tests of two specimens which were air-quenched and tempered at temperatures recommended by the manufacturer. In this and in subsequent tables are given the results of bend tests, which indicate the angle through which the specimens bent over a radius equal to the thickness of the metal before failure occurred. All heat-treated specimens were held for at least 30 min. at the quenching and tempering temperatures in order to attain equilibrium conditions in the metal.

Alloy "B" is not air-hardening, and the results of tests after heat-treatment as recommended are given in Table III. For purposes of comparison, "A" specimens were treated in the same manner, with the results given in Table II. The quenching medium, with the exception of the air-quenched specimens, was an oil which had been found suitable for general quenching purposes. These results did not appear as favorable as was expected, and more comprehensive tests were made to explore thoroughly the quenching and tempering ranges, with the results as indicated in Tables IV and V, and as shown graphically in the illustration.

In some of the accompanying tables are given the results of corrosion tests. Specimens were exposed to the corrosive action of salt water (20 per cent NaCl) spray in a sealed wooden box, fitted with an air atomizer so that they hung for the periods mentioned either in the mist or in the saturated air in the tank. During 8 hr. of each 24 hr. the specimens were under spray conditions. They remained moist during the remainder of the day, but the rate of corrosion was perhaps retarded during the period in which the spray was not used.

The corrosion scores assigned to the various specimens, as shown in the tables, represent only an approximation

of the true condition, because the ratings were based on visual examination only. The specimens were arranged in a series in which the position of each was determined by its appearance. The ratings are considered sufficiently accurate for purposes of comparison. Some of the corrosion specimens were the fragments of tensile specimens; others were corroded before tensile testing, in which case the ill effects of corrosion may be noted by comparison of their physical properties with those of corresponding untreated specimens.

In Table VII are given the results of tests of heat-treated 3 to 4-in. round bar stock. The quenching and tempering temperatures used were those which previous tests of sheet stock indicated most suitable. The physical properties of normalized and annealed sheet are given in Tables VII and VIII. The low proportional limit and yield point of the normalized specimens should be noted.

Both butt and flange-welded specimens were used to determine the weldability of these two stainless irons. After welding, the samples were quenched at 1650 deg. Fahr. and tempered at 800 deg. Fahr. No flux was used in making the joints and the filler rod was cut from the stock being welded. Flange-welded "A" specimens of 1-32-in. sheet, 1 in. wide, broke under loads ranging from 1750 to 4020 lb. The corresponding range for "B" specimens was from 1595 to 4070 lb. The breaking loads for "A," 1-32 by 1-in. butt-welded specimens, ranged from 4170 to 8820 lb. and for "B" specimens from 2625 to 7810 lb. These values indicate that some difficulty may be expected if welding is undertaken by an operator unfamiliar with stainless iron. Instructions are furnished by some of the manufacturers and should be made available to the operator. Electric spot welds are readily made to withstand loads averaging 1500 to 1600 lb. for "A" and about 1500 lb. for "B" 1-16-in. sheet.

Brazing of stainless iron of all grades is rather difficult because the brazing brass does not flow readily into the spaces between the parts being joined. The brazing brass does not seem to "wet" the surface of the heated iron, and part of the openings which should be filled by capillary attraction remains unfilled and constitutes a source of weakness in the brazed joint. Both flame and dip-brazed specimens were prepared for tests. The flux used was a mixture of borax and boric acid and was not very satisfactory. The dip-brazed specimens were preheated in flux baths until they attained a temperature of 1860 deg. Fahr. and were then immersed in the molten brass (70-30 copper-zinc). Flame-brazed joints were made in the usual manner with an oxy-acetylene torch. The area of the lap in both cases was approximately ½ sq. in., which should have given the joints a breaking strength in shear of 12,000 to 15,000 lb. The average for "A" specimens was 9000 lb. and for "B" slightly less. Some specimens broke under loads 1000 to 2000 lb. above or below the average. Breaking loads for flame-brazed specimens averaged about 2000 lb. less than

Table II.—Results of Tensile and Corrosion Tests of "A" Stainless Iron
Quenching Temperature, 1775 deg. Fahr.; Tempering Temperature, 1115 deg. Fahr.

Condition	Hardness		Hardness After Heat Treatment		Tensile Strength			Elong. Per Cent in 2 In.	Corrosion Score
	Hb	Hr	Hb	Hr	P. L.	Y. P.	U. S.		
1/32-In. Sheet Stock									
As received	136	B83	...	...	...	63,100	82,900	15.7	..
Salt sprayed	136	B83	...	...	48,900	72,100	82,600	12.9	78
Heat treated	391	C39	387	C23	...	117,000	125,500	5.0	..
H. T. and salt sprayed	391	C41	387	C23	58,600	111,600	122,100	3.4	70
1/16-In. Sheet Stock									
As received	149	B80	...	...	...	54,100	76,700	24.3	..
Salt sprayed	151	B80	...	...	45,200	56,800	76,700	23.3	80
Heat treated	387	C41	364	C29	...	115,700	128,700	6.0	..
H. T. and salt sprayed	418	C41	364	C29	63,300	116,200	132,100	7.0	75
1/8-In. Sheet Stock									
As received	143	B81	...	...	...	51,300	79,800	26.0	..
Salt sprayed	143	B81	...	...	43,400	55,400	78,300	26.3	92
Heat treated	387	C41	375	C29	...	124,200	136,300	10.5	..
H. T. and salt sprayed	418	C40	364	C29	77,300	128,300	135,300	11.3	82
Brinell load—1500 kg. Corrosion period—60 days.									

Brinell load—1500 kg. Corrosion period—60 days.

Table III.—Results of Tensile and Corrosion Tests of "B" Stainless Iron

Quenching Temperature, 1775 deg. Fahr.; Tempering Temperature, 1125 deg. Fahr.

Condition	Hardness		Hardness After Heat Treatment		Tensile Strength			Elong. Per Cent in 2 In.	Corrosion Score
	Hb	Hr	Hb	Hr	P. L.	Y. P.	U. S.		
1/32-In. Sheet Stock									
As received	182	B90	...	...	...	84,600	102,800	10.7	..
Salt sprayed	182	B90	...	...	57,300	86,400	97,800	7.4	90
Heat treated	302	C31	239	B92	...	86,700	103,100	11.7	..
H. T. and salt sprayed.....	302	C31	239	B92	50,500	84,200	96,300	8.3	80
1/16-In. Sheet Stock									
As received	182	B91	...	...	...	84,200	102,700	13.5	..
Salt sprayed	182	B91	...	...	56,300	84,700	100,400	11.7	93
Heat treated	302	C31	241	B97	...	90,700	107,700	13.0	..
H. T. and salt sprayed.....	302	C31	241	B98	54,200	89,700	165,400	9.9	80
1/8-In. Sheet Stock									
As received	207	B93	...	...	...	82,300	104,200	14.7	..
Salt sprayed	207	B93	...	...	60,900	88,700	102,300	13.2	92
Heat treated	302	C31	228	B96	...	92,500	110,000	13.7	..
H. T. and salt sprayed.....	302	C31	241	B97	57,100	92,100	113,100	13.3	82
Brinell load—1500 kg. Corrosion period—60 days.									

Brinell load—1500 kg. Corrosion period—60 days.

Table IV.—Results of Tensile, Bend and Corrosion Tests of "A" Stainless Iron (1/16-in. sheet)

Hardness			Tempering T. (Deg. Fahr.)	Hardness			Tensile Strength			Elong. (2 in.)	Bend Failure, Deg.	Corrosion Score
Hb	Hs	Hr		Hb	Hs	Hr	Prop. Limit	Yield Point	Ult. Stress			
Quenching Temperature—1550 deg. Fahr.												
1326	55	C36	800	364	53	C35	106,000	155,500	177,000	9.5	135	70
1326	56	C36	1,000	321	53	C32	92,600	140,500	158,500	9.0	170	50
1326	58	C36	1,200	1209	39	C11	71,700	86,150	99,900	14.8	O. K.	30
Quenching Temperature—1600 deg. Fahr.												
1326	59	C39	800	387	59	C39	97,650	158,500	184,500	9.0	135	70
1326	56	C39	1,000	387	51	C32	95,500	149,250	167,000	8.0	160	50
1326	55	C38	1,200	1194	39	C12	68,300	91,800	103,700	13.8	180	20
Quenching Temperature—1650 deg. Fahr.												
1326	59	C39	800	418	62	C40	110,300	157,000	191,000	8.3	90	70
1326	61	C39	1,000	375	61	C37	98,300	152,750	166,000	7.3	160	50
1326	60	C39	1,200	1209	41	C14	68,050	85,300	106,650	13.5	O. K.	25
Quenching Temperature—1700 deg. Fahr.												
1357	60	C40	800	387	64	C41	104,500	167,000	196,500	7.8	90	75
1357	63	C40	1,000	364	62	C36	98,700	146,150	166,750	6.8	170	45
1357	61	C40	1,200	1209	40	C14	71,300	90,250	105,700	14.0	180	25
Quenching Temperature—1750 deg. Fahr.												
418	65	C42	800	418	64	C42	93,000	158,500	193,500	8.3	90	80
418	61	C40	1,000	387	59	C35	93,950	153,800	175,750	7.5	180	50
418	64	C41	1,200	1209	41	C12	69,850	91,850	105,500	12.3	O. K.	25
Quenching Temperature—1800 deg. Fahr.												
418	65	C40	800	418	63	C41	100,800	159,750	191,600	7.8	90	75
418	64	C41	1,000	364	62	C37	94,500	157,450	190,500	7.5	170	60
418	64	C44	1,200	1209	41	C16	62,700	89,150	104,500	12.5	180	30
All specimens were cleaned by means of a longitudinal and two transverse.												

Each value represents the average of four specimens—two longitudinal and two transverse. All specimens were cleaned of furnace scale before starting corrosion test. Corrosion period—60 days. All Brinell readings were taken with 3000-kg. load except those marked with (1) which were taken with 1500 kg. load.

Table V.—Results of Tensile, Bend and Corrosion Tests of "B" Stainless Iron (1/16-in. sheet)

Hardness			Tempering T. (Deg. Fahr.)	Hardness			Tensile Strength			Elong. (2 in.)	Bend Failure, Deg.	Corrosion Score
Hb	Hs	Hr		Hb	Hs	Hr	Prop. Limit	Yield Point	Ult. Stress			
Quenching Temperature—1550 deg. Fahr.												
1194	36	C8	800	217	35	C8	61,800	80,500	110,500	15.5	O. K.	90
1194	33	C7	1,000	198	36	C9	52,300	77,450	102,900	17.5	O. K.	70
1194	35	C5	1,200	161	28	C7	41,200	57,900	79,750	22.5	O. K.	75
Quenching Temperature—1600 deg. Fahr.												
1256	45	C23	800	277	49	C26	76,450	109,100	137,600	13.3	180	90
1256	45	C23	1,000	286	45	C24	73,100	111,000	126,100	13.0	180	70
1256	45	C24	1,200	182	33	C 5	54,500	70,250	89,750	18.0	O. K.	50
Quenching Temperature—1650 deg. Fahr.												
1300	47	C29	800	321	51	C30	85,950	136,000	154,000	11.3	180	90
1300	48	C27	1,000	311	47	C27	78,350	120,700	133,500	10.3	180	70
1300	51	C27	1,200	194	37	C12	57,400	71,800	92,750	17.3	O. K.	40
Quenching Temperature—1700 deg. Fahr.												
1300	54	C30	800	321	..	C34	84,600	139,000	156,250	11.8	180	85
1300	51	C31	1,000	302	52	C28	76,500	120,850	135,500	11.0	180	70
1300	54	C30	1,200	194	39	C 9	57,600	74,600	95,100	16.5	180	30
Quenching Temperature—1750 deg. Fahr.												
321	50	C30	800	312	51	C32	87,000	146,150	156,500	11.0	180	85
321	53	C31	1,000	311	48	C30	78,500	123,250	140,100	11.0	180	60
321	50	C31	1,200	1195	40	C12	61,250	78,200	96,300	16.0	O. K.	30
Quenching Temperature—1800 deg. Fahr.												
321	54	C33	800	340	53	C33	84,750	141,000	152,750	10.5	O. K.	80
321	51	C34	1,000	302	45	C29	78,800	123,600	137,000	12.0	O. K.	65
321	51	C36	1,200	1209	36	C12	61,550	80,200	94,650	14.5	O. K.	45
Longitudinal and two transverse. All specimens were cleaned.												

Each value represents the average of four specimens—two longitudinal and two transverse. All specimens were cleaned of furnace scale before starting corrosion test. Corrosion period—30 days. All Brinell readings were taken with 3000-kg. load except those marked with (1) which were taken with 1500 kg. load.

for dip-brazed joints, and there was a greater difference between the maximum and minimum loads.

Both types of stainless iron were soldered without difficulty. The surfaces may be readily cleaned by application of dilute hydrochloric acid saturated with zinc, or by pickling with dilute hydrochloric acid. Zinc chloride, or "Hull" flux, may be used with about equal results.

Neither "A" nor "B" stainless iron was difficult to machine or to form when in the annealed condition, and parts have been machined from "A" alloy which had a Brinell hardness indicating 125,000 lb. tensile strength. Cutting tools should be high-speed tool steel and attention should be given to their shape and position in order to avoid a rough finish due to dragging. The corrosion-resisting properties of stainless iron make its use most attractive and, although it is not so resistant as some of the higher chromium alloys, it is considerably better than some of the commonly used alloys of similar strength.

The results of the above-mentioned tests indicate that attention should be given to the heat-treatment temperatures used in order to bring out the maximum resistance of the alloys. This is particularly true of "A" iron, which suffered by comparison with "B" except for "A" specimens which were tempered at 800 deg. Fahr. The relationship of the tempering temperature to resistance to corrosion was not studied as thoroughly as desirable, but enough work was done to indicate a decided decrease in rate of corrosion with decrease in tempering temperature.

The results also indicate that the tensile properties of these two types in the annealed condition are considerably better than those of mild steel and that the ultimate strength of normalized stock exceeds that of normalized medium-carbon steel. The strength of hardened and tempered stainless iron, combined with its capacity for resistance to corrosion and its fabrication qualities, has led to its use in the manufacture of aircraft parts. This application is expanding gradually and, up to the present time, no serious difficulty has been experienced in its use.

Table VI.—Results of Tensile and Hardness Tests of Bar Stock

Condition	Hardness		Tensile Strength			Elong. (2 in.)	Red. of Area
	Hb	Hr	P. L.	Y. P.	U. S.		
"A" Stainless Iron							
Annealed	147	B81	40,700	44,000	81,000	34.8	73.0
Heat treated ..	357	C35	85,100	109,300	181,800	15.7	57.6
"B" Stainless Iron							
Annealed	114	B71	29,500	30,700	62,300	41.2	72.9
Heat treated ..	300	C31	73,600	100,600	142,800	19.0	55.7

Annealing temperature for "A" and "B"—1650 deg. Fahr.
Quenching temperature for "A" and "B"—1650 deg. Fahr.
Tempering temperature for "A"—1000 deg. Fahr.
Tempering temperature for "B"—800 deg. Fahr.
Specimens machined from 3/4-in. round bar.
Tempering time—1 hr.

Table VII.—Results of Tensile and Bend Tests Specimens Normalized at 1650 deg. Fahr., Air Cooled

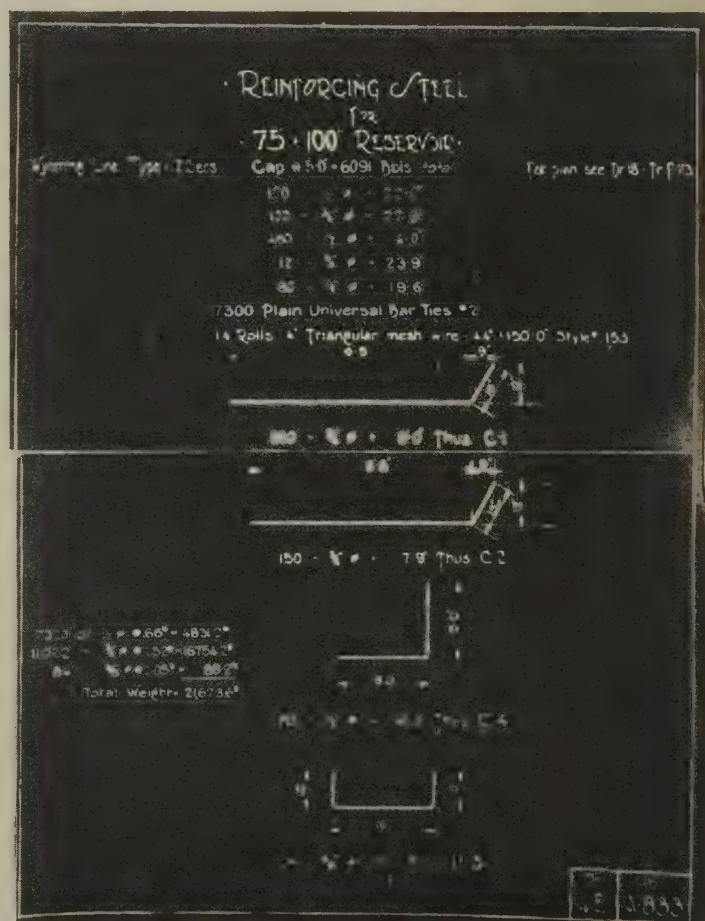
Thick- ness, In.	Hardness			Tensile Strength			Elong. (2 in.)	Bend Failure, Deg.
	Hb	Hs	Hr	P. L.	Y. P.	U. S.		
<i>"A" Stainless Iron Sheet</i>								
1/32....	299	55	C35	76,000	119,800	174,000	8.8	90
1/16....	279	52	C38	69,200	115,300	177,500	8.3	90
1/8.....	299	52	C33	73,500	105,200	172,000	11.7	85
<i>"B" Stainless Iron Sheet</i>								
1/32....	139	26	C19	41,000	67,500	117,800	10.0	O. K.
1/16....	139	28	C19	40,800	65,100	121,300	11.5	O. K.
1/8.....	139	28	C21	58,000	69,500	120,800	13.2	180

Table VIII.—Results of Tensile, Bend and Corrosion Tests of Annealed 1/16-In. Sheet

Annealing Temp. (Deg. Fahr.)	Hardness		Tensile Strength			Elong. (2 in.)	Cor- rosion Rating
	Hb	Hr	P. L.	Y. P.	U. S.		
"A" Stainless Iron							
As received..	149	B80	...	54,700	76,700	24.2	80
1300	161	B79	36,700	43,700	76,600	25.6	75
1400	151	B78	37,600	42,800	75,700	25.3	75
1500	151	B76	33,500	40,000	77,000	25.1	75
1600	151	B76	30,300	36,700	72,400	24.9	75
"B" Stainless Iron							
All specimens withstood 180-deg. bends without failure.							
As received..	182	B91	...	86,200	102,700	13.0	90
1300	172	B90	64,500	74,800	95,200	17.9	90
1400	161	B81	39,500	45,200	76,700	21.7	90
1500	151	B78	33,200	39,100	71,400	24.5	90
1600	151	B73	29,400	35,000	65,900	28.6	90

Time Saved by Transmitting Blueprint by Telephotograph

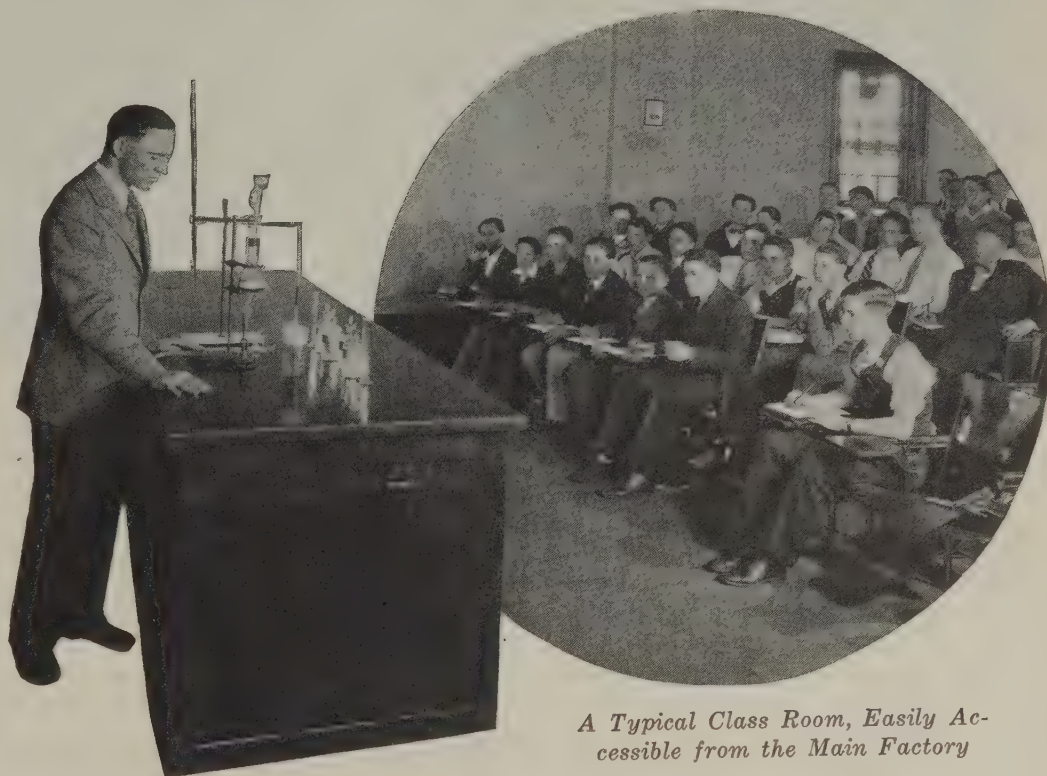
THE attached photograph is a reproduction of a telephotograph order transmitted from St. Louis to the Chicago office of Joseph T. Ryerson & Son, Inc. It calls for 1890 reinforcing bars with 1100 bends, 7300 bar ties and 14 rolls of wire mesh that were needed immediately for the construction of a reservoir at La Rose, Ill., for the Sinclair Pipe Line Co., Tulsa, Okla. The order was given in blueprint form to W. T. Branson, Ryerson representative at Tulsa, and as it could not be delivered by telephone, he dispatched it immediately by mail to the company's St. Louis office. As La Rose, Ill., could be served quicker from Chicago, the order was telephotographed from St. Louis to the Ryerson Chicago office. The accuracy of the wired photographic system made checking or confirmation unnecessary, and the material was ready to ship in 1 hr. 25 min. Dispatched late in the afternoon, it reached La Rose the following morning.



A Thousand Apprentice Tool Makers

Apprentice School Has Class Rooms and Laboratories Within the Factory and Students Divide Time Between Instruction and Production

BY FAY LEONE FAUROTÉ*



A Typical Class Room, Easily Accessible from the Main Factory

STARTING as a simple toolmakers' course in 1923, the Ford apprentice school in Detroit has grown until today it is a thriving industrial college with four major courses in its curriculum and two post-graduate courses available to those who may have shown exceptional ability and are desirous of becoming specialists in their lines.

The four main courses, which cover a period of two years and a half each, are tool making, electrical engineering, metallurgy and metallography, and steam engineering. The post-graduate courses are in tool and die design and in electrical design and drafting.

The apprentice school is entirely separate from the Ford trade school, the latter institution being intended for the training of boys from 12 to 16, who are not yet able to work in the shops or not fitted by education to take the advanced work given in the apprentice course. The two schools are quite distinct in character. The trade school

*Mechanical engineer, New York.

and shops, for example, are entirely separate from the factory, while in the apprentice school the pupils are actually engaged upon production work alongside experienced workmen, tool makers and engineers.

Entrance requirements to the apprentice school are simple. The applicant must be an employee of the Ford Motor Co., pass the entrance examination, be willing to comply with requirements, disciplinary and otherwise, and not be over thirty years old. He may then secure in some two and a half years of steady work and application a fund of knowledge and a facility of practice attainable in few places elsewhere.

Naturally, the pupils are drawn from boys and men with varying educational backgrounds. Some have completed only a few grades in a common school, others are graduates of colleges and universities. The school takes them all, determines their capabilities, classifies them, sets suitable tasks and aids them in every way possible to complete their courses with credit to themselves and the school.



The Younger Apprentices Are Segregated for the First Few Months. View shows a special lunch room for their exclusive use



Boys With No Previous Training in Machine Shop Work Are Given Elementary Exercises on Modern Tools Until They Become Skilled Enough to Enter the Production Line

The preliminary examination is a simple one, largely concerned with mathematics, and is intended only to eliminate those who could not possibly handle the theoretical work given as a companion part of the practical courses.

During the summer of 1928 the Ford apprentice school had a total attendance of 1480, distributed among the four courses and the two post-graduate courses as follows:

<i>Elementary School</i>	
Toolmaking	1,030
Electrical	316
Steam engineering	36
Metallurgy	68
<i>Post-Graduate</i>	
Electrical drafting	14
Tool and die design	16
Total	1,480

The teaching staff is composed of instructors most of whom are university graduates. Some give their full time to the educational work, others divide their time between administrative work in the production shop and teaching in the school. All of them are well acquainted with the most advanced practice. Their ability to requisition the factory stockrooms for the very latest types of mechanism, latest samples of new materials, actual working drawings of every kind and character—these advantages and facilities make the school's instruction comprehensive and timely.

It will be appreciated that the scheme of instruction is

similar to the cooperative plan introduced by Dean Herman Schneider of the University of Cincinnati, and widely copied elsewhere, wherein the student spends alternate periods of time in the classroom and in the shop doing the everyday tasks of production. In the Ford school this alternation is daily.

The classrooms and laboratories are located in main manufacturing buildings within the Ford plants and are readily accessible to those boys and young men who are using them. Class hours for instruction and laboratory work are arranged so they will not interfere with the working periods, at the same time making it possible for the pupils to go directly from the shops to their study rooms or vice versa without returning to their homes between times.

These class hours are set so that no matter which shift the student is working he will have suitable times for his theoretical training. At the present time the schedule for classes is as follows:

- 1.45 p. m. for No. 3 shift (afternoon).
- 3.45 p. m. for No. 2 shift (day).
- 8 a. m. for No. 1 shift (midnight).

Manual training is thus done in the line of production. Mental training is done in large measure by means of answer sheets. That is, the problems are assigned and explained in the classroom while the work is done outside.



Tool Maker Apprentices Before Long Work Shoulder to Shoulder with Skilled Mechanics in the Ford Plant Tool Rooms

Only the answers are brought in for credit and grading. It is expected that problems receiving non-passing grades (less than 70 per cent) will be reworked and returned with the new lessons on the following class day. Explanation sheets, which will supplement the work of the instructors, are issued to help with homework. Despite the fact that the theoretical work given is of a high character, the percentage of failure is small. In passing, it may be said that only those who are eager to attain a good grade in their work are apt to be accepted or remain in the school.

Recognized school and college texts are used for textbooks. Smith's "Advanced Machine Work," for example, provides some eight lessons in the theory of tool making and operation. For steam engineering and power plant work the well-known textbooks by Crofts are used, while for the metallurgical and metallographical course a special textbook written by Ford engineers and instructors, but following closely the work of Sauveur, is provided.

The latter course starts out with a study of elementary chemistry, physics (heat and its measurement), the physical properties of metals like strength and hardness; then it takes up briefly the methods of production of iron, steel and other alloys. Finally consideration is given to hardening

practice and theory, forge and foundry work, and finishing operations such as cleaning and plating.

At various stages as the student is shifted from one job to another in the shop, or completes sections of the course, his foreman or instructor is expected to sign his record card and comment upon his ability, faithfulness and general character. When he completes the specified course he is given a certification or graduation card signed by the department foreman, department instructor and the superintendent of the school.

Upon graduation his employment is not mandatory, but approximately 90 per cent of the graduates stay on from choice. Records show that the graduates readily progress into positions of importance and trust, either in the Ford Motor Co. or in the Government service, in colleges, schools, or other industries.

Because the boy's technical education has been accomplished, at least in part, in the exact environment in which his further progress may be made, the graduate finds the period of transition into the world of business less difficult. He has learned how to get along with men and acquired that feeling of independence which the possession of accurate up-to-date knowledge gives.

High Price of Special Steel Prevents Wide Use

Chemical Industry Needs Slow-Rusting Steel, Made in Tonnage, to Develop 90,000 Lb. Ultimate and 35 Per Cent Elongation

BY T. MCLEAN JASPER*

IN selecting metals for chemical service it is presumed that great emphasis would be placed on steels with high alloy content to take care of the unusual chemical requirements due to corrosion and high temperatures. As a matter of fact, most steels of high alloy content are so expensive that many of the special problems of the chemical engineer are being solved by using the less expensive steels in vessels for carrying the load, lining them with alloy steel, or with something other than steel, for resisting corrosion. There are also added difficulties in the fabrication of high-alloy steels, especially chromium steels.

It would seem, therefore, that the cost of high-alloy steels, and the difficulties encountered in their fabrication, will restrict the use of such steels to a relatively small proportion of the containers and pressure equipment. Much larger possibilities would exist if economical means could be found for the production and fabrication of such alloys.

Much Misinformation Being Circulated

The fact that there are so many conflicting reports as to what such alloy steels can perform under service makes it appear that many of the producers of steel are not acquainted with the actual facts. It is very desirable that the pertinent facts covering the use of such steels should be obtained more accurately and made available to those interested.

The large percentage of the world's loads have been carried by ordinary carbon steels, and at the present time this class of tonnage steel has been developed to a point where it is probably yielding the largest possible return in terms of strength and ductility.

There is, however, a great need for a steel that, without heat treatment, will possess an ultimate strength of 90,000 to 95,000 lb. per sq. in., yield point 60,000 to 65,000, and a

ductility represented by 30 to 35 per cent elongation. If this steel can have the added quality of being more corrosive resistant than carbon steel, it would be more useful yet. Plain carbon steels meeting the above strengths fall considerably below the above figures in ductility when made by the present tonnage methods. If the new steel could be produced to compete with carbon steel on a cost basis per 1000 lb. per sq. in. strength, a very large use indeed could be found for it.

Should Standardize Tests at High Temperatures

The question of strength of steel at high temperatures and the question of designs and shapes to utilize such steels most economically are of great importance to the chemical engineer. There is also a great need for a clarification of methods of testing at elevated temperatures that will produce consistent results in the many laboratories engaged in this work. There seems to be considerable difference of opinion as to which test results should be considered as being most reliable. The writer is of the opinion that the factor of safety of large equipment should be based on the ultimate strength, because it is the value which can be most accurately obtained. In some mechanical equipments the stress beyond which fairly large strains occur is also an important factor to determine. No stress should be allowed in any equipment that allows large strains to exist during the life of the equipment, and for this reason a simple method for obtaining a reasonably reliable value is needed.

Another important factor entering the value of steels when used to resist chemical corrosion is the knowledge of what such steels will do under working conditions. The laboratory test that does not take into consideration the actual conditions of service will often fail miserably in selecting the best steel for the purpose. A steel that is to be used to carry load as well as to resist the effects of corrosion must be tested under appropriate load, temperature and corrosion conditions.

*Director of research A. O. Smith Corporation, Milwaukee, Wis. From a paper read before the American Chemical Society at Northwestern University, Evanston, Ill.

Use of Electric Power in Iron Mining

Increase in Lake Superior District and Effect on Ore Output—Electric Shovels for Open-Pit Mines

BY A. C. BUTTERWORTH*

PROBABLY the first mine in the Lake Superior district to be completely electrified was the Penn mine at Vulcan, Mich., electrification of which was started in 1906. In 1910 the Cleveland Cliffs Iron Co. started extensive electrification of its properties in and around Ishpeming, Mich. In 1912 the Davidson and Bengal mines at Iron River were completely electrified, these being the first mines to operate entirely on purchased power. In 1913 the Oliver Iron Mining Co. built a hydroelectric plant at Quinnesec Falls on the Menominee River below Iron Mountain, Mich., for furnishing power for a set of 3000-gal. centrifugal deep-mine pumps in its Chapin mine.

In 1910 there probably was not a mine in operation which did not make some use of electric power, although there were few motor-driven hoists and compressors and not many motor-driven pumps. The next ten years saw a complete reversal of conditions, so that, after the slump of 1921, with few exceptions, the underground mines that resumed operations either had already been completely electrified or were in process of being changed over to electric drive.

Use of electric power in the past five years has continued to show an increase, which appears to be reflected directly in increased efficiency. In 1922 a group of 12 representative underground mines, nine of which were completely electrified, and the others partly electrified, showed a power consumption of slightly less than 4 kwhr. a ton. In 1927 a group of 16 mines showed a power consumption of slightly over 8 kwhr. a ton.

Although the use of electric power cannot be credited with the entire increase in efficiency, it is interesting to note that, coincident with the foregoing increase in power consumption from 4 kwhr. to 8 kwhr. a ton, the mining efficiency, as expressed in tons per man was nearly doubled.

Pumping, Air Compressing and Ventilating

For 1927 the pumping power for the group of 16 electrically equipped mines amounted to about 40 per cent of the total power consumption. For every ton of ore produced, 2½ tons of water was pumped a vertical distance of 1000 ft. The sum of the hoisting and pumping power amounted to approximately 50 per cent of the total power.

Power used in compressing air is, next to pumping, the largest single item and amounts to about 35 per cent of the total power. Compressing air by electricity is one of the most expensive ways of using power, unless constant attention is paid to the matter of leaks, proper sizes of air lines, and the question of overtime operation. For individual mines the power consumption per ton varies from 1.5 kwhr. to 10 kwhr., depending on the extent of the air-distribution system, number of hours during the month in which the compressor is running, condition of underground ventilation, type of mining equipment and method of mining being used, and to a certain degree the character of the material being mined.

More and more attention is being paid to mechanical

ventilation of mines. There is not the necessity of getting rid of explosive gases, which exist in some coal mines, but the heat and the carbon dioxide due to decaying timber matting, together with the powder smoke underground, make it necessary to pay attention to this problem. In the early days many mines had reasonably good natural ventilation, but with the increased depth of mining even those mines are now turning to mechanical ventilation. Many devices have been tried out to improve local ventilation in exceptionally poor places. Direct blowing of compressed air and the use of air "injectors" and air-operated fans and blowers have generally given way to the latest type of portable motor-driven ventilating fans. The trend of this work, however, is toward the large mine-ventilating unit, together with a proper system of air doors throughout the mine, to give adequate and positive ventilation everywhere in the mine.

Slushing Hoists a Great Improvement

Perhaps the factor of greatest importance in the last six years in increasing mining efficiency has been the development of the slushing hoist and its adaptation to the problems of mining. The earliest equipment consisted of a small steam-operated hoist pulling a scraper such as was formerly commonly used in general excavating work on the surface. From this beginning the equipment has been developed successively through refinements of the air engine and final application of electric drive, so that now practically all underground mines have slushing hoists of some type operated either by air engines or electric motors.

There are several double-drum hoists in operation, driven by 25-hp. motors, and capable of handling scrapers more than 4 ft. wide at a rope speed of approximately 300 ft. a minute. Such an outfit with two-man crews working on 8-hr. shifts recently mined and scraped into the loading chute more than 1000 tons of ore in one 24-hr. period. For the entire month in which this record was made this one machine was credited with about one-third of the total production from this mine.

Electric Power in Open-Pit Mining

Practically all the open-pit mines have been stripped of their overburden by means of steam shovels and steam locomotives, and a large proportion of the present ore tonnage is handled by the same means. However, a few of the recent stripping jobs have been done partly by electric power, either with electric shovels or drag lines, or by hydraulic sluicing. In practically all cases, however, the haulage is by steam locomotives.

Use of electric power for shovel operation in regular production of ore is becoming more and more general, although it probably will be a long time before the steam shovel will become obsolete on the Mesaba Range. Electric shovels in operation range in size from the small 1¼-yd. revolving shovel up to the 350-ton revolving shovel on trucks, using a 10-yd. dipper. Some of the earlier shovels have a.c. motors, but the latest ones use a synchronous or induction motor-generator set, with d.c. motors and Ward Leonard control.

*Electrical engineer, mining department, Pickands, Mather & Co., Duluth, Minn. This is abstract of a paper read at the summer meeting, St. Paul-Minneapolis, of the American Society of Mechanical Engineers.

Fair Dealing Must Be Enforced

Business Standards of Both Fabricators and Mills Must Be Raised to Protect Structural Steel Industry from Ruinous Price Cutting



T. J. FOSTER

"SPECULATION in the steel market is a thing of the past. The structural steel industry has entered an era in which the sole approach to profits is through merchandising," said Thomas J. Foster, chairman National Bridge Works, Long Island City, N. Y., when interviewed by a representative of THE IRON AGE.

"In the days of sharply fluctuating prices, fabricators, as well as other buyers, made speculative purchases of steel when they thought the market was scraping bottom, and frequently cashed in handsomely on their judgment. Such dividends from astute buying have not been possible for several years. Market conditions have changed, and the problem of the fabricator has changed with them.

"It is trite to say that the greatest present need is better selling. What is required is not merely an appreciation of this need, but the development of specific plans for its fulfillment. When it is realized that only a quarter of the structural steel shops in this country showed a profit in 1927, the desperate case of the industry becomes apparent.

"What is wrong? Why do structural shops continue to take business at less than cost?

"Leading fabricators recognize that the problem calls for hard thinking, and, as soon as all those who have a stake in the industry take an unbiased interest in finding a solution, success will not be far around the corner. When new methods are proposed, they are frequently called visionary, but it is only through vision that progress is possible. Murder was formerly regarded as the concern only of the family or clan aggrieved. It took vision to see that murder was a crime against society as a whole, and that punishment was society's obligation.

"It will take vision to see our way out of present economic maladjustments. Already a marked change in the point of view of business men is seen in the growth of trade associations. The interdependence of competitors is winning general recognition. Just as the rise of the state brought new political duties and relationships, so will the new conception of business unity create a new sense of responsibility, which will not merely affect the relations of competitors in a single branch of an industry, but will also control the policy of suppliers of raw materials.

"It is generally admitted that it is demoralizing, damaging and economically wasteful for a fabricator to cut prices below costs. It is not yet so clearly recognized that

"To put business on a higher plane a first essential is to crystallize the best thought regarding proper relationships among competitors on the one hand and between mills and buyers on the other. This conception should be reduced to writing as a code of standard practice. Enforcement, I am confident, will be through individual self-respect and moral suasion."—THOMAS J. FOSTER

it is equally wrong for a mill to sell material to such a price cutter. In fact, it is not uncommon practice for a fabricator who has taken unprofitable work to throw himself on the mercy of the mill, asking it to share part of the loss. That steel producers, at times, have acceded to such appeals from customers is understandable, but, from the standpoint of sound business, such action is inexcusable.

"The steel maker who does not feel responsible for his product

and the merchandising of it after it leaves the mill is short-sighted. A sale of steel to a customer who markets his product at a loss is not merely the affair of the two parties to the transaction, but adversely affects the business of all of the customer's competitors. Instances of this sort when multiplied threaten the very integrity of whole industries. Thus short-sighted sales can seriously impair or even destroy long established outlets for steel.

"An industry cannot flourish when the incompetent are permitted to set the pace for their competitors. It is only because of the lack of an enlightened selling policy that such disturbing elements are allowed to stay in business. The best present-day merchandising provides for the fixing of the retail price by the manufacturer. Granted that such a policy is impractical in the steel industry, there is still room for much more active interest on the part of the mills in the final disposition of their products.

"In the fabricating field, it is not difficult to ascertain when prices are cut to prohibitive levels. Shop methods have become standardized, and there is only a fractional difference in the costs of different shops, whether they be large or relatively small. In fabricating, a shop works to specifications, in contrast with a mass production plant, where operating economies are proportionate to the volume of standard products turned out.

"Selfishness is no bar to more effective cooperation between fabricators and mills. Selfishness will always exist, but it should be our servant, not our master.

"Controlled selfishness is exhibited in the feeding of the family group. Uncontrolled selfishness is exemplified by the hog. The hog eats as though each bucket of swill dumped were the last. Each hog tries to grab the bucket and runs the chance of spilling all of it. The animal is not concerned over the amount it destroys. The quantity it can get and keep others from getting is its whole life.

"Society cannot exist without proper controls; losing them, it lapses into barbarism. Members of society who do

not control themselves voluntarily are controlled by force and we thus have our courts and penal institutions. Business is still in a state of barbarism; it needs civilizing as much as our social life.

"Business must learn that 'success can come only through correct relationships.'

Code of Business Practice Proposed

"To put business on a higher plane a first essential is to crystallize the best thought regarding proper relationships among competitors on the one hand and between mills and buyers on the other. This conception should be reduced to writing as a code of standard practice. Just as the citizen cannot know his duties unless the laws binding him are specific, likewise the business man must have definite information regarding what is expected of him in his economic relations.

"How would the standard code be enforced? Certainly not by Governmental authority. That is neither desirable nor necessary. The salvation of industry lies in solving its own problems rather than in inviting more political interference. Enforcement, I am confident, will be through individual self-respect and moral suasion. Anyone who has observed social life knows that social ostracism is frequently more punishing than conviction at the bar of the court.

"Once a standard of business conduct is generally accepted, violators will be treated as business outcasts. Fabricators, acting on their own individual initiative, but without doubt in sufficient numbers to make themselves felt, will sever all relations with a competitor who indulges in practices that threaten the industry. Nor are they likely to continue to patronize a mill that has so little interest in

their common welfare as to sell steel to such a fabricator.

"What we need is a new conception of integrity and conduct conforming to that conception."

Mr. Foster's proposal for the drafting of a code of standard practice in the selling of structural steel is timely in view of the general appreciation of the need for more stable competitive relationships among manufacturing consumers of steel and, latterly, the growing interest in what mills can do to that end. A number of associations in the iron and steel consuming field have appointed committees on steel mill relations. Mr. Foster is chairman of such a committee for the American Steel and Heavy Hardware Association. A similar committee of the American Institute of Steel Construction is headed by its president, W. M. Wood, of the Mississippi Valley Structural Steel Co., Decatur, Ill.

Cutting Tools Made of Tungsten Carbides

Interest in the cutting or abrasive qualities of tungsten carbides continues and there is every indication that the carbides will be one of the important tungsten products hereafter, in the opinion of Colin G. Fink, writing in "Mineral Industry, 1927." Krupp of Essen, Germany, produces tools of tungsten carbide according to patented specifications by pressing a mixture of tungsten carbide powder together with a little cobalt, nickel, or iron powder as a binder, sintering at 1000 deg. C., shaping, and then finally sintering at about 1500 deg. C. K. Becker and R. Hoelbling have also prepared the carbide W_2C by heating the theoretical amount of tungsten and carbon at 1900 deg. C. in a carbon-free atmosphere. A definite compound results that is very resistant to acids, even mixtures of hydrofluoric and nitric. It can be melted without alteration.

Dubuque Barge Terminal Provides Link for Rail-and-Water Movement from Chicago to Twin Cities

THE new dock terminal at Dubuque, Iowa, shown in the illustration, affords terminal advantages suitable for water-and-rail shipments from the Chicago district to St. Paul and Minneapolis. In the left foreground of the picture may be seen the bulk cargo terminal. Dock house, escalator and wharf barges are shown in the center, and a recently constructed concrete landing for excursion steamers, at the extreme right. In the background are new plants of the Maizwood Products Corporation and the International Harvester Co.

The Interstate Commerce Commission has prescribed rail-and-river rates from practically all points in Illinois and Indiana that produce a large tonnage of traffic for through

movement via Dubuque. The destination territory includes all points on the Mississippi River north of Dubuque and points west of the Twin Cities are far as Grand Forks and Fargo, N. D. The barge-and-rail rate on steel products from Chicago to Minneapolis is $23\frac{1}{2}$ ¢. per 100 lb., as compared with an all-rail rate of $27\frac{1}{2}$ ¢.

The distance from Chicago to Dubuque is 180 miles, a 12-hr. run by rail. The present towboat schedule provides for two trips each way weekly, and the boat time from Dubuque to Minneapolis averages three days upstream and two days downstream. With reasonably close connections between rail service and the towboat schedules, Chicago shippers may expect five-day service by this route.

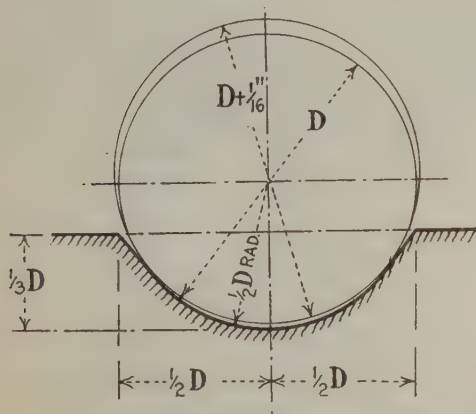


Qualities of Cold Rolled Shafting

Comparisons with Cold Drawn Steel—Design of Groove for Rolling—Typical Steel Analyses

BY JOSEPH R. MILLER*

IT was Lauth who first made shafting by cold rolling. Setting up a mill with rolls in which he had cut a suitable groove, he accomplished the first of a product which was then and is still superior for the purpose of shafting. With primitive equipment, the fit of the housings and shoes as well as the boxes and windows chipped by hand, and half of an old-time steamboat engine mounted with a heavy flywheel on a big cast iron shaft, this accurate product was made, a standard in its line. And it still deserves to hold its place as a standard for those special purposes to which it was first applied.



Cold Rolling of Steel Shafting. The rough bar is $\frac{1}{16}$ in. above finished size and will not fill the groove, as shown. D is diameter of finished bar; $D + \frac{1}{16}$ is diameter of rough bar; $\frac{1}{2} D$ is radius of groove; $\frac{1}{3} D$ is depth of groove

Perhaps it was a freak of luck that in those early efforts the best of its kind was produced, and upon the foundation of profits from this manufacture, wisely applied, rests the superstructure of a great steel corporation; for in those days line shafting and pulleys and belts carried the power in factories and mills, now carried over the wire. For this service, by the test of years of use, cold rolled shafting established itself in the esteem of those acquainted with it.

The superiority of this product is proved in this way by the most searching test—that of service. The superficial points that were particularly urged in its composition are not hard to find or explain. In the first place it was made to accuracy, and the finish smoothed and burnished with a toughened skin by rolling. In the second place it had a very high elastic limit, which gave it a capacity for heavy loading and reduced considerably the size and cost of the equipment. At the same time it was tough enough to stand considerable bending; as they said at the time, and exhibited specimens, "you could tie it in a knot."

Except for the very excellent surface, all these tests were met in the newer "die rolled" or cold drawn product. But there was something to be learned about these two very similar products, cold rolled and cold drawn. And, as in many phases of our experience, it is the hidden virtue which makes us go finally to the better thing; so it was with cold rolled. The point of superiority preeminent, hard to explain, invisible, is the integrity of its substance or struc-

ture, revealed only in its use or in tests that represent use.

This elemental thing which seemed so hard to explain is lacking in the cold drawn to a more or less extent. The cold drawn bar starts out badly, with an inherent tendency to failure, perhaps from microscopic flaws or possibly an incipient weakness. For the work and strain of the cold finishing process must be passed through the crumbling structure in the pull of drawing, while in the cold rolling process the work is applied direct.

The severity of the comparison between cold drawn and cold rolled steel is modified as the size becomes smaller, so that it is not so evident with bars $1\frac{1}{2}$ in. diameter and less. Also the composition is a factor in the comparison, and the highly satisfactory combination of hardening elements which can be used for good cold rolled shafting cannot be used when the shafting is drawn. Early in the history of the art of drawing the shafting sizes cold it was learned, through expensive and well-nigh disastrous results, that these facts existed. And it was learned also that the speed of drawing had to be modified to suit size and to suit various compositions.

Since line shafting is largely out of style and since, for other similar uses, different makers use their own judgment about the process to be applied, cold rolled steel is not particularly featured by anyone. Hence no one can construe what has been said as favorable to any particular manufacturer. But rather it is to be regretted that there is passing out of hand a superior and remarkable material which should be capable of development, both in its uses and in the cheapening of its production cost.

Below are given some data regarding the corresponding

Typical Compositions of Steel for Cold Working

	Carbon	Manganese	Phosphorus Limit	Sulphur Limit
Cold drawn shafting	0.18 to 0.25	0.40 to 0.60	0.04	0.05
Cold rolled shafting	0.26 to 0.32	0.60 to 0.80	0.04	0.05
Cold rolled axles*	0.26 to 0.32	0.60 to 0.80	0.03	0.05

A silicon content up to 20 per cent is optional.

*For street car and other service, 25 per cent discard.

Diameter of Shaft	Size of Mill
2 in. and under	12 in.
3 in. and under	17 in.
4 in. and under	21 in.
$5\frac{1}{2}$ in. and under	21 in. short rolls

compositions of cold rolled and the cold drawn substitute. There is also given the contour of grooves used successfully for years in cold rolled manufacture and the size of mill for the various diameters. The number of passes to complete a shaft varies with the size and is between 20 and 35, roughly. The speed of the mills described was 60 r.p.m.

Bituminous coal produced in the week ended Sept. 1 was 9,483,000 net tons, according to the Bureau of Mines, bringing the year's total to 312,812,000 tons, compared with 354,315,000 tons to the same date last year.

*245 Melwood Avenue, Pittsburgh.

Crank Shapers Provided with V-Type Ram

V-TYPE ram with 55-deg. V-ways and a newly designed table support features new 16, 20 and 25-in. high-speed back-geared crank shapers which have been placed on the market by the Smith & Mills Co., Cincinnati.

The ram has a cap and gib of one-piece construction for the full length, with single horizontal adjustment to compensate for wear of the bearing surfaces. The ram is of box construction, heavily ribbed and has large bearing on the column ways. Felt inserts connecting with an oiling arrangement have been provided for the ram ways. The ram carrier has been lengthened and screw adjustment provided so that the ram may be positioned while the machine is in motion or at rest. The ram carrier has a large opening in the center so that long shafts may be passed directly through for keyseating, which is emphasized as eliminating the disadvantage of planing at an angle.

In the new arrangement, the housing for the adjustable block of the table support is securely bolted to the base of the machine, and since the support block is always in contact with the table, a bearing is provided even when the table is elevated to its extreme height.

Massive construction of the head is intended to resist tool thrusts from heavy cuts. The head is arranged to swivel through an arc of 90 deg. The screw, of chromium steel, has a bronze adjusting nut for taking up wear and the tool slide is fitted with a full length gib. The slide is adjustable for wear by means of set screws with lock-nuts.

Internal ratchet feed with a drop-

forged pawl and trip is provided. Feed gears are of steel and the solid feed rod is provided with a graduated feed disk which shows at a glance the number of notches, in steps of 0.010 in., up to 15. The feed hanger, of new design, has a long feed stem bearing to permit the connection rod to bear on the outside, thereby eliminating wear in the large hole of the rod. Automatic vertical and horizontal feed of the table in either direction is provided.

The machine is driven by single pulley mounted on tapered roller bearings, through a disk clutch and brake to a six-splined shaft. The clutch and

brake, controlled by a long lever at the side of the operator, start and stop the machine independently of the motor. The speed box is of unit type. Four changes of speed are provided, which, combined with the back gears, give eight cutting speeds. Gears are of alloy steel, heat treated. Shifting gears slide on multiple splined shafts which are mounted on tapered roller bearings. Lubrication of the main revolving shaft bearings and ram ways, as well as of parts inside of the machine, is by means of a one-shot foot-operated system, comprising a supply tank, pump and distributing headers. Motor drive arrangement instead of single pulley drive can be furnished.

Cable Clip with Two Grooved Jaws

CABLE clips having two jaws that are fully grooved for the lay of the cable, so that neither of the cables is gripped by the U-bolt, are being marketed by the Eureka Metal Products Corporation, North East, Pa. Triple grip on the cable is another feature stressed, and it is claimed that the device carries three times the load of a cable clip having only one grooved jaw and a U-bolt in contact with the cable. This clip, available in a full range of sizes in steel and in bronze, is said to give equally good results on wire rope and messenger strand.

Arrangement of the device may be noted from the illustration. There are only four separate parts, the extra grooved jaw being peened to the "U." Any size wrench can be used to tighten the clip and it is stated that

restriction as to the length of wrench handle is unnecessary, because the double grooved surfaces of the clip prevent distortion of the cable regardless of how tightly the nuts are

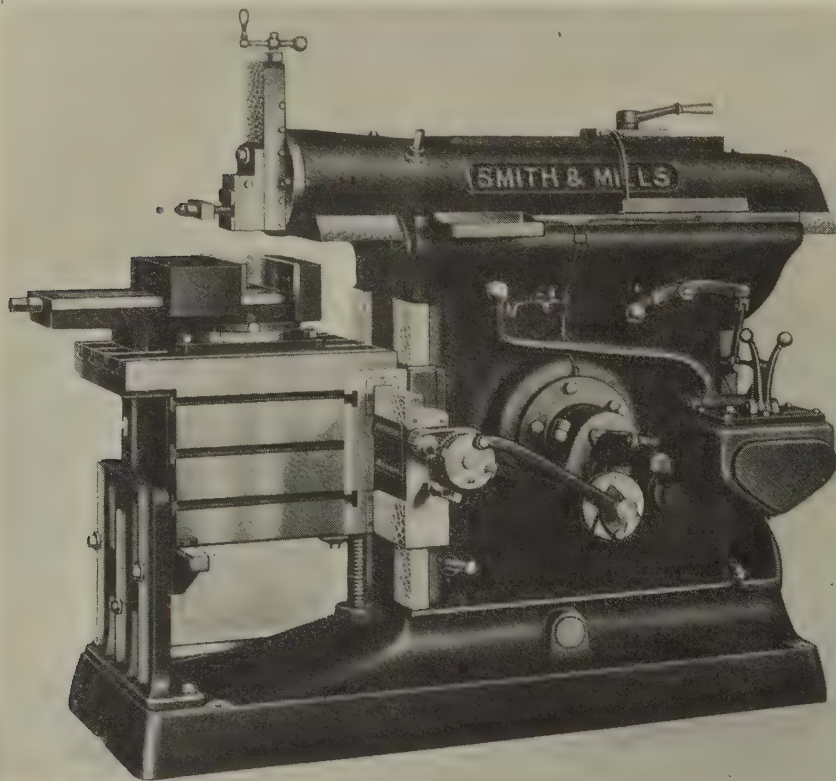


Triple Grip on the Cable Is a Feature of the Clip

pulled down. In placing the clips on the cable, they may be staggered or placed with all the U-bolts in the same direction. "Circle bends" are not produced in the cable by the clips, and the "U" can be placed over the live cable with as good results as when turned the other way. The double grooved jaws produce a symmetrical loop, with equal flexibility on both sides. It is stated that the stresses on the cable are equalized under heavy loads.

Increased safety and savings in cable, due to the elimination of the cutting of strands by the U-bolts, are claimed. Direct saving in clip cost, as well as saving in labor, are attributed to the fewer clips needed.

Production grinding methods were discussed by Vernon W. Wells, Carborundum Co., Niagara Falls, N. Y., at the first fall meeting of the Cincinnati chapter of the American Society for Steel Treating, Sept. 6.

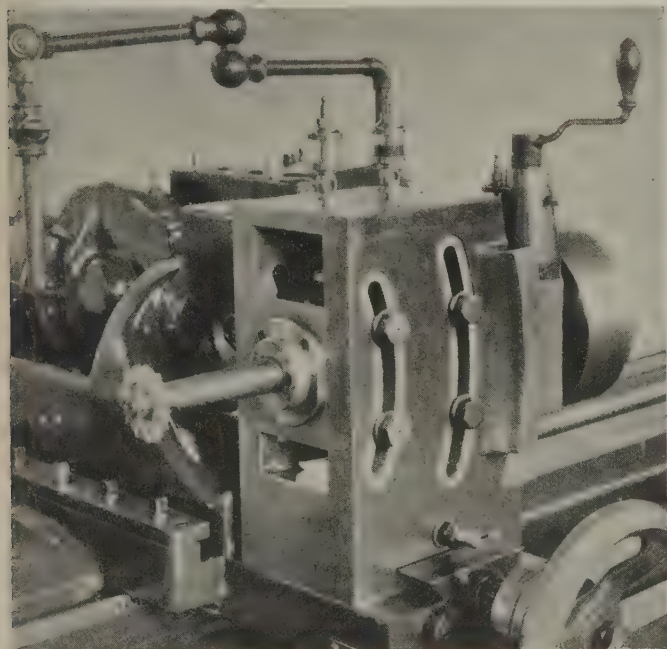


The Table Support Has Been Redesigned to Provide Rigidity at Extreme Elevation of the Table. The ram has 55-deg. V-ways

Internal Milling Head for Thread Millers

A NEW milling head, for internal milling and hobbing operations, has been made available by the Pratt & Whitney Co., Hartford, for use on its 6 and 10-in. model "B" thread milling machines. Application of this head is emphasized as eliminating the necessity of having two machines,

ing simultaneously of the external and internal heads. Power is transmitted to the cutter of the internal milling head by a gear on the cutter spindle shaft of the external head through two intermediate gears, all gears in this drive being Maag cut. Sight feed oilers provide continuous



The Head for Internal Milling and Hobbing Operations Converts the Thread Miller Into a Universal Unit

one for external work and one for internal work. In addition to this saving, provision has been made for larger output by increasing the cutter speed of the new internal head.

The base of the internal milling head is dovetailed to fit on the cross-slide with the regular external cutter head. The head is locked in position on the cross-slide by a lock bolt equipped with check nuts, which fits into a tapped hole in the base casting of the external cutter head. This arrangement permits the use of the cross-slide handwheel for the travers-

lubrication of the gear train. The spindle of the internal milling head is mounted in bronze bearings and is equipped with a flywheel.

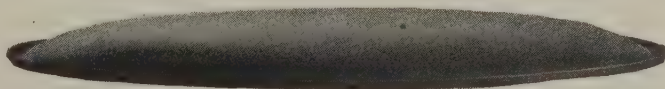
Adjustment is provided for setting the cutter at any angle up to 10 deg. above or below the center line, the angular setting being facilitated by graduations on the side of the milling head. Tie rods serve to hold the cutter arbor at any given angle and to prevent slippage. The angular setting of the cutter above or below the center line is of advantage when milling right or left-hand threads.

Double-Dished Heads for Storage Tanks

MANUFACTURE of steel storage tanks is being materially simplified by the use of double-dished heads, which recently have been developed and put on the market by the Commercial Shearing & Stamping Co.,

diameter, the making of tanks is speeded up by the fact that any number of shells can be cut to size and welded or riveted, with the assurance that the heads will fit accurately. Formerly it was necessary to make each

Upturned Rim Makes the Double-Dished Head



Youngstown, Ohio. In this new head the flange extends in the same direction as the bulge of the head, and flares slightly, so that when the head is pushed into the shell it tightens up around the entire circumference and gives a metal to metal contact—the ideal condition for welding.

Sizes range from 18 in. to 84 in. in diameter. As every head is true to

tank shell to fit the heads, as there was usually so much variation in their circumference that the shell had to be lapped either at one end or the other.

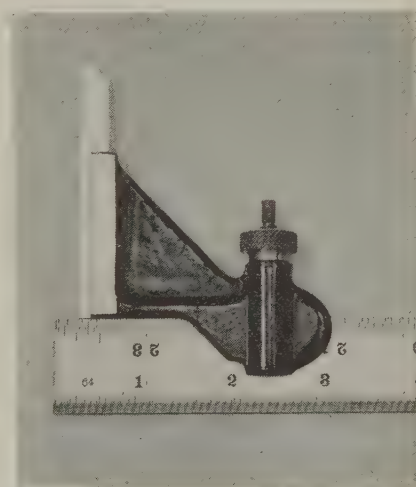
Accuracy of dimension is not the only improvement. Of equal importance is the dished feature, which allows the capacity of the tank to remain unchanged while the length of the shell is decreased from 2 to 4 in.,

depending upon the diameter of the tank. The capacity of the heads in a 30-in. diameter tank is 8 gal. This increases proportionately up to 88 gal. in the 84-in. diameter tank.

Tanks fitted with the double-dished heads, under pressure test, have demonstrated ability to withstand far greater pressures than underwriters' requirements. Double-dished heads are made also in the obtund shape, for basement oil-burner tanks.

Height Gage Attachment for Combination Squares

A NEW height gage attachment for use on the blades of combination squares and sets, making the tools a height gage, has been brought out by the Brown & Sharpe Mfg. Co., Providence. Rigid construction and the arrangement of the blade, which extends practically to the rule, to fa-



Used with Combination Squares and Sets, the Attachment Facilitates Comparative Measurements of Heights or Projections from Plane Surfaces

cilitate relatively exact measurements of heights of blade or projections, are features. The attachment may be used at all positions from the extreme top to the bottom of the blade. It is also reversible and can be used on either side of the blade.

The frame of the attachment is drop-forged and has a japanned finish. The inside end of the pointer, which is of steel, hardened, tempered and ground, projects from the body of the attachment to the edge of the blade so that the height at which the pointer is set may be read easily. Two sizes, designated as the No. 465A and 465B, for use on the company's combination squares and sets having 9-in. blades and on squares and sets having 12, 18 or 24-in. blades, respectively, are available. The attachments are not designed for use on squares and sets having heavy blades.

Day & Zimmermann, Philadelphia consulting engineers, have removed their offices from 1600 Walnut Street to 112 North Broad Street.

Jobbers Object to Lower Cash Discount

Hold Meeting of Protest in Pittsburgh Which Is Attended by Sheet Manufacturers, Who Defend Their Action

JOBBERs of sheet steel made a very urgent plea to sheet manufacturers at a meeting held at the William Penn Hotel, Pittsburgh, Wednesday, Sept. 5, that the latter either rescind their recent action in reducing the cash discount from 2 per cent to one-half of 1 per cent or defer its effective date from Oct. 1 until Nov. 1, to permit the jobbers to discuss the matter at the annual convention of the National Hardware Association at Atlantic City in October.

The Pittsburgh meeting was called by F. O. Schoedinger, Columbus, Ohio, chairman metal branch National Hardware Association, and represented another step on the part of the jobbers to stem the lowering of the cash discount terms, originally announced by the American Rolling Mill Co., Middletown, Ohio, and since adopted by all manufacturers of sheets. It followed a recent visit of a delegation of the sheet jobbers to the American Rolling Mill Co. at Middletown on a like mission. Because the reduced discount is to become effective Oct. 1, and that date is prior to the metal branch annual convention, it was felt to be highly important that the position of the jobbers be laid before manufacturers promptly.

Jobbers Adopt Resolution of Protest

About 30 members of the metal branch from various parts of the Eastern half of the United States met in executive session during the morning at which the matter of the reduced discount was thoroughly threshed out and resulted in the following report of a special committee:

"Your committee wishes to present as a result of the deliberations of a special meeting held in Pittsburgh, the following resolution, which was originally adopted in 1899, when a similar movement to lower the cash discount was proposed:

"That it is the sense of the National Hardware Association that the discount, 2 per cent for cash in 10 days, formerly given by manufacturers of steel and iron goods, be not construed as bank interest, but as a premium for prompt payment and as an insurance or protection of credits, and further, that such or similar discount be retained where still allowed, and that we urge its restoration where it has been discontinued."

"The reasons for this are as follows:

"The cash discount is an insurance or protection of credit for the reason that it permits the extension of credit on a 10-day basis to those who are only entitled to credit for this period and no longer.

"If the 2 per cent is withdrawn, it will tend to increase accounts receivable of mills and jobbers to a figure that would, in many cases, necessitate refinancing and considerable capital.

"The 2 per cent discount should not

be regarded in light of bank interest, but as a premium for prompt payment or a penalty for failure to make payment within the 10-day period.

"The 2 per cent discount should be and is generally regarded as a legitimate item of cost, just as raw material, labor, freight, etc., and should be always added as such by all mills and manufacturers.

"The reduction of the cash discount would reduce net profits of jobbers, which now are approaching the vanishing point; this can be definitely proved from reports compiled by our association.

"The reduction of the cash discount by sheet steel mills would set an example for similar action by other groups of manufacturers.

"It would not be possible for jobbers of sheet steel, hardware and kindred lines to reduce their cash discount to one-half of 1 per cent to their trade for the reasons given in articles one and two and also because of the diversity of the lines distributed by them and the competitive conditions among the hundreds of distributors handling sheet steel whose territories overlap.

"We understand that the chief contention of the mills in proposing the reduction of the 2 per cent discount is because they claim that it is costing them 36 per cent. We wish to refute this statement and point out the fact that the only cost to them is the interest rate that they are compelled to pay on their accounts receivable, which is offset by the penalty of 2 per cent collected from those who do not discount.

"The jobbers can only figure 2 per cent on the number of turnovers of their stock, which average four times per annum, or 8 per cent on the amount invested in stock. The one-half of 1 per cent discount, if put into effect, will show jobbers' a loss of 6 per cent.

"The reduction of the cash discount will not only greatly increase the accounts receivable, but will add to the cost of collection, which will affect both mills and jobbers."

Manufacturers Defend Their Action

This report, which was signed by R. H. Lyon, Lyon, Conklin & Co., Baltimore; A. W. Howe, L. A. Osborne Co., Cleveland; Walter B. Richards, Richards & Conover Hardware Co., Kansas City, and W. H. Donlevy, Carter, Donlevy & Co., Philadelphia, formed the basis of the discussion of the afternoon meeting, at which the representatives of several of the sheet steel companies were present.

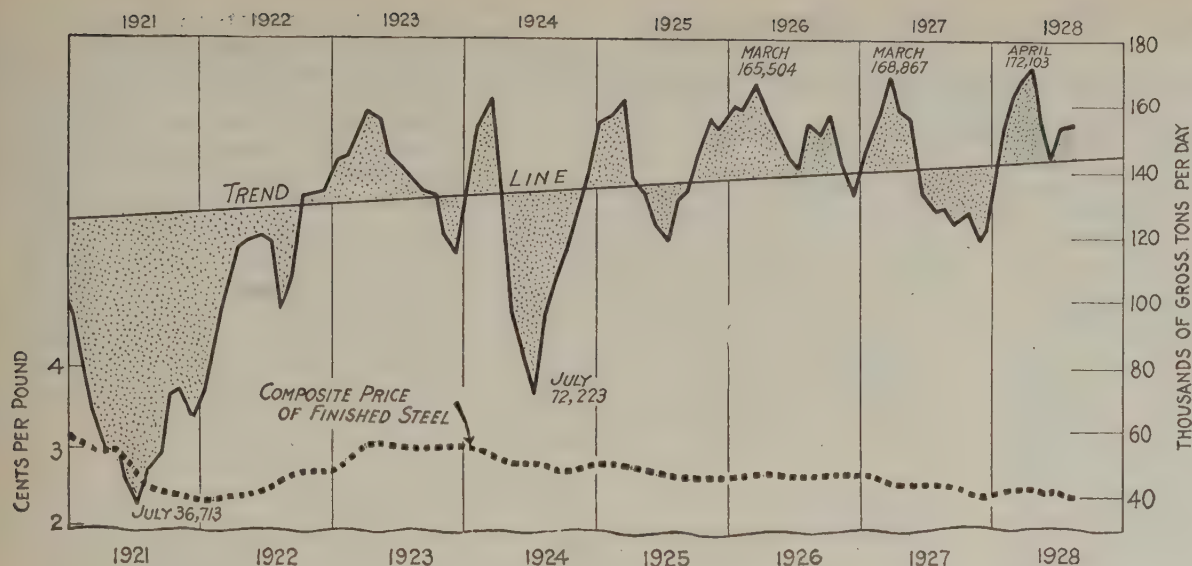
As his company inaugurated the lower discount, it fell to the lot of Charles R. Hook, vice-president American Rolling Mill Co., to explain the reasons which led his company to take the step. He said that every possible

angle of the matter had been considered prior to the announcement and that among the phases that had been debated was the desirability of encouraging prompt payment of bills. But there was also the fact, Mr. Hook pointed out, that it was much easier for jobbers to finance themselves, in view of the easier money and credit situation that now exists, as compared with the time when the discount was set at 2 per cent. He also drew attention to the inconsistency of his company in allowing one-half of 1 per cent discount on steel loaded in one end of a car and 2 per cent on material in another part of the same car, when both products came from the same mill. In answer to a question, Mr. Hook said that 6 per cent of his company's product passed into consumption through jobbing channels. He further justified the lower discount rate by observing that jobbers could borrow money at 6 per cent and actually net 9 per cent and that the manufacturers received no discount on raw materials and that in some cases, notably on spelter purchases, payment was made before the goods were received.

Sheet Manufacturers' Problems Stressed

John Follansbee, president Follansbee Brothers Co., Pittsburgh, also spoke and was able to present both the manufacturing and jobbing viewpoint, since his company manufactures sheets and through a subsidiary does a jobbing business. Mr. Follansbee said his company would allow one-half of 1 per cent for cash on carloads and 2 per cent for the smaller or warehouse lots. He said that on warehouse lots the price is \$20 a ton over the mill base and that it was necessary to allow a high discount on such lots to insure prompt payment. Fred M. Fuller, assistant general manager of sales American Sheet & Tin Plate Co., Pittsburgh; John J. Watson, general manager of sales Weirton Steel Co., Weirton, W. Va.; W. S. Horner, vice-president American Rolling Mill Co.; W. W. Latta, sales manager sheet steel division Wheeling Steel Corporation, and L. D. Mercer, general manager of sales Berger division, Central Alloy Steel Corporation, Canton, Ohio, also presented the views of the manufacturers. The latter pointed out that the sheet manufacturers have as many troubles in sales as do the jobbers and made a strong plea for cooperation in the solution of the problems of distribution. The Newport Rolling Mills Co., Newport, Ky., was represented by F. A. Moeschl, and the Apollo Steel Co. by A. M. Oppenheimer, president.

Those discussing the matter from the jobbers' angle laid much emphasis upon the desirability of the manufacturers' including the discount as part of the cost and to employ this method as a means of retaining the 2 per cent discount. This suggestion was met by manufacturers by one that the jobbers raise their sales prices to the extent of the reduction in the discount.



Ingot Production Made a New Record for August, While the Eight-Month Total Was 4 Per Cent Ahead of Any Previous Eight Months. Prices were only fractionally better in August than in July

Largest August Steel Ingot Production

Output Exceeds by 100,000 Tons Any Other Month in Second Half of Any Year—Eight-Month Figure a Record

PRODUCTION in August of open-hearth and Bessemer steel ingots in the United States, as indicated by reports made to the American Iron and Steel Institute, was 9.6 per cent greater than in July. The August gain last year was in about the same ratio. The August production, at 4,178,481 tons (calculated) was not only the largest August tonnage ever recorded, but was larger than the production of any other month in the second half of any year. Only two previous months later than May have shown more than 4,000,000 tons—October, 1926, with 4,074,544 tons, and October, 1918, with 4,017,435 tons.

On the basis of 27 working days, with which August is credited, the output was 154,759 tons a day. This is the highest figure since May and compares with 129,576 a year ago. Output in July was given as 152,463 tons a day.

For the eight months of the year to date, the calculated production was 32,782,937 tons. This is 7.4 per cent greater than the 30,510,071 tons of last year and 3.2 per cent greater than the highest previous record for the first eight months, which was that

of 1926, with 31,775,768 tons. Previous to 1923 no year had shown as much as 30,000,000 tons in the first eight months. Beginning with that year, however, only 1924 and 1925 have fallen below that figure.

Total ingot production, including crucible and electric steel ingots, which no longer are reported by the institute, was probably 1000 tons greater on the daily basis than the figure given. Production of crucible

and electric ingots in 1927 aggregated 378,974 tons in the 12 months. This production is irregular, being much heavier in the spring customarily than in the later months of the year. Probably 275,000 tons under this heading was produced in the first eight months. This would raise the total ingot production to more than 33,000,000 tons, or 4 per cent greater than the highest record, which included electric and crucible ingots.

Lowest Locomotive Shipments in Over 15 Years

WASHINGTON, Sept. 11.—Thirty-four railroad locomotives were shipped in August, as against 46 in July and 81 in August of last year, according to reports received by the Department of Commerce. August shipments were the lowest for any month in more than 15 years. For the eight months ended with August 394 locomotives were shipped, compared with 711 for the corresponding period of last year and 1157 in 1926.

Of the August shipments, 23 steam and four electric locomotives were for

domestic account, while seven steam locomotives were for foreign account. Unfilled orders at the end of August totaled 204 locomotives, of which 135 steam and 26 electric locomotives were for domestic use and 41 steam and two electric locomotives were for export.

While the decline from last year has hit all types of locomotives, it is noteworthy that shipments of electric units for domestic use have held up far better than the three other groups. Here the reduction for the eight months was from 109 to 85, or 22 per cent. In steam locomotives for domestic use the drop was from 487 to 257, or 47 per cent; in locomotives for export, from 115 to 52, or 55 per cent.

EIGHT MONTHS' PRODUCTION OF STEEL INGOTS (GROSS TONS)

Months	1927				1928			
	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927	Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927	Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
Jan.	3,042,133	545,596	26	145,764	3,280,247	498,746	26	153,513
Feb.	3,043,492	565,226	24	158,835	3,308,728	521,366	25	161,812
Mar.	3,702,660	590,709	27	167,973	3,700,411	567,309	27	166,945
Apr.	3,341,750	565,440	26	158,744	3,509,637	564,039	25	172,103
May	3,273,593	557,785	26	155,663	3,397,631	581,949	27	155,674
June	2,823,107	486,053	26	134,446	3,016,487	527,351	26	143,960
July	2,596,349	436,883	25	128,165	3,075,247	533,550	25	152,463
Aug.	2,806,347	505,596	27	129,576	3,386,750	569,436	27	154,759
8 Months: . . .	24,629,431	4,253,288	207	147,392	26,675,138	4,363,746	208	157,610

Inspect River-Rail Terminals

Pittsburgh District Steel Companies Well Represented in Boat Trip on Monongahela River

ALMOST all of the steel companies in the Greater Pittsburgh district were represented in the river-and-rail terminal inspection trip held Thursday, Sept. 6, under the auspices of the shippers' council, Chamber of Commerce of Pittsburgh. Leaving Pittsburgh on the steamboat Julia Belle Swain, the party, which numbered more than 300, was conveyed up the Monongahela River to Clairton, Pa., the site of the steel works and by-product coke plant of the Carnegie Steel Co. The coke works at this point comprises 1482 ovens and is the largest plant of this kind in the world. In full operation it carbonizes 30,500 tons of coal a day, producing approximately 22,000 tons of metallurgical coke, supplying all of the blast furnace requirements not only of the Carnegie Steel Co. stacks in the Pittsburgh district, but most of the other ore smelting units of the Steel Corporation in that area. A tow of several barges of coke moving from the Clairton ovens to the Mingo, Ohio, blast furnaces of the Carnegie Steel Co. was met on the up-river trip.

Another steel plant passed on the first leg of the journey was that of the Jones & Laughlin Steel Corporation, located on both banks of the Monongahela River. Much interest was shown in the facilities this company has created for the inward movement of raw materials and the outbound movement of finished products. The dockage employed in connection with car ferry service between the company's Pittsburgh and Aliquippa, Pa., works, commanded particular attention. At West Homestead, the plant of the Mesta Machine Co. and the boat ways and docks of the John Eichleay, Jr., Co. were passed. Then came the works of the Carnegie Steel Co. at Homestead, on the south bank of the river, and the Carrie furnaces, seven in number, which serve the Homestead plant with molten pig iron, on the opposite bank. Next were passed the Rankin and, Braddock plants of the American Steel & Wire Co. on the north bank of the river and, just beyond, the Edgar Thomson works of the Carnegie Steel Co.

At McKeesport, the plant of the National Tube Co. came into the picture, while at Dravosburg, a few miles further, were the Carnegie Steel Co. marine ways and storage landing and crane, where much of the steel sent south by water, by that company is assembled. At Glassport is located the freight assembling station of the American Barge Line, one of the commercial barge lines serving Pittsburgh district companies on river-borne shipments to points along the Ohio and Mississippi rivers. The turn was made at Clairton, and the party was taken back over the Monongahela to the Ohio River as far as Neville

Island, where the Dravo Contracting Co. launched two river barges while the tourist steamer was passing. It had been intended to journey up the Allegheny River as far as Aspinwall, but a late start made it necessary to omit that portion of the trip.

Traffic officials of the Bethlehem Steel Co. were particularly interested members of the party. This company

New Commerce Office

Department of Commerce Establishes Pittsburgh Headquarters

A NEW branch office of the Department of Commerce was opened in Pittsburgh on Sept. 8 in the Chamber of Commerce Building. The office is in charge of Wilson K. Ray, who has been assistant chief of the Iron and Steel Division of the Department since May, 1927. Formal ceremonies for the opening will take place in Pittsburgh on Oct. 5 with prominent Government officials participating. The Department has also recently established branches at Milwaukee, Charlotte, N. C., Indianapolis and Denver.

Mr. Ray is a native of Pittsburgh and formerly was connected with the Liberty Steel Products Co. and Lawry-Ray Co., steel broker, of that city, having been a member of the latter firm. Born in 1893, he attended the public schools of Pittsburgh, Shady-side Academy and Princeton University, receiving the A. B. degree from Princeton in 1915. From 1915 to 1917 Mr. Ray was engaged in the general insurance business in Pittsburgh and from 1917 to 1919 served with the American Expeditionary Forces in France. After he was discharged from the army he returned to Pittsburgh and engaged in the sale of iron and steel products and railroad and construction supplies.

In August, 1923, Mr. Ray was appointed assistant trade commissioner and assigned to the Paris office, and on Dec. 1, 1925, he was appointed as special agent in the Industrial Machinery Division of the Department at Washington. Subsequently he was made chief of the hardware section of the Iron and Steel Division and later assistant chief of the division.

Varied Service Offered

The opening of the Pittsburgh office, said Director Julius Klein of the Bureau of Foreign and Domestic Commerce, marks another step in the Department's program of establishing "service stations" in various parts of the country where information and counsel on all subjects pertaining to foreign and domestic trade may be promptly furnished. Dr. Klein emphasized the excellent service which has

already has tried the experiment of shipping steel from its Cambria works, Johnstown, Pa., by rail to Glassport for river shipment to Southern and Southwestern destinations, and it is understood that the company is interested in a movement looking toward the improvement of the Connemaugh River from a point near Johnstown to its junction with the Kiskiminetas River. As the latter empties into the Allegheny River near Freeport, Pa., the Connemaugh River improvement would place the company in a position to use the inland waterways in moving steel from Johnstown.

been given by the Pittsburgh Chamber of Commerce. It has acted as a co-operative office of the Department since May 19, 1919, and the new office has been made possible largely through its efforts. Because of the importance of the Pittsburgh district in the iron and steel, machinery, foundry, coal and allied fields, the office will be of especial value to those trades. The district which the new office will cover includes western Pennsylvania, eastern Ohio and West Virginia.

In addition to the aid offered to exporters, the Pittsburgh office will serve as a clearing house for firms in its district for information on a great many problems connected with domestic marketing. The Bureau of Foreign and Domestic Commerce is making studies in domestic commerce as part of its nation-wide elimination of waste program. The purpose of these investigations is to acquire and disseminate exact data concerning domestic commerce and the best marketing practices. The resulting information will be made available promptly through the Pittsburgh office, which will also cooperate in arranging for special investigations desired to serve the particular needs of the area covered.

Together with the general economic information on every world market, the Pittsburgh office will be able to provide the latest available information on such subjects as foreign tariffs, trade practices and commercial laws; foreign banking, currency, and exchange; methods of packing for different markets; most economical shipping routes; warehouse facilities in foreign ports, etc. It will also furnish exporters confidential information regarding trade opportunities abroad and provide them with reliable data in connection with distributors and agents in foreign countries.

Announcement is made that the concession department of the Government of Soviet Russia has placed the tungsten deposits of the Transbaikalian region of Siberia on the list of resources open to exploitation by foreign firms. Large reserves, which have been worked to a very slight extent for a number of years, are indicated by preliminary explorations.

Welsh and American Mills Negotiating

Agreement on Tin Plate Export Markets Reported Imminent—
German Freight Increase Raises Mill Costs — European Prices Firm

(By Cable)

LONDON, ENGLAND, Sept. 10.

THE position of Cleveland furnaces is improving with consumers covering their autumn requirements and foreign competition negligible. Hematite demand is expanding slowly, but output is still restricted and prices are steadier. Pease & Partners are permanently closing the Tees Bridge Iron Works. Foreign ore is quiet.

Export demand for finished steel is increasing. Japan has been a buyer of shipbuilding material and Australia and New Zealand are among the foreign markets inquiring. Domestic demand for construction work is heavy and likely to continue active for several months. Dorman, Long & Co. have secured an order for 47,000 tons of rails for South Africa.

Galvanized sheets are active and makers are well sold for several weeks ahead. Some Japanese demand is reported for black sheets, but the tonnages involved are mostly small.

Continental markets are firm with some good business being booked direct from overseas. Demand from British consumers is restricted as the

price difference between Continental and British mill prices has narrowed considerably.

The International Wire Rod Cartel meets Sept. 11, when the question of entry of Austrian, Hungarian and Czechoslovakian mills is to be discussed.

Welsh tin plate bars are in active demand, as Continental steel is now expensive for British users. Tin plate demand is good for October and later delivery, but September specifications are needed by most mills although they are well sold for October-December shipment and some into next year.

Arrangements are reported imminent between United States and Welsh tin plate makers for the regulation of sales in certain large export markets. Following negotiations here, Welsh representatives are now visiting the United States and agreement may be reached on lines, the indicated result of which is expected to be that Welsh mills while relinquishing certain markets will no longer encounter United States competition in others and should benefit considerably in the total volume of their export trade.

maintain their equipment properly by necessary purchases of rolling stock and at the same time to accumulate required reserves of cash in the bank. It is of great importance also to the iron, steel and coal industries.

In 1927, a sum equal to only 3.6 per cent of the Railroad Corporation's fixed capital was provided to write off obligations. In 1928, had the present rates been maintained throughout the year, there would have been a deficit, after payment of 660,000,000 m. (\$157,212,000) contribution to reparations, of 489,000,000 m. (\$116,479,800). Increased costs of operation are based on higher salaries and wages, which total 2,470,000,000 m. (\$588,354,000), while expenditures for materials have been only 1,258,000,000 m. (\$299,655,600), compared with 1,388,000,000 m. (\$330,621,600) in 1927.

In May the Government refused consent to an increase in rates by which 250,000,000 m. (\$59,550,000) of additional revenue would be obtained, 195,000,000 m. (\$46,449,000) from freight charges and 55,000,000 m. (\$13,101,000) from passenger fares. Industry objected and the question was submitted to the Federal Railroads Court, which has decided for an advance, of which freight is to bear 200,000,000 m. (\$47,640,000) and passenger fares 50,000,000 m. (\$11,910,000). As coal carrying alone provides about 30 per cent of the Railroad Corporation's gross receipts, coal will be considerably affected by the increased

German Freight Increase Approved

Railroads Allowed 11 Per Cent Advance, Probably on Oct. 1—Export Prices Continue Strong

BERLIN, GERMANY, Aug. 29.—Railroad freight rates are to be advanced an average of 11 per cent, probably

about Oct. 1. The increase is expected to offset the deficit of the railroads, which have found it impossible to

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.	\$4.25
Bilbao Rubio ore*.....	1 2 to £1 2½s.	5.35 to \$5.48
Cleveland No. 1 fdy.....	3 8½ to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy.....	3 6	16.04
Cleveland No. 4 fdy.....	3 5	15.80
Cleveland No. 4 forge.....	3 4½	15.68
Cleveland basic (nom.)..	3 5	15.80
East Coast mixed.....	3 10	17.11
East Coast hematite.....	3 10½	17.23
Rails, 60 lb. and up.....	7 15 to 8 5	37.66 to 40.10
Billets.....	6 2½ to 6 15	29.77 to 32.81
Ferromanganese.....	13 15	66.83
Ferromanganese (export)	13 0 to 13 5	63.18 to 64.39
Sheet and tin plate bars,		
Welsh.....	6 0	29.16
Tin plate, base box.....	0 18 to 0 18¾	4.37 to 4.43
Black sheets, Japanese		
specifications.....	13 7½	65.00
C. per Lb.		
Ship plates.....	7 12½ to 8 2½	1.63 to 1.74
Boiler plates.....	9 0 to 10 10	1.92 to 2.25
Tees.....	8 2½ to 8 12½	1.74 to 1.84
Channels.....	7 7½ to 7 17½	1.58 to 1.69
Beams.....	7 2½ to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 5 to 7 15	1.55 to 1.66
Steel hoops.....	9 0 to 10 0	1.92 to 2.14
Black sheets, 24 gage...	9 15 to 10 0	2.09 to 2.14
Galv. sheets, 24 gage...	13 10	2.93
Cold rolled steel strip, 20		
gage, nom.....	16 0	3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium.....	£3 3s.	to £3 5s.	\$15.32	to \$15.80	
France.....	3 3	to 3 5	15.32	to 15.80	
Luxemburg.....	3 3	to 3 5	15.32	to 15.80	
Basic pig iron (nom.):					
Belgium.....	3 3	to 3 4	15.41	to 16.38	
France.....	3 3	to 3 4	15.41	to 16.38	
Luxemburg.....	3 3	to 3 4	15.41	to 16.38	
Coke.....	0 18		4.37		
Billets:					
Belgium.....	4 19½		24.18		
France.....	4 19½		24.18		
Merchant bars:					
Belgium.....	6 0	to 6 3	1.30	to 1.33	
France.....	6 0	to 6 3	1.30	to 1.33	
Luxemburg.....	6 0	to 6 3	1.30	to 1.33	
Joists (beams):					
Belgium.....	5 3	to 5 5	1.12	to 1.14	
France.....	5 3	to 5 5	1.12	to 1.14	
Luxemburg.....	5 3	to 5 5	1.12	to 1.14	
Angles:					
Belgium.....	6 0		1.30		
½-in. plate:					
Belgium (a).....	6 12½	to 6 14	1.44	to 1.48	
Germany (a).....	6 12½	to 6 14	1.44	to 1.48	
¾-in. ship plate:					
Belgium.....	6 8		1.41		
Luxemburg.....	6 8		1.41		
Sheets, heavy:					
Belgium.....	6 1		1.33		
Germany.....	6 1		1.33		

(a) Nominal.

rates. The steel industry will also be affected, and mills claim that their export surplus, which has been increasing this year, may again decline. The delivered prices of steel to finishing mills, and freight rates on exports will necessarily increase.

Iron and steel output is still declining, but the general situation is not so unfavorable as a month ago. Improvement comes from the firmer prices in the export market. Rolling mill production in July was 1,026,333 metric tons, compared with 1,052,905 tons in July, 1927. Total output for the first seven months of this year was 7,294,699 tons, compared with 7,344,936 tons in the corresponding period of 1927.

Domestic activity has declined only slightly in the past few weeks. The Stahlwerksverband has booked an order from the Railroads Corporation for 550,000 tons of rails and ties for delivery during the next year, and a further purchase of 100,000 tons is expected. "Avi," the association of producers which determines the amount of price rebates by the Ingot Steel Syndicate to exporting manufactur-

ers, reports that large export orders for machinery and other metal products are being booked.

Semi-finished material prices in the domestic market have shown some weakness lately, but export quotations are firm. Structural steel has been more active for domestic delivery, but the building trades have been less active this year than had been expected. Business in steel bars is good, but most of the tonnage being rolled consists of specifications against large contracts placed in the spring when an advance in the market was expected. Some mills are asking 10 to 12 weeks' delivery on bars. Sheet mills rolling the heavier gages for export are well filled with orders, but the average of deliveries is now three weeks. Orders for light-gage sheets are unsatisfactory and prices are being shaded. No change has been made in price rebates to exporting manufacturers. The result of price firmness in France and Belgium has been to reduce the difference between German domestic prices and the "world market" level, on which rebates are based.

ed for 93 per cent of the 1927 output.

The figures show clearly that the Swedish iron ore industry is in process of rapid development, although the condition of the iron and low-grade steel industry is far from good. During 1927 only 58 of the 125 blast furnaces in Sweden were in operation, and the production of pig iron decreased to 417,765 tons from 462,200 tons in 1926, in spite of a considerable increase in exports. Only foundry pig iron has shown an increase in production, and this was due chiefly to the utilization of the large blast furnaces at Oxelosund. The decrease in pig iron production as a whole is held to have resulted from a deliberate attempt on the part of producers to decrease reserve stocks, which have been too large.

Production of steel and rolling mill products was about the same as in 1926, though certain electric steel products, such as rails, showed an increase over 1926. The prices of iron and merchant steel dropped as the result of keen competition from Continental producers. Production of iron alloys increased to 36,750 tons from 32,508 tons in 1926.

British Steel Export Trade Small

Foreign Orders for Pig Iron and Tin Plate, However, Are Large—
"Protection" Still Urged

LONDON, ENGLAND, Aug. 31.—Conditions in the iron and steel trade have not altered much in the past fortnight, as in most districts holiday periods have obstructed the flow of normal trade. Vacations, however, have about ended and fall activity is expected before long.

Pig iron producers have reduced their prices to the lowest level permitted by costs. Stocks of iron are small, and buyers are beginning to contract with domestic producers rather than on the Continent. A favorable factor is the steady increase in the cost of foreign material, which, in the case of pig iron, has advanced so that the Continental furnaces are no longer competitive here. For export, however, foreign competition is still keen as European furnaces endeavor to regain their foreign markets.

It is expected that, with Parliament once more in session, advocates of "protection" on iron and steel will again become active. But not much progress is expected in view of the pronouncement of Premier Baldwin that the Government cannot accede to requests for protection. It is evident, however, that one of the foremost issues of the general election in 1929 will be an extended program of protection.

Business in finished products has suffered from the holiday period, and there is as yet little improvement, although in some branches, particularly structural steel and certain light materials, there has been considerable activity in the domestic market.

Tin plate mills have been booking some good orders and, in most cases,

are well filled for several months. The latest advance of the minimum price to 18s. (\$4.37) per base box, f.o.b. works port, has apparently convinced consumers that lower prices are no longer in prospect, and heavy buying from all foreign markets has developed.

Swedish Exports of Iron Ore Exceed Output

Production of iron ore in Sweden during 1927 reached the record figure of 9,660,977 metric tons, an increase of 14 per cent over the 1926 total of 8,465,914 tons, and of 29.2 per cent over the 1913 total of 7,475,571 tons, according to a report received by the Department of Commerce from Basil D. Dahl, assistant trade commissioner, Stockholm. This increase is attributed to the sale of the ore in foreign countries, since the domestic consumption is considerably less than before the war. The exports of iron ore last year reached a new high figure of 10,700,000 tons. Trafik Aktb. Grangesberg-Oxelösund, the leading exporter of iron ore, extracted 7,650,000 tons in 1927 and exported 9,790,000 tons, the difference being made up by drawing upon the reserve stocks at Narvik. In 1927 the Grangesberg company purchased that part of the Grangesberg field belonging to Stora Kopparbergs Bergelags Aktb., and thus strengthened its already strong position in the Swedish iron ore industry. The provinces of Norrbotten and Kopparberg account-

German Wire Rod Mills Adopt Export Contract

HAMBURG, GERMANY, Aug. 26.—To prevent the resale to German consumers of wire rods bought by Dutch and British merchants from German mills at export prices f.o.b. Hamburg or Antwerp, the mills here have adopted a new contract form. In the future all purchasers for export must agree in the contract not to resell the rods into Germany and to submit actual proof that the material has been shipped to another country. Breach of this contract is penalized by a fine of 50s. (\$12) per ton. It is understood that no sales for export are being made unless the new contract is accepted by the buyer.

Wire rod producers expect this to prevent a practice which has been increasing and exercising a depressing effect on the wire rod market in Germany. The difference between the domestic and export price of wire rods has been rather wide, with exports at £6 (\$29.16) per ton f.o.b. Antwerp or Hamburg, and the domestic market at about 159 m. (\$38) per ton delivered.

The second International Conference on Bituminous Coal is to be held in Pittsburgh, Nov. 19 to 24, under the auspices of the Carnegie Institute of Technology. About 100 engineers and scientists, representing 15 nations, have tentatively accepted invitations to speak or send papers.

An American syndicate is to construct a pipe line at Baicoi in the Rumanian petroleum region, according to *L'Usine* of Paris. The line, which is to be known as the Constantza, is to be purchased in six months at a cost of about \$3,000,000.

Importers Await Steel Marking Test

Suit Before Customs Court with Government Defending Its Ruling
Is Expected—Far Eastern Trade Small

NEW YORK, Sept. 11.—The United States Treasury Department's investigation of the marking of foreign steel with the country of origin is still being widely discussed by importers, who would be affected by a ruling requiring more marking than at present. With few exceptions almost all importers in New York and Philadelphia have received notices that their arrivals are being investigated at the request of certain domestic steel producers. A test case against one importer of steel is expected to result from the present investigation.

Except for a small tonnage of steel that is still arriving on orders placed with European mills by importers when the market abroad was lower, there is but little business. Continental export prices have been again advanced, so that beams are quoted at about 1.82c. per lb., duty paid, New York; channels, angles and tees at about 1.87c. per lb., New York, and plain steel bars at about 1.95c. per lb., New York. Recently Southern makers of hoops and bands have been able to meet the delivered prices of importers, so that sizable arrivals of Continental material seem to have been temporarily checked. Recent quotations on hoops have ranged from 2.30c. to 2.50c. per lb., duty paid at

Southern port, the price depending upon the gages specified.

Export trade with the Far East continues small, despite the Chinese boycott of Japanese products, which was expected in some quarters to bring a few small orders for tin plate and sheets to the United States. While Japanese trade with China has apparently been somewhat affected by the boycott, Japanese galvanizing plants, particularly, being reported as feeling the effect of the curtailment of buying by China, exports of Japan in August were valued in excess of imports, the exports having been 189,000,000 yen (\$86,694,300) and the imports 152,000,000 yen (\$69,722,400). The exchange value of the yen, however, continues low.

Some of the recent lack of Japanese buying, particularly the scarcity of black sheet business, is attributed to unusually heavy rains in Japan during the summer. Under normal weather conditions, the rice growers require a fair tonnage of sheets for use in holding water on the rice fields, but continued heavy rains have made this unnecessary. At the same time, it is pointed out that continued rain has reduced the volume of small building construction, thereby reducing the demand for sheets for roofing.

in operation, was 1,034,694 tons, against 1,021,350 tons produced from 103 furnaces in June. The daily average per furnace was 333¾ tons in July and 330½ tons in June. Steel output in July totaled 1,311,134 tons, compared with 1,294,538 tons in June.

Gains in exports in July were made in 10 classes of products, and losses were registered in 11 classes. While most of the changes in individual products were small, there were several instances in which large tonnages were added. The chief of these was an increase of 9197 tons in plates and sheets, with a total of 39,266 tons in July, against 30,069 tons in June. Exports of bars and rods made a gain of 6562 tons, amounting to 99,415 tons, against 92,853 tons. Exports of wrought pipe gained 6468 tons, totaling 36,568 tons, compared with 30,100 tons, while pig iron exports, amounting to 23,551 tons, showed an increase of 2923 tons over the 20,628 tons exported in June. Ingots, blooms and billets declined 5476 tons to 49,681 tons, against 55,159 tons. A decline of 4531 tons was made in exports of rails, which amounted to 50,928 tons, compared with 55,259 tons. Hoops and bands made a decline of 3046 tons to 12,195 tons, compared with 15,241 tons.

The largest items of importation in July consisted of iron and steel bars, rods and angles, which amounted to 55,650 tons, against 59,849 tons in June. Imports of pig iron and ferroalloys aggregated 29,964 tons, against 31,422 tons, while imports of ingots, blooms and billets amounted to 26,936 tons, compared with 24,366 tons.

German Exports Up; French Declining

Shipments of Iron and Steel Products from Each Country
Running About 400,000 Tons a Month

CONTINUING the upward trend of the preceding month, exports of iron and steel products from Germany in July aggregated 407,528 metric tons, against 353,815 tons in June, a gain of 12,004 tons, according to a radiogram received by the Department of Commerce from Fay-

ette W. Allport, commercial attaché, Berlin. Imports maintained practically the same level, amounting to 163,417 tons in July, compared with 163,394 tons in June, a difference of but 23 tons.

Production of pig iron in Germany in July, from the 100 blast furnaces

French Exports Less Than
in 1927

EXPORTS of iron and steel products from France during the first half of 1928 totaled 2,286,600 metric tons, against 2,625,160 tons for the corresponding period of last year, a decrease of 338,560 tons, according to preliminary figures received by the Department of Commerce from Paris.

German Foreign Trade in Iron and Steel in June and July, 1928
(In Metric Tons)

	Exports		Imports	
	June	July	June	July
Pig iron and ferroalloys..	20,628	23,551	31,422	29,964
Ingots, blooms and billets	55,159	49,681	24,366	26,936
Iron and steel bars, rods and angles	92,853	99,415	59,849	55,650
Structural steel.....	3,810	2,330	854	1,293
Hoops and bands.....	15,241	12,195	8,131	8,323
Plates and sheets.....	30,069	39,266	7,553	7,053
Galvanized sheets.....	1,675	1,530	97	21
Tin plate.....	2,874	3,640	1,828	2,155
Cast iron pipe.....	9,293	8,190	4,616	5,186
Wrought iron pipe.....	30,100	36,568	3,871	3,129
Pipe fittings.....	3,972	3,491	155	170
Rails	55,259	50,928	6,744	9,870
Other railroad material..	7,499	8,187	460	702
Plain wire.....	33,600	34,571	8,935	9,143
Barbed wire.....	4,803	5,443	159	129
Wire rope.....	1,632	1,087	65	59
Wire cloth.....	1,965	1,880	5	7
Other wire manufactures.	801	791	88	78
Nails, tacks, rivets and washers	7,945	8,373	732	305
Castings and forgings...	14,048	13,026	2,483	2,503
Other iron and steel manufactures	3,298	3,583	981	941
Total	396,524	407,528	163,394	163,417

French Foreign Trade in Iron and Steel—First Six Months
(In Metric Tons)

	Exports		Imports	
	1928	1927	1928	1927
Pig iron	300,000	448,000	21,000	17,000
Ferroalloys	4,000	2,000	12,400	16,800
Blooms, billets and bars.	1,281,000	1,459,000	6,800	9,000
Ingots	26,000	24,000	....	....
Rails	187,000	197,000	2,500	846
Sheets of all kinds, including hot-rolled bands	137,000	141,000	2,400	6,000
Hoop iron or steel, hot-rolled and cold-rolled	59,000	43,000	1,900	1,100
Machine iron or steel...	122,000	97,000	....	....
Wire	31,800	28,460	1,400	1,700
Wire nails	4,800	7,700	30	12
Cast iron work.....	134,000	178,000	....	....
Total	2,286,600	2,625,160	48,430	52,458
Average month...	381,100	437,527	8,072	8,743

The figures include the Saar in each case.

Imports were 48,430 tons and 52,458 tons respectively, a decrease of 4028 tons.

Exports of pig iron showed a decrease of 148,000 tons, amounting to 300,000 tons, against 448,000 tons, but pig iron production during the first six months of the present year was 300,000 tons greater than during the corresponding period of last year. Imports of pig iron, amounting to 21,000 tons, showed an increase of 4000 tons over the 17,000 tons imported during the first half of 1927. This situation is explained by both the increased French production of steel, which absorbed a large part of the pig iron output, and by export difficulties, especially in England, following price reductions by the British producers.

French exports of blooms, billets and bars also showed a decline, amounting to 1,281,000 tons, against 1,459,000 tons. As French production of steel during the first half of 1928 reached 4,624,000 tons, an increase of more than 500,000 tons over that of the two preceding years, the diminution in exports can be explained only by an appreciable increase in the national consumption. This is, therefore, an indication that the French mechanical and fabricating industries were able to increase their manufacturing operations.

German Steel Houses to Be Made in Czechoslovakia

HAMBURG, GERMANY, Aug. 25.—The Vereinigte Stahlwerke A. G., Düsseldorf, has licensed a newly formed company in Czechoslovakia, Stahlhaus A. G. at Bratislava, to manufacture its steel dwellings. The buildings are to be made for the new company by the Mannesmann Tube Co. of Czechoslovakia, and it is planned to produce 3000 next year. A new company has also been formed in Vienna to produce steel dwellings for construction in Austria, and 2000 houses is the output planned for 1929.

New Export Terms on Machinery Formulated

HAMBURG, GERMANY, Aug. 26.—Machinery makers are expected to agree upon new conditions for export payments. At present the usual conditions on export sales are one-third of the total price with the order, one-third on delivery and one-third against bill of lading.

The suggested conditions are that European countries should pay one-third when an order is ready to ship, one-third against bill of lading and one-third on a sight draft at point of delivery. Conditions to overseas buyers under the proposed revision would be one-half against bill of lading and the balance against a sight draft.

These terms would be applied only to ordinary standard machinery. If special designs are purchased, the usual payment of a deposit would be

required, either in cash or by opening a letter of credit. The suggested revision of terms may be adopted by machinery makers in Czechoslovakia and Austria.

Czechoslovakian Mill Opens Moscow Sales Office

HAMBURG, GERMANY, Aug. 26.—The Skoda Steel Works, Pilsen, Czechoslovakia, is reported to have been granted permission by the Russian Government to establish a sales office in Moscow. This has caused considerable comment, as it is the first case of a foreign manufacturer being permitted to deal directly in Russia, instead of through the Government trading companies. The Skoda works produces alloy steels, special quality sheets, machinery, guns and rifles.

German Reparations Deliveries Large

HAMBURG, GERMANY, Aug. 26.—Shipments of steel and machinery on reparations account were higher in July than in any month since establishment of the Dawes plan, totaling 7,200,000 m. Near Eastern countries, France and Portugal received the heaviest shipments, but Japan also bought machinery valued at 300,000 m., which was charged to reparations, the first such purchase by that country.

British Institute to Hold Fall Meeting in Spain

The autumn meeting of the Iron and Steel Institute (British) will be held at Bilbao, Spain, Sept. 25 and 26. The following technical program is announced:

"Iron Ore Mining in Vizcaya," by J. Balzola.

"The Influence of Varying Strains and Annealing Temperatures on the Growth of Ferrite Crystals in Mild Steel," by C. A. Edwards and T. Yokoyama.

"The Phenomena of Corrosion of Iron and Steel," by A. Herrero and M. de Zubiria.

"The Influence of Pearlization below the Ar₁ Point on the Mechanical Properties of Carbon Steel," by J. Orland.

"The Use and Interpretation of the Transverse Test for Cast Iron," by J. G. Pearce.

"The Change in Tensile Strength due to Aging of Cold-Drawn Iron and Steel," by L. B. Pfeil.

"Some Properties of Cold-Drawn and of Heat-Treated Steel Wire," by S. H. Rees.

"Effects Observed in Quenched Liquid Steel Pellets and Their Bearing on Bath Conditions," by J. H. Whiteley.

The sessions will be held in the assembly hall of the Alfonso XIII High School.

Pig Casting Machine for India

The Bengal Iron & Steel Co., Barrackar (Kulti), India, has bought from Heyl & Patterson, Inc., Pittsburgh, a double strand pig iron casting machine, a ladle cradle, three ladles and an 80-ton crane. The order for the crane has been let to the Moragan Engineering Co., Alliance, Ohio.

German Cruiser Is to Be Electrically Welded

HAMBURG, GERMANY, Aug. 26.—It is reported that the new German cruiser, to be constructed at the Deutsche Werke, Kiel, is to be electrically welded, no rivets being used in any part of the ship. It is also understood that the armor plate used will be thinner than the usual battleship plate, made of a new alloy steel developed by Friedrich Krupp A. G. This steel will have the same resistance as the steel formerly used and will reduce the weight about 22 per cent, which is expected to permit greater speed.

Delegates Chosen for London Fuel Conference

Seven of the ten official delegates who will represent the United States at the Fuel Conference to be held in London from Sept. 24 to Oct. 6, under the auspices of the World Power Conference, have been chosen, as follows: Dr. Gustav Egloff, petroleum technologist, Universal Oil Products Co., Chicago; H. W. Brooks, consulting engineer, New York; O. P. Hood, chief of the technological branch, United States Bureau of Mines, Washington; Martin Frisch, manager of field engineering, Combustion Engineering Corporation, New York; G. A. Orrok, consulting engineer, New York; David B. Rushmore, formerly consulting engineer, General Electric Co., New York, and O. C. Merrill, general chairman of the American Committee of the World Power Conference and ex-secretary of the Federal Power Commission.

German Rail Rates Reduced on Czechoslovakian Exports

HAMBURG, GERMANY, Aug. 26.—An agreement has been negotiated between the German Railroad Corporation and the Czechoslovakian railroads associated with the Czechoslovakian Government, under which freight rate concessions are made by both railroad systems on transportation of Czechoslovakian steel, non-ferrous metal products, machinery and locomotives, when such materials are exported to overseas countries via Lübeck, Hamburg or Bremen, Germany. In the past, Czechoslovakian mills have been greatly handicapped by the high German freight rates, but under the new agreement they receive the same treatment as is accorded to German exporters of the materials specified. It is expected that the new arrangement will place Czechoslovakian producers in a much stronger position in the international markets.

"Fuel Briquets in 1927" is the title of a pamphlet by F. G. Tryon and J. M. Corse, issued by the United States Bureau of Mines. Its eight pages give detailed statistics of the American industry as well as world production.

Tool Steel Merger

Colonial Company Taken Over by Vanadium-Alloys

THE Vanadium-Alloys Steel Co., Latrobe, Pa., has acquired the Colonial Steel Co., Colona, Pa., according to an announcement by Roy C. McKenna, president of the former company. Both companies make tool and high-speed steels.

The Colonial company, founded in 1901, is capitalized at \$4,000,000, or 40,000 shares of common stock of \$100 par value, of which 32,500 shares are outstanding, and has an annual capacity of 57,600 gross tons of ingots produced in basic open hearth, crucible and electric furnaces. Its products, besides high-speed and carbon tool steels, include agricultural plates, plow steel, saw blanks, alloy and special steels, copper clad steel bars, spring, cutlery, section and alloy and high-speed steel sheets and forged die blocks, rings, bars and shapes.

The Vanadium company has electric furnaces rated to produce 6500 tons of ingots annually. Alloy steel ingots, carbon and alloy tool steels and high-speed steels comprise its products. The company about two years ago acquired the Anchor Drawn Steel Co., Latrobe, and in this purchase secured a plant for making drill rods. The capitalization is \$1,500,000, or 15,000 shares of common stock of \$100 par value. This will be changed to 210,000 shares of no par value and present holders of Colonial Steel Co. stock will receive 2¾ shares of the new stock for each share of their Colonial stock, or 89,375 shares.

No changes in the management of the Colonial Steel Co. are contemplated for the present, except that the sale of the products of the two companies will be coordinated. George P. Rhodes, T. Howe Childs and S. Clarke Reed will be the representatives of the Colonial company on the board of directors of the Vanadium company.

Meeting on Precise Linear Measurement

A meeting on measurement will be held in the Engineering Societies Building, New York, on the evening of Wednesday, Oct. 17, under the joint auspices of the Museums of the Peaceful Arts and the Machine Shop Division of the American Society of Mechanical Engineers.

Dr. George K. Burgess, director, Bureau of Standards, Washington, is to preside, and two papers will be given, the first by Prof. James A. Hall, Brown University, Providence, R. I., on "Measuring Devices, Primarily Manual," and the second by Prof. Earle Buckingham, Massachusetts Institute of Technology, Cambridge, Mass., on the "Development of Automatic Measuring Devices and Use of Optical Methods." An active discussion has been arranged for, after which the meeting

will be adjourned to the Museums of the Peaceful Arts at 24 West Fortieth Street, New York, to a loan exhibit of measuring devices, participated in by Pratt & Whitney Co., Brown & Sharpe Mfg. Co., Bausch & Lomb Optical Co., John Bath & Co., Jones & Lamson Machine Co., the Bureau of Standards, and others. This collection will be opened that night and remain on exhibition at the museum for one month. The meeting and the exhibit together will, in a word, deal with precise linear measurement and its development.

British Exports of Electric Furnaces Criticized

Criticisms of the policy of Sheffield, England, electric furnace manufacturers of selling their furnaces abroad in countries that have not been in the habit of making steel have aroused discussion in Sheffield among prominent steel makers.

C. G. Carlisle of Carlisle, Wiles & Co., well known Sheffield steel manufacturers, has pointed out two decided obstacles to a rapid extension of electric furnace plants in other countries. The first is the scarcity of existing forges and rolling mills. It is possible to manufacture steel wherever electric current is available and cheap, but, Mr. Carlisle points out, to work it up into shapes presents a larger financial problem. The second factor is the scarcity of suitable men willing to isolate themselves. This psychological factor is a contributory cause of the centralization of the industry and a preventive of its break-up.

Sheet and Tin Mill Wage Rate Is Unchanged

Tonnage rates for sheet and tin mill workers in mid-Western mills continue unchanged for September-October at 25½ per cent above base as a result of the bimonthly settlement last week. Average selling price of Nos. 26, 27 and 28 gage sheets shipped during the 60 days ended Aug. 31 was disclosed as 3c. per lb., unchanged from the average two months ago.

Ore Unloading Machine for Lackawanna Plant

An ore unloading machine of large capacity and having several new and improved features will be erected by the Bethlehem Steel Co. at its Lackawanna plant, Buffalo. Contract for the unloader has been placed with the Wellman-Seaver-Morgan Co., Cleveland, for delivery and erection in time for operation by the opening of the navigation season next year. This unloader will operate on the same tracks as five other machines of the same type installed 26 years ago.

The unloader will have a nontelescopic bucket of 17 tons capacity, a

receiving hopper with revolving disk discharge having an apron feeder mounted on a rotating frame and a belt conveyor with a traveling tripper. Ore will either be loaded into railroad cars standing on the first track inside the front leg, or stocked under the cantilever beyond the rear leg through the receiving hopper, apron feeder and belt conveyor with tripper.

The trolley with bucket will be designed for one trip in 50 sec. with 17 tons of ore. The machine proper travels 75 to 100 ft. per min. It will be electrically operated throughout. There will be a total of ten electric motors required ranging in size from 15 to 275 hp., with a total horsepower in all of over 900.

Industrial Stocks of Coal Still Decreasing

Stocks of coal on hand in industries of the United States and Canada Aug. 1 are estimated by the National Association of Purchasing Agents at 39,415,000 net tons. This is the lowest figure in many months. There has been an uninterrupted decline since the total, Oct. 1 last, of 60,154,000 tons. The supply is estimated as equivalent to an average of 36 days' use at present rate of consumption. This varies with different industries: By-product coke plants have 21 days' supply; electric utilities and coal gas plants have 51 days' supply; railroads have 36 days; steel mills, 35 days, and other industries, 38 days.

Industrial consumption in July is given as 33,527,000 tons, an increase of about 750,000 tons over June, but otherwise the smallest since last September. Production in the United States is given as 41,785,000 tons, which is 521,000 tons more than in June, but nearly 3,000,000 tons less than in May. Except for June and April, the July production was much the lowest in more than a year.

Combustion Engineering Acquires Boiler Company

The International Combustion Engineering Corporation, New York, has completed negotiations for the purchase of the Hedges-Walsh-Weidner Boiler Co., Chattanooga, Tenn., which was formed recently by a merger of the Casey-Hedges Co., maker of boilers and tanks, and the Walsh & Weidner Boiler Co., manufacturer of tanks and boilers, fabricated steel plate products and sugar making and special machinery. The acquisition rounds out the Combustion company's line of boilers, and with its facilities for making fuel burning equipment, the company is prepared to supply complete steam generating plants of any size. The Chattanooga company will be operated by the Combustion Engineering Corporation, which is the United States operating subsidiary of the International corporation.

Pittsburgh Coal Co. Says New Railroad Will Be a Benefit

WASHINGTON, Sept. 11.—Construction of branch lines of the Pittsburgh, Lisbon & Western Railroad from Smith's Ferry, Pa., to Youngstown, instead of setting up a monopoly for its controlling interest, the Pittsburgh Coal Co., will have the opposite effect, according to a reply filed by the company with the Interstate Commerce Commission in answer to protests made by trunk line carriers, including the Pittsburgh & Lake Erie, the Pennsylvania and Baltimore & Ohio Railroads.

The Pittsburgh Coal Co. answer declared that construction of the extensions will have a tendency to reduce prices of the commodity (coal) in the market reached through the rail and river route, the new line affording connection with the Ohio River. Such construction, it was pointed out, will benefit rather than injure the consuming public. The project, it was stated, will have the effect of holding in check "a monopoly that now exists, . . . that of railroad exceptants, who have hitherto enjoyed without real competition an excessively high rate on coal to the consuming public of the Youngstown district and the markets reached by coal from the Pittsburgh district. The sole effect of the grant of the application prayed for will be to furnish the Youngstown district with the cheaper rail-and-river system of transportation of this commodity."

The reply declared further that the proposed construction of the line would not be in violation of any law.

Welders to Discuss Pipe Structures and Aircraft

While all the details of the program have not yet been fixed, the main features of the American Welding Society's meeting in Philadelphia (jointly with the American Society for Steel Treating and the Institute of Metals) are as follows:

Tuesday, Oct. 9. Morning: Discussion of pipe welding in large plants, buildings and residences, led by R. A. Jack of *Domestic Engineering*. Afternoon: Welds at Elevated Temperatures, by Prof. C. Moser, Leland Stanford University. Design Stresses for Pressure Vessels, by S. W. Miller, Union Carbide & Carbon Research Laboratories.

Wednesday, Oct. 10. Morning: Discussion on welding for aircraft. Also J. H. Deppeler, chief engineer Metal & Thermit Corporation, will describe recent developments in European welding.

Thursday, Oct. 11. Afternoon: Symposium on structural welding and cutting: F. P. McKibben, consulting engineer General Electric Co., J. F. Lincoln, Lincoln Electric Co., and others.

Friday, Oct. 12. Morning: "Design of Machinery Parts by Use of Welded

Steel Shapes," by Messrs. Hague, Marthens and Brinton, Westinghouse Electric & Mfg. Co.

Wednesday afternoon will be devoted to inspection trips, of which several will be available. Meetings of special and research committees will also be held during the week.

Scrap Institute to Hold Various Local Meetings

The Institute of Scrap Iron and Steel, 11 West Forty-second Street, New York, has arranged a series of meetings in various cities to afford an opportunity to the leaders in each locality to meet with Benjamin Schwartz, director general of the institute, and to hear his message and discussion of the problems of the industry and the work of the institute. The tour of the director general will be begun with a dinner on Sept. 12 at the Tumble Brook Country Club, in Bloomfield, Conn., for the dealers in Hartford, Springfield, Norwich, Worcester, Northampton, Boston and surrounding territory. On Sept. 13 a luncheon will take place at the Hotel Taft, New Haven, Conn., for the dealers of Bridgeport, Meriden, New Britain, New Haven, New London, Norwich, South Norwalk, Stamford, Waterbury and Portchester, N. Y. A similar luncheon will take place in Newark, N. J., at the Newark Athletic Club on Sept. 19 for the scrap iron men of Hoboken, Jersey City, Kearny, Newark, Passaic, Perth Amboy, Phillipsburg, Plainfield, Somerville, South Amboy, Trenton, Asbury Park, Atlantic City, Elizabeth and surrounding territory. This will be followed up by meetings in New York, Philadelphia, Baltimore, Washington, Wilkes-Barre, Pittsburgh, Buffalo and Boston.

To Build Cold-Drawn Steel Plant at Buffalo

A plant is to be erected immediately in Buffalo by Bliss & Laughlin, Inc., Chicago and Harvey, Ill. The Buffalo plant will be devoted to the same products as are now being manufactured at Harvey and have been since 1891, covering cold-drawn steel in rounds, squares, hexagons and flats, and screw stock in open-hearth and special alloy grades and polished and ground shafting.

Paul J. Kalman is president Bliss & Laughlin, Inc. Walter R. Howell, vice-president and general manager, will be in direct charge.

Airplane at Steel Treaters' Convention

Greater attention than ever before is to be given the airplane at the annual convention and exposition of the American Society for Steel Treating at Philadelphia, Oct. 8 to 12.

F. T. Sisco, chief of the metallurgical laboratory at Wright Field, Dayton,

Ohio, is to present a paper at the technical sessions on "Steel Failures in Aircraft." Convention visitors will learn of the type of construction and material used in the engines, propellers and other parts of planes used by Col. Charles Lindbergh and other famous flyers. Among the leaders in the air industry who will be at the convention are W. B. Stout of Stout Air Service, Inc., Detroit, and E. P. Warner, Assistant Secretary of the Navy for Aeronautics.

Important discussions will cover the development of duralumin, of which all-metal planes are made. Attention also will be given the construction of feed and oil pipes, the breaking of which has caused so many flights to fail. Prominent in the discussion will be the methods of manufacture, with demonstrations of both welding and riveting. Of interest, too, will be the adaptation of the X-ray for the detection of flaws in metals. This work will also be demonstrated. W. H. Eisenman, secretary of the society, is arranging for an aircraft display at the exposition.

Wide Sintering Machine for Indiana Harbor

Under a license from the American Ore Reclamation Co., the Youngstown Sheet & Tube Co. is installing a Dwight and Lloyd sintering plant at its blast furnaces at Indiana Harbor, Ind. There will be a Dwight and Lloyd machine 72 in. wide and 63 ft. 9 in. long, with a rated capacity of 650 tons of sinter per day from blast furnace flue dust. The material to be treated consists of the dry dust from the down-comers, as well as the filter cake recovered from the gas washers.

This is the third of this type of machine to be installed. The original machines were 42 in. wide. The first 6-ft. machine was built for the Chateaugay Ore & Iron Company, Lyon Mountain, N. Y., for sintering concentrates. The second wide machine was installed this year by the Buffalo Sintering Corporation at Buffalo in its custom sintering plant.

Steel Framed Houses at Boston and Pittsburgh

Model, firesafe houses, entirely framed of steel, are soon to be opened at Boston and Pittsburgh by the Broderick Firesafe Homes Association, Inc., 358 Fifth Avenue, New York, as a part of a nationwide program of the association. The houses will embody other features such as aluminum shingles, asbestos board subflooring and cork insulation. The Pittsburgh house, located on Ardmore Boulevard at Edgewood Acres, will be opened on Oct. 8. The A. & S. Wilson Co., Pittsburgh, is general contractor. The Boston house, which will be opened on Oct. 14, was built by Rogers & Sullivan, Boston, and is located at Longwood and Pine Roads, Milton, Mass.

Manganese Needs Research and Tariff

Producers' Association Told That Preparedness Requires Prices High Enough to Bear Cost of Solving Low Grade Ore Problem

WASHINGTON, Sept. 11.—Sounding a note of confidence that a domestic manganese ore industry is on the threshold of being firmly established, the American Manganese Producers' Association at its first annual meeting at the Mayflower Hotel adjourned this afternoon, following a two-day session. Problems in research of processes of converting low-grade material into that of standard commercial analyses, to meet the requirements of the steel industry, and realization of the present difficulty of interesting capital to invest in the industry were all considered at the meeting. There was an attendance of approximately 50 representatives of the industry.

Summarized, the meeting gave the assurance that within a few years the industry would be able to meet all domestic demands. It was in substance declared that the United States has large visible and enormous potential amounts of manganese supplies, which through beneficiation can, with further development of processes, be worked into high-grade material. Demand was made that the present tariff on manganese be maintained or increased.

Officers Reelected

Officers were reelected, J. Carson Adkerson, Hy-Grade Manganese Co., again being made president and chairman of the executive committee, which was renamed. The new directors elected were: C. D. Hutchens, Manganese Ore Co., Watauga Valley, Tenn.; Ottomar Stange, Stange Construction Co., Philadelphia; W. R. Spencer, Luna Manganese Co., Jackson, Mich.; W. J. Staunton, Cuban American Manganese Corporation, New York, and Herbert Wilson, Union Carbide & Carbon Co., New York.

Russian Supply Unreliable Because of Economic Instability

In his address of welcome to the delegates, J. Carson Adkerson, president, declared that much has been accomplished since the association was formed on Aug. 2, 1927, in Washington. Tracing the history of the domestic manganese industry, he said that as a national institution it was born during the World War, cast aside as an orphan during the post-war period and was finally adopted by the manganese producers themselves "and today it takes its place as a growing industry among the basic industries of the United States."

Touching upon the world situation, Mr. Adkerson said that among all the principal steel producing countries, none has produced, within its own boundaries a sufficient supply of

manganese to meet its own needs. The United States draws some manganese from India, Africa and Brazil, but a large part has been coming from Russia. Disturbances in Europe would seriously impair, if not entirely stop the flow of manganese to this country. "For the past several years I have attempted to call attention to the instability of the manganese situation in Russia," said Mr. Adkerson. "Today we hear the announcement that the American interests have withdrawn from the Russian fields and that the manganese concessions have been returned to the Bolshevik government."

Our Problem Is to Concentrate Low Grade Ores

After speaking of developments which had taken place in America, he pointed out that there is still a wide field of opportunity for further improvements in the development of low grade ore reserves. "During the past years we have seen many new methods of beneficiation brought to light," said Mr. Adkerson. "Foremost among these are the roasting of rhodochrosite ores in Montana; the development of the Bradley process of leaching with sulphate of ammonia; the work of the Bureau of Mines station at the University of Minnesota in manufacturing ferromanganese from manganiferous iron ore; the sulphur dioxide processes; magnetic separation; and sintering manganese ore both to raise the metallic manganese content and to make the material into a form most suitable for steel furnaces. Instead of attempting to copy iron ore mining practice, let us turn for our inspiration to the zinc industry. We see the zinc operators mining and treating, at a profit, ore which runs 1.5 per cent zinc, but in our industry, we have been content to ignore or discard as tailings material running from 10 to 30 per cent metallic manganese."

In the first of a series of remarks on reserves of manganese ore in various States of the country and Cuba, L. B. Miller, Cleveland, said that substantial contribution by Arkansas to tonnage of high grade ore must, like many other States, wait on suitable methods to transform its low grade ores into high grade. Its well-located and enormous tonnage of low grade ore will then make it a powerful factor in high grade ore supply, but, in his opinion, not until then. He suggested that the major work of the American Manganese Producers' Association is not the discovery of ample manganese ore, high grade in its original mineral condition, but rather that the conversion

of low and medium grade manganiferous and ferruginous manganese ores into high grades be given close study.

Cuban Ores Will Benefit by New National Highway

Armando Roa, commercial attache of the Cuban embassy, showed that exports of manganese ore from Cuba to the United States for the two years, 1926 and 1927 totaled 297,766 tons, valued at \$6,518,736. The richest manganese mines are located in the province of Oriente and the majority of shipments were of metallurgical grade, carrying 46 to 48 per cent manganese. A serious handicap to the development of manganese in Cuba has been the lack of transportation facilities and the inaccessibility of most of the mines. This, it was declared, will be entirely overcome in the near future when the new national highway, now under construction, will be opened for traffic.

Montana and Virginia Ores

Speaking of reserves in Montana, E. L. Blumenthal of the Montana Laboratory Co., said that State produced one-half of the manganese produced from domestic sources during the World War. The industry has languished lately, and shippers of 35-per cent manganese had been forced to suspend. But, he added, optimism has returned, due chiefly to developments in beneficiation. Reserves in the Philipsburg district alone amount to 1,320,000 tons of ore grading 35 per cent or better. Reserves in other districts are also large. He spoke of one company which has contracted to supply 125,000 tons during the next five years. The treatment of rhodochrosite ores in Montana by the Domestic Manganese & Development Co., was described by Mr. Blumenthal. A nodulizing process is used which produces material of proper size and characteristics for use in the blast furnace. The material analyzes as high as 52 per cent manganese. Ore at present is drawn from the Butte district, but later on will be taken from the Philipsburg and other districts.

E. M. Massey of the Hy-Grade Manganese Ore Co., spoke especially of properties at Mineral Ridge, Va., and said shipments of 300,000 tons of hand-picked ore had been made from that property. With the installation of a plant, it is expected, to produce 25,000 tons of 45-per cent ore during the next year. Dr. J. S. Grasty of the University of Virginia, also said that the country is on the threshold of a large and profitable production of manganese ore.

William H. Kemler, chemical and mining engineer, Johnson City, Tenn., spoke of the possibilities of rhodochrosite in eastern Tennessee and the Carolinas, but M. D. Lavino of Lavino & Co., said he did not think they were rhodochrosite ores but were calcites containing 7 to 9 per cent manganese. He would not

recommend that any one attempt to concentrate the so-called rhodochrosite ores of Tennessee.

Emergencies Need Active Operations Not Dormant Reserves

Every possible step should be taken to guarantee to the steel industry an uninterrupted supply of manganese ore, said A. H. Hubbell of *Engineering and Mining Journal*, New York. Mr. Hubbell recalled our dependence during the World War and declared that any lack of manganese will jeopardize the national safety in time of war and its prosperity and well-being in time of peace. Development of manganese resources of this country, it was said, require adequate tariff protection. Research likewise is contingent upon the tariff, "for without the latter the domestic industry, now in its small beginnings, would cease to exist and neither government nor private capital would be interested in a non-existent industry."

The speaker challenged the idea that the best way of insuring a supply of manganese for use in war emergency, when foreign sources of supply may be cut off, is to hamper development of the manganese within our borders. Those advocating such a practice underestimate the time that would be required to resuscitate the dead or dormant industry. Furthermore he added, by shutting down the industry research would be killed and so the country would be at a loss to utilize the low-grade manganese ore when the emergency arrived.

Position of Strategic Minerals

At a dinner given at the Mayflower Hotel, Monday evening, Maj. Alfred H. Hobley of the Air Service, listed nine strategic minerals: Manganese, antimony, mercury, chromium, platinum, tungsten, nitrates, quicksilver and tin. Major Hobley, who is engaged in studying these and other materials whose domestic supplies are considered inadequate for time of emergency, declared that three questions are presented in the study; first, methods of stimulating production; second, creation of reserves; and third, development of substitutes in ample quantities. The first question, that of stimulating production is eliminated altogether where there are no domestic supplies. Regarding the second point, it was pointed out that with the passing of time and development of new methods and new uses of materials, it has been found in certain instances that such reserves would not be needed. Moreover, creation of reserves involves considerable expenditure and the desirability of creating a stock pile is a much disputed point. The last factor, namely use of substitutes, was said to be a promising possibility in the case of manganese.

Concerning tin, Major Hobley said that a grave shortage would be experienced if imports were interrupted, yet he explained that inasmuch as

the Army operates under extreme conditions, the situation might not be embarrassing in some circumstances, because it may be able to preserve food without use of tin containers. Tungsten was said to have proven satisfactory in replacing platinum for electrical contacts, though the problem of a probable shortage of tungsten still remains.

For nickel steel it might be possible to substitute molybdenum or manganese steels, Major Hobley said. Heat treated duralumin now is being used for tubing in the fuselage of airplanes, replacing alloy steels and wood. The day of all-metal planes is just arriving—one of the outstanding changes being the use of metal instead of spruce for structural members.

Herbert W. Smith, Union Carbide & Carbon Corporation, who presided as toastmaster, expressed confidence that the domestic manganese industry would be established and urged that the industry continue its research with that end in view. He also strongly urged that the tariff on manganese ore should be maintained.

Manganese Ore Resources of the Country

E. F. Burchard, United States Geological Survey, speaking on "Types of Deposits, Their Use and Method of Treatment," expressed the belief that the United States has wonderful resources in ore and that it will make good in its production and marketing. He said surveys so far made by the Geological Survey had disclosed 297 deposits of manganese ore through the country.

In a paper on "Grades and Character of Ore Desired by the Market," prepared by John J. Howard, E. J. Lavino & Co., and read by M. D. Langhorne of that company, it was declared that domestic producers of manganese ore show a woful lack of knowledge of the kind of ore suitable for makers of ferromanganese. Pointing out that the alloy must be 80 per cent manganese, $\frac{1}{4}$ per cent phosphorus and 1 per cent of silica, it was stated the base of ore should be 50 per cent manganese and 5 per cent silica. It was emphasized that domestic manganese ore for the most part did not measure up to the standard. Analysis showed that the domestic ore ranges from as low as 5 per cent and as high as 20 per cent in silica. Emphasis was laid on the fact that each 1 per cent increase in silica content in the ore materially increased the cost of producing ferromanganese. Comparison was made between foreign and domestic manganese ores in favor of the latter.

The William B. Pollock Co., blast furnace builder, has received a contract, estimated at \$1,000,000, to rebuild the Illinois Steel Co.'s No. 11 blast furnace at Gary, Ind.

Pioneers of Industry to Be Honored on Oct. 24

Charles M. Schwab, Henry Ford and Thomas A. Edison will be among the guests of honor at a dinner for pioneers of American industry to be given in New York the evening of Oct. 24 by Columbia University and the Institute of American Meat Packers in cooperation with the Chamber of Commerce of the State of New York and the Merchants' Association of New York. Other guests of honor will be Orville Wright and Glenn H. Curtiss, representing aviation; Julius Rosenwald, merchandising; George Eastman, photography, and Harvey S. Firestone, rubber.

The dinner will be preceded in the morning by a conference of major industries held under the same joint auspices. At this conference a leader from a number of fields will discuss the situation of the business or industry from which he comes. Myron C. Taylor, chairman finance committee United States Steel Corporation, will represent the steel industry; Alvan Macauley, president National Automobile Chamber of Commerce and the Packard Motor Car Co., the automobile industry; Franklin D. Roosevelt, president American Construction Council, the building construction industry; Walter S. Gifford, president American Telephone & Telegraph Co., communications; Frank B. Noyes, president Associated Press, publishing, and Charles E. Mitchell, president National City Bank, New York, finance. A speaker for the railroads is to be announced later.

Mackintosh-Hemphill Co. Is Reorganized

A reorganization of Mackintosh-Hemphill Co., Pittsburgh, has been consummated and new interests have taken over the management of the company. The board of directors of the reorganized company consists of H. V. Blaxter, John W. Chalfant, Edwin Hodge, Jr., Herbert A. May, J. H. O'Neill, W. C. Rice and T. C. Ward, and the following officers have been elected: H. V. Blaxter, chairman of the board; F. H. Moyer, vice-president; W. C. Rice, treasurer, and D. H. Baum, secretary and assistant treasurer.

The company is the oldest among those engaged in the manufacture and engineering of all classes of rolling mill construction. It was founded in 1803, and after 119 years of continuous operation, it was expanded by the acquisition of the A. Garrison Foundry Co., Pittsburgh, the Pittsburgh Iron & Steel Foundries, Midland, Pa., and Woodard Machine Co., Wooster, Ohio.

The Ames Shovel & Tool Co., Boston, has removed its sales and administrative departments to the factory at North Easton, Mass.

This Issue in Brief

"Cutting prices below cost is demoralizing, damaging and economically wasteful," says T. J. Foster. "Once a standard of business conduct is generally accepted, violators will be treated as business outcasts."—Page 635.

* * *

Users of alloy steels should be provided with dependable performance data, says metallurgist. Many producers are not acquainted with pertinent facts concerning their product, he charges, and misinformation is being circulated.—Page 633.

* * *

Seeks new uses for cold-rolled shafting. "This superior material should find new uses and research might point the way to lower production costs," J. R. Miller says.—Page 637.

* * *

Steel sets new August production record. Daily output of ingots was 154,759 gross tons, a gain of 1.5 per cent over July, while the gain in the month's total was 9.6 per cent. August made the highest record for any month in any last half.—Page 641.

* * *

Simplifies manufacturing problems in automobile body construction by stamping large pieces. Entire sedan side is made in one piece; four pieces form complete body. Single stamping withstands stresses better than jointed piece, provides greater strength and more accurate fitting.—Page 623.

* * *

Sheet steel jobbers object strongly to cut in 10-day cash discount rate. Declare they need the 2 per cent discount to provide them with a fair profit. Producers say that one-half of 1 per cent discount is adequate, as money can be borrowed at 6 per cent.—Page 640.

Cuts operating costs by paying bonus for reduced repairs to production equipment. Repair foreman and helpers are paid a premium for keeping down repair costs, and each machine operator in Chinese nail plant is given a production bonus as well as a premium for saving on cutters and dies.—Page 626.

* * *

Stainless iron proves its suitability for aircraft use. Physical and anti-corrosion properties are satisfactory, and the metal fabricates and machines well.—Page 627.

* * *

Ford apprentices alternate daily between class room and shop. Course covers 2½ years, and class hours are set so that, no matter what shift the student is working, he has suitable time for theoretical training.—Page 631.

* * *

Confusion exists in tests of metals at high temperatures, says metallurgist. Declares that tests should be standardized, as considerable difference of opinion exists as to which test results should be considered most reliable.—Page 633.

* * *

Electric power an important factor in doubling output of ore mines in tons per man. From 1922 to 1927, during which electric power consumption in representative underground mines increased from 4 to 8 kwhr. a ton, mining efficiency doubled.—Page 634.

* * *

Is there a scarcity of scrap? No, says editorial writer. Prices have been too low to cover the cost of gathering old material. The rush to cover on the part of dealers who sold short creates an impression of scarcity.—Page 653.

When welding stainless iron, be sure the operator is furnished with the instructions provided by the producer of the metal. Otherwise trouble may be expected, says aircraft builder, finding that breaking load of welds varies markedly with the way the welding is done.—Page 628.

* * *

Great need exists for a steel with an ultimate strength of 90,000 to 95,000 lb. per sq. in., yield point of 60,000 to 65,000 lb. and ductility of 30 to 35 per cent elongation, says research director. Plain carbon steels having these strengths fall below the required ductility figures, he declares, when made by present tonnage methods.—Page 633.

* * *

In machining stainless iron, use high-speed steel cutting tools, metallurgist recommends. Attention should be given to the shape and position of the tools, to avoid "dragging." In annealed condition, stainless iron machines readily.—Page 630.

* * *

Five-day week would result in lower production and higher costs for most industries. While labor leaders declare that shorter week would increase production, due to saving from human fatigue, this would apply only to those organizations permitting human driving.—Page 653.

* * *

"Interdependence of competitors is winning general recognition," declares steel fabricator. Taking business at less than cost will in time be regarded as a business crime. Mills should refuse to sell to price cutters, for the entire industry is injured by accepting unprofitable work.—Page 635.

A. I. FINDLEY
Editor

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W. W. MACON
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A Much-Needed Code

FROM the picture Mr. Foster paints in the interview put before IRON AGE readers on another page, competition in the steel fabricating industry has reached a stage at which academic discussion is ruled out and only practical remedies are worth considering. By some Mr. Foster's proposal of a code of practice governing the relations of structural steel mills and companies fabricating such steel may be taken as simply another contribution to business ethics, one likely to fare hardly in that field of two-fisted competition. Yet, carefully examined, the plan will be seen to have teeth. These sentences, for example, plainly look to a regime under which the steel producer will accept a new responsibility, one that may involve a refusal to sell a fabricator who has become known as a chronic price-cutter:

Once a standard of business conduct is generally accepted, violators will be treated as business outcasts. Fabricators, acting on their own individual initiative, but without doubt in numbers sufficient to make themselves felt, will sever all relations with a competitor who indulges in practices that threaten the industry. Nor are they likely to continue to patronize a mill that has so little interest in their common welfare as to sell steel to such a fabricator.

As Mr. Foster points out, a fabricating shop works to specifications, so that mass production cannot figure in any such way as to work great operating economies. Shop methods are so far standardized that there are no wide differences between the costs of competing plants. An unsuccessful bidder can quite well take the measure of the profit or loss of his competitor who receives the award. Thus, it is held, the proposed code does not fall into the category of cooperative measures designed to stabilize prices by bolstering the weak and inefficient. Rather it aims to unite the influences in the trade which are committed to sound practice and to eliminate those factors which work for low morale.

Much will doubtless be said as to the difficulties in the way of making and enforcing such a code. It would be a mistake, however, for steel producers and fabricators to treat the proposal and the comment that goes with it as just one more of the common run of complaints of the scant profits of making and working in structural steel. The situation is one that calls for candid expression, sound thinking and decisive action.

WAGE-EARNERS in the metal-working industries of the country had a purchasing power nearly 12 per cent higher in July this year than in July last year. Weekly wages paid in automobile, iron and steel, elec-

trical goods and agricultural implement manufacture and in foundries and machine shops and railroad car building and repair shops, averaged \$33,561,000 in July against \$30,006,000 in July, 1927. For all industries, however, the weekly factory pay roll, amounting to \$81,147,000, was 1.9 per cent smaller than in the preceding July. The recent upward trend in business is indicated by the decreasing difference between pay rolls of corresponding months of the two years. Whereas April showed nearly 7 per cent smaller pay rolls for all industries, May pay rolls dropped 5.8 per cent under May, 1927; June was off 3.3 per cent, and finally July, as stated, only 1.9 per cent.

A New Record in Steel

STEEL ingot production in the United States in 1928, it now seems likely, will make a new high record. In the first eight months the total, for open-hearth and Bessemer steel alone, was 32,783,000 tons. Estimating crucible and electric steel at 275,000 tons, we have 33,058,000 tons. Against this the highest record for eight months was 31,775,768 tons, or roundly 1,280,000 tons less. If the remainder of the year should but equal the very moderate production of the last four months of 1927—12,887,000 tons—the 1928 total would be 45,945,000 tons, or within 1,000,000 tons of the 1926 record of 46,936,205 tons. But we are now going, on the basis of the August daily figures, at a gait 19½ per cent higher than in 1927. If we average only two-thirds of that excess during the final four months, we shall end the year with a total of 47,600,000 tons, or more than 650,000 tons beyond the great output of 1926.

Whose Five-Day Week?

IN his last Labor Day speech William Green, president of the American Federation of Labor, heralded the early advent of the time when labor would enjoy two holidays in every week. Progress in this direction was characterized as the outstanding achievement of the labor unions in the last year. The objective may be described as employment for hire for only 250 days a year, or say 2000 hours. Expressed in that way, which is arithmetically the same as five days a week, but quite different in its implications, it reflects a condition that obtains in many industries owing to seasonal and other reasons, and is not liked.

We have never heard any clear statement of just what unionized labor means and wants in respect to a five-day week. Is it wanted only for some workers or for all? If the latter, is it contemplated to have a com-

plete cessation of labor as in two Puritan Sundays? What then would people do?

Even now we have to run our railroads on Sunday, and likewise our trolley lines, subways, water works, illuminating plants, hotels and divers other things. A good many industrial operations are incapable of being halted.

Many carpenters, bricklayers, plumbers and other artisans now refrain from going to work on Saturday. Not a few of us have had the maddening experience of something going wrong in household mechanics on a Friday evening, with the inevitability of a wait until Monday (or Tuesday if an extra holiday intervenes) before it can be fixed. Doubtless even a bricklayer objurgates the plumber in such an event. We imagine also that all of the enjoyers of the Saturday holiday like to be able to shop on that day, and want their morning paper, milk and gasoline on Sunday. Mr. Green should tell us how organized labor proposes to arrange such matters.

Of course the great economic question is what effect a five-day week would have upon production, supposing it were to be limited to miners, factory workers, and artisans. Organized labor answers off-hand and glibly that it would increase production owing to the saving from human fatigue, and immediately cites the precedent in Mr. Ford's works. On the other hand it is well established that a five-day week has not increased the production of bricklayers. Mr. Ford, as we have pointed out in other connections, has a unique industrial organization that permits human driving; but it is inconceivable that the application of his principle to a blast furnace would produce any benefit. Nor would it in our manufacturing industry in general. What would really happen would be a further immobilization of our costly plant for production.

Low Prices for Petroleum Products

AN article in the last number of the *Lamp*, the house organ of the Standard Oil Co. of New Jersey, says that the consumption of gasoline in the United States in 1900 was only 2,000,000 barrels, while the consumption in 1928 will probably be about 390,000,000 barrels, most of which will be used by motorists. The barrel of gasoline is 50 gallons. The article goes on to comment: "Gasoline has not kept pace with the rising trend of commodities. Actually its cost is lower now than it was in the infancy of the motor car business and, if its production in miles be considered, it probably costs less today than in an intervening period when its price per gallon was lower."

In good practice the petroleum refiner gets about 30 gallons of gasoline out of a 42-gallon barrel of crude oil. This gasoline last January was selling at about 5¾ cents per gallon, in the wholesale market in the mid-continent area, and at 7¾ cents on the Atlantic seaboard. About the mid-year the prices had risen to 9¾ cents and 11¾ cents respectively, which has been very good for the refining companies, the price for crude oil having remained substantially unchanged at the low level.

This latter condition is likely to continue, for any advance in the price for crude would immediately develop increased production from the several fields that are recklessly exploited and possess an immense poten-

tiality for pouring out an even greater flood of oil than they now produce. Their wastrel owners should therefore be left to fry in their own fat, and while their stockholders may deserve some sympathy their managers do not.

The refiners, however, while now enjoying good times are unable to have everything their own way, for increase of their margin attracts competition. Even now California gasoline is being offered in the New York market at a shading of price, which indicates that the latter has topped. In short, the whole petroleum business is strongly competitive and perhaps there is no commodity in respect to which the consumer has less ground for complaint. The difference between the price he pays at filling stations and the price the refiner realizes is of course the remuneration for the cost of distribution, which involves the use of a large amount of capital, as every automobilist from his own observation can understand. Indeed, the thoughtful observer might get the idea that not only are our own roadsides unnecessarily defaced, but also that he has to pay the price for an overbuilt and overmanned trade.

Increasing Outcome of Scrap

A RECENT sharp rise in the Pittsburgh district scrap market and tightness reported in other districts might suggest that scrap as a material has grown "scarce." That is not the case. It is a matter of prices. The short sales of dealers were at too low prices. Who made the prices so low is a moot question which need not be discussed here.

There is a certain cost, though a varying one, in the gathering of old material and when the market price does not cover this cost and freight the material is not gathered. Not a great deal of the scrap consumed is subject to this influence, which may however be enough to regulate the supply at times, at least taking the edge off open market fluctuations.

There is no general rule as to the average length of time steel remains in service before it becomes scrap, nor is there any specific information as to whether that length of time, whatever it may be, is tending to increase or decrease. One thing, however, we do know, and that is that up to 1916 the production of both pig iron and steel was increasing rapidly. Since then the increases have been at relatively a very moderate rate. The suggestion is clear that the outcome of old material should now be increasing year by year at a much greater rate than production of pig iron and steel is increasing.

These market advances in scrap have not as a matter of fact put scrap up to what might be called its "intrinsic" value, relative to the value of pig iron, since in making steel either scrap or pig iron must be used. Each steel mill has its own system of appraising the value of pig iron, for the mill making its pig iron itself does not consider market value, but cost, and in counting what might be called intrinsic cost, various items are considered, an important one being profits from by-product coking operations.

There is an enormous store of iron and steel in the country, chiefly in service, though undoubtedly there is no small tonnage that is simply awaiting the time when it will pay to take it up and supply it to the market. The total is probably far in excess of half a billion tons, which means cumulative production plus imports, minus

exports and losses of material by rusting and too minute division or extensive distribution. Thus obviously there is much opportunity for scrap to come out. In the case of the railroads, which account for considerably more than a hundred million tons, the monthly outcome is fairly steady.

Post-War Economy

THERE is something satisfying and reassuring in counting up the expected post-war dangers the American people have avoided. Emerging from the war with large profits and with labor in easy position both as to wage rates paid and the service expected from the wages, there were fears that the country would run through a period of extravagance, involving injudicious investment of capital in construction work as well as wasteful spending by wage earners. Those fears were at the time quite reasonable, and for somewhat over a year after the Armistice the country did run much along such lines. The course was brought up with a sudden turn and then people settled down to harder work and judicious expenditure.

In many and important respects we have been on an economical basis in the last few years, in that we are getting good things, necessary and worth-while things, on a low cost basis. With almost identically the same number of freight cars as on July 1, 1914, the railroads are performing about 45 per cent more freight service than in any year before the war and are doing it more expeditiously. The quality of the service is improved in addition to the quantity, and the railroads are not under the necessity of making relatively large capital expenditures.

Complaint about the coal and oil industries being overdeveloped is from the viewpoint of owners. In coal at least, they do not receive a reasonable return, but the country is furnished coal and oil at very low cost. Money is not being spent extravagantly or wastefully for coal or oil.

The automobile was pictured by many as a serious economic danger. It was a favorite remark that people were mortgaging their homes to buy automobiles and by and by they would have only the mortgages. It has turned out that the people were able to replace their worn out cars and year by year there are more owners. Cars are cheaper and more efficient and they can be made to last longer if desired.

Dwelling house construction at very high, possibly temporarily high, cost was considered a danger. Costs have declined but no serious trouble has been caused and the homes are serviceable. Costs are still too high, considering what a day's labor produces in various manufacturing industries, but there is no longer any fear of a disturbing slump.

Steel has improved greatly in quality and the production cost has gone down. The relation of price to cost is very favorable to the consumer, as shown by the light earnings returns of producers relative to capital investment. Considering the service rendered by improved quality steel at present prices is very cheap indeed.

We have been doing a great deal of our work most efficiently and economically. We have not had a post-war period of extravagance and waste, and one cannot but recall that there seemed to be great danger of this very thing.

Of course many items can be cited on the other side. No doubt the people are paying altogether too much money year by year for various "nationally advertised" and expensively advertised products, but there would be no great derangement if the people found it necessary or desirable to cut down such expenditures. It would not be the same as having a lot of idle railroad equipment or factories or buildings on our hands. Men may be working too short hours and too many may not be working at all, but when in employment men work harder and accomplish more than they did in the first year or two after the war.

CORRESPONDENCE

Ethical Buying and Ethical Selling

To the Editor: Your editorial of Aug. 30 on "Purchasing Agents and Profits" touches one of the most important phases of the profitless prosperity discussion in its reference to the relationship of buying and selling in the same organization. Of course, a considerable proportion of our production is purchased by governmental agencies, railroads, public utilities and educational institutions, and they do not sell a commodity that would bring them directly into this comparison.

The industrial organization of today, in which management has become the dominant factor according to many writers, is composed of several highly specialized divisions; mechanical, selling, engineering, purchasing, advertising and financing probably being the most prominent. Surely, it is necessary to coordinate these various functions of management and the well managed organization requires, and usually has, a definite policy controlling all its functions.

A satisfactory sales policy and an unsatisfactory purchasing policy or vice versa can hardly make a sound combination and would be unusual. Successful producing con-

cerns cannot hope to dignify or concentrate on one or more functions of management and neglect the others, for each of the functions must to some extent at least be considered as representative of the organization's policy.

The purchasing department is and should be as representative of the organization as the sales department. The firm is judged by one as well as the other, and failure to have representative men and methods in one is as serious a mistake as neglect of the others would be, for each has a necessary work to perform that does not conflict with or lessen the value and importance of the other divisions.

G. A. RENARD,

Secretary-Treasurer National Association of
Purchasing Agents, Inc.

New York, Sept. 5.

Fabricators Ask for Relief from Anti-Trust Laws

To the Editor: I am inclosing a copy of a letter which the Structural Steel Board of Trade of New England has voted to send to the Chamber of Commerce of the United States and also to the proper authorities in Washington.

While there have been expressions of widespread dissatisfaction with the application of both the Sherman Law and Clayton Act by many individuals and from all lines of industry, this is the first time, I believe, that an industry has

made an open and frank appeal for relief from the application of these statutes as at present construed by our courts. We are led to do this by the conviction that unless these statutes are amended or repealed our industry, representing millions of dollars of investment, is threatened with disaster.

We would be the last to deny that, at the time these acts were passed, the country was suffering from evils which it was essential should be restrained. We do not believe that even now manufacturers should be free to enter into agreements or combinations which would result in the public's paying an unfair price for their products. But we do believe that the manufacturer is entitled to a fair and reasonable profit and that this right should be just as firmly guaranteed and protected as that the consumer should not be forced to pay an unfair price for what he buys.

The justice, nay, necessity, that corporations should receive a fair return for their efforts is recognized by both the Federal Government and the States with respect to public service corporations. The Federal Government has established rates and tariffs for the railroads calculated to produce a given net revenue upon the invested capital. Here in Massachusetts the State fixes the price of gas and electricity at levels which are intended to return a fair rate of interest to the stockholders, and our own Boston Elevated Railway has been guaranteed for years a 6 per cent rate of dividends.

Private Competition Construed as Warfare

But when it comes to private enterprise the attitude of our courts and lawmakers (and, indeed, the public in general) is something different again. It is quite similar to that of the spectators at a cock fight. Their only interest is to see which of the two combatants will succeed in killing off the other. And the competition within the industry is precisely that of a cock fight, whether the industry happens to be textiles, shoes, oils, coal, silk, steel or any other of an essential nature.

As the Sherman Law and Clayton Act are now construed it is demanded of manufacturers of similar articles that they fight each other to the death. No friendly or co-operative act may be indulged in if, as a result thereof, the article they manufacture is increased in price one mill. The result is inevitable. We are having industrial warfare carried to the point of ruination in industry after industry, and all because thirty years ago certain large groups carried their activities to a point that was harmful to the general welfare.

We submit that this situation is intolerable and in no sense what the framers of the Sherman Law and Clayton Act had in mind as the purpose of those acts. Those acts were intended to break down great monopolies and to prevent the forming of others and not to operate to compel the independent industries to fight each other to the death. The only alternative to that result is to drive the independents into consolidations and mergers, which is precisely what the framers of the two acts in question intended to prevent.

Inadequate Prices for Fabricated Steel

When you build a house you now pay the carpenters \$1.37½ an hour. When the Sherman Act was passed you paid not over 40c. This increase has been brought about solely through the combined efforts of organized labor, supported by public opinion. But you are paying no more for

fabricated steel now than you did then, despite the trebling of wages, due to economies in and improved methods of manufacture and the almost entire elimination of profits.

If labor is permitted, through concerted action, to raise the rates of wages to the utmost that the situation will bear, should not some way be provided so that those who pay these wages, and supply the opportunity for obtaining them, should receive a reasonable return on their investment and for their own efforts?

CHARLES N. FITTS.

Boston, Aug. 13.

The letter referred to by Mr. Fitts in the foregoing is as follows:

Aug. 13, 1928.

To the United States Chamber of Commerce,
Washington, D. C.
Attention: Committee on Sherman Law and Clayton Act.
Gentlemen:

The Structural Steel Board of Trade of New England respectfully addresses your attention to the condition of the structural steel industry in this section of the country. The operation of the Sherman Law and the Clayton Act is responsible, we believe, for the fact that practically no profits have been made in this industry in New England for the last five years, and that relief must be had from the operation of these statutes as construed by the Courts if this industry is to survive in New England.

This industry represents and requires a larger investment of capital than other lines of industry, is fundamental to the development of any community, proved its absolute necessity to the Government in time of war, and is entitled to reasonable compensation for its service. It is being completely demoralized by the operation of those statutes.

We shall appreciate any suggestion from your committee as to what may be done by us to aid any effort addressed to a revision or revocation of those Acts or to legislation in substitution for them.

Board of Governors, Structural Steel Board of
Trade of New England.

By Charles N. Fitts, Chairman.

Production of Magnesium Increases

In 1927 production of metallic magnesium in the United States (according to J. M. Hill of the United States Bureau of Mines) was 366,400 lb., worth \$441,700, an increase of about 13 per cent in both quantity and value over 1926. The average sales price of magnesium ingot for 1927 was 68c. per lb.; powder, \$1.56 per lb.; castings, \$1.84 per lb. Castings amounting to 31,990 lb. are reported by "Mineral Industry" as sold in 1927, a decrease of 13 per cent from the previous year. Ingot sales increased 6 per cent over 1926 and were 69 per cent of the total magnesium sold.

Gann and Winston, of the Dow Chemical Co., leading producer of the ingot, in a paper in *Industrial and Engineering Chemistry* say that the continuous electrolysis of the fused chloride is the most general method of manufacture for magnesium and bids fair to bring the price low enough to compete with aluminum. The same authors give precautions for foundry work with the alloys, showing radical departures from older practice. A mixture of magnesium chloride and potassium chloride is used as a flux, varied by the substitution of sodium chloride when pure magnesium is to be cast. The elimination of impurities from the castings is accomplished by a mechanical washing, and scrap is cleaned by the same process.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Sept. 20—Position of Iron and Steel Producers; Oct. 4—Activity in Steel Consuming Industries.

Iron and Steel Markets

Prices of Primary Materials Rising

Country-Wide Advances in Scrap and Additional Increases
in Pig Iron Prices—Heavy Specifying Builds Up
Mill Backlogs

COUNTRY-WIDE advances in scrap prices, further evidences of strength in pig iron and the accumulation of substantial backlogs in finished steel are salient features of the iron and steel market.

Heavy melting scrap at Pittsburgh has gone up 75c. a ton, making a total recovery of \$2.75 from the low point reached in July. At Philadelphia the week's advance in heavy steel scrap was \$2 a ton, and at Birmingham, \$1.50 a ton, while increases at other market centers ranged from 25c. to 75c. a ton.

Pig iron prices continue to stiffen in proportion to the improvement in furnace bookings. In the Valleys, foundry iron has risen 50c. and basic iron 25c. a ton; at Cleveland, foundry and malleable grades for local delivery have been marked up 50c. a ton.

The bulk of fourth quarter contracting for pig iron has been completed, but the week's commitments included several large purchases, among them 25,000 tons of basic bought in eastern Pennsylvania and 15,000 tons of the same grade placed at St. Louis.

Specifications for finished steel have been large. Sheet buyers have been particularly liberal in placing shipping orders, having the twofold purpose of taking advantage of third quarter prices and the present cash discount of 2 per cent, which will be reduced to one-half of 1 per cent Oct. 1.

Mill bookings are so large that shipments will necessarily carry over into the fourth quarter. In fact, price advances intended to rule on contracts for that period may not undergo a severe test until well toward the close of the year.

Specifying in bars, shapes and plates, although apparently not so heavy as in sheets, will undoubtedly extend deliveries of a considerable tonnage into the last quarter. The clause in the third quarter contracts of most mills stipulating that shipping orders be filed by Sept. 10 has been effective in driving in business, although seemingly it has failed to restrict the releases to third quarter needs.

Under the circumstances, buying at fourth quarter prices is deferred. However, it is now evident that steel producers do not intend to insist on a minimum price of 2c., Pittsburgh, or \$3 a ton above the ruling figure in third quarter contracts, but rather propose an advance of \$2 a ton for all classes of buyers. For the majority of consumers this will mean a price of 1.95c., Pittsburgh, while a few large buyers who have been getting steel at 1.80c. will be charged 1.90c. The maximum quotation of 2c. will apply to small or occasional buyers who have been paying 1.90c. during the current quarter.

Cold-finished strip steel is now generally commanding 2.75c., Pittsburgh or Cleveland. While this

is \$2 a ton short of what mills aimed at, it represents an advance of \$2 a ton over recently prevailing prices.

A single base price for all gages and widths of hot-rolled strip will probably be put into effect Oct. 1 by at least some producers.

The rate of steel production remains unchanged, with Chicago operations at slightly over 80 per cent and output in the greater Pittsburgh area between 80 and 85 per cent. The average of the various Steel Corporation subsidiaries continues at about 75 per cent.

Steel ingot production in August was the largest for any second-half month, totaling 4,178,481 tons, or 154,759 tons a day. In only two previous months later than May has output exceeded 4,000,000 tons—October, 1926, and October, 1918. Ingot output so far this year surpasses the previous eight-month record, in 1926, by 4 per cent.

A gain of 53,116 tons in the unfilled orders of the Steel Corporation in August brought the total to 3,624,043 tons, compared with 3,196,037 tons a year previous. This increase, together with heavy releases prior to Sept. 10 in sheets, bars, shapes and plates, points to the continuation of a high rate of output.

Among the major outlets for steel, the automobile industry is expected to curtail operations somewhat in October. On the other hand, the railroads will soon place fall orders for rails. The Canadian Pacific has bought 13,000 tons from the Algoma mill, and the Hocking Valley is in the market for 6500 tons. Early inquiries are expected from the Louisville & Nashville and the Pennsylvania.

A pipe line order of 50,000 tons was added to an already large tonnage of this class of steel recently put on mill books. The buyer was the Sinclair Pipe Line Co., which will extend a line from Oklahoma to Chicago. A Milwaukee fabricator of electrically welded pipe is about to place 110,000 tons of steel for a recent order for a gas line from Amarillo, Tex., to Omaha.

A New York City water tunnel, now up for bids, will take 20,000 tons of miscellaneous iron and steel products, of which 9325 tons is fabricated structural steel and 2850 tons is reinforcing bars.

Negotiations to regulate competition in export markets for tin plate in the interest of Welsh and American makers are reported from England by cable. Some semblance of a partitioning of markets is indicated, though the arrangements are probably not substantially different from those which have lately existed.

Registering the second rise since a low was reached in July, THE IRON AGE composite price for pig iron has advanced from \$17.34 to \$17.46 a ton. The finished steel composite remains for the sixth week at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
No. 2, fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$20.26
No. 2, Valley furnace.....	17.00	16.50	16.50	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.19	20.94
No. 2, Birmingham.....	16.25	16.25	15.50	17.25
No. 2 foundry, Chicago*.....	18.00	18.00	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.25	16.00	16.00	17.00
Valley Bessemer, del'd P'gh.....	19.01	18.76	18.76	19.76
Malleable, Chicago*.....	18.00	18.00	17.50	19.50
Malleable, Valley.....	17.25	17.00	17.00	17.50
Gray forge, Pittsburgh.....	18.26	18.01	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80

Finished Iron and Steel,	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.24	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.17½	2.04
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.40	3.85
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill.	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago dist.				
mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
Heavy melting steel, P'gh....	\$16.75	\$16.00	\$15.50	\$15.50
Heavy melting steel, Phila....	15.00	13.00	13.00	14.00
Heavy melting steel, Ch'go....	13.00	12.75	12.75	12.25
Carwheels, Chicago.....	13.50	12.75	12.75	14.50
Carwheels, Philadelphia.....	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh.....	15.00	14.75	14.50	15.00
No. 1 cast, Philadelphia.....	16.00	15.50	15.50	16.50
No. 1 cast, Ch'go (net ton)....	15.00	14.25	14.00	14.50
No. 1 RR. wrot. Phila.....	14.00	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)...	12.00	11.25	11.00	11.25

Coke, Connellsville, Per Net Ton at Oven:	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Sept. 11, 1928	Sept. 4, 1928	Aug. 14, 1928	Sept. 13, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	14.75	14.75	14.75	13.25
Electrolytic copper, refinery...	14.50	14.50	14.50	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	6.25
Zinc, New York.....	6.60	6.60	6.60	6.60
Lead, St. Louis.....	6.25	6.22½	6.00	6.00
Lead, New York.....	6.40	6.40	6.20	6.25
Tin (Straits), New York.....	47.12½	48.00	48.25	62.00
Antimony (Asiatic), N. Y....	10.62½	10.12½	10.00	11.50

Pittsburgh

Some Falling Off in Automobile Demand But Other Steel Specifications Are Heavy—Plates, Shapes and Bars Advanced \$2—Pig Iron Prices Higher

PITTSBURGH, Sept. 11.—Makers of steel dependent upon the automotive industry as an outlet for the major part of their production report business in the first 11 days of September to have fallen below that of the same period last month. In other respects, the steel market is fully as active as it has been lately and there has been little or no change in the rate of ingot production in this and nearby districts. Much business in bars, plates and shapes has been driven in by the insistence of makers on specifications on third quarter contracts by Sept. 10 and equal firmness in the matter of securing higher prices for fourth quarter contract tonnages.

Instead of an advance of \$3 a ton over the third quarter contract price, as had been proposed, steel companies generally seem to be asking only \$2 a ton above the price at which each buyer got the bulk of third quarter shipments. This means a range of 1.90c. to 2c., base, according to the importance of the buyer, instead of a minimum for all of 2c., base.

There has been some fourth quarter contracting, and it is said that the higher prices are meeting with very little resistance, much less, at any rate, than might be encountered if the advance was only \$1 a ton. It has been found that when the latter amount has been sought, buyers are disposed to resist on the theory that

it does not reflect real confidence on the part of producers.

Sheet business has continued to be stimulated by the desire of buyers to get in as much tonnage as the mills would take for delivery this month, in the effort to escape the lower discount for cash which becomes effective Oct. 1.

Tin plate business still is in its seasonal contraction and tin mill operations are slipping, but the demand for wire products shows a tendency to expand, as is usual at this time of the year.

The pipe producers, more especially those making seamless pipe, still are having a good business. Railroad demands continue to disappoint, but contracting for next year's rail requirements is expected to start up in the next 30 days.

The agricultural implement manufacturers have had an exceptionally active year, and, judging from the size of the demand for sheets from that source, a continuance of that condition is commonly expected.

Some sheet makers have on order as much tonnage for shipment over the remainder of this year as they have taken in full 12 months' periods in recent years.

The pig iron market is gaining in strength, and, while business is quiet, producers have enough business booked to be able to take a strong stand on prices.

Further advances in scrap have increased the recovery from the recent low point on heavy melting steel to \$3 a ton, sales of that grade having

been made at \$17. Not the least interesting feature in this market is the fact that compressed sheet scrap is commanding the same prices as heavy melting steel.

Pig Iron.—Business is only moderately active, but this condition is as much due to the firm price attitude of producers as any lack of interest on the part of melters. More business might be done in basic iron if makers were willing to sell at recent prices. Most producers now are quoting \$16.50, Valley furnace, for this grade and report having refused several thousand tons on which they were offered \$16; while no sales are noted at \$16.50, it is also evident that none of this grade is available at less than \$16.25. Bessemer iron has not been sold in the past week at less than \$17.25 and the more common asking price is \$17.50. All producers of foundry iron are quoting \$17, Valley furnace, for No. 2 grade and appear disinterested in more business at less. That price is supported by a fair number of small-lot sales. An advance of 25c. on malleable iron has found some basis in sales. A local sanitary ware company, with a plant at Louisville, has closed for the foundry iron requirements of that plant for the last quarter of the year; purchases are estimated at about 8000 tons, of which three-quarters will be furnished by southern Ohio furnaces. Birmingham iron was sold at \$16.25 for No. 2 grade, while that from southern Ohio was sold at a delivered price approximately 30c. per ton less than the Southern iron. The Pittsburgh-Valley market is showing real firmness, which in the case of foundry iron is due to the fact that most makers now have good-sized backlogs, while there is the additional factor of the firmness of the Lake front furnaces and the fact that they are not offering quite as stiff competition in competitive territory as they did recently.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.25 to \$16.50
Bessemer	17.25 to 17.50
Gray forge	16.50
No. 2 foundry.....	17.00
No. 3 foundry.....	16.50
Malleable	17.25
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Consumers continue

to take deliveries freely on contracts, but there is little spot business because so many users are covered by contracts. Prices are unchanged.

Semi-Finished Steel.—There is a continued good movement of billets, slabs and sheet bars on third quarter contracts, but little interest is being shown by non-integrated manufacturers in fourth quarter tonnages. The mills have indicated an intention of holding for an advance of \$1 a ton over the third quarter prices, on fourth quarter contracts, but buyers are hesitating about signing up in view of the fact that the recently announced advance in strips does not appear to be holding, while the higher fourth quarter prices on sheets have not yet been seriously tested. Wire rods are fairly active and steady at \$42, base, Pittsburgh.

Bars, Plates and Shapes.—An advance of \$2 a ton now seems to be the plan that some manufacturers will take in respect to prices for fourth quarter contracts. Buyers who contracted for this quarter at 1.90c., base, will be asked to pay 2c., base; while it is said a good many third quarter contracts carried 1.90c., base, it is admitted that the tonnage was small. The more common price was 1.85c., while some of the really large buyers have been drawing against 1.80c. contracts. The latter classes will also be asked to pay an advance of \$2 a ton and the market seems to be shaping for a range of 1.90c. to 2c., instead of a minimum of 2c., as suggested in the announcements which began to appear early in July. Buyers still are drawing heavily against existing commitments, insistence upon third quarter contract specifications by Sept. 10 having stimulated such releases. Some large users of hot-rolled bars have until Sept. 20 in which to place specifications on third quarter contracts, but in shapes and plates the earlier date has been more commonly observed.

Rails and Track Supplies.—The Chesapeake & Ohio Railroad has followed up its recent rail inquiry with one for its fourth quarter requirements of spikes. Otherwise the market for track fastenings is dull and the placing of standard-section rails

for late winter and early spring shipment is yet to get under way.

Wire Products.—Business continues to make a good showing in comparison with this time last year. Fall demands for barbed wire and fencing are expected to be fairly large this year and users of plain wire are ordering with a fair degree of freedom. Nails are moving steadily. Prices still show marked steadiness in all markets except those which ordinarily are irregular on account of the convergence of competition from several producing centers.

Tubular Goods.—Demand holds up well for seamless drill pipe and casing from California, and it is some time since there was as full engagement of productive capacity as at present. The National Tube Co. running at its Lorain, Ohio, plant on a seamless 10 in. oil pipe line to extend from Midland, Tex., to Port Arthur is reported to have produced in excess of 18,000 tons of this size on its No. 2 mill in one month. Lapwelded oil country pipe is dull and butt welded pipe for building and construction is yet to feel the stimulation of the fall heating demands.

Sheets.—The market still is active, as a result of the eagerness of consumers and distributors to get specifications in by Sept. 10, which most mills set as the deadline on third quarter contract tonnage releases on which buyers would be given a discount of 2 per cent for cash in 10 days. One large maker found it necessary to stop taking specifications on automobile body sheets on Sept. 3, because it could not possibly expect to make shipments before the end of the month, when the discount for cash in 10 days goes to one-half of 1 per cent. An interesting phase of the situation is the strong effort made by buyers, who hitherto have been keeping purchases to from two to four weeks' requirements, to contract for all of their fourth quarter needs. Some producers interpret this activity as due to the fact that buyers are expecting higher prices and want to be covered. The more general condition, however, is that mills have taken more business than they can ship in the remainder of this quarter

THE IRON AGE Composite Prices

Finished Steel

Sept. 11, 1928, 2.348c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.348c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.	Feb. 14;	2.314c.	Jan. 3
1927	2.453c.	Jan. 4;	2.293c.	Oct. 25
1926	2.453c.	Jan. 5;	2.403c.	May 18
1925	2.560c.	Jan. 6;	2.396c.	Aug. 18
1924	2.789c.	Jan. 15;	2.460c.	Oct. 14
1923	2.824c.	Apr. 24;	2.446c.	Jan. 2

Pig Iron

Sept. 11, 1928, \$17.46 a Gross Ton

One week ago.....	\$17.34
One month ago.....	17.04
One year ago.....	18.00
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.75,	Feb. 14;	\$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.95c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60 ft. lengths	1.90c.
F.o.b. Pittsburgh mills, cut lengths.....	2.15c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle.....	\$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago	2.10c. to 2.20c.
Bars, Cleveland	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.35c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'l Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.84c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$3.00
2100 (1½% Nickel)	0.55	3.30
2300 (3½% Nickel)	1.50	4.25
2500 (5% Nickel)	2.25	5.00
3100 Nickel Chromium	0.55	3.30
3200 Nickel Chromium	1.35	4.10
3300 Nickel Chromium	3.80	6.55
3400 Nickel Chromium	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100 Chromium Spring Steel	0.20	2.95
6100 Chromium Vanadium Bars	1.20	3.95
6100 Chromium Vanadium Spring Steel	0.95	3.70
9250 Silicon Manganese Spring Steel	0.25	3.00
Chromium Nickel Vanadium	1.50	4.25
Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/8	45	19½	1/4 to 3/8..	+11	+39		
1/4 to 3/8..	51	25½	1/2	22	2		
1/2	56	42½	3/4	28	11		
3/4	60	48½	1 to 1½..	30	13		
1 to 3....	62	50½					

Lap Weld

2	55	43½	2	23	7
2½ to 6..	59	47½	2½	26	11
7 and 8..	56	43½	3 to 6....	28	13
9 and 10..	54	41½	7 to 12..	26	11
11 and 12..	53	40½			

Butt Weld, extra strong, plain ends

1/8	41	24½	1/4 to 3/8..	+19	+54
1/4 to 3/8..	47	30½	1/2	21	17
1/2	53	42½	3/4	28	12
3/4	58	47½	1 to 1½..	30	14
1 to 1½..	60	49½			
2 to 3....	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	28	9
2½ to 4..	57	46½	2½	29	15
4½ to 6..	56	45½	4½ to 6..	28	14
7 to 8....	52	39½	7 to 8....	21	7
9 and 10..	45	32½	9 to 12..	16	2
11 and 12..	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in....	27 1½ in. ....+18
2½ to 3 in....	37 1¾ to 1½ in....+ 8
3 in.	40 2 to 2½ in....— 2
3½ to 3¾ in....	42½ 2½ to 3 in....— 7
4 to 13 in....	46 3¾ to 4½ in....— 9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives 1 Ten
5000 lb. to 12,000 lb....	5 Fives 2 Tens
12,000 lb. to 21,000 lb....	6 Fives 2 Tens & 2½
21,000 lb. and over	7 Fives 2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63 3 in. 48
1¼ to 1½ in....	55 3¼ to 3½ in.... 50
1¾ in.	39 4 in. 53
2 to 2½ in....	34 4½, 5 and 6 in.. 45
2½ to 2¾ in....	42

Hot Rolled

2 and 2½ in....	40 3¾ to 3½ in.. 56
2½ and 2¾ in..	48 4 in. 59
3 in.	54 4½, 5 and 6 in.. 48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads) ..	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

and some makers doubt that there is much likelihood of getting prices up before the first quarter of 1929. Tin mill black plate is firmly held at 2.90c., base, but most of the business in sheets in general is at recent prices.

Tin Plate.—Demand for tin plate is steadily diminishing and mill operations are moving in the same direction. The American Sheet & Tin Plate Co. started this week with a full operation, but expects to take off some mills before the end of the week. Shipments for the year to date have been considerably heavier than in the same period last year and it will take a lean final quarter to wipe out the gain.

Cold-Finished Steel Bars and Shafting.—Business has shown some recession. Evidently, automobile parts makers are well supplied on their orders for this month and are not yet interested in their requirements beyond Oct. 1. Makers report some resistance to higher prices on the part of automobile builders, but there is no evidence of deviations from 2.20c., base, on tonnage to be shipped in the fourth quarter.

Hot-Rolled Flats.—There has been a slight letdown in the orders and specifications for strips. Production plans of automobile builders are not as heavy for October as for this month, and, since there is a lapse of about four weeks between the time the strips leave the mills and appear in automobiles, current orders reflect that fact. One maker of a low-priced car will wind up production on the present series about the middle of October and is taking steel merely in keeping with that plan. It is the hope of producers now that the proposed advance in price for the fourth quarter will be made effective on first quarter of 1929 business.

Cold-Rolled Strips.—Failure of the proposed advance in hot-rolled strips

to become generally effective has made it difficult for makers of cold-rolled strips to raise prices. While the regular quotation is 2.85c., base, the more common maximum is 2.75c., and large consumers are said to have been covered for the fourth quarter at the third quarter price.

Bolts, Nuts and Rivets.—Demand still is more notable for its steadiness than its size. There is no change in prices.

Coke and Coal.—Except for some increase in the demand for coal and coke for household heating purposes, conditions are much as they have been for the past few weeks. Slack coal continues very weak, owing to the fact that the supply is gaining as production of prepared sizes moves up with the demand for household coal. There is not much spot furnace coke, but not much is wanted, and prices hold where they were last week. Offerings of spot foundry coke are quite ample for all requirements, with prices unchanged.

Old Material.—Prices continue to work higher, with real strength showing in machine shop turnings, which have been sold in the past week at as high as \$12, and in blast furnace grades, which have climbed to \$13, these prices representing an advance of \$1.50 a ton from those of a week ago. Dealers still report that it is easier to sell than to buy heavy melting steel, and, because of the scarcity of that grade, compressed sheets, which rank with the heavy melting grade, are bringing the same price. It was believed that the Pennsylvania Railroad heavy melting steel would sell well above \$17; while some of it went to one point in the district at \$17.08 per gross ton, most of the lot sold at \$16.80 to \$16.90. These prices, however, were fully \$1 a ton over those realized on the August list.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$16.50 to \$17.00
Scrap rails	16.00 to 16.50
Compressed sheet steel.....	16.50 to 17.00
Bundled sheets, sides and ends	15.00 to 15.50
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	16.75 to 17.25
Heavy breakable cast.....	12.75 to 13.25
No. 2 railroad wrought.....	16.50 to 17.00
Heavy steel axle turnings.....	14.50 to 15.00
Machine shop turnings.....	11.50 to 12.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers.....	17.50 to 18.00
Railr. coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 20.50
Low phos., mill plates.....	18.50 to 19.00
Low phos., light grade.....	17.50 to 18.00
Low phos., sheet bar crops.....	18.50 to 19.00
Hvy. steel axle turnings.....	14.50 to 15.00

Electric Furnace Grades:

Low phos. punchings.....	17.50 to 18.00
Hvy. steel axle turnings.....	14.50 to 15.00

Blast Furnace Grades:

Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings.....	12.50 to 13.00
No. 2 busheling.....	11.00 to 11.50

Rolling Mill Grades:

Steel car axles	18.50 to 19.00
No. 1 railroad wrought.....	12.50 to 13.00
Sheet bar crops.....	16.50 to 17.00

Cupola Grades:

No. 1 cast.....	15.00 to 15.50
Rails 3 ft. and under.....	16.50 to 17.00

Steel Corporation's Orders Increase in August

An increase in unfilled orders on the books of the United States Steel Corporation was recorded in August. The total on Aug. 31 was 3,624,043 tons, compared with 3,570,927 tons on July 31—an increase of 53,116 tons. In July there was a decrease from June of 66,082 tons. A year ago, on Aug. 31, the unfilled orders were 3,196,037 tons. The table gives the reported figures for the last 20 months.

		1928	1927
Jan.	31.....	4,275,947	3,800,177
Feb.	28.....	4,398,189	3,597,119
Mar.	31.....	4,335,206	3,553,140
April	30.....	3,872,133	3,456,132
May	31.....	3,416,822	3,050,941
June	30.....	3,637,009	3,053,246
July	31.....	3,570,927	3,142,014
Aug.	31.....	3,624,043	3,196,037
Sept.	30.....	.....	3,143,113
Oct.	31.....	.....	3,341,040
Nov.	30.....	.....	3,454,444
Dec.	31.....	.....	3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

20,000 Tons of Steel in New York Water Tunnel

The New York Board of Water Supply will receive bids on Sept. 25 on 20,523 tons of iron and steel which will be required for a water tunnel extending from Yonkers, N. Y., to Brooklyn. The project, which will be let in four sections, will require five years for completion. According to official estimates, the steel requirements will be as follows: 2950 tons of structural steel shapes; 2750 tons of steel roof supports; 3625 tons of interlocking steel plates; 2850 tons of reinforcing bars; 3490 tons of sheet steel piling; 117 tons of gratings, ladders, doors and frames; 768 tons of miscellaneous cast iron, wrought iron and steel; 213 tons of cast steel pipe and fittings; 170 tons of cast iron pipe and fittings; 190 tons of steel pipe conduits; 50 tons of galvanized steel sheets, and 3350 tons of valves and fittings, the last item to be purchased directly by the city.

L. C. L. Freight Rate to Virginia and Maryland Increased

WASHINGTON, Sept. 11.—In a decision made public yesterday the Interstate Commerce Commission found justified the proposed tariff of the Pennsylvania Railroad to increase the rate on iron and steel articles, in less than carloads, from Pittsburgh and certain points in Pennsylvania eastward to Norfolk, Va., and points in Virginia and Maryland on the Delaware-Maryland-Virginia peninsula. The new schedule, effective Sept. 18, increases the present fourth class rate of 47.5c. per 100-lb., to 48c.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 34.00
Forging, ordinary.....	38.00
Forging, guaranteed.....	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.....	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus.....	89c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25

Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Chgo ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis..	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines ..	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines..	90c. to 1.00
Gas slack, f.o.b. W. Pa. mines....	1.00 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	\$23.00
6%	24.00
7%	25.00
8%	26.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal, del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltitium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	————
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	\$40.00
Standard size	\$45.00

Chrome Brick

	Per Net Ton
Standard sie	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*.....	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E..	70
Stove bolts in packages, Pittsburgh. 80, 10 and 2½	
Stove bolts in packages, Chicago. 75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago. 75, 20, 10, 5 and 2½	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base Per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut threads.....	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread..	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Producers Announce 2.10c. as Price on Plates, Shapes and Bars—Backlogs Have Increased

CHICAGO, Sept. 11.—Chicago producers of plates, shapes and bars have named 2.10c. per lb. as the price effective from Sept. 10. Backlogs have grown measurably in recent weeks and deliveries have been extended to the range of three to five weeks and so forecast shipments of lower priced steel after the opening of the final quarter. Prices that previously had been named to fabricators on special jobs are being held open to Sept. 15, but it remains to be seen what tangible results will come from this favor because of the general tightening of loans for building construction. Spot purchases of finished steel are less numerous and orders for delivery after Oct. 1 are so few and small that there is little or no gage by which to judge the strength of the new quotations. Taken as a whole, sales compare favorably with the average week so far this year. A fair sprinkling of miscellaneous rail orders is holding rail output at 50 per cent of capacity, while ingot production is a shade above 80 per cent of practical mill rating.

September shipping schedules for manufacturers of automobiles are larger for the industry as a whole, and farm implement plants are not only holding to a high rate of output but are now studying steel requirements for the manufacture of tillage machinery for spring delivery.

No. 8 furnace at South Chicago has been blown out for relining. The leading producer now has 14 stacks in blast and one is banked for the district as a whole, 23 of 36 furnaces are in use. A merchant pig iron stack has been added to the active list.

The Sinclair Pipe Line Co. has placed 50,000 tons of steel pipe, half with the National Tube Co. and the remainder divided between the Jones & Laughlin Steel Corporation and the Bethlehem Steel Co., for increasing the capacity of an oil trunk line from Oklahoma to Chicago.

Ferroalloys.—Ferromanganese is reported stronger at \$105, seaboard. Specifications for spiegeleisen are heavier but sales are light at \$32 to \$33, Hazard, Pa., for the 19 to 21 per cent grade. Release orders against ferrosilicon contracts are more numerous.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Pig Iron.—A Federal furnace was lighted Sept. 13, thus bringing into use the full capacity of merchant stacks in the immediate vicinity of Chicago. Prices are strong at \$18 a ton, local furnace, for No. 2 iron. Several sizable contracts for fourth quarter delivery have been closed, but buying is mostly confined to spot purchases. The strength of the market, expanding shipments and low furnace stocks discount statements that buying in recent weeks was on a speculative basis. It is admitted by sellers that a few users may have overbought, but some observers believe that buyers are still cautious and that even a continuation of the present rate of melt will bring a large fill-in tonnage into the market before the end of the year. Silvery sales are active, with prices generally maintained except on the higher silicon grades. Curtailment of output may

strengthen quotations. A few scattered sales of charcoal iron are reported.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	22.26
So'th'n No. 2 (barge and rail)	21.76
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—A Western manufacturer of electrically welded steel pipe is negotiating for about 110,000 tons of plates needed for a 24-in. gas line, which will extend from Amarillo, Tex., to Omaha, Neb. The Sinclair Pipe Line Co., a joint subsidiary of the Sinclair Consolidated Oil Corporation and the Standard Oil Co. of Indiana, has ordered 50,000 tons of 8, 10 and 12-in. lapweld pipe for a line to extend from Oklahoma to Chicago. The business was divided among the National Tube Co., Bethlehem Steel Co. and Jones & Laughlin Steel Corporation. Miscellaneous oil tank orders for the Chicago territory have added 2500 tons to plate makers' books. Plate mills in this district are busy; notwithstanding that car shops are operating at a low rate and that fabricators are making greater use of special shapes, thus eliminating many narrow plates. Demand is sustained from the oil industry, which has found large needs for welded pipe and for added oil storage facilities. Steel orders for tank construction this year are running fully 50 per cent heavier than in 1926, which was considered a good year. Sept. 10 was the closing date on specifications against purchases at third quarter prices, and sellers are now asking 2.10c. per lb., Chicago. With deliveries averaging three weeks or more, it is evident that shipments against 2c. purchases will be carried beyond Sept. 30. The Great Northern has ordered 500 flat cars from the Standard Steel Car Co. and will build 500 box cars and 2000 un-

derframes in its shops at Superior, Wis. The bulk of the 21,000 tons of steel needed for this equipment will be rolled by Western mills.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Deliveries of soft steel bars are extending. Several automobile manufacturers, whose production of new models is under way, are expanding operations, bringing the general demand for steel from that source to a slightly higher level than in the previous week. Ford output is creeping up, though one of its competitors is taking less steel while models are being changed. Tractor plants are operating full and farm implement manufacturers are now preparing to produce tillage machinery that will be needed for spring delivery. Mills are asking 2.10c. per lb., Chicago, for soft steel bars. Sales, however, are not affording real tests of the higher quotations. Fourth quarter contracting for alloy steel bars is under way at the advance of \$2 a ton. Specifications are steady and output has been increased to 90 per cent of capacity. Demand for rail steel bars is unchanged; both local mills are operating double turn.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Structural Material.—Producers are asking 2.10c. per lb., though protection is being extended to Sept. 15 to fabricators who have quoted on special jobs. Sales at the new prices are not numerous and the market needs further tests.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Sheets.—Because of warm weather, output in the past week has not gone above 80 per cent of hot mill capacity. Producers have tonnage on their books to warrant full operation of all units. Prices are firm, though current sales are not heavy and shipments are largely against old obligations. Fourth quarter contracting is moving slowly, and it is noticeable that individual commitments for the final period are smaller than in the third quarter, lending weight to the general impression that heavy specifications now foretell building up of stocks against a part of buyers' fourth quarter requirements. Users are issuing liberal specifications, and deliveries have lengthened to three to five weeks for all finishes. Old obligations that have been drawn against heavily in the past few weeks are dwindling. Third quarter contracts probably will be taken out in full. Though little resistance to new prices is offered, buyers generally are objecting strenuously to the lower discount for cash.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Two lettings of moderate size have given a little life to this market, which has been unusually dull for several weeks. The State of Illinois has ordered 700 tons of 10 to 16-in. pipe for delivery at Joliet, Ill. The American Cast Iron Pipe Co. was given the order for 10 and 12-in. pipe and the United States Cast Iron Pipe & Foundry Co. was awarded the larger sizes. James B. Clow & Sons have been awarded 7000 ft. of 6-in. and 2000 ft. of 8-in. centrifugal cast pipe for Appleton, Wis. Among fresh inquiries is 500 tons of 20-in. pipe for Portsmouth, Ohio. Milwaukee will buy 825 tons of 42-in. pipe and 34 tons of special fittings. A few contractors are still busy and have work ahead well up to early winter. Many of them are seeking small contracts to fill out the next two or three months of pipe laying weather. Prices are firm at \$34 to \$35, Birmingham, for diameters 6 in. and larger.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Hot-Rolled Strip.—Western producers are ready to accept fourth quarter contracts for this commodity at 2c. to 2.30c. per lb., Chicago. Current specifications are large from practically all classes of users. Forward buying is light.

Reinforcing Bars.—Although close to 1300 tons of rail steel reinforcing bars was placed in the past week, there is a growing impression that various conditions are holding building operations in check. Loans for building projects are more difficult to obtain and there are some who attribute quieter business to the approaching presidential election. Fresh inquiry is much lighter in both small and large jobs, and several heavy tonnage projects have been temporarily shelved. Shop operations, under the impetus of a uniform flow of business in the late summer months, remain steady. Prices lean toward weakness. Recent contracts and fresh inquiry are shown on page 676.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.20c. to 2.80c.
Reinforc'g bars, rail steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank... 60	
Hot-pressed nuts, hex., tap. or blank... 60	
No. 8 black ann'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Old Material.—Prices for practically all grades are nominal. Dealers are paying higher prices and railroads are making sales at figures well above recent levels. Steel plants, having reduced the use of pig iron, are more interested in scrap, and rejected cars, instead of being turned away, are being taken in at a cut in price. Manufacturers' scrap is more plentiful, and railroad lists, including 5000 tons offered by the Santa Fe and 6000 tons by the Illinois Central, are numerous.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$13.00 to \$13.50
Shoveling steel.....	13.00 to 13.50
Frogs, switches and guards, cut apart, and misc. rails	14.75 to 15.25
Hydraulic, compressed sheets	11.50 to 12.00
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels.....	16.50 to 17.00
Railr'd tires, charg. box size.....	16.50 to 17.00
Railr'd leaf spring cut apart.....	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs.....	17.50 to 18.00
Electric Furnace Grades:	
Axle turnings.....	13.00 to 13.50
Low phos. punchings.....	15.00 to 15.50
Low phos. plate, 12 in. and under.....	15.00 to 15.50
Blast Furnace Grades:	
Axle turnings.....	10.00 to 10.50
Cast iron borings.....	9.75 to 10.25
Short shoveling turnings.....	9.75 to 10.25
Machine shop turnings.....	6.75 to 7.25
Rolling Mill Grades:	
Iron rails.....	14.75 to 15.25
Rerolling rails.....	16.00 to 16.50
Cupola Grades:	
Steel rails less than 3 ft.....	16.50 to 17.00
Angle bars, steel.....	15.50 to 16.00
Cast iron carwheels.....	13.50 to 13.75
Malleable Grades:	
Railroad.....	14.50 to 15.00
Agricultural.....	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heav.....	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms.....	20.00 to 20.50
Iron car axles.....	24.50 to 25.00
Steel car axles.....	16.50 to 17.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.50 to 12.00
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth.....	12.50 to 13.00
Pipes and flues.....	9.00 to 9.50
Cupola Grades:	
No. 1 machinery cast.....	15.00 to 15.50
No. 1 railroad cast.....	13.75 to 14.25
No. 1 agricultural cast.....	13.00 to 13.50
Stove plate.....	10.75 to 11.25
Grate bars.....	12.00 to 12.50
Brake shoes.....	10.25 to 10.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—Specifications from the manufacturing trade show variation from last week, and it is thought by some that requirements are lighter. A check on demand from the automobile trade, one of the most active users, indicates that as a whole there is no slackening in the rate of deliveries. Fourth quarter contracting is being done at a satisfactory rate, but it will be a week or 10 days before it will reach a peak. Orders from jobbers are numerous, but are usually of small size. An increased demand for woven wire fencing is noticed in the South, following the announcement of spring terms on that commodity. Prices are steady. Output at 65 per cent of wire mill

capacity is slightly higher than the current rate of shipments, as producers attempt to expand stocks against the fall demand which is expected to develop soon. Prices for wire products are given on page 659.

Rails and Track Supplies.—Miscellaneous standard-section rail orders in the week totaled 16,000 tons. These orders, added to those placed in recent weeks, bring the aggregate for immediate rolling to 23,000 tons. The bulk of this tonnage has been promised for delivery in 30 days, and local rail mills, though having, practically completed former obligations, are holding operations at 50 per cent of capacity. The 45,500 tons needed by the Chesapeake & Ohio is still before producers. Fresh inquiry this week is for 6500 tons for the Hocking Valley. Over 4000 tons of track accessories have been specified in the week. Further evidence is at hand that the fall rail buying movement will soon get under way. Demand for light rails is small and shipments are confined almost wholly to carloads.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Purchasers are being offered fourth quarter contracts at unchanged prices. Specifications are steady and the industry continues to produce at between 60 and 65 per cent of capacity.

Coke.—Shipments of by-product foundry coke are growing heavier as the foundry melt expands. Producers are drawing on stocks to meet shipping instructions. Prices are firm at \$8 a ton, f.o.b. local ovens.

Railroad Equipment

Great Northern Orders 1000 Cars and 2000 Underframes

THE Great Northern's orders for 1000 freight cars, divided equally between an outside maker and its own shops, and 2000 underframes to be built in its own shops were the feature of the week's car business. The Canadian National is inquiring for 55 locomotives and the Denver & Rio Grande Western for 10 to 15. Details of the week's business follow:

Great Northern has ordered 500 flat cars from Standard Steel Car Co. and will build 500 box cars and 2000 underframes in its Superior, Wis., shops.

Chicago, Indiana & Louisville will build 100 box cars in its own shops.

Republic Iron & Steel Co. has ordered repairs to four air-dump cars from Clark Car Co.

Canadian National is inquiring for 55 locomotives.

Bangor & Aroostook has ordered one Mogul type locomotive from American Locomotive Co.

Central of Porto Rico has ordered one Mogul type locomotive from Baldwin Locomotive Works.

Denver & Rio Grande Western is asking bids on 10 to 15 locomotives.

Philadelphia

Steel Company Buys 15,000 Tons of Basic Pig Iron—Heavy Steel Scrap Sold at Higher Prices

PHILADELPHIA, Sept. 11.—Consumers are continuing to issue heavy specifications against current contracts, but except for some sheet contracting, with full specifications for delivery before Oct. 1, not much interest in fourth quarter has been exhibited by steel users. Bar and plate mills are well filled with tonnage and are approaching the period of last quarter contracting with confidence that prices will be maintained at 1.90c. to 2c., Pittsburgh, on bars and 2.05c. to 2.15c., Coatesville, on plates. Sheet mills also have fair backlogs, which have placed them in a more independent position than in many months. Users have specified freely against third quarter contracts and have in many cases anticipated at least part of their last quarter sheet requirements to obtain the 2 per cent discount for cash, which terminates Oct. 1.

Since the recent flurry of buying in foundry pig iron for fourth quarter delivery at \$19.50 per ton, base, which culminated in an advance by furnaces in this district to \$20, base, the market has become quieter. Iron and steel scrap continues strong and consumers in eastern Pennsylvania are beginning to seek new contracts at the higher levels established by dealer buying in the past fortnight.

Pig Iron.—Consumers of foundry iron have apparently covered their requirements for at least part of the next quarter at the former quotation of \$19.50 per ton, base, so that \$20 per ton, the present quotation, is untested except on occasional carload lots for prompt shipment. Most sellers still have some \$19.50 per ton offers outstanding, of which buyers are expected to take advantage in the next few days. The purchase last week of about 25,000 tons of basic iron by a Coatesville consumer has completed coverage of eastern Pennsylvania users of this grade for the next few months. Recent buying of basic was at a range of \$18.75 to \$19.25 per ton, delivered, but makers are now quoting \$19 to \$19.50 per ton, which is not likely to be subjected to an early test.

Prices, per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26 to \$20.76
East Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.26
East. Pa. No. 1X.....	21.26 to 21.76
Basic (del'd east. Pa.)...	18.75 to 19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)...	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates; 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Mills are well booked with tonnage specified on present contracts, but orders for prompt shipment are few and buyers have not expressed much interest in their last quarter requirements. Within the next week or 10 days a development of fourth quarter inquiry is expected, and with mills in a good position, prices are expected to be from 1.90c. to 2c., Pittsburgh, or 2.22c. to 2.32c., delivered Philadelphia.

Shapes.—Less than 1.95c. per lb., Pencoyd, Pa., or 2.01c., Philadelphia, on shapes has about disappeared, but an advance to 1.90c., Pittsburgh, or 2.05c., Bethlehem, is not considered

likely for the present, as mills are in most cases quoting from 1.95c. to 2.05c., Pencoyd, or 2.01c. to 2.11c., delivered Philadelphia. Large fabricators are booked with tonnage to carry them to the end of the year and fabricated steel prices on sizable projects are reported slightly stronger on recent bidding.

Plates.—Mills are well filled with specifications for delivery on current contracts, in addition to which some sizable tonnages of plates have recently been booked from large buyers. Interest in fourth quarter contracting has not yet developed, but 2.05c. to 2.15c., Coatesville, or 2.15c. to 2.25c., delivered Philadelphia, is generally considered by mills as the probable range of quotations.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.60c.
Plates, ⅜-in.....	2.80c.
Structural shapes.....	2.60c.
Soft steel bars, small shapes, iron bars (except bands).....	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 2.75c.
Cold-fin. steel, rounds and hex....	3.45c.
Cold-fin. steel, sq. and flats.....	3.95c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24).....	3.85c.
†Galvanized sheets (No. 24).....	4.50c.
Blue ann'l'd sheets (No. 10).....	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c. to 5.80c.
⅝-in.	5.50c. to 6.00c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Sheets.—Recent buying, on which specifications for September delivery have been given, has been fairly active, and with some consumers already covered at the present prices on part of their last quarter requirements, a smaller tonnage is generally expected on contracts for fourth quarter shipment. Galvanized sheets are quoted at 3.50c. to 3.60c. per lb., Pittsburgh, but 3.40c. per lb. has not entirely disap-

peared. Black sheets seem to be quite firm at 2.75c., per lb., Pittsburgh. Blue annealed prices range from 2c., base Pittsburgh, on widths up to 45 in., to 2.10c., base, on wider than 45 in.

Warehouse Business.—Jobbers in this district have advanced structural shapes and plates to a minimum of 2.60c. per lb., base, and have included them in the quantity differential applied for several months to bars and bar-size shapes.

Imports.—In the week ended Sept. 8, 3763 tons of chrome ore arrived at this port from Cuba. Steel imports consisted of 182 tons of bars, of which 93 tons was from Sweden, 45 tons from France and 44 tons from Belgium. Other arrivals from Belgium were 44 tons of structural shapes and 10 tons of bands. Steel billets totaling 56 tons came from Sweden and 32 tons of steel scrap from Germany.

Old Material.—A purchase of a few thousand tons of heavy melting steel by a nearby steel plant at \$15 represents a full \$2 a ton advance in this market. Although the nominally quoted price of \$13 has not been tested in many weeks by transactions, the continually increasing strength in other markets, particularly Pittsburgh, has made it necessary for brokers to advance their quotations. On the Pennsylvania Railroad list \$16.85 and \$17.10 per ton, delivered to mills in the Pittsburgh district, is reported to have been bid on the heavy melting steel. Heavy breakable cast has been bought at \$16 and stove plate at \$12 per ton by a Harrisburg consumer, and a Phoenixville mill has paid \$11.50 per ton for machine shop turnings, an advance of 75c. per ton from its previous price. Specification pipe has registered a rapid upward trend on recent sales to consumers, who have paid \$14, \$14.50 and \$15 per ton, delivered. Nearly all grades of scrap show advances of 50c. to \$1 a ton and sellers express the opinion that an eastern Pennsylvania mill buying No. 1 heavy melting steel today would find it necessary to pay close to \$16 a ton to secure more than a limited tonnage.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.....	\$15.00
Scrap T rails.....	\$14.00 to 14.50
No. 2 heavy melting steel.....	11.00 to 12.00
No. 1 railroad wrought.....	14.00 to 15.00
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)...	11.00
Heavy breakable cast (for steel works).....	16.00
Railroad grate bars.....	11.50 to 12.00
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under.....	17.50 to 18.00
Couplers and knuckles....	15.00 to 15.50
Rolled steel wheels.....	15.00 to 15.50
No. 1 blast f'nace scrap...	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50 to 15.00
Shafting	17.00 to 17.50
Steel axles	19.00 to 20.00
No. 1 forge fire.....	11.00 to 11.50
Cast iron carwheels.....	15.50 to 15.75
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling....	15.00 to 15.50

New York

Plates, Shapes and Bars Advanced \$2 for Fourth Quarter— Pig Iron Market Still Active

NEW YORK, Sept. 11.—Pig iron bookings by local selling offices totaled 12,000 tons. The flow of business is still in good volume, although most of the larger buyers are now covered for the fourth quarter. The Central Foundry Co. has closed against its inquiry for 6000 tons for its Dundalk, Md., plant, having bought some foreign iron in addition to tonnage from the New England stack and another Northern producer. Other orders recently placed include 4000 tons for the Richardson & Boynton Co., New York, and 1500 tons for the Burnham Boiler Corporation, Irvington, N. Y. Pending inquiries include one from a consumer in this territory for 4000 tons and another for 1500 tons for shipment outside this district. Numerous small lots are before the trade, possibly totaling 2000 tons. Prices show increasing strength. Some sellers are holding to a minimum of \$17, base Buffalo, on foundry iron, and an increasing number of orders are being taken on that basis, but quotations 50c. lower have not entirely disappeared. Eastern Pennsylvania foundry iron ranges from \$19.50 to \$20, base furnace. The peak of the wheat movement on the State barge canal has passed, and from now on water shipments of pig iron are expected to gain. Foundry melt continues to increase. Shipping instructions for pig iron are heavier, and specifications for foundry coke, a commodity which is not stocked to any extent, have shown a steady gain since the middle of August.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$21.41 to \$21.91
*Buf. No. 2, del'd east N. J.	19.78 to 20.28
No. 2, del'd east. N. J. tidewater	19.51 to 20.01
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—New business in ferromanganese is confined to carload and small lots, mostly for early delivery, at \$105, seaboard basis. Specifications with most consumers covered by contract for the remainder of the year, are very heavy. Sales of spiegeleisen are fairly numerous in carload and small lots and there has been some business done in the imported alloy. Quotations are very firm at \$33, furnace, for the 19 to 21 per cent grade, and \$32 for the other.

Plates, Shapes and Bars.—The attitude of steel producers on fourth quarter prices has been clarified within the past week. Instead of an advance to 2c. for all buyers there will be a \$2 a ton rise for all buyers above the prices which applied on their

third quarter contracts. This will make the minimum 1.90c., Pittsburgh, for large buyers, many of whom have been getting their steel through this quarter at 1.80c. The majority of users, however, have paid 1.85c., while small or occasional buyers have been

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	.60
1 x 16 in. and smaller	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12

Wrought Iron—

½-in. butt	5	+19
¾-in. butt	11	+9
1-1½-in. butt	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.	
No. 22	3.75c. to 3.95c.	
No. 24	3.80c. to 4.00c.	
No. 26	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

charged 1.90c. Thus, the fourth quarter range, if the advances become effective, will be 1.90c. to 2c. Eastern plate and shape mills have regarded the third quarter price as 2c. at Eastern mill basing points, though some large buyers have been protected at less. The probable range on these products is 2.05c. to 2.15c., Coatesville, on plates and the same at Bethlehem on shapes. A week of fairly heavy specifications has resulted from the insistence of some mills that consumers specify their third quarter tonnages in full by Sept. 10. The mills which had this clause in their contracts report a very general observance of the stipulation, but other mills which did not make this provision have received smaller specifications in the first 10 or 11 days of September than the average for August. It is certain, however, that practically all mills will insert such a clause in their fourth quarter contracts, calling for complete specifications by Dec. 10. For delivery over the rest of this month, plates and shapes are available at the prices which have recently been in effect. Structural steel lettings in the metropolitan district in August for buildings (and exclusive of subways, bridges, etc.) totaled 43,350 tons, the Structural Steel Board of Trade reports. The July total was nearly 71,000 tons, while in August, last year, 32,000 tons was put under contract. Awards of the week included 8100 tons for a garment building in New York, 3000 tons for an apartment building in Tudor City and 2500 tons for a plant addition for the Western Electric Co., Kearny, N. J. The Board of Water Supply, New York, will take bids until Sept. 25 on about 20,000 tons of steel fabricated material for a water tunnel to extend from Yonkers to Brooklyn. The railroad equipment market is quiet except for an inquiry for 55 locomotives from the Canadian National Railways.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; struc. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Reinforcing Bars.—In line with the fourth quarter advance in merchant bar prices, reinforcing bars will be advanced \$2 a ton on Sept. 15, although consumers will be given until Oct. 1 to take advantage of prices on business outstanding. On the new basis the price will be 2c., Pittsburgh, for 40, 50 and 60-ft. lengths which are available for direct mill shipment, while 2.25c., Pittsburgh mill warehouse, or 2.59c. on cars at New York, will be quoted on cut lengths. This practice of no longer quoting the mill price on cut lengths, which was adopted by distributors in this territory on Aug. 1, is designed to divert to the distributors small tonnages formerly shipped directly from the mills, and is being generally adhered to. New York warehouse prices are not being changed at present. Approximately 2850 tons of bars will be required for a water tunnel extending from Yonkers to Brooklyn, for which bids will be taken by the Board of

Water Supply, New York, on Sept. 25. The Packard garage and service station in Manhattan will take 1000 tons, and Government barracks on Governor's Island, 500 to 600 tons. Bars for a walk at Rockaway Beach, N. Y., calling for 350 tons, are reported to have been placed with E. T. Edwards, Columbia, Pa.

Pipe.—The Sinclair Pipe Line Co., New York, has divided an order for 50,000 tons of 8, 10 and 12-in. lap-welded pipe among the National Tube Co., the Bethlehem Steel Co. and the Jones & Laughlin Steel Corporation. The pipe is to be used for a line from Oklahoma to Chicago.

Sheets and Strip Steel.—Fairly heavy specifications for sheets against third quarter contracts have been received within the past week by mills whose contracts contained a clause requiring customers to specify not later than Sept. 10. This also was the last opportunity for buyers to take advantage of the 2 per cent discount for cash, which will not be effective after Oct. 1. Most of the sheet mills now have sufficient bookings to insure continuous rollings at high capacity for the remainder of this month and well into next month. Meanwhile, fourth quarter contracting is not of much interest to consumers and probably will not be until they get toward the end of their present commitments.

Warehouse Business.—Buying is at about the same rate as during August and except for concessions on black and galvanized sheets, quotations are well maintained. Galvanized sheets are in active demand, and most of the price shading seems to be in the metropolitan district, where concessions from 4.50c. per lb., base, are offered on desirable business. Black sheets are occasionally shaded from 3.80c. per lb., base, but demand is small. In local New Jersey 4c., base, for black and 4.70c., base, for galvanized are fairly well maintained.

Cast Iron Pipe.—The price situation is substantially unchanged, with Southern makers of pressure pipe quoting \$34 to \$35 per ton, Birmingham, which is occasionally shaded in this district to supply small additional needs of customers, and Northern foundries quoting from \$35.60 to \$37.60 per net ton, New York. Most of the current orders for pipe are small, but the aggregate is fair. Contractors' bids asked by the Department of Water Supply, Gas and Electricity, New York, involving about 2000 tons of pipe, brought out low bids by Michael De Stefano, St. George, Staten Island, and the Riverdale Water Works Corporation, New York. Included in a tunnel from Yonkers, N. Y., to Brooklyn, bids on which are to be opened Sept. 25, are 170 tons of cast iron pipe and 3350 tons of valves and fittings.

Prices per net ton, deliv'd New York:
Water pipe, 6-in. and larger, \$35.60 to \$37.60; 4-in. and 5-in., \$40.60 to \$42.60; 3-in., \$50.60 to \$52.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Deliveries of by-product foundry coke are more protracted, with practically all ovens heavily

booked with tonnage for delivery until the end of the year. Connellsville coke prices are firm, but unchanged at \$2.75 to \$3 per ton, Connellsville, for standard furnace and about \$3.75 per ton for standard foundry. Special brands of foundry coke are \$4.85 per net ton, ovens, and delivered prices are \$8.56 per net ton, to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Eastern Pennsylvania consumers of scrap are beginning to buy at the higher prices established recently by dealer and broker activity in filling old contracts, and the market is advancing rapidly. No. 1 heavy melting steel has been bought by a Claymont, Del., consumer at \$14.75 and \$15 per ton, delivered, and brokers are paying as much as \$14.75 per ton, delivered, to fill these orders. Brokers buying for shipment to western Pennsylvania are paying as much as \$11.25 per ton, New York, or with a \$5.30 freight rate, \$16.55 per ton, delivered. Bids for the heavy melting steel on the Pennsylvania Railroad list are reported as \$16.85 and \$17.10 per ton, delivered to western Pennsylvania mills. Stove plate has been bought by a Harrisburg user at \$12 and

brokers are paying as much as \$12.50 per ton on this delivery. Heavy breakable cast has advanced on a recent sale to \$16 per ton, delivered eastern Pennsylvania, and machine shop turnings have been bought by brokers, at \$11.50 per ton, delivered Phoenixville, Pa., on an order at the same price. All other grades show corresponding advances of 50c. to \$1 a ton, based on buying prices of brokers and new purchases by consumers.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$10.75 to \$11.25
Heavy melting steel (yard)	7.25 to 8.00
No. 1 hvy. breakable cast	11.75 to 12.50
Stove plate (steel works)	8.25 to 8.75
Locomotive grate bars	8.25 to 8.75
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furn. or steel works)	6.50 to 7.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles	16.75 to 17.25
Iron car axles	24.75 to 25.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.25 to 10.75
Forge fire	7.25 to 7.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrot, long	8.50 to 9.00
Rails for rolling	11.00 to 11.50
Cast iron carwheels	13.00 to 13.50
Stove plate (foundry)	8.75 to 9.25
Malleable cast (railroad)	10.00
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	\$16.00 to \$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.)	
cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Cleveland

Heavy Specifications on Third Quarter Contracts For Plates, Shapes, Bars and Sheets—Pig Iron Advanced

CLEVELAND, Sept. 11.—Heavy specifications came out during the week for steel bars, structural material and plates against contracts that required specifications to be in by Sept. 10. Some of the mills had set Sept. 15 as the last day for accepting specifications. While in certain cases mills have granted a little more time because of resistance of buyers, the plan of fixing a deadline for specifications so that consumers cannot rush in during the last days of the month is generally meeting with success and apparently little tonnage will remain unspecified after this week. The higher prices quoted for the last quarter materially help to bring out specifications against expiring contracts. Because of the forcing out of specifications, many consumers for a time will carry larger stocks than they have recently.

While a few fourth quarter contracts have been taken, the price advance has not yet been given much of a test. However, the market has a firm tone, and steel bars, structural material and plates evidently will become established at \$2 a ton higher than the prices that prevailed during the present quarter, which means a range of 1.90c. to 2c., Pittsburgh.

Some of the outside mills that are using Cleveland as a basing point for steel bars, with a 5c. per 100 lb. differential over the Pittsburgh base, are quoting bars at 1.95c. to 2.05c., Cleveland, for the last quarter and are asking the same prices for current orders. A local mill which has been on a 1.85c., Cleveland, base for steel bars has not yet announced its last quarter price. Plates are still available at 1.85c., Pittsburgh. This product is being quoted by one Ohio mill at 1.95c., Pittsburgh, for last quarter on round lots.

The demand for steel from the automotive industry, including the Cleveland parts makers, continues heavy, and one large car builder has increased shipping orders.

Structural lettings during the week included 4000 tons for a building for the B. F. Goodrich Co., Akron, the steel for which will be divided equally between the Carnegie Steel Co. and the Bethlehem Steel Co.

Pig Iron.—Cleveland furnaces today advanced foundry and malleable iron for local delivery 50c. a ton to \$18, furnace, and expect shortly to make a similar advance to \$17.50 for outside shipment. The market still shows considerable activity, although buying further declined in the past week. Cleveland interests sold 33,000 tons during the week, but less than 3000 of this was taken by furnaces located in Cleveland. Consumers in this territory are mostly covered. One local producer is virtually out of the mar-

ket and another is showing less disposition than recently to take business in outlying competitive points. Furnaces in this district are now adhering to full silicon differentials. Buf-falo furnaces which recently advanced foundry iron to \$17.50 are specifying in their contracts that all iron carried over to the first quarter will be billed at \$18. This, it is expected, will have a tendency to check speculative buying and cause some consumers to take iron more promptly than they might otherwise. One producer of Ohio silvery iron has withdrawn prices and there is talk of an advance on that grade. Specifications from the motor car industry continue heavy.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.50
S'th'n fdy., sil.	1.75 to 2.25	22.25
Malleable		18.50
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace	\$16.25 to	16.50
Stand. low phos., V'ley fur.	26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have reestablished for the fourth quarter the present discount of 70 per cent off list for bolts and nuts. This discount has been in effect since the present list was adopted, April 1, 1927. Present prices were reaffirmed in spite of the expectation of manufacturers that they will have to pay more for steel bars for the coming quarter. However, wire, which is used for much of their product, will cost no more than during the present quarter. While rivet manufacturers have not announced their prices for the last quarter, they will probably reestablish the present base of \$2.90, Pittsburgh and Cleveland, for large rivets. Bolt and nut orders this month are not starting out quite as well as in August.

Iron Ore.—The movement continues heavy, and some consumers have recently increased shipping orders. Ore on Lake Erie docks Sept. 1 was 5,718,482 tons, compared with 6,074,966 tons on the same date a year ago.

Sheets.—Demand from the automotive industry continues heavy, and considerable business in auto body sheets has been taken for October shipment at the 4c. price, which was reestablished for the last quarter. There has been no test of the advanced prices on other grades for the next quarter. Mills that set Sept. 10 as the deadline for specifications on contracts have got most of their

Warehouse Prices, f.o.b. Cleveland

Base per Lb.	
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.40c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

specifications in, although they met with some resistance from buyers. However, some of the mills did not include this restriction in their contracts and will accept specifications through this month. Prices for current orders are unchanged at 2.65c., Pittsburgh, for black, 1.90c. to 2c. for blue annealed, and 3.40c., Pittsburgh, and 3.50c., Valley, for galvanized.

Strip Steel.—Orders are still heavy, particularly for hot-rolled strip. Not much new business is coming out in hot-rolled material at regular prices as the larger buyers will be carried through the last quarter at the old prices. The new card of extras making one base price for all gages and widths will probably be placed in effect by some of the mills Oct. 1. Cold-rolled strip appears to have been definitely established at 2.75c., Cleveland, for the fourth quarter for the larger buyers and old customers, thus making the recent advance to 2.85c. applicable only to small-lot business. The 2.65c. price that prevailed recently seems no longer in evidence.

Old Material.—The market is very firm and the top prices that prevailed a week ago have become more general, as dealers having short orders are forced to pay the advance. No. 1 heavy melting steel for one local mill is bringing \$13.50 to \$14 and for another \$14 to \$14.50, with reports of as high as \$14.75 being paid. The higher range of prices is being paid to fill orders taken at \$13.85. Dealers are paying \$10 to \$10.50 for blast furnace scrap to cover \$9.65 contracts. Most mills have enough scrap due on old contracts to last them for some time and show no disposition to pay present prices, although some probably would be willing to make purchases at a moderate advance above their last buying prices. One Valley mill has advised the trade that it will not pay above \$15.50 for No. 1 heavy melting steel. A local consumer has curtailed shipping orders materially, which may furnish some relief to scrap buyers.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$13.50 to \$14.00
No. 2 heavy melting steel	13.00 to 13.25
Compressed sheet steel	12.50 to 13.00
Light bundled sheet stamp'gs	11.50 to 11.75
Drop forge flashings	11.50 to 12.00
Machine shop turnings	7.75 to 8.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	10.50 to 11.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.00 to 16.50
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings	10.00 to 10.50
Mixed bor'gs and short turn'gs	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Semi-Finished Steel.—Buyers as yet are showing no interest in fourth

quarter contracts. A local maker is asking \$33, Cleveland, for sheet bars, billets and slabs for that delivery. Specifications are still heavy.

Warehouse Business.—Jobbers' sales, particularly of steel bars, show some gain over those of last month. Sheets are moving well. Prices generally are firm.

Coke.—Jobbing foundries in this territory are getting busier and this has caused a better demand for foundry coke shipments against contracts. Prices are unchanged at \$3.50 to \$4.85, ovens, for standard Connells-ville brands and \$7.75, Painesville, for Ohio by-product coke. Heating coke is firmer, now holding at \$2.75, ovens. By-product domestic coke is fairly active at \$4.50, Ohio ovens, for egg size. A local producer quotes \$6, delivered Cleveland, for egg and \$5.50 for nut.

Symposium on Blast Furnace Slag

"Preparation of Slag for the Market" is the title of a 33-page pamphlet issued as Symposium No. 6 by the National Slag Association, Cleveland. The symposium is one of a collection dealing with the characteristics and uses of blast furnace slag. The five previous symposiums have had as their respective subjects: "Absorption of Slag and Slag Concrete," "Resistance of Blast Furnace Slag to Abrasion and Wear," "Action of Slag Under High Temperatures and Fire," "Manufacture and Use of Slag Products" and "Bond in Slag and Slag Concrete."

Power Show at Detroit

More than 400 exhibitors are represented in the Power Exhibition being held this week in Detroit in connection with the forty-sixth annual convention of the National Association of Power Engineers. Practically every detail of present-day mechanical power, safety, heating and ventilating equipment is on exhibition in the 168,000 sq. ft. of floor space occupied by the show in Convention Hall, Detroit. The Michigan Association of Power Engineers is host to the delegates of the national organization.

Annual report of the Dominion Iron & Steel Co., Ltd., Montreal, for the year ended Dec. 31, 1927, shows net operating profits of \$1,859,215, and after deductions for sinking fund provisions, a balance before depreciation of \$845,118. Previous surplus amounted to \$90,065, making a total surplus at beginning of 1928, of \$935,183. As no public report was made for 1926, the year in which the company was placed under the administration of the National Trust Co., Ltd., comparisons are not available.

The Sharon Steel Hoop Co. is making trial runs of a new cold strip mill installation, with capacity for 50,000 tons a year. The extension was financed from the proceeds of a bond issue floated early in the year.

Pacific Coast

Inquiry for 1500 Tons of Steel for Oil Storage Tanks— Coast Business Is Well Sustained

SAN FRANCISCO, Sept. 8 (*By Air Mail*).—Movement of iron and steel products on the Pacific Coast continues well sustained. Some fair-sized awards were reported this week. The inquiry of the Shell Oil Co., San Francisco, for five 80,000 bbl. tanks for its Martinez plant, calling for 1500 tons of plates and shapes, is one of the few for storage tanks that have come before fabricators for figures this year.

Pig Iron.—Foundry iron sales and inquiries this week were limited to unimportant lots. Little improvement is noted in the rate of operations among jobbing foundries on the Coast. Stocks in foundry yards apparently are sufficient to take care of immediate requirements. Prices are unchanged.

Prices per gross ton at San Francisco:
*Utah basic \$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25 25.00 to 26.00
*Indian fdy., sil. 2.75 to 3.25 24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Demand for reinforcing steel bars appears to be improving and some fair-sized lots were placed this week. Among these were 650 tons for the West Hanford Street sewer in Seattle and 210 tons for the West Stanislaus Irrigation District at Westley, Cal., booked by the Pacific Coast Steel Co. The Northwest Steel Rolling Mills secured 250 tons for a warehouse addition in Seattle and 175 tons for the Cushman spillway at Tacoma. Bids will be opened next week on 1800 tons for a college building at Berkeley. The Soule Steel Co. was low bidder on 165 tons for a storm drain in Los Angeles. Low prices prevail on material from warehouse stocks and 1.80c. apparently is general, little business being placed at a higher price. In the Los Angeles district, which has been on a much firmer basis, 1.80c. is also being quoted.

Plates.—Plate fabricators are keenly interested in the first large inquiry for oil storage tanks to come into this market this year. The Shell Oil Co. has issued an inquiry for five 80,000 bbl. tanks, calling for 1500 tons of plates and shapes. Action has been deferred until the next meeting of the directors of the East Bay Municipal

Utility District, Oakland, on 7200 tons for a distributing pipe line. The Birchfield Boiler Co. took 330 tons for a 32-in. welded pipe line at Tacoma, and the Western Pipe & Steel Co. secured 105 tons for a 36-in. pipe line in South Dakota for the United States Bureau of Reclamation. Plate prices range from 2.20c. to 2.30c., c.i.f.

Shapes.—Demand for structural steel is well sustained. Awards this week exceeded 3000 tons. Among the larger projects were 415 tons for the Marblemount bridge and 444 tons for the Nugents bridge in Washington, taken by the Pacific Car & Foundry Co.; 600 tons for the Exposition Building at Pomona, Cal.; 535 tons for a hotel in San Francisco, and 432 tons for a bridge for the Pacific Electric Railway, Los Angeles, taken by the McClintic-Marshall Co. Bids were opened this week on 230 tons and 120 tons respectively for the Kalama and Coweeman River bridges in Washington. Domestic shapes are firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—The largest award was made by the Spring Valley Water Co., San Francisco, and called for 1062 tons for 6 and 8-in. Class 150 pipe. George H. Oswald, Los Angeles, took 149 tons of 2 and 4-in. Class B pipe

for the improvement of Fig Street in Compton, Cal. San Diego, Cal., placed 148 tons of 6 to 10-in. Class C pipe for the improvement of Garnet Street with the R. E. Hazard Contracting Co., San Diego. The American Cast Iron Pipe Co. took 320 tons of 2 to 16-in. Class B pipe for Santa Ana, Cal. About 100 tons of various sizes is involved in six other small improvement projects at San Diego, the contracts being awarded to several contractors. The Miracle Construction Co., San Diego, was low bidder on 355 tons of 4 to 10-in. Class B pipe for the improvement of streets in the Encanto District, San Diego. Bids were rejected by Compton, Cal., on 148 tons of 2 and 4-in. Class B pipe. San Bernardino, Cal., decided on welded steel pipe instead of cast iron pipe. The United States Cast Iron Pipe & Foundry Co. was low bidder on 1236 tons of 4 to 10-in. Class B pipe for Edmonds, Wash. Bids will be opened next week on 1467 tons of 4 to 12-in. Class B pipe for Clearwater, Cal. The inquiry for 1210 tons of 32-in. pipe for the improvement of East Eleventh and Taylor Streets, Tacoma, was withdrawn, as welded steel pipe was decided upon.

Steel Pipe.—Movement of standard steel pipe, while showing some improvement, is by no means heavy. Most distributors have good stocks on hand. Oil country goods, especially well casing, continues in good demand. No large pipe line tonnages are up for figures.

Canada

Canadian Pacific Orders 13,000 Tons of Rails—Structural Steel Outlook Good—Pig Iron Buying Increases

TORONTO, ONT., Sept. 11.—The Canadian Pacific Railway has ordered 13,000 tons of rails from the Algoma Steel Corporation, Sault Ste. Marie, Ont. This is sufficient to keep the Soo rail mill in operation until rolling starts on 1929 requirements. The Dominion Iron & Steel Co., Sydney, N. S., has maintained rail mill operations through the first eight months of the year at almost capacity and still has enough business ahead to continue until 1929 rail orders appear. This is the first year in some time that Canadian rail mills have had business sufficient to keep in operation through the summer. As a rule, rail mills have closed down at the end of May and have not resumed until fall or winter. This year, however, is an exception, not only with regard to rail mill operations, but in practically all lines of iron and steel.

Pig Iron.—The demand for merchant iron is holding at a high level. Melters are buying extensively for spot and future delivery. Fourth quarter contracting has been featured in business of the week. Prospects for early advances in Canadian pig

iron prices have a tendency to bring buyers in the market, many of whom are anxious to buy at the prevailing level. Producers, on the other hand, do not appear anxious to close long term contracts, but are accepting that offered. It is estimated that about 50 per cent of contract buyers are now covered to the end of the year, and others are showing a readiness to cover. Spot demand is also at a high level. Orders on this account range from 100 to 1000 tons, the larger quantities being for water delivery before the close of navigation. Several 2000-ton orders have been booked on contract for delivery over the rest of the year. Despite the fact that United States prices have been advancing and local producers have been considering higher prices here, changes have not yet gone into effect.

Structural Steel.—About 50,000 tons of structural steel orders probably will be placed before the end of the year, and prospective orders for reinforcing bars are only slightly less. Structural steel business in sight includes 7000 tons for the Hotel Toronto, Toronto; 8000 tons for the Bell

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.....	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker...	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100-lb. keg.....	3.40

Telephone Co. Building, Montreal; 1000 tons for a garage for L. A. DeLaplanche, Toronto; 3500 tons for the Medical Arts Building, Toronto, in connection with which the Trussed Concrete Steel Co. of Canada has the contract to supply 600 tons of reinforcing steel; 500 tons of structural steel and 200 tons of reinforcing bars are required for factory in Hamilton for J. R. Moodie & Sons, Ltd.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$23.10 to \$23.60
No. 2 fdy., sil. 1.75 to 2.25.	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25.	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—September has brought a stronger demand for scrap in the Toronto and Montreal markets. While much of the current business is for spot delivery, orders on this account invariably call for larger ton-

nages than formerly and consumers are buying more frequently. Several consumers have covered for requirements to the end of the year. Prospects of higher prices have had a tendency to strengthen the demand. Scrap supplies are still plentiful. Dealers are buying more freely both for direct shipment to consumers and for yard stocks. Prices are strong, but have not been changed.

Dealers' buying prices:

Per Gross Ton		
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast.....	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels.....	16.00	16.00
Malleable	13.00	13.00
Per Net Ton		
No. 1 machinery cast.....	15.00	....
Stove plate	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap	13.00	....

Arbor, 338 tons; Kansas City Southern, 283 tons; St. Louis-San Francisco, 22 carloads; Chicago & Eastern Illinois, 17 carloads, and Pullman Co. (St. Louis), 7 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$11.50 to \$12.00
No. 1 locomotive tires....	12.50 to 13.00
Heavy shoveling steel.....	11.50 to 12.00
Miscel. stand.-sec. rails	
includ'g frogs, sw'ches	
and guards, cut apart...	13.50 to 14.00
Railroad springs.....	14.25 to 14.75
Bundled sheets	8.25 to 8.75
No. 2 railroad wrought...	11.50 to 12.00
No. 1 busheling	9.00 to 9.50
Cast iron borings.....	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling.....	14.00 to 14.50
Machine shop turnings...	7.50 to 8.00
Steel car axles	18.00 to 18.50
Iron car axles	25.50 to 25.75
Wrot. iron bars and trans.	18.25 to 18.75
No. 1 railroad wrought...	9.75 to 10.25
Steel rails, less than 3 ft..	15.50 to 16.00
Steel angle bars.....	13.25 to 13.50
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable.....	11.75 to 12.25
No. 1 railroad cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and	
under	20.50 to 23.50
Relay. rails, 70 lb. and	
over	26.50 to 29.00

St. Louis

Pig Iron Sales Include 15,000 Tons of Basic—Mills Have Backlogs of Sheets and Tin Plate—Scrap Higher

ST. LOUIS, Sept. 11.—A sale of 15,000 tons of basic pig iron by the St. Louis Gas & Coke Corporation for fourth quarter delivery to an East Side melter was the principal transaction of the week. The same maker sold 4400 tons of foundry iron for shipment through the remainder of the year. A leading Southern interest sold about 500 tons. Prices are being maintained by makers. One interest declined an order for 3000 tons offered at a figure under the market. Shipments are good, and the melt in the district is holding up well.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$19.00 to \$19.50
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd.....	20.67
Northern malleable, deliv'd.....	20.16
Northern basic, deliv'd.....	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Local by-product interests have increased the price of domestic coke 25c. a ton to \$11.25 for furnace sizes and \$10.25 for nut sizes, either delivered in St. Louis, or f.o.b. ovens, for shipment outside the district. Dealers are beginning to show interest in domestic sizes. The price of foundry coke is unchanged, with demand limited.

Finished Iron and Steel.—The Granite City Steel Co. broke all records in August for shipments of tin plate and is well booked up on this item for the remainder of 1928. The previous record month was March. Mills also have a backlog of sheets. The price situation continues to gain strength. Fabricators are showing

decidedly more interest in structural steel in the hope of better business. Railroad inquiries are light.

Old Material.—A leading mill bought about 4000 tons of heavy melting and shoveling steel during the week, and there has been better buying of other items. The market is firm at higher prices. Heavy melting steel, heavy shoveling steel, miscellaneous standard-section rails, railroad springs, No. 2 railroad wrought, rails for rolling, steel angle bars and railroad malleable are 25c. a ton higher, while machine shop turnings and No. 1 railroad wrought are up 50c. Railroad lists: Baltimore & Ohio, 7185 tons; Wabash, 2975 tons; Ann

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw	
stock	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	5.25c.
Blue ann'l'd sheets (No. 10).....	3.60c.
Black corrug. sheets (No. 24).....	4.50c.
Galv. corrug. sheets.....	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100	
lb. or more	70
Less than 100 lb.....	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped,	
200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped,	
200 lb. or more.....	60
Less than 200 lb.....	50

German Mines Substitute Steel for Wood Props

HAMBURG, GERMANY, Aug. 18.—With a view to increasing the domestic market for steel and reducing costs in coal mining, the steel industry is advocating the use of steel instead of wood in mine supports. Use of wood for these supports declined from 5,100,000 pieces in 1925 to 4,370,000 in 1927, although there was an increase of 16 per cent in coal production during this period. As most of the coal mines are owned by steel companies, it is planned to substitute steel for timber in about 75 per cent of the mines during the next five years. At present about 9 per cent of the coal mines are using steel exclusively, while only 5 per cent used it in 1927, 3 per cent in 1926 and 1 per cent in 1925. It is expected that by the end of this year about 14 per cent of the mines will be using steel supports.

According to an estimate of a number of coal mines that are using steel, the saving in costs is considerable. When wood was used exclusively the cost of timber per ton of coal produced amounted to 91 pf. (22c.), whereas steel costs about 45 pf. (11c.) per ton of coal produced. It is estimated that the total savings per month in the Ruhr, with 75 per cent of the mines using steel instead of wood, will be close to 2,600,000 m. (\$619,000).

The executive committee of the Pittsburgh Foundrymen's Association has decided to dispense with the September meeting this year and will start its fall and winter activities with the October meeting, which will be held on Monday evening, Oct. 15, at the Fort Pitt Hotel, Pittsburgh.

Boston

Pig Iron Firmer in New England—Scrap Prices Advance— Larger Demand for Foundry Coke

BOSTON, Sept. 11.—Pig iron sales in the past week were 7000 to 8000 tons, and included one 2000-ton, one 1500-ton and one 800-ton lot of two grades to Connecticut foundries. The Mystic Iron Works again topped the list in bookings. That stack has sold approximately 15,000 tons more of iron this year than it has made. Recent transactions included eastern and western Pennsylvania, New York State, Alabama, Buffalo, Indian and Dutch irons. Quite a little malleable iron is moving for mixture purposes. Eastern Pennsylvania No. 2X is selling at \$24.15 a ton, delivered, and No. 1X at \$24.65, an advance of 50c. a ton. Apparently no Buffalo No. 2X is now available at less than \$17 a ton, furnace, and at least one producer is getting \$17.50. The Mystic Iron Works quotations are practically on a delivered Buffalo basis. Imported No. 2X iron is \$21.50 to \$22 a ton, on cars dock here, duty paid.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91
*Buffalo, sil. 2.25 to 2.75..	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Imports.—Importations of pig iron at Boston in August were 1095 tons, of which about 250 tons was Dutch and the rest Indian. Importations in July totaled 1196 tons; in August, last year, 2262 tons; in August, two years ago, 6347 tons. August importations of ore were 16,084 tons,

made up of 5783 tons from Tunis, 6800 tons from Algeria and 3401 tons from Australia. July ore importations were 9800 tons, while those in August, last year, were 34,227 tons, and in August, two years ago, 26,232 tons.

Coke.—Specifications against foundry coke contracts continue of good proportions, and at least one maker is behind on deliveries. This company has been making liberal water shipments to Connecticut points and as soon as these are completed expects to catch up on all-rail specifications. The freer movement of fuel to foundries is due to their desire to stock up for the winter and not because of any appreciable increase in the melt of iron. Foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone. Domestic coke is moving in volume. The new New Haven, Conn., ovens should be in production within a week or two.

Cast Iron Pipe.—Private buying of pipe is again on a fairly large scale. The only municipal business closed recently was 100 tons of 6 and 8-in. pipe for Revere, Mass., which went to the Warren Foundry & Pipe Co. It is believed several New England cities will come into the market within the next month. The market for small pipe holds steady, but large dimensions can be had at concessions. Pipe foundries have much less business on their books than they had a year ago, and are operating at not more than 85 per cent of capacity. Prices are: 4 in., \$45.10 to \$46.10 a ton, f.o.b. common Boston freight rate points; 6 to 12 in., \$41.10 to \$42.10. The usual \$5 differential is asked on Class A and gas pipe.

Fabricated Steel.—The past week was the quietest experienced by steel fabricators so far this year. Only two contracts of size were let, calling for a total of 525 tons, and bookings of small tonnages dropped to a minimum. Several tonnages ranging from 100 to 300 tons are pending.

Old Material.—Further expansion of the movement of old material out of New England developed in the past week. With the better demand has come higher prices for many grades of scrap. Heavy melting steel is easily 75c. a ton higher, and rails have also advanced that much. Steel turnings bring 50c. a ton more, while mixed borings and turnings are \$5.50 to \$6 a ton, on cars shipping point, against \$5 to \$5.50 a week ago. Long bundled skeleton and forge scrap are 50c. a ton up. The higher prices for heavy melting steel have slowed up the export market, and there is a possibility that shipments to Danzig will be temporarily discontinued. Most of the shipments are to the Pittsburgh territory. The Boston & Maine Railroad closes bids this week on 65 cars of miscellaneous material.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$10.25 to \$10.75
Scrap T rails.....	9.25 to 9.50
Scrap girder rails.....	8.50 to 8.75
No. 1 railroad wrought....	8.50 to 9.00
No. 1 yard wrought.....	7.00 to 7.50
Machine shop turnings....	6.00 to 6.50
Cast iron borings (steel works and rolling mill) ..	6.00 to 6.50
Bundled skeleton, long....	7.50 to 8.00
Forge flashings	7.75 to 8.25
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	6.25 to 6.60
Shafting	12.50 to 13.00
Steel car axles	14.00 to 14.50
Wrought pipe 1 in. in diameter (over 2 ft. long) ..	9.00 to 9.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.50 to 14.50
Stove plate	10.00 to 10.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot pressed nuts.....	.50 and 5
Cold-punched nuts.....	.50 and 5
Stove bolts	.70 and 10

*Including quantity differentials.

Birmingham

Pig Iron Buying Steady But Not Large—Steel Bookings Fair—Scrap Stronger

BIRMINGHAM, Sept. 11.—Pig iron buying has been steady for the past few days. The number of consumers covering through the fourth quarter at the current price of \$16.25 is somewhat less than expected, though forward buying as a whole is much better than it was this far in advance of either of the two preceding quarters. A better sentiment is noted. Some basic iron is being exported to the Orient by way of the Warrior River barge line. September shipments to date are slightly ahead of the make. The No. 3 Ensley furnace of the Tennessee company was changed from basic to foundry on Sept. 3. The No. 2 Bessemer furnace of this company was put in operation Sept. 7, having been banked since Aug. 21. The active

furnaces at present total 17, of which 12 are on foundry, three on basic, one on ferromanganese and one on recarburizing iron. The rebuilding of the Alabama City furnace of the Gulf States Steel Co. will be completed within a few days.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—Bookings so far this month are much better than for the first part of September last year. Inquiries are good and sales officials expect the fourth quarter to be the most active period of the year. Sheet specifications are holding up to a higher rate than had been expected. Lettings of fabricated structural steel

contracts continue fairly good. Concrete reinforcing bars are active in contracts under 100 tons. The Ingalls Iron Works Co. will furnish 350 tons of structural steel for the Mobile, Ala., mill of the Rome Wire Co. Prices are firm. The Ensley rail mill of the Tennessee company was placed in operation again on Sept. 9 after a few weeks' idleness. Nine open-hearth furnaces have been in operation for the past two weeks. The Tennessee company has six active at Fairfield and the Gulf States Steel Co. has three on at Alabama City.

Cast Iron Pipe.—A steady volume of private business has featured the market in the past several weeks. The total volume has not been satisfactory, and with very few exceptions the individual tonnages have been small. Municipal lettings of size have been very few. The National Cast Iron Pipe Co. received an order last week for about 400 tons from Plain Dealing, La. Bids have been opened on fair-sized tonnages at Mobile, Ala., and Bonifay, Fla., Sulphur, La., will open bids Sept. 18 on about 13,500 ft. of 6 to 10-in. pipe. Prices remain steady at \$34 to \$35. Soil pipe has not been active for some time, though

several shops have been producing steadily.

Coke.—Interest in coke has been stimulated, following the recent advance in the price of pig iron, and many consumers are contracting for their requirements for the next six months. Shipments are heavier than for some time. Quotations remain at \$5 for both spot and contract coke.

Old Material.—Prices show an upward trend as demand grows stronger. Quotations on heavy melting steel have advanced from \$9 to \$11. Rails for rolling have increased to \$14, while an advance of \$1.50 has been made on scrap steel rails, short shoveling turnings, tramcar wheels and cast iron car wheels. Shipments to mills are larger than at any time this summer and stocks on yards are being rapidly depleted.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$10.00 to \$11.00
Scrap steel rails.....	11.50 to 12.00
Short shoveling turnings...	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00
No. 1 cast	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Cincinnati

Pig Iron Demand Has Abated—Scrap Market Advances—Steel Demand Steady

CINCINNATI, Sept. 11.—After two weeks of active pig iron buying, sales have subsided and local dealers booked somewhat meager tonnages in the past seven days. Most consumers have covered fourth quarter requirements and therefore open inquiries are scarce. Small orders are being placed quietly by some melters. In fact, the majority of pig iron purchased recently has been bought in private transactions with comparatively little competitive bidding. The Tennessee furnace has advanced its asking price 25c. a ton to \$16.25, base Birmingham, to be on an equality with Alabama interests, but nevertheless is still accepting attractive tonnages at \$16. Northern Ohio iron is being offered locally at a delivered price of \$19.90, although in some instances sellers are said to be holding to \$20.40. Ironton companies continue to dispose of small lots of iron from yard stocks at from \$17 to \$18, base furnace. Since much of the iron is shipped by barge down the Ohio River and there is no established transportation charge, it is difficult to determine the going price at Ironton.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$18.89 to \$19.89
So. Ohio malleable.....	20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25..	19.94
Ala. fdy., sil. 2.25 to 2.75..	20.44
Tenn. fdy., sil. 1.75 to 2.25	19.69
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Demand for bars, shapes and plates has been well sustained at 1.90c., base Pittsburgh, for prompt shipment, although sellers are now engaged in soliciting fourth quarter contracts on a basis of 2c. There is increased activity in structural steel, although small jobs ranging from 25 to 100 tons make up the bulk of the tonnage. The only sizable award called for 290 tons of structural steel to be furnished by the Dayton Structural Steel Co. to a Middletown, Ohio, company. Gas holder fabricators have stepped up production somewhat to conform to a larger volume of incoming business. Orders and specifications for wire goods have been rather sluggish. Common wire nails

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

are quoted at \$2.55 per keg, Ironton, with a 14c. barge rate to this city. Some Eastern mills are meeting this price at Ohio River points, but these irregularities disappear in territory reached only by all-rail deliveries. District sheet companies state that bookings have held up to a high level, with the result that the volume of unfilled orders on hand has attained impressive proportions. Sales have been remarkably diversified and prices have not changed, although a firmer tone is noted.

Warehouse Business.—Shipments out of local warehouses have been of fairly good volume and have been well distributed among all products. Louisville jobbers are reported to be quoting \$2.65 per keg, or lower, on common wire nails, although prices in the Cincinnati market have not been affected. Otherwise, schedules remain unchanged.

Coke.—Specifications of by-product foundry coke are appreciably better than in August and indications are that this month will show a gain of about 10 per cent. Wise County foundry coke is quoted at \$4 to \$5, f.o.b. ovens, with furnace grades bringing \$3.50 to \$3.75. New River beehive foundry coke is selling at \$6.50 to \$7, ovens.

Old Material.—Steel plants are showing more interest in forward buying and consequently activities of dealers have been stimulated. Prices of a number of items have increased from 25c. to \$1 a ton, although heavy melting steel has not changed in the past week. Railroad offerings this week include the Southern, 6000 tons; Chesapeake & Ohio, 8000 tons; and Louisville & Nashville, 12,500 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.75 to \$12.25
Scrap rails for melting....	12.00 to 12.50
Loose sheet clippings.....	9.00 to 9.50
Bundled sheets	9.75 to 10.25
Cast iron borings.....	8.50 to 9.00
Machine shop turnings....	8.00 to 8.50
No. 1 busheling.....	10.50 to 11.00
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires.....	13.00 to 13.25
No. 2 railroad wrought....	11.75 to 12.25
Short rails	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	16.00 to 16.50
No. 1 railroad cast.....	13.00 to 13.50
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.25 to 10.75
Railroad malleable	12.25 to 12.75
Agricultural malleable....	11.25 to 11.75

Lower Production of Trackwork Reported

Production of trackwork for T-rail track of 60 lb. a yard and heavier is reported for August by the American Iron and Steel Institute at 11,040 net tons—the lowest figure since last January. This compares with 11,776 tons in July and with 13,387 tons in August, 1927, and 15,203 tons in August, 1926.

For the first eight months the total has been 99,945 tons, comparing with 120,873 tons in the first eight months of 1927 and 139,501 tons in 1926.

Detroit

Automobile Production Continues to Break Records—1927 Figures Surpassed by Nearly All Companies

DETROIT, Sept. 11.—Industrial activity in this section continues upward, with the automotive industry still achieving higher production. In some cases new records have been made during the past month, and in practically all cases 1927 figures have been surpassed.

For the fifth consecutive week the labor barometer of the Employers' Association has broken all records. The increase for the week ended Sept. 4 amounted to 5287, bringing the total to 298,744. These figures are the total of persons on the combined payrolls of Detroit companies which employ two-thirds of the city's industrial working population. The increase for the week ended Aug. 28 was 5854. A year ago the total figure was 98,079 less than the figure of Sept. 4.

Cadillacs and LaSalles shipped during August totaled 5142 units, or 616 better than the company's highest previous record.

The Chevrolet Motor Co. last week turned out its millionth car for the current year.

It is estimated that the September production for Chrysler Corporation will set a new record. On Sept. 1 this company's unfilled orders amounted to 53,417 units. Recently a new production record for one day was established by the Chrysler Corporation, when 1370 cars were produced.

Production at the Dodge plants is running about 1000 units a day and is steadily being increased.

Assembly of Ford Model A cars and trucks has reached about 4000 units a day, with 500 additional units at Canadian plants. Ford's employment shows a new high level, at 120,293.

August production by the Graham-Paige Motors Corporation amounted to 11,207 cars, which was more than 50 per cent of the entire 1927 production.

August production for the Hudson Motor Car Co. was approximately 22,000 units.

The previous annual record for the Hupp Motor Car Co. was achieved in 1926, when the total was 45,426 cars. The total for the present year to Sept. 1 is 50,457 cars.

August production of the Olds Motor Works stands at 7773 cars. A new one-day record was established on Aug. 31, with 670 units, surpassing the previous record of March 31 of 613 units.

The Packard Motor Car Co. in August shipped 5001 cars, exceeding the previous record of May, 1928, by 219 cars.

The Reo Motor Car Co., with a total production in August of 4823 units, slightly exceeded the July figure of 4814.

A. R. Erskine, president Studebaker Corporation, states that profits for the current third quarter will show an increase of approximately 25 per cent over the same period of 1927.

August sales have exceeded 15,000 units, as against 11,437 for August a year ago.

The Buick Motor Co.'s July production of 15,000 units was increased in August to 27,000 units. The September schedule is 32,000 units.

A contract totaling \$10,000,000 worth of bodies, for delivery over five years, has been placed by Willys-Overland Co. with the Mengel Co. The Hays Body Corporation has recently received two orders from Marmon Motor Car Co. which will increase the former's production by approximately \$10,000,000 annually.

Pig iron producers serving the district have sold a large tonnage for fourth quarter delivery on an \$18 base.

There has been a great deal of activity in the scrap market in this district during the past two weeks, with the result that advances of 50c. per ton have been registered on steel mill and blast furnace materials. Mills and furnaces have found difficulty in covering at present prices with dealers holding stocks.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$12.00 to \$12.50
Borings and short turnings	8.00 to 8.50
Long turnings	7.00 to 7.50
No. 1 machinery cast.	14.00 to 15.00
Automobile cast.	19.00 to 20.50
Hydraulic comp. sheets	11.50 to 12.00
Stove plate	11.00 to 12.00
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Buffalo

Pig Iron Quieter After Price Advances—Steel Mills Average 90 Per Cent Operation

BUFFALO, Sept. 11.—Pig iron business has been quiet following the recent price increase. Indication that the market is stiffening is shown by the action of one producer in increasing its price for No. 2 plain, 1.75 to 2.25 silicon, to \$18.50 for delivery in the district and \$18 on New England business. One lot of 500 tons of foundry was sold at \$18, base, and two orders totaling 1000 tons were sold by another maker at \$18, base. Considerable buying is looked for in the near future on the theory that the majority of the smaller users have not yet covered for last half. August was the biggest month of the year with most of the producers.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$17.00 to \$17.50
No. 2X fdy., sil. 2.25 to 2.75	17.50 to 18.00
No. 1X fdy., sil. 2.75 to 3.25	18.50 to 19.00
Malleable, sil. up to 2.25	17.50 to 18.00
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mills are holding to a 90 per cent operation, with orders continuing fairly heavy. Some orders for bars and shapes for fourth quarter delivery have been taken at 2.10c., Buffalo. Prices on alloy steel have been increased \$2 a ton. Sheet prices are firm and business is reported as good. Two reinforcing bar jobs, one for 375 tons and another for 400 tons, are being figured. Bolt and nut business continues

fair and the wire cloth and mesh business is good.

Old Material.—No large orders were taken during the week and business is largely among dealers covering on the last two large purchases. Heavy melting steel is scarce, owing to outside markets being stronger than the local market. There have been a few scattered sales of 2-ft. rails at \$17 to \$17.50 and No. 1 machinery cast at \$14 to \$14.50. Dealers are still seeking to cover against the last outstanding order for stove plate, 2500 tons. A few lots of stove plate have been sold at \$14.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$14.00 to \$15.00
No. 2 heavy melting steel	12.25 to 12.50
Scrap rails	13.00 to 13.50
Hydraulic comp. sheets	12.25
Hand bundled sheets	8.00 to 8.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.25 to 12.50
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.00 to 11.50
Acid Open-Hearth Grades	
Knuckles and couplers	16.00 to 16.50
Coil and leaf springs	16.50 to 17.00
Rolled steel wheels	15.50 to 16.00
Low phos. billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Hvy. steel axle turnings	12.00 to 12.50
Short shov. steel turnings	10.00 to 10.50
Blast Furnace Grades	
Short shov. steel turnings	10.00 to 10.50
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.50 to 10.00
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	16.50 to 17.00
Iron axles	19.50 to 20.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.50 to 14.00
Locomotive grate bars	11.25 to 11.75
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	12.00 to 12.50
Malleable Grades	
Industrial	15.00 to 15.50
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struct. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.70c. to 5.05c.
Blue ann'd sheets (No. 10)	3.70c.
Com. wire nails, base per keg	\$3.65
Black wire, base per 100 lb.	3.90

Non-Ferrous Metal Markets

Copper Sales Very Heavy, Tin Sold at Lower Prices, Lead Active, Zinc Quiet and Firm

Copper.—Sales since Labor Day have been very heavy, being estimated at 35,000 to 40,000 tons for the week ended Sept. 8. About 20,000 tons of this was for domestic consumption. Sales this week, Monday and Tuesday, have been on a large scale, particularly to domestic consumers, and it is reported that several producers have withdrawn from the market for October shipment. Most of the domestic sales have been for October delivery, with some November metal included. Foreign sales have consisted largely of September requirements and some for October. Considerable interest centers in the

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Sept. 11	Sept. 10	Sept. 8	Sept. 7	Sept. 6	Sept. 5
Lake copper, New York.....	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	47.12½	47.00	....	47.00	47.45	47.37½
Lead, New York.....	6.40	6.40	6.40	6.40	6.40	6.40
Lead, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

price situation, which is still unchanged at 14.75c., delivered in the Connecticut Valley, and at 15c., c.i.f. European ports, for electrolytic copper. If sales keep up at the present volume, which the Copper Institute is reported to have estimated as fully equal to the heavy buying of last May, price advances would seem justified, but responsible opinion is that quotations will remain where they are through the remainder of the year. Lake copper is moderately active and firm at 14.75c. and 14.87½c., delivered.

Tin.—Considering the holiday on Sept. 3, sales for the week ended Sept. 8 were very heavy at about 1200 tons. Both consumers and dealers were buyers. The most interesting day was Friday, Sept. 7, when the agent here of a large London house sold 175 tons on the New York Metal

Exchange at a sacrifice in price, and at the same time puzzling the trade. It is many months since as much business was done on the local exchange in one day. On Monday the market was quiet and steady, with about 100 tons changing hands, and Tuesday about 300 tons was sold, mostly to consumers, with spot Straits tin quoted at 47.12½c., New York. Prices in London Tuesday were considerably lower than a week ago, with spot standard quoted at £209 12s. 6d., future standard at £208 5s., and spot Straits at £213 2s. 6d. The Singapore market was £211 10s. Arrivals thus far this month have been 4185 tons, with 6855 tons reported afloat.

Lead.—Business on Monday and Tuesday was fairly large, but not as heavy as in the two previous weeks. Buying has been well distributed and prices are firm at 6.25c. to 6.27½c.,

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	49.00 to 50.00c.
Tin, bars	51.00c. to 52.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½.....	32.00c. to 33.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c.
Tin, bar	56.00c.
Copper, Lake	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting	14.00c.
Zinc, slab	8.00c.
Lead, American pig.....	6.75c. to 7.00c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	55.50c.
Solder, ½ and ½.....	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes.....	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9),	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since the advances of May 25. Zinc sheets have been quoted at 9.75c. per lb., base, since July 30, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled.....	23.50c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.

Rods—	
High brass	17.00c.
Naval brass	19.75c.

Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls.....	22.50c.
Brazed Brass Tubing.....	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	11.75c.
Brass, heavy	7.00c.	8.25c.
Brass, light.....	6.00c.	7.25c.
Hvy. machine composition	9.75c.	10.75c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. turnings...	9.00c.	10.00c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	19.25c.	
Copper, hot rolled.....	23.50c.	
Copper, cold rolled, 14 oz. and heavier	25.75c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	25.62½c.	
Copper	26.50c.	
Brass Rods	17.00c.	
Brazed Brass Tubes.....	27.25c.	

St. Louis, with the quotation of the leading interest unchanged at 6.40c., New York.

Zinc.—Orders for prime Western zinc thus far this month have been in moderate volume, but the tone of the market is good, with prices steady and unchanged at 6.25c., St. Louis, or 6.60c., New York. Interest centers in the ore situation, data for the week ended Sept. 8 showing that output has not yet been restricted adequately. The output was 12,250 tons and the shipments were only about 8800 tons, with sales about 4530 tons. Thus stocks are larger at close to 45,600 tons, an increase for the week of about 3400 tons. The quotation is unchanged at \$40, Joplin.

Antimony.—Chinese metal is considerably higher at 10.62½c., New York, duty paid, for all positions, an increase of ½c. over last week. Reports of a combination of interests in China and more demand from consumers and dealers here are the cause.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 11.—This market is quiet with prices lower for tin and lead. Sales of old metals are light.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 47.50c.; lead, 6.35c.; zinc, 6.35c. in less-than-carload lots; antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

August Ore Shipments Increase, Year's Total Lower

Shipments of iron ore from the Lake Superior region amounted to 9,242,869 gross tons in August, an increase of 467,376 tons, or 5.33 per cent, above the 8,775,493 tons shipped from upper Lake ports in August, 1927. The total for the season to Sept. 1, or 32,517,693 tons, declined 2,636,223 tons, or 7.5 per cent, compared with the 35,153,916 tons shipped to Sept. 1, 1927. The table gives the shipments for August and for the season in 1928 and 1927 in gross tons.

MOVEMENT OF LAKE SUPERIOR ORE				
Port	August, 1928	August, 1927	To Sept. 1	
			1928	1927
Escanaba	929,800	978,799	3,302,615	3,772,445
Marquette	529,680	555,091	1,978,354	1,958,655
Ashland	1,111,686	996,668	4,004,315	4,359,222
Superior	2,754,134	2,586,591	9,231,648	9,901,363
Duluth	2,989,085	2,657,539	10,528,626	11,221,286
Two Harbors.....	928,484	1,000,805	3,472,135	3,940,945
Total	9,242,869	8,775,990	32,517,693	35,153,916
Increase	467,376			
Decrease			2,636,233	

Dwight & Lloyd Patent Decision Affirmed

The decision of the lower court (United States District Court for the Southern District of New York) in the suit of the Dwight & Lloyd Sintering Co. vs. John E. Greenawalt has been affirmed by the United States Circuit Court of Appeals. In the original suit infringement of seven patents was alleged, these covering the process of producing a sinter out of finely pulverized metalliferous ores. The court found that the long delay in bringing suit precluded any recovery of profits from the defendant under the basic down-draft sintering patent, although Dwight & Lloyd are recognized as the inventors of this contribution to the art and its importance is acknowledged.

As to the other patents in the suit, the decision on the particular claims before the court turned on various technical questions and the interpretation of certain phases of the patent law and Patent Office practice. Suits are still pending under the same patents in other jurisdictions against different defendants, and it is expected that one or more of these suits will be brought to trial in order to reach the United States Supreme Court on the technical questions presented.

The Dwight & Lloyd Sintering Co. is the owner of various patents covering the construction and operation of sintering machines which were not involved in this litigation.

Bingham & Taylor Take Over W. P. Taylor Co., Buffalo

The firm of Bingham & Taylor, Buffalo, has been incorporated to take over the steel foundry of the W. P. Taylor Co., 575 Howard Street, Buffalo. In addition to making iron and steel castings, railroad supplies, water and gas fittings and doing general foundry work as the old company did, the new company will produce alloy castings of steel, bronze and nickel for chemical work.

Officers of the new company are: James W. Gibney, president; William J. Gibney, vice-president, and J. H. Gardiner, secretary and treasurer. Directors are the three officers, with W. H. Crosby, Oliñ Dibble, A. C. Smith and Burt C. Weber, all of Buffalo.

The foundry is one of the oldest of its kind in the United States, having been founded in 1849 by Robert Bing-

ham. In 1884, W. Perry Taylor obtained an interest in the company and the name was changed to Bingham & Taylor. Later when Mr. Bingham retired the firm became known as the W. P. Taylor Co. Recently Mr. Taylor retired from business.

Valley Mills Operating at Above 85 Per Cent

YOUNGSTOWN, Sept. 11.—Production schedules in the Mahoning Valley this week continue at above 85 per cent, with 46 of 53 independent open-hearth furnaces melting. Including the Steel Corporation furnaces, a total of 59 of 68 are active. Of 127 Valley sheet mills, 113 are scheduled, as are 14 of 20 pipe mills. Strip mill capacity is occupied at a high rate.

Obituary

CHARLES E. DINKEY, for 20 years general superintendent Edgar Thomson works, Carnegie Steel Co., Braddock, Pa., and connected with the steel industry for 50 years, died at his home in Pittsburgh Sept. 8. Born in Bowmanstown, Pa., Aug. 4, 1868, Mr. Dinkey went to work as a messenger at the Edgar Thomson furnaces of Carnegie Brothers & Co. He served in various capacities until 1900, when he was appointed general superintendent of the plant. Since 1920, when he resigned that position and retired from active work, Mr. Dinkey had devoted himself to the securities brokerage business as president of Dinkey & Todd Co. He was a member of the American Institute of Mining & Metallurgical Engineers, the American Iron and Steel Institute and several Pittsburgh clubs. He was a brother of Alva C. Dinkey, now president Midvale Co., Philadelphia.

HENRY CHALFANT, chairman Spang, Chalfant & Co., Inc., Pittsburgh, died at Biarritz, France, Aug. 27. Mr. Chalfant apparently was in good health when he departed for Europe in July. He was 62 years of age, a native of Pittsburgh, and throughout his business life had been identified with the company that his father, John Chalfant, helped to found 100 years ago.

WILLIAM H. YAWGER, vice-president Weston Electrical Instrument Corporation, Newark, N. J., died on Sept. 3. He had been associated with the corporation and its predecessor for 34 years, having served as director of purchases and subsequently as treasurer and vice-president. He had been in poor health for three years and retired from active duty about three months ago.

WILLIAM H. GENSKE, secretary Lakeside Bridge & Steel Co., North Milwaukee, died on Aug. 31 after a brief illness. He was born in Waukesha County, Wis., in 1868, and had been identified with the Lakeside company for many years.

PERSONAL

WALLACE G. IMHOFF, formerly metallurgist in the electrical materials department of Hubbard & Co., Pittsburgh, has opened an office at 401 Highland Building, Pittsburgh, to engage as a consulting metallurgical engineer in pickling and galvanizing. His practical experience in the galvanizing field dates back 15 years, when he started in the galvanizing department of the American Steel & Wire Co. at Rankin, Pa. He received his formal technical training at the Carnegie Institute of Technology, from which he received degrees in engineering and science, and has since studied at the University of Wisconsin, Harvard University and the University of Pittsburgh. Mr. Imhoff is a contributor to *THE IRON AGE*.

W. A. BRIGGS, for many years in charge of the service department of the Boston Woven Hose & Rubber Co., Boston, has been appointed sales manager for that company. R. J. OWENS has been named merchandise manager and H. F. MAXON has been made district field manager in charge of territory, including New York, Pennsylvania, New Jersey, Delaware and Maryland.

L. KATTENBURG, president of R. S. Stokvis & Zonen, Rotterdam, the Netherlands, arrived in New York on Aug. 31 for a visit of several weeks in this country.

FRED C. GARDNER, treasurer of E. C. Atkins & Co., Indianapolis, saw and machinery manufacturers, has been named chairman of a special committee to recommend a site for a municipal airport for Indianapolis.

BERNARD LESTER, assistant industrial sales manager Westinghouse Electric & Mfg. Co., East Pittsburgh, has been placed in charge of the company's business relationships with architects, builders, building contractors and manufacturers of machinery and motor-driven appliances, with headquarters at 150 Broadway, New York. Mr. Lester, who has been identified with the Westinghouse company for more than 20 years, was graduated from Haverford College in 1904.

WALTER J. KOHLER, president Kohler Co., Kohler, Wis., and one of the best known manufacturers of the Central West, was nominated as the Republican candidate for governor of Wisconsin at the primaries on Sept. 4.

GEORGE O. WITH, formerly Chicago manager of the Consolidated Expanded Metal Cos., has been appointed district sales manager at Chicago for the Concrete Steel Co., succeeding WILLIAM PIEZ.

FRED S. SLATER, for a number of years associated with George D. Wetherill & Co., Inc., Philadelphia, has been made manager of the technical paint division of the M. J. Merkin Paint Co., Inc., New York.

C. W. HEPPENSTALL, president Heppenstall Forge & Knife Co., Pittsburgh, with Mrs. Heppenstall, sailed for Europe on Sept. 8.

WILLIAM H. COVERDALE, since 1913 associated with the Gulf States Steel Co., Birmingham, as consulting engineer and a director, has been elected president of the company, succeeding the late James Bowron. JOHN W. PLATTEN, who has been chairman of



W. H. COVERDALE

the finance committee, has been named to succeed Mr. Bowron as chairman of the board, and LESTER E. GEOHEGAN, for several years vice-president and general manager, has been made a director. Mr. Coverdale is a member of the consulting engineering firm of Coverdale & Colpitts, 52 Wall Street, New York, and has been active in the supervision of the improvement program that is being carried on by the Gulf States company. He was born at Kingston, Ont., in 1871, and attended the Collegiate Institute in that city and Geneva College, Beaver Falls, Pa., having been graduated from the latter institution in 1891. He served in the engineering department of the Pennsylvania Railroad for nine years and has since been engaged in consulting work. He is president of the Canadian Steamship Lines, Ltd., the Century Coal Co., the Midland Shipbuilding Co. and the Davie Shipbuilding & Repairing Co.; chairman of the Pierce Petroleum Corporation; vice-president and director of the Consolidation Coal Products Co., and a director in a number of banks, railroads and industrial companies. He is a member of the

American Society of Civil Engineers, the American Institute of Consulting Engineers, the American Iron and Steel Institute and the Engineers Club of New York.

LEIGH B. MORRIS, sales agent at Los Angeles for the Bethlehem Steel Co. and formerly district sales agent in New York for the Midvale Steel & Ordnance Co., has resigned.

ROBERT DONNER of the Donner Steel Co., Buffalo, sailed last week on the steamer Ile de France for a European trip.

AUGUST WILKS, for the last five years production manager of the Hoover Co., Canton, Ohio, has been made works manager of the Kearney & Trecker Corporation, Milwaukee. C. M. Cheadle, Jr., recently appointed advertising manager of the Milwaukee company, formerly served in a similar capacity with the Barber-Colman Co., Rockford, Ill.

H. A. DEFRIES, consulting metallurgist Ludlum Steel Co., Watervliet, N. Y., will address the Worcester, Mass., chapter of the American Society for Steel Treating, Thursday evening, Sept. 13, on "Recent Metallurgical Developments in France and Germany." He returned recently from a trip through those countries.

H. W. PETERS, for 12 years associated with the Packard Motor Car Co., Detroit, as office manager and later as general manager of the Detroit branch has been elected a vice-president of that company, in charge of distribution, to succeed Dr. Herbert H. Hills, who recently resigned.

GODOFREDO M. DE MENEZES, Caixa Postal 19, Rio de Janeiro, Brazil, is now spending a few weeks in the United States, largely on a commission to study the organization and construction of American highways. Road building is a major item of activity with the present president of Brazil, and the good roads movement appears to have become permanently popular. In 1929, probably in July, the next Pan-American highway congress will be held in Rio de Janeiro. Mr. Menezes, who is a graduate of Lehigh University, would undoubtedly welcome information regarding road construction and road building equipment.

J. J. MACKENZIE has been appointed manager of the engineering sales department of the Walworth Ohio Co., Cleveland.

J. STANLEY SEE, who has been production engineer of the industrial division of the Industrial Brownhoist Corporation, Bay City, Mich., has been made manager of the division.

R. L. RHOADS has been appointed dean of engineering at the University of Wyoming, Laramie.

Fabricated Structural Steel

Awards of 32,300 Tons—36,500 Tons in New Projects— New York Garment Building Takes 8100 Tons

AWARDS reported during the week amounted to 32,300 tons, the largest of which was for 8100 tons for a garment building in New York. New projects totaling 36,500 tons, included 9325 tons for a New York water tunnel and 8000 tons for a commercial building in Philadelphia. Awards follow:

WALTHAM, MASS., 350 tons, hospital, to A. L. Smith Iron Works.
GREENFIELD, MASS., 175 tons, theater, to Palmer Steel Co.
STATE OF VERMONT, 300 tons, bridges, to American Bridge Co.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 140 tons, bridge work, to Shoemaker Bridge Co.
NEW YORK, 8100 tons, Garment Center at Seventh Avenue and Thirty-eighth Street, to Levering & Garrigues Co.
NEW YORK, 3000 tons, unit 7 of Tudor City development at 320 East Forty-second Street, to Harris Structural Steel Co.
NEW YORK, 800 tons, apartment building in East Seventy-second Street, to Harris Structural Steel Co.
NEW YORK, 450 tons, fur warehouse in West Twenty-eighth Street, to A. E. Norton, Inc.
NEW YORK, 250 tons, building for Rockefeller Institute of Medical Research, to Hedden Iron Construction Co.
STATE OF NEW YORK, 600 tons, highway bridges, to unnamed fabricators.
NEW YORK, 1380 tons, building at Sixty-ninth Street and Central Park West, to Hinkle Iron Works.
GRANVILLE, N. Y., 200 tons, high school, to McClintic-Marshall Co.
KEARNY, N. J., 2500 tons, factory building for Western Electric Co., Inc., to McClintic-Marshall Co.
MOBILE, ALA., 350 tons, new mill for Rome Wire Co., to Ingalls Iron Works Co.
ALTOONA, PA., 1100 tons, West Side High School, to Jones & Laughlin Steel Corporation.
SEWICKLEY, PA., 350 tons, Sewickley Valley Hospital, to Jones & Laughlin Steel Corporation.
AKRON, OHIO, 4000 tons, factory building for B. F. Goodrich Co., to Berger Iron Works.
MIDDLETOWN, OHIO, 290 tons, factory for Gardner-Harvey Paper Co., to Dayton Structural Steel Co.
MANSFIELD, OHIO, 300 tons, Richland Bank, to Forest City Structural Co.
LOUISVILLE, KY., 500 tons, plant for Mengel Body Co., to Louisville Bridge & Iron Co.
GREENCASTLE, IND., 100 tons, gas storage tank, to Stacey Mfg. Co.
PENDLEVILLE, IND., 100 tons, gas storage tank, to Stacey Mfg. Co.
FLINT, MICH., 450 tons, machine shop for Chevrolet Motor Co., to Flint Structural Steel Co.
FORDSON, MICH., 900 tons, grade crossing elimination, to American Bridge Co.
LASALLE, ILL., 250 tons, building for Marquette Cement Mfg. Co., to Mississippi Valley Structural Steel Co.
EAST CHICAGO, IND., 2500 tons, United States Gypsum Co. building, to American Bridge Co.
CHICAGO, 300 tons, catenary structures for Illinois Central Railroad, to Continental Bridge Co., local.
CHICAGO, 500 tons, bridge over Forty-third Street, to Mount Vernon Bridge Co.
OLYMPIA, 444 tons, Nugents bridge, to Pacific Car & Foundry Co., previously reported to unnamed fabricator.
SEATTLE, 210 tons, Boeing Airplane plant, to Austin Co.

SAN FRANCISCO, 535 tons, hotel, Geary and Maggie Streets, to McClintic-Marshall Co.
SAN FRANCISCO, 150 tons, apartment building at Leavenworth and Gough Streets, to Golden Gate Iron Works.
POMONA, CAL., 600 tons, exposition building for Los Angeles County, to McClintic-Marshall Co.
LOS ANGELES, 432 tons, bridge over Los Angeles River at Glendale Boulevard for Pacific Electric Railway, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 9325 tons, including 3625 tons of plates, tunnel for Board of Water Supply; bids Sept. 25.
NEW YORK, 2000 tons, George Washington Hotel at Lexington Avenue and Twenty-third Street.
STATE OF NEW JERSEY, 350 tons; 225 tons for railroad bridge at North Bergen township, and 125 tons for bridge over Meeker Avenue, Newark.

REINFORCING STEEL

New York Water Tunnel Will Take 2850 Tons

INCLUDING 2850 tons for a water tunnel in New York and 1000 tons for an automobile garage and service station in the same city, new projects reported during the last week totaled 6300 tons. The following awards, amounting to 2950 tons, include no jobs of outstanding size:

NEW YORK, 160 tons, anchorages for Hudson River bridge, to Buffalo Steel Co.
ROCKAWAY, BEACH, N. Y., 350 tons, board walk; from Montrose Contracting Co., general contractor, to E. T. Edwards, Columbia, Pa.
BUFFALO, 125 tons, Union Road, to a local maker.
BUFFALO, 200 tons, superstructure for Rand Building, to a local maker.
CHICAGO, 650 tons of rail steel bars, office and store building at Michigan Avenue and Grand Avenue, to Calumet Steel Co.
CHICAGO, 255 tons of rail steel bars, apartment building at 1032 North Dearborn Street, to Calumet Steel Co.
STATE OF ILLINOIS, 250 tons of rail steel bars, road work, to Calumet Steel Co.
CHICAGO HEIGHTS, ILL., 100 tons, public school, to Calumet Steel Co.
WESTLEY, CAL., 210 tons, West Stanislaus Irrigation District, to Pacific Coast Steel Co.
SEATTLE, 250 tons additional for Frederick & Nelson warehouse, to Pacific Coast Steel Co. and Northwest Steel Rolling Mills.
SEATTLE, 250 tons, addition to Peck & Hills Furniture Co. warehouse, to Northwest Steel Rolling Mills.
TACOMA, WASH., 175 tons, Cushman spillway, to Northwest Steel Rolling Mills.

PHILADELPHIA 700 tons, "out patients" building and laboratory for University of Pennsylvania.

PHILADELPHIA 8000 tons, commercial building at Callowhill Street for Reading Co.

WILDWOOD, N. J., 400 tons, "Fun Chase" pier, bids in.

WASHINGTON, 250 tons, three 75-ft. girder spans for M Street bridge.

ERIE, PA., tonnage unstated, Erie County courthouse.

ROCHESTER, N. Y., 200 tons, building for Rochester Trust & Safety Deposit Co.

AKRON, OHIO, 5000 tons, building for Goodyear Tire & Rubber Co.

CINCINNATI, 125 tons, Roger Bacon High School.

DAYTON, OHIO, 600 tons, factory addition for Leland Electric Co.

INDIANAPOLIS, 600 tons, addition to building for Big Four Railroad.

INDIANAPOLIS, 500 tons, Majestic Building.

DECATUR, ILL., 2500 tons, office building.

CHICAGO, 2500 tons, Patterson Estate Building, American Bridge Co., low bidder.

CHICAGO, 1000 tons, power house for University of Chicago; Lakeside Bridge & Iron Co., Milwaukee, low bidder.

STATE OF ILLINOIS, 500 tons, highway bridges.

OLYMPIA, WASH., 120 tons, Coweeman River bridge; bids opened.

OLYMPIA, 230 tons, Kalama River bridge; bids opened.

SEATTLE, 130 tons, Pacific Coast Cement Co. plant; bids being taken.

SAN FRANCISCO, 1500 tons plates and shapes, five 80,000-bbl. tanks for Shell Oil Co.; bids being taken.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 2850 tons, water tunnel from Yonkers to Brooklyn for Board of Water Supply; bids Sept. 25.
NEW YORK, 1000 tons, Packard garage and service station at Eleventh Avenue and Fifty-fourth Street.
NEW YORK, 500 to 600 tons, Government barracks on Governor's Island.
NEW YORK, 340 tons, subway Section 5, route 107; Necaro Co., Inc., low bidder on general contract.
NEW YORK, 110 tons, miscellaneous work in Mott Haven yards of New York, New Haven & Hartford Railroad; Babor-Comeau & Co., Inc., general contractor.
BUFFALO, 375 tons, bridge over Eighteen-Mile Creek; Peckham Construction Company, low bidder.
DUNKIRK, N. Y., 400 tons; sewage disposal plant and seawall; bids opened Sept. 15.
CLEVELAND, 300 tons, building for W. S. Tyler Co.
ST. LOUIS, 250 tons, hotel at Twelfth Boulevard and Locust Street; McKelvey-Carter Construction Co., general contractors.
LOS ANGELES, 165 tons, Verdugo Wash storm drain; Soule Steel Co., low bidder.

110,000-Ton Pipe Line Order Placed

The A. O. Smith Corporation, Milwaukee, will fabricate by its electric welding process about 110,000 tons of 24-in. pipe for a gas line to run from Amarillo, Tex., to Omaha, Neb.

Machinery Markets and News of the Works

Machine Tool Volume Holds

Sales Slightly Lower in Some Districts Than in August
But This Is Offset by Gains Elsewhere

MACHINE tool business is holding at a fairly steady level. Slight losses in some districts, compared with August sales, are offset by gains in others. In addition, prospects, as represented by the amount of new inquiry, promise sustained fall activity.

It is expected that the latter half of September will bring larger orders, since many inquiries have been quoted on in the last 30 days, and a large proportion of these are still pending. Diversification of buying is gratifying to machine tool builders, many of whom are planning on keeping production schedules at the present level for some time.

The demand for presses has been exceptionally good in the Cleveland district, owing to the continued heavy demands for pressed metal parts from the automobile industry. The Midland Steel Products Co. has added a large number for two additional lines of manufacture in its Cleveland

plant and for enlarging the frame and shock absorber departments of its Detroit plant. The Central Mfg. Co., Connersville, Ind., has placed a \$75,000 order for presses to be used for automobile body stampings.

Business from the railroads is assuming larger proportions at Chicago. The Chicago, Milwaukee, St. Paul & Pacific have issued a sizable list, while the Chicago, Burlington & Quincy, which has just closed on a small list, has issued an additional inquiry for three 36-in. shapers. The Chicago, Rock Island & Pacific has also been a buyer of tools.

Demand for equipment in the Chicago district comes largely from manufacturers of tractors, agricultural implements and machinery and radios. The Nash Motors Co. is planning on replacements of machines at its three Wisconsin plants.

The Cleveland Board of Education will take bids until Sept. 17 on about 30 metalworking and woodworking machines for several Cleveland schools.

American Cyanamid Co., 535 Fifth Avenue, New York, has begun an expansion and improvement program at its plant at Niagara Falls, Ont., including installation of new machinery, to cost over \$250,000.

International Motor Car Repair & Machine Co., 614 East Eighty-third Street, New York, has leased part of building at 503 East Seventy-second Street for expansion.

Westchester Lighting Co., Mount Vernon, N. Y., has authorized expansion and betterment program during remainder of year to cost about \$2,000,000, including extensions in stations and lines at Ossining, to cost \$500,000; Port Chester, to cost \$500,000; Mamaroneck, to cost \$475,000, and other districts. An equipment distributing and service building, with repair facilities, will be built at Rye to cost about \$100,000, and a similar structure at Ossining, to cost close to like amount.

Waterfront Service Corporation, 26 Court Street, Brooklyn, plans installation of elevating, conveying and other handling equipment in new warehouse and docks, for which plans will be prepared by Moores & Dunford, Inc., 110 East Forty-second Street, architect and engineer, to cost more than \$400,000.

Nostrand Mfg. Co., Plattsburg, N. Y., recently organized by officials of Saranac Pulp & Paper Co., will take over local

mill of last noted company and plans expansion, including addition to paper mill, new pulp mill and new steam power plant, latter to include automatic stoking and coal-handling equipment, etc. Work is reported to cost more than \$175,000 with equipment. H. P. G. Nostrand, president of Saranac company, heads new organization.

Nash Queens' Motor Co., Long Island City, local representative for Nash automobile, has plans for three-story service, repair and sales building, 125 x 170 ft., to cost over \$200,000 with equipment.

Direct Control Valve Co., 101 Park Avenue, New York, has purchased plant and business of Lawler Water Feed & Damper Regulator Co., Mount Vernon, N. Y., and will consolidate with its organization. It is proposed to remove Mount Vernon plant to Milwaukee, where it will be consolidated with works of Milwaukee Valve Co., an affiliated organization, and which specializes in mechanical parts for valves; assembly plant of acquired organization will also be located in Milwaukee. James G. and Joseph G. Lawler, heretofore heads of Lawler company, will be connected with purchasing company.

Brooklyn Union Gas Co., 176 Remsen Street, Brooklyn, has filed plans for a three-story mixing plant to cost \$125,000 with equipment.

Liquidometer Co., Inc., Thompson Avenue, Long Island City, manufacturer of long-distance direct reading liquid gages and kindred specialties, has been acquired by new interests which will reorganize company and carry out expansion program.

Lighthill Corporation, 150 East Forty-first Street, New York, T. A. Meyer in charge, has plans for multi-story automobile service, repair and garage building, to cost more than \$500,000 with equipment.

Art Metal Works, 7 Mulberry Street, Newark, has taken bids on general contract for two-story addition, to cost about \$40,000 with equipment. Henry Baechlin, 665 Broad Street, is architect.

DeForest Radio Co., 139 Franklin Street, Jersey City, N. J., is carrying out an expansion program, including remodeling of equipment and installation of additional machinery.

Wright Aeronautical Corporation, Railway Avenue, Paterson, N. J., has awarded general contract to J. W. Ferguson Co., 152 Market Street, for a new two-story foundry, to cost more than \$225,000 with equipment.

New England

BOSTON, Sept. 10.—Although many machine tool houses report no improvement in business, more machines have been sold in New England since Labor Day than in the previous two weeks. Fully 90 per cent of the past week's business was transacted in west-

New York

NEW YORK, Sept. 11.—The volume of machine tool business the first 10 days of September showed no gain over the August rate, but orders and inquiries continue in satisfactory number, and prospects for a steady demand during the fall appear promising. The General Electric Co. has issued inquiries for a few additional machines for its refrigerator department. The Texas Corporation is in the market for a few tools. The New York Central continues to inquire for single machines. A railroad has ordered a 48-in. carwheel boring machine.

Sales of Pratt & Whitney Co. in the past week included five new and two used lathes, 6-spindle deep-hole drilling machine, four jig borers, 6-in. vertical shaper, 30-in. vertical profiler, 5-in. production hand miller. Miscellaneous sales were three Morris radial drills, two Cincinnati high-speed tapping machines and an 18-in. x 20-ft. gap lathe.

Plans have been filed by Columbia Metal Box Co., Ryder Avenue and 142nd Street, New York, for two-story addition to cost about \$100,000 with equipment. George A. Bagge & Sons, 157 East Forty-fourth Street, are architects.

The Crane Market

BUSINESS in overhead and locomotive cranes continues limited, and only a small volume of new inquiry is in the market. One overhead crane builder has been quite active recently, and in the past ten days has received orders for eight electric cranes, of which six were from one buyer in Philadelphia.

Among recent purchases are:

New England Power & Construction Co., Worcester, Mass., 25-ton standard locomotive crane from American Hoist & Derrick Co.

Passaic Valley Sewer Commission, New-

ark, N. J., 25-ton standard locomotive crane from McMyler-Interstate Co.

M. W. Kellogg Co., Jersey City, N. J., 12-ton crawl-tread crane for export from American Hoist & Derrick Co.

E. I. du Pont de Nemours & Co., Wilmington, Del., 1½-cu. yd. bucket crane from a builder in the Middle West.

De La Vergne Machine Co., Philadelphia, 10-ton, 58-ft. 6-in. span, 40-ton, 56-ft. 11-in. span, 20-ton, 38-ft. span, 10-ton, 36-ft. 8-in. span and 10-ton, 35-ft. span electric traveling cranes from Niles Crane Corporation.

Spang, Chalfant & Co., Inc., Pittsburgh, one 6-ton, 77-ft. span overhead electric traveling crane for Economy, Pa., works from Alliance Machine Co.

United States Gypsum Co., Chicago, one 4-motor, 4-yd. bucket crane from Cleveland Crane & Engineering Co., and two 4-motor, 3-yd. bucket cranes from Whiting Corporation.

Emerson Brantingham Co., Rockford, Ill., one 3-ton, 3-motor, 47-ft. span and one 3-ton, 3-motor, 21½-ft. span overhead electric traveling crane from Alfred Box Co.

ern New England and included lathes, jig boring equipment, drilling machines and a milling machine. The largest individual sale of used tools was four presses to a Philadelphia dealer.

New England railroads are working on 1929 budgets, but it is not likely that they will purchase a great deal of equipment. Many New England plants are securing considerable automobile work, and shops in general are better employed than in many months.

Small tools are moving freely. August sales by the largest makers were better than those in July, and made a new high record for 1928.

Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., is making alterations to one of its East Boston shops.

Miller & Levi, 46 Cornhill, Boston, architects, are taking bids on a one-story addition for Joseph Pollack Tool & Stamping Co., 81 Freeport Street, Dorchester district, Boston.

Edward T. P. Graham, 171 Newbury Street, Boston, architect, has revised plans for a municipal pumping station for Cambridge, Mass. J. J. Scully is chairman of city water board.

Albert Kahn, Inc., 1000 Marquette Building, Detroit, architect, is revising plans for a sales and service station for Packard Motor Car Co., 1089 Commonwealth Avenue, Boston.

Charles D. White Co., 208 Purchase Street, Boston, has been made factory representative of United Metal Box Co., Brooklyn, steel medicine and other cabinets.

Plans are being drawn by New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, etc., for one-story addition to forge shop, 125 x 200 ft., to cost about \$100,000 with equipment.

Stacy Machine Works, West Springfield, Mass., manufacturer of upright drills and other tools, is removing from Taylor Street to a factory on Memorial Avenue where capacity will be increased.

Connecticut Power Co., New London, Conn., has plans for a three-story equipment storage and distributing plant, 75 x 200 ft., at Waterford, Conn., with repair department, to cost about \$100,000 with machinery. L. H. Goddard, 85 State Street, is architect.

New England Power Association, Worcester, Mass., has plans for early construction of power dams, power stations and other work in connection with hydroelectric power project on Connecticut River, near Monroe, N. H., and Barnet, Vt. It is purposed to provide equipment for output of 250,000 hp., with cost more than \$30,000,000, including steel tower transmission lines. Project will

be carried out by Connecticut River Development Co., a subsidiary organization.

Seth Thomas Clock Co., Thomaston, Conn., has plans under advisement for additions to replace several old factory buildings, and will increase capacity with installation of new equipment. Work is nearing completion on a four-story addition to main plant, costing more than \$100,000.

Crandall Engineering Co., East Boston, manufacturer of mechanical products, has plans for new two-story plant at Cambridge, to cost over \$35,000, with equipment.

E. E. Hilliard Co., Buckland, Conn., has approved plans for a water power and hydroelectric station at its local woolen mill, to cost over \$100,000 with equipment. Charles T. Main, Inc., 201 Devonshire Street, Boston, is engineer.

Philadelphia

PHILADELPHIA, Sept. 11.—Strawbridge & Clothier, Eighth and Market Streets, Philadelphia, department store, has awarded general contract to Nelson Pedley Construction Co., 1510 Chestnut Street, for two-story storage and distributing plant, including automobile service and garage division, to cost \$250,000. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are architects and engineers.

David B. Flower, operating a railroad supply business at 1217 Spring Garden Street, Philadelphia, has organized D. B. Flower Mfg. Co., to manufacture electric appliances, parts, mechanical devices, etc. It is understood that new company will take over and expand present works. J. Struthers Dunn, 112 East Gowen Avenue, Mount Airy, Pa., and William C. Lex, Jenkintown, Pa., are interested.

Girard Smelting & Refining Co., Tioga and Richmond Streets, Philadelphia, recently organized to take over company of same name, has purchased property of Tacony Steel Co. for \$432,500 for a new works.

Philadelphia Gas Works, 1401 Arch Street, Philadelphia, operated by United Gas Improvement Co., same address, has plans for new artificial gas plant, with storage and distributing facilities, to cost about \$1,000,000. United Engineers & Constructors, Inc., 1401 Arch Street, is engineer.

Bids will soon be asked by Reading Co., Reading Terminal, Philadelphia, for ten-story and basement commercial, storage and distributing building, 225 x 500 ft., with service, repair and garage division to provide facilities for about 600 automobiles. Project will cost about \$3,000,000. Clark Dillenback is company architect.

Penn-Jersey Steel Co., 1450 Ferry Avenue, Camden, N. J., has awarded general contract to Herman Schestack, 631 South Sixty-third Street, for one-story addition, 65 x 166 ft.

Atlas Powder Co., Wilmington, Del., is planning erection of new nitrate plant at works at Reynolds, Pa., to cost about \$400,000 with equipment.

Pennsylvania Gas & Electric Corporation, York, Pa., has arranged for a bond issue of \$2,500,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction. H. A. Clarke is vice-president.

E. F. Houghton & Co., 240 West Somerset Street, Philadelphia, refined oils, is having plans drawn for a three-story addition, to cost over \$60,000. Austin Co., 1015 Chestnut Street, is architect and engineer.

B. Edmund David, Inc., Scranton, Pa., operating a silk mill, is said to be planning installation of power station and machine shop in proposed new plant, project to cost over \$300,000 with machinery.

Columbia Malleable Castings Co., Columbia, Pa., has awarded general contract to John H. Wickersham, Columbia, for one-story addition, 320 x 360 ft., to cost more than \$200,000 with equipment. Lothar R. Zifferer is president.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, is planning an expansion and betterment program at its coal properties, including construction of about seven new breakers, with mechanical and electrical equipment, remodeling several existing breakers, consolidation of collieries, and installation of coal-mining and other operating machinery.

Automatic Appliances, Inc., 3145 North Broad Street, Philadelphia, has been organized to distribute specialized heating products, including automatic anthracite coal burners, electric refrigeration equipment, etc., and, for the present, will not enter manufacturing field.

South Atlantic

BALTIMORE, Sept. 10.—Following organization of Albemarle-Chesapeake Co., Inc., West Point, Va., to take over and consolidate Albemarle Paper Mfg. Co., Richmond, Va., and Chesapeake Corporation, West Point, plans have been authorized for new mill adjoining plant of last-noted company at West Point, to be equipped for kraft and other heavy paper production. It will include power house, machine shop and other units. A fund of more than \$1,250,000 is being arranged for mill. H. W. Ellerson is president of consolidated company.

Board of Education, Baltimore, is considering installation of manual training equipment in new Northeast junior high school to cost about \$500,000, for which plans will be drawn by William W. Emmart, Union Trust Building, architect.

Board of District Commissioners, District Building, Washington, will receive bids until Sept. 18 for one portable gas-driven air compressor; until Sept. 19 for equipment for cafeteria for public schools, including dish-washing machines, trucks, 828 wire stools, etc.

Conveying equipment, power and refrigerating and other machinery will be installed in new packing plant to be built by J. Phillips Sausage Co., 10 Wholesale Row, Washington, to cost about \$200,000. Henschien & McLaren, 637 Prairie Avenue, Chicago, are architects and engineers.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 2 for six-cylinder marine type gasoline engines, machine screws, malleable iron pipe fittings, brass pipe fittings, soldering irons, bolts, steel wire foundry brushes, and other equipment, Panama circular 1901.

Summers Fertilizer Co., Stock Exchange Building, Baltimore, has awarded general contract to Austin Co., Cleveland, for new super-phosphate mill, to cost about \$180,000 with machinery.

City Council, Petersburg, Va., has authorized construction of municipal airport in vicinity of Lee Park, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, to cost more than \$75,000. City engineering department is in charge.

Ovens, power equipment, conveying and other machinery will be installed in new plant to be built by Waldensian Bakery Co., Valdese, N. C., to cost about \$100,000. Martin L. Hampton, Congress Building, Miami, Fla., is architect.

Perel's Fixture Exchange, 241 Harrison Street, Baltimore, store fixtures, etc., will soon take bids on general contract for three-story storage and distributing plant, to cost about \$45,000 with equipment. John Freund, 1307 St. Paul Street, is architect.

Collins Durax Co., Salisbury, N. C., is planning purchase of centrifugal pumping equipment and accessories.

Seeley-Peteet Pipe Fabricating Co. has moved into its new plant at 322 North Highland Avenue, Atlanta, for fabricating piping for power plants, heating and plumbing work and industrial plants, and for pipe and other oxy-acetylene welding. James Cannon is superintendent.

Buffalo

BUFFALO, Sept. 10.—Arrangements have been made by Kelker Blower Co., 2383 Fillmore Avenue, Buffalo, manufacturer of blower equipment, sheet metal products, etc., for purchase of one-story factory, 60 x 200 ft., at 19 Bush Street. Improvements will be made and present works removed to new location, with installation of additional equipment.

Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, has work under way on extensions to increase output about 30 per cent, to cost about \$50,000 with equipment.

McKaig-Hatch, Inc., 595 Ontario Street, Buffalo, manufacturer of forgings, etc., has plans for a one-story addition.

Kittenger Furniture Co., 1893 Elmwood Avenue, Buffalo, has awarded general contract to Hydro Construction Co., Mu-

tual Building, for a three-story addition, to cost over \$200,000 with equipment.

Officials of Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, have organized Curtiss Flying Service, Inc., to operate an airplane line between at least 25 cities. Plans are under way for establishment of airports, including hangars, repair and reconditioning shops, oil storage and distributing buildings and other units. Company will also operate service and repair stations, including parts and accessories. Arrangements are being made for sale of 750,000 shares of stock, to net more than \$8,000,000, proceeds to be used for construction noted, purchase of planes, etc. C. M. Keys, president of Curtiss company, will be chairman of board of new organization. Casey Jones will be president.

United Reproducers Corporation, Rochester, N. Y., is being organized to take over United Radio Corporation, with local factory, and Newcombe-Hawley Co., Inc., St. Charles, Ill. A preferred stock issue of \$2,475,000 is being arranged, part of fund to be used for completing merger and for expansion. Jesse Hawley, treasurer of last noted company, will head new organization.

Chicago

CHICAGO, Sept. 10.—Machine tool business from railroads is in larger proportions. The Chicago, Milwaukee, St. Paul & Pacific has issued a sizable list and the Chicago, Burlington & Quincy is inquiring for three 36-in. shapers following the closing of a small list. The Rock Island has also purchased tools on which it had taken prices. Lack of an appropriation is said to be holding in check purchases by the A. O. Smith Corporation, Milwaukee. Allis-Chalmers Mfg. Co. has set Sept. 15 as the closing date on its list. The Nash Motors Co. is planning replacements at its three Wisconsin works, and radio parts manufacturers are in need of machine tool equipment. Tractor builders are again entering the market, one order from that source being for two 6-ft. radial drills. Impression is uniform that sales in September will be good.

List of Chicago, Milwaukee, St. Paul & Pacific Railroad.

One 3½-in. turret lathe, with 220-volt direct-current motor.

One internal grinder for locomotive air pumps, with reverse gear cylinder attachment and motor.

One 32-in. crank shaper, with motor.

Two 32-in. heavy-duty crank shapers with motors.

One 20-in. railroad brass lathe with chasing bar.

Two 20-in. speed drill presses with motor.

One 3-ft. radial drill with motor.

One structural steel and miter shear, universal punch and coping machine.

Two 3½-in. semi-automatic turret lathes with motors.

One 30-in. x 18-ft. piston lathe with motor.

One 42 x 42-in. x 16-ft. heavy-duty planer with two rail heads and one side head, with reversing motors.

Two 3-post electric rivet heaters for rivets ⅝-in. to 1¼-in. by 1½-in. to 10-in.

One 3½-in. single bar screw machine with motor.

One 72-in. boring mill with motor.

One 42-in. motor-driven lathe, 10½-ft. centers.

One 4½-in. horizontal boring mill with motor.

Knapp Brothers, manufacturers of metal trim and building specialties, will move their plant from Cicero to Joliet,

Ill., and will erect a factory, 120 x 600 ft., to cost \$130,000.

Central Steel & Wire Co., Chicago, will build a one-story warehouse, 120 x 360 ft., at corner of South Western Avenue and West Forty-fifth Place, to cost \$200,000. W. S. Crosby is architect.

American Carton Corporation, 4936 South Rockwell Street, Chicago, will build an addition, 80 x 211 ft., to cost \$33,000. T. B. Jorgensen, 510 North Dearborn Street, is architect.

Illinois Public Service Co., 130 South Sixth Street, Cairo, Ill., is planning construction of a one-story ice manufacturing plant to cost \$75,000.

Bids have been asked on general contract by Okaw Stove & Enameling Co., New Athens, Ill., for a one-story plant, 80 x 200 ft., to cost about \$40,000 with equipment. W. C. Ross, 1015 East Monroe Street, Belleville, Ill., is head of company.

Standard Oil Co. of Indiana, 400 East Cerro Gordo Street, Decatur, Ill., plans new storage and distributing plant to cost about \$100,000 with equipment. Schlinz & Bailey, 53 West Jackson Boulevard, Chicago, are architects.

International Harvester Co., Chicago, has let contracts for additions to grinding building, steel storage and steel shearing departments at plow production plant, Canton, Ill., to H. K. Ferguson Co., Cleveland. Steel storage building will be one story, 32 ft. high, and will house large machinery. H. W. Bland is plant engineer. Contract has also been awarded to Kucharo Construction Co., Des Moines, for one-story factory branch, service and repair building, 95 x 170 ft., at Dubuque, Iowa, for motor truck division, to cost over \$70,000 with equipment.

M. L. Kraman, 134 North La Salle Street, Chicago, architect, has filed plans for three-story automobile service, repair and garage building, to cost about \$275,000 with equipment.

Mountain States Power Co., Basin, Wyo., will make extensions and improvements in power facilities and transmission lines to cost about \$150,000, including new line from Lovell to Gray Bull, Basin and vicinity, with automatic substation equipment. Headquarters are at Tacoma, Wash.

St. Louis

ST. LOUIS, Sept. 10.—City Council, Kirkwood, Mo., has engaged Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., engineer, to prepare plans for municipal electric power plant and system, to cost about \$200,000 with equipment.

Officials of Gardner Motor Co., Main and Rutger Streets, St. Louis, manufacturer of automobiles, are said to be arranging for organization of new company, with capital of \$2,000,000, to manufacture airplanes and parts.

City Council, Stanberry, Mo., will receive bids until Sept. 25 for equipment for municipal electric light and power plant, including Diesel engines and auxiliaries. Henrici-Lowry Engineering Co., 114 West Tenth Street, Kansas City, Mo., is engineer.

United States Cold Storage Co., 500 East Third Street, Kansas City, Mo., has plans for new six-story cold storage and refrigerating plant unit, to cost \$400,000 with equipment. A. Epstein, 2001 West Pershing Road, Chicago, is engineer.

Chicago, Burlington & Quincy Railroad

Co., 547 West Jackson Boulevard, Chicago, has filed plans for an electrically-operated coaling station at Kansas City, Mo., with capacity of 200 tons.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., plans installation of manual training equipment in new three-story senior high school to cost about \$450,000, for which superstructure will soon begin. Layton, Hicks & Forsyth, Braniff Building, are architects.

St. Louis Air Transport & Terminal Co., Boatman's Bank Building, St. Louis, P. E. Peltason, head, is having plans prepared for airport at East St. Louis, Ill., including hangars, repair and reconditioning shops, oil storage and distributing buildings, to cost over \$400,000. Love-Sultan, Inc., 6625 Delmar Boulevard, University City, Mo., is architect and engineer.

Cleveland

CLEVELAND, Sept. 10.—Machine tool business came out in moderate volume the past week with few orders for more than single tools. Demand is largely from the automotive field. Turret lathe manufacturers report a fair volume of orders, although sales are not quite as brisk as in the first part of August. Press equipment is active. The Midland Steel Products Co., Cleveland, has just purchased several presses for use in two additional production lines to its automobile frame department in its local plant and for enlarging the frame and shock absorber departments of its Detroit plant. Part of the expansion has been necessitated by a large export order for automobile frames. The Central Mfg. Co., Connersville, Ind., has purchased \$75,000 worth of press equipment to manufacture automobile body stampings.

The Cleveland Board of Education will take bids Sept. 17 for about 30 metal and wood-working machines and some miscellaneous equipment for several schools. The list follows:

- One 1-in. x 6-in. x 14-in. turret lathe.
- Two tool-room lathes.
- One 11-in. x 5-ft. lathe.
- One 12-in. floor grinder.
- One 10-in. sensitive drilling machine.
- One arbor press.
- One 14-in. drilling machine.
- One 6-in. combination grinder.
- One tumbling barrel, sand blast and dust arrester.
- One air compressor.
- One melting furnace.
- Three 12-in. x 7-ft. wood-working speed lathes.
- One 24-in. planer.
- Two 6-in. jointers.
- One utility type bench lathe.
- Two 14-in. band saws.
- One 30-in. band saw.
- Three universal bench saws.

Swartwout Co., 18511 Euclid Avenue, Cleveland, manufacturer of steam specialties, is planning a new one-story plant, to cost over \$125,000 with equipment, for which architect will be selected soon.

Board of Education, Chagrin Falls, Ohio, contemplates installation of manual training equipment in new high school to cost about \$375,000, for which plans will soon be completed by Fulton & Taylor, 8120 Euclid Avenue, Cleveland, architects.

Cleveland Wire Spring Co., 1281 East Thirty-eighth Street, Cleveland, has engaged George S. Rider Co., Century Building, architect and engineer, to prepare plans for one-story addition, 120 x 125

ft., to cost about \$80,000 with equipment. Part of structure will be used for storage and distributing.

Peerless Motor Car Corporation, East Ninety-third Street, Cleveland, has plans for a new one-story steam power house with coal storage and distributing facilities, including conveying, unloading and other equipment, to cost close to \$40,000. Wilbur Watson and Associates, 4614 Prospect Avenue, are architects and engineers.

Toledo Central Garages, Inc., Toledo, Ohio, care of Mills, Rhines, Bellman & Nordhoff, Ohio Building, architects, has plans for six-story service, repair and garage building, 110 x 200 ft., to cost about \$500,000 with equipment.

Transue & Williams Steel Forgings Corporation, Cleveland, has let contract to H. K. Ferguson Co. for additions to its Alliance, Ohio, plant.

Hill Clutch Machine & Foundry Co., Cleveland, has appointed following dealers: Harry P. Leu, Orlando, Fla., in southern Florida; Engineering Sales Co., Saginaw Mich., in thumb district of Michigan; F. C. Richmond Machinery Co., Salt Lake City, in Utah, Nevada, Idaho and Wyoming; Arthur E. Jones, Syracuse, N. Y., in western New York; Hollis & Co., Little Rock, Ark., in southern Arkansas, and San Antonio Machine & Supply Co., in southern Texas.

Cincinnati

CINCINNATI, Sept. 10.—Machine tool sales the first week of September showed a slight falling off from the August level, although bookings still continue exceptionally good. Usually the latter part of August and the first half of September are comparatively dull, because the heaviest effects of the vacation season are reflected in that period, but it has been distinctly different this year. As inquiries are fairly numerous and there are a considerable number of transactions which are reasonably certain to be closed soon, local builders expect September to be a satisfactory month from the standpoint of new orders. Diversified buying is an outstanding source of satisfaction to manufacturers who are planning to keep production at the present high level indefinitely.

LeBlond-Schacht Truck Co., Eighth and Evans Streets, Cincinnati, manufacturer of automobile trucks, has purchased equipment, good will, patents and other properties, other than real estate, of O. Armleder Motor Truck Co., Twelfth Street and Central Parkway. New corporation is to be formed, and equipment at Armleder plant will be moved to 3134 Spring Grove Avenue, property of LeBlond-Schacht Truck Co. Armleder company recently has been producing daily 12 heavy-duty motor trucks, ranging in capacity from 1½ to 5 tons.

Contract has been let by Variety Mfg. Co., 2901-3 West Third Street, Dayton, Ohio, manufacturer of spun metal products, to Hillsmith & Co., Winters National Bank Building, for one-story and basement addition, to cost about \$40,000 with equipment.

Richards, McCarty & Bulford, 584 East Broad Street, Columbus, Ohio, architects, have plans for a two-story automobile service, repair and garage building to cost about \$100,000 with equipment.

Liberty Blow Pipe Works, Louisville, has been purchased by G. L. Jackson, formerly plant engineer for Mengel Co.,

and associates, who will reorganize company and increase production facilities. New organization has arranged with Kirk & Blum Mfg. Co., Cincinnati, manufacturer of blowers, exhaust systems, etc., to use patents of that company in Louisville district.

Ohio Pattern Works, Colerain Avenue, Cincinnati, manufacturer of metal and wood patterns, has awarded general contract to D. Meinken & Sons, 2143 Barnard Street, for a four-story and basement addition, to cost about \$100,000 including equipment.

David Dermon, Dermon Building, Memphis, Tenn., and associates are negotiating purchase of site for six-story automobile service, repair and garage building, 148 x 150 ft., to cost over \$150,000 with equipment. George Awsumb, Dermon Building, is architect.

Springfield Metallic Casket Co., North Street, Springfield, Ohio, has taken bids on general contract for a five-story addition, 140 x 203 ft., to cost about \$175,000 with equipment. Eastman & Budke, First National Bank Building, is architect.

City Council, Chattanooga, Tenn., is considering a municipal airport and aviation field, with hangars, repair and reconditioning shops, oil storage and distributing buildings, entire project to cost about \$250,000. A bond issue is being arranged.

Milwaukee

MILWAUKEE, Sept. 10.—Not only are machine tool plants busy, with several operating overtime, but new business is developing satisfactorily, and the present rate of production seems assured for some time. Automotive demand is noteworthy despite heavy purchases in recent months. Foundry and machine shop employment in Milwaukee and vicinity is at the highest peace-time record, and the supply of machinists, machine hands and molders is very light, with an absorbing demand.

Seaman Body Corporation, Milwaukee, subsidiary of Nash Motors Co., Kenosha, Wis., will further enlarge its plant over a two-year period at a cost of \$2,000,000. Contracts are being awarded for first unit, a five-story wing, 100 x 385 ft., for production of steel body panels and body stampings. A battery of new stamping and drawing presses is being purchased. When this unit is completed, another wing of similar size will be built. It is also stated that plant of Seaman-Dunning Co., Pine Bluff, Ark., also a Nash subsidiary, will be enlarged to provide Seaman body works with increased hardwood stock.

Malleable Iron Range Co., Beaver Dam, Wis., manufacturer of kitchen ranges and other heating devices, has contracted with Hutter Construction Co., Fond du Lac, Wis., for a one-story factory warehouse building, 86 x 110 ft.

Welded Products Co., 851 Kinnickinnic Avenue, Milwaukee, manufacturer of steel joists and other welded building material and specialties, is erecting a new production unit, 60 x 120 ft., in Cudahy. The investment will be about \$35,000.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., will extend its artificial gas distributing system from Fond du Lac, Wis., to Beaver Dam, Wis., by way of Lamartine, Ripon and Waupun, and plans a 200,000 cu. ft. gas holder in Beaver Dam. E. J. Kallevang is chief engineer.

Hill & Hubbell Co., San Francisco, will rush work on a new plant in Milwaukee to replace leased quarters at Thirty-second and Hopkins Streets, destroyed by fire Sept. 4. Company manufactures and operates special machinery for covering electrically welded steel pipe made by A. O. Smith Corporation, Milwaukee. Two 60-ton cranes in one section of the building were badly damaged.

Gillette Rubber Co., 799 Wisconsin Avenue, Eau Claire, Wis., has started work on erection of a one-story tire and tube manufacturing addition, 50 x 135 ft.

Eastman Mfg. Co., Manitowoc, Wis., producer of hose couplings, is building a one-story addition, 40 x 60 ft.

David White Co., 315 Court Street, Milwaukee, manufacturer of surveying instruments and other optical specialties, has increased its capital stock from \$50,000 to \$75,000. Additional space is being taken in its building and some new equipment will be installed.

Durant Mfg. Co., 655 Buffum Street, Milwaukee, manufacturer of counting machines for production machinery, will invest about \$50,000 in building and equipping two additional stories on its present main shop, 60 x 120 ft.

American Metal Products Co., Thirty-fourth Avenue and Burnham Street, Milwaukee, manufacturer of bronze castings, is preparing to build an addition to its rolling mill, 50 x 120 ft.

Pittsburgh

PITTSBURGH, Sept. 10.—While machine tool sales are not large nor numerous, inquiry is brisk and is coming from sources which usually purchase after asking for bids.

Vulcan Crucible Steel Co., Aliquippa, Pittsburgh, has acquired five acres adjoining plant for future expansion.

Board of Education, Apollo, Pa., is said to be planning installation of manual training department in new three-story high school to cost \$200,000. A. L. Thayer, Greer Building, New Castle, Pa., is architect.

Oil City Tank Car Co., Oil City, Pa., recently organized by B. H. Mathias, Oil City, and associates, with capital of \$50,000, will operate local plant for manufacture of tank car equipment, oil refining apparatus, tanks and other specialties. L. D. Fulton and E. H. Leslie, both of Oil City, are interested in new company.

United States Engineer Office, Pittsburgh, will receive bids until Sept. 27 for repair parts for engines, circular 75. It is said bids will be asked early in October for lock-operated machinery for double locks at Deadmans Island dam, Ohio River, as per plans being drawn.

C. J. Kerin, Emsworth, Pittsburgh, and associates have organized Pittsburgh Eastern Air Lines, to operate a commercial flying service between Pittsburgh and Philadelphia by way of Harrisburg, including construction of airports at points noted, with hangars, repair and reconditioning shops, oil storage and distributing buildings. Work will begin soon.

Joint High School Board of Education, Barboursville, W. Va., is said to be planning installation of manual training facilities in new high school to cost more than \$175,000, for which bids on general contract for first unit will be received Sept. 19. William F. Diehl, Robson-Prichard Building, Huntington, W. Va., is architect.

Indiana

INDIANAPOLIS, Sept. 10.—Bids will soon be asked by Poinsett Brothers, 323 East Washington Street, Fort Wayne, for a one-story machine shop and service building, 50 x 150 ft., to cost about \$40,000 with equipment. Pohlmeier & Pohlmeier, Central Building, are architects.

Wheeler-Schebler Carburetor Co., Inc., 1302 Barth Avenue, Indianapolis, manufacturer of carburetors and automobile accessories, has engaged D. A. Bohlen & Son, Majestic Building, architects, to prepare plans for one-story addition, 130 x 140 ft., to cost about \$50,000 with equipment.

Motor Bodies, Inc., Evansville, subsidiary of Graham-Paige Motor Co., Detroit, has begun superstructure for one-story addition, 450 x 480 ft., to cost over \$650,000 with equipment.

Chicago & Eastern Illinois Railroad Co., 332 South Michigan Avenue, Chicago, has plans for new locomotive and car repair shops at Evansville, to cost about \$200,000 with equipment. L. C. Hartley, 6600 South Union Avenue, Chicago, is chief engineer.

Dodge Mfg. Corporation, Mishawaka, Ind., manufacturer of transmission equipment, etc., has plans for one-story addition, 100 x 200 ft., to cost close to \$45,000 with equipment.

United States Slicing Machine Co., La Porte, Ind., has begun work on an addition to increase capacity close to 40 per cent, to cost over \$200,000.

Bendix Brake Co., South Bend, has plans for brick and steel addition, 200 x 300 ft., to cost about \$10,000. It will be erected by H. G. Christman Co., South Bend.

Detroit

DETROIT, Sept. 10.—Plans are being completed by Detroit Gasket Mfg. Co., 6309 Hamilton Avenue, Detroit, for one and two-story addition, including boiler plant, to cost about \$50,000 with equipment. C. W. Brandt, 2111 Woodward Avenue, is architect.

Knight Screw Products Co., 6510 Epworth Boulevard, Detroit, has awarded general contract to Gallagher-Flemming Co., 6500 Epworth Boulevard, for one-story addition to machine shop to cost about \$25,000.

Crane Co., 836 South Michigan Boulevard, Chicago, has engaged Van Leyen, Schilling & Keough, 3440 Cass Avenue, Detroit, architects, to prepare plans for a one-story factory branch and distributing plant at Detroit, to cost over \$80,000 with equipment.

Wilder-Strong Implement Co., Monroe, Mich., is carrying out an expansion program to double, approximately, capacity. Additional equipment will be installed.

Pontiac Pattern & Engineering Co., Pontiac, Mich., has awarded general contract to Pryale Construction Co., Pontiac, for a foundry addition to cost about \$24,000. Robert O. Derrick, Inc., 120 Madison Avenue, Detroit, is architect.

Newaygo Portland Cement Co., Newaygo, Mich., is considering new mill in vicinity of Charlevoix, Mich., with power house, machine shop and other buildings, to cost about \$1,000,000 with equipment.

Chevrolet Motor Corporation, Flint, Mich., has awarded general contract to H. G. Christman Co., Lansing, Mich., for a two-story addition, 200 x 240 ft., primarily for assembling, to cost over \$180,000 with equipment.

Bennett Pump Corporation, Terrace Street, Muskegon Heights, Mich., manufacturer of pumps and pumping machinery, is having plans drawn for an addition to total about 22,600 sq. ft. floor space, to cost close to \$55,000 with equipment.

Hupp Motor Car Corporation, Detroit, has begun construction of a new unit to main plant. Building will be eight stories, 150 x 200 ft., and will include shipping docks and trackage and accommodate engineering department on top floor. Other floors will be utilized for car storage.

Gulf States

BIRMINGHAM, Sept. 10.—William E. Easterwood, Jr., Baker Hotel Building, Dallas, Tex., is at head of project to construct a plant to manufacture aircraft, with initial unit largely for parts and assembling.

Texas Co., Texas Co. Building, Houston, Tex., is reported planning new oil refinery in southwestern part of State. Project will include construction of pipe line from properties in Winkle County to refinery, and will cost over \$500,000.

Martin-Navarro Co., Frost Bank Building, San Antonio, Tex., has awarded general contract to Walsh & Burney, Inc., 928 Flores Street, for one and two-story motor bus service, repair and terminal building, to cost about \$115,000 with equipment.

Trinity Portland Cement Co., Fort Worth, Tex., will make extensions and improvements in mill to double capacity, to cost about \$500,000 with machinery.

Phillips Petroleum Co., Bartlesville, Okla., has authorized new gasoline refinery near McCamey, Tex., to cost about \$450,000 with machinery.

New Orleans Parish School Board, City Hall, New Orleans, is planning installation of manual training equipment in new three-story school to cost about \$275,000, for which bids have been asked on general contract. E. A. Christy, City Hall, is school architect.

Ovens, power equipment, conveying machinery and other equipment will be installed in new two-story and basement baking plant, 100 x 120 ft., to be built by Arnot Baking Co., 401 East Third Street, Jacksonville, Fla., to cost about \$115,000.

Pacific Coast

SAN FRANCISCO, Sept. 6.—Little Rock Power & Water Co., Los Angeles, affiliated with Southern Sierras Power Co., Riverside, Cal., has secured permission for a hydroelectric power development on Little Rock Creek, Los Angeles County, to cost about \$600,000, including power dam and transmission line. Output will be used by Southern Sierras company.

Marchetti Motor Patents, Inc., Russ Building, San Francisco, recently formed by Paul Marchetti and associates, is having plans drawn for aircraft manufacturing plant at South San Francisco, consisting of two one-story units, totaling 28,000 sq. ft. and 68,000 sq. ft., for airplane motor production, and aircraft parts manufacture and assembling, respectively. Project will cost close to \$275,000 with machinery. A. W. Ryder is company engineer, in charge.

Flagstaff Gas Co., Flagstaff, Ariz., has plans for a new artificial high pressure gas plant, to cost close to \$190,000 with equipment.

Shell Oil Co., Lloyd Building, Seattle, has awarded general contract to Strandburg & Robinson, Arcade Square, for a two-story machine shop, 60 x 120 ft., with one-story and basement automobile service and garage building, 60 x 135 ft., on adjoining site, project to cost about \$85,000 with equipment.

Olympic Motor Boat Co., 5915 Marginal Way, Seattle, is said to have plans for extensions for building aircraft, including seaplanes, with facilities for parts manufacture and assembling.

Swift & Co., Union Stock Yards, Chicago, and Los Angeles, have awarded general contract to Richards-Neustadt Construction Co., W. M. Garland Building, for oil refinery in Vernon section, to cost about \$140,000 with machinery.

Richfield Oil Co., Matson Building, San Francisco, has plans for new storage and distributing plant in Squalicum Creek Basin section, Bellingham, Wash., to cost about \$100,000 with equipment.

Pacific Galvanizing Co., 1711 East Sixty-first Street, Los Angeles, has been formed to do galvanizing-electro and hot-cadmium plating and sand blasting. Company has plant completely equipped.

Hallett Aero Motors Corporation, 523 South Redondo Boulevard, Inglewood, Cal., has been organized to manufacture airplane engines. It has been operating foundry and machine shops for manufacture of air compressors and marine engines and additional capacity will be constructed to take care of its new line.

Canada

TORONTO, Sept. 10.—Business in machine tools has been more active the past two weeks than at any time since the first of July. Much of the improvement is due to sales at the Canadian National Exhibition which closed Sept. 8. A considerable volume of business is in prospect for closing within the next six weeks, and dealers and builders look for high average sales for this month. A steady demand is reported for tools for automotive plants, garages and repair shops.

Eastern Car Co., Amherst, N. S., is making some changes in its plant and is asking for a few special tools. Steel Co. of Canada, Ltd., Hamilton, Ont., and Algoma Steel Corporation, Sault Ste. Marie, Ont., are expected to enter market soon with some large lists.

Beach Foundry, Ltd., Ottawa, Ont., will issue 7 per cent cumulative preferred stock, fund to be used for plant improvement and to finance its increasing business. Company manufactures stoves, furnaces, heaters, ranges, etc.

General Steel Wares, Ltd., Toronto, has secured a site at North Bay, Ont., for a branch plant for assembly, distributing and warehouse.

Ford City, Ont., Cyril Fraser, councillor, is contemplating erection of a new waterworks pumping station to cost \$80,000.

Bids are being received by Bates Valve Bag Co., Ltd., head office, Walker Power Building, Walkerville, Ont., manufacturer of automatic bag filling and weighing machinery, no closing date set, for erection of a factory at its branch plant at Cap de la Madeleine, Que., to cost \$100,000. Building to be one story, 80 x 200 ft., brick construction.

Canada Cement Co., Canada Cement Building, Montreal, will make alterations and additions to its plant at Hull, with installation of new machinery, to cost \$500,000.

Canadian International Paper Co., 1153 Notre Dame Street, Montreal, is having plans prepared for a paper mill at Paugan Falls, Que.

Chrysler Motor Car Co., Windsor, Ont., contemplates building another addition to its plant at Tecumseh and McDougall Streets.

Arco Paint & Varnish Co., Toronto, Ont., will start work immediately on a manufacturing plant at Mount Dennis, Ont.

Western Canada

Murray-Latta Machine Works, Vancouver, B. C., has awarded contract to Dominion Construction Co., Ltd., 509 Richards Street, for a machine shop and boiler house, one story, 50 x 122 ft. S. A. Lake, 509 Richards Street, is architect.

Foreign

OFFICIALS of Anglo Smelting & Refining Co., London, England, G. P. Lewis, president, have organized Anglo-American Nickel Co., a subsidiary, to develop a deposit of nickel in northern part of Arizona. A reduction plant is planned. Project is reported to cost more than \$200,000.

Mexican National Railways Co., Mexico City, Mexico, is said to be planning an extension and improvement program for locomotive and car shop facilities, including removal of four existing shops in different cities to other locations, where capacities will be increased.

Corn Products Refining Co., 17 Battery Place, New York, with mills at Edgewater, N. J., Argo and Pekin, Ill., is said to be considering construction of a new plant in Brazil, as well as new mill in Japan. Arrangements have recently been made for a plant in Argentina.

Department of Communications and Public Works, Mexican Government, Mexico City, Mexico, is planning construction of new airport, including four hangars, each with capacity for housing 15 planes, repair and reconditioning shops, oil storage and distributing buildings, to cost over \$120,000.

State Department, Government of Bolivia, La Paz, has approved plans for construction of first section of its railroad project, comprising first 100 miles of track between Cochabamba and Santa Cruz, a total distance of 350 miles, with car and locomotive shops, yards, terminal facilities, etc., project to cost \$35,000,000. General contract has been let to Kennedy & Carey, 44 Wall Street, New York.

A steel company at Newcastle, New South Wales, Australia, is planning expansion in its mills, with installation of considerable additional equipment; a new coke oven unit is planned. Project is reported to cost about \$5,000,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Australia No. 9-3-28.

Plans have been approved for a new cold storage and refrigerating plant at Stavropol, Russia, under direction of Soviet Government, to cost more than \$200,000 with equipment. Information at office of American-Russian Chamber of Commerce, 145 West Fifty-seventh Street, New York.

Ford Motor Co., Highland Park, Detroit, is arranging for expansion at its plants at Cork, Ireland, and Trafford Park, vicinity of London, England. First noted works will be used in future for manufacture of Fordson tractors, including parts and assembling, and following removal of certain machinery from Cork plant to Trafford Park works, additional equipment will be provided. Trafford Park plant will be devoted in future to manufacture of automobiles only.

Imperial Airways, Ltd., London, England, is planning construction of airport in vicinity of Hamilton, Bermuda, including hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical structures.

New Trade Publications

Arc Welders.—Fusion Welding Corporation, 103rd Street and Torrence Avenue, Chicago. Folder of four pages devoted to Fuzon arc welders, and giving dimensions and general specifications for three sizes. General design and other data are included.

Racks for Storage.—Revolator Co., 336 Garfield Avenue, Jersey City. Four-page folder devoted to racks for storage of barrels, drums and kegs with their contents. Included are tiering machines for putting the materials into storage and removing them from storage.

Production Tools.—Kelly Reamer Co., Cleveland, Ohio. Catalog of 94 pages describes a line of production tools for all classes of boring and reaming, including various types of tools for multiple cutting, with numerous illustrations. Other parts of the catalog illustrate and describe the set-up of tools and fixtures on machines for specific operations.

Power Shovels.—Thew Shovel Co., Lorain, Ohio. Loose-leaf handbook covering very completely the operation, care, adjustment and application of the Lorain line of steam shovels. Numerous illustrations are included. One section is devoted to excavation information and tables. This book is intended to instruct the operator and assist him in becoming more proficient and also to aid erecting engineers in making standard adjustments.

Powdered Coal.—Combustion Engineering Corporation, 200 Madison Avenue, New York. Reprint in four pages of an article by Henry Kreisinger, which appeared in *Power*, May 29. This deals with the present situation in the use of powdered coal and in equipment for using it.

Celite for Concrete.—Celite Products Co., Los Angeles. Bulletin 339 of 16 pages illustrates and describes the use of Celite as an ingredient in concrete for building purposes. The illustrations are mostly from work in progress. Directions are given for the use of the material.

Arc Welder.—General Electric Co., Schenectady, N. Y. Bulletin GEA-874B of four pages illustrates and describes a portable welder with a.c. motor. Distinctive features are emphasized and specifications given.

Unit Pulverizer.—Erie City Iron Works, Erie, Pa. Bulletin of 4 pages illustrating and describing the Unitype pulverizer for powdered coal, which is built in four sizes with rated capacity from 250 to 7500 lb. an hour. Dimensions are given, together with a section of the pulverizer and installation views.

THE IRON AGE

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Alloy Bridge Steel Sixty Years Old

Excellent Condition of Chromium Steel in St. Louis Bridge—Historical Notes on Difficulties Encountered During Manufacture, Fabrication and Erection of First Steel Bridge in America

BY E. E. THUM*

FROM time to time prominent bridge engineers express their wariness of heat treated alloy steels for long-span bridges. This prejudice is being gradually uprooted, if one may judge by the growing use of silicon, manganese and nickel steel and of heat treated eyebars in the important structures now being constructed. Doubtless the situation duplicates many features of the transitional period when the tried and true wrought iron was being slowly replaced by the stronger carbon steels. The parallel is almost complete. Then, as now, the comparatively new metal, at a higher price, could be used with economy only for the longest spans where the saving in weight through the use of stronger metal counterbalanced the increased price per pound.

Pioneer Uses of Steel in Bridges

It is worthy of record that the first American bridge to use steel for main members was the arch bridge over the Mississippi River at St. Louis, designed by Captain James B. Eads. (Captain Eads, by the way, was a most versatile engineer, having achieved noteworthy success in glass manufacture and gun-boat building, and later in life supervised

control works for the lower Mississippi River.) The bridge then was, and still is, regarded as a most remarkable monument to engineering. The size of the arches (520-ft. span), the heavy loadings assumed (a double line of locomotives and a crowded highway deck), the unprecedented feat of sinking masonry piers to bed rock 110 ft. below water level, and the total cost of \$6,540,000 were the features which attracted most attention.

Captain Eads boldly decided that nothing but the best crucible steel would serve for the arch ribs. As will appear in the sequel, he had to advance even further and install chromium steel for these principal load-carrying members. Consequently the Eads bridge is not only the first American bridge to use steel, but it is also the first anywhere to use alloy steel. (a) That the decision was a wise one is shown by the record of uninterrupted service, and the minute examinations given it in 1902, 28 years after its completion, and again during the past winter. After the latter examination, the board of engineers certified that "the Eads bridge is in excellent physical condition, and amply safe

(a) The first bridge to use steel for main structural members was built between 1863 to 1868 at Kuilenburg, Holland, over an arm of the Rhine. Its main span is a 515-ft. truss, and it carries a double-track railroad.

*THE IRON AGE, New York.

for the loads and service it is called upon to carry and is carrying." This despite the fact that the highway has been strengthened, once to carry a track for street cars and later for heavy interurban trolley cars, and that both railroad tracks were reconstructed in 1926 to carry wheel loads of freight and passenger cars that have so largely increased since 1868, when the bridge was designed.

Evidence That Steel Strength is Permanent

Such structures as the Eads bridge are the best evidence which could be gathered about the permanence of the properties of well made steel. To quote Henry Miller, president of the Terminal Railroad Association of St. Louis, the present owner of the structure, "there are many who think that steel crystallizes with age, but I have seen so many old

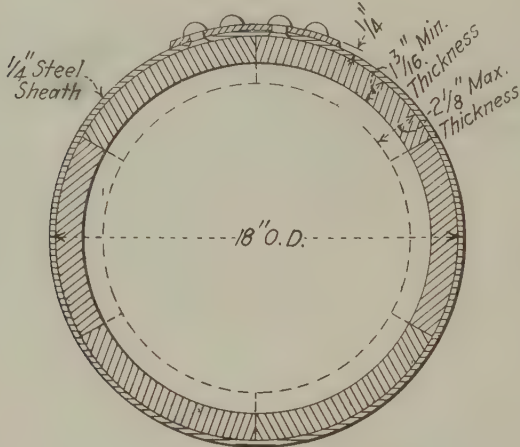


Fig. 1—Cross Section of Main Arch Members. Crucible steel sheath incloses six staves of chromium steel

structures taken down in good condition that it is my impression that if the metal is of good quality, not overstressed, and properly protected it will last indefinitely, and this is exemplified by the experience with the Eads bridge."

Corrosion is the greatest enemy of metal. As a matter of fact, the reconstruction work on the highway deck in 1924 showed that steel I-beams installed in 1902 were unfit for further service where they were exposed to the smoke of locomotives passing on the lower deck. Wrought iron members of the same floor system, installed in 1874, were not seriously damaged in more than double the time.

Plain Chromium Steel in the Arches

Minute examination of all members in the bridge was made last winter by J. N. Ostrom, consulting engineer, and aside from a few minor details no evidence of overstrain, such as cracking of paint films, could be discovered. Mr. Ostrom drilled 1-in. inspection holes in the bottom of each of the main arch members (which are built-up tubes, as described later) and found the interior dry and the original bitumen coating in good condition. No traces of interior or exterior corrosion were noted. Analyses of these drillings revealed the steel to be a high-carbon chromium steel extremely low in sulphur. Since it is known that the steel was made in the crucible process, the uniform chromium

content is quite remarkable. The analyses fall within the range given in the accompanying table.

Analyses of Chromium Steel in Eads Bridge

	High	Low	Average
Carbon	0.95	0.64	0.79
Manganese	0.23	0.018	0.11
Silicon	0.19	0.056	0.10
Sulphur	0.013	0.006	0.009
Phosphorus	0.082	0.007	0.044
Chromium	0.68	0.54	0.61

It required 3 to 10 drills to go through the 2 1/4 in. of chromium steel in the tube wall, there being rough agreement between the number of drills used and the carbon analysis—a 70-carbon steel requiring three drills and a 90-carbon steel ten.

Loads Carried by Alloy Steel

As will be described later, the chromium steel in these main members was proof-tested very thoroughly in full sized pieces, and there is no doubt that its elastic limit in compression averages at least 60,000 lb. per sq. in. Small sized test bars machined from crop ends regularly developed ultimate strengths of 115,000 to 140,000 lb. per sq. in. in tension. Captain Eads used a design stress of 30,000 lb. per sq. in. in compression for the most unfavorable combination of loads.

Stress analyses made last winter by J. M. Johnson for the loads the bridge may now be called upon to carry show that the greatest working stress to be expected even now is 39,700 lb. per sq. in., a maximum that is 10,600 lb. less than the proof-load and an even greater amount below the elastic limit. This stress occurs in the unlikely event that a hurricane strikes the bridge when both railroad and highway decks are loaded to capacity and on the hottest day in the year. Captain Eads believed the bridge to be twice as strong as it need be for the conditions of 1870, (i.e., that his design stress of 30,000 lb. per sq. in. for the alloy steel arches was half what it might be for the chromium steel used). Consequently from his recent computations Mr. Johnson believes that the maximum probable stress today of 39,700 lb. per sq. in. should not be considered dangerous. The day-by-day working stresses are figured at 31,000 to 34,000 lb. per sq. in. He further remarks: "Consideration must also be given to the fact that high-strength steels are much more reliable under compression than under tension."

Under these conditions, namely, that there are no signs of corrosion or distress in the main bridge members, and that analysis of the loads now being carried give maximum stresses no greater, in proportion to the elastic limit and ultimate strength of the material, than are now being used as a basis for designs with ordinary structural steel, the engineer making the investigation had no hesitancy in stating that the Eads bridge is amply strong for its present duties.

Steel Making Art in 1868

Fortunately a voluminous account of the Eads bridge was written by Calvin M. Woodward, of Washington University, St. Louis. It is most interesting reading for the bridge engineer; it also contains many side lights on the steel and iron industry of the day. Thus, the state of the art in 1868 may be inferred from the following quotation

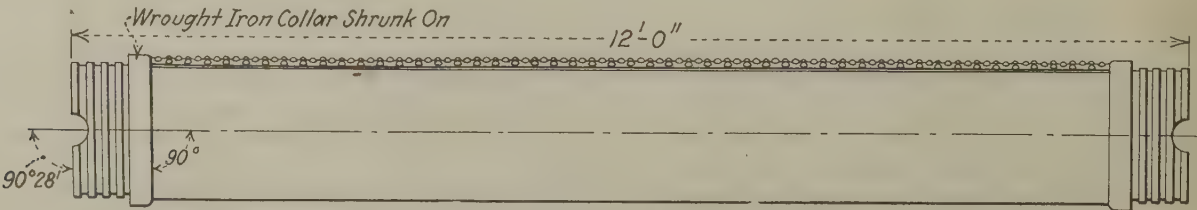


Fig. 2—Exterior of Assembled Arch Member; Coupling Grooves Cut on Ends

from Captain Eads's first statement to his associates in the Illinois & St. Louis Bridge Co.

"To obtain the highest value of cast steel in compression I think it should be used in the tubular form. Although cast-steel tubes have been recently drawn cold by hydrostatic pressure in France, I cannot learn that the process has been carried beyond the production of gun-barrels. (b) As the use

tested to a degree of strain much beyond what it can by any possibility be subjected to when in the bridge. For this purpose I am having a powerful machine made."

Stormy Sessions with Andrew Carnegie

This last provision was the source of much delay and anxiety. A contract for metal work and erection was signed

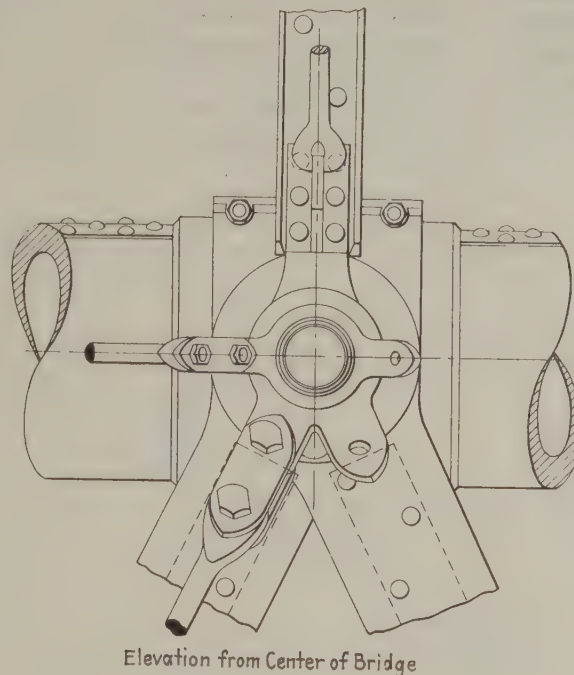
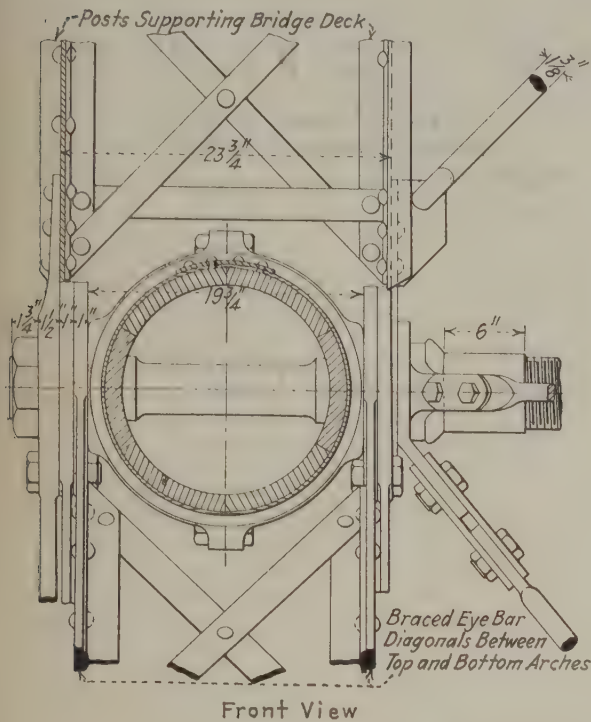
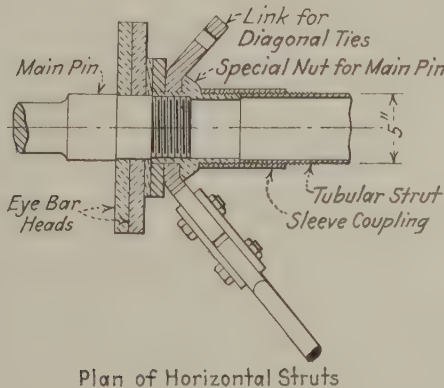


Fig. 3—Assembly at Main Panel Points



Feb. 26, 1870, with the Keystone Bridge Co., Pittsburgh, before working drawings were delivered. Prices were:

Crucible steel work...	15c. per lb. (planing staves extra)
Wrought iron work.....	7.9c. per lb.
Cast iron work.....	6c. per lb.
For testing materials.....	\$36,000
For erection	\$104,000
Time required	17 months (c)

Soon it was found that there were many unusual requirements implied in the contract. "Both iron and steel makers were unaccustomed to the rigid tests," says Professor Woodward's history. "The insertion into specifications of the items of elastic limit and modulus of elasticity was a new feature in bridge contracts. Moreover, the grade of workmanship desired was altogether exceptional." To illustrate the practical effect of such specifications, it may be mentioned that no pipe maker would tender bids for horizontal struts between chords (Fig. 3), because acceptance tests were to be made on one out of every 20.

The Keystone Bridge Co. (Andrew Carnegie, vice-president), subcontracted all the metal, getting only the wrought iron eyebars and structural shapes from an associated organization: Carnegie, Kloman & Co. (Union Mills). The eyebars were special—more metal was upset in the heads than usual. (d) It seemed impossible to meet the specifications without triple rolling, a costly procedure, so an argument was started about the form of the test piece. Eads held for a cylindrical "bolt," Kloman wanted a ½-in. circular groove turned in the center to localize strain. Eads refused because he held that this gave a fictitious increase of 10 to 15 per cent in breaking load, and the form was such that the elastic limit and modulus could not be deter-

(c) The bridge was finally opened July 14, 1874, three years late.

(d) Specifications were as follows: Eyebars to be of best American iron; upset ends to be planed on both sides, pin holes drilled. Each bar to be subjected to proof load of 20,000 lb. per sq. in. without experiencing permanent set. Specimen test bolts to develop 60,000 lb. per sq. in. ultimate strength. Test pieces cut from plates to develop 60,000 lb. per sq. in.; beams, 55,000; angles, 50,000.

of cast steel in bridge building is comparatively in its infancy, I have used the material at a much safer limit as regards its ultimate strength than my judgment would otherwise dictate. When this material comes to be universally used in bridge construction in the place of wrought and cast iron (as it inevitably will be because of its greater economy), the very large margin for safety in your bridge will be more fully appreciated.

"To insure a uniform quality and high grade of steel at the lowest prices, I propose to have the steel rolled for the arches in bars of 12 ft. length, and of such form that six of them shall fill the circumference of an 18-in. riveted steel tube, ¼ in. thick, in the manner that the staves of a barrel fill the hoops. [See Figs. 1 and 2.]

"This would virtually form a steel tube 18 in. diameter and of 13¼ in. bore, the steel being about 2¾ in. thick at most. The tubing in which the steel bars will be inclosed will effectually protect the latter from the weather.

"Every part of the structure is to be thoroughly

(b) Captain Eads uses "cast steel" not in the sense of steel casting, but to distinguish crucible cast-steel from blister steel. In the parlance of the day "cast steel" or "homogeneous steel" referred to what would now be called crucible steel forgings or bars.

mined. The iron shapes rolled at Union Mills also seemed to be about 10 per cent below specifications that were representative of best foreign and American bridge work. The matter was finally compromised by the makers accepting a 9 per cent reduction in price per pound, and all iron details were increased 10 per cent in cross section.

Meanwhile, the steel contractors were having many troubles. The Keystone Bridge Co. strenuously objected to any modification of the requirements for the steel, wishing to delay deliveries from sub-contractors and thus avoid penalties for slow erection. Matters came to such a head that one of Captain Eads's associates wrote: "I entertain a fear as to the willingness of the Keystone Bridge Co. to complete the bridge in time, if at all. Your letters evince a spirit of fault finding, captiousness, and a supercilious

then to be made of six selected staves having approximately the same modulus. Small test pieces were to be cut from 5 per cent of the staves, selected by inspector from extra long staves or those rejected for imperfect workmanship, and must develop a minimum elastic limit of 40,000 lb. per sq. in. and minimum ultimate strength of 90,000 lb. per sq. in. If, however, a failure of such a percentage of these tests should occur as to create a want of confidence in the remainder, the chief engineer may cause such additional numbers to be tested as to insure the requisite strength in each staff.

The Keystone Bridge Co. sublet the steel manufacture to William Butcher Steel Works of Philadelphia (Samuel Huston, president) at 10¾ c. per lb., tested. This company

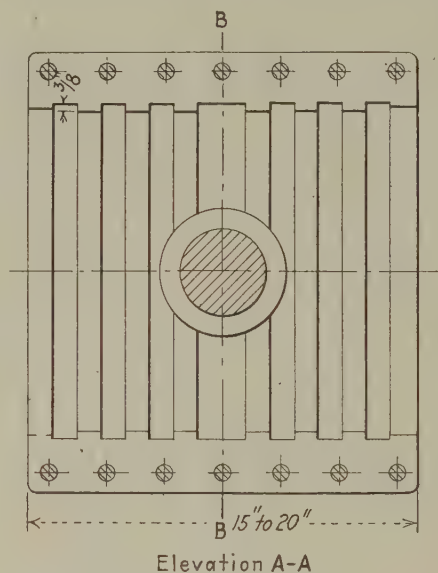
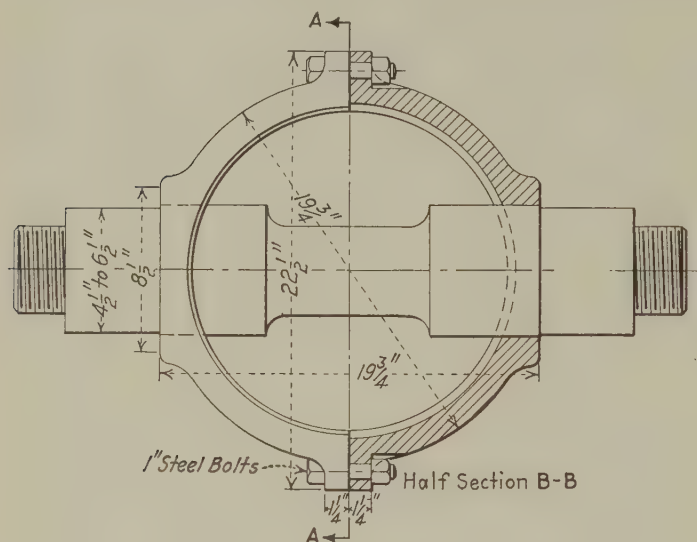


Fig. 4—Design of Couplings for Arch Members

disregard of the spirit and letter of the contract." To which Carnegie replied: "Captain Eads had expected that the steel staves would be rolled as to require no planing. Now, every bar must be planed. All holes are to be drilled—a thing unheard of! Our upset links [eyebars] must be made in a different way. All links in all lands are hammered only; these have to be planed. Captain Eads must require only the custom of the trade. Of all men, your man of real decided genius is the most difficult to deal with practically." And it was by that time inexpedient to annul the contract, because of Carnegie's influence with various railroads which were presumptive users of the new bridge.

Endless disputes were finally adjusted by referees: Eads got the required metal and the Keystone Bridge Co. got \$363,000 in extras. Nevertheless Eads and Paul Dahlgren, his first testing engineer, had started something that continued, namely, close inspection and testing of steel work on important structures. By 1873 inspection of bridge steel was general in America. By 1877 every forged eyebar was given a proof test as a matter of routine.

Steel Bolts a Failure

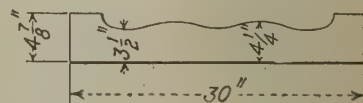
Such difficulties with getting high-grade iron as sketched above foreshadowed even greater troubles with steel. Indeed, they arrived when the first anchor bolts were tested, and continued almost unabated until attempts to make the couplings of steel were abandoned. Many small sized test bars convinced Captain Eads that several manufacturers either in America or Europe could make steel of the quality called for in the specifications, namely:

Each steel bolt must be able to withstand without permanent set a load of 40,000 lb. per sq. in. Specimen bars cut from each end of each bolt must develop 100,000 lb. per sq. in. ultimate strength.

Steel for tubes must have modulus of elasticity between 26,000,000 and 30,000,000. Each bar to be tested and modulus stamped on it. Each tube was

was the pioneer American maker of steel castings (1867), but the equipment and staff were wholly inadequate to manufacture forged steel bolts 5¾ in. diameter, 34 ft. long, with upset ends. To make them rectangular ingots 15 in. square, 48 in. long were cast, carefully examined for surface cracks, and drawn down under a steam hammer with several reheatings. The first bolt to be tested broke at a unit stress of 30,000 lb. per sq. in., endangering the testing crew, 30 ft. away. The second broke at 33,000 and the third at 26,000 lb. Since the fractures showed no gross defects, and since test pieces taken from the bars developed the specified strength, it was thought that light forging at the finish had caused large internal tension stresses near the axis of the bolt. Annealing was suggested, but the first annealed one broke at 12,000 lb. at a flaw near the end, and the next one wrecked the testing machine.

Fig. 5—"Corrugated" Sand-Cast Ingots Unsuccessfully Used for Rolling Couplings



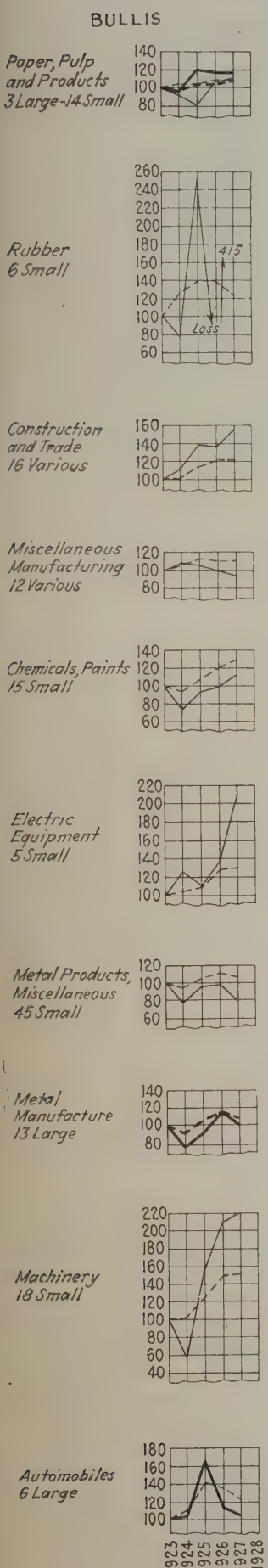
And so it went. Of 87 steel bolts made for test, 27 broke under proof load. Of 80 wrought iron bolts (made by Union Steam Forge, Bordentown, N. J., Bridgewater Forge of Massachusetts, and others) tested under proof load of 18,000 lb. per sq. in., not a single one failed. No good explanation of the trouble with the steel bolts was forthcoming, other than the probability that the steel makers were unable to control the mixtures in the crucibles so as to make such a large ingot of homogeneous metal. The broken anchor bolts were doubtless overheated and cold worked by the hammer men.

Meanwhile the Butcher plant was having trouble with the staves. As seen from Fig. 1 they are much lighter pieces

(Continued on page 733)

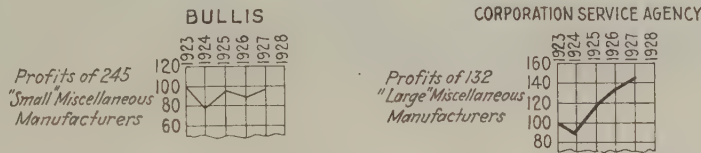
Survey Shows Upward Profit Trend

General Rising Tendency Indicated, Especially for Larger Corporations, Although Counter Movement Is Disclosed in Particular Industries



THE trend of profits in the United States in the past three or four years has been generally appraised on the basis of published opinions resting solely on facts pertaining to one industry or industrial group, or on inferences drawn from considering several such stated opinions. Manifestly there have been high and low spots in industrial results, so that broad conclusions based on limited data are unlikely to be dependable, and are still less likely to disclose general underlying factors affecting profits.

To obtain a more complete picture of the profit trend in industry, Harry A. Bullis, secretary and comptroller of the Washburn-Crosby group of flour mills, now combined under the name of General Mills, Inc., undertook a comprehensive investigation. He addressed inquiries to 7500 American

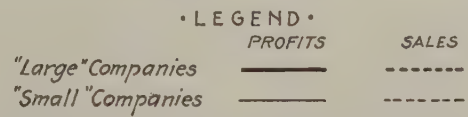


PROFIT Trends for a Number of Larger and Smaller Corporations Contrasted. The graph for the smaller companies is based on reports obtained by Harry A. Bullis, that for the larger on data provided by a corporation service agency

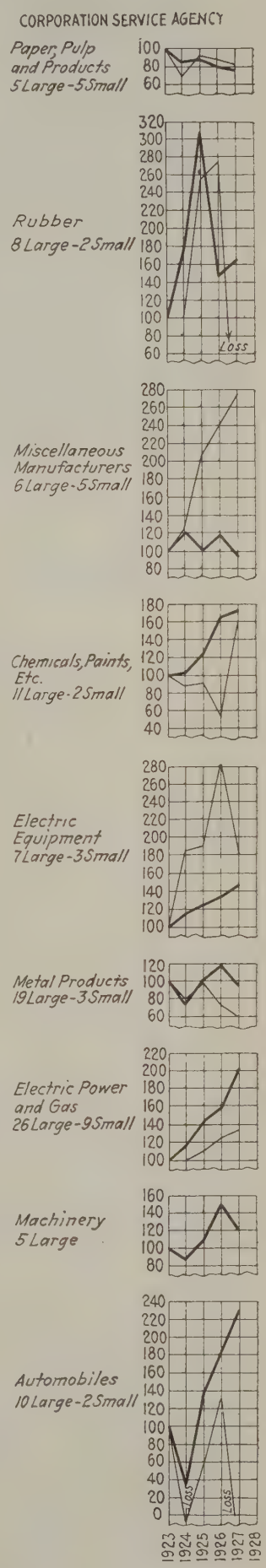
manufacturers. From the replies he selected about 300 that were complete in their answers to his questionnaire. To these he added 350 financial reports from corporation service agencies, and a study of corporation tax returns from the United States Internal Revenue Department. He also corresponded in detail with trade associations and industrial groups.

The results of the investigation were presented by Mr. Bullis in a paper read at the recent annual meeting of the National Association of Cost Accountants at New York. The paper will eventually be published in full by the association, but, in the meantime THE IRON AGE has prepared a diagrammatic presentation of figures obtained from the larger manufacturing industries.

A fact that became evident in the course of the inquiry is that industries, if arbitrarily classified into two groups of "small" and "large," show different profit trends. The dividing line between the small and the large companies was drawn at \$1,000,000 of net income annually. Income figures for 650 corporations were classified in this way according to size and then grouped by industries. Indices of profit and sales for each group for the five years 1923 to 1927 were computed on a scale of 100 for 1923. In many



SHARP Variations in Profit Trends Are Shown in Different Industries. The graphs, at left and right, though not intended to give a complete picture for industry as a whole or for any one industry, reflect no general economic condition warranting the description "profitless prosperity"



cases a similarity in the results of business operations in the small and large companies in a given industry is disclosed. A few distinct departures from the general trend of profits are shown for certain industries, but the causes for the difficulties that have beset these manufacturers are, in some cases, generally recognized.

Mr. Bullis's investigation showed that, although profits have been declining in some industries because of special circumstances, the general profit trend for larger manufacturers is upward. He believes that much of the discussion of declining profit margins refers not to the total amount of earnings but to the smaller margin of profit in each sales dollar. He states that it is also probable that there is a declining rate of return per unit of investment in many industries.

The upward trend of profits among the larger companies is particularly noteworthy because of the declining tendency of prices. Quoting from an article by David Friday in the *Atlantic Monthly* of February, 1928, Mr. Bullis said that the Bureau of Labor Statistics price index of non-agricultural products for the year 1920 was 241, on the basis of the five-year period 1910-1914 as 100, and by 1925 had declined to 165. Yet the total profits of all manufacturing and mining corporations (before taxes and depreciation were deducted) were \$5,537,000,000 in 1920, and in 1925 had increased to \$6,013,000,000. Manifestly the level of prices was not the controlling factor in determining the profits of the two years. Again in 1922 the price index began at 158 in January and rose to 175 in December; yet in spite of this price increase the total profit was only \$4,536,000,000. With an average price level higher than in 1925, profits were only about three-quarters as great.

The explanation lies in the greater volume of output and the increased efficiency of labor in 1925; the Federal Re-

serve Board's labor index of output rose from 87 in 1920 to 104 in 1925. During the same period, the index for the number employed went from 103 in 1920 to 90 in 1922 and 95 in 1925, while the total payroll changed from 124 to 89 and 107 in the respective years. With the gain in volume of output, overhead costs were reduced and profits increased accordingly. Continuing, in 1926 the price index was 161, and in 1927, 152; yet the labor index of output in 1926 rose to 108, and industrial profits showed a gain of 10 to 15 per cent. In 1927 profits were nearly the same as in 1925, although prices declined five points between the beginning and end of the latter year.

It is apparent that higher efficiency in production and a larger volume of consumption have both contributed to an increase in total profits in spite of a decreased percentage of profit with respect to selling price.

One reason that income returns of corporations are sometimes misinterpreted, it is pointed out in Mr. Bullis's paper, is that many corporations are conducted for certain technical advantages only, or merely for the benefit of other corporations, and are not expected to show a profit. Thus a considerable proportion of all corporations may appear to be unsuccessful, although many of them are, in fact, performing important service in connection with the successful operation of larger companies that earn satisfactory incomes.

Mr. Bullis summarized conclusions drawn from the statistics he assembled and the comments of his correspondents as follows:

"Although profits have declined for all companies in certain industries, and for some companies, especially the smaller units, in many industries, profits in industry as a whole have not declined, but have been on somewhat of an upward trend."

Combination Firing of Blast Furnace Gas and Pulverized Coal

SEVERAL Stirling boilers in the Ensley plant of the Tennessee Coal, Iron & Railroad Co. have been fitted for burning either blast furnace gas or powdered coal or both. The earliest of these units was first fired in 1922. Additional boilers have been added and their performances formed the subject matter of a paper by F. G. Cutler, chief of the bureau of steam engineering of the Tennessee com-

close whenever the pressure falls. By regulating the supply of gas to these boilers, the supply going to the hot blast stoves and to the boilers fired with that gas only is equalized, thereby reducing the demand for regulation of gas and air supply on those units.

Comparison of conditions prior to this installation with those subsequent is made in the table. This covers nine yearly periods, the first four of which represent conditions previous to installation of the boilers. The last four years show conditions after the boilers were in service and are based on the assumption that 70 per cent of the total heat in the top gas was delivered to the boilers. As the furnace gas is not washed, the calculated heat in the top gas includes the sensible heat.

Wood-Working Tools Made of High-Speed Steel

Hartford Chapter, American Society for Steel Treating, opened its 1928-29 series of meetings on Sept. 11, by entertaining Henry E. Allen, chief metallurgist Henry Disston & Sons, Inc., Philadelphia. Speaking on the general subject of "Tool Steels," he mentioned more particularly the effect of molybdenum. One alloy tool steel containing nickel and molybdenum and about 0.85 per cent carbon was said to harden through to the center of a 1¼-in. bar when water quenched. This illustrates a combination of alloys to produce a hardening effect which neither one, alone and in the same amount, would produce. Molybdenum added to chromium steels is said to produce a finer grain and tougher tools. Mr. Allen also mentioned the use of high-speed steel tools in wood-working machinery, and a high carbon silico-manganese steel for finishing chilled iron rolls.

Comparison of Ensley Plant for Nine Yearly Periods

Year	Average Boiler Hp. Generated By			Coke Per Ton of Pig Iron, Lb.	Heat in Mill, B.t.u. Per Hr.		Average of Rating, Per Cent
	Blast-Furnace Gas	Coal	Total		70 Per Cent Top Gas	Steam From Furnace Gas	
1919	29,798	1225	31,023	2867	1567	998	63.7
1920	29,174	1150	30,324	2917	1652	977	59.1
1921	24,890	1660	26,550	2784	1330	834	62.7
1922	28,126	2160	30,286	2732	1495	942	63.0
Average 1919-22	27,997	1549	29,546	2825	1510	938	62.1
1923	30,592	2300	33,892	2640	1655	1022	61.8
1924	33,746	4270	38,016	2608	1687	1130	67.0
1925	34,104	5050	39,154	2699	1708	1142	67.0
1926	31,965	5850	37,815	2473	1565	1070	68.4
1927	36,323	4030	40,353	2575	1827	1215	66.5
Average 1924-27	34,034	4800	38,834	2589	1697	1139	67.2

pany, read some time ago before the Fuels Division of the American Society of Mechanical Engineers. What follows is abstracted from that paper.

These boilers are arranged to be fired with either of the two fuels separately or a combination of both fuels at the same time. They have gas regulating equipment which operates to open the gas and inter-connected air dampers whenever the gas pressure on the mains increases and to



Lake Transportation of Automobiles a Growing Factor in Distribution

BY W. W. BURDEN*

IT is no longer uncommon to see the large lake freighters moving up and down the Detroit River, their decks covered with automobiles. In fact, the lake freighter has recently come into position as a standard means for the movement of factory shipments of automobiles.

Just when the first cargo of automobiles was shipped in this manner is not clear. According to one report it dates back to 1918, during one of the railroad embargoes of the war period. In any event the use of lake freighters for this purpose did not become much of a factor prior to 1925. The last three years, however, have seen this movement developed to its present magnitude.

Vessels carrying the majority of this business may be grouped in three classes: the bulk freighter, the package freighter and the "automobile carrier."

Chiefly, the business of the bulk freighter is the transporting of coal from Pennsylvania and Ohio westward, and the movement of grain and ore from the western and northern ports of the lakes back to the middle-western and eastern ports. This type of boat is designed especially for the service in which it is used. It has no "tween decks." The cargo hold is entered directly from the spar deck by means of a series of hatches running athwartship, spaced 12 ft. on centers and with 2 ft. between hatches. The depth of the cargo hold is about 26 ft.

The package freighter is equipped with side gangways for loading and has intermediate decks between the spar deck and the tank bottom. The automobile carrier may or may not have side gangways. Where access to the lower decks is not provided in this manner, a set of permanent

elevators serves to handle automobiles to and from the lower decks.

In addition to the freighter, the passenger vessel may be mentioned as carrying a limited volume of this traffic.

The automobile carrier has a maximum capacity of 650 automobiles, with an average of about 500. The bulk freighter will hold from 150 to 175 cars on its spar deck, and often carries many in the hold, while the package freighter usually carries from 30 to 70 cars, in addition to other commodities.

Automobiles for shipment are gathered at one of the various shipping terminals along the waterfront, the terminal having sufficient accommodations usually for 1000 to 1500 machines. The transportation company, by its own dispatching system, keeps track of the position of all available vessels. When a cargo is ready to move, the next vessel up is ordered into the pier for loading. As soon as the hawsers are made fast, the loading crew goes into action.

Each car is driven aboard under its own power. If the vessel has side gangways, these are utilized. If she has no such entrances, as in the case of some of the automobile carriers, machines are driven up on the spar deck by means of a convenient ramp and lowered to the decks below by the elevators. If the vessel being loaded is a bulk freighter carrying a cargo, the automobiles are driven on to the spar deck. Bridging is used to make a track for the automobiles over the openings between hatches, this bridging being placed prior to the movement of machines aboard.

Except in one instance, which will be the subject of a subsequent article, no attempt is made to anchor the cars

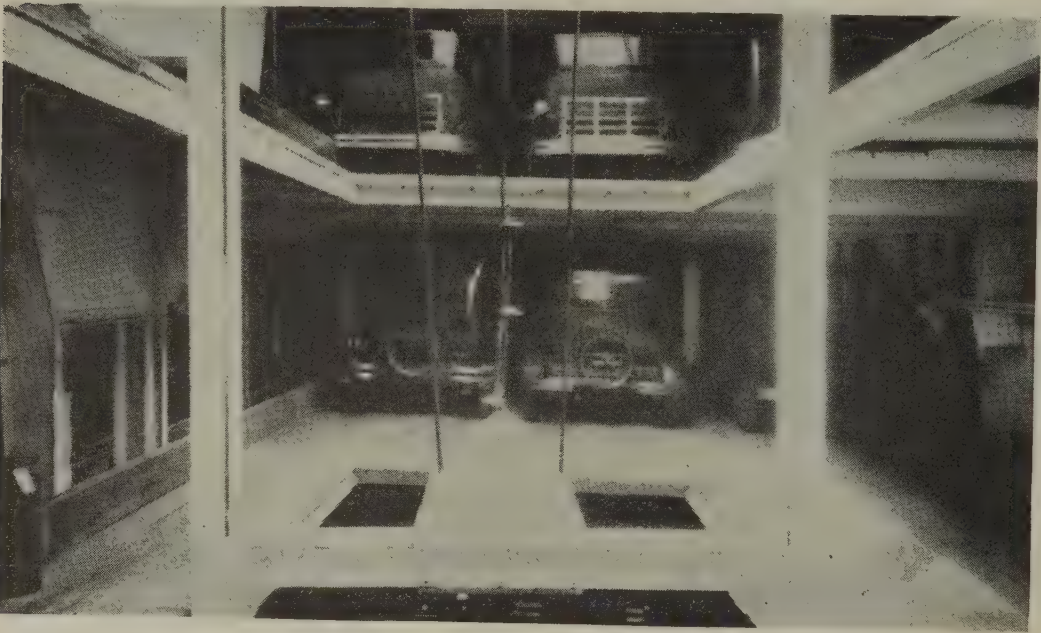
*100 West Kirby Street, Detroit.

to the deck or to provide any trackage except the flat bridging between the hatches. When the car is spotted on deck, it is put in gear and the brakes are set. The car then is covered with a tarpaulin. Experience seems to indicate that this is sufficient to prevent shifting of the cargo except in extremely heavy weather. The same scheme of placement and the same precautions against movement are taken with those cars lowered between decks, except that no canvas covering is used.

It requires about 3 hr. to load or unload an automobile carrier. It takes from 1½ to 2 hr. to load the deck of a bulk freighter. The loading and unloading time on a

made up of port-to-port shipments—the remainder having destinations inland.

The tariff on all lake shipments is regulated by the United States Shipping Board and the Interstate Commerce Commission. Passenger cars and trucks 12 ft. or less in length, going from Detroit to Buffalo, carry a transportation charge of \$8 each, to which 50c. is added for each additional 6 in. of length. From Detroit to Chicago, cars under 12 ft. 8 in. carry a charge of \$14.50, with a \$2 differential for each additional foot in length over 12 ft. 8 in. On the same basis, shipments from Detroit to Milwaukee carry a charge of \$14, with a differential of \$2 for each



LOADING of a Section of 'Tween Decks on Steamer Crescent City. The hoist "spots" the cars on one deck after the other. Here three decks are shown in use

package freighter depends largely on the amount and character of the freight other than automobiles.

The fastest boats in this service are capable of 13 knots, while the average will run a little less than 12, depending to a degree on the weather. Sailing time from Detroit to Chicago is 48 hr.; to Duluth, 66 hr.; to Cleveland, 36 hr.; and to New York, 6 days. The following are route distances to the principal ports:

Miles		Miles	
Detroit to Chicago	634	Buffalo to Oswego	163
Detroit to Milwaukee	569	Toledo to Buffalo	251
Detroit to Kenosha	597	Toledo to Cleveland	125
Detroit to Toledo	54		
Detroit to Cleveland	108		
Detroit to Buffalo	261		
Detroit to Erie	191		

Westbound cargoes of automobiles from Toledo or other nearby ports are usually brought into Detroit on the smaller vessels, making a short run. On arrival at the Detroit terminal the cargo is transferred to one of the larger vessels for the remainder of the trip.

Shipments bound for inland points beyond the lake ports are transhipped at the port either by rail or truck. It is possible of course to drive these cars on their own power from the port, if the final destination is not too far, usually about 300 miles being the limit. Trucking firms now operating in the lake ports handle factory shipped automobiles inland on special automobile trailers. One firm in Duluth has developed a special trailer for this purpose which holds three automobiles. Two such trailers are carried by one tractor unit. Another firm uses a trailer which will accommodate five automobiles.

In the traffic between Detroit and Cleveland—an overnight run—between 350 and 400 cars a day are being handled. The total annual movement of factory shipments by water is variously estimated between 130,000 and 150,000 cars, with approximately two-thirds of this volume

additional foot. The schedule of shipments from Cleveland or Toledo to Duluth, and from Detroit to Duluth, are as follows:

	Cleveland or Toledo to Duluth	Detroit to Duluth
Passenger Automobiles		
Under 111 in. wheel base.....	\$23.00	\$18.00
111 in. to but not including 128 in. wheel base	25.50	20.50
128 in. to but not including 144 in. wheel base	32.50	27.50
144 in. to but not including 160 in. wheel base	41.50	36.50
160 in. and over.....	50.50	45.50
Freight Automobiles		
Under 13 ft. over all.....	23.00	18.00
13 ft. 8 in. to but not including 14 ft. 8 in.	25.50	20.50
14 ft. 8 in. to but not including 15 ft. 8 in.	32.50	27.50
15 ft. 8 in. to 16 ft. 8 in.....	41.50	36.50
Over 16 ft. 8 in.....	50.50	45.50

This subject, from an economic viewpoint, has several phases. The shipper, or more precisely the automobile dealer, to whom the shipment is consigned, saves the blocking and tilting charge required in railroad shipment. As quoted by the Shipping Board schedule, these charges, which are in addition to the freight rates, follow:

Charges for Loading Automobiles, Freight or Passenger	
The charge for blocking, bracing and—or—tilting passenger or freight automobiles is as follows:	
For furnishing and installing blocking.....	\$4.75 per carload
Bracing and tilting materials to tilt one automobile in one freight car, in addition to blocking charge.....	5.00 per carload
Bracing and tilting materials to tilt two automobiles in one freight car, in addition to blocking charge.....	8.00 per carload
Bracing and tilting materials to tilt three automobiles in one freight car, in addition to blocking charge.....	13.00 per carload

This saving accrues to the dealer, inasmuch as sales prices for automobiles are fixed and include all items of railroad freight costs. The shipper also saves some time in being able to have his shipment moved directly off the

Handling Automobiles on Great Lakes Steamers

PREPARING to Hoist a Car from the Hold of a Bulk Freighter or Ore Boat (Right). Below, the steamer David P. Thompson is moving away from the dock of the Minnesota-Atlantic Transit Co., Detroit, with a deck load of automobiles. At the head of page 689 is seen the load on this steamer, consigned to the Northwest



UNLOADING a Deck Load of Automobiles at Duluth. In the foreground is the turntable for swinging each car through 90 deg., so that it may be run off the steamer to the wharf. This turntable is "spotted" opposite each row of cars in turn. Sheet steel troughs hold the cars in position during the voyage



boat, without the customary railroad yard terminal and unloading delay.

All shipments are entirely covered by marine insurance—the insurance going into effect before the cargo leaves the port of origin and extending throughout the time the cargo is being unloaded at the port of destination. Losses in this service have been negligible and have occurred only by reason of the heavy weather early in the spring or very

late in the fall. The navigation season opens approximately April 15 and closes shortly after Dec. 1.

Boat shipments of automobiles and trucks have been steadily increasing since 1925. The increase in 1926 was about 7.4 per cent, while 1927 showed a further gain of 12.3 per cent. From present indications the increase for the current year will be relatively larger, as the movement is rapidly gaining favor with both shipper and dealer.

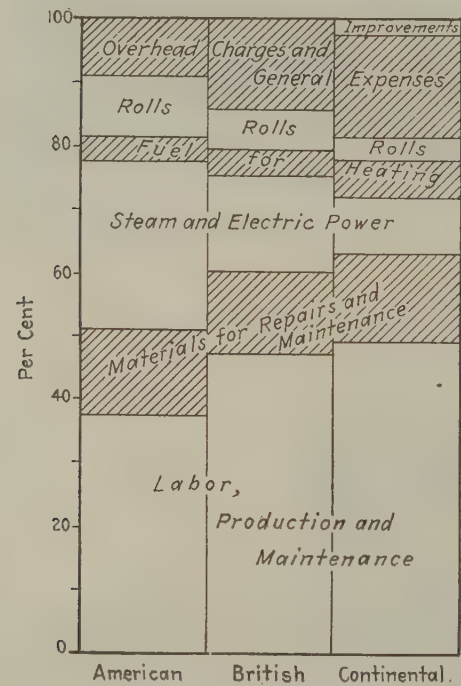
Distribution of Rolling Costs in Various Countries

SURVEYING rolling mill practice, with special reference to reducing production costs through judicious rehabilitation of existing equipment, G. A. V. Russell read a paper last spring before the Institution of Mechanical Engineers at Swansea, Wales. In the course of his paper he presented a diagram of rolling costs, from which our illustration is taken. What follows is abstracted rather freely from the paper.

Broadly speaking, modern rolling mill machinery has reached its present state of development under the stimulus

while the production of a corresponding plant of the same general type in England is between 1500 and 3000 tons. The author believes that the present three 8-hr. shifts in vogue in Great Britain could give way to two working shifts and one idle shift, while turning out the same tonnage as at present. This would save about 33 per cent of the productive labor costs and would provide other incidental advantages in reducing the aggregate rolling costs. His suggestion is predicated upon the difficulty of the steel companies in marketing even the present comparatively small production.

Among the incidental advantages expected would be the ability to carry out the bulk of maintenance work on the mill in ordinary working hours, instead of at week-ends when overtime rates prevail. The plant would be available for maintenance purposes a greater proportion of the time, permitting this work to be performed more efficiently and thoroughly. Electrically driven mills can so arrange the working shifts that surplus power in stand-by hours could be disposed of to local public utilities, or purchased power could be utilized largely on off-peak rates. Steam-driven plants would find it possible to get the fires in good shape between turns. Heating practice both at soaking pits and in reheating furnaces could be improved, with resulting smaller power consumption and roll wear. Consumption of lubricants would be diminished, as the amount required is more a function of the time the machinery is running than of the intensity of the work being done.



PERCENTAGE
Distribution of Rolling Costs. The American mill was rolling wire rod from the ingot; the British, sheet bar; the Continental, semi-finished shapes and railroad material

of economic necessity for conservation of four items: Time, owing to pressure of demand; labor, owing to increasing value of human effort; power; supplies and stores. Working on old established plants, expenditures to conserve labor and power will usually yield the largest returns. The predominant influence of labor costs, and particularly of labor plus power, will be noted from the illustration.

One outstanding difference between British and American rolling mill practice lies in the much more onerous demands made upon production equipment in the United States. The author cites an average blooming mill, which in the United States would be expected to roll monthly about 60,000 tons of ingots into 6 by 6-in. blooms. He gives an example from the Ensley works of the Tennessee company, in which the average tonnage on a 12-hr. shift (in 1923) was 1730, making 144 tons an hour. The blooming mill rolls made 684 passes an hour in the six turns surveyed. This was in rolling 24 x 24-in. ingots weighing 10,800 lb., with a few larger ingots up to 14,000 lb. Few plants in Great Britain, with anything like such an output, would rely on one blooming mill. The author refers to several rolling about 30,000 tons a month and doing it on two mills.

Medium-sized merchant mills in the United States are stated to be turning out from 6000 to 7000 tons a month,

Grinding Surface of Spring Leaves Increases Endurance Markedly

An extended research on spring steels has been under way at the National Physical Laboratory at Teddington, England. The following steels are under investigation, they being the analyses most frequently used for making leaf springs in England:

Type	Analysis	Quench (Deg. C.)
Carbon	0.6 C	950 in oil
Carbon	0.8 C	900 in oil
Silico-manganese		950 in oil
		or 870 in water
Chrome-vanadium		800 to 850 in oil
Low chromium	0.6 C, 0.6 Cr	800 to 850 in oil
High chromium	0.6 C, 1.4 Cr	800 to 850 in oil

Torsional fatigue limits of the silico-manganese and the chrome-vanadium steels were no higher when tempered at a low temperature (and with correspondingly high tensile properties) than when drawn at higher heats, unless the surface was highly polished—a condition wholly impracticable in service.

An interesting finding is that 0.6 carbon steel spring leaves have a fatigue range of 30,000 lb. per sq. in. in the ordinary forged and heat treated condition, but this figure is increased to 85,000 lb. per sq. in. by grinding 1/16 in. off the surface, thus removing all microscopic hardening cracks. J. Bradley has devised a high-speed testing machine for testing such spring leaves.

Why Tilting Furnaces Are Better

They Aid in Working an Open-Hearth Heat and Avoid Many Troubles—Likely to Make Better Steel

BY CARL W. PEIRCE*

IT will be the purpose of this article to present the different points of superiority of the tilting furnace which aid in giving a more uniform grade of product, greater tonnage and a more economical operation. The thought which suggested it was brought out in Doctor Waterhouse's paper "Basic Open-Hearth Practice," read at the May meeting of the American Iron and Steel Institute in New York.

Ability to Remove an Unsatisfactory Slag

In stationary practice heats often melt with raw slags which are hard to get into shape, and faulty steel can be traced in many cases to this type of melt. With the tilting type, it is possible to cant the furnace forward and remove a large part of the undesirable slag and then make a new one by the addition of burnt lime. This can be done without the slag becoming too heavy and viscous and destroying the action of the boil which is necessary in making good steel.

Tilting Furnace Does Away with Slow and Hard Taps

One of the difficulties encountered in stationary furnace practice is that of slow and hard taps. In making quality steel in a stationary furnace, where a close tapping temperature is desired, a slow tap will often cause a skull in the bottom of the ladle and produce bad pouring of a large part of the heat. This will more than offset the good results expected from the close tapping temperature. Because of this fact, melters prefer to take no chances and so tap their heats hotter, to insure a clean pouring practice.

Hard taps, consuming from 10 to 30 min. in getting the hole open, and the metal started in the ladle, are of frequent occurrence. All open-hearth men have seen heats break out through the front while the furnacemen were trying to get the hole open on a hard tap. In addition to the loss of production caused by such delay, the heat is getting lower in carbon and often the metal becomes too hot, producing an unsatisfactory heat.

In the tilting furnace the taphole, being on a level with the slag line, is usually opened a half-hour before the heat is ready to tap. It is cut out to permit a full-sized stream to enter the ladle when the furnace is sufficiently canted. This type permits heats to be tapped on a closer temperature, and in the long run less off-heats will occur, because the heats can be tapped when ready. With a full-sized stream quickly filling the ladle, a more uniform and better pouring practice will result.

Tilting Furnace Does Away with Soft and High and Raw Melting Heats

One of the most frequent causes of poor steel is that the heat from which it was made melted low in carbon, or soft. The size of the heat charged in a stationary furnace is usually governed by the size of the ladle into which it is to be tapped. The ladle is expected to be large enough to hold the charge, with the furnace and ladle additions and enough slag to keep the metal hot enough for proper pouring.

It often happens in stationary furnace practice that, be-

cause of a poorly working furnace, or a charge with iron too low in silicon, the heat will melt too low in carbon, requiring the addition of extra pig iron to finish the melting and working of the heat. Often, because of the fear that the heat will exceed the capacity of the ladle, not enough extra iron is added when the heat gets in this condition. Frequently, too, the furnace is driven at a high temperature and the metal is over-oxidized, in an effort to get the heat ready without the addition of extra metal.

Many times extra iron is added beyond the capacity of the ladle and, when the heat is tapped, the full ladle is taken to the pouring platform and the overflow allowed to run into the pit. In tilting furnace practice, the furnace is returned to an upright position when the ladle is filled, and any steel remaining in the furnace is left for the following heat.

Heats which melt excessively high and raw, due to high silicon in the pig iron or scrap, are of common occurrence in stationary furnace practice. This type of heat will require a large amount of iron ore to oxidize the surplus silicon and carbon and will require extra time and care in working the heat. This type of heat will produce better steel than the soft melting kind, but it is not so satisfactory as the one having a good, medium melt.

Both soft and high and raw melting heats can be avoided with the tilting furnace, as it is the common practice to add barely enough pig iron to melt the scrap and then, by frequent tests, judging the carbon and adding extra pig iron when the carbon gets down to 0.20 or 0.25 per cent. In this way uniform melts are obtained and at no time is it necessary to drive the furnace to avoid a soft melting heat. Faster time per heat can be made on the tilting furnace, also, because as a rule both soft and high and raw melting heats require a longer time for preparation than those with good melts.

Less Danger of Breakouts in Fronts and Ends

In making low-carbon steel in stationary furnaces, breakouts through the front or port ends frequently occur. Ofttimes a boil will start in front of one of the doors, and many heats have been tapped a few minutes ahead of time because of the fear of a breakout. Pig iron breakouts when the hot metal part of the charge is added to a stationary furnace are of common occurrence in all plants. With the tilting furnace, it is possible to cant the furnace backward, repair the weak spot and, after allowing it to set for a few minutes, return the furnace to its normal position without the danger of the heat breaking through.

Less Bottom Trouble and Greater Tonnage

Perhaps the greatest criticism of the stationary type of furnace is the amount of time lost because of bad bottoms and banks. This is especially true in the manufacture of low-carbon steel. Often many hours are spent in washing out the furnace bottom to free it of accumulated lime and steel which have been left from previous heats. This washing out process increases the size of the taphole, so that when the repairs to the bottom are finished

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it becomes necessary to burn in a new taphole. Usually some time is consumed in freeing the hole from pieces of steel and slag and getting it to the right level for the pipe.

In a recent conference of open-hearth men this subject was under discussion and the following reports given of the number of heats cast before it was necessary to put in a new tap hole: 5 to 30; 16 or 17; 6 to 25; every week; 10 to 20; 30; 35; 15 or 20; "with extremely low-carbon heats, we get only 2 or 3 heats." The use of compressed air for blowing out holes and lime ridges in stationary bottoms is very hard on the tapholes and increases their size.

In tilting furnace practice, the tapholes are on a level with the slag line and slope toward the bath; no heats are delayed on account of them unless it is necessary to drain the furnace. In the duplex practice, it is customary to drain the furnace at the end of each week's campaign, which usually consists of from 60 to 70 heats. For tapping the last heat and draining the bottom dry, it is necessary to cut the hole down. This is done quickly with the aid of an oxygen tank and hose.

When working on scrap and hot metal, tilting furnaces

are frequently operated for three or four months without being drained. The writer recalls one furnace which on its first run was operated for more than a year without being entirely empty. When shut down at intervals for general repairs, two heats were tapped and the remaining steel was left in the furnace.

Tapholes are put in on this type of furnace while it is being charged, by inserting a wood plug in the taphole and packing ganister mud around it. It is then faced on the furnace side with magnesite or burned dolomite. The greater part of the plug burns away, leaving a well-shaped hole by the time the next heat is ready.

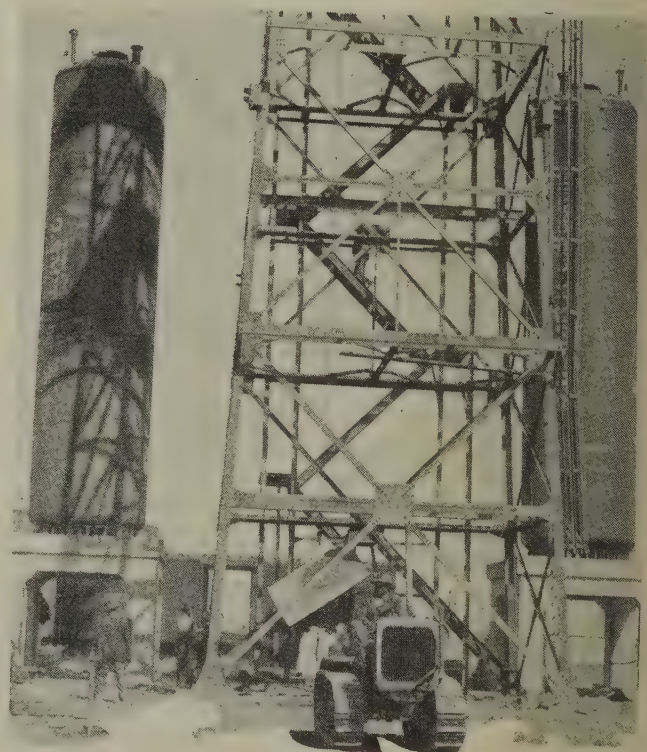
Because of its ability to keep bottom troubles reduced to a minimum, and to avoid both soft and raw melting heats, greater tonnages and correspondingly lower conversion costs are possible with the tilting furnace. Furnaces working on scrap and hot metal practice are making from 9000 to 13,000 monthly, while one furnace working on duplex made 331,000 tons of steel last year. One plant, having both stationary and tilting furnaces, showed the tilting furnace to have a lower conversion cost by about 80c. a ton.

How Tractors Render Valuable Aid Around Industrial Plants



NEW uses are constantly being found for tractors around industrial plants, some of which are shown here. Possession of a tractor simplifies plant haulage. If wheeled trailers are not available, steel plates may be put on a low skid carrier and the tractor will easily drag along the dead weight.

Many plants find constant demands to move freight cars, to speed loading or unloading operations. The tractor comes in handy for jobs like this, as shown. Tractors sometimes render valuable service by hoisting steel plates for the construction of a tower or derrick, as shown in a third photograph.



Business Analysis and Forecast

Steel Industry Is in Sound Position

High Production Rate Demanded by Consuming Industries—Building Falling Off and Steel May Follow

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

THERE appears to be a little danger that just a touch of the speculation now rampant in the stock market may be transmitted to the steel industry—perhaps through the medium of the automobile industry. It is true that severe competition exists in the manufacture and sale of automobiles, and also that the steel price structure is in general so low that it can hardly be said that the slightest trace of inflation is to be found there. We note, however, that just as people now seem to think that their favorite stocks are going to move upward forever, so the automobile manufacturers appear to think that people are going to continue buying new models at the rate that has obtained in recent months. And the steel manufacturers are possibly beginning to get the idea that above-normal production of steel can be maintained indefinitely without affecting the possibility of advancing prices for the various items of finished steel. There has recently been some talk concerning speculative buying of steel scrap and pig iron, and even some kinds of steel have been reported as being bought for stock.

Although our analysis shows that no appreciable progress of the speculative craze is apparent in the steel industry (and it seems doubtful if such a development can make much progress), perhaps a suggestion of caution is not amiss. It should be remembered that steel production is 13 per cent above normal and that building activity, at least, is on the decline. Bank credit is decidedly strained and high money rates are exercising a general effect in curtailing the flow of funds into industry through the sale of new securities. There is no indication of any general expansion in industry, such gains as have occurred during the last month or two having for the most part been merely seasonal.

Consumer Activity Demands High Output

AT present, the situation in the steel industry seems sound enough. Though steel production continues at a high rate, it can still be said with a good deal of certainty that it is no greater than the potential requirements of the consuming industries, as indicated by their activity in production. Whether these requirements are closely reflected in orders or not, the fact remains that the chief steel-consuming industries have since February been running at an average rate that amply justifies the general level of steel production that has prevailed during the summer.

Our composite demand line declined very slightly in

July, following a similar movement in June. The chief factor in holding down the demand figure has been the setback in building activity, the adjusted index of that outlet being now the lowest since last March. Freight traffic, general manufacturing, machine tool orders and iron and steel exports, also, either declined or made less than the usual seasonal gain in July. Automobile production, however, gained quite sharply, considering the season. Mining activity, including petroleum production, averaged about as before.

While steel production in July was a little too high in comparison with the composite demand line, it gained less than usual in August, thus showing a tendency to decline, and was below the probable level of the demand curve in that month.

Probably the level of demand in August was higher than in July, in spite of the slump in building. The period of tight money promises to continue for some months, and this is bound to affect unfavorably the demand for steel. August may well have been the peak month of the year in demand. But it seems equally probable that consumption will fall little below the present level during the remainder of 1928.

Conditions in Particular Lines

Railroad freight traffic shows little change, and certainly no expansion is indicated here. Total car-loadings in August amounted to about 4,812,000, which compares with 4,808,000 a year ago. As the size of the carload, however, is appreciably smaller, the total traffic in tons may be estimated to have been below a year ago, in spite of the fact that it was then on the downgrade. Railroad gross revenues in July were less than 1 per cent above July, 1927. Some improvement in net income is reported, chiefly due to economy in maintenance. Ultimately, of course, the carriers must make up for such economy, but no early increase in steel buying is indicated. The most encouraging symptom is the increase in locomotive orders last month.

As for the other steel-consuming industries, *building* continues the least favorable, with a considerable decline registered in August. This will before long bring a reduction in sales of structural steel and tend to reduce sales of some kinds of pipe and nails. The *automobile industry*, however, appears to have more than made up for any let-down in building, being unusually active for the season. July production decreased less than usual and probably the same will be found true of the August figure. Of course the industry cannot expand forever, any more than the

stock market can, but the end is not yet in sight and the new models contain such great changes that they will doubtless tend to stimulate buying.

General manufacturing activity, even excluding the automobile and steel industries, is at a high rate. It declined a little in July, but was at about the same annual rate as in May. Machine tool orders, which are often barometric, also declined a little more than usual in July and appear to have passed their peak. Some seasonal gain is probable, but no new high levels are to be expected, and possibly the gain will not be up to the fall seasonal proportions.

Mining activity continues at a low level, with little change in July and August. Copper production has increased considerably, but coal output is in small volume. Oil production shows little change, but the slightly declining trend of the first six months of the year has apparently been checked, while drilling activity shows a slightly rising trend.

In most important cases crops promise to be large, but the prices for the chief cash crops, wheat and cotton, are low. The farm situation is moderately favorable, and the business of the agricultural implement manufacturers promises to continue active.

Though large and much above a year ago, *exports* of iron and steel decreased more than usual in July.

Increase in Steel Output Below Normal

AS noted above, steel production, after reaching the peak of the year in July, fell off in August. The average daily ingot output actually increased, but the increase over July was much less than would be normal for the period. Our adjusted index for August is 113.2, or 13 per cent above normal. It compares with 119.2 in July, but a year ago the index was only 95.9. Except for April and July, the August index represents the highest annual rate made this year.

Unfilled orders, as reported, also increased over July, but here again the increase loses significance when consideration is given to the small changes that occur from month to month. In fact, *the gain of 53,000 tons was almost exactly normal, so that the adjusted index remains practically unchanged.* It may be concluded that the unfilled orders were maintained, but, even considering the season, were lower than they were in any of the first four months of the year and also lower than in June. In view of the efforts made to drive in new business during August, this is not a particularly favorable showing.

Steel prices have advanced. THE IRON AGE composite index of finished steel prices for August averaged 2.348c., against 2.321c. in July, and 2.367c. a year ago. The August average is exactly the same as that for May. Probably the average price of finished steel for the third quarter this year will be similar to the average for the second quarter. This, it is to be remembered, is 7 per cent under the average for the years 1923-1927, inclusive.

Pig iron production increased more than usual in August and, according to our estimates, was 9.6 per cent above normal. In July it was 6.5 per cent above normal and a year ago 3.6 per cent. Thus iron production is still low in comparison with the steel output, and it has been so since May last year. The pig iron output has just about reached a level at which, in the past, it has proved to be

too large to be long maintained and at which any advance in pig iron prices has been checked.

In August, however, the average price of pig iron advanced, as we had anticipated. THE IRON AGE composite figure for the month is \$17.11, against \$17.07 in July and \$18.13 a year ago. This is 20 per cent under the average for 1923-1927.

Structural Steel Bookings Expected to Decline

OUR index of the sales of finished steel declined fractionally in July. This was due to a considerable reduction in sales of structural steel and of steel castings, which more than offset the good gains in sales of sheets and plates. The total for the first seven months of 1928, however, exceeded that for the same period in any recent year by a good margin.

The decline in building activity is significant, as being one of the first indications of the unfavorable effects of tighter money markets. Building contracts showed only 78,873,000 sq. ft. of floor space in August, which compares with 82,125,000 sq. ft. in the preceding month. This decrease is notable as being in contrast with the usual gain that occurs in August. Our adjusted index becomes 123 per cent of the average for 1921-1926 against 132 per cent in July and 114 per cent a year ago (when building was recovering from the 1926-1927 slump). Both building permits and the value of contemplated new construction also showed a declining trend last month.

July data indicate that the bookings of fabricated structural steel were reflecting the trend in building. They dropped from 303,800 tons in June to 297,500 tons, the decline being greater than usual for the season. Such bookings, however, were still at a rate of 48 per cent above the average for 1921-1926. According to trade reports, some recovery seems to have occurred in August, but it is only a matter of a little time before structural steel bookings must follow the trend of building.

Price Structure May Adjust Itself

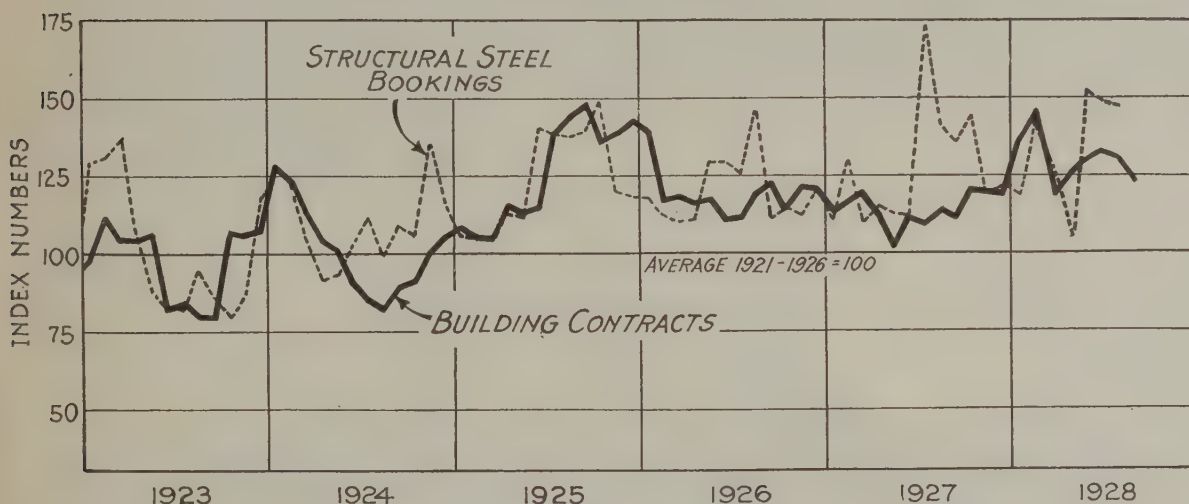
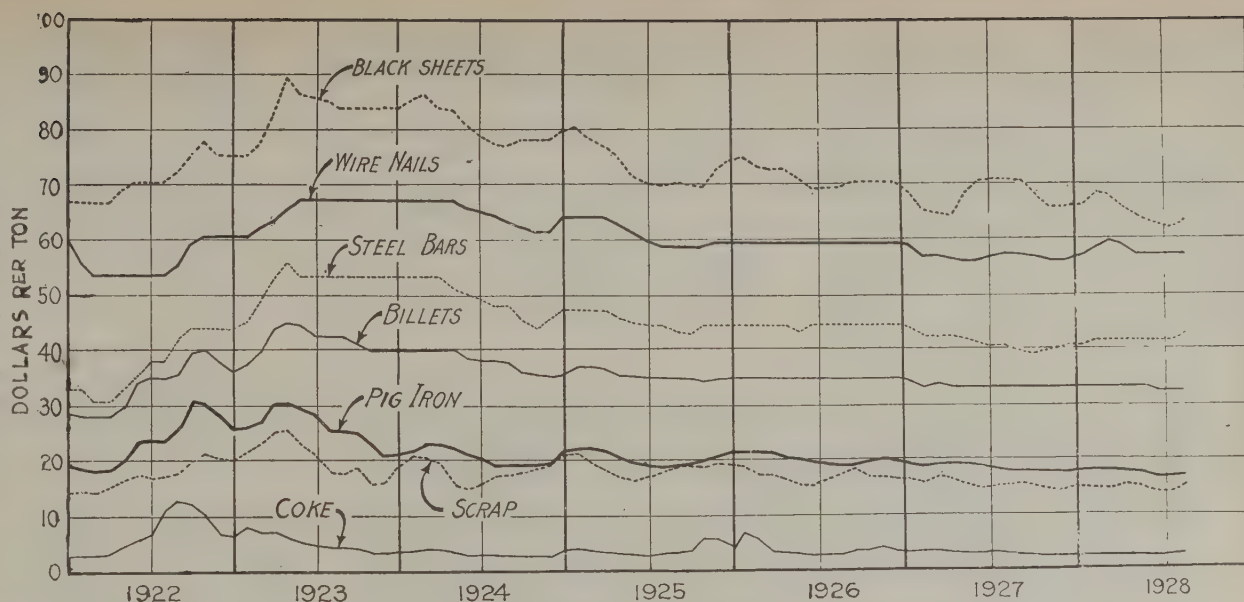
PIG iron may be said to be cheap in comparison with the general level of the steel price structure, and this fact is emphasized by the advance in coke prices during the past two months. The output, however, is large and has gained considerably on steel production. It is reported that most large buyers are well covered for the fourth quarter. While strength promises to continue, it does not seem likely that any long sustained or large advance in pig iron prices is in prospect.

Contrary to the case of pig iron, steel scrap seems relatively dear and has apparently been affected by speculative developments. The trend, however, is still upward and is likely to carry a little further in that direction. We think that the greater part of the advance has been made and that a reaction is probable before the end of the year.

Other price changes illustrated in the fourth chart are found in the case of bars, sheets and coke, all being in an upward direction. Sheet prices still appear to be too low and likely to advance further. Greater strength in pig iron markets will doubtless strengthen the movement to get higher prices for billets and bars, for these items are now about right in comparison with pig iron and the spread between them is normal.

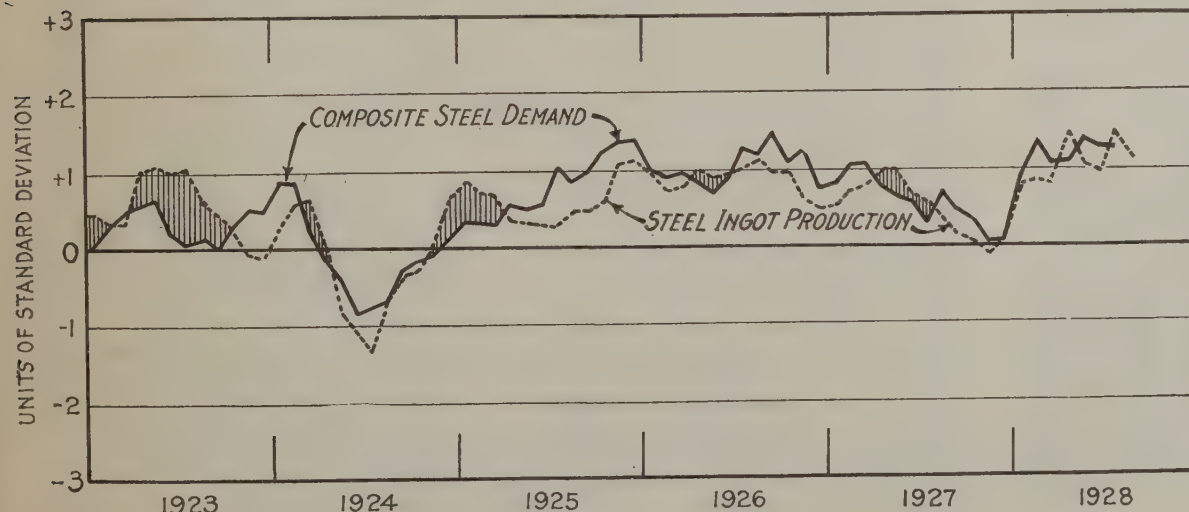
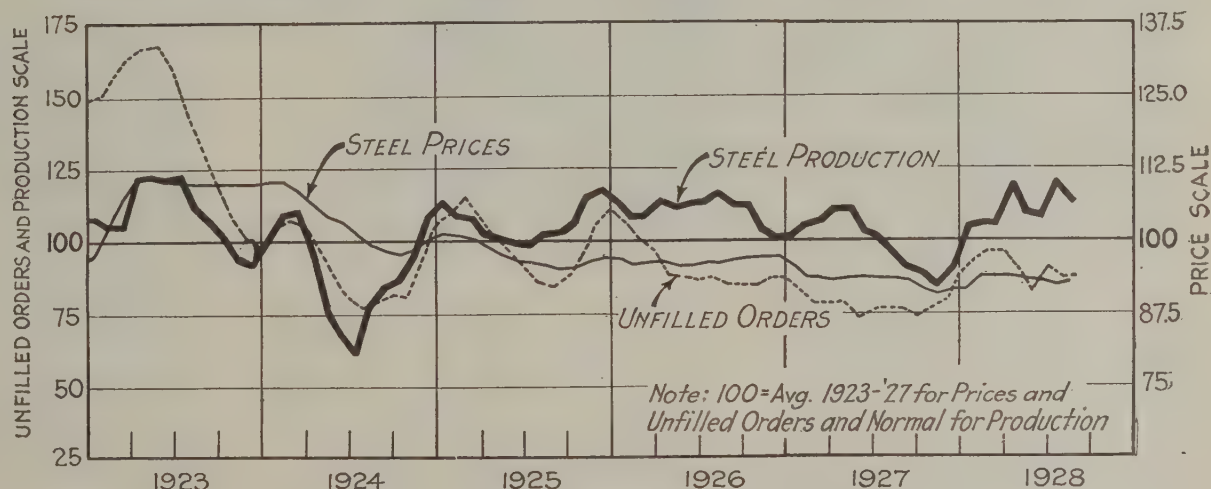
Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Oct. 4—Activity in Steel Consuming Industries; Oct. 18—Position of Iron and Steel Producers.

IMPROVE-
MENT in
Some Finished
Steel Prices (in
Particular, Sheets
and Bars) May
Be Further Ex-
tended Later.
Scrap prices ap-
pear to be partly
speculative, but
billets and bars
may go higher



BUILDING Ac-
tivity Showed
a Further Decline
in August. Fabri-
cated structural
steel bookings
fell off in July
from June

STEEL Output
Was 13.2
Per Cent Above
Normal in Au-
gust, Against 4.1
Per Cent Below
Normal a Year
Ago. Unfilled or-
ders made a sea-
sonal advance
and prices were
moderately better



STEEL Produc-
tion in Au-
gust Rose Less
Above July Than
Is Usual. While
demand has con-
tinued high, the
outlook is for a
moderate decline
in the demand
curve

Horizontal Machines for Production Drilling of Transmission Cases and Other Parts

TWO new multiple-spindle fixed center horizontal drilling machines designed for the production drilling of automobile transmission cases have been brought out by the Defiance Machine Works, Defiance, Ohio.

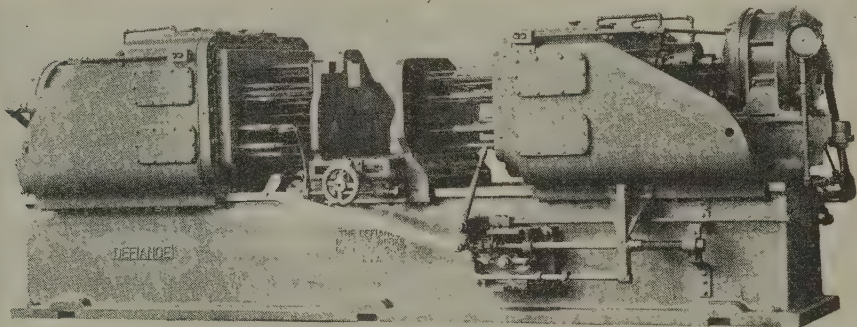
One machine is a two-way opposed-

includes loading and unloading as well as drilling time.

The base of each machine is of box type, is heavy, well-ribbed throughout and has a cored center. The ways on which the heads slide are broad and deep. The multiple-spindle heads are fitted with alloy steel spindles which

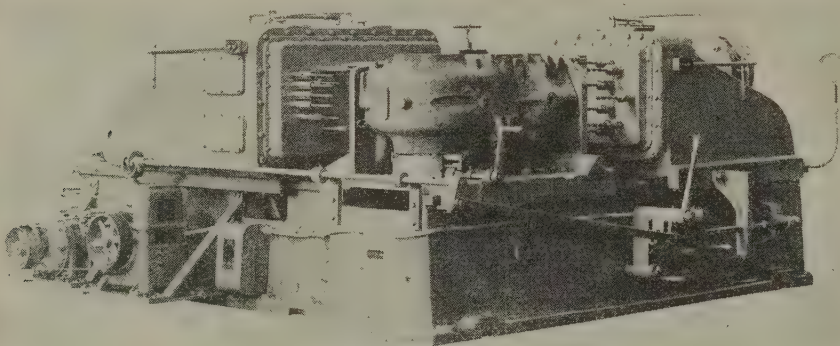
jig plate is mounted in front of each head on the fixture. This is fitted with removable jig eyes for guiding the various sizes of drills.

The two-way opposed machine occupies a floor space 64 x 180 in. and its net weight is 19,580 lb. The two-way right angle machine occupies a floor space of 132 x 138 in. and its net weight is 18,700 lb.



Although Arranged for Production Drilling of Automobile Transmission Cases, the Machines Are Adapted for Use on Motor Blocks and Similar Work. Either Oilgear or mechanical screw feed may be provided

The Two-Way Opposed-Head Drilling Machine, Above, Is for Drilling the Two Sides of the Transmission Cases, While the Right-Angle Machine, Below, Is for the End and Bottom or Side of the Cases. Companion machines for tapping are also built



head unit and the other a two-way right-angle machine, the former for use in drilling the two sides of the transmission cases and the latter for drilling the ends and bottom or side of the cases. The machines can also be used for motor blocks or other similar work requiring multiple drilling machines. Companion equipment for tapping operations can also be furnished.

Oilgear feed is provided on both machines, although mechanical screw feed with rapid traverse movement can be supplied if preferred. The hydraulic cylinders are mounted in the base under the heads, which are equalized with cut steel rack and pinion. The stroke of each head of the opposed-head machine is 18 in. and of the right angle machine 16 in., with rapid traverse forward then change to the rate of feed desired for drilling, with automatic kick-off and automatic quick return movement. The Oilgear pump is driven by a 3-hp. 860-r.p.m. motor. Production is at the rate of one drilled case every 2 min., which

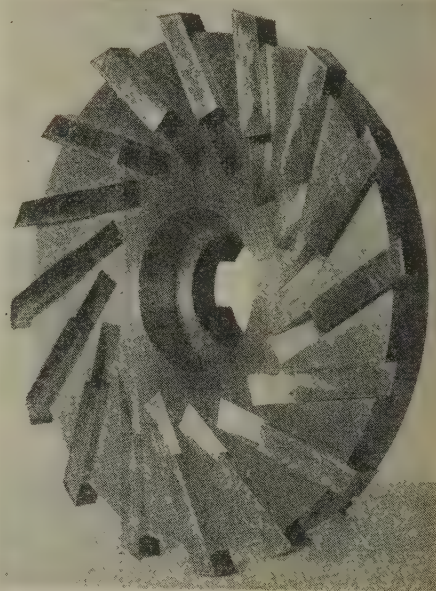
run in tapered roller bearings. The drive to the spindles is through stub-tooth heat-treated gears, which are entirely inclosed and are continuously lubricated by a force feed system. Spindle bearings of navy bronze can be supplied if desired.

The right-hand head of the two-way opposed machine has 36 spindles and the left-hand head has 31 spindles. Each head is driven by a 15-hp. motor. The right-hand head of the right-angle two-way machine shown in the illustration has 12 spindles driven by 7½-hp. motor and the left-hand head has 39 spindles that are driven by a 10-hp. motor. Speeds of the motors on both machines are 1150 r.p.m. The motors are direct connected to the heads by flexible couplings.

Each machine is equipped with a heavy fixture, which has a hardened plate and locating pins for centering, and a roller conveyor table which is raised and lowered by means of eccentrics, forming a stripper to raise the case off the pins and a roller conveyor after the case is raised. A heavy

Surfacers and Other Rotary Tools with Self-Fastening Blades

ROTARY surfacers with self-fastening, interchangeable high-speed steel blades, which may be fed out as they become worn, are being marketed by Tindel & Phillips, 516 Commerce Street, Philadelphia. These tools, illustrated herewith, are designed to rough and finish simultaneously, and the rake and clearance angles of the blades are said to be such that rapid and powerful cutting is assured. Wedges, screws or other fastenings are not used to hold the blades in the solid steel-plate disk which carries them. Twelve sizes of the surfacers, ranging from 6 to 24 in. in diameter, are regularly available. The 6-in. cutter has 11 blades and is rated to take a 17/32-in. face cut and a 1 31/32-in. side cut and the 24-in. tool



The Blades of the Rotary Surfacing Tool Are Interchangeable and May Be Fed Out as They Become Worn

has 28 blades and will take a 7/8-in. face cut and a 3 5/16-in. side cut. Tools up to 38 in. in diameter can be furnished special.

Rotary cold saws having two sets of blades, one on each side of the solid steel disk that carries them, to divide the cut, are also marketed by the company. The blades of these tools are interchangeable and self fastening. Slotting and channeling tools are also available and these, as well as the cold saws, can be furnished in 17 sizes from 12 to 62 in. in diameter. The 12-in. tools have 36

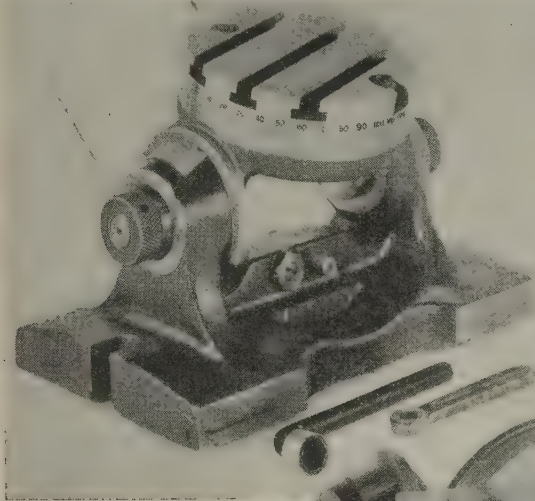
blades, are 0.250 in. thick and have a kerf of 0.312 in. and the 62-in. cutters have 86 blades, are 0.750 in. thick and have a kerf of 0.906. Slotters and

channelers of special diameters and thickness can be furnished to order, as well as saws up to 72-in. in diameter.

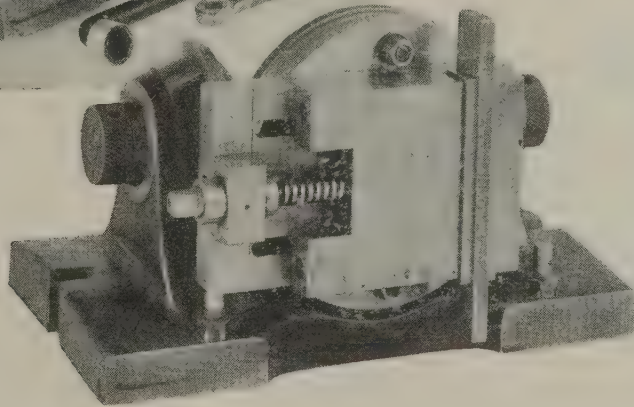
Vise-Plate with Two Service Feature

PATENT application has been made on the universal vise-plate illustrated, which is being manufactured

moving them from the vise. The clearance under the vise jaws, when the latter are vertical, is $1\frac{1}{2}$ in. Both



The Vise and Slotted Table Are Interchangeable on the Same Base. A piece held in the vise may be ground on one end, the vise rotated to a stop and the piece ground on the other end



by N. W. Ordway, 69 Congress Street, Hartford, Conn., for use in connection with milling or grinding machines as a vise or as a table, the vise and the table being interchangeable on the same base.

Many pieces difficult to machine may be attached to the table and milled or ground to any angle. The table and vise are graduated in degrees, 180 deg. each side of center, to facilitate setting and, with the application of verniers, angles may be measured within 5 min. of arc. After the pieces held in the vise have been ground on one end the vise may be rotated to a stop, and the pieces ground on the other end, without re-

the table and the vise revolve on a stud in the center of the upper base casting and are held down by the same hexagonal nuts. Removable keys extending parallel with the center of the fixture are provided in the base.

Two sizes of the vise-plate are available. The smaller has a table $3\frac{1}{4}$ in. in diameter and a base measuring $4\frac{1}{2} \times 7\frac{1}{2}$ in. The height is $4\frac{1}{2}$ in. and the T-slots are $\frac{1}{4}$ in. in width. The larger vise-plate, of identical construction, has a $4\frac{1}{2}$ in. diameter table, a $6\frac{1}{2} \times 9$ -in. base and $5\frac{1}{16}$ in. T-slots. The height is $5\frac{13}{16}$ in. The jaws of the vise, which open $1\frac{3}{8}$ in., are $\frac{5}{8}$ in. thick and 3 in. wide.

Wooden Wedges Produced Automatically

WEDGES of hard or soft wood and of various sizes are produced automatically on the machine illustrated, which has been placed on the market by the Oliver Machinery Co., Grand Rapids, Mich. The capacity is for wedges up to 3 in. in length, $1\frac{1}{8}$ in. in width and of various tapers with thicknesses from zero at one end to $\frac{1}{2}$ in. at the other end. The machine is entirely automatic and the output is from 50 to 60 wedges per minute.

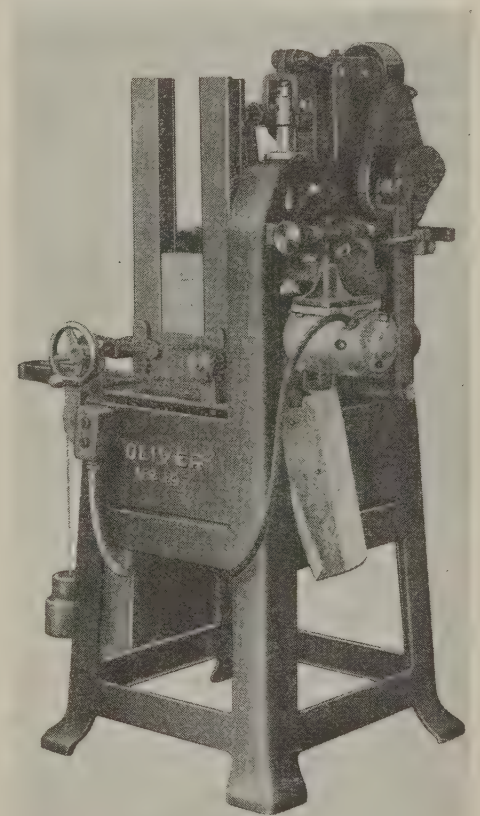
Stock or raw material fed into the magazine consists of cross cut strips, the thickness of which will form the

width of the wedges, and the length along the grain will be the length of the wedge desired. The strips may be of any width up to 10 in. and although it is preferred to have the strips of uniform 10-in. widths, material of various widths can be fed into the magazine simultaneously.

Two motors are employed, one the feed motor and the other the saw motor, both of which are of $\frac{1}{2}$ hp. These motors are mounted on the machine and wired to suitable starters having a push-button start and stop station. The feed mechanism is adjustable.

The stock is fed forward by means of a pusher with suitable movement to provide the exact thickness of wedge desired. The proportions of the feed motor pulley to the worm gear case pulley controls both the vertical movement of the saw motor and the feeding forward of the stock, which motions are synchronized. The cutting unit consists of a high-speed saw, 7-in. in diameter, which is mounted directly on the motor. This unit has side motion for cutting at various angles and sufficient vertical movement, on the regular machine to produce wedges $1\frac{1}{8}$ in. wide. This vertical motion can be changed to suit requirements for wider wedges if desired.

Waste from each strip of wood inserted into the machine consists of the initial cut and the stub end. The automatic method of holding the piece while the saw cuts off the wedge permits holding a very small stub end, which is emphasized as much thinner than can be held by hand on a hand-operated wedge sawing machine. It is claimed that this waste is decreased



Production Is at the Rate of 50 to 60 Wedges a Minute. Accurate and smooth wedges, as well as minimum waste, are claimed

by 50 per cent. Production of wedges that are accurate and smooth is also claimed.

Following the lead set by many firms who have issued "house organs," the United States Cast Iron Pipe & Foundry Co., Burlington, N. J., has started a publication called *U. S. Cast Iron Piper*. Volume I, No. 1, dated September, contains four well-written stories about the properties and applications of cast iron pipe.

Introduces New Line of Riveting Hammers

THE Ingersoll-Rand Co., 11 Broadway, New York, has brought out a new line of riveting hammers in four sizes, having strokes of 5, 6, 8 and 9 in. respectively. High power, ease of operation and low air consumption are claimed for the new tools.

A feature stressed is the manner in which the handle is fastened to the barrel and kept tightly in place by a



The Handle Is Threaded to the Barrel and Prevented from Unscrewing by a Spring Locking Device

spring locking device. The handle is threaded to the barrel and the spring lock not only prevents the handle from unscrewing, but applies tension to automatically tighten it.

The valve operates in a hardened and ground valve box located at the head of the barrel and clamped in place by the handle. It has large bearing surfaces and is free from holes or ports from which cracks might start. The valve box has a solid upper end to provide a positive compression chamber for the piston on its up stroke. It acts to prevent the piston from striking the handle end, as this air cushion is not dependent upon an air-tight joint between the handle and the barrel. The barrel of the hammer is of steel, heat-treated and ground.

An open-type outside trigger handle is furnished as standard, but closed or inverted handles can also be supplied.

Portable Disk Sander

THE United States Electrical Tool Co., Cincinnati, has added to its line a 9-in. disk sanding tool, which is



A 9-In. Sanding Disk Which Operates at 3600 R.P.M., Under Load, Is Employed

equipped with ball bearings throughout and operates at a speed of 3600 r.p.m. under load. The machine is equipped with a fan-cooled universal motor and has a two-pole trigger

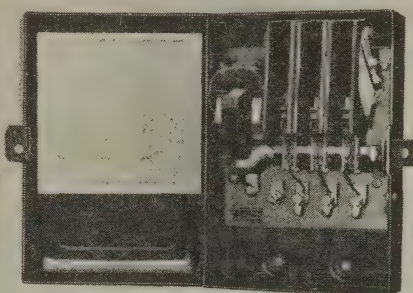
switch in the handle. Balance, facilitating operation, is a feature emphasized.

Regular equipment includes fine, medium and coarse sanding disks, flexible cable, two-piece attachment plug and armored cable guard. The weight of the machine is 12 lb.

New Magnetic Contactors

A NEW line of alternating current magnetic contactors for controlling lighting and power circuits automatically, and for miscellaneous applications, has been announced by the Cutler-Hammer Mfg. Co., Milwaukee. Hammer-head type magnets with self-aligning armature, continuous-duty magnet coil, hardened steel bushings, tin dipped solid copper contacts, magnetic blowouts and chimney type arc shields are features. The contactors, of large size, have the magnet frame supported on a spring plate to absorb the shock of the magnet on closing.

Two or three wire control can be



Magnetic Contactor for Automatic Control of Light and Power Circuits

used. With two wire control, low voltage release is provided and with three wire control, low voltage protection is provided. A wide variety of types and sizes are available, with the contactors mounted in a split inclosing case or on a slate panel for switchboard mounting.

Repulsion-Induction Motor

AN improved single-phase repulsion-induction motor in four sizes has been brought out by the General Electric Co. It is of constant speed, 1800 r.p.m., with a high starting torque, and is intended for general application. The sizes are $\frac{3}{4}$, 1, $1\frac{1}{2}$ and 2 hp.

More efficient use of the stator punchings is an important improvement in this four-pole motor. The motor has been designed with small overall length and a modification of the commutator and brush rigging design has permitted making the end shield the same dimensions at both ends, thus giving a symmetrical appearance. Phosphor bronze bearings packed with waste are applied at both ends.

Except for ventilating openings in the lower portion of each end shield the motor is inclosed. Air is drawn in by the internal fan on the pulley

end and passed out at the commutator end. The unit is designed to operate at a temperature not exceeding 40 deg. C. above that of the room.

Controls Temperature in Chromium Plating

A new equipment for controlling the temperature of chromium plating tanks is offered by the St. Louis Motor Valve Co., St. Louis, Mo. A special totally inclosed reversible motor of General Electric manufacture drives a threaded shaft through a double worm reduction gear mechanism. A lever, connected to this shaft and pivoted in its center, is arranged to operate two valves alternately, one for steam and one for water. A limit switch, at the top of the cast aluminum housing, stops the motor at proper positions.

The complete control consists of a contact-making thermometer, either of the recording or indicating type; a relay panel, and the duplex valve unit. The thermometer, which may be of any standard make, contains two contact points by means of which one circuit is made when the temperature is low, another when the temperature is high and none when the temperature is correct. The relay panel, which consists of two small contactors with series resistances, is operated by the instrument contacts. By the use of this relay the instrument contacts carry only a very small current and do not break an inductive circuit. Another purpose of the relay panel is to provide an electric circuit to the motor at the neutral position of the instrument.

Life tests in the laboratory and extensive tests in the field, it is stated, have proved this device to be both accurate and dependable in providing automatic temperature control where alternate heating and cooling is required. Many of the temperature charts, it is added, show a temperature variation of less than $\frac{1}{2}$ deg. on either side of the correct setting.

A manufacturer engaged in fabricating fences from wire has signed a stipulation agreement with the Federal Trade Commission to cease and desist from alleged misrepresentation in advertising. It is charged that a picture of the character known and recognized as "Uncle Sam" was carried in advertisements along with the words "the fence Uncle Sam recommends." Another assertion was that the wire was "just double the strength" of ordinary wire and "double galvanized." The Federal Trade Commission said it found these statements misleading.

A cast semi-steel pulley has been added to its line by the W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago, as a product of high dependable strength, even wearing qualities and good appearance.

This Issue in Brief

Profit trend for large manufacturers has been clearly upward, investigation reveals, while average profits of smaller manufacturers (under one million annual net income) have changed little in past five years.—Page 687.

* * *

Chromium-covered sheets may be fabricated without cracking surface, manufacturer claims. The base is rolled zinc, on which copper, nickel, and then chromium are bonded, not plated on.—Page 729.

* * *

Cuts cost of cleaning castings by hydraulic method. Foundry, situated on river, uses ordinary fire hose; solves labor problem, eliminates accidents caused by flying fins and sand, cleans cores more thoroughly, and lessens work to be done by sandblast operator. But hydraulic method is economical only where a river is handy.—Page 734.

* * *

Fires boilers with either blast furnace gas or pulverized coal. In blast furnace plant gas is automatically fed to boilers when pressure is high and is shut off when pressure falls.—Page 688.

* * *

Endurance of leaf spring steel almost tripled by grinding surface. Spring steel of 0.6 per cent carbon has a fatigue range of 30,000 lb. per sq. in. in ordinary forged and heat treated condition. Grind 1/16 in. off the surface, thus removing all microscopic hardening cracks, increases strength to 85,000 lb. per sq. in.—Page 692.

* * *

Open-hearth tapping difficulties are eliminated by tilting furnace. In stationary furnace hard taps frequently require 10 to 30 min. to get the metal started in the ladle, causing production loss and

oftentimes spoiling the heat. In tilting furnace the taphole is on a level with slag line and is usually opened a half hour before heat is ready to tap.—Page 692.

* * *

Sheet prices are likely to advance, says Doctor Haney. He believes they are too low in relation to other finished steel products.—Page 696.

* * *

New production record will likely be set by automobile industry for 1928. Indications are that the previous record of 4,424,538 cars and trucks, established in 1926, will be surpassed. August output was 485,000 units (estimated).—Page 731.

* * *

Chromium steel bridge members found to be in excellent condition after 60 years' service. Eads bridge over Mississippi River at St. Louis, first steel bridge in America, reveals no signs of corrosion or overstrain.—Page 684.

* * *

Though United States wages are more than twice those paid in Europe, labor cost in this country is a smaller item in whole cost of rolling steel than abroad. Here labor cost is about 38 per cent of the total, in England about 43 per cent, and on the Continent 45 per cent.—Page 692.

* * *

Automobile transportation cost reduced by Lake steamer shipment. Special automobile boats accommodate 650 cars. No blocking or bracing is necessary. Cars are loaded under their own power, unloaded at Lake port destinations and shipped to final destination by rail or truck.—Page 689.

Steel testing in the '70s was a hazardous occupation. Forged steel bolts, for use in Eads bridge at St. Louis, wrecked the testing machine and endangered the lives of testing crew.—Page 733.

* * *

Better steel at lower cost is made in tilting furnace, says open-hearth man. Production of soft and high and raw melting heats can be avoided, faster time per heat can be made, there is less danger of breakouts, and less bottom trouble, he declares.—Page 693.

* * *

Even with decreased percentage of profit relative to selling price, total profits of big manufacturers has grown greatly, because of higher productive efficiency and larger volume of consumption.—Page 688.

* * *

Foresees even level of business in steel-consuming industries for some months. "It is probable that (steel) consumption will fall little below the present level during remainder of 1928," says Doctor Haney.—Page 695.

* * *

Record in machine tool sales since first half of 1920 established in August, says National Machine Tool Builders' Association. Indications are that the total for September will equal, if it does not exceed, that of August.—Page 735.

* * *

Improved qualities imparted to metals by heat-treating and work-hardening are permanent, tests reveal. If metal is properly made, protected from corrosion, and not overworked, it will serve its purpose indefinitely.—Page 702.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

True as Steel; Strong as Iron

CERTAIN facts suggest the question, "Are the strength and toughness of sound metal really permanent?" For instance, wrought brass bowls resting on a shelf have been found cracked. Die-cast meter cases shipped to tropic ports have disintegrated. Samples of duralumin strip laid away in a desk drawer have become brittle. Springs or axles which have successfully withstood bumpy roads for years break off short under relatively small shock. Can the builder of a monumental structure rely on any metal for indefinite service?

A metallurgist would have no hesitation in saying "Yes" most emphatically, yet he would have a hard time to prove that his answer was based on facts rather than faith. He would point out that the greatest enemy is corrosion, "the ravages of time," weathering; that all building materials need protection from the elements. Mysterious failures of metals, like those cited above, have always been shown to be accompanied by corrosion and severe stress. The metallurgist would extrapolate these facts into the conclusion that if the metal is properly made, protected from corrosion, and not overworked, it will serve its purpose indefinitely.

Such reasoning does not convince the doubter as would records of long-time performance. But long-time records do not exist, simply because steel, today the all but universal metal, was first used for structural members sixty years ago. Actual experience dates back a relatively few years. So it is doubly fortunate that the first bridge in America to use steel in its main ribs has been minutely examined recently and certified to be "in excellent physical condition and amply safe for the loads and service it is called upon to carry and is carrying."

The Eads bridge, described in the first article in this issue, is a monument to the universal experience of mankind, crystallized into the common phrases "true as steel," "strong as iron."

The record of the Eads bridge is doubly important because the steel in it is alloy steel. Sixty years ago the engineer's trust was in wrought iron, and only slowly did constructors accept the stronger metal made by alloying a little carbon with the iron. We have now accepted steel as a suitable material of construction, but civil engineers are less anxious to place dependence on alloy steel, especially if heat treated. Mechanical engineers have become acquainted with it, and use it in large quantities every day in important machine parts where failure would endanger human life. To civil engineers the Eads bridge should be the best evidence of the permanency of the improved properties of low-

carbon structural steel secured by the addition of a little alloying metal and by a simple heat treatment. Carbon improves iron and makes steel. Other metals improve steel and make alloy steels heat-treatable. Both improvements are permanent.

Some support for these statements may be had from an examination of old metal. The only ancient steel existing today is in tools and swords. Of course, cutlery is made of much higher carbon steel than the structural grade. But all the old steels have been hardened and consequently may shed some light on the question, "Are the effects of heat treatment permanent?" A sword is hardened and tempered to a delicate point, and in the parlance of the physical chemist is in a much more metastable condition than a heat-treated structural steel would be. Consequently if there is any tendency to change with time, the microstructure and the physical properties of ancient blades should show marked deterioration.

Fortunately Japanese scientists at the Imperial University have made a careful study of these points, and Dr. Kotaro Honda concludes that the Masamune swords made some 600 years ago are superior to anything made today, both in original sharpness and durability. Fragments of a sword from an old tomb probably 1200 years old show the expected microstructure of fine-grained martensite with no traces of its well known decomposition products, even when examined at 1000 diameters. The Shore scleroscope hardness of this fragment varies from 58 to 68. Eleven other very old swords were tested with the following results: Maximum hardness 83, minimum 53, mean 66 (all Shore scleroscope numbers). Since these results are within the same range as those found on much more modern blades, Professor Honda and his associates conclude that "Japanese swords found in old tombs do not undergo any change of structure (other than corrosion) during several hundreds of years, or even over one thousand years."

Here are no signs of internal decay.

In conclusion, it might be pointed out that civil engineers have used successfully large quantities of steel in a condition which mechanical engineers would avoid. We refer to the wire in suspension bridge cable. It is work-hardened to a high degree, and experience with non-ferrous alloys particularly shows that work-hardening is a common cause of spontaneous failure through "season cracking." Well made bridge wire fortunately is immune from this trouble. Work-hardening, so far as is known, is also just as permanent as hardening by heat treatment (and when we say hardening we also mean strengthening). Thus, H. C. Boynton, metallurgist of John A. Roebling's Sons Co., has tested

bridge wire after nearly 75 years' service and concludes that "cold-worked iron installed 75 years ago has not lost its valuable physical properties since the bridge was erected."

Penetrating the Tropics

INDUSTRIALIZING the tropics has been commonly regarded as waiting on the biologist. It is not alone sufficient to subjugate insects that beset humans, and generally to render sanitary and healthful the vast land areas in those zones. Also, those pests are to be conquered which are deadly to the plant life that must flourish in quantity sufficient to support larger populations and leave exportable surpluses. Pending the results of scientific research into diseases of tropical animals and plants, man seems steadily to be penetrating from the temperate zones by way of the automobile. Growth in the popularity of the latter has led to the betterment and extension of roads, and the automotive vehicle, truck as well as passenger car, is a spur to the investigations of the hygienist and the plant-life expert.

Thus whole countries with vast unopened areas seem likely sooner or later to become road-minded. Brazil, for example, has a president who was a good-roads enthusiast as head of the State of Sao Paulo and is now making road-building a major activity of the Federal Government. Next year that country will be host for the Pan-American Highway Congress and will exhibit two arterial highways, one 500 kilometers long connecting Rio de Janeiro and Sao Paulo.

It is logical to say that, given highways for ready collection of produce by motor trucks, trunk-line railroads may follow, that meanwhile repair shops must be provided and at length will come manufacture for local needs or from local materials. Granted that all this is a long look ahead, yet it is well to vision the conquest of the tropics as not alone the task of the biologist, but a development in which established industries in temperate zones will figure in a large way.

Farm Politics and Economics

IT is pathetic how the politicians essay with their palliatives to solve the farm problem, which is well known to be insolvable except by the natural operation of economic law. Intelligent thought on the part of the doctors boils down to the simple formula of co-operation as the only prescription they can offer. A good expression of this is made by William M. Jardine, Secretary of Agriculture, who said recently:

We must eliminate the waste between the farmer and his market and increase the profit to the producer without increasing the cost to the consumer. There must be organized competitive selling of the main commodities produced on the farms. The parasites of agricultural marketing must be weeded out and able and efficient men left to conduct the marketing.

This really does not mean as much as it seems to mean. The marketing of agricultural products is already done in a competitive way by able and efficient men. The transportation of agricultural products is conducted by able and efficient railroad men on terms that afford but small return to their stockholders. How is cooperative marketing going to squeeze out any waste

or get more money for the farmer without increasing the cost to the consumer?

The farmers could have had an act of Congress aiding them in cooperation at any time during the administration of Mr. Coolidge when they wanted it. Their professional exponents were under no illusions, however, and wanted the McNary-Haugen bill, which would have given to the farmers money at the expense of other taxpayers, knowing that such is the only way. The phantom of extracting a profit out of a conjectural waste does not intrigue them.

Under either Mr. Hoover or Mr. Smith we shall probably have an agricultural cooperative program. Yet we may well doubt that cooperative marketing as politically devised will be as efficient as the competitive individualism that now prevails. There are no easy pickings. The fittest survive; the most inefficient become insolvent, and the ordinarily inefficient eke out a bare living, as in every other competitive business.

Will Rogers, who pretends to be running for President on the platform of the "Anti-Bunk" party, states his position on farm relief in the following way:

I am the only candidate running this year that ever looked a mule in the face, and I know I can't do anything for the farmer. The only difference to him if he votes for me is that he'll be disappointed earlier than if he votes for either of the recent farmers on opposing tickets.

This is an expression in a nutshell of the common sense of the matter.

Finding Profits in Prosperity

AT a time when the major political parties are at grips over the existence of prosperity, more facts than usual are available regarding the trend of profits in American industry. The results of a broad study of industrial profits were presented recently before the National Association of Cost Accountants in a paper by Harry A. Bullis, abstracted elsewhere in this issue. The author arrived at the following conclusion:

Although profits have declined for all companies in certain industries, and for some companies, especially the smaller units, in many industries, profits in industry as a whole have not declined, but have been on somewhat of an upward trend.

Mr. Bullis's survey was general, touching virtually all fields of manufacture. However, since it covered a relatively small percentage of the total number of industrial companies, the conclusiveness of his deduction may properly be questioned. He addressed inquiries to 7500 manufacturers. From the replies he selected 300 that were complete in their answers to his questionnaire. To these he added 350 financial reports from corporation service agencies, also a study of Federal corporation tax returns.

Despite the incompleteness of the data, they definitely show that "profitless prosperity" is an unwarranted description of the business situation. No general economic condition, affecting all industries alike, is preventing profitable operations. On the contrary, a marked unevenness of results is indicated in graphs depicting the trend of net income in different industries. Complete balance in the business situation has been lacking ever since the war, and depression in specific fields is reflected in the income curves.

Much of the discussion of smaller profits, in Mr. Bullis's opinion, refers to a declining margin of return on each sales dollar. If this view is right, it helps to explain the better profits found for the greater corporations, which handle a far larger volume of business than their smaller competitors. It also emphasizes the need for further economies in distribution.

World Gains in Steel Output

EUROPE gained 2.2 per cent in steel production and North America 14.8 per cent, comparing production in the first half of this year with the average rate in the whole of 1927. The gain in the two continents was 8.3 per cent. Both the United Kingdom and Germany had losses, however. The detailed showing below includes such European statistics as are available:

	Monthly, First Half 1928, Gross Tons	Change From 1927 Average, Per Cent
United Kingdom	715,000	— 5.6
Germany	1,299,000	— 3.0
France	758,200	+11.8
Belgium	313,700	+ 2.9
Saar	167,400	+ 7.7
Luxemburg	208,500	+ 2.9
Italy	146,300	+13.2
Russia	345,700	+13.7
Poland	108,400	+ 5.6
Total	4,062,200	+ 2.2
United States	4,168,000	+14.3
Canada	108,000	+43.0
North America	4,276,000	+14.8
Grand total	8,338,200	+ 8.3

A certain allowance should be made from the showing of the above figures, since the United States regularly has a heavier production in the first half of a year than in the second half, whereas other countries do not show that variation. The divergence in the United States this time is particularly strong, for the second half of last year was an unusually poor second half.

The figures do not reflect any influence from the European cartel. Germany is in it and the United Kingdom is out of it, but both lost. The United States and Canada are out of it and both gained.

The growing countries are readily picked out—chiefly France, Italy and Russia. In the case of Russia there is merely a coming back, for Russia is still below her 1913 rate. Germany is down from 1913, on account of division of territory, while Poland is also down, about 19 per cent.

Italy's production this year is chiefly a gain upon last year. There is little advance from 1926 and 1925, though nearly a doubling since 1913. Production there is under adverse circumstances, for while Italy produces a large part of its iron ore it produces little fuel, and that almost entirely lignite. Substantially all coal is imported as well as some coke, a moderate amount of pig iron and a large amount of scrap.

The total in the above table falls quite short of representing the world's steel output, for several European countries are omitted and there is production in Asia, Australia and South Africa.

Get Out the Vote

ATTENTION has been drawn repeatedly to the failure of a large percentage of American citizens to exercise their right to vote. It is a common experience that the total vote cast is only about 55 per cent of the possible. Likewise repeatedly there are urgings to voters to do their duty. Indeed, we believe there is a Get-out-the-vote civic organization.

We do not deprecate the indignation that is worked up on this subject. We say emphatically that everyone who is entitled to vote and can do so intelligently ought to do so. Nevertheless we may offer some extenuation for those who fail to vote.

Let us suggest immediately that the golf players who would spend an unbroken day on the links rather than take the trouble to visit the polls are relatively few in number. No doubt if we should include all sportsmen their total would be insignificant. We may also suggest that in some States the politicians who conduct our elections contrive to make the conditions unnecessarily onerous, especially some registration requirements. This in itself keeps a good many voters from exercising their right.

There is always a large number of citizens who refrain from voting, owing to their inability to express themselves conscientiously. Thus in the pending election many persons who would vote to uphold the economic principles of one or the other of the two great parties are in a dilemma in view of their stand in respect to the 18th Amendment.

We imagine, however, that the great explanation of non-voting is failure to understand the questions at issue, coupled with willingness to leave the decision to those who do understand (or think they do). It might as well be honestly recognized that a considerable part of our population deliberately does not want to vote.

Of the proposal to drive to the polls those who do not know how to vote or do not want to, it is to be said that balloting by such persons would be largely a matter of chance. Perhaps it is so in the case of many others. At all events we may reflect that a 55 per cent vote probably averages better in intelligence and thoughtfulness than would one of 100 per cent, and that if a compulsory voting system were ever enacted we might have results that we should not like. What is already evident in the present campaign is that in many States an unusual percentage of citizens will exercise their franchise in November, and the experience, particularly in the case of women, may tend to a permanent stepping up of the percentage of voters.

All predictions thus far about America's oil supply have been proved to be understatements, according to the Oil Heating Institute, 420 Madison Avenue, New York. In a recent publication entitled "What About the Supply of Fuel Oil?" the institute asserts that, notwithstanding increased demands due to the popularity of the automobile and the household oil heater, our petroleum reserves should prove ample for generations to come. Discovery of new oil fields and scientific improvements in working petroleum deposits and preventing waste have conclusively contradicted the early prophecies of an oil famine. Estimates of reserves made as late as 1926, it is stated, have proved far too low; by 1930 California alone will have produced more oil than the entire visible supply was supposed to be in 1923.

Protest Against Examiners' Report in Rate Case

WASHINGTON, Sept. 18.—The first exceptions to the report of Examiners Howard C. Faul and C. M. Bardwell in connection with the general steel rate investigation case were filed last week with the Interstate Commerce Commission by interests in Wisconsin and Michigan, which protested against the exclusion of that part of Official Classification territory along the west bank of Lake Michigan. In the excluded section are included Green Bay, Kewaunee, Sheboygan, Manitowoc, Two Rivers, and Marinette, Wis., and Menominee, Mich.

It was contended that the examiners erred by not proposing the same basis of rates for the excluded territory as was proposed for stations in the southern peninsula of Michigan and southern Wisconsin. The fifth class rate, governed by official classification, is now applicable to the iron and steel articles involved in the case between the towns named and official territory, it was pointed out. The same scale of rates, the statement urged, should continue to those points as applicable elsewhere in official territory and the scale of rates found reasonable allowed to apply to the west bank Lake Michigan ports.

Those filing the statement were the Green Bay Association of Commerce, the Kewaunee Chamber of Commerce, the Manitowoc-Two Rivers Traffic League, the Sheboygan Association of Commerce, the Menominee-Marquette Chamber of Commerce and the Manitowoc Shipbuilding Corporation.

Canada to Consider Steel Tariff Revision

TORONTO, ONT., Sept. 18.—Iron and steel will be subjects of inquiry at the next sittings of the Tariff Advisory Board, to begin on Sept. 25 at the board's headquarters at Ottawa, Ont.

On Sept. 27 and 28 there will be a hearing on the application by the British Empire Steel Corporation, Ltd., for a duty on coke; imposing of a duty on anthracite screenings; and abolition of the rebate on duty at present granted on coal imported for the manufacture of coke used in the melting of metals, and on coal for the manufacture of coke in by-product ovens.

On Oct. 2 and 3 a hearing will take place on the application of the Algoma Steel Corporation, Sault Ste. Marie, Ont., for revision of tariff item 1007, so as to render dutiable flat spring steel, steel billets, and steel axle bars when imported for the manufacture of springs and axles for automobile vehicles; revision of tariff item 1008, so as to render dutiable spiral spring steel, when imported for the manufacture of railroad spiral springs; insertion in the Customs Tariff of the following: "Steel in all forms and shapes, by whatever process made, and by whatever name designated, whether cast, hot or cold-

rolled, forged, stamped or drawn, containing nickel, cobalt, vanadium, chromium, tungsten, molybdenum, also manganese or silicon, when present in the steel in excess of 1 per cent manganese or 0.50 per cent silicon, or any other metallic content used in alloying steel—35 per cent ad valorem, general and British preference"; increases of customs duty on all sections of steel angles up to and including 6 x 6 in.; and on beams up to 6 in. and channels up to 7 in.

High Record in Fabricated Structural Steel

WASHINGTON, Sept. 18.—Bookings of fabricated structural steel in August totaled 274,467 tons, or 95 per cent of the monthly capacity of 288,610 tons of the 191 reporting firms. The August total of actual orders reported has not been exceeded since July, 1927, when the total was 280,613 tons, representing 92 per cent of the capacity of the then reporting firms.

On the other hand the computed bookings for August, 356,250 tons, exceeded that of July of last year, with 345,000 tons, and made a new high record. Bookings in July of the present year aggregated 238,350 tons, or 79 per cent of the capacity of 301,035 tons of the 214 firms that reported to the Department of Commerce. Computed shipments in August amounted to 300,000 tons, or 80 per cent of capacity, against 270,000 tons, or 72 per cent of capacity, in July.

Orders for the eight months ended with August were computed at 2,238,750 tons, against 2,013,750 tons for the corresponding period of last year. Computed shipments were 2,017,500 tons and 1,886,250 tons respectively.

Foundrymen Meet in Montreal

A number of the leading foundrymen in the Montreal district met at luncheon at the Engineers Club in Montreal on Wednesday, Sept. 12, and were addressed by Dr. Richard Moldenke, the eminent foundry metallurgist, on some of the new and interesting developments of the foundry industry. The meeting was arranged jointly by the Witherbee, Sherman & Co., Port Henry, N. Y., and their Canadian sales agents, A. C. Leslie & Co., Ltd., Montreal, Forrester B. Leslie of the latter company acting as chairman.

Following an interesting and instructive talk, the meeting was thrown open to discussion and questions in which several took part, including Charles A. Pascoe, Canadian Car & Foundry Co., H. J. Roast, Robert Mitchell Co., and T. F. Kelly, Witherbee, Sherman & Co.

This meeting was held to further a better understanding between foundrymen and blast furnacemen, as to how the latter can best meet the various foundry requirements, and it

was something new to the iron industry of the district. The main idea put forward was that while the furnaceman might be doing everything possible to operate efficiently his own plant, this was of little value to the foundryman unless the furnace made iron that would produce good castings. With quality as the main objective, the furnaceman wanted to know just where the foundryman had trouble, and what he therefore might require in the way of better or more suitable pig iron.

Scrap Dealers Organize in Connecticut

New England scrap dealers on Wednesday, Sept. 12, at a meeting held at the Tumble Brook Country Club, Bloomfield, Conn., for the purpose of meeting Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, took steps to organize a Connecticut chapter with headquarters in Hartford.

Among those attending the Bloomfield meeting were: George B. Doane, Perry, Buxton & Doane, Boston; Carlson & Bager, Northampton, Mass.; L. I. Alport and Cohen Brothers, Springfield, Mass.; B. Cotton and Edinberg & Bloomfield, and Joseph W. Rafferty, Worcester, Mass.; M. Katz, Suissman & Blumenthal and H. Katz, Hartford, Conn.; M. Gordon & Son, Norwich, Conn.; Samuel J. Liffitt, Ansonia, Conn.; P. J. Katz, Danbury, Conn.; Max Miller, Middletown, Conn.; S. Jacobs, Bridgeport, Conn.; Benjamin Epstein, Norwich, Conn.; Berkshire Iron Yard, Meriden, Conn.; I. Feigenbaum & Son, M. Kotkin, S. Shurberg, New Britain, Conn.; Harris Iron & Metal Co., Joseph M. Regan, New Haven, Conn.; Iron & Metal Co., Eastern Iron & Metal Co., New England Iron & Metal Co., United Steel & Metal Co., New London, Conn.; American Waste & Metal Co., Norwich, Conn.; Harris & Gann, South Norwalk, Conn.; F. Murphy, Silverman & Shanen, Stamford, Conn.; Albert Brothers, Commercial Iron & Metal Co., Samuel Goldman, Waterbury, Conn.; S. Kaslowsky, B. Manaker, Portchester, N. Y.; S. Blumenthal, S. Cooper & Son, Max Jacobs, M. Levine and Yale Rubin, Ansonia, Conn.

"The Manganese Steel" is the title of an attractively printed booklet issued by American Manganese Steel Co., 333 North Michigan Avenue, Chicago. It describes the history of high manganese cast steel, its properties, and the various uses to which it is put. Mention is also made of the electric furnaces used by the company, and the research laboratories.

The Drop Forge Supply Association will hold its annual dinner Wednesday evening, Oct. 10, at Bookbinder's Restaurant during National Metal Week at Philadelphia.

Iron and Steel Markets

Steel Price Situation Unsettled

Market Levels for Fourth Quarter Contracts in Doubt—
September to Equal August in Output—Further
Advances in Pig Iron

THE volume of business in iron and steel holds at a high level, but prices present a mixed picture. In contrast with further advances in pig iron and scrap, finished steel prices are unsettled.

The application of a Sept. 10 deadline for specifications in bars, plates, shapes and sheets was not so general as expected. Some third quarter contracts placed the limit at Sept. 15 and others at Sept. 20, while a number of mills imposed no restricting clause. As a result, many buyers are still able to draw against current quarter contracts, and others, not yet ready to commit themselves for fourth quarter, are either out of the market or are placing spot orders.

Such fourth quarter contracting as has been done in bars, plates and shapes points to lower prices than mills aimed at. Consumers taking too little tonnage to be regarded as in the preferred buyer class have been able to cover at 1.90c., Pittsburgh, suggesting that price, rather than 2c., as the probable general market level for the final quarter.

Willingness of mills to extend protections on plain material to steel fabricators, and a pliable attitude on automotive contracts for alloy steel bars are other complicating factors.

In sheets, heavy bookings will carry both mills and buyers well into the coming quarter, and price tests are deferred. It is conceded that specifying was sharply stimulated by the impending reduction in cash discount, even though that was not the case with certain consumers, such as manufacturers of stampings, who do not find it practical to stock material.

Sheet steel sales so far this month have probably been not less than a full month's production, which, added to unfilled orders of 498,023 tons as of Sept. 1, reported by the National Association of Flat Rolled Steel Manufacturers, indicates that mills are quite generally sold up well into November.

Steel production leaves little to be desired. With September more than half gone, little doubt remains that output for the 30 days will be fully as large as last month, when steel plant operations averaged 83 per cent. The rate in September, 1927, was 69 per cent.

The decline in steel demand from motor car builders noted last week proved only a temporary dip. Although some automobile companies plan to curtail operations or shut down for repairs about Nov. 1, releases of steel in the aggregate are again large, in keeping with efforts to turn out as many cars as possible before the expected winter lull in demand sets in.

Railroad buying gives signs of expanding. The Pennsylvania has exercised an option for 10,000 tons

of rails, and the Great Northern has placed 4000 tons of high-manganese rails. These orders are forerunners of the customary fall rail buying movement, which is expected to get under way soon. The Chesapeake & Ohio and the Norfolk & Western will each take bids on round tonnages of bars, plates and shapes this week.

Pipe line construction promises to continue as a major outlet for steel. Dallas, Tex., has contracted for a pipe line taking 4250 tons of plates, and the Texas Corporation will build a line from Oklahoma to Lockport, Ill., requiring 25,000 tons.

Pig iron prices are still advancing, although the bulk of fourth quarter contracting has been completed. At Chicago, St. Louis and Philadelphia prices have gone up 50c. a ton. Cleveland furnace prices for outside delivery are 50c. a ton higher, and Valley furnaces have marked up quotations on all grades except foundry iron 25c. to 75c. a ton.

Heavy melting scrap at Philadelphia has risen 50c. a ton, following an advance of \$2 a ton in the previous week. Higher prices have been named in other market centers, but the upward trend has lost momentum. At Pittsburgh, recent purchases of scrap are explained, in part, by the desire of consumers to stimulate shipments against contracts at lower prices.

Structural steel lettings for the week are large. Including 26,000 tons for New York subways, the total is 49,000 tons. Prospective work includes 6000 tons for a department store in Minneapolis, 5000 tons of plates for oil tanks in California, 4500 tons for a glass manufacturing plant at Crystal City, Mo., and 3500 tons for a Mississippi River dam near St. Paul.

Computed bookings in fabricated structural steel in August, at 356,250 tons, made a new record, exceeding the previous peak month, July, 1927, by 11,250 tons. The gain over July, this year, was 60,000 tons.

A firmer world market in tin plate, a sequel of the recent understanding between Welsh and American mills, is reported from England by cable. Stronger prices for both pig iron and steel on the Continent are reflected in heavier domestic demands on British producers.

Copper advanced on Sept. 15 to 15c. a lb., the highest price since January, 1925. Sales in the first half of September totaled 125,000 tons, of which 80,000 tons was to domestic consumers. Tin has also been active, sales in the past four weeks totaling 6500 tons.

THE IRON AGE composite price for pig iron has advanced for the third time in four weeks. At \$17.63 a ton, it is within 12c. of the year's high, which came in February. The finished steel composite remains for the seventh week at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
No. 2, fdy., Philadelphia.....	\$20.76	\$20.26	\$20.26	\$20.26
No. 2 Valley furnace.....	17.00	17.00	16.50	17.50
No. 2, Southern, Cin'tt.....	19.94	19.94	19.19	20.94
No. 2, Birmingham.....	16.25	16.25	15.50	17.25
No. 2 foundry, Chicago*.....	18.50	18.00	17.50	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.25	16.25	16.00	17.00
Valley Bessemer, del'd P'gh....	19.01	19.01	18.76	19.76
Malleable, Chicago*.....	18.50	18.00	17.50	19.50
Malleable, Valley.....	17.25	17.25	17.00	17.50
Gray forge, Pittsburgh.....	18.26	18.26	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.75

Finished Iron and Steel,	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.17½	2.04
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	1.95
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.40	3.85
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill.	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill.	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
Heavy melting steel, P'gh....	\$16.75	\$16.75	\$15.50	\$15.50
Heavy melting steel, Phila....	15.50	15.00	13.00	14.00
Heavy melting steel, Ch'go....	13.00	13.00	12.75	12.25
Carwheels, Chicago.....	13.50	13.50	12.75	14.25
Carwheels, Philadelphia.....	16.00	15.50	15.50	15.50
No. 1 cast, Pittsburgh.....	15.00	15.00	14.50	15.00
No. 1 cast, Philadelphia.....	16.50	16.00	15.50	16.50
No. 1 cast, Ch'go (net ton)...	15.00	15.00	14.00	14.50
No. 1 RR. wrot. Phila.....	15.00	14.00	13.50	15.50
No. 1 RR. wrot. Ch'go (net)...	12.00	12.00	11.25	11.00

Coke, Connellsville, Per Net Ton at Oven:	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Sept. 18, 1928	Sept. 11, 1928	Aug. 21, 1928	Sept. 20, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	15.00	14.75	14.75	13.25
Electrolytic copper, refinery...	14.75	14.50	14.50	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	6.22½
Zinc, New York.....	6.60	6.60	6.60	6.57½
Lead, St. Louis.....	6.32½	6.25	6.00	6.00
Lead, New York.....	6.50	6.40	6.20	6.25
Tin (Straits), New York.....	48.00	47.12½	47.87½	61.50
Antimony (Asiatic), N. Y....	10.87½	10.62½	10.25	11.00

Pittsburgh

September Steel Production Will Equal That of August— Price Advances on Finished Products Not Well Established

PITTSBURGH, Sept. 18.—Steel orders and production remain at the high rate of the past month or more and, with September more than half gone, it is now safe to say that this will be quite as big a month as August and will make a particularly favorable showing with September, 1927, when both demand and output were on the downgrade.

The falling off in demands from the motor car builders, noted a week ago, proves to have been only a lull, as tonnage releases from that quarter again have been large and urgent in the past week. Automobile builders seemingly are determined to get out as many cars as possible before the demand slackens. It is well established that demand for cars is chiefly in replacements, and the usual experience is that those who do not replace old cars by the fall seldom do so until the winter is over.

The lower rate of discount for cash, which becomes effective on sheets and cold-rolled strips on Oct. 1, has been a strong factor in driving in specifications for those products. Business in bars, plates and shapes has been stimulated by the limitations which some, not all, manufacturers imposed as to the time they would accept specifications on third quarter contracts. Quite apart from those facts, however, has been the record breaking activity of

the automotive industry, an unusual high rate of production by agricultural implement manufacturers and a sustained demand for structural steel from the building industry, while the oil and gas industry has contributed a goodly amount of seamless well pipe and welded pipe line.

From the standpoint of business and steel plant engagement, a more satisfactory situation would be hard to imagine. On the score of prices, the

market leaves much for steel makers to desire. While advances have been announced in bars, plates, shapes, sheets and strips, it is observed that the last-named product has failed to make the gain and those in the other lines are not definitely established. The idea that advances would meet with little or no resistance appears to have been false, as some large buyers are contesting.

Increased mill buying of scrap has brought about no further advance in that commodity, probably because the purchases were dictated by the fact that they were not getting anywhere near full shipments against older and lower-priced purchases and the new commitments were what a few years ago were called a "marrying" of contracts. Generally higher prices are asked for pig iron, but there is not enough demand to provide a test. Greater activity in beehive coke is seen in a firmer, but not appreciably higher, market.

Pig Iron.—The Youngstown Sheet & Tube Co. has announced prices of \$17, Valley furnace, for No. 2 foundry and basic iron, \$17.50 for malleable and \$17.50 to \$18 for Bessemer. These prices, which represent advances in all except foundry iron of

from 25c. to 75c. a ton, also have become the quotations of most other producers serving this market, but only in the case of foundry iron, and then on very small lots, have they found basis in actual sales. So many of the larger consumers are covered on their requirements for the remainder of the year, that the demand is chiefly from the single carload buyers and no real test of prices is afforded. For the present, the new prices may be regarded as indicative of the attitude of producers rather than as a basis established by sales. The market is firm, because merchant producers are fairly well sold up at prices that are unprofitable and they naturally want to raise their averages on any additional business they may take. Hence, they are not forcing sales. The steel companies are finding a need for most of their iron production at present and selling pressure from that direction also is light, although the suggestion is heard that cold iron stocks are by no means small on steel company furnace yards and that the steel companies have come to the belief that low prices for pig iron have been one of the reasons for difficulty in raising finished steel prices. The Sharpsville, Pa., furnace of the Davison Coke & Iron Co., which has been idle since June 4 last, will be blown in Oct. 1.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.25 to \$17.00
Bessemer	17.25 to 17.50
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.25 to 17.50
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Fourth quarter prices of billets, slabs and sheet bars are not yet clearly defined. While producers generally have indicated that they would seek higher prices and several have announced \$33 as the price on sheet bars for the final quarter of the year, there has been no definite word as to billets and slabs. It is noted that makers still are taking specifications on contracts carrying a price of \$32, Pittsburgh, and the fact that buyers can specify

until the end of the month probably means that they will be able to secure next month's requirements at that price. Wire rods are steady at \$42, base, Pittsburgh or Cleveland, and are moving well.

Rails and Track Supplies.—Not much 1929 standard-section rail business is going on mill order books, but the distribution of such orders is likely at any time within the next 30 days. Track supplies are only moderately active. Light-section rails are dull.

Wire Products.—Nail business is slow, but there is a good movement of plain wire, and barbed wire and fence are doing fairly well. Marked decrease in the use of coated nails is noted, compared with that of a few years ago. Supplanting of wooden boxes by cardboard containers is responsible.

Tubular Goods.—Demand continues good for seamless pipe for deep oil wells and makers are maintaining substantially full operations of mills. There is a parallel situation in line pipe, but demand for welded oil country pipe is light and the call for butt welded pipe for building and construction work is steady rather than active.

Sheets.—No appreciable letdown is noted in the demand for sheets, although the volume of specifications has lessened with the passing of the date on which mills would accept them for shipment before the lower rate of discount for cash in 10 days became effective. Some effort has been made to get the mills to accept more business that would carry a discount of 2 per cent for cash, but without success, since most mills have all the tonnage they can possibly turn out this month and few will have completed shipments until after the turn of October. An order for 1000 tons of automobile body sheets has been seeking some mill that would ship it before the lower discount became effective. While any tonnage specified for shipment this month that goes out in the first part of October will carry the 2 per cent cash discount, the mills are firm in their adherence

to the lower rate on all other business. With the third quarter now commonly regarded as completed, stronger efforts are being made to obtain the higher prices announced on fourth quarter tonnages several weeks ago. These prices are 2.75c., base Pittsburgh, for black, 3.50c., base, for galvanized and 2c., base, for blue annealed. Some mills, however, are committed on part of their probable fourth quarter production at recent prices. Mill operations have increased in the effort to get out the orders stimulated by the desire to escape the lower discount rate and several plants of American Sheet & Tin Plate Co. last week operated 17 turns instead of the usual 16 turns.

Tin Plate.—Mill operations are receding as orders run out. While the weather lately has been favorable for growing and probably has added to the yields of a good many packing crops, the fact that no supplementary tin plate business has developed means that container manufacturers are well supplied. There is nothing new as to prices and probably will not be until along about the middle of November, when can makers must know the price on which they will figure 1929 business.

Cold-Finished Steel Bars and Shafting.—Specifications, which lagged a little in the previous week, have increased again. There is still some resistance to 2.20c., base Pittsburgh, which makers have announced as the fourth quarter contract price, but there is no evidence that makers are yielding in this demand, which represents an advance of \$2 a ton over the third quarter price.

Bars, Plates and Shapes.—It develops that not all third quarter contracts for these products stipulated that specifications against them were to be in by Sept. 10; some made the deadline Sept. 15, others Sept. 20 and a number were written that did not contain any limiting clause. The result is that a good many buyers still are able to draw on third quarter contracts. This situation has made difficult the efforts of producers to obtain the higher fourth quarter prices an-

THE IRON AGE Composite Prices

Finished Steel

Sept. 18, 1928, 2.348c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.348c.
One year ago.....	2.346c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c.,	Feb. 14;	2.314c.,
1927	2.453c.,	Jan. 4;	2.293c.,
1926	2.453c.,	Jan. 5;	2.403c.,
1925	2.560c.,	Jan. 6;	2.396c.,
1924	2.789c.,	Jan. 15;	2.460c.,
1923	2.824c.,	Apr. 24;	2.446c.,
			Jan. 2

Pig Iron

Sept. 18, 1928, \$17.63 a Gross Ton

One week ago.....	\$17.46
One month ago.....	17.04
One year ago.....	18.00
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75,	Feb. 14;	\$17.04,
1927	19.71,	Jan. 4;	17.54,
1926	21.54,	Jan. 5;	19.46,
1925	22.50,	Jan. 13;	18.96,
1924	22.88,	Feb. 26;	19.21,
1923	30.86,	Mar. 20;	20.77,
			Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.90c. to 2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60 ft. lengths	1.90c. to 2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.15c. to 2.25c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.85c.

Iron

Common iron f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.25c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle	\$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c. to 2.20c.
Bars, Cleveland	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, Pittsburgh.....	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.84c. to 2.94c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.\$11.20	25-lb. coating I.C.\$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel)	\$0.25	\$3.00
2100 (1½% Nickel)	0.55	3.30
2300 (3½% Nickel)	1.50	4.25
2500 (5% Nickel)	2.25	5.00
3100 Nickel Chromium	0.55	3.30
3200 Nickel Chromium	1.35	4.10
3300 Nickel Chromium	3.80	6.55
3400 Nickel Chromium	3.20	5.95

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100 Chromium Spring Steel	0.20	2.95
6100 Chromium Vanadium Bars	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel.....	0.25	3.00
Chromium Nickel Vanadium	1.50	4.25
Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1½	45	19½	19½	14 to ¾	+11	+39	
1¼ to ¾	51	25½	25½	12	22	2	
1½	56	42½	42½	10	28	11	
¾	60	48½	48½	1 to 1½	30	13	
1 to 3	62	50½	50½				

Lap Weld

2	55	43½	43½	2	23	7	
2½ to 6	59	47½	47½	2½	26	11	
7 and 8	56	43½	43½	3 to 6	23	13	
9 and 10	54	42½	42½	7 to 12	26	11	
11 and 12	53	40½	40½				

Butt Weld, extra strong, plain ends

1½	41	24½	24½	14 to ¾	+19	+54	
1¼ to ¾	47	30½	30½	12	21	17	
1½	53	42½	42½	10	23	12	
¾	58	47½	47½	1 to 1½	30	14	
1 to 1½	60	49½	49½				
2 to 3	61	50½	50½				

Lap Weld, extra strong, plain ends

2	53	42½	42½	2	23	9	
2½ to 4	57	46½	46½	2½	29	15	
4½ to 6	56	45½	45½	4½ to 6	23	14	
7 to 8	52	39½	39½	7 to 8	21	7	
9 and 10	45	32½	32½	9 to 12	16	2	
11 and 12	44	31½	31½				

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2¼ in.....	1½ in. ....+18
2½ to 2¾ in.....	1¾ to 1½ in....+ 8
3 in.	2 to 2¼ in....— 7
3¼ to 3½ in.....	2½ to 3 in....— 2
4 to 13 in.....	3½ to 4½ in....— 9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb....	5 Fives
12,000 lb. to 21,000 lb....	6 Fives
21,000 lb. and over	7 Fives

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in....	55	3½ to 3¾ in....	50
1¾ in.	39	4 in.	53
2 to 2¼ in....	34	4½, 5 and 6 in..	45
2½ to 2¾ in....	42		

Hot Rolled

2 and 2¼ in....	40	3¼ to 3½ in..	56
2½ and 2¾ in..	48	4 in.	59
3 in.	54	4½, 5 and 6 in..	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads). ..	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

nounced early in July. Some buyers, whose tonnage is hardly large enough to put them in the so-called preferred buyer class, have been able to place fourth quarter contracts at 1.90c., base Pittsburgh, which although \$1 a ton more than many paid in the third quarter, point to that price rather than 2c. as the probable general price for the final quarter of the year. It is said that mills have not turned a deaf ear to requests from structural steel fabricators for extensions of protections on projects on which they have quotations outstanding. Some large Detroit users of forging bars have not yet spoken as to their fourth quarter requirements and uncertainty as to carbon bar prices is creating some doubt as to the effectiveness of the recent advances in alloy steel bars. Three railroad inquiries for bars, plates and shapes will close late this week and next. The Chesapeake & Ohio will close for an indefinite tonnage, but not over 3000 tons, on Sept. 20, the Seaboard Air Line for a small tonnage on Sept. 22, and the Norfolk & Western for approximately 2500 tons on Sept. 27.

Hot-Rolled Flats.—Demand, which showed some tendency to lag last week, again is on the upgrade and tonnage releases to mills in this area for the first half of the month uniformly are running ahead of those for the same period in August. Prices are steady at the levels that ruled through the second and third quarters, an attempted advance having been defeated by the existence of some large contracts at those prices to the end of the year.

Cold-Rolled Strips.—Business again is active after showing some letup in the week immediately following Labor Day. There is a quotation of 2.85c., base Pittsburgh, but more commonly 2.75c., base, is being done.

Coal and Coke.—The furnace coke market is showing a little more life, and, while prices have not changed,

the undertone is stronger. An Eastern furnace has bought for the last quarter of the year, taking about 8000 tons a month, while a Valley furnace, which will be blown in Oct. 1 has ordered coke shipments to begin next Saturday, and another Valley furnace, which has been running on by-product coke supplied by a steel company, will in the next few weeks go back to beehive coke. Production is increasing merely in keeping with the larger demands, and spot offerings still are light and readily salable at \$2.75 per net ton at ovens. Spot foundry coke also is in better demand, but at the same price range as a week ago. There is some demand for coal for household use, but no general activity in coal, supplies of which still are very ample, and prices remain weak.

Old Material.—Great activity in the past week has not been accompanied by any marked change in prices. It is estimated that purchases by two steel companies in this district have aggregated between 65,000 and 70,000 tons of heavy melting steel, the business being done at \$16.75 and \$17. It became necessary for these mills to insure larger supplies, to give dealers fresh orders at much higher prices than they paid on previous purchases, against which the shipments were very light. Earlier purchases were made at from \$15 down to \$14, with an average of not far from \$14.50; as a result of the past week's sales, the average on all unfilled orders is about \$15.50. The short interest in this grade has increased. If supplies do not come out more freely under the new contracts, and if present steel works operations are maintained, there is groundwork for another advance. The common belief, however, is that supplies will be ample and that there will be a less insistent steel works demand after Oct. 15.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$16.75 to \$17.00
Scrap rails	16:00 to 16.50
Compressed sheet steel.....	16.50
Bundled sheets, sides and ends	15.00 to 15.50
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	16.75 to 17.25
Heavy breakable cast.....	12.75 to 13.25
No. 2 railroad wrought.....	16.50 to 17.00
Heavy steel axle turnings.....	14.50 to 15.00
Machine shop turnings.....	11.50 to 12.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers.....	17.50 to 18.00
Railr. coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 20.50
Low phos., mill plates.....	18.50 to 19.00
Low phos., light grade.....	17.50 to 18.00
Low phos., sheet bar crops.....	18.50 to 19.00
Hvy. steel axle turnings.....	14.50 to 15.00

Electric Furnace Grades:

Low phos. punchings.....	17.50 to 18.00
Hvy. steel axle turnings.....	14.50 to 15.00

Blast Furnace Grades:

Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
No. 2 busheling	11.00 to 11.50

Rolling Mill Grades:

Steel car axles	18.50 to 19.00
No. 1 railroad wrought.....	12.50 to 13.00
Sheet bar crops.....	17.50 to 18.00

Cupola Grades:

No. 1 cast	15.00 to 15.50
Rails 3 ft. and under.....	16.50 to 17.00

Increases Group Insurance

An increase of approximately \$3,500,000 in group life insurance covering employees of the Allegheny Steel Co. and the Allegheny Coal & Coke Co., affiliated corporations of Brackenridge, Pa., has been announced, bringing the total of such insurance carried by the companies to more than \$7,000,000. Since October, 1922, beneficiaries of the Allegheny Steel and Allegheny Coal & Coke employees have received from the insurance company a total of more than \$112,000 in death benefits, while an additional \$8,000 in total and permanent disability claims has been approved for payment.

The general employees are separated into two salary classes, those in one receiving \$1,000 insurance and those in the other \$2,000. A somewhat higher scale of additional insurance is provided for executives, superintendents and assistant superintendents.

Included in the life insurance policy is a clause which guarantees the payment of an employee's insurance in full if he becomes totally and permanently disabled before age 60. These payments are made to the employee in monthly installments.

In addition to the actual protective provisions, the group program includes a visiting nurse service and the periodical distribution of pamphlets on disease prevention and health conservation.

Aeronautical engineering classes, headed by Lieut. E. D. Koger, U. S. N. R., with plane parts from the U. S. Navy air station at San Diego used for demonstration purposes, are in the program of the College of Engineering of the University of Southern California. Cooperating agencies include Harry Guggenheim, president Guggenheim Fund for the Promotion of Aeronautics; William P. MacCracken, Jr., Assistant Secretary of Commerce in charge of aviation; Major Clarence M. Young, Director of Aeronautics, Department of Commerce, Washington; Harris M. Han-shue, president American Air Transport Association; James G. Woolley, traffic manager Western Air Express, and John C. Simpson, general manager Airport Engineering Service Co.

How to develop production engineers will be one of the subjects discussed by the production meeting of the Society of Automotive Engineers, to be held at the Book Cadillac Hotel in Detroit, Nov. 22 and 23. Other subjects under consideration for papers are welding, honing, gear making and power transmission standards. A paper on the methods which give the Ford Motor Co. its low production costs will be read by John Younger, Ohio State University.

Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.

Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$33.00
Rerolling, under 4-in. to and including 1½-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.90

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 2.00c.
Sheared	1.85c. to 2.00c.
Universal	1.85c. to 2.00c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	

Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basic 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens.	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines ..	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines....	.90c. to 1.00
Gas slack, f.o.b. W. Pa. mines....	1.00 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	.95c. to 98c.
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines..	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	\$35.00 to \$38.00
Second Quality	35.00 to 38.00
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Flow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh. 80, 10 and 2½	
Stove bolts in packages, Chicago. .75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago. .75, 20, 10, 5 and 2½	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base Per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(¾-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread..85 and 5	
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Prices on Plates, Shapes and Bars Now Range From 2c. to 2.10c.—Pig Iron Again Advanced 50c. a Ton

CHICAGO, Sept. 18.—Prices now quoted on plates, shapes and bars by Chicago sellers are based on figures in third quarter contracts plus \$2 a ton. The new quotations are 2c. to 2.10c. per lb. This policy indicates that there will be no narrowing of the circle of preferred buyers, but if maintained it will give the mills a better margin of profit. Notwithstanding that current specifications are the best since March of this year and that spot sales, usually in small lots, bulk fairly large, there is a feeling of uncertainty as to what October will bring in the steel business. Heavy backlogs, except in sheets, are absent and consumers are intently watching the trend of industrial activity. Caution is noticeable, and it is only the occasional buyer who openly states requirements for the remainder of the year.

Demand for semi-finished steel shows some improvement, specifications for sheet bars being large because of the needs of the automobile industry. Orders for railroad equipment are light and railroad shop operations are unusually low. There is no tangible basis for reports that car buying will increase in the fall and early winter months. Architects are busy, but few of their plans get beyond the preliminary stage. Meanwhile, building permits are less numerous and fabricators are concentrating on old projects, some of which are more active.

Pig Iron.—Chicago producers of Northern foundry iron advanced prices 50c. a ton on Friday. Sales during the week were in fair volume. Shipments are expanding, and, with all furnaces in the immediate vicinity of Chicago lighted, deliveries are in excess of production and furnace stock piles are growing smaller. Total sales in the first 18 days of September were about equal to those of the corresponding period in August, while shipments were fully 10 per cent heavier in the current period. A user in central Illinois is in the market for 500 tons of foundry and malleable iron. Sales of silvery iron total over 2000 tons and prices are holding; shipments against contracts are heavy. Southern iron at \$16.25, Birmingham, now reaches Chicago only by an all-rail rate, which is \$6.01 per ton. The charcoal iron market is moderately active.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	19.00
Malleable, not over 2.25 sil.....	18.50
High phosphorus	18.50
Lake Super. charcoal, sil. 1.50....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—Most sellers in this district are applying a \$2 advance in prices over those paid by consumers for their third quarter purchases. This means that the plan to name a single base price of 2.10c. per lb., Chicago, has been modified and that

fourth quarter quotations will range from 2c. to 2.10c. Some buyers are placing orders only for current needs. A few, whose needs are small in the aggregate, have signed contracts for the final period. Railroads are slow in making known their requirements, and there is little definite tonnage for oil tank construction in the market. A fair volume of plate mill output is going to pipe makers. It now appears that 110,000 tons of plates needed for one pipe order will not come to mills until certain legal matters have been cleared away. The Texas Corporation purposes to construct an oil line, requiring 25,000 tons of pipe, from the Southwest fields to Lockport, Ill. An indication of the dullness in car building shops is afforded by the fact that less than 1000 tons of steel was specified from this source in the week. A fair tonnage of plates is being used by bridge builders and steel building fabricators. Deliveries range from two to three weeks.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Ferroalloys.—Scattered sales of spiegeleisen are reported at \$32 to \$33, Hazard, Pa. Specifications for ferrosilicon are liberal, and releases against ferromanganese contracts are heavier.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Bars.—Bar mills in this district are heavily engaged and deliveries are not better than 20 to 30 days. This has been an unusually heavy week in specifications but new buying is light. Individual releases are larger, which is probably a reflection of higher consumption rather than a tendency toward building stocks. Cold-drawn bar makers are taking heavy shipments. Sellers are adding \$2 a ton to prices paid by consumers in the third quarter, bringing fourth quarter quotations to 2c. to 2.10c. per lb., Chicago. Fourth quarter contracting in alloy steel bars is progressing slowly. In the meantime, specifications are liberal and output is steady. Future requirements for iron bars appear to be of little concern to users. In a quiet market bar iron producers are withholding fourth quarter price announcements until

they are more certain of price trends of other bar commodities. Rail steel bar prices are strong at 1.85c. per lb. The bulk of fourth quarter contracts are signed and there is a fair sprinkling of spot business. Specifications are liberal, especially from the bed trade, which is getting busier as the fall season approaches.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Structural Material.—Interest in this market is confined largely to old inquiries that have become more active. The South Park Commissioners will meet Sept. 19 to consider the award of 5000 tons for the Fine Arts Building, Chicago. The steel for the Patterson Estate Building, Chicago, amounting to 3000 tons, on which the American Bridge Co. is low bidder, may be placed before the end of this week. The consolidation of the Continental & Commercial National Bank and the Illinois Merchants Bank, both of Chicago, may result in the Continental Bank Building being vacated, in which case it may be used by the Board of Trade, which had planned a building requiring 14,000 tons of steel. Fabricators are getting higher prices, though the general level is not up to their expectations. Complaint is heard that shops are not meeting promised deliveries. Several large projects are being delayed on this account. Asking prices for structural material range from 2c. to 2.10c., Chicago. Orders have been taken at these figures from miscellaneous users, but tests have not been made on large tonnages and on the requirements of fabricators for specific jobs.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Sheets.—Sheet mill backlogs are the heaviest so far this year. Releases against contracts and orders for prompt shipment are keeping mills engaged at close to capacity. Moderate weather in the past week has materially improved working conditions in hot mills and output is more uniform and at a higher rate. Talk of a further advance in prices means little as producers are heavily booked for the fourth quarter, and, in view of reported stock building by users, they can look for little in the way of spot tonnages in the next 60 days. Notwithstanding strenuous opposition to the change in the cash discount, local sellers insist that it will become effective with the start of the new quarter.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is low bidder at Milwaukee on 750 tons of 42-in. pipe. For the pipe alone, \$33, Birmingham, was bid and \$32 is the price asked if the plain pipe, lugged pipe and special fittings are all

awarded to this company. Chicago will close Sept. 24 on 2120 tons of 6, 8 and 12-in. pipe. The McWane Cast Iron Pipe Co. has taken 200 tons of pipe for Centerline, Mich. This market gives no signs of becoming much more active than at present until buying for winter manufacture gets under way.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Rails and Track Supplies.—Chicago mills continue to produce at 50 per cent of capacity and schedules are arranged for three to four weeks. The Pennsylvania Railroad, exercising an option, has released 10,000 tons of rails to local mills. The Great Northern has purchased 4000 tons of high manganese rails, of which 2000 tons was taken by a Western mill. Among fresh inquiries is 3000 tons for the Detroit, Toledo & Ironton. Track fastening orders are unimportant except for 1000 kegs of spikes and bolts taken for immediate delivery. Rail mill repair programs will not be undertaken before the first part of October.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Wire Products.—Light frosts in the Northwest have done little damage to late crops and the outlook for an active fall trade in wire products remains favorable. Both sales and specifications are spotty, and the general average for the country as a whole shows business to be less active than a week ago. Orders from the Northwest are more numerous but not heavy. Jobbers throughout the Central West and in the South are ordering more liberally in anticipation of the fall trade, but retailers in most localities report business dull. Specifications from the manufacturing trade are a shade heavier. The slightly lessened rate of shipments is enabling producers to complete round-

ing out stocks for the buying movement which they expect will get under way by Oct. 1.

Old Material.—The Chicago scrap market continues to lean to the strong side. Sales of heavy melting steel to consumers are lacking to support the upward movement which has affected the specialties. Brokers are paying \$13.50 a gross ton, delivered, for heavy melting steel, for which they have orders at \$13.25. The addition of two merchant iron stacks leads dealers to anticipate a stronger market for cast iron borings. Supplies seem adequate for immediate needs of consumers.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$13.00 to \$13.50
Shoveling steel.....	13.00 to 13.50
Frogs, switches and guards, cut apart, and misc. rails	14.75 to 15.25
Hydrcul. compressed sheets	11.50 to 12.00
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels.....	16.50 to 17.00
Railr'd tires, charg. box size.....	16.50 to 17.00
Railr'd leaf spring cut apart.....	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	15.00 to 15.50
Coil springs.....	18.00 to 18.50
Electric Furnace Grades:	
Axle turnings.....	13.50 to 14.00
Low phos. punchings.....	15.00 to 15.50
Low phos. plate, 12 in. and under.....	15.00 to 15.50
Blast Furnace Grades:	
Axle turnings.....	11.00 to 11.50
Cast iron borings.....	9.75 to 10.25
Short shoveling turnings...	9.75 to 10.25
Machine shop turnings....	6.75 to 7.25
Rolling Mill Grades:	
Iron rails.....	14.75 to 15.25
Rerolling rails.....	16.00 to 16.50
Cupola Grades:	
Steel rails less than 3 ft.	17.00 to 17.50
Angle bars, steel.....	15.75 to 16.25
Cast iron carwheels.....	13.50 to 13.75
Malleable Grades:	
Railroad.....	14.50 to 15.00
Agricultural.....	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms.....	20.00 to 20.50
Iron car axles.....	24.50 to 25.00
Steel car axles.....	16.50 to 17.00
No. 1 railroad wrought....	12.00 to 12.50
No. 2 railroad wrought....	11.50 to 12.00
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	5.75 to 6.25
Locomotive tires, smooth..	12.50 to 13.00
Pipes and flues.....	9.00 to 9.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.—Awards during the week were few except on small tonnage requirements. The lull in buying so far in September gives promise of ending, as several large projects which have been before the trade for some time are nearer closing. Fresh inquiry is slowing down, presumably because of the apparent tightening of loans for building construction. Contractors are busy and are pressing for delivery from shops which on the average are engaged at more than 85 per cent of capacity. Prices are unstable in spite of efforts to bring them up to former levels. Mills are asking

\$2 a ton more. New awards and recent inquiries are given on page 722.

Billets.—Contracts for fourth quarter delivery total 40,000 tons. Orders against old obligations are heavy and shipments are in increased volume. Prices for rerolling billets, 4 in. and over, range from \$32 to \$33 a gross ton. The lower price is most commonly quoted.

Warehouse Business.—Sales in August were a trifle better than in the same month a year ago. Some improvement was shown over July, but sales were small in the first two weeks in September. Stocks are well balanced but a trifle lighter than is usual at this time of the year.

Cold-Rolled Strip.—Specifications are in sufficient volume to maintain mill output at 85 per cent of capacity. Deliveries range from three to four weeks. Prices are steady at 2.75c. to 2.85c. per lb., Cleveland. The freight rate to Chicago is 32c. per 100 lb.

Hot-Rolled Strip.—Forward buying is assuming larger proportions at 2c. to 2.30c. per lb., Chicago. Specifications continue heavy, especially from the automobile trade.

Coke.—Producers of by-product foundry coke find production no longer meets the needs of users and stock piles are being drawn on. Prices are firm at \$8 a ton, local ovens.

Bolts, Nuts and Rivets.—Fourth quarter contracting is making headway, and it is now evident that the size of contracts for the final period will compare favorably with obligations in the past three months. Specifications are in smaller total volume. Railroads, in particular, are finding their needs less than in previous weeks.

August Output of Sheets Rises, Sales Decline

Production and shipments of steel sheets increased sharply in August while sales declined, according to a report of the National Association of Flat Rolled Steel Manufacturers, based on 70.1 per cent of the country's capacity. August sales were 254,397 tons, against 333,357 tons during the previous month. Production was 329,396 tons, against 267,685 tons, and shipments amounted to 324,691 tons, compared with 278,310 tons in July.

Unfilled orders Sept. 1 totaled 498,023 tons, a decrease of 52,445 tons for the month. August sales represented 71.7 per cent of capacity, production 92.8 per cent, and shipments 91.5 per cent. Unfilled orders Sept. 1 represented 140.4 per cent of capacity.

Stockholders of Steel & Tubes, Inc., Cleveland, at a special meeting Sept. 14, ratified the plans recently approved by directors of both companies to consolidate with the Republic Iron & Steel Co., Youngstown. Out of 90,000 shares 86,321 were represented in person or proxy.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.20c. to 2.80c.
Reinforc'g bars, rail steel.....	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.

Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Philadelphia

Last Quarter Steel Contracting Developing Slowly—Scrap Continues Upward Movement

PHILADELPHIA, Sept. 18.—Fourth quarter inquiry for bars and plates is developing, and some contracts for steel bars have been closed at 1.90c. to 1.95c. per lb., Pittsburgh. Plate consumers are asking for prices, but have not yet taken out contracts. Sheet contracts are less numerous than earlier in the month, as many users have covered their known requirements for the remainder of this year, so as to receive the benefit of the 2 per cent discount for cash, which terminates Oct. 1. Mills are heavily engaged, and in many cases are unable to offer better than three to four weeks' delivery on sheets. Bar mills are also well filled with tonnage and quoting deliveries of three and four weeks. Prices of shapes are substantially unchanged and little fourth quarter contracting is in evidence. Most mills are endeavoring to maintain a base of 2.05c., Pencoyd, or 2.11c., Philadelphia, but concessions have not entirely disappeared.

Iron and steel scrap prices continue to advance and practically all grades are 50c. to \$1 a ton higher than a week ago. No. 1 heavy melting steel has brought \$16 per ton on a purchase of several thousand tons by a large eastern Pennsylvania user.

Pig Iron.—Most consumers in this district have covered their requirements well into the next quarter, and with furnaces maintaining \$20, base, on the foundry grade, only occasional carload lots are being bought. Outstanding quotations at \$19.50 per ton, of which there were a number a week ago, have been withdrawn and furnaces are unwilling to shade \$20, furnace. The Worthington Pump & Machinery Corporation, Harrison, N. J., is inquiring for 815 tons of Bessemer iron, ranging from 1.50 to 3.50 per cent silicon. Following the purchase, reported last week, of about 25,000 tons of basic by a large eastern Pennsylvania user, the basic market is quiet. Furnaces are quoting \$19 to \$19.25 per ton, delivered, a slight increase from the level at which much of the recent basic buying was done.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X.	21.76
Basic (del'd east. Pa.)	\$19.00 to 19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates; 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Mills are operating at a high rate in most cases and some have

closed rolling schedules up to the middle of October. There is a fair volume of inquiry for fourth quarter and in the few cases where contracts have been made, 1.95c., Pittsburgh, or 2.27c., Philadelphia, is reported, with 1.90c., Pittsburgh, or 2.22c., Philadelphia, to preferred buyers.

Plates.—Plate buyers have not shown as much interest in the last quarter buying as have bar consumers, but there is some inquiry, and 2.05c. to 2.15c., Coatesville, or 2.15c. to 2.25c., Philadelphia, are the prices asked, depending upon the tonnage and the buyer. Makers are working on heavy specifications against present contracts and are maintaining prices with considerable firmness.

Shapes.—There is a fair volume of specifications, but the market has not registered an advance, although prices are slightly firmer. Quotations are 2.05c., Pencoyd, or Bethlehem, or 2.11c. to 2.18c., Philadelphia, but buyers claim to be able to obtain 1.95c., Pencoyd, when a desirable tonnage is placed. Fabricated steel bids are beginning to advance slightly for the first time in many months and this is expected by mills to aid considerably in maintaining the price on shapes.

Sheets.—As a number of consumers covered at least part of their fourth quarter requirements early in the month, interest in contracting has lessened. Specifications for September delivery have been heavy, buyers seeking to take advantage of the discount of 2 per cent for cash, which terminates Oct. 1. Mills are so well booked with tonnage as a result of this that deliveries range from four to five weeks. In the event that a mill is unable to make delivery of sheets specified for September shipment, it is stated that the 2 per cent discount for cash will

be extended to the buyer after Oct. 1. Prices are being maintained at 2c. to 2.10c., Pittsburgh, on blue annealed, 2.75c., Pittsburgh, on black and 3.40c. to 3.50c., Pittsburgh, on galvanized.

Warehouse Business.—Jobbers report a larger volume of orders than early in September. Sheet demand is fair, and, with mills beginning to offer extended deliveries, further improvement seems to be expected.

Imports.—In the week ended Sept. 15, arrivals of ore at this port totaled 12,012 tons, of which 6800 tons was iron ore from Algeria, 4560 tons manganese ore from Russia, 628 tons chrome ore from Portuguese Africa and 24 tons tungsten ore from Germany. Pig iron receipts consisted of 1019 tons of Indian iron and 69 tons of Norway iron. Steel arrivals were 575 tons of structural shapes, 556 tons of skelp, 573 tons of steel bars and 43 tons of steel bands from Belgium, 32 tons of steel bars and 19 tons of billets from Sweden and 14 tons of steel scrap from the United Kingdom.

Old Material.—Several thousand tons of No. 1 heavy melting steel is reported to have been bought at \$16 per ton by an eastern Pennsylvania consumer, whose requirements are exacting. Other grades show a corresponding advance in most cases. Heavy breakable cast has been bought at \$16.50 per ton, delivered, and a later purchase at \$17 per ton, delivered, is said to have been made by a Harrisburg, Pa., consumer. A Claymont, Del., mill has also paid \$16.50 per ton for this grade. Stove plate is quoted at \$12.50 per ton, and brokers are paying as much to fill contracts. Yard steel is quotable at \$12.50 per ton on a recent sale to a user in Harrisburg. Sales are mostly in small tonnages, because of the scarcity of supplies and the unwillingness of sellers to commit themselves in a rapidly rising market for more scrap than they have on hand.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	16.00 to 17.00
Rolled steel wheels	16.00 to 17.00
No. 1 blast f'nace scrap	10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50 to 15.00
Shafting	18.00 to 19.00
Steel axles	20.00 to 21.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	16.00 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	15.50 to 16.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Plates, ⅜-in.	2.80c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 2.75c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c. to 5.80c.
⅜-in.	5.50c. to 6.00c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

New York

Low Quotations on Pig Iron Disappear—Little Steel Contracting for the Fourth Quarter

NEW YORK, Sept. 18.—Pig iron buying is now mainly in smaller tonnages, since most of the large consumers have contracted for their fourth quarter needs and are not yet interested in 1929 requirements. Sales in this district for the week, at 17,000 tons, included one lot of 5000 tons and another of 2200 tons. The contract for 5000 tons was taken by one of the last Buffalo furnaces to hold open a quotation of \$16.50, base, on foundry iron. The common quotation is now \$17, base, although it has not yet been tested by a sizable inquiry. Quotations of less than \$19.50, base furnace, on eastern Pennsylvania foundry iron have apparently disappeared. The Worthington Pump & Machinery Corporation, New York, is in the market for 2000 tons of various grades, including 815 tons for Harrison, N. J., 330 tons for Holyoke, Mass., 350 tons for Elmwood Place, Ohio, and the remainder for Buffalo. The New York Central Railroad wants 600 tons for its Frankfort, N. Y., shops. Shipments of barge iron from Buffalo are moving more freely, but there are few unchartered barges available before the end of the navigation season, so that new sales for water shipment have been checked. Foundry melt continues to improve.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75
to 2.25	\$21.41 to \$21.91
*Buf. No. 2, del'd east	
N. J.	19.78 to 20.28
No. 2, del'd east. N. J.	
tidewater	19.51 to 20.01
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	
2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—Sales of about 500 tons of spiegeleisen for delivery this year have been made during the past week and there have been carload and small-lot transactions in ferromanganese. Prices are unchanged.

Plates, Shapes and Bars.—A few fourth quarter contracts for steel bars have been made at 1.90c. and 1.95c., Pittsburgh and some of the smaller buyers have signed up at 2c., Pittsburgh, but practically no contracting has been done in plates and shapes. In the latter product there has been fairly heavy specifying against expiring third quarter contracts, but plate buyers seem to be in no hurry to take out the remainder of their third quarter obligations, with the result that specifications have fallen off noticeably in the last two weeks. The current price for plates is still 2.17½c., New York, or 2c. Coatesville, although Eastern producers are asking from 2.05c. to 2.15c. on fourth

quarter contracts. Structural steel awards are at a fairly good rate, and a large tonnage is pending. The American Bridge Co. has been awarded 26,000 tons for two sections of the New York subway, subject to approval by the Board of Estimate. Four pub-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12

Wrought Iron—

½-in. butt	5	+19
¾-in. butt	11	+9
1-1½-in. butt	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.	
No. 22	3.75c. to 3.95c.	
No. 24	3.80c. to 4.00c.	
No. 26	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

lic schools, for which contracts have been awarded, will take a total of 3800 tons of steel.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; struc. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets.—Although sheet prices are not yet actually higher, as reflected by sales, some mills which are in a comfortable position have turned down offers from buyers at the prices which have recently prevailed, namely 2.65c., Pittsburgh, on black and 3.40c. on galvanized. The mills have large backlogs and are seldom promising better than four or five weeks delivery on the common finishes, while full finished sheets take longer. The new prices, 2.75c. on black and 3.50c. on galvanized, are nearer realization than they were a few weeks ago, but the fact that so many buyers have covered their requirements for the next 30 to 60 days precludes a severe test.

Warehouse Business.—Jobbers report a slight increase in the volume of orders for plates, shapes and bars. Black, galvanized and blue annealed sheets are only moderately active in this district, but prices are being fairly well maintained. The well-filled condition of sheet mill books has not been reflected by increased buying from warehouse stocks.

Coke.—Demand for both furnace and foundry grades of coke continues good. Prices are unchanged at \$2.75 to \$3 per ton, Connellsville, for standard furnace and about \$3.75 per ton, Connellsville, for standard foundry. Special brands are still quoted at \$4.85 per ton, ovens, or delivered into this district at \$8.56 per net ton to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Cast Iron Pipe.—Prices are unchanged at \$34 and \$35 per ton, base Birmingham, quoted by Southern makers, and \$35.60 to \$36.60 per ton, New York, quoted by Northern foundries. Buying is almost entirely of small lots by privately owned companies. A large utility company, which buys in New York, is inquiring for 240 tons of water pipe and another large company has closed on 135 tons of gas pipe with a Southern maker. Bids were opened yesterday and further bids are to be opened Sept. 19 and Sept. 21, by Hartford, Conn., on a total of 200 tons of water pipe. * An inquiry is in the market from Honolulu, Hawaii, for 1500 tons of 24 and 30-in. water pipe.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Reinforcing Bars.—This market has been quiet during the last week and contractors are apparently in no hurry to take advantage of present prices, which are to be advanced \$2 a ton on Oct. 1. A fair amount of

new work has come out for bids and pending projects requiring 100 tons or more now amount to 9000 or 10,000 tons.

Old Material.—The upward movement of buying prices on practically all grades continues. Dealers and brokers report a shortage of material, particularly for shipment to eastern Pennsylvania users, who normally receive a considerable part of the New York and New England production of scrap. It is pointed out that for some time material has been moving by barge from New York to Buffalo and that the few New England users, such as plants at Bridgeport, Conn., and Worcester, Mass., have been steady buyers lately. In addition, the export movement of heavy melting steel has been good, with shipments of fair tonnages to Japan and Germany. At present German buyers are offering \$12, f.a.s. New York, and Japanese buyers, \$12.50 per ton, f.a.s. Boston or New York. Brokers shipping heavy melting steel to eastern Pennsylvania are paying \$11 to \$11.50 per ton, New York, or \$14.75 to \$15.25 per ton, delivered. As much as \$12.50 per ton delivered is being paid for yard steel and stove plate and \$16.50 to \$16.75 per ton for heavy breakable cast. Locomotive grate bars are bringing \$9.75 per ton, New York, for delivery to a consumer with a \$2.65 freight rate. A large eastern Pennsylvania consumer of strictly No. 1 steel is reported to have just closed on several thousand tons at \$16 per ton, delivered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.00 to \$11.50
Heavy melting steel (yard)	7.75 to 8.75
No. 1 hvy. breakable cast.	12.50 to 13.00
Stove plate (steel works)	8.75
Locomotive grate bars....	8.75 to 9.25
Machine shop turnings....	7.00 to 7.50
Short shoveling turnings..	7.00 to 7.50
Cast borings (blast furn. or steel works).....	6.50 to 7.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles.....	17.25 to 18.25
Iron car axles.....	24.75 to 25.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	7.25 to 7.75
No. 1 railroad wrought...	10.50 to 11.00
No. 1 yard wrot, long....	8.50 to 9.00
Rails for rolling.....	11.00 to 11.50
Cast iron carwheels.....	13.00 to 13.50
Stove plate (foundry)....	9.00 to 9.50
Malleable cast (railroad)...	10.00
Cast borings (chemical)...	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.)	
cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	14.00

The creditors' committee of the Boston Structural Steel Co., 240 Albany Street, Cambridge, Mass., which has been supervising the business of the company for the past four years, has announced that the company is again on a sound financial basis, and the committee has been dissolved. The company's financial affairs became acute in July, 1924. William P. Shine is president and treasurer.

Cleveland

Specifications Still Heavy Against Third Quarter Steel Contracts—Buyers Hesitating As to Next Quarter

CLEVELAND, Sept. 18.—Specifications against contracts for steel bars, structural material and plates continue fairly heavy, these coming largely from customers whose third quarter contracts did not set Sept. 10 as the deadline for sending in specifications. Some of the mills have informed their customers that if they cannot make shipments on these late orders before Oct. 1 deliveries will be made at the mills' convenience. Considerable spot business is also coming out.

While some fourth quarter contracts have been taken at an advance of \$2 a ton over third quarter prices, many consumers are as yet showing a hesitancy about making fourth quarter commitments, and this attitude is evidently the cause of the increase in current orders.

A good volume of business is coming from the automotive industry, but mostly for early needs, as automobile manufacturers are awaiting a test of the new prices before contracting for extended deliveries. Reports from Detroit indicate that some of the automobile companies will curtail production or shut down for repairs around Nov. 1, which would indicate some falling off in steel requirements from that source in the next few weeks. A number of the larger consumers of alloy steel bars in the automotive field have covered for their last quarter's requirements and some concessions from the recently advanced prices are reported.

Current orders for steel bars, plates and structural material are being taken at 1.90c., Pittsburgh, although plates are still available at 1.85c. for deliveries through the fourth quarter. Steel bars are quoted at 1.90c. to 2c., Pittsburgh, and 1.95c. to 2.05c., Cleveland. A local mill is on a 1.90c., Cleveland, base for current orders, but has not yet openly named a fourth quarter price.

Structural lettings during the week included 4500 tons for a factory building for the Goodyear Tire & Rubber Co., Akron.

Pig Iron.—The market continues fairly active, although the volume of sales has shown a rather steady decline for two weeks. Lake furnace prices have again advanced 50c. a ton and the market has a very firm tone. Local furnaces are now quoting foundry and malleable iron at \$17.50, furnace, for outside shipment; another Lake furnace interest is quoting \$18, at which some business has been taken. Detroit furnaces have marked up their price to \$18.50 and another producer is showing a tendency toward that price in the Michigan territory, although \$18 has not disappeared. The price for Cleveland delivery is unchanged at \$18, or at the advance reported a week ago. Furnaces in the Valley district are now asking \$17 for basic iron. Most of the large consumers of foundry and malleable grades are covered for the remainder of the year. Many of the smaller foundries need additional iron and considerable hand-to-mouth buying in lots of 100 tons or under developed during the week. A Valley consumer bought a small lot of low

phosphorus iron at \$26.50. Shipping orders continue good and there are no indications of a lessening in the heavy demands from the automotive industry.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.50
S'th'n fdy., sil. 1.75 to 2.25	22.25
Malleable	18.50
Ohio silvery, 8 per cent....	28.00
Basic Valley furnace.....	\$16.50 to 17.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-Finished Steel.—Consumers are still showing hesitation in placing fourth quarter contracts for sheet bars, billets and slabs, for which a local mill is asking \$33, Cleveland; consequently that price has not yet been established. Specifications continue heavy.

Sheets.—Some business for October shipment has been taken at the regular quotations, but not enough to test prices. Barrel makers and some other manufacturers of standard products have specified heavily to take advantage of the present cash discount, but contract stamping plants do not find it practical to take in large stocks. Black sheets have a firm tone, with some current sales being made at 2.75c., Pittsburgh. Blue annealed sheets are still available at 1.90c., Pittsburgh. The galvanized sheet market still lacks firmness. Considerable business is coming out in auto body sheets, which have not been advanced for the last quarter.

Strip Steel.—Most consumers of 12 in. and narrower hot-rolled strip have covered for the last quarter at third

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars.....	2.25c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.40c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

quarter prices. Specifications are fair. Some of the makers are using a 2c. blue annealed base in quoting for the fourth quarter on wide strip rolled on continuous mills, but no contracts are reported. Consumers of cold-rolled strip show a hesitancy about contracting for the fourth quarter. Mills are asking 2.75c., Cleveland, for round lots for that delivery, but this price has not been well tested. The demand for cold-rolled strip is being affected by the increased use by automobile manufacturers of one piece fenders requiring full finished sheets instead of fender stock.

Wire Products.—Considerable price irregularity on nails still exists in Detroit and other highly competitive markets, but leading producers are holding firmly to the regular \$2.55 per keg base. While wire is firmer than recently, some buyers have low-priced contracts that will carry them well through the fourth quarter.

Warehouse Business.—Sheets are moving well, but the demand for other products is only fair. Reinforcing bars are irregular and attempts are being made to get these on a higher base. Cleveland jobbers will probably adopt the new one-half of 1 per cent discount, although a definite decision has not yet been reached.

Fluorspar.—With a curtailment in production due to shutting down of some of the mines, the supply apparently is not in excess of the demand and the market has a firm tone. Gravel fluorspar is still available in small lots at \$17, mines. However, one producer has virtually withdrawn from the market by making a \$1 a ton advance.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have closed quite a few contracts since their announcement of the reestablishment for the fourth quarter of the present discount of 70 per cent off list. Rivet manufacturers, as expected, have reestablished the present base of \$2.90, Pittsburgh and Cleveland, and \$3, Chicago, for large rivets and 70 and 10 per cent off list for small rivets. Bolt and nut business is fair. Consumers are carrying small stocks and insist on prompt deliveries. The industry is operating at about 60 per cent of capacity.

Coke.—The demand for foundry coke continues good in specifications against contracts, but there is not much new business. Prices are unchanged at \$3.50 to \$4.85, ovens, for standard Connellsville brands and \$7.75, Painesville, for Ohio by-product coke. By-product domestic coke is moving well at \$4.50, Ohio ovens, and \$6, delivered Cleveland, for egg size.

Iron Ore.—The market has shown some activity recently in small-lot purchases by consumers who are rounding out their requirements for the winter season, several sales having been made in lots up to 10,000 tons. Shipments are holding up to the recent rate, and indications are that the movement for the season will be slightly more than that last year,

when Lake shipments were slightly over 51,000,000 tons.

The consumption of Lake ore during August amounted to 4,760,974 tons, a gain of 128,067 tons over that of July. The amount used in August last year was 4,368,101 tons. Furnace stocks on Sept. 1 amounted to 26,035,697 tons. The amount at furnaces and on Lake Erie docks on that date was 31,754,179 tons, compared with 35,802,565 tons on the same date a year ago. There were 155 furnaces using Lake ore in blast Aug. 31, a decrease of three for the month.

Old Material.—The tenseness that featured the market a week ago is less in evidence, as dealers who had short orders have made purchases in sufficient volume to relieve them somewhat of anxiety over obtaining supplies. Some buying was done by dealers during the week at the quoted prices and as high as \$14.75 was paid for selected heavy melting steel for delivery to a local mill. Further price advances were made on compressed sheet steel, No. 2 heavy melting steel, machine shop turnings and No. 2 railroad wrought. Blast furnace scrap is holding at recent quotations. No buying is being done by mills in this territory.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.50 to	\$14.00
No. 2 heavy melting steel.	13.00 to	13.50
Compressed sheet steel....	13.00 to	13.50
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	11.50 to	12.00
Machine shop turnings....	8.50 to	9.00
No. 1 railroad wrought....	11.50 to	12.00
No. 2 railroad wrought....	13.50 to	14.00
No. 1 busheling	10.50 to	11.00
Pipes and flues	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops...	16.00 to	16.50
Low phos., billet, bloom and slab crops	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	10.00 to	10.50
Mixed bor'gs and short turn'gs	10.00 to	10.50
No. 2 busheling.....	10.00 to	10.50
Cupola Grades		
No. 1 cast	16.00 to	16.50
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Combination of *Automobile Trade Journal* and *Motor Age* into a single monthly publication devoted to the interests of the automotive trade has been announced by the Chilton Class Journal Co., Philadelphia. The new publication will be called *Automobile Trade Journal—including Motor Age* and the first issue will be in December.

The administrative board of the American Engineering Council will hold its next meeting in Pittsburgh, Oct. 19 and 20, under the auspices of the Engineers' Society of Western Pennsylvania.

Railroad Equipment

Illinois Traction System Buys 200 Cars

PURCHASE of 100 box and 100 gondola cars by the Illinois Traction System was the only recent feature of this market. Details of the week's business follow:

Illinois Traction System has ordered 100 40-ton box cars from Mount Vernon Car Mfg. Co. and 100 50-ton gondola cars from American Car & Foundry Co.

Northwestern Pacific is in the market for five motor coaches and five trailers. High Point-Thomasville & Denton will purchase 50 all-steel box cars.

Bangor & Aroostook has ordered two baggage-mail cars from Standard Steel Car Co.

Detroit Scrap Market Strong

DETROIT, Sept. 18.—Pig iron shipments are heavy in the district and about on a level with those of August, which was the high month for the year. Producers serving the district are quoting \$18.50, furnace, for No. 2 iron with usual differentials for fourth quarter delivery.

The market on old material continues strong. Sales are being made at a high range of prices. Despite the large production of automobiles and the correspondingly large production of scrap, offerings are being absorbed by dealers and mills at present prices.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$12.00 to	\$12.50
Borings and short turnings	8.00 to	8.50
Long turnings	7.00 to	7.50
No. 1 machinery cast....	14.00 to	15.00
Automobile cast	19.00 to	20.50
Hydraul. comp. sheets....	11.50 to	12.00
Stove plate	11.00 to	12.00
No. 1 busheling.....	9.50 to	10.00
Sheet clippings	7.50 to	8.00
Flashings	10.00 to	10.50

Production of pig iron in Italy during the first six months of 1928 totaled 204,500 metric tons as against 281,500 tons in the corresponding period of 1927 and 260,000 the first half of 1926. Crude steel output in Italy, however, increased to 892,000 tons in the first half of the present year as against 868,000 tons during the corresponding period of last year, according to the Iron and Steel Division, Department of Commerce. For the first half of 1926 Italian crude steel production was 895,000 tons.

Purchases of American agricultural machinery by Germany doubled the first six months of 1928 to 2796 metric tons as compared with 1219 tons the first half of 1927, according to the Agricultural Implements Division, Department of Commerce. Germany's total imports of agricultural machinery rose in the same proportion, from 3921 tons to 6652 tons. Values, however, rose less sharply, from 7,403,000 to 9,877,000 marks.

St. Louis

Pig Iron Advanced 50c. a Ton—Steel Sales Increase— Higher Prices Paid for Scrap by Dealers

ST. LOUIS, Sept. 18.—Announcement of an immediate advance of 50c. a ton on pig iron was sent to the trade last Friday by the St. Louis Gas & Coke Corporation, making its price \$19.50 to \$20, f.o.b. Granite City. The advance applied to all territories. Shipments by this maker have been heavier during the last week than in any week this year, and it has at the same time accumulated a good backlog of orders. Requests for shipments against contracts have been coming in strong, and the demand for spot iron is unusually heavy. The Granite City maker sold about 2000 tons during the week, including 1000 tons of foundry iron to an implement maker, 300 tons to a jobbing foundry in Iowa, and 200 tons each to two northern Illinois melters. Sales of Southern iron were small.

Prices per gross ton at St. Louis:
No. 2 fdy., sil. 1.75 to 2.25, f.o.b.
Granite City, Ill. \$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis. 20.16
Southern No. 2 fdy., deliv'd. 20.67
Northern malleable, deliv'd. 20.16
Northern basic, deliv'd. 20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Dealers are showing increasing interest in their requirements of domestic grades of coke, but the demand for foundry grades in the district is still slow. Prices are unchanged.

Finished Iron and Steel.—The Granite City Steel Co. reports larger sales in the first 12 days of September than during a similar period in July and August, with the demand coming from diversified sources. Some improvement is noticed in specifications from jobbers. Many buyers are agreed that the demand for sheets will continue to grow during the next few months. Plates are not as active as sheets, but are showing an improvement. The advance in price on struc-

tural shapes, effective last Saturday, stimulated some buying by fabricators, but others lacked confidence in the reality of the advance and are delaying purchases pending a revival of construction activity. Warehouse business is fair; several of the larger oil producers bought much-needed supplies during the week.

Old Material.—Heavy melting steel, heavy shoveling steel, miscellaneous standard-section rails and No. 2 railroad wrought are 25c. a ton higher, while iron car axles and No. 1 railroad wrought are \$1 higher. The old material market is generally stronger, due to the activities of dealers, who are largely influenced by stronger markets elsewhere. Consumers in the district are buying very little. Railroad lists include: Southern Railway, 6000 tons; Gulf Coast Lines, 500 tons; Louisville & Nashville, 12,485 tons; Chesapeake & Ohio, 7895 tons; Atchi-

son, Topeka & Santa Fe, 6720 tons; Chicago & Alton, 1670 tons; Wabash, 1250 tons; Chicago, Rock Island & Pacific, 115 carloads; Nickel Plate, 25 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$11.75 to \$12.25
No. 1 locomotive tires....	12.50 to 13.00
Heavy shoveling steel.....	11.75 to 12.25
Miscel. stand.-sec. rails includ'g frogs, sw'ches and guards, cut apart..	13.25 to 13.75
Railroad springs.....	14.25 to 14.75
Bundled sheets.....	8.25 to 8.75
No. 2 railroad wrought...	11.75 to 12.25
No. 1 busheling.....	9.00 to 9.50
Cast iron borings.....	8.25 to 8.75
Iron rails.....	13.00 to 13.50
Rails for rolling.....	14.00 to 14.50
Machine shop turnings....	7.50 to 8.00
Steel car axles.....	18.00 to 18.50
Iron car axles.....	26.00 to 26.50
Wrot. iron bars and trans.	18.25 to 18.75
No. 1 railroad wrought...	10.75 to 11.25
Steel rails, less than 3 ft..	15.50 to 16.00
Steel angle bars.....	13.50 to 14.00
Cast iron carwheels.....	13.00 to 13.50
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable.....	11.75 to 12.25
No. 1 railroad cast.....	13.00 to 13.50
Stove plate.....	11.00 to 11.50
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Boston

Activity Shifting from Pig Iron to Old Material and Prices for Latter Are Higher

BOSTON, Sept. 18.—Activity in the local market is shifting from pig iron to scrap. Current buying of the former is mostly by small consumers, sales for the past week dropping to about 3500 tons, of which the Mystic Iron Works took at least half. Not much improvement in pig iron sales is anticipated until first quarter buying starts, but that is likely to come before the close of September. In fact, one or two important consumers are sounding out furnaces. Prices are firm on a basis of \$17, base Buffalo, or higher, there being no attractive tonnages in the market to induce concessions. Indian iron was sold in the past week at \$21.50 to \$22 a ton, on dock here, duty paid, and some Dutch also was disposed of. Little foreign iron is coming into New England, however, and prices on domestic iron will have to rise at least \$3 a ton to increase importations perceptibly.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91
*Buffalo, sil. 2.25 to 2.75..	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.
*All rail rate. †Rail and water rate.

Coke.—New England ovens are behind on shipments of foundry coke, although not as much so as a week

ago. There is a slight increase in the New England melt of iron, which, together with the stocking of coke by many foundries, accounts for the inability of ovens to keep up with specifications. Foundry coke is still \$11 a ton, delivered within a \$3.10 freight rate zone. Demand for domestic coke is gaining.

Bars.—Reinforcing bars have been advanced \$2 a ton to 2c. a lb., base

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zeos.....	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.45c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.10c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	70
Less than 100 lb.....	65
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Pittsburgh. Direct mill shipments are now 2.36½c. per lb., delivered common Boston freight rate points, while 2.61½c. is the Boston warehouse base. Local distributors are adhering to the full asking price in most cases. Local mill representatives have comparatively little fourth quarter business on their books, consumers preferring to buy only as stock is needed.

Old Material.—The movement of old material out of New England into the Pittsburgh territory continues to increase in volume, a further advance in prices bringing out scrap freely and thereby making it easier for brokers to fill orders. Eastern Pennsylvania mills are not yet much of a factor in the local scrap market, but the trade expects they will be shortly. Exporters are beginning to show interest in No. 1 automobile scrap at \$9.50 to \$9.75 a ton, delivered on dock at Boston. New England foundries continue to buy textile and No. 1 machinery cast from nearby yards. Brokers are shipping quite a little No.

1 machinery cast into the Pittsburgh district, and are paying 50c. a ton more than they did a week or 10 days ago. The greatest demand is for heavy melting steel, rails, skeleton and forge flashings, although material of every description is moving.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$10.50 to \$10.75
Scrap T rails.....	10.00 to 10.50
Scrap girder rails.....	9.50 to 10.00
No. 1 railroad wrought....	9.00 to 9.50
No. 1 yard wrought.....	8.00 to 8.50
Machine shop turnings....	6.00 to 6.50
Cast iron borings (steel works and rolling mill)...	6.00 to 6.50
Bundled skeleton, long....	8.00 to 8.50
Forge flashings.....	8.50 to 9.00
Blast furnace borings and turnings.....	6.00 to 6.50
Forge scrap.....	6.00 to 6.50
Shafting.....	14.00 to 14.50
Steel car axles.....	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long).....	9.00 to 9.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical.....	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$14.00 to \$14.50
No. 1 machinery cast.....	15.50 to 16.00
No. 2 machinery cast.....	13.50 to 14.00
Stove plate.....	10.00 to 10.50
Railroad malleable.....	15.00 to 15.50

been shown by buyers throughout Ontario and Quebec. Montreal dealers report a strong demand for most grades, both for domestic consumption and for export. Some dealers are offering 50c. to \$1 a ton above the usual market to secure desired lots.

Dealers' buying prices:

	<i>Per Gross Ton</i>	
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast....	....	16.00
Stove plate.....	....	13.00
Standard carwheels.....	....	16.00
Malleable.....	....	13.00

Per Net Ton

No. 1 machinery cast....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

Canada

Rail and Structural Steel Orders Lead in Dominion Market —Pig Iron and Scrap Stronger

TORONTO, ONT., Sept. 18.—The Algoma Steel Corporation, Sault Ste. Marie, Ont., has closed two orders for rails, one for 15,000 tons of 100-lb. now being rolled, and one for 15,000 tons of 85-lb. The Soo rail mill has been in continual operation since the first of the year. The rail mill at Sydney, N. S., has orders on hand for about 20,000 tons.

Pig Iron.—The increased demand which set in a week or 10 days ago continues to feature business in the Canadian markets. The possibility of a price advance has brought melters into the market for last quarter iron. Contracts for lots ranging from 1500 to 2000 tons for delivery to the end of the year have been appearing in good numbers, with the result that more than 60 per cent of the consumers are now covered. Spot sales up to 500 or 600 tons have been made. Local blast furnace representatives are trying to do away with the spread in quotations, and in this connection are quoting a straight price of \$23.60 for foundry and malleable iron, delivered Toronto, while Montreal salesmen are now quoting these grades at \$25, delivered Montreal. Prices in the Canadian markets are strong.

Structural Steel.—While the demand for structural steel continues to hold a leading place in the business of the iron and steel industry of this country, sales for the week showed a slight decline from those of previous weeks. The amount of prospective business, however, is large. Reid & Brown, Ltd., Toronto, Ont., has the contract for 1500 tons of steel for a factory at Mount Dennis, Ont., for Firstbrook Boxes, Ltd.; the Dominion Bridge Co., Ottawa, has been awarded 1000 tons for the Medical Arts Building, Ottawa. Several contracts ranging from 200 to 500 tons were also awarded. For the proposed Hennepin Hotel at Niagara Falls, Ont., 3500 tons of structural steel will be required; 1500 tons of structural and 350 tons of reinforcing bars will be bought for a garage in Montreal, for Zetland Garages, Ltd.; for an office building at University Avenue and Elm Street, Toronto, for the National Life Assurance Co. of Canada, 1200 tons of steel will be needed. The Canada Life Assurance Co. of Canada, Ltd., is completing arrangements for the erection of a large office building in Toronto which will take 8000 and 10,000 tons of steel.

Old Material.—With general business conditions in the iron and steel industry of Canada steadily improving, old material sales have fallen in line. The demand for practically all grades of scrap has gained within the past two or three weeks. Much of the improvement is due to liberal buying of heavy melting steel, turnings and rails by consumers in the Hamilton, Ont., district, but interest has also

Youngstown

Valley Steel Plant Operations Average 85 Per Cent

YOUNGSTOWN, Sept. 18.—Improved conditions in the iron and steel trade of northeastern Ohio are holding, as evidenced by high operating rates. Sheet and strip makers are booked from four to six weeks ahead, and longer in some cases. Producers of full finished sheets are sold up well into November. The automotive industry of Michigan is the bright spot in sheet steel demand.

The Youngstown Sheet & Tube Co. has advanced basic pig iron at Chicago to \$18.50. The company is the largest merchant producer and seller in the Chicago area. At Youngstown, the company is quoting basic and No. 2 foundry iron at \$17 and malleable at \$17.50. In establishing a differential of 50c. a ton between foundry and malleable, the company is following the practice of Buffalo melters. A higher grade of iron ore is required for malleable iron.

The Sheet & Tube company is operating its seamless tube mills on day and night shifts, and this department is on a better basis now than at any time since its installation.

Of 53 independent open-hearth furnaces, 47 are scheduled this week. Two of the 53 units have never been operated. Bessemer steel plants are operating at a somewhat lower rate, bringing the average of steel plant production in the district to 85 per cent.

The Ohio State Foundrymen's Association, with headquarters in Cleveland, has changed its name to Ohio Foundries Association, Inc., having been incorporated under the new name. The association felt that a name should be chosen that would be more distinctive of the association's real status, as it is an organization of foundries rather than of individuals, as the old name might indicate.

Prices per gross ton:

<i>Delivered Toronto</i>	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable.....	23.60
<i>Delivered Montreal</i>	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable.....	25.00
Basic.....	24.00
<i>Imported Iron, Montreal Warehouse</i>	
Summerlee.....	33.50
Carron.....	33.00

Birmingham

Steel Backlogs Increasing—Pig Iron Demand Steady— 16,000 Tons in Dallas Cast Iron Pipe Project

BIRMINGHAM, Sept. 18.—Day to day business in the pig iron market is at a fair rate. Some customers are covering through the year but a considerable portion of the fourth quarter tonnage is yet to be booked. Small-lot sales predominate. Occasional orders are being booked from outside the district. Shipments are going forward at about the same rate as in August, which was one of the best months of the year. Prices are steady at \$16.25 for No. 2 foundry. The Tennessee company changed Nos. 1, 3 and 4 at Ensley from foundry to basic on Sept. 10. The rebuilt furnace of the Gulf States Steel Co. at Alabama City was placed in operation on basic iron Sept. 17. It has a capacity of about 400 tons. Of the 18 furnaces now active, 10 are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—Backlogs have been further enlarged this month. Rail orders are slow in developing, but all other lines are active. One company has practically all finishing mills on double shift. Quotations are unchanged, and preferential prices are less frequently made than at any time this year. Structural steel inquiries are good but lettings are small. Bar manufacturers have booked a good aggregate of small orders, and a better outlook is reported. The open-hearth activity of the Tennessee company has been increased to 12 furnaces by the resumption of operations

of six at Ensley. The Gulf States Steel Co. is now operating four, a gain of one.

Cast Iron Pipe.—Bids are being submitted on a project at Dallas, Tex., requiring 16,000 tons of 30 to 36-in. pipe. This is the largest tonnage to develop in recent weeks. Decision is pending as to whether cast iron or steel pipe will be used. The National Cast Iron Pipe Co. has secured an order for 1000 tons for St. Louis. Stocks on yards are light and shipments are taking care of current production. Prices are firm at \$34 to \$35 on 6-in. and larger sizes.

Coke.—The demand for both foundry and domestic coke has improved, and current output is being largely taken. Some business has been booked through the first quarter of next year. Shipments show a little gain. Quotations remain at \$5 for both spot and foundry coke.

Old Material.—Some activity is shown in all lines, and the market as a whole is much stronger than it was 30 days ago. No. 1 cast and heavy melting steel are in greatest demand. Dealers' stocks are being gradually reduced. No further price changes have been made.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$10.00 to \$11.00
Scrap steel rails.....	11.50 to 12.00
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00
No. 1 cast	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Buffalo

Pig Iron Advanced 50¢ a Ton for First Quarter—Steel Mills Active—Scrap Prices Higher

BUFFALO, Sept. 18.—Local furnaces are asking an advance of 50c. a ton on first quarter pig iron business. The ruling price in the district for No. 2 plain, 1.75 to 2.25 silicon, for first quarter is \$18 and for last quarter \$17.50. One furnace is asking \$18 for last quarter iron in the district and \$17.50 for outside shipment. Most of the furnaces are making a price of \$17 for last quarter delivery in the East and \$17.50 for first quarter. Sales have been so heavy that some of the furnaces are a little short of iron. Two inquiries are out for 1000 tons each. One is for foundry and another for various grades of malleable, both from the East. An order for 2000 tons of No. 3 iron was placed by an Eastern melter. Other sales were 400 tons of malleable and 250 tons of

foundry. The Worthington Pump & Machinery Corporation is in the market for 1500 tons of malleable and foundry iron.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00 to \$18.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50 to 19.50
Malleable, sil. up to 2.25.....	17.50 to 18.50
Basic	17.00 to 17.50
Lake Superior charcoal...	27.28

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struct. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.70c. to 5.05c.
Blue ann'd sheets (No. 10).....	3.70c.
Com. wire nails, base per keg....	\$3.65
Black wire, base per 100 lb.....	3.90

Finished Iron and Steel.—Operations at the Lackawanna, Donner, Wickwire-Spencer and Seneca mills are approximately at 90 per cent or better, and inquiry for the steel they roll is voluminous enough to indicate a high rate of operation for some time. Prices are steady and specifications are excellent. Sheet business is especially good, and wire goods purchasing has been extensive. A new State Teachers' College at Buffalo will require 250 tons of reinforcing bars. Structural steel fabricators report quite a volume of smaller lots.

Old Material.—The market has strengthened through renewed purchasing of small lots. One of the largest consumers has been forced to pay \$15.50 for No. 1 heavy melting steel and there have been other transactions at \$15.75 and \$16. No. 1 busheling has been sold at \$14.50. A large consumer whose last purchase of No. 1 heavy melting steel was at \$13.75 has since remained out of the market. It is understood that a sale of No. 2 steel was made at \$13. There has been some selling of No. 1 machinery cast scrap at \$15.50 and in one instance at \$16. There were also some transactions in shoveling turnings.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades

No. 1 heavy melting steel.....	\$15.25 to \$15.75
No. 2 heavy melting steel.....	13.00
Scrap rails	14.50 to 15.00
Hydraulic comp. sheets....	13.00
Hand bundled sheets.....	11.00 to 11.50
Drop forge flashings.....	13.00 to 13.50
No. 1 busheling	13.75 to 14.25
Hvy. steel axle turnings..	12.00 to 12.50
Machine shop turnings...	7.00 to 7.50
No. 1 railroad wrought....	13.00 to 13.50

Acid Open-Hearth Grades

Knuckles and couplers.....	16.50 to 17.00
Coil and leaf springs.....	16.50 to 17.00
Rolled steel wheels.....	16.50 to 17.00
Low phos. billet and bloom ends	17.00 to 17.50

Electric Furnace Grades

Hvy. steel axle turnings...	12.00 to 12.50
Short shov. steel turnings..	11.50 to 12.00

Blast Furnace Grades

Short shov. steel turnings..	11.50 to 12.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.50 to 10.00
No. 2 busheling	10.50 to 11.00

Rolling Mill Grades

Steel car axles.....	18.00 to 18.50
Iron axles	21.00 to 22.00

Cupola Grades

No. 1 machinery cast.....	15.00 to 15.50
Stove plate	13.50 to 14.00
Locomotive grate bars....	12.00 to 12.50
Steel rails, 3 ft. and under.	17.00 to 17.50
Cast iron carwheels.....	13.00 to 13.50

Malleable Grades

Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

An exhibition of American ceramic products has been arranged by the American Ceramic Society in connection with its thirty-first annual convention, Feb. 4 to 9, 1929, in Chicago. The exhibition, to be known as the American Ceramic Exposition, will be held in the exhibition hall of the Stevens Hotel, the society's headquarters.

San Francisco

Oil Storage Tanks Call for 11,000 Tons of Plates—Cast Iron Pipe Awards of 2900 Tons

SAN FRANCISCO, Sept. 15 (*By Air Mail*).—An award of 4250 tons of plates for a pipe line at Dallas, Tex., and 1490 tons of cast iron pipe for the same city, together with inquiries for a number of oil storage tanks, requiring over 11,000 tons of plates, were the outstanding developments on the Pacific Coast this week. In addition, a fair tonnage of structural steel shapes was placed and new inquiries appear to be on the increase.

Pig Iron.—Buying is confined to immediate needs. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	.....	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards this week, the heaviest in over six weeks, totaled nearly 2100 tons. An office building and an apartment in Los Angeles each required 500 tons. The Pacific Coast Steel Co. secured 200 tons for a school in San Francisco. The majority of lettings involved lots ranging from 30 to 40 tons. Bids have been opened on 1800 tons for the Lide Science Building at Berkeley and bids will be opened Nov. 14 on the San Gabriel dam, Los Angeles, involving 350 tons. Out-of-stock prices in Los Angeles and San Francisco continue at 1.80c., base, but on some orders less has been accepted.

Plates.—Due to renewed activity in some of the oil fields in the southern part of the State, demand for oil tankage has increased in a large way. In addition to 1500 tons for five 80,000 bbl. tanks for the Shell Oil Co. at Martinez, Cal., bids on which have been opened, this company has issued an inquiry for 10 80,000 bbl. tanks, taking 3200 tons, for its Domingues refinery plant. The General Petroleum Corporation, Los Angeles, is asking for bids on 14 82,000 bbl., 120-ft. diameter tanks, which will require about 5000 tons. The Rio Grande & Barnsdall Oil Co., Santa Barbara, has an inquiry out for two 80,000 bbl. tanks, calling for 620 tons. Bids will be opened Nov. 14 on the San Gabriel dam, Los Angeles, involving 1135 tons of 60-in. discharge pipe. The Uvalde

Construction Co., Dallas, secured the general contract for 4250 tons of 30 and 36-in. welded steel pipe for the city, the fabrication to be done by an unnamed interest. Plate prices appear to be generally 2.20c., but some business is still at 2.25c. and occasionally as high as 2.30c., c.i.f. Coast ports.

Shapes.—Lettings of structural shapes totaled 650 tons this week, the largest of which was 220 tons for the City Hall at Glendale, Cal., placed with the Llewellyn Iron Works. McClintic-Marshall Co. took 150 tons for a factory on McKee Street, Los Angeles. Bids were opened this week on 230 tons for a bridge over the Kalama River in Washington and on 120 tons for a bridge over the Coweeman River in Washington. On Sept. 28 bids will be opened on 243 tons for the Gardiner bridge over the Yellowstone River in Montana. An election will be held in November to vote on bonds for the Fourteenth Avenue South bridge at Seattle involving 2800 tons. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards of cast iron pipe, at 2900 tons, were larger

than for any week since the latter part of June. The Central Foundry Co. secured 1490 tons of 16 to 24-in. Class 100 Universal pipe for Dallas, Tex. San Diego, Cal., placed 355 tons of 4 to 10-in. Class B for the improvement of the Encanto District with the Miracle Construction Co. The Monarch Construction Co., Aberdeen, Wash., took the general contract for 846 tons of 4 to 10-in. centrifugal pipe for Edmonds, Wash. Hall-Johnson Co., Alhambra, secured 133 tons of 4 and 6-in. Class B pipe for El Monte, Cal. The Blodell-Donovan Lumber Co., Bellingham, Wash., awarded 100 tons of 16-in. Universal pipe to the Central Foundry Co. The George Nelson Co., Seattle, was low on 949 tons of 8 to 30-in. Class C pipe for the Denny Hill improvement project for the city. Bids have been opened on 1467 tons of 4 to 12-in. Class B for Clearwater, Cal., and on 263 to 537 tons of 2 to 12-in. Class B for Phoenix, Ariz. The V. R. Dennis Construction Co. was low on 178 tons of 4 to 10-in. Class B for the improvement of Mt. View Drive, San Diego.

Steel Pipe.—An increase in demand for standard pipe is expected shortly, as stocks in warehouses are becoming depleted in many sizes. Oil country goods continue in good demand. No large pipe line inquiries are up for figures.

Cincinnati

Pig Iron Sales Total 15,000 Tons—Scrap Prices Again Advance—Sheet Buying Heavy

CINCINNATI, Sept. 18.—Pig iron sales have again turned upward and bookings in the past week totaled about 15,000 tons. More than half of this amount was for the Louisville, Ky., plant of the Standard Sanitary Mfg. Co. This transaction was notable in that it covered practically all of the remaining yard stocks of an Ironton, Ohio, furnace which has been idle for a number of months. It is understood that shipment will be made by water, in which case the barge rate plus a local switching charge at Louisville indicates that the seller realized less than \$17, base Ironton. The disposal of this round lot of foundry iron leaves only a small stock at Ironton belonging to another inactive producer. Thus, temporarily at least, Ironton is no longer a factor in the foundry iron market. The Standard Sanitary Mfg. Co. also purchased from 2000 to 3000 tons of Southern iron, paying \$16.25, Birmingham. A Tennessee furnace interest is quoting \$16.25, Birmingham, after a short period during which orders were taken at \$16. Northern Ohio sellers are reported to be asking a minimum of \$17, base furnace, and are trying to obtain 50c. a ton more in some cases. Open inquiries are scarce. However, most of the ton-

nage bought recently has been contracted for quietly.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	.....	\$18.89 to \$19.89
So. Ohio malleable	.....	20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	.....	19.94
Ala. fdy., sil. 2.25 to 2.75	.....	20.44
Tenn. fdy., sil. 1.75 to 2.25	.....	19.94
So'th'n Ohio silvery 8 per cent	.....	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—District sheet mills have been booking liberal tonnages for late September and for Oc-

Warehouse Prices, f.o.b. San Francisco

Base per Lb.	
Plates and struc. shapes	 3.15c.
Soft steel bars	 3.15c.
Small angles, $\frac{3}{8}$ -in. and over	 3.15c.
Small angles, under $\frac{3}{8}$ -in.	 3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	 3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	 5.00c.
Black sheets (No. 24)	 5.00c.
Blue ann'l'd sheets (No. 10)	 4.00c.
Galv. sheets (No. 24)	 5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger	 5.65c.
Com. wire nails, base per keg	 \$3.40
Cement c't'd nails, 100-lb. keg	 3.40

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes	 3.40c.
Bars, soft steel or iron	 3.30c.
New billet reinfrc. bars	 3.15c.
Rail steel reinfrc. bars	 3.00c.
Hoops	 4.00c. to 4.25c.
Bands	 3.95c.
Cold-fin. rounds and hex.	 3.85c.
Squares	 4.35c.
Black sheets (No. 24)	 3.90c.
Galvanized sheets (No. 24)	 4.75c.
Blue ann'l'd sheets (No. 10)	 3.45c.
Structural rivets	 3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	 \$3.00
Com. wire nails, base per keg	 2.95
Cement c't'd nails, base 100 lb. keg	 2.95
Chain, per 100 lb.	 7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	 \$18.00
4-in.	 38.00
Seamless steel boiler tubes, 2-in.	 19.00
4-in.	 39.00

tober delivery. In fact, orders and specifications have exceeded production by a comfortable margin, so that backlogs of considerable proportions have accumulated. Operations continue at full capacity and no slackening in the rate of output is expected in the near future. The roofing demand in the South is fully up to normal, with the result that the call for galvanized sheets has been heavy. While low prices have ruled in recent weeks, there has been a stiffening tendency in the past few days and the minimum is now 3.65c., base Birmingham. Blue annealed stock is being sold at 2c., Pittsburgh, although a few small lots have brought 2.10c. Black sheets remain at 2.75c., Pittsburgh. Specifications for bars, shapes and plates have been fair.

Coke.—The coke market is fairly well stabilized, and present indications are that prices of by-product foundry coke will not be changed during the remainder of September and during October. There is a possibility that domestic grades may be advanced, but this is considered somewhat remote. A further increase in foundry coke specifications is noted and in this respect the month promises to be the best since last spring.

Old Material.—Heavy melting steel is up 75c. a ton, while scrap rails and short rails have each advanced \$1. Loose sheet clippings and bundled sheets also are showing strength, dealers having paid for these items 25c. a ton more than they did a week ago. Railroad lists which closed last week brought much higher prices than last month and it is understood that dealers are bidding for scrap at more than mills are willing to pay. The buoyant state of the market is reflected in the extensive buying by dealers and by heavy specifications from steel plants in this district.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$12.50 to \$13.00
Scrap rails for melting.....	13.00 to 13.50
Loose sheet clippings.....	9.25 to 9.75
Bundled sheets.....	10.00 to 10.50
Cast iron borings.....	8.50 to 9.00
Machine shop turnings.....	8.00 to 8.50
No. 1 busheling.....	10.50 to 11.00
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires.....	13.00 to 13.25
No. 2 railroad wrought.....	12.50 to 13.00
Short rails.....	17.00 to 17.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	16.00 to 16.50
No. 1 railroad cast.....	13.00 to 13.50
Burnt cast.....	8.00 to 8.50
Stove plate.....	9.25 to 9.75
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	12.25 to 12.75
Agricultural malleable.....	11.25 to 11.75

The Brown Instrument Co., Philadelphia, is enlarging its heating plant, which will include a Brown resistance thermometer by means of which the operating engineer may learn, through a suitable switch, the temperature in any department without leaving the boiler room. An H. B. Smith sectional boiler will be used, oil fired in connection with a Brown recording liquid level gage, which will give the rate as well as the amount of oil consumption.

REINFORCING STEEL College Building Will Require 1800 Tons

INCLUDING a science building for the University of California at Berkeley, which will take 1800 tons, new projects brought out during the week totaled 4550 tons. The following awards total 4400 tons:

BOSTON, 500 tons, milk depot in Charlestown district, to Concrete Steel Co.
BOSTON, 175 tons, Boston Elevated Railroad extension in Dorchester district, to Truscon Steel Co.
WILMINGTON, DEL., 300 tons, Y. M. C. A. building, to Kalman Steel Co.
ERIE, PA., 500 tons, West High School, to Truscon Steel Co.
PITTSBURGH, 335 tons, municipal sewer job, to Carlem Engineering Co.
CHICAGO, 150 tons, garage for Swift & Co., to Barton Spiderweb System, Inc.
CHICAGO, 170 tons of rail steel bars, St. Joseph Orphanage, to Barton Spiderweb System, Inc.
ALEXANDRIA, LA., 500 tons, United States Veterans' Hospital, to Jones & Laughlin Steel Corporation.
TACOMA, WASH., 100 tons, Hooker Chemical Co. plant, to Northwest Steel Rolling Mills.
NYSSA, ORE., 338 tons, Owyhee Dam, to an unnamed company.
SAN FRANCISCO, 200 tons, St. Ignatius School, to Pacific Coast Steel Co.
LOS ANGELES, 500 tons, apartment building at Rosewood and Rossmore Avenues, to an unnamed firm.
LOS ANGELES, 165 tons, Verdugo storm drain, to Soule Steel Co.

LOS ANGELES, 500 tons, office building, Hollywood Boulevard and Vine Street, to an unnamed company.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 250 tons, Boston & Maine Railroad baggage room.
NEW YORK, 100 tons, building for Mosaic Tile Co. at 443-5 West Forty-first Street; Frank S. Parker, architect.
BROOKLYN, 200 tons, factory building for I. Rokeach & Sons.
BUFFALO, 250 tons, State Teachers' College.
CHICAGO, 400 tons, building for John Sexton & Co.; Alfred S. Alschuler, architect.
ST. LOUIS, 300 tons, hotel at Twelfth Boulevard and Olive Street; Boaz-Kiel Construction Co., Ambassador Building, contractors.
FORT LEWIS, WASH., 500 tons, barracks and officers' quarters.
SEATTLE, 400 tons, addition to Olympic Hotel.
SALEM, ORE., 260 tons, Mill Creek bridge; general contract to Holdener Construction Co., Sacramento, Cal.
LOS ANGELES, 350 tons, San Gabriel Dam; bids Nov. 14.
OAKLAND, CAL., 248 tons, south spillway, East Bay Municipal Utility District; Ward Engineering Co., low bidder.
OAKLAND, 100 tons, Pardee reservoir, East Bay Municipal Utility District; Ward Engineering Co., low bidder.
BERKELEY, CAL., 1800 tons, Lide science building, University of California; bids opened.

New Trade Publications

Cars and Trailers.—Lakewood Engineering Co., Cleveland. Catalog 16-A of 56 pages illustrates and describes a wide variety of narrow-gage cars and track, trailers, trucks and skids. Specifications and dimensions are given, both of a great many types of cars and of some of the details used in their manufacture.

Direct-Current Motors.—Louis Allis Co., Milwaukee. Bulletin 507 of 12 pages illustrates and describes a line of small motors for a variety of uses, with both horizontal and vertical axes. Included are sectional views, pointing out the principal features.

Electric Drive.—Electric Machinery Mfg. Co., Minneapolis. Descriptive booklet of 56 pages and 85 illustrations, devoted to synchronous motors. Both theoretical and practical points are taken up, many of the illustrations being installation views. Details of construction and consideration of auxiliaries are given attention.

Belt Lacer.—Clipper Belt Lacer Co., Grand Rapids, Mich. Folder describing a new speed lacer, which is said to lace a 6-in. belt in 1½ min.

Gasoline Locomotives.—George D. Whitcomb Co., Rochelle, Ill. Bulletin 2822 of 12 pages illustrates and describes a line of gasoline locomotives from 2½ to 5 tons in weight. Specifications, hauling capacities on various grades and details of design are given considerable attention.

Resistance Thermometers.—Leeds & Northrup Co., Philadelphia. Catalog No. 80, illustrated with photographs and charts, has 30 pages of descriptions of resistance, temperature recording, automatic recording and other types of thermometers.

Water-Tube Boiler.—Erie City Iron Works, Erie, Pa. Eight-page bulletin illustrating and describing a three-drum water-tube boiler, with sections showing the design. Accompanying this is another eight-page bulletin giving representative applications of this type of boiler in industrial plants and showing sections of the units involved. Several of these are fired with powdered coal.

Bending Machines.—Wallace Supplies Mfg. Co., 1310 Diversey Parkway, Chicago. Bulletin 25, of 32 pages, illustrated, describes a line of bending machines for pipe, tube and bar stock up to 6-in. pipe size. Equipment is for both hand and power operation, depending largely on the size. There is a wide variety shown, for various specific purposes. Bar cutters, shears, punches and a variety of other equipment will be found in the bulletin.

Timing Drives.—Diamond Chain & Mfg. Co., Indianapolis. Illustrated folder of four pages in two colors describing a new type of timing drive with double-strand chain, weighing much less than the usual systems. Compactness and simplicity of construction are features stressed.

Non-Ferrous Metal Markets

Copper Prices Advanced, Tin Active and Higher, Lead Quotations Advanced, Zinc Quiet and Steady

Copper.—Convinced that the price of copper would not fall below 14.75c., delivered in the Connecticut Valley, and fearing an advance, domestic consumers for the past two weeks have been buying copper so heavily that it is estimated that at least 80,000 tons was sold up to Sept. 15, with the result that several producers withdrew from the market for October delivery. On Saturday, Sept. 15, despite the opposition of several producers, an advance in copper prices was suddenly announced. First came an increase in the quotation of Copper Exporters, Inc., from 15c. to 15.25c.,

	THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY					
	Sept. 18	Sept. 17	Sept. 16	Sept. 15	Sept. 13	Sept. 12
Lake copper, New York.....	15.00	15.00	15.00	14.75	14.75	14.75
Electrolytic copper, N. Y.*.....	14.75	14.75	14.75	14.50	14.50	14.50
Straits tin, spot, N. Y.	48.00	47.75	....	47.50	47.57½	47.45
Lead, New York.....	6.50	6.50	6.40	6.40	6.40	6.40
Lead, St. Louis.....	6.32½	6.30	6.25	6.25	6.25	6.25
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

c.i.f. European ports, followed at once by an advance in the domestic electrolytic price to 15c., delivered in the Connecticut Valley. At 15c. electrolytic copper is at the highest level this year and 2½c. per lb. above the low level of last year in July. Not since early in January, 1925, has copper been sold at 15c. Since the advance on Sept. 15, buying has been heavy both by domestic and foreign consumers, particularly the latter. Foreign consumers still have considerable September and October metal to buy. It is estimated that 70 per cent of the November requirements of domestic consumers have been contracted for. Sales to foreign consumers are estimated at 45,000 tons for the first half of September. At the higher levels the market was quite active Monday and Tuesday, with foreign sales predominating today, Tuesday. Demand for Lake copper has in-

creased decidedly, with sales quite large and prices higher at 15c. to 15.12½c., delivered.

Tin.—At least 1200 tons of tin was sold during the week ended Saturday, Sept. 15, and the total may have been somewhat larger because a London house with New York connections was quietly selling considerable metal. Last week marks the fourth week of a very active market, with the total sales for those weeks amounting to about 6500 tons, one of the most active periods in many months. Sales last week were confined principally to consumers, with spot to December chiefly involved, although a little April-June metal was contracted for. Yesterday, Monday, about 300 tons was sold to consumers. Today, Tuesday, the market was very quiet, with spot Straits tin quoted at 48c., New York. London prices Tuesday were considerably higher than a week ago, with spot

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	49.50c. to 50.50c.
Tin, bars	51.50c. to 52.50c.
Copper, Lake	16.00c.
Copper, electrolytic.....	15.75c.
Copper, casting	15.00c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.75c. to 13.25c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	32.00c. to 33.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.38c.
Tin, bar	56.38c.
Copper, Lake	14.85c.
Copper, electrolytic.....	14.85c.
Copper, casting	14.00c.
Zinc, slab	8.00c.
Lead, American pig.....	6.85c. to 7.10c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	56.00c.
Solder, ½ and ½	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.50c.
Copper, hot rolled	24.25c.
Copper, cold rolled, 14 oz. and heavier	26.00c.
Seamless Tubes—	
Brass	24.37½c.
Copper	25.25c.
Brazed Brass Tubes.....	27.50c.
Brass Rods	17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9),	10.00c. to 10.50c.
asks	11.00c. to 11.50c.
Zinc sheets, open,	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on all brass and copper products were advanced ¼c. on Sept. 17. Zinc sheets are still quoted at 9.75c. per lb., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.50c.
Copper, hot rolled	23.75c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	24.37½c.
Copper	25.25c.

Rods—	
High brass	17.25c.
Naval brass	20.00c.

Wire—	
Copper	17.00c.
High brass	20.00c.

Copper in Rolls	22.75c.
Brazed Brass Tubing	27.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	11.75c.
Brass, heavy	7.00c.	8.25c.
Brass, light	6.00c.	7.25c.
Hvy. machine composition	9.75c.	10.75c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. turnings.....	9.00c.	10.00c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	19.50c.	
Copper, hot rolled.....	23.75c.	
Copper, cold rolled, 14 oz. and heavier	26.00c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	25.87½c.	
Copper	26.75c.	
Brass Rods	17.25c.	
Brazed Brass Tubes.....	27.50c.	

standard quoted at £215, future standard at £212 7s. 6d. and spot Straits at £218 10s. The Singapore price today was £215 15s. Arrivals thus far this month have been 4395 tons, with 7185 tons reported afloat.

Lead.—On Monday, Sept. 17, the American Smelting & Refining Co. unexpectedly advanced its contract quotation from 6.40c. to 6.50c., New York. Prices in the outside market were also raised from 6.25c. to 6.30c. to 6.32½c., St. Louis. Monday and today, Tuesday, a very good business was reported, largely for October delivery, and the price in the West is higher at 6.32½c. to 6.35c.

Zinc.—Conditions are unchanged. Prime Western zinc is quoted at 6.25c., East St. Louis, or 6.60c., New York. Rumors of concessions from these levels are unverified. Sellers report the market as very quiet, with some business done each day. The ore situation is unchanged both as to stocks and price, which is still \$40, Joplin.

Antimony.—Consumers are showing more interest and Chinese metal is higher at 10.87½c. to 11c., New York,

duty paid, for spot delivery, with futures at 10.62½c.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. and shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c., per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 18.—Prices for tin and lead are advanced in a strong market. Sales are far more numerous than a week ago. Prices for old metals are firmer and users are more interested in the market.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 49c.; lead, 6.40c.; zinc, 6.35c. in less-than-carload lots; antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

New York Subway Takes 26,000 Tons of 49,000 Tons Let—45,800 Tons in New Projects

WITH two sections of the New York subway accounting for 26,000 tons, awards reported during the week amounted to 49,000 tons. New projects, calling for 45,800 tons, included a number of fair-sized jobs, the largest of which were a department store at Minneapolis, calling for 6000 tons, 10 oil tanks at Los Angeles requiring 5000 tons of plates, several buildings for a glass plant at Crystal City, Mo., taking 4500 tons and a Mississippi River dam near St. Paul, Minn., calling for 3500 tons. Awards follow:

CENTRAL VERMONT RAILROAD, 200 tons, bridges at Riverton and Royalton, Vt., to American Bridge Co.

SOMERVILLE, MASS., 350 tons, high school, to Boston Structural Steel Co.

NORTH EASTON, MASS., 200 tons, Ames Shovel & Tool Co. plant, to Berlin Construction Co.

BOSTON, 350 tons, school in Roxbury district, to Boston Structural Steel Co.

BOSTON, 150 tons, Woolworth store, to A. L. Smith Iron Works.

BOSTON, 100 tons, school, to Boston Structural Steel Co.

EVERETT, MASS., 100 tons, high school addition, to New England Structural Co.

BOSTON & MAINE RAILROAD, 150 tons, bridge, to Phoenix Bridge Co.

NEW YORK, 26,000 tons, section 2, route 106 and section 5, route 107 of municipal subway; awarded to American Bridge Co., subject to approval of Board of Estimate.

NEW YORK, 3800 tons, four public schools, to Bethlehem Fabricators, Inc.

NEW YORK, 2500 tons, apartment building at Park Avenue and Fifty-eighth Street, to Paterson Bridge Co.

NEW YORK, 900 tons, building at Dominic and Broome Streets, to Levering & Garrigues Co.

NEW YORK, 600 tons, Fur Merchants Building in West Twenty-eighth Street, to Harris Structural Steel Co.

NEW YORK, 500 tons, store and theater in Eighth Street, to Harris Structural Steel Co.

NEW YORK, 940 tons, apartment hotel in East Forty-ninth Street, to Dreier Iron Works.

STATE OF NEW YORK, 500 tons, highway bridges, to American Bridge Co.

STATE OF PENNSYLVANIA, 150 tons, highway bridge, to Phoenix Bridge Co.

PHILADELPHIA 700 tons, "out patients" building and laboratory for University of Pennsylvania, to American Bridge Co.

PHILADELPHIA, 150 tons, paint shop for Philadelphia Rapid Transit Co., to American Steel Fabricators.

NEW ORLEANS, 2060 tons, American Bank Building, reported awarded to Virginia Bridge & Iron Co.

DETROIT, 1750 tons, National Town and City Club building, to Whitehead & Kales Co.

DETROIT, 387 tons, warehouse for Carborundum Co., to Russell Wheel & Foundry Co.

JACKSON, MICH., 600 tons, building for Commonwealth Power Co., to Wisconsin Bridge & Iron Co.

STATE OF MICHIGAN, 230 tons, two highway bridges, to Massillon Bridge & Structural Co.

QUINCY, ILL., 1500 tons, Calhoun Avenue bridge, to Wisconsin Bridge & Iron Co.

CHICAGO, 600 tons, Harper School, to Hansell Elcock Co.

RACINE, WIS., 1000 tons, addition to Nash Motors plant, to Worden-Allen Co.

MILWAUKEE, 900 tons, addition for Seaman Body Corporation, to Worden-Allen Co.

SEATTLE, 130 tons, Pacific Coast Cement Co. plant, to Wallace Bridge & Structural Steel Co.

SAN FRANCISCO, 160 tons, apartment building, Union and Hyde Streets, to Western Iron Works.

GLENDAL, CAL., 220 tons, City Hall, to Llewellyn Iron Works.

LOS ANGELES, 150 tons, factory at 615 McKee Street, to McClintic-Marshall Co.

TACOMA, WASH., 400 tons, building for Hooker Electro Chemical Co., 100 tons, to Hofius Steel & Equipment Co.; 300 tons, to Austin Co., Cleveland.

The following Junior beams, totaling 1197 tons, have been awarded to Jones & Laughlin Steel Corporation:

Indianapolis, 113 tons, L. S. Ayres Department Store; Toledo, Ohio, 140 tons, Toledo Hospital; Cleveland, 142 tons, Jewish Orphanage; Huntington, L. I., 320 tons, Immaculate Conception Seminary; Saginaw, Mich., 100 tons, Adams Saginaw Building; Pittsburgh, 220 tons, apartment building; Decatur, Ill., 162 tons, junior high school.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 160 tons, stores and offices on Washington Street.

NEW YORK, 700 tons, widening of Park Avenue at Fifty-seventh Street.

NEW YORK CENTRAL RAILROAD, 1000 tons, bridge at Rensselaer, N. Y.

ITHACA, N. Y., 600 tons, building for Cornell University.

PENNSYLVANIA RAILROAD, 3300 tons, 17 bridges; blue prints not yet available.

BALTIMORE, 1200 tons, pier shed for city.

PHILADELPHIA 1300 tons, Blackstone Hotel, Thirteenth and Locust Streets; F. E. Warner Co., general contractor.

PHILADELPHIA 1400 tons, Garden Court annex, Forty-seventh and Pine Streets.

MINNEAPOLIS, MINN., 6000 tons, department store.

ST. PAUL, MINN., 450 tons, addition for Seims-Stemle Co.

ST. PAUL, 3500 tons, Mississippi River dam.

MARINETTE, WIS., 200 tons, interstate bridge; Milwaukee Bridge Co., low bidder.

MILWAUKEE, 1850 tons, garage.

PEORIA, ILL., tonnage not stated, bridge across Illinois River.

SPRINGFIELD, ILL., 2500 tons, bids opened Sept. 18 on 124th Field Artillery Armory.

CHICAGO, 1000 tons, bridges for Sanitary District.

CHICAGO, 2000 tons, 19-story building on South Wabash Avenue.

GREAT NORTHERN RAILROAD, 1900 tons, bridges.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD, 975 tons, girder spans.

CRYSTAL CITY, Mo., 4500 tons, building for Pittsburgh Plate Glass Co.

CAMP LEWIS, WASH., 200 tons, for additions.

SEATTLE, 400 tons, for Sand Point hangar.

SEATTLE, 200 tons, State highway bridge.

OLYMPIA, WASH., 230 tons, Kalama River bridge; Gilpin Construction Co., Astoria, Ore., low bidder on general contract.

OLYMPIA, 120 tons, Coweeman River bridge; J. J. Badraun, Portland, Ore., low bidder on general contract.

PORTLAND, ORE., 243 tons, Gardiner bridge over Yellowstone River in Montana; bids Sept. 28.

LOS ANGELES, 5000 tons of plates, 10 82,000-bbl. tanks for General Petroleum Corporation; bids being taken.

LOS ANGELES, 3100 tons of plates, 10 80,000-bbl. tanks for Shell Oil Co.; bids being taken.

SANTA BARBARA, CAL., 620 tons of plates, two 80,000-bbl. tanks for Rio Grande & Barnsdall Oil Co.

LOS ANGELES, 1135 tons, 60-in. discharge pipes for San Gabriel Dam; bids Nov. 14.

PERSONAL

RALPH W. CLARK has resigned as vice-president of Pilling & Co., New York and Philadelphia, and has been elected vice-president and general sales agent of the Hudson Coal Co., with headquarters at Scranton, Pa. Mr. Clark became New York manager of the pig iron department of Pilling & Co. in 1922. For 22 years before that he had been connected with Rogers, Brown & Co., starting in the Chicago office and later going to Buffalo, then to Boston, and in 1907 to the New York office. In the past 21 years he has been a well-known figure in the merchant pig iron trade of New York and New England. The Hudson Coal Co. is a subsidiary of the Delaware & Hudson Co. The latter company also owns the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., for whose pig iron Pilling & Co. are selling agents.

GEORGE S. JONES, recently assistant manager bar and specialty division, Republic Iron & Steel Co., Youngstown, has been appointed district sales manager in the Youngstown district, with headquarters at the company's general offices.

MURRAY M. BAKER, vice-president and chief sales executive of the Caterpillar Tractor Co., Peoria, Ill., has resigned but will continue as a director of the company. He has been associated with the organization since 1909. E. R. GALVIN, who has been located at the Cleveland branch, succeeds Mr. Baker as division sales manager.

CHARLES C. HENDERSON, vice-president Allegheny Steel Co., Brackenridge, Pa., has been elected treasurer of the company, succeeding R. D. CAMPBELL, who has resigned that office, but remains a vice-president and a director.

JAY S. IRVIN, formerly special representative Trumbull Steel Co., Warren, Ohio, has been named general manager of a new tin plate plant which the Columbia Steel Corporation is building at Pittsburg, Cal. Mr. Irvin at one time was manager of the Laughlin works, American Sheet & Tin Plate Co., Martins Ferry, Ohio, having resigned that position to become general superintendent of the Trumbull Steel Co. when it was organized in 1912.

JOSEPH A. BOHN has been appointed general manager of the Ames Iron Works, Oswego, N. Y., subsidiary of the Pierce, Butler & Pierce Mfg. Corporation, New York, to succeed the late Joseph C. Gaskill. Before going to the Ames plant, Mr. Bohn was cost accountant for the United States Heating & Lighting Cor-

poration, Niagara Falls, N. Y., and prior to his recent promotion he was successively cost accountant, assistant manager and plant manager at the Ames works.

JOSEPH T. GOUGH, safety engineer at the Massena, N. Y., plant of the Aluminum Co. of America, has resigned and plans to enter business for himself.

W. E. TIERNEY has been appointed representative in the South and Southwest for the Botfield Refractories Co., Philadelphia, with headquarters in New Orleans. He is a graduate in mechanical engineering from Tulane University, New Orleans.

JAMES J. ZIMMERMAN, for the last six years identified with the Elliott Co., Pittsburgh, maker of power plant equipment, has been appointed production manager for that company. His early training was obtained in the engineering, maintenance and production departments of the Cambria Steel Co., Johnstown, Pa., and prior to joining the Elliott Co. he was general superintendent of the Scott Foundry Department, Reading Iron Co., Reading, Pa.

EDWIN R. WEGENER was elected president, general manager and a director of the Detroit Forging Co., Detroit, at a meeting of the board on Sept. 10.

L. R. BEATTY has been appointed representative in the Philadelphia district for the Northwest Engineering Co., Chicago, maker of crawler equipment, shovels, cranes and draglines. His headquarters will be at 327 South Twelfth Street.

W. S. STEWART has been placed in charge of an office which has been opened by the Lincoln Electric Co., Cleveland, at 533 Market Street, San Francisco. A stock of motors, welders and arc-welding supplies is being carried. L. P. HENDERSON, who has been identified with the Lincoln Chicago office, has been placed in charge of the Minneapolis district. ROBERT NOTVEST, formerly at Kansas City, has been appointed Indianapolis district manager, and R. E. MASON has replaced him at Kansas City. N. L. NYE has been stationed at Akron, Ohio, under the direction of the Cleveland district office.

L. B. PUTNAM has been placed in charge of a branch office which has been opened by the United States Electrical Tool Co., Cincinnati, at 1641 Stout Street, Denver, Colo. J. R. BAUMBERGER goes to the company's sales organization at Dallas, Tex.

ALBERT WALTON, Melrose Park, Philadelphia, has been appointed Eastern representative of the Gray Iron Institute, Cleveland. He will maintain headquarters in Philadelphia and look after the interests of the Institute in New England, New York and Pennsylvania. Mr. Walton has been engaged in industrial engineering service for a number of years.

BENJAMIN SCHWARTZ, director general Institute of Scrap Iron and Steel, Baltimore, was the guest of the Connecticut members of that association at Bloomfield, Conn., Sept. 12.

JAMES L. DONNELLY, secretary Western Cartridge Co., East Alton, Ill., has been elected executive vice-president and secretary of the Illinois Manufacturers' Association, succeeding the late JOHN M. GLENN. The new secretary has been a director of the association for eight years and for the past year has been first vice-president. Associated with the Western Cartridge Co. for 13 years, Mr. Donnelly has served as secretary and legal advisor, director of sales and advertising and general secretary. He has been a director in the Western Cartridge Co. and several associated companies for a number of years.

HERBERT W. BONNELL has been appointed sales manager Northern Conveyor Co., Janesville, Wis., manufacturer of industrial and contractors' equipment. He formerly was sales manager of Fairbanks, Morse & Co., Beloit, Wis., and has been associated with a number of other large machinery manufacturers.

DR. H. W. HATFIELD of Sheffield, England, who will deliver the Campbell Memorial lecture at the annual convention of the American Society for Steel Treating in Philadelphia in the week of Oct. 8, and who is to speak at various places following that convention, will not appear at Boston and at the Massachusetts Institute of Technology Oct. 7 to 10, as announced in THE IRON AGE Aug. 30, but is scheduled to speak there Nov. 7 to 11. One lecture there will be before a joint meeting of the Boston chapter and the New England Foundrymen's Association, the subject probably to be cast iron.

L. W. STEVENS, who was assistant superintendent of the Veeder Mfg. Co., Hartford, Conn., prior to its merger with the Root Co., Bristol, Conn., is now superintendent at the Hartford plant of Veeder-Root, Inc., the consolidated company.

N. A. HELMER, formerly associated with Ford, Bacon & Davis, Inc., New York consulting engineers, has formed the Helmer Co., with offices in the Woolworth Building, New York, which will make investigations of plants and technical processes, devise

improvements in process work and equipment and supervise the installation and operations of equipment.

C. S. MARSHALL, formerly manager Worcester, Mass., district, American Steel & Wire Co., has been appointed district superintendent, and J. L. PERRY, who has been assistant manager, has been promoted to manager. Other changes announced in the Worcester district by H. A. BARREN, vice-president, are as follows: C. F. HOOD, superintendent South works, Worcester, and M. W. REED, superintendent New Haven, Conn., works, have been made assistant district managers; PETER STEWART, superintendent North works, Worcester, has been named general superintendent of the South works, and F. L. HAVEN, assistant superintendent North works, has gone with him to South works, as assistant; A. J. HOYT, assistant superintendent South works, has been made superintendent North works, and G. A. GREEN continues as assistant; E. W. BARNES continues as superintendent Central works, Worcester; H. W. JONES has been made superintendent New Haven, Conn., works, and R. C. HELM, metallurgist North works, has been named superintendent Trenton, N. J., works.

FRANK A. WEIDMAN, for seven years special representative for Inland Steel Co. at Chicago, has tendered his resignation to take effect Oct. 1. Previous to his connection with the Inland Steel Co. he was for 12 years with the American Sheet & Tin Plate Co. at Pittsburgh.

Company Changes

Sales offices of the Ashland By-Product Coke Co., Inc., and the Ironton By-Product Coke Co., Ashland, Ky., have been consolidated under the name of the Semet-Solvay Co. at 600 Dixie Terminal Building, Cincinnati. The sales office of the Ashland company at 966 Union Trust Building, Cleveland, will also be under the name of the Semet-Solvay Co., which operates coke plants at Ashland, Ky., and Ironton, Ohio.

The Inland Steel Co., Chicago, has completed negotiations for the purchase of the interest of Walter S. Prickett in the Michigan Mineral Lands Co. The principal tract involved is in Iron County, Mich., north of Crystal Falls. The Michigan Mineral Lands Co. owned half of this tract and the Cleveland-Cliffs Iron Co. owns the other half. It is the purpose of the new owners to hold this mineralized land in reserve to be investigated when present ore holdings show signs of depletion.

Ford, Bacon & Davis, Inc., New York engineering firm, has removed its general offices from 115 Broadway to 39 Broadway.

Industrial Relations Course at Springfield College

Announcement is made of the establishment of an industrial relations course at Springfield College (national Y. M. C. A. training institution) at Springfield, Mass., and of the appointment of John Calder, consulting engineer, as its director. Mr. Calder was for many years connected with important industrial establishments as a manager of production and in the past ten years has been consultant in industrial relations to a number of large concerns, being for four years manager of that department for Swift & Co. In recent years he has been a valued contributor to THE IRON AGE.

The object of the new course is to train industrial relations secretaries and other leaders who plan for service in industry, also to give the 600 students at Springfield College an acquaintance with the industrial side of modern life. Mr. Calder's books on "Modern Industrial Relations" and "Foremen Training" are well known and exemplify his practical and forward-looking views of the human problems of industry. In accepting the post at Springfield he plans to give all his time to the new work, as the college authorities look for such encouragement from manufacturing and engineering executives as will assure its permanence.

Large Purchases of Electrical Machinery

Youngstown Sheet & Tube Co. has bought a 7000-hp. blooming mill motor from the Westinghouse Electric & Mfg. Co., and a 5000-hp. billet and bar mill motor and a 2000-hp. skelp mill motor from the General Electric Co. The National Tube Co. also has been a big buyer of electrical equipment, having ordered motors for the six stands of its new continuous 13-in. skelp mill at McKeesport, Pa., aggregating 5600 hp. and a motor generator set from the General Electric Co. and driving motors of a total capacity of 3000 hp. and a motor generator set for the new expanding seamless pipe mill at Gary, Ind., from the Allis-Chalmers Mfg. Co.

Reliance Mfg. Co. Sold to Cleveland Bankers

The Reliance Mfg. Co., Massillon, Ohio, maker of lock washers, has been purchased by a group of Cleveland bankers headed by Otis & Co. and will be headed by new officers, who for some time have been important executives of the company. Frank C. McLain, president and founder of the company, will retire and Edison W. Hart, vice-president and works manager, has already tendered his resignation. W. H. Crawford, for many years secretary-treasurer, will be president of the new organization and

Howard J. McGinn, for some time sales manager, will become vice-president and general manager. The company's plant has a capacity of 4,000,000 washers a day, and is said to do about 50 per cent of all the business in this field. The company's assets are given as \$1,000,000, and it is stated that the sale price was \$2,500,000. The company will be reorganized with an issue of 80,000 shares of common stock, which will be placed on the market this week at \$38 per share.

Warwick Blast Furnaces To Be Sold at Auction

At a meeting of stockholders of the Warwick Iron & Steel Co. in Philadelphia, Sept. 12, it was voted to offer the plant and equipment, raw materials and property of the company at public auction on Oct. 10 and 11. The sale will be conducted by Samuel T. Freeman & Sons, Philadelphia.

The plant of the Warwick Iron & Steel Co., Pottstown, Pa., which from 1912 to 1926 was leased by the Eastern Steel Co., Pottsville, includes two blast furnaces with a total estimated capacity of 346,750 tons a year. No. 1 was built in 1910 and rebuilt in 1919-1920 and No. 2 was built in 1900 and rebuilt in 1919. The original No. 1 furnace was built in 1875 and dismantled in 1919.

Obituary

FRANK D. HAMILTON, formerly a well-known figure in the abrasive industry, died on Sept. 12, at Westfield, Mass., following an illness of several weeks. He was born at Chester, Mass., in 1858, and in 1904 organized the Hamilton Emery & Corundum Co., Chester, serving as its president for 10 years. In 1914 he organized the General Abrasive Co., Niagara Falls, N. Y., and was its president and general manager for several years. Later he organized the American Abrasive Co., Westfield, but retired from business several years ago.

CHARLES J. PECK, sales manager at Detroit for the Crane Co., Chicago, and president of the Detroit Engineering Society, died in Detroit, Sept. 9, following an operation for appendicitis. He was also a member of the Michigan Engineering Society and well known in engineering circles in Michigan, Indiana and Illinois.

ABEL H. CATLIN, president Chattanooga Machinery Co., Chattanooga, Tenn., died on Sept. 17, at Seneca Falls, N. Y., following an attack of heart disease. He was 80 years of age.

CLARENCE F. HOTCHKISS, president Stowe Mfg. Co., Binghamton, N. Y., died on Sept. 9.

Welsh-American Mills In Agreement

Reported to Have Limited Tin Plate Competition—French Public
Improvements to Use Large German Reparations Deliveries

(By Cable)

THE general iron and steel situation is improving. Pig iron consumers are considering making contracts and with Continental pig iron no longer competitive there is talk of blowing in additional Cleveland furnaces. Hematite demand is better, consumers showing increased interest in contracts and some makers beginning to supplement their output with shipments from stock.

Foreign ore is quiet on new business, but deliveries under old contracts have now been resumed from Swedish mines and prices are firm.

Finished steel demand is broadening, particularly in the domestic market for small sized material. Plate mills are still in need of orders. Baldwins, Ltd., is resuming operation of the Port Talbot heavy mills, as increasing cost of foreign steel is causing buyers to consider purchasing British material, especially semi-finished sizes.

Tin plate prices are firm as a result of the recent United States-

Welsh agreement for elimination of competition. As much as 18s. 4½d. (\$4.46) per base box, f.o.b. works port, is asked by some makers for far forward delivery. Mills generally are well sold for October through December.

Galvanized sheets are in active demand and prices are firmer. Black sheets continue quiet.

August exports of pig iron were 28,000 tons, of which the United States received 2500 tons. Total exports of iron and steel were 370,000 tons.

Continental markets are firm with continued demand from overseas users, especially in the Far East and India, but little of this business is passing through British exporters. Some Belgian mills are sold out to the end of November or December. British consumers are declining to pay the high prices now asked for steel by the European mills.

The lockout at the Tata steel works, Jamshedpur, India, has been ended after five months duration.

be tax free, whereas at present exemption is limited to incomes of less than 7,000 fr.

Appropriations that may aid industry include 9,000,000 fr. to be expended for development of water-power, 35,000,000 fr. for the improvement of seaports, 40,000,000 fr. for aviation development and 50,000,000 fr. for road improvement, to which is added credits for national defense. Reparations payments by Germany will play a part in much of this expenditure, however, as the Government intends seeking the authorization of the Parliament for placing at the disposal of various departments reparations deliveries from Germany amounting to 1,200,000,000 fr. This material would be used for extensive work both in metropolitan territory and in the colonies.

French industry foresees some advantage through the credits afforded under the Loucheur Act for the construction of low-priced dwellings, but on the whole considers the budget rather disappointing. It is hoped, however, that, even though large quantities of materials going into public works are furnished by Germany as reparations, in the end industry will benefit through improved economic equipment throughout France.

Pig Iron.—The quantity of phosphoric foundry iron available for domestic consumers in September has been continued at 30,000 tons. Prices are unchanged. In the north of France,

German Material for French Projects

New Budget Plans Use of Large Reparations Shipments for
Public Improvements—French Mills Well Filled

PARIS, FRANCE, Aug. 27.—The budget for 1929 does not afford French industry much relief from taxation.

The only reduction forecast by the new budget is in the tax on wages. Incomes of less than 10,000 fr. are to

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.			\$4.25	
Bilbao Rubio ore.....	1 2	to £1 2½s.		5.35	to \$5.48
Cleveland No. 1 fdy.....	3 8½	to 3 9½		16.64	to 16.89
Cleveland No. 3 fdy.....	3 6			16.04	
Cleveland No. 4 fdy.....	3 5			15.80	
Cleveland No. 4 forge....	3 4½			15.68	
Cleveland basic (nom.)..	3 5			15.80	
East Coast mixed.....	3 10			17.11	
East Coast hematite....	3 10½			17.23	
Rails, 60 lb. and up....	7 15	to 8 5		37.66	to 40.10
Billets	6 2½	to 6 15		29.77	to 32.81
Ferromanganese	13 15			66.83	
Ferromanganese (export)	13 0	to 13 5		63.18	to 64.39
Sheet and tin plate bars, Welsh	6 0			29.16	
Tin plate, base box.....	0 18	to 0 18½		4.37	to 4.43
Black sheets, Japanese specifications	13 7½			65.00	
C. per Lb.					
Ship plates	7 12½	to 8 2½		1.63	to 1.74
Boiler plates	9 0	to 10 10		1.92	to 2.25
Tees	8 2½	to 8 12½		1.74	to 1.84
Channels	7 7½	to 7 17½		1.58	to 1.69
Beams	7 2½	to 7 12½		1.53	to 1.63
Round bars, ¾ to 3 in..	7 5	to 7 15		1.55	to 1.66
Steel hoops.....	9 0	to 10 0		1.92	to 2.14
Black sheets, 24 gage...	9 15	to 10 0		2.09	to 2.14
Galv. sheets, 24 gage....	13 10	to 13 12½		2.93	to 2.99
Cold rolled steel strip, 20 gage, nom.	16 0			3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)					
Foundry pig iron (a):					
Belgium	£3 3s.	to £3 5s.		\$15.32	to \$15.80
France	3 3	to 3 5		15.32	to 15.80
Luxemburg	3 3	to 3 5		15.32	to 15.80
Basic pig iron (nom.):					
Belgium	3 3	to 3 4		15.41	to 16.38
France	3 3	to 3 4		15.41	to 16.38
Luxemburg	3 3	to 3 4		15.41	to 16.38
Coke	0 18			4.37	
Billets:					
Belgium	4 19½			24.18	
France	4 19½			24.18	
Merchant bars:					
Belgium	6 2½	to 6 4		1.35	to 1.36
France	6 2½	to 6 4		1.35	to 1.36
Luxemburg	6 2½	to 6 4		1.35	to 1.36
Joists (beams):					
Belgium	5 3	to 5 5		1.12	to 1.14
France	5 3	to 5 5		1.12	to 1.14
Luxemburg	5 3	to 5 5		1.12	to 1.14
Angles:					
Belgium	6 0			1.30	
½-in. plate:					
Belgium (a)	6 15			1.50	
Germany (a)	6 15			1.50	
¾-in. ship plate:					
Belgium	6 9			1.42	
Luxemburg	6 9			1.42	
Sheets, heavy:					
Belgium	6 1			1.33	
Germany	6 1			1.33	

(a) Nominal.

competition from Dutch hematite iron, particularly from Ymuiden, is keen.

Semi-Finished Material.—Some of the more important producers have withdrawn from the market temporarily, and export prices are quite firm. Blooms are quoted at £4 13s. (\$22.60) per metric ton, billets at £4 15s. 6d. (\$23.21) per ton and sheet bars at £4 18s. (\$23.81) per ton, f.o.b. Antwerp.

Finished Material.—Mills are well filled with domestic business and are not actively seeking export tonnage. Delays in delivery to domestic consumers in some cases range from four to five months, and many producers are refusing to accept orders on which earlier shipment is specified. For export, deliveries are six to eight weeks on practically all products. British specification beams are quoted at £4 19s. to £5 per ton (1.09c. to 1.10c. per lb.), and ordinary specifications at £4 18s. per ton (1.08c. per lb.). Merchant bars range from £5 17s. 6d. to £5 18s. 6d. per ton (1.29c. to 1.30c. per lb.). Sheet prices are firm but do not show the tendency toward further advances that is still evident in merchant products. With fall approaching the question of a "comptoir" to control sheets will probably again be discussed. The Société des Acieres de Chatillon, Commentry et Neuves-Maisons, will shortly put into operation its sheet mills in the center of France. The output of these mills is special automobile sheets. Renewed operation of the mills is understood to be with technical cooperation of the American Rolling Mill Co., Middletown, Ohio.

Luxemburg Trade with Far East Improves

LUXEMBURG, Aug. 22.—Until July 11, when the Antwerp strike of dock workers ended, the market here was decidedly weak, but thereafter recovery was rapid and prices reached a satisfactory level by the end of the month. Business has continued good, and, with large public works projected in France, it is believed that domestic demand in that country will be sufficient for some time to occupy the steel mills there and reduce French competition for export trade.

Refusal of Premier Baldwin in Great Britain to recommend to Parliament action on steel importation, under the Safeguarding of Industries Act, is viewed with satisfaction here and is believed to have removed the possibility of restriction on foreign steel in England until the next general elections there. Trade with India is irregular, affected by sporadic strikes and the monsoon season. Although cessation of hostilities in China has not yet brought out an increase in demand for iron and steel, some improvement is reported in business with Hong Kong. Japanese sheet mills are well engaged, with orders for several months, and have advanced their prices—a development favorable to European business.

Belgian Mills Quote December Delivery

Prices Strong on Small Sizes but Some Tonnage Is Sought in Heavy Beams—Exports to Far East Improving

ANTWERP, BELGIUM, Sept. 1.—Domestic activity in iron and steel is at a high rate, and export sales to some markets are increasing. Transactions are slightly smaller than a week or two ago, as the most recent advance brought some quotations to the level of British prices. However, with mills well booked ahead and consumers of iron and steel operating at a good rate, present prices are expected to be maintained. Deliveries have greatly extended, and buyers report considerable difficulty in obtaining small-sized bars. In some instances mills are offering shipment in December and January. Meanwhile, export inquiry from China and Japan is larger than had been expected, although not particularly satisfactory in the heavier structural steel sizes.

Pig Iron.—The domestic market on No. 3 phosphoric foundry iron has been advanced 1 belga per metric ton and is now 117 belgas (\$16.25) per ton, f.o.b. furnace. Export quotations on this grade range from as high as £3 4s. (\$15.55) per ton, f.o.b. Antwerp. Bessemer hematite is quoted at about 130 belgas (\$18) per ton, furnace, which is equivalent to the British export price to Belgian consumers. Demand for all grades of iron continues active, and the tendency of prices is toward greater strength.

Semi-Finished Material.—The tendency of prices is upward, with very little material available for early delivery. Billet prices range from £4 17s. (\$23.57) per ton for 3-in. to £4 18s. 6d. (\$23.93) per ton for 2-in. Stocks of blooms are small and prices are firm at £4 9s. (\$21.63) per ton for 8-in., £4 12s. (\$22.36) for 6-in. and £4 16s. (\$23.33) for 4-in. Mills are heavily booked with orders for sheet bars, and the usual price for normal specifications is £5 (\$24.30) per ton, f.o.b. Antwerp.

Finished Material.—Demand has decreased slightly but is still considerably in excess of supply. In consequence, prices are advancing except on certain of the larger sizes of beams, on which mills are still seeking some tonnage to complete rolling schedules. Small sizes of steel bars are in most cases not obtainable for earlier than December-January shipment from the mill. China, Japan and the East Indies are buying rather actively, and other foreign markets are expected to develop into purchasers in the next few months. Bar prices are about £6 2s. per ton (1.34c. per lb.), f.o.b. Antwerp, but some makers have been asking as much as £6 5s. per ton (1.38c. per lb.), with deliveries in December and January. On decidedly favorable specifications £6 1s. per ton (1.33c. per lb.) is occasionally quoted. A factor contributing to present market strength is the strong

position of French and Luxemburg makers and the well booked condition of German mills. Other products are in a position similar to that of bars, except large-sized beams, on which the price is stationary at £4 19s. per ton (1.09c. per lb.), f.o.b. Antwerp.

Competition for Contractors' Equipment in Europe and Asia

F. E. Bauer, of the New York sales office, American Hoist & Derrick Co., St. Paul, has returned from an eight months' business visit to France, Spain, Egypt, India, Mesopotamia and Persia. Although he found among French contractors a preference for locomotive cranes, steam shovels, hoists and derricks made in the United States, German equipment delivered on reparations is largely used at present. Such machines may be bought by the contractor from the French Government, which credits the German machine to reparations and extends credit in cases for a year. On some heavy types of equipment, however, such as large capacity power shovels and wrecking cranes, not generally produced in Germany, a field continues for the American product. In India and Mesopotamia contractors are largely British and express preference for British equipment unless the bid of the American maker represents a considerable saving. They point out that having offices or connections in England, there is no problem of inspection of the machine bought, such as would arise with a purchase of a United States product.

Higher Prices on Wire Rods Expected in Europe

HAMBURG, GERMANY, Sept. 2.—It is generally expected that the International Wire Rod Syndicate will increase the price of wire rods for export from £6 (\$29.16) to £6 2s. (\$29.65) per ton, f.o.b. Antwerp. Further increases in the prices of other steel products for export are also looked for, as it is estimated that German steel producers sold practically their entire allotment for the quarter, during July and August. Since the penalty for exceeding the allotment set by the International Steel Cartel is \$1 a ton, higher quotations by German mills will probably develop this month.

Showing a decline of 11, August shipments of electric industrial trucks and tractors represented 96 units against 107 in July, according to the Department of Commerce.

Smaller Orders for Steel Furniture and Shelving

Orders for steel furniture in the "business group" in July were valued at \$2,594,216, against \$2,764,085 in June, according to reports received by the Department of Commerce from 34 manufacturers. The July orders were the lowest for any month since last November. Shipments were valued at \$2,515,482, compared with \$3,009,239, while unfilled orders were valued at \$2,071,553 and \$1,992,665 respectively. A year ago orders in July were \$2,091,804. For the seven months ended with July orders were valued at \$21,186,638, against \$18,273,501 for the corresponding period of last year; shipments were valued at \$20,594,190 and \$18,435,993 respectively.

Shelving furniture orders in July were valued at \$713,330, against \$737,060 in June, and shipments were valued at \$722,516 and \$720,253 respectively. Unfilled orders at the end of July were valued at \$705,657, against \$729,310 at the end of June. Orders a year ago were \$534,875 in July. For the seven months ended with July orders were valued at \$5,275,125, compared with \$4,405,566 for the corresponding period one year ago; shipments were valued at \$5,121,731 and \$4,341,054 respectively.

Newark District Adds 417 New Plants in Three Years

New manufacturing plants which have located in the Newark, N. J., district since the beginning of 1926 number 417, according to a survey completed by the Newark Chamber of Commerce in cooperation with the Bureau of the Census, Department of Commerce. Electrical goods and appliances account for 17. The next important industry is radio apparatus, embracing 15 new companies. Among the articles added to the list of products made in the Newark district are steel savings banks, lead castings, lunch wagons, hospital supplies and equipment, motor pulleys, etc.

Russian Steel Production Unsatisfactory

MOSCOW, RUSSIA, Aug. 28.—Official reports state that the heavy iron and steel industry is in an unsatisfactory position. Scheduled production programs have not been fulfilled. Output of pig iron in July was 267,613 metric tons, compared with 271,943 tons in June. Steel ingot production in July was 312,127 tons, compared with 336,636 tons in June. Output of rolled steel products was 233,635 tons in July, compared with 271,173 tons in June.

The director of the Glavmetal board has pointed out to the metallurgical plants that there are deficiencies in blast furnace output. He points to frequent cases of damage to plants, inefficient technical supervision and

neglect to follow official instructions on reduction of working costs.

The quantity of pig iron available for the engineering and other consuming industries in the current business year is 92,000 tons less than in the preceding year. Since the fiscal year 1926-1927, the shortage of pig iron in the consuming industries has increased from 7 per cent to 25 per cent and the shortage of rolled products has advanced from about 12 per cent to 24 per cent.

Heavy Construction in August

Construction contracts amounting to \$516,970,000 were awarded in August in the 37 States east of the Rocky Mountains, according to F. W. Dodge Corporation. This represents about 91 per cent of the total construction volume of the country. There was a reduction from July of about \$66,000,000, or 11 per cent, while the current figure was less than that of a year ago by \$35,000,000, or 6 per cent. Residential buildings accounted for 41 per cent of the total, or \$213,705,000. Public works and utilities called for \$118,890,000, commercial buildings for \$58,910,000 and industrial projects for \$42,607,000.

Total contracts for the first eight months of the year aggregated \$4,545,270,000, a gain of 6 per cent over last year's \$4,274,871,000 for the same period. Most of the districts showed a drop from July, but the Northwest indicated a reversed tendency, with an increase of 21 per cent over July and of 6 per cent over a year ago. The amount was the highest for August ever recorded in that district.

Timken Roller Bearing Co. Forms Steel and Tube Subsidiary

The Timken Roller Bearing Co. announces the incorporation of the Timken Steel & Tube Co., which will take over the manufacture and selling of Timken steel and tubing. The headquarters and mills are in Canton, Ohio, with sales offices in Chicago, Los Angeles, Detroit and New York. Officers are: H. H. Timken, chairman; M. T. Lothrop, president; J. W. Spray, vice-president; A. J. Sanford, vice-president in charge of sales; J. E. Daily, vice-president in charge of operations; J. F. Strough, secretary and treasurer.

The company has been organized to take care of the growing demand for Timken steel among manufacturers of various products, by the production of high-grade alloy steels on a quantity basis. Its production facilities consist of modern furnaces and mills with a capacity of 30,000 tons of steel per month. This capacity is equally divided between electric and open-hearth steels. The mill is equipped to supply any section or size of hot-rolled bar stock or seamless tubing in

any quantity. Specialized high-grade alloy steels will be produced to conform to any analysis specified.

The use of Timken steel, both bar and tubes, has expanded rapidly over the past few years to include many industries and diversified applications in each industry. In the automotive industry it is used for gears, axles, connecting rods and rear axle sleeves. In the oil industry it is used for making bits and jars, and the tubing is used for oil well pump construction. The steel is also used in airplane engine construction, for electric motor shafts, for machine tool parts and cutting tools, and, in the case of the tubing, for many sorts of mechanical construction.

New Bonded Chrome Sheet on Market

"Apollo Chrom," produced by the Apollo Metal Works, La Salle, Ill., is one of the various metals produced by that company which are offered in sheets ready for immediate fabrication without the necessity for plating, polishing, lacquering, japanning or other finishing.

It is a finished metal having for its base highly refined zinc, specially rolled, to which has been bonded copper and nickel and then chromium. This finish is not plating; on the contrary, the process binds together these metals into a sheet that can be bent, stamped, formed, double-seamed and can be put through operations necessary in fabrication.

Apollo Chrom will not crack, chip or peel when submitted to these various mechanical operations, it is stated. As it is non-rusting, non-tarnishing and corrosion-resistant, it is offered especially as a metal for the production of quality products. It is light in weight, being 33 per cent lighter than copper. It has a silvery, mirrorlike surface that will give a long life under rigorous conditions, it is asserted.

The manufacturing processes are under careful inspection, and various laboratory tests are made daily to keep check on quality and to lower production costs. The metal is now offered in sheets up to 36 x 96 in., in gages from 0.008 to 0.070 in.

Opportunity is now afforded to engineers, chemists and other technicians located in the metropolitan district of New York to pursue graduate study during the evening hours. The Polytechnic Institute of Brooklyn offers, this fall, four graduate courses in the evening which lead to the master's degree in chemistry or civil, electrical or mechanical engineering.

The Interstate Commerce Commission has announced that oral argument on the application of the Pittsburgh, Lisbon & Western Railroad to construct branches which would connect the Youngstown district with the Ohio River will be heard in Washington on Sept. 27.

Slight Reduction in Industrial Activity

Productive activity in the United States, as measured by electrical energy consumption, reported by *Electrical World*, is given as 119 in August compared with 120.2 in July and with 110.6 in August a year ago. The base of 100 is the average monthly figure for 1923-1925. The average for the first eight months has been 119.8, compared with 115 in the first eight months of 1927.

Metal industries, both ferrous and non-ferrous, have been well above the average of all groups this year, while last year at this time they were below the average of all groups. The metal industries group showed 125.5 in August, compared with 124.2 in July and with 104.6 in August, 1927. Its average for the first eight months was 124.4 this year and 113.9 last year.

Both the rolling mill and steel plant classifications and the metal-working plants (ferrous and non-ferrous) showed an August figure almost precisely the same as for the group. The rolling mill and steel plants recorded a substantial advance from July, whereas the metal-working plants showed a fractional decline. Automobile plants, including plants making parts, are classified separately from metal-working. They showed 124.7 in August, against 143.7 in July and 108 in August of last year.

Large Nickel Reserves in Both Canada and New Caledonia

Thomas W. Gibson, in a chapter on nickel in the forthcoming volume, "Mineral Industry, 1927," looks for generous supplies of nickel in coming years. Even though the world's production is confined to two localities, each has been shown to have practically unlimited reserves.

Sudbury mines in the Province of Ontario, Canada, now contribute about 85 per cent of the output. The other leading source is the island of New Caledonia in the South Pacific. The latter deposits are much smaller in size and somewhat richer in nickel content, running from 4 to 8 per cent nickel, but carry no copper. The Sudbury mines are of large dimensions, some of them containing many millions of tons of ore, reserves being placed at about 150,000,000 tons; in New Caledonia, a mine of 400,000 tons is considered large.

An unexpected development has taken place within the last two years in one of the largest mines of Sudbury. The Frood deposit, part of which is owned by the International Nickel Co. and part by the Mond Nickel Co., has been proved to contain a very large body of ore containing the average percentage of nickel, but running up as high as 20 per cent in copper. It appears to Mr. Gibson that the future of both of these com-

panies will be concerned with copper quite as much as with nickel. The market for nickel is comparatively restricted, since the metal is used mainly in alloys. On the other hand, copper is one of the major metals; the demand is not likely to decrease but to increase. The problem of the Sudbury companies, which must necessarily mine the nickel along with the copper, will be to bring about a still further increase in the demand for nickel, so that while producing their copper they may not be obliged to accumulate stocks of the higher-priced metal beyond the ability of the market to absorb.

Le Bulletin du Commerce of Nouméa, New Caledonia, compares the nickel situation in that island and in Canada. It describes the reserves of ore in New Caledonia as large; up to the year 1926 it was computed that only eight grants of land were being worked out of 522 concessions. The electric furnace provides for the treatment of ores of lower grade than those now smelted in the blast furnace, for which the nickel content must be not lower than 5 to 6 per cent. Of such ores, *Le Bulletin* asserts there are practically unlimited supplies, "since two-thirds of the rock surface of New Caledonia is made up of nickeliferous serpentines." It is anticipated that certain industries which do not require pure nickel will substitute ferro-nickel for their steels and special alloys, and thus open up new markets. The defect in the New Caledonia ore is that it does not produce any by-product, such as Monel metal or the silico-nickel of the Canadian ore.

British Foreign Trade in Steel Expanding

WASHINGTON, Sept. 17.—Imports of iron and steel into Great Britain in August increased sharply while exports showed a smaller gain, the former rising to 272,368 gross tons from 218,957 tons in July and the latter amounting to 333,079 tons, against 333,079 tons, according to a cablegram received by the iron and steel division, Department of Commerce, from William L. Copper, commercial attaché at London. Increases were made in all of the important import items.

British Foreign Trade in Iron and Steel Products
(In Gross Tons)

Item	Imports		Exports	
	July	August	July	August
Pig iron and ferroalloys.....	5,286	7,363	32,272	32,451
Ingots, blooms, billets and slabs.....	95,344	114,472	841	613
Iron bars, rods and angles.....	13,703	18,502	2,558	2,237
Steel bars, rods and angles.....	37,367	45,148	25,136	23,621
Structural steel.....	12,326	20,076	6,337	6,780
Hoops and strips.....	12,452	12,948	7,096	7,193
Plates and sheets.....	10,970	17,530	44,318	50,602
Galvanized sheets.....			51,579	65,546
Tin plate.....			43,584	53,168
Cast tubes, pipe and fittings.....	2,256	4,005	7,541	9,096
Wrought tubes, pipe and fittings.....	4,879	5,254	20,237	24,649
Rails.....	1,007	863	34,897	31,411
Other railroad material.....	430	992	15,838	14,891
Wire.....	5,215	6,136	6,511	8,006
Wire cable and rope.....			2,326	2,347
Wire nails, including staples.....	5,984	6,464	169	246
Other wire manufactures.....	767	740	1,676	2,282
Nails, tacks, rivets and washers.....	889	1,718	1,185	1,518
Bolts, nuts and screws for metal.....	1,401	1,121	2,169	2,170
Iron and steel castings.....	1,618	1,505	265	106
Iron and steel forgings.....	931	956	46	72
All other.....	6,132	6,575	26,498	30,719
Total.....	218,957	272,368	333,079	369,773

British Output Declined Again in August

LONDON, ENGLAND, Sept. 17 (*By Cable*).—Pig iron output in August was 519,000 gross tons and production of steel ingots and castings was 648,300 tons, both showing decreases from recent months.

A comparison of the August output with that of the seven preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly..	855,000	638,000
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	619,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—January.....	560,600	626,200
1928—February.....	560,800	764,400
1928—March.....	592,600	793,300
1928—April.....	555,000	644,100
1928—May.....	591,500	752,700
1928—June.....	563,700	709,500
1928—July.....	537,800	666,900
1928—August.....	519,000	648,300

The August pig iron output was the smallest thus far this year.

New Record in Portland Cement Production

Production of Portland cement in August is reported by the United States Bureau of Mines at 18,730,000 bbl., an increase of 7½ per cent over the July figure of 17,445,000 bbl. The month's output makes a new high record, displacing that of August, 1927, when production was 18,315,000 bbl. Production in the first eight months is also a new high record, having been 113,180,000 bbl., against 110,781,000 bbl. in the corresponding period of last year.

Shipments ran ahead of production. The total for August was 21,970,000 bbl., compared with the record of 21,411,000 bbl., in August, 1927. The current figure is 10 per cent ahead of the 19,901,000 bbl. shipped in July. Stocks at the end of August were 19,340,000 bbl., the lowest figure since Nov. 3, 1927. They were more than 3,000,000 bbl. above the stocks at the end of August, last year.

New England Foundrymen Meet

H. A. Lincoln, works manager, and James Prendergast, foundry superintendent, Sullivan Machinery Corporation, Claremont, N. H., and J. R. Linney, vice-president Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., were the speakers at the September meeting of the New England Foundrymen's Association, Wednesday evening, Sept. 12, at the Exchange Club, Boston.

Previous to the speaking there was a short business session, presided over by Charles F. Miller, president. The Jefferson Union Co., Lexington, Mass., and Walter M. Saunders, Providence, R. I., were elected members of the association. Later Mr. Saunders was made official chemist of the organization.

Mr. Linney's address was accompanied by some 75 lantern slides. His story began with the mining of ore at a depth of 1685 ft. and ended in the Chateaugay Ore & Iron Co.'s foundry. The major part of the talk was taken up with the treatment and handling of ores. Some interesting pictures and facts were given regarding the casting of car wheels and cast iron pipe running as high as 4900 lb. in weight. In connection with the operation of the mines and treatment of ores, views were shown of the electric control house, which is notable for its arrangement and equipment.

The contribution of Messrs. Lincoln and Prendergast had to do with the hydraulic process of cleaning castings and will be found elsewhere in this issue.

Increasing Vogue for Color in Kitchens Shown by Metal-Ware Shipments

WASHINGTON, Sept. 14.—July shipments of enameled sheet-metal ware were 277,936 dozens, valued at \$1,059,454, compared with 299,078 dozens, valued at \$1,141,196, in June, and with 248,599 dozens, valued at \$898,240, in July of last year, according to reports received by the Department of Commerce from 18 manufacturers comprising approximately 80 per cent of the industry.

For the first seven months the total has been 2,412,117 dozens, valued at \$9,051,064, against 2,359,788 dozens last year, valued at \$8,227,724. The increase has come wholly from the colored goods, which have aggregated \$2,202,981 this year, against only \$495,548 last year. This depicts the growing trend to put color into kitchens. Both the white goods and the gray dropped off by 10 per cent or more.

Shipments of galvanized sheet-metal in July comprised 169,271 dozens, valued at \$677,451, compared with 189,219 dozens, valued at \$722,086, in June, according to reports received by the Department of Commerce from 15

concerns which represent a large proportion of the industry.

For the first seven months the total has been 1,397,644 dozens, valued at \$5,338,165, compared with 1,311,913 dozens last year, valued at \$4,963,614. Gains were recorded in both groups—pails and tubs, and "other ware."

South Africa to Exhibit Ores at German Fair

HAMBURG, GERMANY, Sept. 2.—Considerable interest has been aroused by a recent announcement that the Government of South Africa plans to exhibit iron, manganese, tin, copper and chrome ores at the Frankfort Fair, Sept. 30 to Oct. 4. This is the first such exhibit by South Africa and is believed to be the outcome of negotiations with German steel interests such as the Friedrich Krupp A. G., and the Vereinigte Stahlwerke, which are interested in exploiting the rich ore fields of Postmasburg and the iron ore deposits in Natal. About 10 tons of various ores will be exhibited.

Statistical Measures of Business Conditions

Construction volume in August is estimated by the Associated General Contractors of America at 239, based on 100 as the average month of 1913. This is the second highest rating ever reached, that for June having been 244; July was 237. The highest previous to 1928 was August, 1927, with 238.

Total production of petroleum in the United States in 1927 is reported by the Bureau of Mines at 901,129,000 bbl., by far the highest output on record. It compares with 770,874,000 bbl. in the preceding year, the gain being 17 per cent. More than 60 per cent of the production of the year came from the Mid-Continent field, while a little more than 25 per cent came from the California wells.

Total production of Portland cement for the first seven months of 1928 amounted to 94,436,000 bbl., compared with 92,466,000 bbl. in the same period of 1927. Total shipments from January to July, 1928, inclusive, amount to 93,851,000 bbl., compared with 93,759,000 bbl. in the same period of 1927.

Average weekly earnings in representative New York State factories in July are reported at \$29.15 by the State Industrial Commissioner. This is a reduction of 33c. from the June average and, with the exception of April, is the lowest figure since last November. Only three months of the last 23 have been lower. One of these was July, 1927, when \$28.95 was recorded.

Production of bituminous coal in the week ended Sept. 8 is reported by the United States Bureau of Mines at 8,934,000 net tons, a reduction having occurred because of Labor Day. The total for the calendar year through Sept. 8 was 321,699,000 tons, comparing with 363,294,000 tons in the corresponding period of 1927.

Electric power produced by public utility power plants in the United States in July is reported by the Geological Survey at 7136½ millions of kwhr., compared with 7009 in June and 7130 in May. The proportion made by water-power declined to 43 per cent in July, from 44.3 per cent in June and 44.7 per cent in May. While daily output in July was lower than in several of the earlier months of 1928, only one month of any previous year (December, 1927), exceeded the record of July.

Shipments of electric industrial trucks and tractors in July are reported by the United States Department of Commerce at 107, the lowest figure since last December. It compares with 117 in June and with 90 in July, 1927. For the first seven months the total was 839, compared with 785 for the corresponding period of 1927.

Consumption of babbitt metal in July is reported by the Department of Commerce at 4,692,825 lb. This is a slight reduction from the 4,731,023 lb. of the preceding month but is higher than the 4,604,786 lb. of July, 1927. For the first seven months there has been a drop of 7 per cent, from 35,735,478 lb. to 33,199,922 lb.

Production of automobiles in Canada in July, as reported by the Dominion Bureau of Statistics, included 20,122 passenger cars and 5104 trucks, compared with production in June of 25,341 passenger cars and 3058 trucks, and production in July, 1927, of 8719 passenger cars and 2268 trucks.

Preliminary figures of an August production of 485,000 cars and trucks carry with them the virtual certainty that the automotive industry will set up a new production record in 1928, says *Automotive Industries*. To do this it must exceed the 4,424,538 total of 1926. Retail sales in July in 17 representative cities showed an increase of 38 per cent over July last year.

Blast furnaces in the Saar produced 952,220 metric tons during the first six months of 1928 as against 879,863 tons in the first half of 1927, while steel production was 1,020,855 tons and 946,600 tons, respectively, according to a report received by the Iron and Steel Division, Department of Commerce.

New German Freight Rates Do Not Apply to Exports

HAMBURG, GERMANY, Sept. 2.—Producers of steel and metal for export will not be affected by the advance in freight rates to go into effect about Oct. 1. Railroad freight rates on material moving to ports for export will continue unchanged, and in the case of certain non-ferrous metals have been reduced. Domestic business has already been affected by the projected increase in freight rates, and an active trade is reported in orders for prompt shipment.

Convention Hall Near Albany Is Planned

The Simmons Machine Tool Corporation, Albany, N. Y., has purchased from the General Railway Signal Co., a building, located between Albany and Troy, which is being remodeled for convention purposes. Posts supporting the roof will be removed and 100-ft. steel trusses installed. The building consists of two floors, containing 35,000 sq. ft. each, and will be equipped with power lines for use in operating machinery at conventions or shows. The hall is served by a railroad siding and has a seating capacity of 8000.

Foundry Problem Bulletins

A series of discussions of present-day foundry problems will be published by Whiting Corporation, Harvey, Ill., from the pen of Dr. Edward E. Marbaker. Dr. Marbaker is investigating such problems at Mellon Institute of Industrial Research, Pittsburgh, and an article by him on "Heat Treatment of Gray Iron" appeared in THE IRON AGE, Aug. 2, page 282. Copies of these publications will be mailed to those requesting them from the Whiting Corporation.

Davison Company Takes Over Neville Furnace

Name of the Sharpsville Furnace Co., with a blast furnace at Sharpsville, Pa., which recently acquired the Neville furnace, owned by the American Steel & Wire Co., but long operated by the Carnegie Steel Co., has been changed to the Davison Coke & Iron Co., the family name of the dominant interest in the company. The new company on Sept. 12 formally exercised its option on the furnace together with 260 acres of land adjacent to it on Neville Island, which is in the Ohio River a short distance from Pittsburgh. The furnace is in shape for immediate operation, but the new owners will install two turbo-blowers and it is not expected that the stack will be blown in until about March 1, 1929. The company also has completed the engineering de-

tails for a new power plant, a cement works and a by-product coke plant. Surveys and excavating work already have been started.

Manless Power Distributing Station

A manless electric distributing station that will ultimately be able to supply power sufficient to light the homes of approximately 300,000 families and will be operated without a human being inside its walls, was put into service on Sept. 17, at 238th Street and Spuyten Duyvil Road, New York, by the New York Edison Co. The station will be controlled from another station more than three miles away. The distant operator can close or open any switch, placing in service the various transformers and circuits in the new station by pressing keys which send over wires electric im-

pulses of the dot and dash system, used in telegraphy. Also he will receive automatic signals from the station which will inform him whether the equipment is functioning properly.

The control system was devised by the Westinghouse Electric & Mfg. Co. The station will receive from the generating stations current at 13,200 volts and distribute it at 2300 volts.

New Great Lakes Car Dumper

Plans for a new electric car dumper, expected to set a new record for speed, have been completed by the Toledo & Ohio Central Railroad. The dumper will be built by Heyl & Patterson, Pittsburgh, and is expected to be completed in March, 1929. It will be located at Toledo. The electric equipment will be supplied by the General Electric Co.

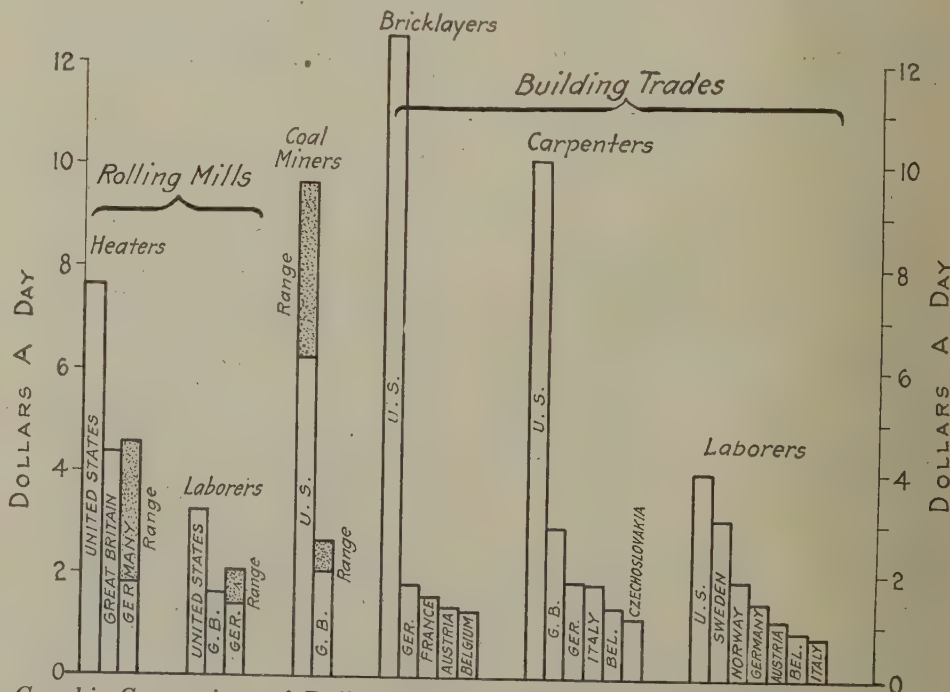
American and Foreign Wages Compared

Comparisons of daily wage rates in rolling mills, building trades and coal mining and farming have been made by the United States Bureau of Labor Statistics. The figures are taken from the latest available data, mainly for the United States, Great Britain and Germany. In some cases, however, additional figures are given covering France, Austria, Belgium, Italy, Czechoslovakia, Norway and

Sweden. The comparisons are given in the tables and are shown graphically in the diagram appended.

Wages in the United States were at their peak in 1920. Hourly wages at that time were 134 per cent higher than in 1913. The depression of 1921 brought the average down and, though there was a further shrinkage in 1922, they still were more than twice the 1913 level. Since then there has been a steady increase until in 1926 wages were 129 per cent higher than in 1913.

Country	Rolling Mills		Building Trades			Coal Miners
	Heaters	Laborers	Bricklayers	Carpenters	Laborers	
United States	\$7.60	\$3.28	\$12.56	\$10.16	\$4.00	\$6.26
Great Britain	4.36	1.61	.....	2.96	.....	9.65
Germany	1.81	1.64	.....	.....	.....	2.02
	4.57	1.40	.....	.....	.....	2.65
France	.....	2.07	1.84	1.86	1.47	.....
Austria	.....	.....	1.57	.....	.....	.....
Belgium	.....	.....	1.39	.....	1.12	.....
Italy	.....	.....	1.32	1.36	0.91	.....
Czechoslovakia	.....	.....	.....	1.82	0.80	.....
Sweden	.....	.....	.....	1.12	.....	.....
Norway	.....	.....	.....	.....	3.09	.....
	.....	.....	.....	.....	1.88	.....



Graphic Comparison of Daily Wages in Various Trades in Several Countries

Alloy Bridge Steel Sixty Years Old

(Continued from Page 686)

than the bolts, weighing from 400 to 750 lb., depending on the thickness, but were of paramount importance to the bridge as designed, because from them were to be built the main arches to carry the entire loads back to the masonry. Some six months was required to get the rolling mill into satisfactory operation. Each change in shape of pass would cause a two-week shutdown. When rolled bars of proper shape were finally produced by this cut-and-try method, the steel proved inferior; both in full sized and small tests the elastic limit in compression proved to be 17,000 to 18,000 lb. per sq. in.

This disappointing outcome would have been fatal to the bridge had not the Chrome Steel Co. of Brooklyn previously furnished two anchor bolts which had not only passed the proof test properly, but test bars cut from the ends developed 119,000 to 161,900 lb. per sq. in. ultimate strength. In view of this successful showing, small ingots of chromium steel were rolled into staves; they worked nicely and passed the tests without difficulty. Chromium steel thus appeared to be the solution of the problem. Consequently C. P. Haughian, superintendent of the Chrome Steel Co., was engaged on Aug. 6, 1871, to instruct the Butcher employees how to make and roll chromium steel staves. He guaranteed to make 100 of them without a single failure under test, which he did by Sept. 21 of that year. For his services and the patent rights he was paid \$15,000.

Julius Baur, of New York, was the first to produce chromium steel on a practical scale, even though Faraday and Stodart made it experimentally as far back as 1820. In 1865 a patent issued to Baur claims "a steel greatly improved, toughened and hardened by the addition of chromium." By 1878 only two other sources were available, Sheffield in England and Unieux in France. The methods then in use may be inferred from a description of the Brooklyn Chrome Steel Works printed in the *Stevens Indicator* in 1892. Scrap iron and own chromium steel scrap were placed in German clay crucibles, plumbago lined, together with a flux of sodium carbonate. Chromium, in the form of chrome-iron ore, manganese oxide and carbon were also added to make up the 100-lb. charge. Two crucibles were charged into a single pit, gas fired and with regenerative checkerwork. After about four hours the crucibles were drawn, skimmed and poured; the ingots were stripped and reheated before getting cold. European melting mixtures, the *Stevens Indicator* notes, consisted of low-carbon Bessemer steel, wrought iron, cast iron, chrome-iron ore and limestone.

The entire absence of chemical analyses in the pages of Woodward's "History of the St. Louis Bridge" is sufficient evidence that steel was steel to the trade in 1870. Finished steel was doubtless classified and graded by fracture; raw materials were selected in a similar manner and combined by rule of thumb in what experience had taught would make a satisfactory product.

To return from this digression: Manifold troubles with bolts and staves had brought the Butcher Steel Works near to bankruptcy. Mr. Butcher resigned, the Midvale Steel Works succeeded to the business, and W. F. Durfee became superintendent. Woodward's history says "A new foreman was employed in the forging shop, and a skillful metallurgist in England was at once sent for to take charge of the melting and mixing of the steel. From this time forward no serious difficulties were met in the manufacture or testing of the staves." Such great uniformity was attained under test that soon only one in three, and later one in ten staves, were given proof loads. Small specimens were continually tested, however, and the modulus kept close to 27,000,000 and ultimate strength in tension seldom below 120,000 lb. per sq. in. It is too bad that the name of this "skillful metallurgist" was not recorded.

Further troubles were encountered of a mechanical nature, due to the hardness of the high-carbon chromium steel. The rolled stave had a fin or ragged edge (evidently metal forced into the roll clearances) which was "much the hardest part," because it was chilled so quickly. Only nine staves per day could be cleaned up on a planer. Two men could chip the fin off five or six in a day. Later a shear was installed at the hot bed and the fin trimmed off the hot bar immediately after the finishing pass.

The Keystone Bridge Co. found as much trouble when turning the required grooves in the ends of the assembled tube as the inspectors found the previous year in drilling them. In order to reduce this machining difficulty and also to avoid brittle steel, the required proof test had been reduced from 60,000 to 50,000 lb. per sq. in. (an action, strange as it may seem, interpreted by the Keystone Bridge Co. as being sufficient grounds for cancellation of the main contract for fabrication and erection). Altogether, chromium steel put quite a strain on a bridge company used to working wrought iron only! To them, when the contract was signed, "this was only one more bridge."

It was planned to make the envelopes (Fig. 2) of chromium steel also. But the first alloy ingots sent to mills which could roll plates 5 ft. wide left a trail of broken rolls and produced hard plates entirely too brittle to be formed into tubes. Consequently the plan was abandoned, and these plates were made and rolled of plain crucible steel by Park Brothers & Co. of Pittsburgh (now a part of the Crucible Steel Co. of America), to a specification calling for a 40,000 lb. per sq. in. elastic limit and 80,000 lb. ultimate strength. This sub-contract appeared to be unique in the bridge's history—apparently the Park works had no difficulty in furnishing satisfactory metal at the required rate.

Failure to Make Sound Chromium Steel in Open Hearth

After such difficulties it would not be anticipated that such an inconspicuous detail as the couplings between arch segments would be especially troublesome. In the completed bridge only a few of them ever take any loads; in fact, in the original design they were to be made of cast iron. But since those in the upper arches were to work in tension during erection, the Keystone Bridge Co. insisted that they should be made of steel and designed for a factor of safety of 12. This turned some of them into a highly stressed detail.

As seen in Fig. 4, they are split sleeves, grooved on the inside to fit accurately into other grooves cut on the ends of the tubes. Finished weights varied from 365 to 500 lb. each, and it was planned to roll them flat in six passes, cut the shape to length, reheat the piece and then press it into a semi-cylindrical form. Such practice required a slab-like ingot, and put only a moderate amount of work into the metal. Nevertheless, owing to the width of the bar and its hardness, rolls were broken frequently. Improper roll diameters caused the bars to curl upward or downward. When bars of proper shape finally were produced, a large proportion cracked under the bending press. Nine couplings (out of 1012 required) were finally produced by July 26, 1872, from work which started Nov. 25, 1871!

In an effort to improve this performance a milder steel was tried—also all manner of changes in the ingot, to avoid the surface cracks. Finally the problem seemed to be solved by a "corrugated" ingot the full width of the completed bar, as shown in Fig. 5. It was cast in dry sand molds, shaken out after two days' cooling and rolled without hammering. One half-coupling was made per ingot in this manner, nearly all of them of fair surface appearance.

Spurred on to win a \$30,000 bonus offered for delivery

of 60 couplings per week, this rate was attained by the end of 1872 and by the following February about 600 pairs were accepted as worthy of finishing and test.

When the grooves were cut in these couplings, however, considerable unsound metal was revealed, and it became obvious that a proof load must be given to each pair. Strangely enough, of the 104 made from steel cast in iron molds, 100 passed, despite the inferior surface appearance as rolled, whereas so many of those rolled from sand cast slabs and having a perfect surface failed under test, that rolled steel for couplings was abandoned after 28 months of effort to make acceptable metal.

Since erection of the steel was being held up, it was necessary to adopt some other material immediately. The Keystone Bridge Co. had meanwhile developed great concern about the strength of the couplings, threatening to abandon responsibility for safe erection unless the utmost of quality was furnished. The problem was finally solved by placing all steel couplings in the lower arches, where they would be under little or no stress either during erection or during use, and installing forged wrought iron couplings on the upper arches.

It was a great mystery why chromium steel, which saved the day for the staves, failed so miserably in the couplings. The latter metal proved unusually weak and brittle, espe-

cially when cast in dry sand molds. The metallurgist gave every assurance that the composition was unchanged, but ten test pieces cut from the last lot of completed couplings broke at 45,000 to 87,000 lb. The average was 60,000 instead of 115,000 lb. per sq. in. as in the staves. Earlier tests indicated that pressing the flat shape into a round coupling caused some damage. Tests from unbent shapes averaged 82,500 lb. per sq. in. ultimate strength; after bending 64,900.

An inference about what may have been wrong may be drawn from this remark from Woodward's history: "The open-hearth furnace, from which five tons of ingots were to be cast at one charge, went down for general repairs." Evidently the crucible process, used for the stove ingots, had given way to the open hearth. Since furnaces of the latter design had been but recently installed, it is fair to suppose that inexperience in its operation was the cause of much of the trouble. Probably little of the chromium in the ore charged into the furnace (or the chromium alloyed in the scrap) came out in the steel except as harmful oxide inclusions; the ingot practice was just right for excessively large primary crystals; and lastly, rolling without side reduction undoubtedly induced great transverse brittleness in exactly the right direction to cause the most damage in the final curving press.

Hydraulic Method of Cleaning Castings

CLEANING castings by water under pressure directed from nozzles was described at the meeting of the New England Foundrymen's Association at Boston, Sept. 12, by James Prendergast, foundry superintendent, and H. A. Lincoln, works manager, of the Sullivan Machinery Corporation, at Claremont, N. H. Mr. Prendergast said in part:

"The layout of our plant, with river running alongside and a basement under the cleaning room, lent itself perfectly to the installation of a hydraulic process of cleaning castings. We installed the equipment in the basement under the floor of the cleaning room. We lower the castings down into this room through a hole in the floor. The floor of the hydro-blast room is raised high enough from the basement floor to allow the water, after use, to drop 12 ft. and flow back into the river.

"We took advantage of the distance the water dropped to wash the fine burnt sand. It is possible for us to reclaim the clean sand. The agitation of the water accomplishes this without the use of mechanical aid. By a simple arrangement the water and sand cleaned from castings rushes through a hole in the floor through a screen which catches rods, nails and large pieces of core, then through a trough arranged to reduce the speed of the water flow. Agitation is arranged for to cause the fine burnt sand to separate easily as it passes down to a finer screen. This second screen of 50 mesh holds the sand we wish to reclaim.

"As the sand to be reclaimed accumulates, it is forced by the flow of water through a small slot into a space divided in the center to direct this sand to two spouts directly above dump buckets. These buckets have numerous screened holes to allow the water to escape. The unclaimed sand with water is discharged into the river.

"The sand in the dump buckets is allowed to stand over night, and is used the next day in facing sand for side floor, bench and machine molding. No new sand is used with the reclaimed, but simply an addition of ordinary fire clay and the regulation amount of sea coal. The mixture is worked up in the usual manner. Sand costs \$6 a ton, delivered Claremont, consequently the saving is worth while."

Cores running in size up to 9 x 18 x 66 in. are cleaned out by this method. The flow of water in the process of cleaning castings is delivered at 300 lb. pressure through common fire hose with $\frac{3}{4}$ -in. nozzles. The only cost involved in

operating the cleaning outfit is that of running a 100-hp. motor on the pump.

This method of cleaning castings has relieved the company of the hardest labor problem it had to contend with. The labor turnover on the old method of cleaning castings was very high, but now it is practically eliminated. Accidents due to flying fins and sand are done away with. Uncleaned castings and large sand piles, due to the inability to secure men to do the work, causing congestion on the cleaning floor and delayed deliveries, are a thing of the past. Cores are cleaned more thoroughly than ever before, said Mr. Prendergast, and consequently the machine shop is relieved of a lot of unnecessary work. The hydro-blast, however, does not do away with sand blast, but it does lighten the task of the sand blast operator. One operator takes care of all the work, making a saving of five men. The power cost is approximately \$2.50 per day, and the saving of sand is 17 tons per month. Best of all, the speaker added, working conditions are satisfactory.

Mr. Lincoln went into more detail as to savings in operating costs and costs of installation of the hydro-blast equipment. He pointed out that the installation of such a system in foundries not having a river handy or low city or town water rates is out of the question, but added that, where an installation can be made, it is the most practical method of cleaning castings.

Study of the mutual position of atoms in solid substances and chemical compounds, using the X-ray method, began in 1912. During that year there were six contributions to learned societies by the pioneers, W. H. and W. L. Bragg, Laue, and Stark. It has proved, however, such an attractive field of investigation for physicists that up to the end of 1927 no less than 1800 different articles have been published giving data on crystal structure and the means for studying it. Much of the work has had to do with pure metals and alloy systems. The articles are listed in a "Bibliography of Crystal Structure," by Jared K. Morse, published by University of Chicago Press, Chicago. The book also contains a statement of the methods used by the University of Chicago laboratory, and some of the results of investigations at that place.

Machinery Markets and News of the Works

Machine Tool Sales Rise

Average for June, July and August the Highest Since
First Half of 1920—Present Demand Fair

MACHINE tool business in the past week has held fairly close to the average of recent weeks. The volume of inquiries gives the trade confidence that the total for September will equal, if it does not exceed, that of August. Orders of outstanding size are exceptional, but the total of single tool requirements is fairly large.

The National Machine Tool Builders' Association reports that the average for June, July and August was the largest for any similar period since the first half of 1920, when the post-war boom was on the down grade. With 100 representing average shipments in 1922, 1923 and 1924, the June-July-August period registered a total of 220 points, or an increase of 12 points over the preceding three months' period. The peak of the post-war boom demand was 405 points on the association's scale.

"Machine tool orders seem to have been more plentiful in August than they were in July," the association's report says. "In fact, the August

figure, taken by itself, is higher than any figure we have had for any single month since the post-war boom. Since figures for the post-war boom must have included considerably more export business than is included in our latest figures, it looks as though domestic business can be fairly considered as being quite satisfactory.

"It is doubtful whether every company in the industry shared in the same proportion that it shared in the post-war boom totals. Many changes in design and sales policies have taken place since the post-war boom nine years ago. These changes would necessarily affect individual results, increasing some and diminishing other individual participations."

Railroad buying appears somewhat more promising in the Chicago district. The Chicago, Burlington & Quincy has placed orders within the week, and the Chicago, Rock Island & Pacific is asking for prices on a number of machines. Several railroads that buy at St. Louis may soon state their requirements for fall and winter.

New York

NEW YORK, Sept. 18.—Machine tool sales so far this month have been about on a par with those for a like period in August, but enough business is pending to raise hopes that the volume will increase in the remaining two weeks to such an extent as to place this month ahead of August. One of the large prospective purchases is eight planers ranging in size from 30 in. to 10 ft., totaling about \$150,000 in value. Single tools predominate in the rest of the pending list, but fresh inquiries the past week were in sufficient volume to encourage expectations of a continued good business for some weeks.

Among the week's sales were an 80-in. Maag gear generator, a 48-in. carwheel borer and a 1100-lb. steam hammer by Niles-Bement-Pond Co. and nine lathes, seven deep-hole drilling machines, two rotary surface grinders, a vertical surface grinder, two jig borers, two auto-

matic centering machines, three multiple spindle drilling machines, two die sinkers, two vertical shapers and a production hand miller by Pratt & Whitney division of same company.

American Bank Note Co., 70 Broad Street, New York, manufacturer of paper goods, has awarded general contract to Cauldwell-Wingate Co., 101 Park Avenue, for extensions and improvements in factory on Barretto Street to cost \$225,000 with equipment.

American Neon Light Corporation, 549 West 132nd Street, New York, manufacturer of tube lighting equipment for display, is planning purchase of plant property to provide for five times present capacity. A capital stock issue of 100,000 shares is being sold, entire proceeds to be used for project. Otto B. Shulhof is president; and Paul F. LeBrun, chief engineer.

William A. Veechio, 161 West Second Street, Mount Vernon, N. Y., and associates are planning construction of three-story ice-manufacturing and cold storage plant, 100 x 150 ft., to cost approximately

\$250,000 with machinery. Company will be organized to carry out project.

Takamine Corporation, 208 Rawson Avenue, Long Island City, manufacturer of electric controls and kindred equipment, has leased additional space, totaling about 20,000 sq. ft., for expansion.

Marion Reid Garage & Gas Station, Inc., 391 Fulton Street, Brooklyn, is having plans drawn for new two-story service, repair and garage building to cost about \$100,000 with equipment. Kleinert & Klie, 250 Park Avenue, New York, are architects.

Ovens, power equipment, conveying and other machinery will be installed in two-story plant to be constructed by Dugan Brothers, Inc., 228 South Fifth Street, Brooklyn, at Queens Village, L. I., to cost about \$500,000, for which general contract has been let to Willcox Construction Co., Inc., 1 Bridge Plaza, Long Island City. Henry Holder, 242 Franklin Avenue, Brooklyn, is architect.

Montgomery Ward & Co., Chicago Avenue and Larrimore Street, Chicago, have purchased 23 acres at Albany, N. Y., as site for new storage and distributing plant, to cost more than \$500,000 with equipment.

New York, New Haven & Hartford Railroad Co., Grand Central Terminal, New York, has awarded general contract to H. Wales Lines Co., 130 State Street, Meriden, Conn., for new engine house, with repair facilities, at Maybrook, N. Y., to cost over \$40,000 including equipment.

Bark & Djorup, Inc., 1351 Broadway, New York, architects, have plans for a two-story automobile service, repair and garage building, to cost \$125,000 with equipment.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has authorized appropriations of \$197,035 and \$103,155, for purchase of mechanical equipment in public schools Nos. 227 and 200, at Brooklyn.

Officials of Anchor Cap & Closure Corporation, 22 Queens Street, Long Island City, are organizing Anchor Cap Corporation to take over and consolidate present concern and other companies specializing in manufacture of metal caps and affiliated products, including Paragon Can & Cap Co., Paterson, N. J.; Sure Seal Co., Beacon Machinery Corporation, Automatic Screw Capping Machine Corporation, Pilgrim Auto Supply Co., and Capstan Glass Co., New York, as well as Anchor Cap & Closure Corporation of Canada, Ltd. New company plans expansion, including vacuum and friction cover caps, screw thread caps, rubber jar rings, gaskets, etc.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has plans for a two-story equipment storage and distributing plant, with repair department, at Jersey City, N. J., to cost about \$200,000 with equipment.

Texas Co., 17 Battery Place, New York, has plans for a new oil storage and dis-

The Crane Market

INQUIRY for overhead and locomotive cranes continues small. Interest in overhead equipment, although limited to inquiries for cranes of small capacity, is fairly steady. There is a moderate volume of inquiry for small capacity locomotive cranes, such as crawl-tread and truck type, but contractors are inactive and have but little locomotive crane business in prospect from new contracts.

Among recent purchases are:

General Motors Export Co., New York, two 5-ton, electric cranes for shipment to South America from Cleveland Crane & Engineering Co.

F. H. Crawford Co., 30 Church Street, New York, 25-ton used Industrial locomotive crane from unnamed seller.

Republic Iron & Steel Co., Warren, Ohio, 2-ton, single I-beam electric crane from H. D. Conkey & Co.

Dow Chemical Co., Midland, Mich., 8-ton, single I-beam hand power crane from H. D. Conkey & Co.

New Haven Copper Co., Seymour, Conn., two 5-ton hand power cranes from H. D. Conkey & Co.

Fisher Body Corporation, Pontiac, Mich., 5-ton, 2-motor, overhead crane from H. D. Conkey & Co.

International Paper Co., Corinth, N. Y., 2-ton hand power crane from H. D. Conkey & Co.

Vermont Marble Co., Proctor, Vt., 2-ton, single I-beam, electric crane for Cleveland from H. D. Conkey & Co.

Truscon Steel Co., Youngstown, 1-ton, single I-beam, electric crane from H. D. Conkey & Co.

Chevrolet Motor Co., Detroit, 22-ton, 8-wheel, steam-operated locomotive crane from Orton Crane & Shovel Co.

The Alliance Machine Co., Alliance, Ohio, reports the following recent crane awards:

165-ton ladle crane, 5-ton open-hearth charger and 7½-ton soaking pit crane, Timken Roller Bearing Co., Canton, Ohio.

5-ton standard crane, Wilkoff Co., Youngstown.

5-ton standard crane, Heppenstall Forge & Knife Co., Pittsburgh.

15-ton magnet crane, Interstate Iron & Steel Co., Chicago.

60-ton standard crane, 50-ton standard crane, two 25-ton double hook, magnet, 25-ton magnet crane and 25-ton magnet trolley, Wheeling Steel Corporation, Wheeling, W. Va.

175-ton ladle crane, and 5-ton soaking pit crane, Ford Motor Co., Detroit.

Five 2½-ton double trolley cranes, Electric Pig Iron Corporation.

60-ton ladle crane, Bethlehem Steel Co.

15-ton standard crane, Laclede Steel Co.

75-ton ladle trolley, Standard Steel Works, Burnham, Pa.

15-ton double drum crane and 5-ton open-hearth charger, Ford Motor Co., Detroit.

Five 5-ton double trolley cranes, Carnegie Steel Co., Pittsburgh.

10-ton gantry crane, American Rolling Mill Co., Middletown, Ohio.

5-ton standard magnet, Tennessee Coal, Iron & Railroad Co., Ensley, Ala.

10-ton special crane, 35-ton standard crane, and 20-ton magnet trolley, Timken Roller Bearing Co., Canton, Ohio.

20-ton magnet crane, American Steel & Wire Co., Donora, Pa.

3-ton standard crane and 25-ton trolley, Pittsburgh Plate Glass Co., Pittsburgh.

5-ton standard crane, Transue-Williams Steel Forgings Corporation.

tributing plant at Little Ferry, N. J., to cost about \$100,000 with equipment.

Franklin Lightning Rod Co., 1101 Firemen's Building, Newark, has been organized to manufacture and install lightning rods. Company purchases copper, bronze and lead from cable and rod manufacturers and does assembling on job.

Goethal Steel Co., Inc., with shop at 229 Butler Street, Elizabeth, N. J., has been organized to fabricate and erect structural steel and ornamental iron.

New England

BOSTON, Sept. 17.—The machine tool market continues quiet, although business the past week was better than in the week previous. One local house expects to close immediately on some good orders in western Massachusetts, and other dealers have a number of tools under negotiation. Most of the week's business was in Connecticut, and included shapers, lathes, jig borers, for the most part Pratt & Whitney tools, drilling and milling machines and presses. Some good sales are understood to have been made in Bridgeport, but details are lacking.

Used tools are moving slowly. Recent orders include a 3-ft. radial drill, a turret lathe equal to No. 4 Warner & Swasey, tool-room lathe, engine lathe, small drilling tools and presses. Small tools continue to move in volume. Sales so far this month are slightly ahead of those for the first half of August.

Conveyors, pneumatic tubes and other equipment are required for a three-story, 91 x 159 ft. mail and baggage unit for Boston & Maine Railroad, Boston. Densmore, Le Clear & Robbins, 31 St. James Avenue, Boston, are engineers.

Winsted Insulated Wire Co., Winsted, Conn., is having plans prepared for additional manufacturing space.

Work has started on a two-story and basement, 60 x 98 ft., addition for Continental Wood Screw Co., Mount Pleasant Street, New Bedford, Mass. Leary & Walker, Union Street, are architects.

Plans have been completed for a \$1,000,000 cement making plant at Pownal, Vt., for Commonwealth Portland Cement Corporation. L. L. Griffiths, room 1011, 58 Pine Street, New York, is president.

National Packaging Machine Co., Newtonville, Mass., has started work on a four-story addition.

Motors and conveying equipment are required for a plant for *New Haven Register*, New Haven, Conn., bids for which closed Sept. 15. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are engineers.

Connecticut Light & Power Co., Hartford, Conn., has awarded general contract to United Engineers & Constructors, Inc., 1401 Arch Street, Philadelphia, for a one and two-story equipment storage and distributing plant at Norwalk, Conn., with service and repair department, to cost about \$150,000 with equipment.

Saco-Lowell Shops, 147 Milk Street, Boston, manufacturer of textile mill equipment, is planning to concentrate majority of production at Biddeford, Me., and has applied for permission to close Gooch Street to provide for erection of foundry and other units to present plant, to cost more than \$85,000. Company recently removed a portion of plant at Lowell, Mass., to Biddeford. Works at Newton Upper Falls, Mass., will be continued as heretofore.

Columbia Phonograph Co., Bridgeport, Conn., has contracted with Kolster Radio Corporation, 200 Mount Pleasant Avenue, Newark, N. J., for manufacture and distribution of equipment for joint service. Bridgeport plant will be arranged to produce two new products, comprising radio sets and Columbia-Kolster electric vibrational phonograph, including parts and assembling.

Dennison Mfg. Co., Framingham, Mass.,

manufacturer of paper goods, cardboard tags, etc., has leased property at Chicago for branch plant, primarily for tag and other heavy stock manufacture. Machinery will be installed at once, to provide for operations in October. W. F. Wentworth, manager of tag division, is in charge.

Hood Rubber Products Co., Watertown, Mass., manufacturer of automobile tires, etc., has leased property at Hartford, Conn., and will remodel for factory branch and distributing plant.

Nash Engineering Co., Wilson Point Road, South Norwalk, Conn., manufacturer of pumping machinery, compressors, etc., has plans for a two-story addition, 69 x 80 ft., to cost about \$40,000 with equipment.

Atlas Mfg. Co., Water and Warren Streets, New Haven, Conn., manufacturer of sheet metal goods and wire products, is said to be planning to rebuild part of plant destroyed by fire Sept. 13, with loss reported more than \$40,000 with equipment.

South Atlantic

BALTIMORE, Sept. 17.—Plans have been authorized by Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, for extensions and improvements in plant of Terminal Freezing & Heating Co., South Eutaw Street, recently acquired, including installation of boilers, forced-feed blast fans, pumps, tanks, etc., to increase capacity about 50 per cent, and to cost about \$500,000.

Officials of Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, manufacturer of metal bottle caps, bottle capping machinery, etc., have formed Crown Cork International Corporation, capitalized at 600,000 shares stock, no par value, to operate in foreign countries. Company is arranging for plants in Europe and will also purchase existing properties.

Charles E. McManus, president, will occupy similar position with subsidiary.

Hermitage Ice & Storage Co., Inc., Hermitage Road, Richmond, Va., is planning new ice-manufacturing and cold storage plant addition, to cost more than \$80,000 with machinery. Another plant is also being considered in East End district to cost about like sum.

Board of Education, Atlanta, Ga., will soon begin work on addition to commercial high school, with additional manual training facilities, to cost over \$135,000. G. Lloyd Preacher & Co., Wynne-Claughton Building, are architects.

Lerio Patent Cup Co., 201 South Royal Street, Mobile, Ala., manufacturer of metal cups, is planning establishment of branch plant at Savannah, Ga. Portion of equipment will be shipped from Mobile to new factory site.

Printing Roller Mfg. Co., Greensboro, N. C., has plans for extensions and improvements in plant, with installation of additional equipment.

Feldspar Milling Co., Inc., Burnsville, N. C., recently organized, has work under way on new feldspar grinding mill at Bowditch, N. C., with daily output of 75 tons of finished material. It is proposed to install a third unit later. C. P. Rogers, Tryon, N. C., is president; Rudolph Glatly is manager, in charge of construction.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, is planning construction of new metallurgical plant in vicinity of Boncar, Va., to cost approximately \$5,000,000 with machinery. Project will be carried out in connection with hydroelectric power development of New Kanawha Power Co., a subsidiary, Glen Ferris, W. Va., and office of parent company. Site has been secured near Hawks Nest on New River, and plans are in progress for initial station, to cost more than \$10,000,000 with transmission lines. Power development will furnish service for metallurgical plant.

Board of Trustees, Fort Valley High and Industrial School for Negroes, Fort Valley, Ga., plans early call for bids on general contract for new four-story and basement school, to cost about \$135,000 with equipment. Ludlow & Peabody, 101 Park Avenue, New York, are architects. Robert S. Fiske, Healey Building, Atlanta, Ga., is consulting engineer.

Pittsburgh

PITTSBURGH, Sept. 17.—Actual sales of machine tools again in the past week have been few, but inquiries continue numerous and the trade still inclines toward a cheerful view of prospects. The Carnegie Steel Co., which is building a new warehouse on the site of its McCutcheon mills, Pittsburgh, may possibly buy a compressor, but will supply most of the other machine tool requirements of the new warehouse fabricating department from the old warehouse and its other plants. The fourth quarter tool list of the Westinghouse Electric & Mfg. Co. has not been issued yet. This company has bought most of the tools in its third quarter list on which it asked prices.

Board of Education, Duquesne, Pa., is planning installation of manual training equipment in three-story addition to high school to cost more than \$175,000, for which plans are being completed by

Carlisle & Sharrer, Martin Building, Pittsburgh, architects.

Highland Glass Co., Washington, Pa., manufacturer of wire glass and ribbed glass products has consolidated with Western Glass Co., Streator, Ill., manufacturer of similar products with branch plants at Shirley, Ind., and Fullerton, Cal. New company will be known as Highland-Western Glass Co., capitalized at \$5,000,000. Larger output is planned.

United States Engineers Office, Pittsburgh, will receive bids until Oct. 8 for one upper fabricated gate of two leaves and one lower fabricated gate of two leaves for 56-ft. lock, and two similar fabricated steel gates for 110-ft. lock at Deadmans Island, Ohio River.

Buffalo

BUFFALO, Sept. 17.—Bids will be asked soon by Board of Education, Genesee Building, Buffalo, for three and four-story Burgard vocational school, to cost about \$1,000,000 with equipment. Ernest Crimi, Genesee Building, is architect.

Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, has taken options on about 50 acres near present plant and contemplates construction of new unit totaling close to 300,000 sq. ft. floor space, for manufacture of new radial type airplane motor for commercial aircraft, including parts department, assembling division, testing and other departments, to cost over \$650,000 with machinery. Company is expanding present plant, with installation of additional machinery for manufacture of new radial motor unit prior to completion of new plant, to cost more than \$200,000. C. M. Keys is president.

Viking Metallic Products Corporation, Windsor and Scott Streets, Jamestown, N. Y., is said to be planning one-story addition, to cost more than \$35,000 with equipment.

Smith Trailer Corporation, Syracuse, N. Y., has purchased rights for manufacture of Watson bottom dump tractor wagon, heretofore produced by Rex-Watson Corporation, Canastota, N. Y., including patterns, templates, and will continue manufacture under name of Smith trailers, with facilities for production of different models from 3 to 10-yd. capacities. Harold P. Bentley, formerly connected with Watson organization, will be production manager at Smith plant. R. Shaw Goldthwait, formerly sales manager for Watson company, will act in same capacity for Smith Trailer Corporation.

Board of directors, Emergency Hospital, 669 Main Street, Buffalo, is considering extensions and improvements in power plant at institution on Pine Street, estimated to cost close to \$90,000 with equipment. L. J. Schwab is in charge.

Detroit

DETROIT, Sept. 17.—Work will begin at once on three-story addition, 140 x 725 ft., at plant of Reo Motor Car Co., Lansing, Mich., for motor truck division, to cost about \$400,000 with equipment.

Michigan Central Railroad Co., Jackson, Mich., has approved plans for a new coaling station at Detroit, to cost about \$100,000 with conveying, loading and other equipment. A similar plant will also be built at Clarendon, Mich., to cost approximately \$25,000.

Chrysler Motor Car Co., 12200 East Jefferson Street, Detroit, is having plans drawn for a new one-story unit, 50 x 400 ft., for experimental and engineering departments, to cost about \$100,000. Smith, Hinchman & Grylls, Marquette Building, are architects.

City Council, Allegan, Mich., has disposed of bond issue of \$185,000, and will use fund for municipal hydroelectric power development on Kalamazoo River, for which plans are being completed.

Oldberg Mfg. Co., 2661 East Grand Boulevard, Detroit, manufacturer of automobile mufflers and kindred equipment, will soon take bids on general contract for one-story addition, to cost about \$30,000 with equipment. Revised plans are being completed by Christian W. Brandt, 2111 Woodward Avenue, architect.

Ovens, power equipment, conveying and other machinery will be installed in new one-story and basement plant to be erected by Boettcher Baking Co., Pleasant Ridge, Mich., to cost about \$100,000.

Charles J. Gibson, head of Gibson Refrigerator Co., Greenville, Mich., has acquired refrigerator manufacturing plant of Belding-Hall Co., Belding, Mich., at a public sale for about \$650,000, including real estate, plant and equipment, and will use for expansion. Electric division of Belding-Hall plant was not included in sale, and will be continued in operation by Brinton F. Hall, receiver.

Board of directors, General Motors Institute of Technology, Flint, Mich., has approved plans for additions of about 35,000 sq. ft. of floor space for extensions in machine shop, automotive service station, metallurgical laboratory and other departments. Additional equipment will be installed. Work is estimated to cost over \$100,000. E. T. Strong, president of Buick Motor Co., Flint, is head of board of directors. H. E. Mills, Buick company, is engineer.

Corduroy Tire Co., Grand Rapids, Mich., has filed plans for one-story addition, to cost over \$50,000 with equipment.

Work on a \$100,000 addition to foundry of Baker-Perkins Co., Saginaw, Mich., which is expected to double capacity, will be started at once.

Milwaukee

MILWAUKEE, Sept. 17.—The machine-tool trade continues optimistic, due to the volume of new business being maintained. At most shops bookings offset deliveries, and inquiry indicates a busy fall and winter. While the automotive industries are probably the most active purchasers and prospective customers, business sources cover a wide range of lines of production.

Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of metal and wood fixtures and furniture, has established a Pacific Coast branch factory at Los Angeles, to be ready Oct. 1. Buildings have been acquired and equipment is being installed. An investment of more than \$400,000 is contemplated. Frank Krecjie will be general manager, and Dewey Berger, general superintendent.

In addition to a five-story manufacturing wing, 100 x 386 ft., on which work will begin this week, Seaman Body Corporation, 1732 Richards Street, Milwaukee, has broken ground for an extension, 40 x 80 ft., to its steam generating plant. Contract for boiler equipment has been placed with Wickes Boiler Co., Saginaw, Mich.; automatic stokers, Combustion Engineering Co., Chicago; soot blowers,

W. Clasman Co., Milwaukee; force draft fans, Clarage Co., Kalamazoo, Mich.

Kewaskum Aluminum Co., Kewaskum, Wis., producer of aluminum utensils, novelties and other drawn ware, is about to place contracts for a one-story manufacturing and storage addition, 30 x 200 ft.

Sivyer Steel Casting Co., Milwaukee, is making improvements in its plant at Thirty-seventh Avenue and Mitchell Street, West Milwaukee, including erection and equipment of a new power house, 70 ft. sq., and a brick and steel foundry addition, 48 x 52 ft.

H. O. Eiken, director Board of Vocational Education, Green Bay, Wis., is taking bids until Oct. 1 for general construction of a three-story vocational institute, 120 x 150 ft., designed by Foeller, Schoeber & Berners, architects, Green Bay. It will cost about \$350,000 complete.

Wisconsin Public Service Co., 559 Marshall Street, Milwaukee, will replace its present gas producer plant in Sheboygan, Wis., on a new site in Lyman's addition, commencing work Nov. 1 for completion prior to Jan. 1, 1930. Estimates of cost are not given. A. F. Davey is district manager. C. C. Smith is president and general manager.

G. E. Wiley, architect for Milwaukee Board of School Directors, 1011 Highland Avenue, will draw plans for a three-story addition to Milwaukee Boys' Technical High School, 345 Virginia Street, to cost about \$400,000. It is planned to place contracts and begin work before close of this year. Frank M. Harbach is secretary and business manager.

Tobin Tool & Die Co., Fond du Lac, Wis., is inquiring for a planer, boring mill and other items for an addition, 50 x 52 ft., to be ready Oct. 1.

Board of Education, Prairie du Sac, Wis., has engaged Law, Law & Potter, architects, Madison, Wis., to design a \$50,000 manual training and domestic science addition to high school. Work will begin about Oct. 15. William Schultz is secretary of board.

Keller Tool & Machine Works, 601 Jefferson Street, Eau Claire, Wis., founder and machinist, has acquired building at 123 South River Street for factory branch.

Cleveland

CLEVELAND, Sept. 17.—Machine tool business was moderate the past week. Orders placed in this territory came mainly from automobile parts manufacturers most of whose plants are operating close to capacity. Some activity is reported in Detroit in small lots of machines. A fair amount of business is in prospect in single machines. Turret lathes continue active, although sales during the first half of September were not quite up to the first half of August, when orders were unusually good. The Steel Improvement & Forge Co., Cleveland, which recently moved into a new plant, purchased a die sinker the past week.

Toledo Scale Co., Toledo, Ohio, is enlarging its plant by addition of 50,000 sq. ft. of floor space, for assembly purposes in its industrial scale department.

B. F. Goodrich Co., Akron, Ohio, has awarded general contract to Carmichael Construction Co., Akron, for nine-story addition, 148 x 260 ft., to be used in part for storage and distributing, to cost \$1,200,000 with equipment.

Barr Rubber Products Co., Sandusky,

Ohio, is considering rebuilding part of mill destroyed by fire Sept. 6, with loss in excess of \$200,000 including machinery.

Saxon Stamping Co., Toledo, Ohio, has removed its headquarters to 375 Phillips Avenue.

Timken Roller Bearing Co. has taken bids on general contract for three-story addition, 40 x 100 ft., to be used in part for metallurgical and chemical laboratory, to cost about \$60,000 with equipment. R. T. Campbell and R. A. Zenk, 144 West Wood Street, Youngstown, Ohio, are architects.

Philadelphia

PHILADELPHIA, Sept. 17.—Universal Service Motors Co., Broad and Pine Streets, Philadelphia, has leased property at 1817-19 Market Street and plans construction of new multi-story service, repair and garage building, to cost over \$150,000 with equipment.

Department of Public Works, Philadelphia, Alexander Murdoch, director, will make improvements in municipal airport at Island Road and Tinicum Avenue to cost about \$25,000. Plans are being projected by city, under direction of Mayor Mackey, for purchase of land and construction of new airport, including hangars, repair and reconditioning shops and other units, entire project to cost close to \$1,000,000. Ludington-Philadelphia Flying Service, care of Airport Equipment Division, Pennsylvania Building, has plans for a new hangar with repair facilities at present airport, to cost close to \$30,000.

Philadelphia Paper Mfg. Co., Water and Wolfe Streets, Philadelphia, is carrying out an expansion program at its mills, including installation of additional equipment for manufacture of hardened fibre board containers and kindred products.

United States Gypsum Co., 300 West Adams Street, Philadelphia, is reported planning construction of new mill at Philadelphia for manufacture of gypsum building products, including wallboard, tile, etc., to cost more than \$350,000 with machinery. Engineering department of company is in charge.

Firestone Tire & Rubber Co., Akron, Ohio, is reported planning new multi-story factory branch and distributing plant at Wilmington, Del., to cost more than \$100,000 with equipment.

City Commission, Camden, N. J., has authorized an appropriation of \$300,000 for new junior high school, with manual training facilities, for which plans will soon be completed. Board of Education is in charge.

Leon H. Brendlinger, Robert J. Best and Joseph F. Schneider, all of Mount Carmel, Pa., have organized Ornamental Iron Works, with capital of \$20,000, and plan early operation of local plant for production of ornamental, architectural and structural iron specialties, as well as brass and bronze goods. Mr. Brendlinger will be treasurer.

Hudson Coal Co., Scranton, Pa., is planning extensions and improvements in its Marvine coal breaker, near Carbon-dale, Pa., including installation of new equipment, to cost about \$175,000.

A company whose name is temporarily withheld has leased former plant of Wesel Co., Scranton, Pa., and will remodel for new works to manufacture aircraft motors, including parts and assembling departments. Scranton Chamber of Commerce has carried out negotiations for new plant and is interested in project. Production is scheduled to begin by close of year.

Penn-Jersey Steel Co., 1450 Ferry Avenue, Camden, N. J., will equip one-story addition, 65 x 166 ft., generally for storage and distributing, and will install crane runway, cutting, drilling, punching and other equipment. Arnold H. Moses, Camden, is architect.

Hobson, Flatware Co., Lansdale, Pa., manufacturer of chromium and nickel plated ware, is said to be planning construction of new plant at Lambertville, N. J., to cost more than \$75,000 with equipment. It is purposed to remove present plant to new location and increase capacity. Lambertville Chamber of Commerce is interested in project.

Queen City Aircraft & Airways Co., Allentown, Pa., is being organized by local interests, headed by Arthur R. Wieand, and plans early operations. An airport will be established at Wescoesville, near Allentown, with hangars, repair and reconditioning shops, and other units. Company will manufacture aircraft, it is said, at later date.

Chicago

CHICAGO, Sept. 17.—Purchases of machine tools in the first half of September were equal to the total for the first two weeks in August. Inquiry, both old and new, gives dealers confidence that early fall business will be well up to the summer rate. Of special interest is the increased activity by railroads. Inquiries for used tools are fairly numerous and sales bring good prices.

The Rock Island is asking for prices on a rod grinder, two emery grinders, a gate shear, beam punch, bevel rotary shear, 36-in. drill press, horizontal punch and an 18-in. lathe, all motor driven. The Chicago & North Western will purchase a 32-in. shaper and the Chicago, Burlington & Quincy has placed orders the past week. Several railroads that purchase at St. Louis may make known soon their fall and early winter requirements.

Peoples Gas Light & Coke Co., 122 South Michigan Avenue, Chicago, will build a two-story compressor house, 47 x 80 ft., to cost \$40,000. R. Schwend, 122 South Michigan Avenue is architect.

Interstate Rivet Co., Chicago, has leased a one-story building containing 20,000 sq. ft. of floor space, at 6600 South Oak Park Avenue, for expansion.

Contract has been let by Wilson Steel Products Co., 4840 South Western Avenue, Chicago, to Nolan-Burke Co., 5 North La Salle Street, for one-story addition, 93 x 100 ft., to cost about \$25,000. Fred A. Fielder, 118 East Twenty-sixth Street, is architect.

Ray Brown & Co., 743 Twentieth Street, Rockford, Ill., manufacturers of mechanical equipment, are planning erection of one-story machine shop, to cost about \$24,000 with equipment.

Board of Education, South St. Paul, Minn., is considering installation of manual training equipment in two-story addition to high school, to cost about \$150,000, for which bids will be asked on general contract early in October. Toltz, King & Day, Builders' Exchange Building, St. Paul, are architects.

Adams Sheet Metal Works, Mason City, Iowa, will move from 17 Second Street, S. W., to 2402 South Federal Avenue, where additional facilities will be provided for larger output.

Caterpillar Tractor Co., Washington Street, East Peoria, Ill., is said to be planning one-story and basement addi-

tion, to cost over \$100,000 with equipment. Company is completing work on one-story extension, 160 x 612 ft., costing more than \$200,000.

Board of Education, City Hall, Minneapolis, Minn., contemplates new vocational school to cost about \$450,000 with equipment, work to begin early next year. Bureau of Buildings, 245 Ninth Avenue North, will prepare plans.

National Sewing Machine Co., 176 North Michigan Boulevard, Chicago, has awarded general contract to Holm-Page Co., Rockford, Ill., for two-story addition to plant at Belvidere, Ill., 80 x 80 ft., to cost about \$30,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, Rockford, are architects.

Baker Mfg. Co., 910 Stanford Street, Springfield, Ill., manufacturer of road-making machinery and parts, is said to be planning an addition to cost about \$40,000 with equipment.

Dahlin Brothers & Davis Mfg. Co., 515 First Avenue, N. E., Minneapolis, Minn., manufacturer of furniture, has awarded general contract to Peterson & Lang, Builders' Exchange Building, for one-story and basement factory, 70 x 230 ft., at Burlington, Iowa, to cost about \$40,000 with equipment. Lang, Raugland & Lewis, Essex Building, Minneapolis, are architects.

United States Gypsum Co., 300 West Monroe Street, Chicago, has awarded general contract to Turner Construction Co. for new mill at East Chicago, Ind., to manufacture wallboard and other specialties. Works will include power house, machine shop and auxiliary structures, to cost more than \$200,000 with machinery. J. H. Nold is company engineer.

St. Louis

ST. LOUIS, Sept. 17.—Bids will soon be asked by Brass & Copper Sales Co., 1712-14 Chestnut Street, St. Louis, for two-story storage and distributing plant, to cost about \$65,000 with equipment. Klipstein & Rathman, Security Trust Building, are architects.

Evans-Wallower Lead Co., Joplin, Mo., operating local properties formerly owned by Golden Rod Mining & Smelting Co., has plans for new electrolytic zinc plant at East St. Louis, Ill., to cost over \$850,000. Officials have organized Evans-Wallower Zinc Co., a subsidiary, to carry out project.

N. O. Nelson Mfg. Co., 928 Chestnut Street, St. Louis, manufacturer of plumbing equipment and supplies, will soon call for bids for two-story unit, to cost more than \$200,000 with machinery. P. J. Bradshaw, 718 Locust Street, is architect.

Board of Education, Excelsior Springs, Mo., is considering installation of manual training equipment in new high school to cost \$200,000, for which plans will be drawn by Saylor & Payson, Interstate Building, Kansas City, Mo., architects.

Officials of St. Louis Car Co., 800 Broadway North, St. Louis, have organized Cardinal Aircraft Co., a subsidiary, to build commercial airplanes and parts. Complete assembling works will be operated. E. B. Meissner is president of parent company.

General Tire & Rubber Co., Akron, Ohio, will take bids for three-story factory branch and distributing plant at Kansas City, Mo., to cost about \$200,000 with equipment. Greenbaum, Hardy & Schumacher, Scarritt Building, Kansas City, are architects.

East Side Levee and Sanitary District, Metropolitan Building, East St. Louis, Ill., has revised plans for two new pumping plants for municipal water system, installation to include four and two pumping units, respectively, with accessories.

City Council, Kirkwood, Mo., has engaged Black & Veatch, Mutual Building, Kansas City, Mo., consulting engineers, to prepare plans for municipal electric light and power plant, to cost about \$200,000 with machinery. Previous reference to appointment of another engineer was premature.

Heck Electric Lawn Mower Co., 1016 Baltimore Avenue, Kansas City, Mo., recently formed by H. L. Heck and associates, is planning manufacture of new type electrically-operated lawn mower, with rotary cutting blades. For time being, company will contract with outside interests for production of parts and assembling, and later will establish own plant. Mr. Heck will be president and general manager.

Bauman Auto Body & Fender Works, Great Bend, Kan., has leased building to be erected at 1908 Broadway and will use largely for machine shop and repair service.

Cincinnati

CINCINNATI, Sept. 17.—In the first half of September machine-tool sales were less than the August average, but were substantially ahead of those in the same period of 1927. There has been an almost total absence of transactions involving more than one or two machines, but this has been offset by the liberal volume of fall orders. Inquiries are fairly good, and the diversified nature of current bookings is an indication that buyers in many industrial lines are planning to replace old equipment.

Plans are under way by Union Light, Heat & Power Co., Fourth and Plum Streets, Cincinnati, for new five-story equipment storage and distributing plant, with service and repair division, to cost more than \$200,000 with equipment. Engineering department of Columbia Engineering & Management Corporation, Cincinnati, is in charge.

City Council, Cincinnati, will take bids for municipal airport at Lunken field, including 12 hangars, service and repair shops, oil storage and distributing buildings, administration building and other units. C. O. Sherrill is city manager.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, is said to be negotiating for purchase of former plant of William J. Oliver Mfg. Co., Knoxville, Tenn., for establishment of new branch plant to manufacture automobile body accessories. Options have been secured on 9-acre tract adjoining Oliver works for expansion. Project is reported to cost more than \$250,000 with equipment.

Air Corps, Fairfield Air Depot, Dayton, Ohio, Captain Laughlin in charge, plan call for bids before end of month for one-story aircraft assembling plant to cost about \$100,000 with equipment, and for one-story aircraft machine shop and repair works to cost about \$140,000 with equipment.

Board of Education, 216 East Ninth Street, Cincinnati, plans installation of manual training equipment in new three-story and basement junior high and grade school to cost \$750,000, for which bids have been asked on general contract. C.

H. Ferber, Union Trust Building, is architect.

Mengel Body Co., Fourth and G Streets, Louisville, a subsidiary of Mengel Co., same address, has awarded general contract to Struck Construction Co., 147 North Clay Street, for one-story and basement addition, 300 x 440 ft., primarily for automobile parts production, to cost about \$1,000,000 with machinery. Company has secured large contract from Willys-Overland Co., Toledo, Ohio, and new unit will be given over to this business for several months.

Plans are being drawn by Niles Steel Products Co., Niles, Ohio, for new one-story plant, to cost over \$125,000 with equipment. J. E. Fitzgerald is president.

Indiana

INDIANAPOLIS, Sept. 17.—Delco-Remy Co., Anderson, manufacturer of automobile starting and lighting equipment, is equipping new plant unit, recently completed. Machinery will be transferred from existing buildings and additional facilities installed for increased output.

Artificial Ice & Cold Storage Co., 316 West Ohio Street, Indianapolis, is considering erection of addition to ice-manufacturing and cold storage plant, to cost more than \$70,000 with equipment.

Rushville Natural Gas Co., Rushville, will make extensions and improvements in stations and pipe lines to cost about \$30,000.

Wilbur C. Hibberd, Richmond, and associates have organized Richmond Hammered Ring Co., and will operate plant for production of piston rings and kindred specialties. Earl W. Allen, Richmond, is interested in new organization.

National Mill Supply Co., Fort Wayne, machinery and mechanical equipment, has work under way on addition to factory, including erection of two additional floors to three-story building, to cost more than \$45,000 with equipment.

Gulf States

BIRMINGHAM, Sept. 17.—Work has been started by Graham-Paige Motor Co., West Warren Street and Detroit Terminal Railroad, Detroit, on new branch mill at Perry, Fla., for manufacture of automobile and truck body accessories, to cost about \$140,000 with equipment.

City Council, Amarillo, Tex., has been authorized to expend \$100,000 for municipal airport, including hangars, repair and reconditioning shops, oil storage and other units. A 480-acre tract has been selected.

Texas Ice & Refrigerating Co., 1201 Jones Street, Fort Worth, Tex., has plans for new ice-manufacturing and cold storage plant, to cost about \$50,000 with equipment.

Humble Oil & Refining Co., Houston, Tex., is said to be planning an expansion and improvement program at its Ingleside refinery, near San Antonio, Tex., including three new stills, with auxiliary equipment, gasoline refining unit and other equipment, to cost more than \$850,000.

Standard Rock Asphalt Co., Brady Building, San Antonio, Tex., J. C. Arnold, president, is arranging for installation of equipment on limestone rock properties in Kinney and Uvalde Counties, and will purchase bucket elevator, automatic conveyors, pit machinery and quarrying apparatus, two crushers and auxiliary equipment.

Straven Coal Mining Co., American-Traders Bank Building, Birmingham, will develop coal properties in Shelby County, where about 1200 acres has been secured, and will install machinery for output of more than 150 tons per day.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, will proceed with erection of new branch assembling plant on Jefferson Davis Parkway, New Orleans, one story, to cost about \$150,000 with equipment. General contract has been let to Gervais F. Favrot, Balter Building, New Orleans.

A. H. Thomas Mfg. Co., Lake Worth, Fla., will rebuild its ice-manufacturing and cold storage plant at Stuart, Fla., destroyed by fire Sept. 11, with loss over \$100,000 with machinery.

Cities Service Gas Co., 60 Wall Street, New York, will make extensions and improvements in natural gas plants at Pampa, Tex., and Mooreland, Okla., including installation of additional equipment, to cost about \$80,000. New compressor station of 5000-hp. capacity will be installed at natural gas properties at Higgins, Tex., to cost close to \$100,000.

Board of Trustees, Texas Technological College, Lubbock, has work under way on new engineering building, totaling about 52,000 sq. ft. floor space, for mechanical, electrical and architectural engineering divisions, to cost \$240,000 with equipment.

X. L. Mfg. Co., Gadsden, Ala., recently organized by J. C. Greene, Gadsden, and associates, is planning establishment of new plant for enameling cast iron parts for stoves and ranges, to cost close to \$25,000 with equipment. Otto Agricola will be secretary and treasurer.

Lores Canning Co., Mobile, Ala., is planning to rebuild part of plant destroyed by fire Sept. 12, with loss close to \$100,000 including equipment.

Pacific Coast

SAN FRANCISCO, Sept. 9.—Plans are being arranged by Emsco Aero Engine Co., Los Angeles, recently organized, for new factory to manufacture aircraft motors and parts, to cost over \$45,000 with equipment. E. M. Smith is president, and W. J. Smith, secretary and treasurer. A site is being secured near municipal airport.

Board of Education, Ventura, Cal., is arranging a bond issue of \$400,000 for a new junior high school group, to include one-story vocational shop. A 14-acre tract has been purchased.

Byron Jackson Pump Mfg. Co., Huntington Park, Cal., is having plans drawn for one-story addition, 30 x 140 ft., crane runway and remodeling of present unit, 90 x 280 ft., to cost \$65,000 with equipment. Hamm, Grant & Bruner, Inc., Ferguson Building, Los Angeles, is architect.

Barde Steel Co., 2709 Utah Street, Tacoma, Wash., has purchased site on tideflats for construction of new one-story storage and distributing plant to cost about \$200,000, including two overhead bridge cranes and other handling and conveying equipment.

George L. Barnes, Centralia, Wash., has leased site and will soon begin work on one-story foundry for production of brass and bronze castings, to cost about \$30,000 with equipment.

Victor Talking Machine Co., Camden, N. J., has awarded general contract to Austin Co. of California, Los Angeles, for initial unit of Pacific Coast branch at 1016 North Sycamore Avenue, one

story, 90 x 135 ft., to cost about \$50,000 with equipment. Other buildings will be erected later.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has applied for permission for hydroelectric power development on Mokelumne River, Amador County, providing for additions to generating stations at Salt Springs and Tiger Creek, with 48,000 hp. additional capacity. Extensions will be made in steel tower transmission lines. Project will cost about \$7,000,000.

Western Electric Co., 165 Broadway, New York, and 680 Folsom Street, San Francisco, is expected to ask bids in about 30 days for new five-story telephone and radio equipment plant at Emeryville, Cal., to cost close to \$500,000 with machinery. Engineering department of company, New York, is preparing plans.

Crystal Ice & Cold Storage Co., Phoenix, Ariz., will erect five-story ice-manufacturing plant, with cold storage division, to cost \$100,000 with machinery.

Feenaughty Machinery Co., Portland, Ore., has taken over agency of Galion Iron Works & Mfg. Co., Galion, Ohio, together with other lines formerly handled by Willamette Equipment Co., Portland, which is retiring from machinery business. Feenaughty company is transferring Willamette stock to its new warehouse and Fred Kingston, formerly general manager of latter company, will become associated with Feenaughty organization as general field salesman, with offices at 324 Belmont Street.

Canada

TORONTO, Sept. 17.—While no large business developed in this market the past week, demand is steady. Single tool sales predominate, and a good volume of orders is being placed. Inquiries are coming out for equipment for new works, and several lists are being prepared. The Canadian General Electric Co. is expected in the market soon with a fairly large list for its Peterborough, Ont., plant addition. Willys-Overland, Ltd., Toronto, and the Chrysler Motor Co., Walkerville, Ont., also are interested in equipment for plant additions. Demand for tools from northern Ontario for mining operations continues a feature.

Plans have been approved for additions and improvements to Brantford and Toronto plants of Dominion Radiator & Boiler Co. An appropriation of \$500,000 has been made to carry out these improvements. Approximately 60 per cent of fund will be spent on Toronto plant, and remainder on plant at Brantford. Work will be started at once, and it is purposed to have both plants completed by end of this year.

Jones Brother of Canada, Ltd., Toronto, manufacturer of show cases, barbers' supplies, etc., has taken over plant of Walker Bin & Store Fixture Co., Ltd., Kitchener, Ont., where it will produce a large part of equipment now made in Toronto plant. Considerable new machinery will be installed.

W. B. Foshay Co., Milwaukee, has purchased power plants at Walkerton and Southampton, Ont., and will spend \$105,000 on alterations and additions. W. A. Emerson, Walkerton, Ont., is engineer.

John Evans, architect, is receiving bids for erection of an addition to plant of Dominion Tack & Nail Co., Galt, Ont., to cost \$30,000.

Fraser Brace Engineering Co., Ottawa,

Ont., has been awarded contract for a power house and dam at Nigger Rapids, Que., for Gatineau Power Co., 91 Carter Street, Ottawa, Ont.

Canadian Ingersoll-Rand Co., Ltd., Sherbrooke, Que., has awarded contract to Newton Construction Co., 165 Portland Avenue, for an addition to cost \$35,000.

Satin Finish Hardwood Flooring, Ltd., Oak Street, Weston, Ont., has started work on an addition to its plant, 72 x 256 ft., to cost \$32,000. Contracts for equipment have not yet been placed.

The Deloro Mining & Smelting Co., Deloro, Ont., will build a new refinery to cost \$100,000, to replace plant destroyed by fire Sept. 4.

Western Canada

Pacific Coast Terminals, Ltd., Twelfth Street, New Westminster, B. C., has awarded contract to Northern Construction Co., Ltd., Birks Building, Vancouver, B. C., for superstructure for cold storage plant, to cost \$900,000. It will be six stories, 150 x 700 ft.

Shell Company of California, 559 Fifth Avenue East, Vancouver, B. C., is preparing plans for an oil and gas distributing plant at Port Alberni, B. C., to cost \$50,000.

British Columbia Terminal Warehouse Co., Ltd., Victoria, B. C., will start work at once on erection of a plant to cost \$600,000.

Foreign

BIDS will be received by Bureau of Yards and Docks, Navy Department, Washington, until Oct. 10 for power equipment for naval station at Guantanamo Bay, Cuba, including two 250-kw. Diesel engine-generators, with starting equipment and exciter; motor-generator set; a. c. motors for existing centrifugal pump and air compressors, with switchboard and accessory apparatus, specification 5699.

American & Foreign Power Co., operated by Electric Bond & Share Co., 2 Rector Street, New York, is reported planning construction of hydroelectric power plant on Paraguassu River, near Bahia, Brazil, with transmission lines throughout district.

Amorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Russian Government, has arranged for increase in capital from \$1,500,000 to \$3,000,000, to provide additional funds for purchase of equipment for Soviet industrial projects and other expansion. During coming fiscal year more than \$700,000,000 will be invested for capital construction in Soviet industries, a considerable portion of amount to be expended for mechanical equipment. S. G. Bron is chairman of board of directors.

Victorian Railways Commissioners, Melbourne, Australia, will receive bids until Oct. 10 for one beam straightening machine.

Insular Government of Bermuda, Hamilton, has authorized construction of an electrically-operated railroad, 29 miles long, to cost \$1,000,000 with equipment. Project will be carried out under Government direction by British Traction Co. It expected to complete about one-third of road this year. Power stations and line facilities will be provided.

Superintendent of Stores, Saptieh, Cairo, Egypt, will receive bids until Oct. 16 for 17,215 kilos of brass and copper wire and rods of various sizes. Information at office of chief inspecting engineer, Government of Egypt, London, England.

THE IRON AGE

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New Alloy Steels, Machines and Methods to Be Seen at Metal Show

IT has come to be recognized that the annual show held by the American Society for Steel Treating records the achievements of the metal-making and metal-working industries generally. A visitor to the National Metal Exposition, to be held at Commercial Museum, Philadelphia, the week of Oct. 8, will be shown the latest developments in steels, alloys, testing and control equipment, heat-treating appliances, and metal-working tools. In order to help such an onlooker appraise the progress which has been made in recent months, many of the exhibitors have forwarded special information to THE IRON AGE.

This is an era when we move rapidly and are building boldly. Speed and bulk are commonplace matters. But Lindbergh could not have flown to Paris, nor could the Hudson River be spanned until an enormous amount of work had been done by metal and machine makers to produce an even flow of fine metal of utter dependability.

The demands of today, and those of only a few decades ago, are vividly contrasted in the sketch showing the relative sizes of the Brooklyn Bridge (in its day one of the wonders of the world) and the new Hudson River bridge now under construction. One firm, John A. Roebling's Sons Co., Trenton, N. J., is responsible for the cables on both these bridges. Compare the Norway iron bridge wire used

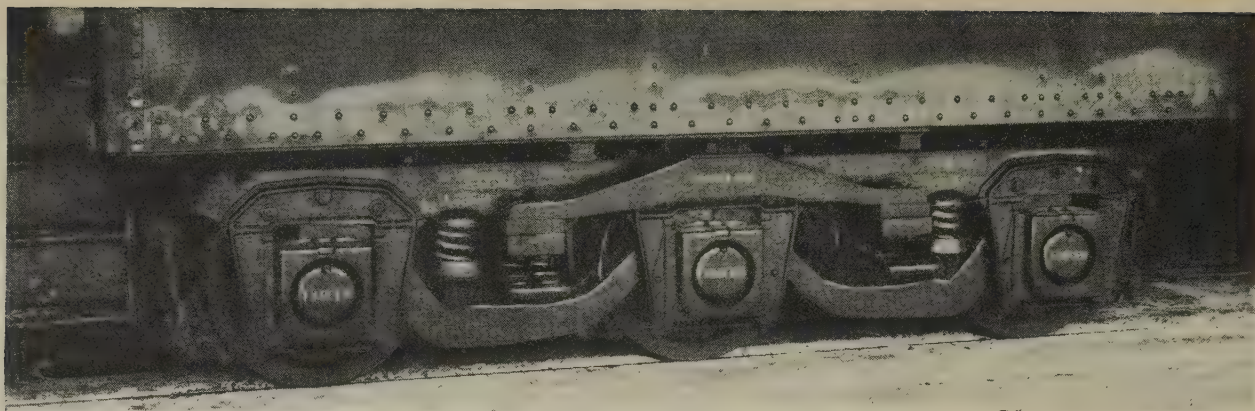
80 years ago, having an ultimate strength of 90,000 lb. per sq. in. with the high carbon acid open-hearth steel wire being made for the new mammoth structure, having an average strength of 231,000 lb. per sq. in.! This is a good measure of the improvement made in all fine steels.

Growing Demand for Special Steels

Many manufacturers of special steels report a gratifying increase in business. For instance, the Timken Roller Bearing Co., Canton, Ohio, has noticed so decided an increase in the demand for high-grade alloy steels from manufacturers of all sorts of equipment as to warrant tripling the capacity of the Timken steel plant, installing a group of electric furnaces for scientific annealing of the product, and organizing a subsidiary company—Timken Steel & Tube Co.—to handle the business. The Donner Steel Co., Inc., Buffalo, is also producing an increasing proportion of alloy steel bars. To meet the demand for more specialized qualities and finishes cold drawn bars and "die-rolled" products have been made since the first of the year, and the first electric furnace steel was produced on June 15. Similar movements have been reflected in operations at the works of the Universal Steel Co., Bridgeville, Pa. During the past year additions and improvements have been made in its electric



IMPROVEMENT in Quality of Steels in Recent Years Is Gaged by Comparing the Size of Hudson River Bridge, Now Building, With Brooklyn Bridge, for Decades the Largest of Its Kind



*Railroads
Economize on
Power and
Maintenance
by Using Alloy
Steel Bearings*

melting, rolling mill and annealing departments, and two new departments for cold drawing and cold rolling were placed in full production.

Much of this expanding tonnage of high-grade steels is absorbed by the automobile industry. Some firms have secured desirable business from the manufacturers of aircraft and aircraft engines. Particularly, the Carpenter Steel Co., Reading, Pa., reports its most notable advances as being in the production of special chrome-nickel, chrome-vanadium and other steels for highly stressed airplane engine parts. This company has also produced a free cutting stainless iron by the addition of a small quantity of zirconium sulphide. The Climax Molybdenum Co., New York, is successfully promoting the use of chrome-molybdenum steel tubing for the construction of fuselage skeletons. Americans now prefer all-welded metal aircraft structures to the older wood and steel composite types, on account of added safety. Chrome-molybdenum steel is said to lend itself best to welded construction, because the heated joint air-hardens on cooling and thus regains nearly all the original strength.

Alloy Steel for Hardware Products

Important though the automotive industry undoubtedly is, as a purchaser of fine steel, a reviewer of trends in the industry must not overlook important other outlets which are only now appearing. Hardware is one of these branches which has great possibilities. Recently J. H. Williams & Co., Buffalo, have been making drop-forged and heat-treated wrenches of chrome-molybdenum steel; the product is held as setting a new standard in uniformity and reliability; and such wrenches have given a kind of service as to warrant a guarantee by the makers against breakage from any cause.

Railroads, even better customers of the steel industry than automobile plants, are also giving increasing attention to alloy steels, according to the International Nickel Co., New York. Nickel steels are now being made into main frames for locomotives, driving rods, axles, boiler and fire-box plate, seamless tubes and staybolts. Nickel-molybdenum steel has also been built into roller bearings for passenger cars by the Timken company.

Alloy Steels for the Chemical Industry

Still another major industry which is absorbing the new alloy steels in increasing amounts is the chemical industry,

including such allied lines as petroleum refining, soap making and similar processing. The Halcomb Steel Co., Syracuse, N. Y., notes a rapid development in non-corrosive and heat-resisting alloys. Construction of new plants for making nitric acid and nitrogenous fertilizers has gone forward, plants of such size and using such processes as could hardly have been constructed of glass, stoneware or noble metals, as in the past. This has required the production of alloy steels for severe service which can be rolled, forged, riveted, or welded.

At the Steel Treathers' Show held in Philadelphia in 1920, Crucible Steel Co. of America exhibited in a very small way some newly developed steels of superior corrosion- and heat-resisting properties. In the intervening years these chromium-nickel-silicon steels called Rezistal have found so many uses that the production is no longer looked upon as a specialty. At the present exhibit the company will show some large-scale pieces of equipment, made from these alloys, in this manner indicating the important advances in chemical and other apparatus made possible by a combination of metals regarded as a laboratory curiosity only ten years ago.

Merchandising problems evidently increase as the variety of products and the number of outlets multiply. The Carpenter Steel Co. (among others) is meeting this situation by a rapid extension of warehouse facilities. Horace T. Potts & Co., Philadelphia, find so many customers who require not one but a dozen types of steel, that salesmen must be competent to appraise each situation, and tender sound advice on the individual needs. Customers' demands are also becoming more stringent, as to quality, uniformity, and prompt deliveries.

Developments in Steel Making Technique

Two notable events may also be recorded in steel making technique. The Ajax Electrothermic Corporation, Trenton, N. J., notes that a high frequency induction furnace of 1-ton capacity has been installed for melting high speed steel at the Edgar Allen Steel Co.'s works in Sheffield, England, and another is being installed by Jacob Holtzer & Co., in France. The Vanadium Corporation of America, New York, has also marketed a new deoxidizer, a carbon-free alloy of aluminum, silicon and iron, so proportioned that the products of reaction form a fusible aluminum silicate, readily eliminated in the ladle. It is said that the resulting steel is entirely free from harmful aluminum oxide or aluminum



Low Carbon Nickel Steel Casting, With Gates and Risers, a Main Side Frame for Large Locomotives, Meets Severe Specifications Required by Heavier Traffic

carbide inclusions, and is more uniform in soundness, toughness and machinability.

New and improved alloys have been placed on the market in the past year, as well as new uses found for old ones. A brief review, such as this, must treat such developments in a fragmentary manner—details can best be obtained at the exhibits of the steel companies. Perhaps the latest development is that announced by the Firth-Sterling Steel Co., McKeesport, Pa.—a high-carbon high-chromium steel to be marketed under the trade name Chromovan triple die steel. Such an analysis has been known to give superior life when made into dies, but the dies have been so hard and so difficult to machine that costs of die sinking have been almost prohibitive. By improved annealing and mill inspection, Firth-Sterling has produced Chromovan with

a thin case, glass hard, is produced without quenching, and at a temperature where grain growth and distortion are avoided. Hardening by ammonia was patented some years ago by American Gas Furnace Co.

Materials for Heat-Resisting Uses

Several firms report activity in the field of heat resisting steels and alloys, largely used by steel treaters, among others, for carbonizing boxes and for automatic furnace parts. In the past the most attention has been paid to castings for such services, but the Halcomb Steel Co., Syracuse, N. Y., has been marketing metal which can be made into sheets, tubes and other rolled shapes, and suitable for fabrication into carburizing boxes and furnace muffles. Advantages claimed reside in the fact that a thinner wall, and con-



Twenty-two Tons of Fahr-alloy for Roller Hearth of One Continuous Sheet Annealing Furnace

hardness under 210 Brinell, and of an analysis which will either oil or air-harden, it is claimed, without warping and with negligible change in volume.

New Uses of Well Known Materials

As an instance of new uses for well known materials, the Kinite Corporation, Milwaukee, calls attention to hobs and cams made of the air-hardening alloy steel known as Kinite. It states that as this metal holds its shape under heavy pressure, manufacturers of Bakelite and other molded products may make molding dies by pressing a Kinite hob into low carbon steel blocks. It is offered also as easily cast into cams, and in such form is especially useful for withstanding heavy pressures as in coining presses.

An interesting change in what had long been thought to be a standardized article has been effected by Heppenstall Forge & Knife Co., Pittsburgh. Since the first sheet metal was rolled, it has been trimmed to shape by shear blades made of high grade carbon tool steel. With the recent advent of the wide strip and the continuous sheet mill, it became apparent that the old style knife could not stand up under the punishment of such heavy production. To meet this need, blades made of acid open-hearth alloy tool steel have been developed, known as Kleenkut shear knives, described as giving greatly increased service between grinds.

An innovation which has caused much discussion among heat treaters during the last year is the method of case hardening special steels by exposure to ammonia gas at 950 deg. Fahr. American rights for this process are shared by the Ludlum Steel Co., Watervliet, N. Y., and the Central Alloy Steel Corporation, Massillon, Ohio. A special steel—usually high in aluminum—is used for this process, and

sequently a more efficient heat transfer, may be made from sheet than from cast metal.

The Allegheny Steel Co., Brackenridge, Pa., has also marketed quite successfully its most recent high-nickel, high-chromium steel known as Ascoloy 44. This can be furnished in castings as well as rolled shapes, and may be welded by either the gas or electric process. Thus a wide variety of furnace parts, heat resisting equipment, recuperators and heat exchangers may be fabricated readily.

A number of cast alloys have been successfully used for carbonizing boxes and furnace parts. It seems possible to get materials of this sort at a wide range of prices, each one having individual merit for certain services. The problem of selecting the alloy which will give the greatest return per dollar expended has become so complex that the General Alloys Co., Boston, has established an industrial survey division for studying it. The division is to function in two ways. First, to study existing installations of Q-alloys (the company's principal product), and second to study the conditions in the plants of prospective users.

The Bell & Gossett Co., Chicago, and an associated organization, the Case Hardening Service Co., Cleveland, have been marketing for eight months an alloy of nickel-chromium-aluminum known as Ni-Chro-Al. It is a low priced alloy, frankly admitted to be less durable than some of the more expensive alloys, but it is said to have replaced steel or malleable carburizing boxes with resultant economies.

That a considerable amount of heat resisting alloys enters into a modern furnace is obvious from a glance at one of the accompanying illustrations, representing 22 tons of Fahr-alloy shafts and disks for a single furnace. The

Southern Manganese Steel Co., St. Louis, patentee, have, by an improved design, been able to avoid the necessity of water cooling the alloy parts, forming the roller bottoms

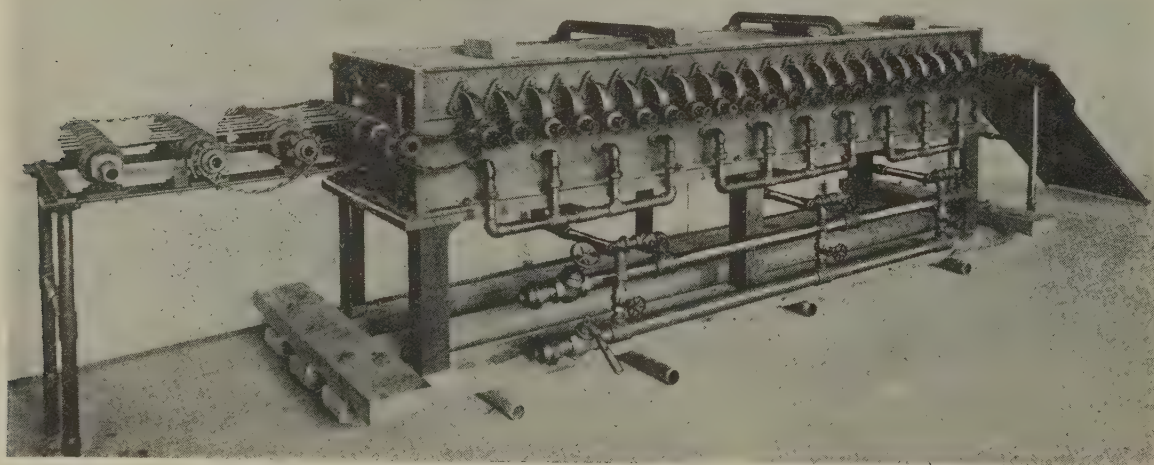
of sheet annealing furnaces. It is urged that this innovation saves fuel, avoids the expense of water and the cooling system, and increases the furnace output.

Developments in Furnaces and Fuel Applications for Them

H EAT treating methods and equipment form the principal interest of the American Society for Steel Treating, and naturally the majority of the visitors at the National Metal Exposition will be attracted by novelties in these lines. As an attempt was made in the early part of this review of progress to measure recent advances in metal manufacture by contrasting the size of noteworthy bridges, so will E. F. Houghton & Co., Philadelphia, emphasize the advances in heat treating by contrasting the mediæval alchemist's den with a research and control laboratory, with its electric furnace, pyrometric control, physical testing equipment, microscope and X-ray machine. It seems a far cry from the cementation furnaces used only a century ago, requiring 21 days to convert wrought iron into steel, to the modern counter-flow recuperative furnace, carrying

tady, N. Y. Such furnaces are useful for hydrogen annealing of iron sheets for electrical purposes, or for making joints by the coppering process (as was fully described in THE IRON AGE for May 10, page 1305.)

A merry battle continues between the proponents of the various heating methods. Gas, oil and electricity each have their supporters, and doubtless an engineering analysis would select one fuel for one set of circumstances, and another for different conditions. It is probably true that the manufactured gas industry has recouped far more than its lost lighting load by intensively cultivating the possibilities of industrial heating. The Peoples Gas Light & Coke Co., Chicago, notes in the last year such outstanding examples as one plant of average size increasing its gas consumption over 50 million cu. ft. a year, and making large expendi-



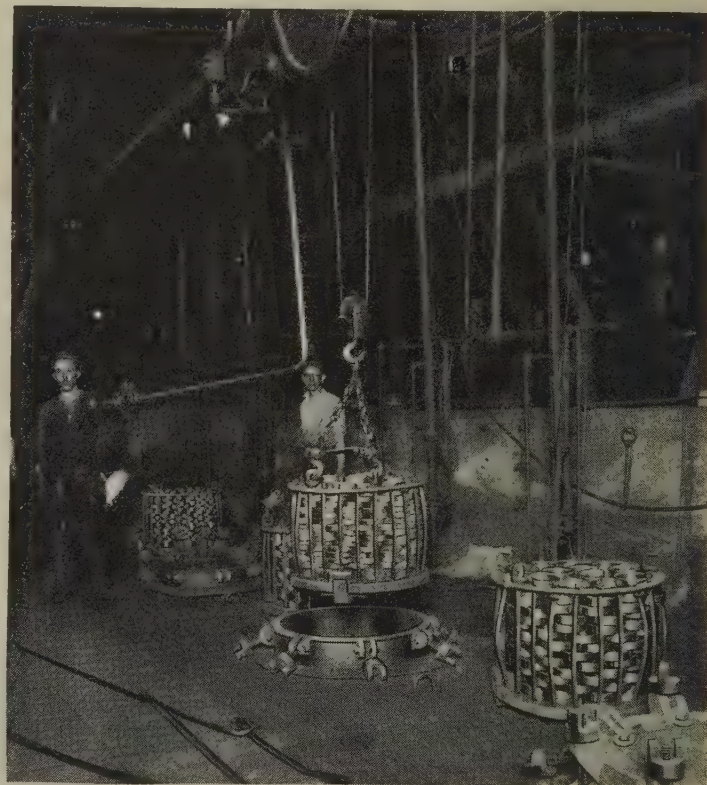
Continuous Strip Annealing Furnace, Built in 1899 for the Philadelphia Mint by American Gas Furnace Co., Contained Many Elements of Advanced Designs in 1928

continuous rows of pots, full of mild steel parts, packed in special carburizing compounds, each pot completing the trip in as many hours. Holcroft & Co., Detroit, record notable developments in such furnaces as last mentioned, and build them either for city gas or for electric heat.

As a matter of fact, continuous heat treating furnaces have been available for 30 years, to a date back in the "dark ages" of heat treatment—at least for the present generation. One of the accompanying illustrations was dug out of the archives of the American Gas Furnace Co., Elizabeth, N. J., and it may be observed that this 1899 furnace has the essential elements of the up-to-date through annealer. The most recent development to be reported by this organization is an active interest in vertical furnaces for carburizing in a gas atmosphere. A notable installation is also here shown. The advantages are said to be a more uniform case, produced in a manner which avoids injury to carefully machined surfaces. When such work is slowly cooled, economy in heat and time may be had by using the new thermo-syphon heat exchanger. It consists of an insulated chamber big enough for two baskets of work, one hot from the furnace, the other cold.

Heat Treating in Gaseous Atmospheres

Other instances of new developments in heat treating by the use of gaseous atmospheres are the nitriding process, mentioned earlier in this article, and furnaces for heating in a hydrogen atmosphere. A fine example of the latter is that designed and built by General Electric Co., Schenec-

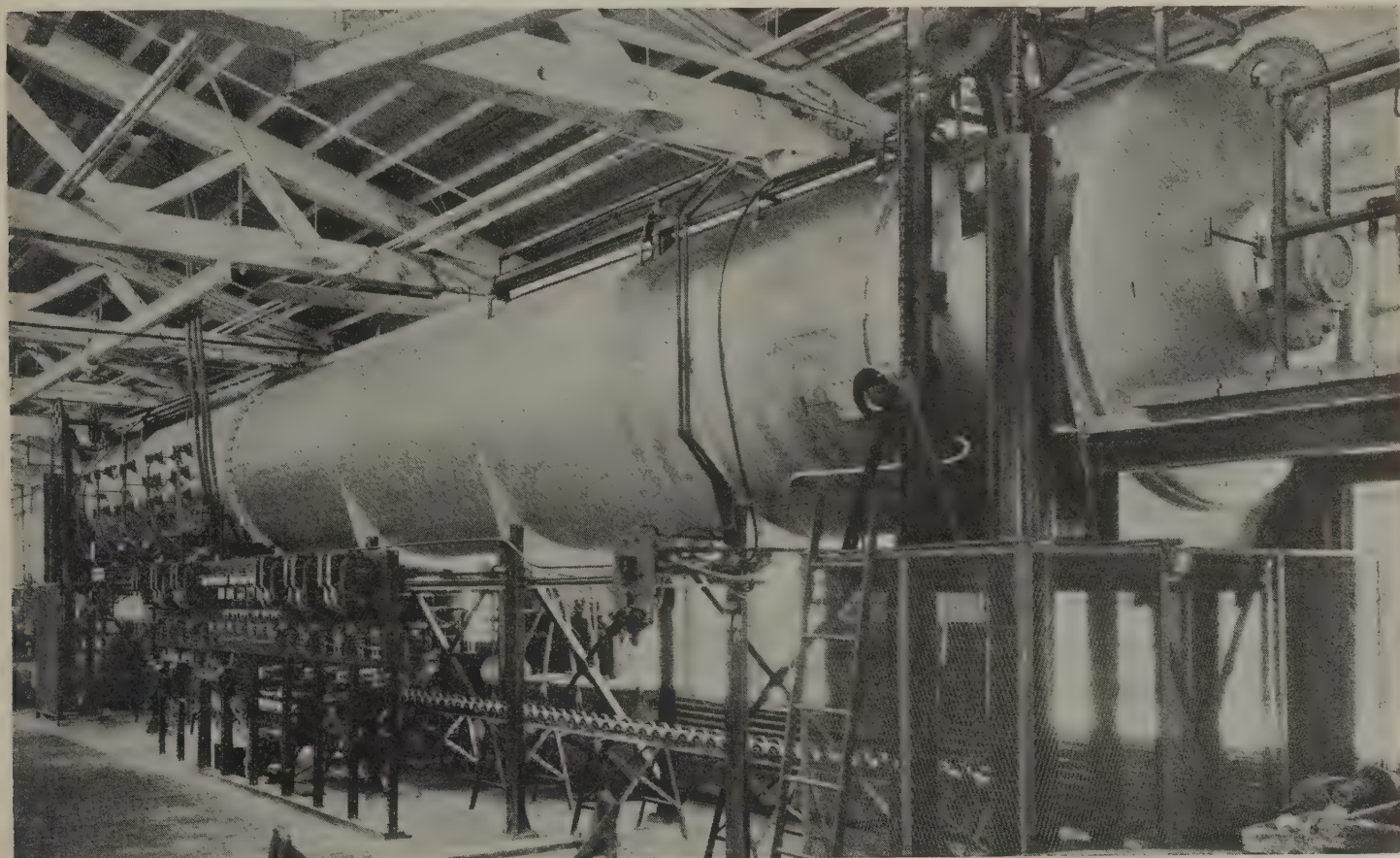


A Basket of Rings Being Charged Into Vertical Furnace for Gas Carbonizing. Control of furnace atmosphere is given increased attention

tures in single pieces of gas-burning equipment. Single furnaces costing \$20,000 are installed frequently; the largest noted in recent months cost \$65,000.

The Surface Combustion Co., Toledo, Ohio, also visions an increase in interest in gas furnaces, but only if they are correctly designed and installed, and adequate for the intended duty. Past development work has occurred chiefly after cut-and-try experiments, and to avoid continuing this practice, the company has established research and development laboratories. The former inquires into the fundamen-

transformer is needed. The Sentry Co., Taunton, Mass., uses a nichrome ribbon, wound in double helix in such a manner that an almost continuous heating surface radiates to the pot wall. A special alloy drain tube is built into the base, to prevent drip from building up and short-circuiting the heating elements. In passing it might be mentioned that the Roessler & Hasslacher Chemical Co., New York, has developed a non-poisonous material known as R. & H. drawing salts, suitable for temperatures between 300 and 1100 deg. Fahr. It is thus suitable for heat coloring and



Pusher-Type Furnace for Heating Parts in Atmosphere of Hydrogen, Suitable for Bright Annealing or for Making Joints by "Coppering" Process (General Electric Co.)

tal scientific basis of any proposed development, and the latter designs, constructs and experiments with the units before building the furnaces for the customer.

Electrical Heat Applications

Electric heat has been used long enough for metal treating to establish a secure field. Aside from its ease of control, perhaps its outstanding advantage is the ability to place a furnace in a production line of precision tools, without the distractions of noise and exhaust gases. Consequently the most interesting things to report in the electric furnace field are heating applications of unusual size or unconventional service.

Thus, Hoskins Mfg. Co., Detroit, one of the pioneer builders, reports that the furnaces built today produce about 25 per cent more per kw-hr. of current consumed than units in similar service built a few years back. Due to automatic features of heat control, charging and discharging, labor costs are sharply cut.

New designs for electrically heated pots are being vigorously pushed. The Harold E. Trent Co., Philadelphia, has recently marketed them for operating salt, cyanide or lead baths up to 1700 deg. Fahr. The feature of this design is a very narrow clearance between insulated casing and the pot, this annular space being occupied by a bent resistor of the grid type. Electric characteristics are such that no

low tempering, and is said to be non-hygroscopic and non-adherent to the hot metal.

A notable invasion of new fields by electric heat is made by the Electric Furnace Co., Salem, Ohio. A pit-type furnace of this make for annealing alloy steel bars is here shown, one of a group of six special furnaces recently installed by them for the Timken Roller Bearing Co. This furnace holds 50 tons of steel; the heater grids are protected at the sides by buffer beams. When loaded a 25-ton cover is placed and sealed with sand. Electric connections are adjustable for rapid heating, and then for soaking at constant temperature. After slow cooling through the critical range, further cooling in the furnace may be hastened by blowing air through a pipe labyrinth built into the brick walls of the pit. In this manner the time cycle is materially reduced.

Electric heat is also being used for heating bars and billets prior to forging. Holcroft & Co., Detroit, are installing Globar non-metallic resistors in electric forges, both batch type and continuous. A wide variety of forge furnaces have been intensively developed by this company, and at present it is engaged in extended experimentation on a new gas-fired unit. Forges using either oil, gas or electricity have been developed to a high state of efficiency in recent years.

The Mahr Mfg. Co., Minneapolis, reports increasing in-

terest in modern labor saving heat treating devices in some branches of the metal working industry which have received little publicity. Thus, the Hughes Tool Co., Houston, Tex., maker of oil drilling machinery, has replaced a number of batch type furnaces with two continuous trains for semi-automatic operation. In each train three lines of forged tool joints are pushed slowly through a heating furnace, and quenched one by one in oil. A conveyor delivers these

pieces to the drawing furnace; they are pushed through, quenched in water, and delivered by conveyor to Brinell hardness testing machines. Such equipment is expected not only to save labor, but to produce drill joints of highest quality and uniformity, and thus avoid expensive breakages down deep in the well. A sketch of part of this installation is given in the accompanying line drawing on the opposite page.

Furnace Auxiliaries and Control Apparatus

IT is only natural that developments in furnace design should be accompanied by corresponding improvements in the various details, auxiliary apparatus and control. Notes on heat resisting alloys, so necessary in the construction, have already been given in the first section of this review. Some auxiliaries like pyrometers have been well standardized in the past; models now on display differ only in details. An exception to the latter statement will be displayed by Thwing Instrument Co., Philadelphia, an in-

an operating furnace equipped with its "three-position balanced controller." Upon starting a cold furnace, such a controller opens valves at a predetermined rate to give a rapid heat, yet reduces the fuel supply gradually as the correct temperature is reached so as to avoid "overshooting." Slight changes in furnace temperature will cause slight corrective changes in fuel supply, but a large drain on the heat will cause a large increase in combustion rate. As in the heating stage, the valves are automatically regulated to



Development Laboratory of Surface Combustion Co., Where New Designs Are Studied and Perfected

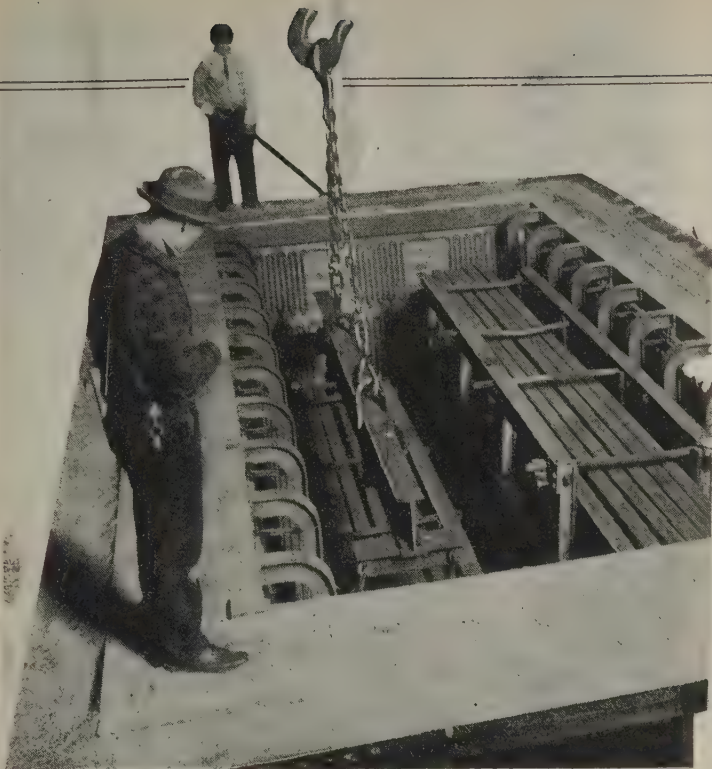
closed type of radiation tube, containing a lens (with cleaning shutter) to focus the heat rays on a sensitive thermopile, and thus develop potential to actuate either an indicating or recording instrument. A perfected design of recorder, called Model 28, will be exhibited for the first time.

An accompanying illustration shows a permanently mounted radiation pyrometer in the tool department of Hess-Bright Mfg. Co. A radiation tube is contained in the square box, sighted through a hole in the side of the muffle directly upon the high speed steel being heated. To prevent the flare of hot gases, an air jet blows continually across the aperture. This control equipment operates indefinitely at temperatures up to 2500 deg. Fahr.

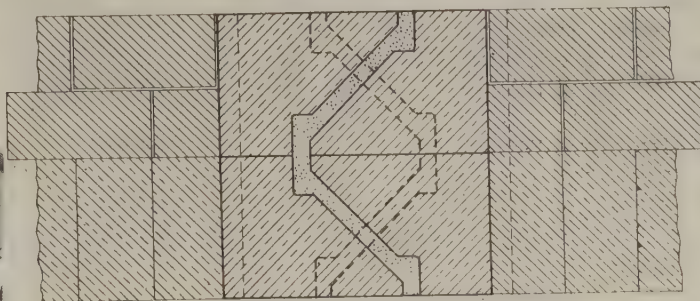
Controls for burners or heating circuits have been developed which possess almost human intelligence. The Automatic Temperature Control Co., Philadelphia, will have

prevent overshooting, even if a counter movement is required by the particular furnace. Compensation for controller and thermocouple lag may also be made.

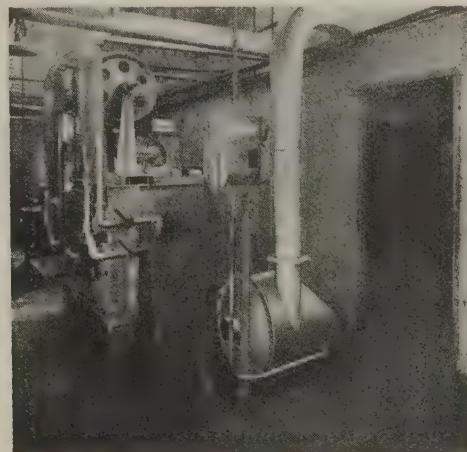
Other devices are for controlling the operation of the furnace by the changes occurring in the heated metal—evidently a more direct matter than relying upon the temperature of one or more points in the furnace atmosphere. The Stanley P. Rockwell Co., Hartford, Conn., will exhibit the new remote control model of the Rockwell Dilatometer here reproduced. As may be well known, this device records the changes in expansion rate as steel is heated through the critical range. A quartz tube rests on the hot steel, and its movements up and down are transmitted and magnified by a simple lever and recording system. Heretofore the device could only be mounted directly over the furnace, but in the present modification, as shown in the view, changes in position of the quartz rod (at the left) cause



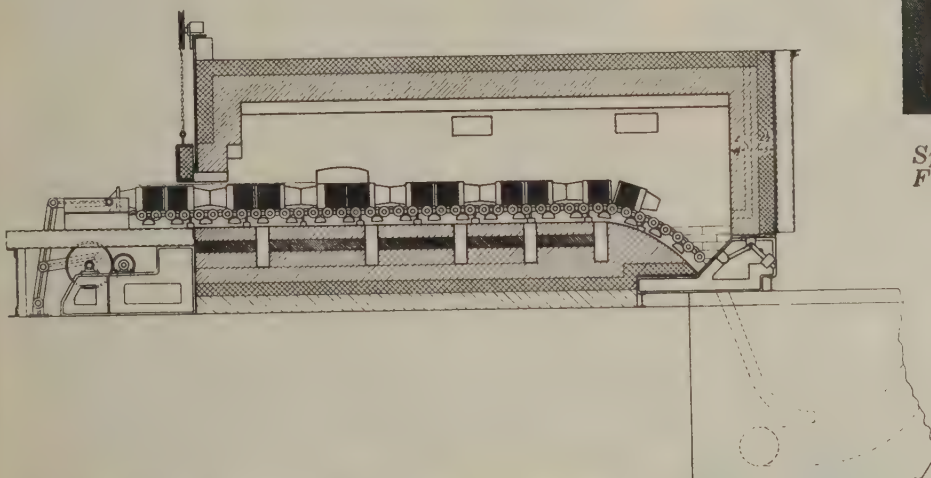
*Furnace For Annealing 50 Tons of Alloy Steel Bars
Built by Electric Furnace Co.*



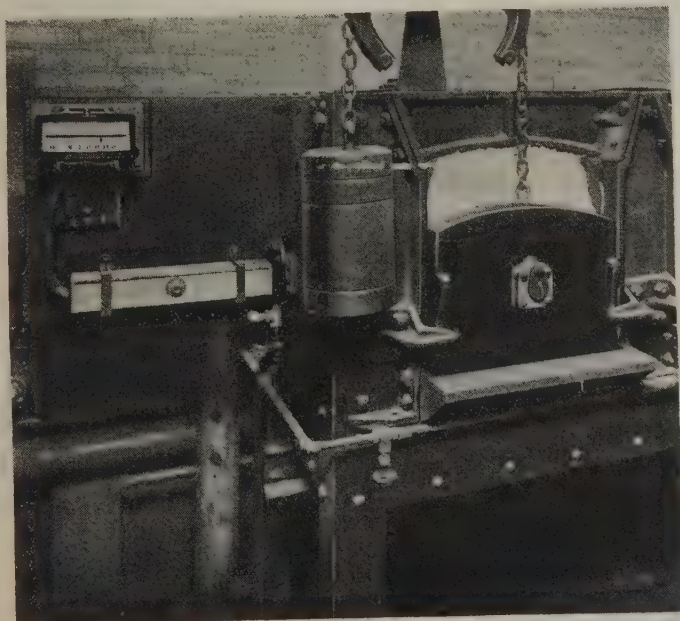
*Expansion Joint Laid in Furnace Wall With
Reintjes Tile*



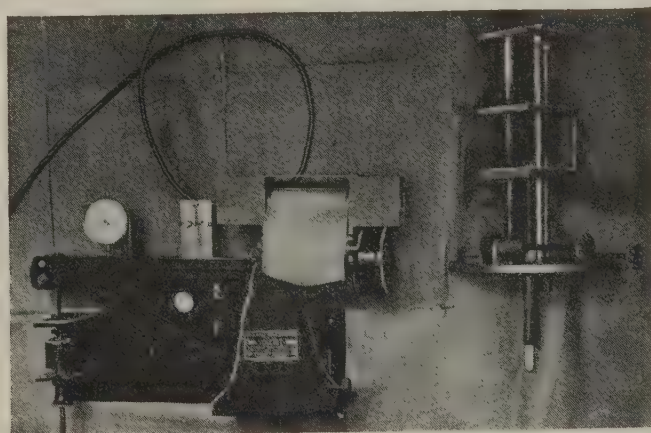
*Spencer Turbo-Compressor of 3 Hp.
Furnishing Air to Tool Hardening
Furnaces*



*Gas Fired Furnace (at Left)
Installed by Mahr Mfg. Co. as
Part of Automatic Train For
Heat Treating Oil Drilling Tools*



*Thwing Radiation Pyrometer for Control of High-
Speed Furnace Up to 2500 Deg. Fahr.*



*Remote Control of Rockwell Dilatometer by Dia-
phragm Gages and Liquid Transmitter*

changes in pressure in a closed liquid system, and are equally reflected by movements in the group of diaphragms at the recorder, the latter located at any convenient distance.

Carbon steels lose their magnetism when passing through the critical range, and this property may be utilized to control the heat treatment. The Hevi Duty Electric Co., Milwaukee, will demonstrate such equipment, known as Hevi-Duty Wild-Barfield electro-magnetic furnace. A detector relay, operated by windings in the soaking zone of the furnace, controls the pusher or conveyor mechanism in such a manner that at a given time interval after the piece loses its magnetism it is ejected from the furnace. Such a relay may also operate signal lights or bells.

New Refractory Equipment

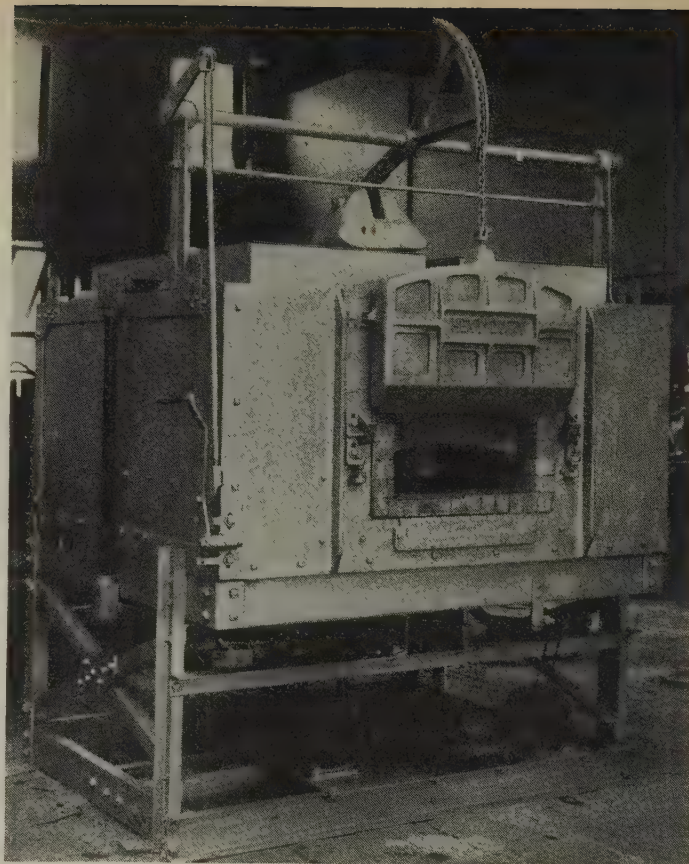
Several manufacturers of refractory materials will offer developments in this department. The Armstrong Cork & Insulation Co., Pittsburgh, has marketed an insulating brick for equipment operating at temperatures up to 2500 deg. Fahr. It is thus applicable to high speed and melting furnaces which would cause excessive shrinkage or spalling of the older insulators made of diatomaceous earth.

The George P. Reintjes Co., Kansas City, will exhibit new shapes of corner bonding and expansion joint tiles illustrated in the drawing here reproduced. It builds readily into the brickwork, and by merely turning one of a pair over, it makes a corner joint, well keyed, yet allowing expansion clearance. Interlocking flat arch tiles requiring only three shapes have also been devised.

The Botfield Refractories Co., Philadelphia, has produced Adamant-Adachrome, a refractory cement especially adapted for facing and patching brickwork by means of a "gun" which sprays the slurry against the wall.

Various Furnace Auxiliaries

Other exhibitors of furnace auxiliaries are the Sullivan Machinery Co., Chicago, which exhibits gas compressors for boosting the pressure of the fuel supply as needed, and the Spencer Turbine Co., Hartford, Conn., which finds a considerable fraction of its output being absorbed by builders of heating and heat treating furnaces to burn oil or

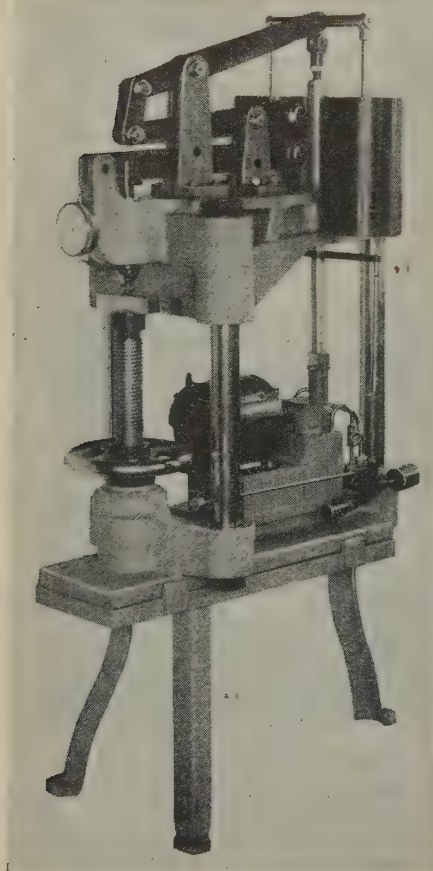


Near the Floor May Be Seen a Reeves Variable Speed Transmission for Controlling Speed of Round Plate, Forming Bottom of Electric Furnace

gas. While most of them are small in size, as shown in the cut, units as large as 150 hp. are required at times.

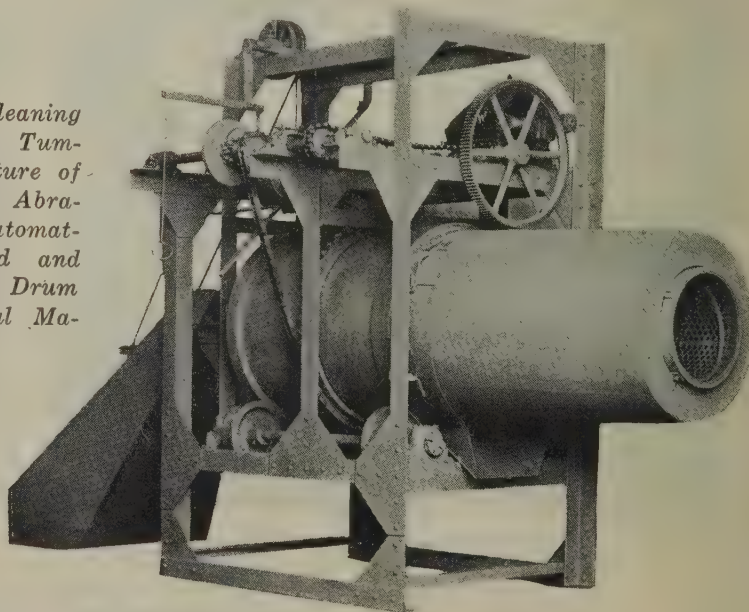
The Reeves Pulley Co., Columbus, Ind., manufacturers of variable speed transmissions, reports that many furnace builders provide this adjustable device on continuous furnaces. An illustrative installation is on the baking ovens of Atwater Kent Mfg. Corporation. Various sizes of radio cabinets are in production, and in order to secure the proper results it is necessary to vary the speed of travel, closely controlled according to the size and design of the metal ware. One of the illustrations shows a Reeves transmission for driving the round plate forming the bottom of an electric furnace.

Turning now to the important duty of cleaning and handling heat treated work, several firms will be found exhibiting machines and chemicals for such purposes. The J. B. Ford Co., Wyandotte, Mich., finds that the phrase "chemically clean" must be literally interpreted by those



Precision Brinell Testing Machine, With Automatic Cycle of Loading, Holding and Release (Pittsburgh Instrument & Machine Co.)

Machine for Cleaning Metal Parts by Tumbling in a Mixture of Stars and Sand. Abrasive material automatically Separated and Returned to the Drum (Ideal Industrial Machinery)



engaging in chromium plating, and has expended much time and energy in discovering the best combination of materials and processes for this class of work.

Cleaning equipment as represented by tumbling barrels will be exhibited by the Ideal Industrial Machinery, Cincinnati. One of the pictures shows a machine which tumbles metal parts in an equal quantity of stars and sand. This

proportion serves to prevent collision between the forgings, and to produce a finish on them hardly distinguishable from a sand blasted surface. Work is loaded by power in batches. When the finish is correct, the direction of rotation is reversed. The stars and sand are automatically screened out, returned to the tumbling compartment, and the forgings discharged at the open end.

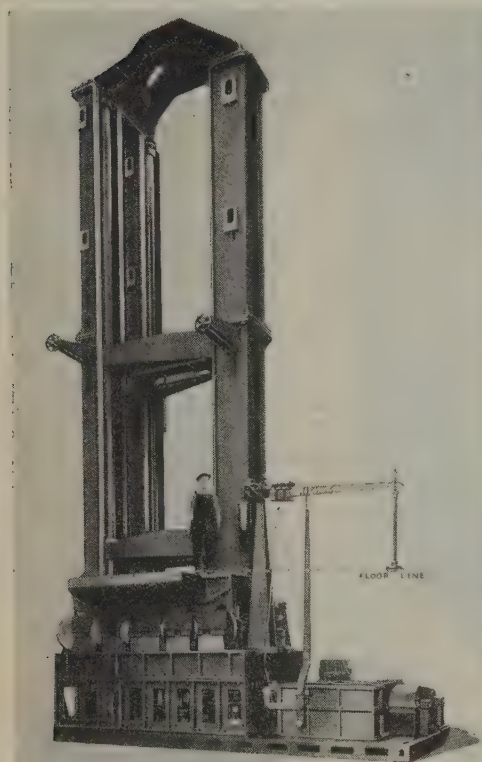
Testing Equipment for Controlling Production

HARDNESS testing for the control of production is becoming more and more the vogue, and for that reason at least three firms will exhibit new types of machines operating on the Brinell principle. The Molybdenum Corporation of America, Pittsburgh, will have a Vickers hardness testing machine, particularly adapted to test the nitrided steels in which the exhibitor is greatly interested. This machine was described in detail in *THE IRON AGE* for March 1, page 602.

The Pittsburgh Instrument & Machine Co., Pittsburgh,

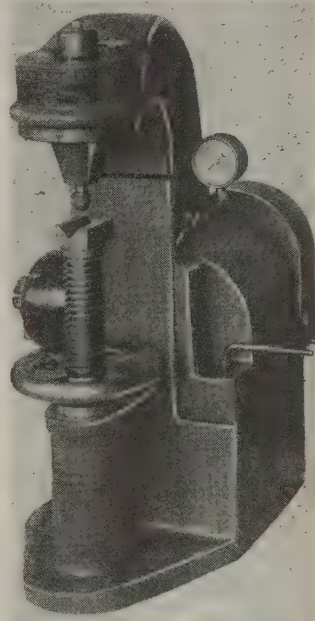
high degree by the increasing impact of a shower of steel balls.

The Riehle Brothers Testing Machine Co., Philadelphia, will exhibit a diversified line of physical testing machines, but are proudest of the 2,000,000-lb. tension machine re-

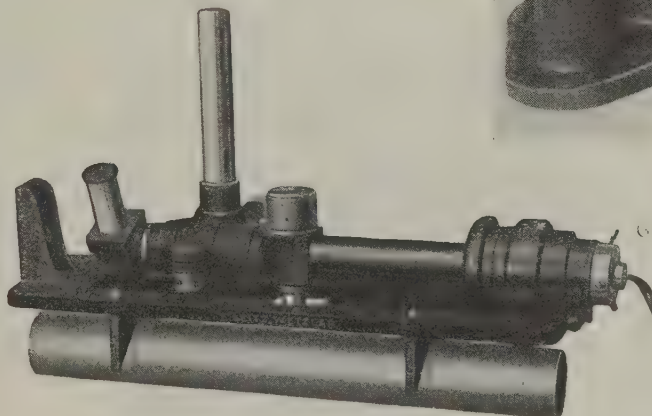


Riehle Testing Machine, Installed at Roebing's for Hudson River Bridge Work, Could Pull Apart a 6-In. Bar of Structural Steel

Motor Driven Brinell Machine for Inspection Purposes (Tin-ius Olsen Testing Machine Co.)



Leitz Metallur-scope, Mounted So As to Examine Surface of Round Bar



has just placed on the market a precision machine whereby the correct rate of loading, maintenance, and release is automatically controlled. It has been found that most errors in hardness measurement occur through hastening one or more of these three stages. In this new machine these operations are controlled in a fixed cycle by a motor-driven cam and lever system. The system of weights and levers shown in one of the pictures insures a high degree of accuracy in the load.

A production type of Brinell machine will be demonstrated by Tin-ius Olsen Testing Machine Co. It is motor driven, all moving parts are under forced lubrication, and it may be operated continuously without undue effort by the operator. A more rapid machine built under the Johnson patent will be shown for the first time, as well as the Herbert Cloudburst tester and hardener, wherein the surface of metal may be gradually work hardened to a

cently placed in operation at Roebing's. This machine, a photograph of which is here reproduced, is installed primarily to proof test loops of full-sized suspender cable, 25 ft. long, made for the new Hudson river bridge. It is said to be the largest universal testing machine in existence, and could pull apart a 6-in. billet of structural steel. Special recoil apparatus is required to absorb the shocks at sudden breakage of a specimen under test, and to avoid damage to the knife edges. Despite its capacity and size, the sensitivity is such that the balance responds to a slight pressure of the hand.

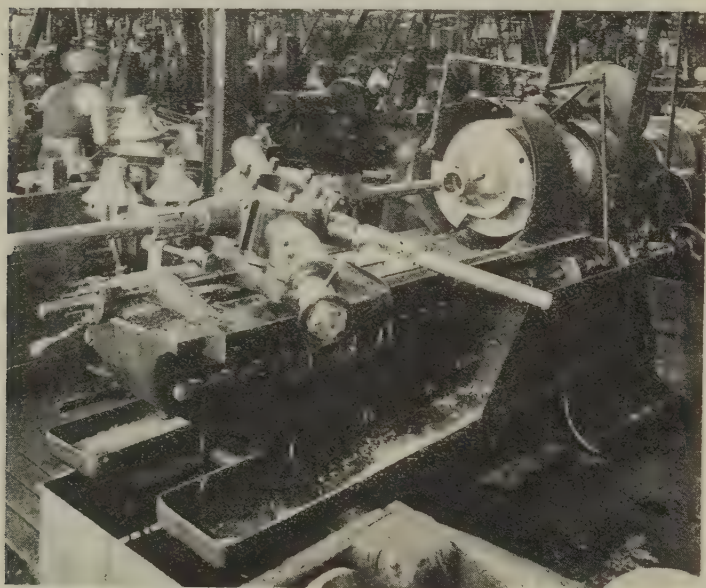
An innovation in metallographic equipment known as the Metallur-scope may be seen in the exhibit space of E. Leitz, Inc., New York. It may be seen to be a self-contained optical system, somewhat portable yet accurate, and designed for industrial laboratories where high powers are not needed, or for inspection purposes in the shops. The

view shows it mounted on vee blocks for examining the surface of a round bar. When clamped to a rail on a table top, with the objective turned in a vertical direction, and

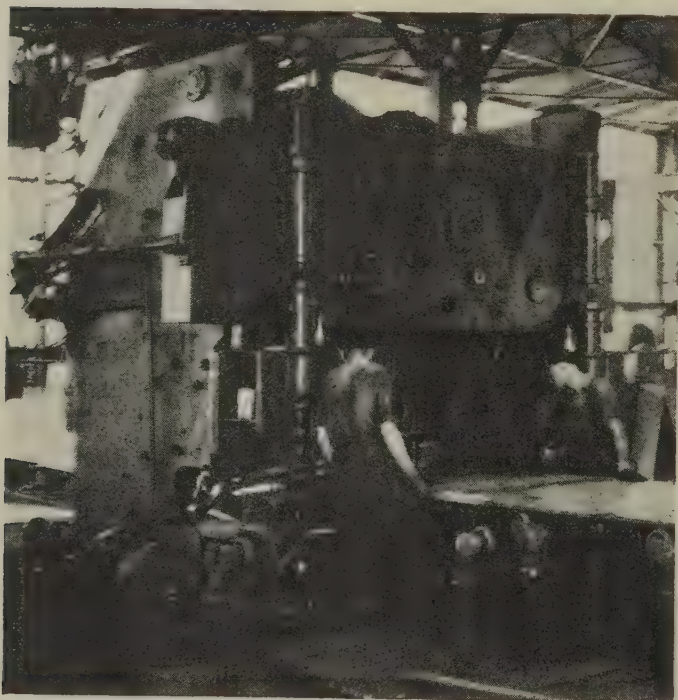
a stage attached to the upright bar, smaller specimens may be examined in the usual way. A camera box may also replace the eyepiece for photography.

Metal Cutting Tools and Fixtures

COMPETITIVE conditions in the metal trades are so exacting that manufacturers find themselves driven to economies which in less strenuous times would have been given little thought. A new method of fabrication that may only reduce the amount of scrap is given serious consideration. Increasing accuracy and interchangeability is often demanded, even of minor parts, and this throws



Turret Lathe Tooled With Rugged Multiple Cutters to Work Machine and Part at Maximum Speed



Pels Gate Shear With Rolled Steel Plate Frame Cutting $\frac{3}{4}$ -In. Plate, 8 Ft. Wide, at Eggleston Brothers & Co., Long Island City

back a more and more severe demand for limited tolerances on the machines, and increased accuracy on the tools. Labor costs must be reduced by driving machines to the limit of endurance, and getting the maximum out of the tools, jigs and fixtures. Exhibitors in the machine tool

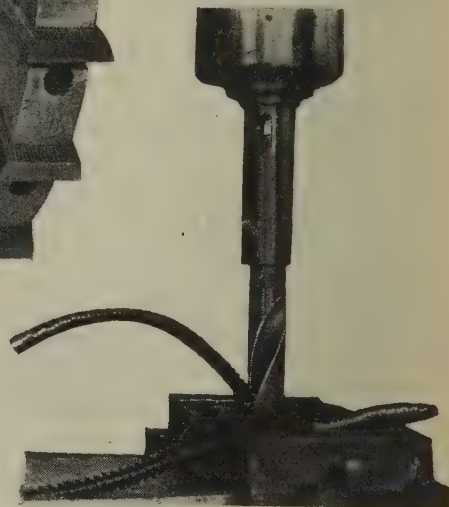
section at the Commercial Museum, even though presenting a wide variety of equipment, all emphasize these recent trends in production.

The Kelly Reamer Co., Cleveland, emphasizes that the machine tool is no better than the cutting units furnished it. Multiple cutting tools of rugged design, adjustable to compensate for wear, are necessary to attain full production. An accompanying illustration shows a Gisholt machine tooled by the Kelly company upon the above theory. While this view does not show the peak of multiple cutting at the same time, it does show the ultimate which can be reached upon this piece, as only three positions are taken for boring and reaming, giving two boring cuts and a finish ream. The reaming bar in the fourth position for finish reaming two diameters simultaneously is especially notable, for it does the work which ordinarily would require a double position for small tolerances.



Close-Up of Cutter With Inserted Teeth, Adjustable Both Out and Sideways (National Twist Drill & Tool Co.)

Morse Twist Drill (Below) Capable of Drilling $13\frac{1}{2}$ Inches Into Manganese Steel Castings With One Grind



This same idea of rigidity and adjustability for wear is featured by the Union Mfg. Co., New Britain, Conn., in its line of lathe, drill and planer chucks, and by the National Twist Drill & Tool Co., Detroit. A cutter with inserted teeth made by the latter firm is here shown. One side of the slot is covered with tiny pyramids which match the serrations clearly shown on the back of the blades. The locking wedge and set screw then holds these inserted teeth securely in the correct position, even when working at very high feeds.

Drills for Cast Manganese Steel

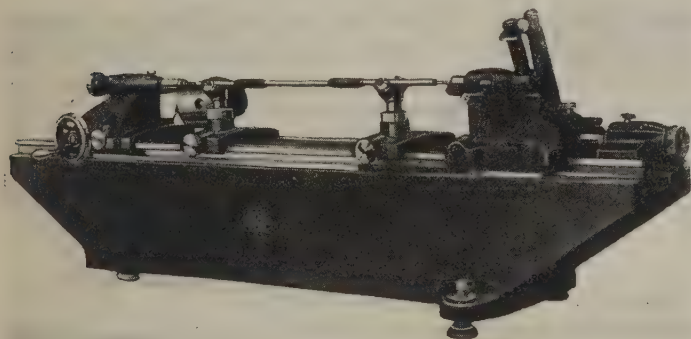
The Morse Twist Drill & Machine Co., New Bedford, Mass., has achieved what has long been regarded as impossible, namely, a tool which will cut high manganese steel castings. High speed drills turning at 12 r.p.m., with 0.003 in. feed crumble on the cutting lips after drilling $\frac{1}{4}$ in. into

such metal. A $\frac{3}{4}$ -in. hole might be drilled in 100 min. by a hardened and untempered carbon steel drill, after five grinds. One picture herewith shows the new drill running at 50 r.p.m., with 0.0075-in. feed. Nine $1\frac{1}{2}$ -in. holes were drilled with one grind.

Another exhibit of the extra heavy duty demanded of present-day tools will be found in that of Henry Pels & Co., Inc., New York. Its line of punching and shearing machines, with main frames made of steel plate, includes the gate shears designed along the lines shown in an accompanying cut, with a capacity of a 12 ft. x 2 in. plate. During the past year a line of heavy presses has been developed, using the same steel plate frame construction.

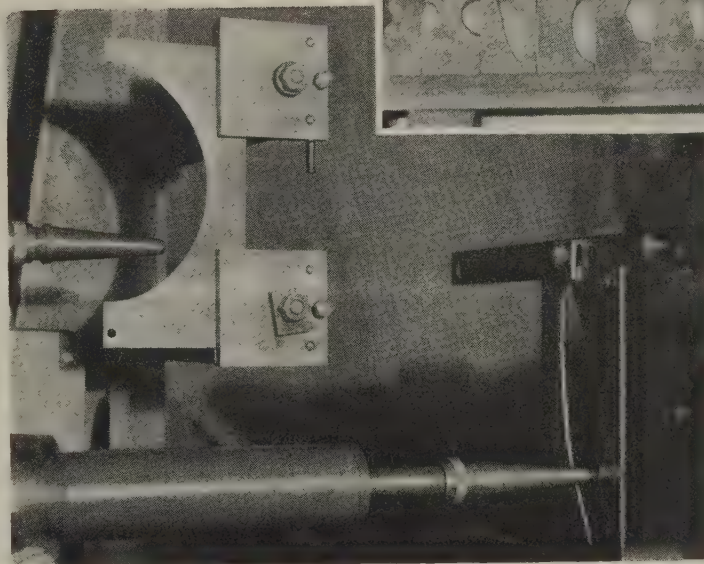
Rugged Machines for High-Speed Saws

Real progress is apparently being made in the field of metal sawing, lifting it into a speedy, economical, almost



Above Is a Zeiss Measuring Machine Capable of Reading to 0.00001 Inch

At Right Is Indicated Method of Controlling Keller Die Cutting Machine by Two Tracers, the Upper Guiding the Cross Sectional Travel of the Tool, and the Lower the Outline. At the upper right is an inset illustrating a forging die for a crankshaft, cut by use of the sheet metal templates shown



a precision operation. This has been effected by the combination of improved saw blades of alloy steel and rigid sawing machines.

E. C. Atkins & Co., Indianapolis, will have a display of "Silver-Steel" hacksaw blades, said to be the first line of genuine high-speed steel made commercially in the United States. L. S. Starrett Co., Athol, Mass., will show a line of high-speed saw blades developed and placed on the market in recent months.

The Atkins company and Peerless Machine Co., Racine, Wis., will also feature modern hacksaw machines. The latter are characterized by saw blades mounted across the center of square frames, instead of across the top of an open U. This construction provides rigidity to stretch the new blades at that high tension required for rapid traverse and heavy cuts. The saw frame is also guided in upper and lower ways, and the work clamped in substantial vises or on angle fixtures, so the operator is enabled to cut metal to very close dimensions, and on occasion to use the equipment to block out dies and punches.

Die making machines, and precision units for tool rooms will also be in evidence in the machine tool section of the Steel Treathers' show. Marburg Brothers, Inc., New York, will show a line of imported labor saving filing and sawing machines for punch and die work. The process consists of laying out the shape on a slab or plate of suitable steel, drilling a small hole alongside the cut, sawing along the line with a finely set saw, then replacing the saw with a file and filing on the machine until a perfect fit is secured to the template.

Precision Equipment for Tool Rooms

The Keller Mechanical Engineering Corporation, Brooklyn, N. Y., will demonstrate the latest developments in the control of die cutting machines by combined use of two tracers for work with cavities of three dimensions. An accompanying cut illustrates the two-tracer method, the upper tracer controlling the cross section and the lower the outline. By this means complete models for the dies are no longer necessary, they being replaced as shown in the illustration just below by a series of templates cut out of metal $1/32$ in. thick.

Jig borers of Swiss manufacture may be seen at the



exhibit of the R. Y. Ferner Co., Washington. While this particular machine is built primarily to drill holes with center lines precisely parallel, it also has a universal tilting table by means of which holes may be bored at any angle in the piece, and to notably close accuracy of angle and location.

Another high precision instrument in the form of a 40-in. measuring machine will be shown by George Scherr Co., Inc., New York. It is manufactured by the German optical firm, Carl Zeiss, and is said to have an accuracy of $1/20,000$ -in. over the range. Head stocks and tail stocks are adjustable in 4-in. steps, and located by glass marks imbedded into the frame of the machine. After the piece to be measured has been properly mounted, readings to the nearest 0.005 in. are made by the rear microscope, viewing a graduated glass rule. Subdivisions to 0.00001 in. are then estimated through the forward eyepiece, called the optimizer, with optical system in line with the piece to be measured, a detail which is required for highest accuracy.

Steel Treaters' Exhibit Opens Oct. 8

Commercial Museum, Philadelphia, Will House Displays
of Nearly 250 Companies Prominent in the Making,
Working, Treating and Fabricating of Steel

NEARLY 250 companies will be represented by exhibits at the annual convention of the American Society for Steel Treating to be held at the Commercial Museum, Philadelphia, the week beginning Monday, Oct. 8, to be known as the second annual National Metal Week. It is estimated by the society that fully 25,000 metallurgists, executives and others interested directly in the metal industry will attend. The American Welding

Society and the Institute of Metals are participating in the event with the American Society for Steel Treating.

The National Metal Exposition will be housed in the Commercial Museum, which has 80,000 sq. ft. of available exhibit space. The exhibits will represent the metal working, fabricating and treating industries, as well as the making of steel. A list of the exhibitors, together with the products they will exhibit, is given below.

List of Exhibitors and Products They Will Show

Abrasive Co., Philadelphia. Booth 221.

High Speed swing frame grinder snagging steel castings demonstrating Red Center high-speed wheels of Borolon bakelite grinding wheel segments; bricks, sticks and stones. Represented by: R. A. Shaffer, vice-president; S. M. Hershey, sales manager; J. F. Fischer, assistant sales manager; W. A. Ruppel, L. R. Burnes, W. B. Ilko, I. R. Blair.

Acme Electric Welder Co., Philadelphia. Booth 130.

A 6 kw. spot welder; a 35 kw. spot welder with a 48-in. throat; also a butt welding attachment. Represented by: George M. Hessdoerfer.

Air Reduction Sales Co., New York. Booths 129 and 131.

Airco 99.5 oxygen and Airco acetylene in cylinders, Airco D-B oxygen discharge manifold, Airco D-B welding and cutting torches, regulators and supplies; the Radiograph, motor driven and portable, for oxyacetylene cutting of steel plate, forgings, billets, risers, etc.; No. 4 Oxygraph, a new machine of greater scope than the No. 2 Oxygraph, with structural improvements, for oxyacetylene cutting of light and heavy sections and production shapes; first showing of new No. 2 Camograph, improved and cutting area extended, for reproduction cutting of shapes from steel plate. Represented by: W. W. Barnes, W. H. Eliason, A. T. Walker, C. D. Trout, W. L. Humphreys, H. B. Hand, C. S. Peters, W. H. Ludington, H. L. Rogers, A. H. Yoch, Fred Judelson, F. E. Rogers, G. Van Alstyne, J. J. Crowe.

Ajax Electrothermic Corporation, Trenton, N. J. Booth 34.

High speed induction heat treating furnace.

Allegheny Steel Co., Brackenridge, Pa. Booth 118.

Samples of Allegheny metal products and sheets, bars, tubes, etc., of high heat-resisting Ascoloy. Represented by C. B. Calomon, manager of alloy sales; P. M. Otte, L. W. Hostettler and W. R. Murphy, engineers.

Edgar Allen Steel Co., Inc., and A. Milne & Co., New York. Booth 300.

From A. Milne & Co.: FJAB tool steels, die steels, hollow die steels; AMCOH hollow die steel; FJAB hollow drill steel, Auger drill steel, special sections; MR Lancashire iron and electrical iron; Prince ball bearing steel and ball wire; S. & C. Wardlow, Ltd., cutlery sheets, gin saw sheets, hack saw sheets, and file sections; NOHAB anvils; and FJAB hammers. From Edgar Allen Steel Co., Inc.: Imperial Major high-speed steel, extra special high-speed steel, and special high-speed steel; turning and finishing steels; Minerva air-hardening steel; self-hardening steel and special chisel steel; Red Label steel; tack knife steel; die-casting steel; Solid Double Six production steel; hollow Double Six production steel; class P tool steel; class E tool steel; Stag drill steel; and Talon drill steel. Represented by Henry Sears Hoyt, member A. Milne & Co. and president, Edgar Allen Steel Co., Inc.; J. King Hoyt, Jr., member of A. Milne & Co. and secretary-treasurer, Edgar Allen Steel Co., Inc.; V. A. Greene, vice-president and general manager, Edgar Allen Steel Co., Inc., and sales manager, A. Milne & Co.; R. P. Rice, G. K.

Boland, A. E. Van Stone, E. R. Carnell and H. R. Adams, salesmen.

American Brass Co., Waterbury, Conn. Booth 97.

Complete line of Anaconda copper alloy welding rods; a demonstration of oxyacetylene welding by Charles Gallo (expert welder) using Tobin bronze filler rods, an exclusive product of American Brass Co.; Everdur (manganese-silicon bronze) also on display in the form of sheets, rods, tubes, castings, wires, bolts, rivets, etc. Represented by: A. M. Dinkler, C. W. Swift, W. H. Dowd, W. J. MacLean, John Becht, G. M. Hurlbut, J. H. Larmett, C. M. Saltsman, D. E. Hotchkiss.

American Car & Foundry Co., New York. Booth 24-A.

Berwick electric rivet heater and Berwick electric forging heater. Represented by: F. C. Cheston, John S. Helt.

American Gas Association, New York. Booths 1 to 14, 35 to 50.

Latest developments in gas-fired heating furnaces, including practically all types of combustion systems; completely outfitted metallurgical laboratory showing latest improved automatic sample polishing machine, hardness tester and micro-metallographic microscope. Represented by: D. W. Chapman, chairman American Gas Association Committee on Display at Industrial Exhibits, and members of this committee including H. S. Christman, A. P. Apmann, R. B. Burr, E. B. Dunkak, E. W. Rowand.

American Gas Furnace Co., Elizabeth, N. J. Booth A. G. A. section.

One of new, large size, rotary retort carburizing machines having a capacity of 1000 to 1250 lb. of work per charge. As in the smaller machines the retort is of highest grade heat resisting alloy. The furnace lining is practically monolithic and is backed by 9 in. of insulation. Individual motor drive is provided for rotating the retort and tilting and a small hoist is provided for handling the retort cover; a small rotary carburizing machine, capacity 75 to 100 lb. of work; also other furnaces. Represented by: P. C. Osterman, vice-president; John Mehrman, Gustav Schwab, Theodore Farwick, Sr., Elmer C. Cook, F. W. Hornbruch.

American Manganese Bronze Co., Philadelphia. Booth 263.

Specimens of manganese-bronze castings.

American Metallurgical Corporation, Boston. Booths 65 and 66.

Following new models of the American electric furnaces: HB-1 20 kw. 8 x 16 in. high-speed (temperatures up to 2400° F.); P-1 8 kw. 6 x 10 in. salt; B-2 15 kw. 12 x 24 in. tool room furnace; lead, salt or cyanide pots and box furnace for carburizing, hardening and annealing. Represented by: K. A. Juthe, president; S. N. Juthe, vice-president; A. J. Hanson, chief engineer; John C. Juthe, sales manager; A. B. Beach, L. A. Smith, A. D. Heath, E. E. Bolds, A. A. Anderson.

American Steel & Wire Co., Chicago. Booth 98.

Welding wire.

Ampco Twist Drill Co., Jackson, Mich. Booth 244.

Two automatic drilling machines requiring approximately 50 sq. ft. and weighing combined 10,000 lb.; display board of

drills and reamers. Represented by: George Melling, inventor of machines; Oscar Monrad, president; W. E. Loy, general manager; F. J. Sikorovsky, superintendent; G. G. Chapman, David O'Brien, Mr. McCumber.

Armstrong-Blum Mfg. Co., Chicago. Booth 203.

No. 8 Marvel metal band saw,—a fully universal metal saw for cutting off bar stock, for tool room and die work, for miscellaneous cutting of pipe, structural shapes, formed mouldings, etc., both straight and miter cuts; No. 5 Marvel automatic high-speed saw,—a fully automatic production cutting-off machine which has been increased in weight, has larger bearings and other improvements; No. 4 Marvel high-speed hack saw. Represented by: Harry J. Blum, secretary; G. L. Hunt, S. A. Woleben.

Armstrong Brothers Tool Co., Chicago. Booth 201.

Lathe, planer and shaper tools, lathe dogs, "C" clamps, ratchet drills, drop forged wrenches, pipe tools. Represented by: Horace Armstrong, secretary; A. F. Arbogast, G. L. Hunt.

Armstrong Cork & Insulation Co., Pittsburgh, Pa. Booth 24.

Armstrong's and Nonpareil insulating brick for furnaces, ovens, etc.; high pressure covering and blocks for steam equipment; cork covering for refrigerated lines; corkboard for cold storage rooms, insulation of residences and the roofs of buildings. Represented by: H. B. Gates, S. L. Barnes, John R. Livezey.

E. C. Atkins & Co., Indianapolis. Booth 220.

No. 4 metal cutting bandsaw machine; No. 18 Kwik-kut power hacksaw machine; No. 7 Kwik-kut power hacksaw machine; Silver-steel hacksaw blades. Represented by: Edward S. Norvell, W. H. Sherer, L. C. Garvin.

Atlas Steel Corporation, Dunkirk, N. Y. Booth 77.

Chrome bearing steel products; stainless iron and steel products; cold header dies and products; fractures of the principal brands of tool steel; L-XX high-speed steel forgings. Represented by: A. F. Dohn, president; F. B. Lounsberry, vice-president and works manager; C. P. Burgess, vice-president; W. H. Wills, W. R. Breeler, Gustaf Peterson, S. B. Matthews, James Malloy.

Automatic Nut-Thread Corporation, Philadelphia. Booth 178.

Automatic nut tapping machines.

Automatic Temperature Control Co., Philadelphia, Pa. Booth 174.

Motor-operated valves controlling fuel and air to industrial furnaces; other control devices. Represented by: J. D. Andrews, sales manager; C. Wilhelm, G. H. Johanson, G. S. Frazee, R. A. Smart, R. C. Lawlor.

B

W. O. Barnes Co., Detroit. Booth 191.

Barnes Red Arrow high-speed steel hack saws. Represented by: W. O. Barnes, president; J. H. Flavell, secretary-treasurer; F. M. Shaw, William Gross, C. G. VanTuyt, R. Schindler, C. B. Cecil.

Bastian Blessing Co., Chicago. Booth 128.

Complete line of welding and cutting equipment, including new approved portable acetylene generator and oxygen manifold. Represented by: E. L. Mills, sales manager; E. N. Stevens, assistant sales manager.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth 216.

Metallographic equipment with several new improvements, as well as the contour measuring projector for inspection of screw threads, gear forms, etc.; the toolmaker's microscope for the checking of screw threads, measurements of small parts, etc.; also microscopes for the inspection of raw and finished products, and other optical tools of general interest to manufacturers in the metal working industry. Represented by: J. A. Ccheick, J. I. Wexlin, W. L. Patterson, I. L. Nixon, E. H. Anthes.

Bellevue Industrial Furnace Co., Detroit. Booth 68.

Several small heat treating furnaces. Represented by Walter E. Hinz, president; Louis J. Raymo, sales manager.

Bellis Heat Treating Co., Branford, Conn. Booth 72.

Lavite for hardening, tempering, annealing; new electric Lavite furnace. Represented by: A. E. Bellis, J. W. Black, R. C. Jordan.

Bethlehem Steel Co., Bethlehem, Pa. Booths 111 to 114.

A display of various grades of Bethlehem tool steels and Bethlehem stainless steel; an exhibit of alloy steels including an operating exhibit of silico-manganese spring steel; a display of interesting types of forgings and castings; structural steel sections; miscellaneous finished products illustrating the application of various grades of steels. Represented by: R. S. Tucker, manager of sales alloy steels; W. R. Shimer, metallurgical engineer; Henry Wysor, metallurgical engineer; A. P. Spooner, engineer of tests; H. G. Walton, general manager

of sales; G. F. Hocker, manager of sales forgings, castings, etc.; D. C. Roscoe, manager of sales tool steels; E. A. Buxton, assistant superintendent tool steel department; G. P. Witteman, tool steel development engineer; H. C. Bigge, superintendent tool steel department; T. G. Foulkes, assistant research metallurgist; W. C. Hartman, assistant research metallurgist; A. McDonald, assistant research metallurgist; E. R. Long, superintendent central tool department; W. B. Kennedy, manager of sales Philadelphia district; J. H. Stoll, M. W. Dalrymple, W. E. Titus, W. S. Lippincott, H. E. Graffin, E. H. Jamison, H. R. Weeman, J. D. Coddling, G. A. Cushman.

Blax Flexible Shaft Co., New York. Booth 286.

Portable flexible shaft machines, flexible shafting, portable grinders, portable sanding machines, die sinking and rotary filing machines. Represented by: R. Wezel, president; F. I. Vanderbeek, vice-president; G. M. Vanderbeek, secretary-treasurer; and from Riter Brothers, M. Buehler and Mr. Riter.

G. S. Blakeslee & Co., Cicero, Ill. Booth 299.

Blakeslee Niagara and pump type metal cleaning equipment for cleaning all kinds of stamped and machined parts, removing the oil, grease, dirt, chips, etc., prior to inspection, assembling, painting, etc. Represented by: G. R. Blakeslee, president; J. W. Dammers, secretary; A. T. Nogrady.

Charles Bond Co., Philadelphia. Booth 176.

Gas welding and cutting apparatus manufactured by Torch-weld Equipment Co., Chicago; the new Reeves variable speed transmission, manufactured by Reeves Pulley Co., Columbus, Ind. Represented by: W. A. Slack, president Torch-weld Equipment Co.; Charles Irwin, Reeves Pulley Co., sales engineer; T. A. Bergen and L. R. McKean, Charles Bond Co., sales engineers; C. Carter Bond, managing director Charles Bond Co.

Botfield Refractories Co., Philadelphia. Booth 59.

Adamant fire brick cement; Adachrome and Adachrome fines; the Adamant gun; Adapatch, plastic patching material. Represented by: Axel H. Engstrom, sales manager; L. B. Botfield, W. B. Smith, S. C. Lott, Joseph J. Sweeney, A. J. Wittwer, W. E. Tierney, Charles C. Phillips.

H. Brinton Co., Philadelphia. Booth 309.

Special machined parts, raw materials for all classes of manufacturing. Represented by: John Leafstrom, Elmer Nicholson, Wilfred Vaughan, Harry Doenges.

Bristol Co., Waterbury, Conn. Booth 21.

Bristol recording and indicating instruments, also electric controllers and motor operated control valves. Represented by: H. L. Griggs, general sales manager; H. W. Moss, G. H. Gaites, I. F. Inderdohnen, J. H. Ferguson, E. R. Wyatt.

D. P. Brown & Co., Philadelphia and Detroit. Booth 277-A.

Teon, a waterproof, oil and acid-fume proof belt that is not injured by heat up to 300 deg. Fahr.; Brown's woven endless belts, that have no end; Sprucolite, a new pulley, made of compressed spruce. Represented by: John McCauley, W. E. Warren, F. R. Andrews.

Brown Instrument Co., Philadelphia. Booth 116.

Pyrometers, flow meters, thermometers, automatic control valves, thermocouples, portable instruments, etc. Represented by: G. W. Keller, sales manager; J. P. Goheen, secretary; L. M. Morley, W. H. Lukens, K. R. Knoblauch.

Brown Lynch Scott Co., Monmouth, Ill. Booth 228.

Screening machine for cleaning and grading carburizing compound. Represented by: W. B. Lynch.

Budd Manufacturing Co., Edward G., Philadelphia. Booth 168.

Automobile metal stampings.

C

Andrew C. Campbell, Inc., Bridgeport, Conn. Booth 264.

Various sizes of nibbling machines in operation. One recent interesting adaptation of this machine was made for trade using slotted tubes, especially oil burner manufacturers.

Carborundum Co., Niagara Falls, N. Y. Booth 31.

A general display of abrasive material, including crankshaft wheels for roughing and finishing, Aloxite Redmanol cam wheels, tool room wheels, internal grinding wheels, centerless wheels, etc., Carborundum and Aloxite polishing grain, abrasive paper and cloth. Represented by: S. F. Courter, general sales manager; W. J. Griffin, district sales manager, Philadelphia; G. E. Chorman, Boyd Work, A. H. Prey, G. T. Kretschmar, E. C. Maguire, H. L. Henszey, J. F. Brady.

Carborundum Co., Perth Amboy, N. J. Booth 33.

Model demonstrating method of applying Carborundum combustion chambers to car type annealing furnaces; model of

Carborundum recuperator; model of wire annealing furnace, equipped with a Carborundum arch between the combustion and annealing chambers; Carborundum and Aloxite super refractories for high temperature installations; insulating Infrac refractory fire brick; various grades of high temperature cements. Represented by: C. E. Hawke, sales manager; John G. Fritzinger, F. W. Miller, R. A. Beverley, C. A. Dutton, S. A. Fenno.

Carpenter Steel Co., Reading, Pa. Booth 171.

Various articles made of Carpenter stainless steels, showing definite applications of the five grades of Carpenter stainless steels now on the market. Represented by: F. A. Bigelow, president; J. H. Parker, vice-president; R. V. Mann, F. R. Palmer, J. E. Sharp, E. P. Pyewell, B. H. DeLong, G. V. Luerssen, P. B. Greenawald, W. H. Kemper, W. M. Loos, G. H. Edmunds, J. B. Guthrie, R. L. Williams, C. A. Heil, H. J. Joyce, Jr., C. W. Olsen, K. L. Crickman, W. O. Steele, R. Calvert, H. B. Gaylord, V. B. Fisher.

Case Hardening Service Co., Cleveland. Booth 117.

Hardening room materials and equipment: Bohnite, carburizing compound; Caseite, cyanide hardening compound; Cyanide, all grades; Drawite, drawing salts, range 300 deg. to 1200 deg. Fahr.; Bathite, hardening salts, range 1200 deg. to 1700 deg. Fahr.; Ni-Cro-Al, nickel-chromium-aluminum alloy pots and boxes; Cleancoat, lead pot covering; Non-Case, anti-carburizing plant; pressed steel pots; B & G oil coolers. Represented by: W. C. Bell, president; E. J. Gossett, vice-president; J. S. Ayling, sales manager.

Celite Products Co., Los Angeles, Cal. Booth 52.

Sil-O-Cel heat insulating materials with especial attention to Sil-O-Cel C-3 which has recently been used widely for the construction of complete ovens as well as furnace doors and bases, and is often applied with a cement gun as a veneer insulating course on regenerator walls, etc. Represented by: Frank C. Coe, Fred H. Emerson, Angelo Gossman, E. S. Crosby, vice-president and sales manager.

Central Alloy Steel Corporation, Massillon, Ohio. Booths 158-159.

Agathon alloy steels, Enduro stainless iron, Toncan copper mo-lyb-den-um iron, Agathon nitralloy. Represented by: B. F. Fairless, president; J. M. Schlendorf, vice-president in charge of sales; W. M. Garrigues, assistant general manager of sales; M. J. R. Morris, D. B. Carson, C. C. Willits.

Char Products Co., Indianapolis. Booth 200.

Char carburizing compound, a case hardening material in which the energizing substance is sealed within each grain of compound by a shell of carbon. The product is characterized by low shrinkage, low dusting loss and constant activity with very small amounts of new material added to the mix. Also Char lead pot carbon, Char annealing carbon and Char calcined carbon. Represented by: William Higburg, sales manager; C. B. Edwards, C. Q. Swenson.

Chicago Pneumatic Tool Co., New York. Booth 211.

Pneumatic tools, electric tools, "Hicycle" electric tools, Uniloy jointless rotor. Represented by: A. E. Goodhue, vice-president; A. M. Brown, T. P. Harris, L. J. Walker.

Chicago Steel Foundry Co., Chicago. Booths 75 and 76.

Pyrasteel carburizing pots and boxes; pots for lead, salt and cyanide; conveyor chain, hearth plates, pusher plates and grids, oil burner equipment; parts fabricated from Pyrasteel sheets and samples of Pyrasteel sheets. Represented by: David Evans, president; William J. Chapin, George J. Jeffrey; J. N. Bourg, of Park Chemical Co., Detroit, agent; George O. Desautels, Indianapolis, agent.

Chrobaltic Tool Co., Detroit. Booth 288.

High Duty alloy castings for resisting heat, acid and for electrical resistance purposes. Represented by: W. B. Sullivan, vice-president; L. H. Whiteside, C. M. Conner, J. M. Mull, A. A. Cash, Louis Eitzen Co., Murdock Company, Premier Machine Co.

Cleveland Twist Drill Co., Cleveland. Booths 265, 266, 267, 268.

Two high-speed drill presses demonstrating Cle-Forge high speed drills at various speeds and feeds; also a display of complete line. Represented by: H. G. Smith, F. M. Hoelzle, O. B. Hansen, G. Burkhardt, W. C. Weidig, R. G. Berrington, E. Horan, T. Thomas, H. P. Jensen, H. A. Baier, T. Skove, D. Burdett.

Climax Molybdenum Co., New York. Booth 163.

Molybdenum ore as it occurs, together with the concentrates produced from the ore and all the forms in which it is prepared for use by the iron, steel and industrial trades. The display includes various exhibits of commercial products employing molybdenum in their manufacture. Represented by: B. F. Phillipson, president; F. C. Langenberg, vice-president

in charge of research; J. B. Thorpe, W. P. Woodside, and R. L. Rolf.

Clipper Belt Lacer Co., Grand Rapids, Mich. Booth 197.

Complete Clipper line consisting of all models of belt lacers, belt fasteners or hooks, belt cutters and connecting pins. Represented by: Carl P. Field.

Coats Machine Tool Co., New York. Booth 283.

Krupp line of Mikrotast gages; Elasticometer spring testing machine; Prestometer micrometer fluid gages; Coats hand tachometers; Coats divided machine vises; Skailnot, scale preventive. Represented by: Charles E. Coats.

Colonial Steel Co., Pittsburgh. Booths 279 and 280.

Complete line of products, including high-speed and carbon tool steels in both bars and sheet stock; tool steel forging products such as blocks, rings and special forgings; also a number of fractured specimens in both the cast and heat treated conditions. Represented by: Lawrence Wood, general sales manager; T. H. Nimick, assistant general sales manager; H. C. Poole, assistant general sales manager; N. B. Hoffman, chief metallurgist; A. C. Muller, C. M. Stevenson, E. L. Earley, E. A. Carleton.

Cooper Hewitt Electric Co., Hoboken, N. J. Booth 170.

Represented by: C. F. Streb, sales manager; D. R. Grandy, R. B. Chipman, W. R. Flounder.

Crucible Steel Co. of America, New York. Booths 184, 185, 187 and 189.

Various grades of high-speed steel, special machinery steel, alloy and carbon tool steel, cold drawn specialties, stainless iron and steel, and non-corrosive steels. Represented by: F. B. Hufnagel, president; J. A. Mathews, vice-president; A. T. Galbraith, vice-president; J. M. McComb, vice-president; H. L. Gellinger, auditor; R. Michener, general sales agent; R. E. Christie, W. K. Krepps, J. P. Jayme, E. P. Gaffney, R. H. Heatley, J. W. Barnett, F. J. Dawless, W. H. Plage, Allan Fraser, C. E. O'Connor.

D

Danly Machine Specialties, Inc., Cicero, Ill. Booths 243, 245.

Die sets, standardized and "special"; leader pins, bushings, die shoes, punch-holders, dowel pins, pry bars, goose neck clamps, swivel head cap screws, automatic stock stop for punch presses, hollow head cap and set screws, pressure pad springs, fillister and socket head, stripper bolts, laps and lap arbors, and Danly transparent die set templates. Represented by: P. H. Danly, vice-president and general manager; A. G. Gullberg, A. L. Miller, H. F. Bitzer, C. F. Schonmann, M. W. Rouse, A. F. Wallace, J. R. Fitzsimmons.

Darwin & Milner, Inc., Cleveland. Booth 225.

Alloy tool steel with particular reference to non-deforming alloy die steels, either oil-hardening or air-hardening for maximum quantity production; form tool castings from patent Cobaltrom steel; patent Cobaltrom steel safety razor blades, etc. Represented by: Victor F. J. Tlach, president; John R. MacCracken, H. L. Harrison.

Dearborn Chemical Co., Chicago. Booth 231.

No-ox-id, chemically compounded rust preventive; No-ox-id-ized wrapper; powdered cleaners. Represented by: E. M. Converse, sales manager; C. A. Remsen, C. I. Loudenback.

Henry Disston & Sons, Inc., Philadelphia. Booth 274.

Steel and hack saw machine in operation, using the new Disston high-speed steel machine hack saw blades. Represented by: S. Horace Disston, vice-president; H. A. Baxter, manager of steel sales; J. C. Forrest, Ed. Ludy.

Donner Steel Co., Buffalo. Booths 173 and 175.

Cold drawn material and parts made therefrom. Represented by: W. F. Vosmer, vice-president; J. W. Donner, general superintendent; A. G. Greenamyer, assistant general superintendent; C. A. Cherry, assistant to vice-president. District managers as follows: H. G. Uphouse, Philadelphia; E. D. Pumphrey, Detroit; P. M. Guba, New York; H. C. Richardson, Cleveland; R. E. Sherlock, and W. C. Peterson, metallurgical engineers; L. C. Miller, J. W. Percy, F. H. Lammert and N. F. Tisdale from the metallurgical department.

Driver-Harris Co., Harrison, N. J. Booth 30.

Cast Nichrome in form of carburizing containers, retorts, muffles, furnace parts, etc.; Nichrome grade B, an addition to cast iron for tougher, stronger and harder iron easily machined; new development of Nichrome sheet boxes for carburizing. Represented by: H. D. McKinney, general sales manager; G. A. Lennox, assistant sales manager; J. B. Shelby, W. E. Blythe, J. C. Bllek, J. C. Henderson.

Duriron Co., Inc., Dayton, Ohio. Booth 169.

Complete line of Duriron and Alcumite pickling equipment including exhaust fans, Duriron circulating steam jets, Duriron centrifugal pumps for unloading acid, Alcumite sheet, Alcumite tie rods, Duriron pipe, valves and fittings. Represented by: W. E. Pratt, sales manager; P. C. Lewis, E. B. Thacker.

E

Eastman Kodak Co., Rochester, N. Y. Booth 271.

X-ray films and accessories for use in radiographic examination of metals. Represented by: E. E. Smith and A. W. Fuchs.

Eclipse Fuel Engineering Co., Rockford, Ill. Booth A. G. A. section.

New Design 7 hp. type D steam boiler complete with automatic pump unit and condensation receiver; ½ hp. boiler, miniature; 4 hp. type C boiler with No. 4 feed water regulator and automatic fuel cut-off; No. 2 lead hardening furnace complete with low pressure gas burners; No. 3 high-speed steel furnace with No. 1 high pressure proportional mixer, new design base complete with burner equipment for high-pressure blast steam boilers; automatic core oven burner; centrifugal blowers, No. 2311, No. 2515, No. 6815 two stage mounted; new design series C controller mounted in connection with No. 4615 blower for demonstration; display of pressure steel and pressed alloy pots; single and compound injectors, burners, burner tips, inspirator type burners, etc.; demonstrating unit for new type tunnel burners with cooling wells, connected to 10-lb. gas line; No. 5 rivet heater with high pressure proportional mixer; and No. 3621 blower with 5 hp. 220 a.c. motor for furnishing air. Represented by: O. M. Olsen, Walter Frederick, D. A. Campbell, J. M. Traugott, L. B. Maximon, G. W. McKee.

Electric Furnace Co., Salem, Ohio. Booth 70.

Electric heat treating furnaces and equipment for all purposes; literature, information, and illustrations of unusual and interesting electric furnace installations; engineering representatives available for consultation. Represented by: R. F. Benzinger, vice-president; F. T. Cope, chief engineer; A. H. Vaughan, assistant chief engineer; R. D. Thomas, E. P. Larkin, F. J. Peterson, S. Floyd Keener, T. B. Bechtel, N. H. Knowlton.

Electric Steel Founders' Research Group, Chicago. Booths 304 and 306.

High grade steel castings, small and medium sized. Represented by: R. A. Bull, director, and C. N. Ring, assistant director, Electric Steel Founders' Research Group, Chicago; A. C. Jones, research engineer, Lebanon Steel Foundry, Lebanon, Pa.; and David Zuege, research engineer, Sivyer Steel Casting Co., Milwaukee.

Electro Alloys Co., Elyria, Ohio. Booths 119 and 120.

Thermalloy castings for use in construction of furnaces, combustion chambers, carbonizing pots, oil burner parts, resistance grids and steel mills. Represented by: A. L. Garford, president; W. C. Whyte, vice-president; J. B. Thomas, treasurer; J. W. Henry, metallurgist; A. M. Miller, Jr., H. P. Miller and W. J. Hansen.

Electro Refractories Corporation, Buffalo. Booth 293.

Silicon carbide brick, in various shapes; high temperature cement; and Mag-NO-Spall brick. Represented by: L. U. Milward, president; C. A. Asher, representative.

Elkon, Inc., New York. Booths 142 and 144.

Elkonite dies and some accomplishments by their use. Represented by: G. N. Sieger, vice-president; J. A. Weiger, Eddie Bremer, J. T. Cox, George H. Rockey.

Endicott Forging & Mfg. Co., Inc., Endicott, N. Y. Booth 272.

Drop forgings for automotive, tractor and general engineering industry. Represented by: S. J. Marshall, president; T. B. Kelday, superintendent; George B. Reed and J. I. Smith.

F

Falls Electric Furnace Corporation, Buffalo. Booth 71.

Electric box-type furnace using Falls former full radiating sheet type units; photographs, sample unit sections and refractories. Represented by: H. J. McCauley, president; J. R. Eves, vice-president and sales manager; C. M. Adams, H. E. Trent, J. V. Calhoun.

R. Y. Ferner Co., Washington. Booth 202.

Latest model of No. 5 high precision locating and jig boring machine demonstrating the use of a universal tiltable table for boring oblique holes or making small box jigs; micro-indicator tubes and supports for measurements of steel balls, rings, blocks, and other metal parts, or as an accurate indicator in the assembling of machine tools or set-up of

work on machines; high precision bench micrometers. Represented by: R. Y. Ferner, representative; Charles T. Ameel, demonstrator; Ernest Stucky, demonstrator; John Cetrule, sales engineer; Nicholas Cetrule, sales engineer; and Peter Seibel, sales engineer.

A. Finkl & Sons Co., Chicago. Booth 162.

Recent developed applications of hot work die steel and drop forge supplies. Represented by: Charles E. Finkl, general manager; Fred Finkl, William Finkl, J. C. Vance, E. H. Graham, J. M. Curley, N. H. Rieger and T. P. Wallace.

Firth-Sterling Steel Co., McKeesport, Pa. Booth 167.

Steels. Represented by: L. Gerald Firth, general manager; D. G. Clark, director of sales; Robert S. Stevick, works manager; G. J. Comstock, director of research; O. K. Parmiter, metallurgical engineer; A. S. Martin, C. G. Thoma, A. E. Barker, O. T. Smith, H. I. Moore, E. T. Jackman, G. A. Jacobs, W. C. Royce, W. J. MacFarland, J. V. Little, R. F. Kimber, F. N. Mead, I. Olsen, Harry Jarvis, Fred Jarvis, G. R. Bunting, J. Johnson, W. A. Ruppel.

J. B. Ford Co., Wyandotte, Mich. Booth 229.

Wyandotte metal cleaners. Represented by: B. N. Goodell, W. M. Cole, George J. Lawrence and W. P. Scott.

Frew Machine Co., Philadelphia. Booth 275.

No. 1 Frew automatic tapping machine and No. 4 motor-driven saw bench. Represented by: George H. Frew, Jr., H. Edwards.

Fusion Welding Corporation, Chicago. Booths 135 and 137.

Fuzon 300-amp. motor generator arc welder in operation and Weldite welding rods, including Green Surfaced rod, Yellow Jacket rod and Blue Streak rod. Will weld up sections of pipe using special method of copper backing weld so as to improve tensile strength of finished weld, and will then pull specimens with Tinius-Olsen tensile strength testing apparatus. Also new portable gas engine driven outfit mounted on wire automobile wheels with pneumatic tires. Represented by: J. B. Green, president; F. B. Toombs, sales manager; E. J. Shuler, D. C. Giles, R. W. Holt and F. A. Green.

G

Gairing Tool Co., Detroit. Booth 165.

Types A, B, C and interchangeable counterbores, types C and F core drills, multiple operation tools with solid and inserted blade, inserted blade boring heads, chucking reamers, grinding fixtures and counterbore sets. Gairing full floating holder and Gairing nose drive reamer are shown for first time. Represented by: E. Gairing, president; C. E. Wyrick, chief engineer; B. O'Meara, D. J. Normoyle and E. T. Gropler.

Gathmann Engineering Co., Baltimore. Booths 259 and 260.

Split ingots of different sizes cast in several types of molds, demonstration of effect of mold designs on solidification, and revised edition of "Big-End-Up versus Big-End-Down." Represented by: Emil Gathmann, president; G. A. Dornin and Mark Gathmann.

General Alloys Co., Boston. Booths 148 and 149.

Q-Alloy heat treating containers; carburizing and annealing boxes, cyanide, lead and salt pots, tubes and retorts, dipping baskets; Q-Alloy and X-ite furnace parts, retorts, muffles, rails, hearths, Hump furnace fixtures; Q-Alloy bars, sheet, forged bolts, fabricated shapes, oil still parts, special valve parts, etc. Q-Alloy Link-Belt chain. Represented by: H. H. Harris, president; W. K. Leach, general manager; George C. McCormick, chief engineer; Fred Blaney, general superintendent; W. R. Blair, R. A. Alger, J. C. Van Arman, R. M. Kirk, Ralph Hare, A. L. Grinnell, J. J. Donovan, W. A. Toohill, A. D. Heath, H. G. Chase.

General Electric Co., Schenectady, N. Y. Booths 53, 54, 55, 56, 57 and 58.

Electric furnaces, electric welding machines. Represented by: C. F. McLoughlin and others.

Gibb Welding Machines Co., Bay City, Mich. Booth 102.

Model 436 HDA seam welder, model 312 automatic welding press, 300 amp. Zeus air cooled arc welder, and type SS-12 spot welder. All except type SS-12 spot welder new additions to line. Represented by: W. H. Gibb, president; C. E. Shearer, advertising manager, and R. D. Thomas, C. M. Rusk, A. M. Taylor and E. P. Larkin of R. D. Thomas & Co., eastern sales agents.

Globar Corporation, Niagara Falls, N. Y. Booth 29.

High-temperature electric furnace equipped with Globar Elements in operation at 2400 deg. Fahr., and furnace equipped with latest type self-cooled terminal. Represented by: A. H. Heyroth, general manager; K. E. Rogers, assistant sales

manager; E. Hediger, plant superintendent, and B. A. Bovee, H. N. Berry, S. Evans and A. Pfau, Jr.

Goodell-Pratt Co., Greenfield, Mass. Booth 209.

Electric drills and precision tools. Represented by: F. W. Pratt, C. L. Jernberg and Lee Fluke.

Goss & De Leeuw Machine Co., New Britain, Conn. Booths 194 and 196.

6-in. multiple spindle chucking machine, threading type, motor drive; and an 11-in. multiple spindle chucking machine, threading type, motor drive; exhibited for the first time. Represented by: Stanley T. Goss, president; Val. C. Hart, J. J. Spring, H. J. Hauck, E. H. Peck.

H

George J. Hagan Co., Pittsburgh. Booths 60 and 62.

Information concerning furnace installations using coal, gas, oil or electricity, together with blueprints and other general operating data. Represented by: R. E. Talley, president; C. F. Cone, A. D. Dauch, J. L. Edwards, J. Sandberg and V. A. Hain.

Halcomb Steel Co., Syracuse, N. Y. Booths 186 and 188.

Airplane motor and starter parts, non-corrosive and heat resisting products, and tool and alloy steels for special purposes. Represented by: F. B. Hufnagel, president; A. T. Galbraith, general manager of sales; S. T. Harleman, assistant sales manager; H. A. Pardee, general manager; H. J. Stagg, S. C. Spalding, J. T. Leyden, H. Barlow and A. Fraser.

Harrington Co., Philadelphia. Booth 261.

Chain hoists, trolleys, and allied products, 1-ton electric hoists. Represented by: Roger Sherron, president; A. M. Harrington, treasurer; R. E. Bishop, sales manager; W. J. Somerset, David Black.

Hartford Machine Screw Co., Hartford, Conn. Booth 246.

Special screw machine products, cap screws, nuts, taper pins and set screws. Represented by: William C. Walsh, L. M. Church and P. M. Mueller.

C. I. Hayes, Providence, R. I. Booth 28.

Improved type Globar furnace for hardening high-speed steel and preheating and high-speed furnaces, equipped with full automatic temperature control and special attachment for

THE IRON AGE will have Booth 183 at the Steel Treaters' Exposition. Representatives of the editorial, advertising and reader service departments will be in attendance, and copies of THE IRON AGE will be on file.

controlling atmosphere in furnace chamber during heating. Represented by: C. I. Hayes, chief engineer, and J. E. Hines, sales manager.

Haynes Stellite Co., Kokomo, Ind. Booth 143.

Stellite wearing parts and method of applying Haynes Stellite to wearing surfaces using oxy-acetylene blowpipe. Represented by: W. A. Wissler, metallurgist; A. V. Harris, G. E. Wilson, A. S. Shiffert.

Heppenstall Forge & Knife Co., Pittsburgh. Booth 195.

24-in. and 10-in. octagonal ingot split through center, showing quality of steels made in company's 18-ton acid open-hearth furnaces; small model shear in actual operation, showing shear knives as manufactured by company. Represented by: C. W. Heppenstall, president; B. B. Weinberg, general sales manager; C. J. Sauer, manager Heppenstall Forge Co.; A. J. Porter, Jr., sales manager Heppenstall Forge Co.; J. A. Succop, D. A. Stuart, G. I. Allen, F. C. Moyer, A. L. Wurster, L. A. Daines, C. G. Singleton, G. O. Desautels and O. W. Mueller.

James H. Herron Co., Cleveland. Booth 61.

Industrial furnaces, including model of company's new continuous conveyor belt furnace, in operation but not heated. Represented by: James H. Herron, president, and Oscar C. Trautman, furnace division engineer.

Hevi Duty Electric Co., Milwaukee. Booth 67.

General line of electric heat treating furnaces. Represented by E. L. Smalley, president; F. A. Hansen, general manager; W. B. Cooley, sales manager.

Hisey-Wolf Machine Co., Cincinnati. Booth 334.

Electric tools as follows: Drills, screw drivers, nut setters, tool post grinders, angle plate grinders, combination ex-

ternal and internal grinders, vertical spindle grinders, bench grinders, floor grinders, bench buffers, floor buffers, combination disk and production grinders and portable grinders. Represented by: H. W. Wallace, J. W. Friedlander, W. J. Holtmeier.

Holcroft & Co., Detroit. Booth 84.

Continuous forging furnaces and continuous heat treating furnaces. Represented by: C. T. Holcroft, president; R. T. Cadwell, vice-president; H. L. Ritts, secretary and treasurer; C. H. Martin, C. E. Barba, C. L. Joy and A. Ruckstahl.

Hoskins Mfg. Co., Detroit. Booth 69.

New type electric heat treating furnace, alloy castings, chromel resistance alloys and thermo-couples and laboratory furnaces and hot plates. Represented by: W. D. Little, sales manager; W. A. Gatevard, F. L. Limmerman, G. L. Price and C. S. Kinnison.

E. F. Houghton & Co., Philadelphia. Booths 121 to 124.

Represented by: George W. Pressell, W. A. Buechner, W. J. Wright, J. Coleman Bentley, E. H. MacInnis, E. C. Barlow, E. W. Bock, C. H. Reiss, C. G. Schultze, H. C. Finck, Fred J. Ramsey, Arthur Jenner, W. I. Schwarz, F. R. Dieterich, D. J. Richards, C. H. Schultz, Raymond W. Justice, John T. Taylor, C. H. Stonerod, J. Weber, H. Seward, F. A. B. Harris, F. V. Armato and John D. Powers.

Hydraulic Tool Works, Philadelphia. Booth 310.

I

Ideal Industrial Machinery, Cincinnati. Booth 153.

An Ideal 36 x 60 in. Star return tumbling barrel with power loader and motor drive; photographs of a number of special installations. Represented by: C. A. Albrecht, George Walsh, N. Ranschoff.

Illinois Steel Co., Chicago. Booths 204 and 205.

Products manufactured by customers from steel produced by company, electric furnace model and photographs of company's alloy mill. Represented by: W. I. Howland, Jr., Assistant general manager of sales; A. L. Meyer, R. Korsan, C. R. Moffatt, R. G. Glass, F. S. Crane, E. Davidson, F. B. Mulvaney, H. McKeown, George Landrus, A. R. Williard, C. A. Parsons, H. G. Daley, C. F. Ramer and F. T. McCue.

Illinois Tool Works, Chicago. Booth 177.

New shear cut gear roughing hob, standard line of metal cutting tools and demonstration of Shakeproof lock washers. Represented by: J. M. Gribble, P. J. Nelson and S. O. Bjornberg.

International Nickel Co., Inc., 67 Wall Street, New York. Booth 219.

Typical applications of nickel and nickel alloys, including nickel steel, nickel cast iron and other nickel-bearing ferrous and non-ferrous alloys. Represented by: F. S. Jordan, sales manager; F. A. Wheeler, assistant sales manager; E. J. Bothwell, nickel department; A. J. Wadhams, manager, development and research department; and P. D. Merica, assistant manager, development and research department; T. H. Wicken-den, Charles McKnight, D. M. Houston, J. S. Vanick, F. B. Coyle, J. W. Sands.

J

Jessop Steel Co., Washington. Booth 237.

Stainless steels and irons, cold-rolled products and bar steel and sheet products. Represented by: S. A. Grayson, president; F. T. H. Youngman, secretary and treasurer; A. G. Lambert, metallurgist; R. M. Paxton, L. R. Samuels, J. C. Dawson and F. T. Morgan.

William Jessop & Sons, Inc., New York. Booth 152.

Represented by: Fred C. A. H. Lantsberry, director of William Jessop & Sons, Ltd., Sheffield; Robert Ross, secretary; G. J. MacQuarrie, A. L. Magilton.

Jones & Laughlin Steel Corporation, Pittsburgh. Booth 230.

Hot rolled and cold finished Jalcas steel and parts made therefrom; various shapes; cold finished bars; light weight channels and junior beams; new section of steel sheet piling. Represented by: W. B. Todd, manager of sales cold finished department; H. W. Graham, general metallurgist; T. C. Ham, Philadelphia district sales manager; C. S. Bradley, general manager of sales; A. A. Wagner, assistant manager hot rolled department; J. D. Allen, J. S. Grumbling, J. H. Flaherty, W. R. K. Scott, metallurgists, and William Miller.

Jones Machine Tool Works, Inc., Philadelphia. Booth 223.

C. M. Kemp Mfg. Co., Baltimore. Booth A. G. A. section.
Various types of burners and furnaces operating from the Kemp automatic gas system; special furnaces to demonstrate the exclusive features of the improved Kemp system; internally fired lead baths, open flame burners and special

display of gas burning under water. Represented by: Elmer B. Dunkak, sales manager; W. M. Ponder, William Hunt.

K

K-G Welding & Cutting Co., Inc., New York. Booth 88.

Style K oxygen and acetylene regulator, and styles A and M welding and cutting torches. Represented by: W. D. Flannery, H. H. Kress and A. W. Carr.

Keller Mechanical Engineering Corporation, Brooklyn. Booths 297 and 298.

Type BL-2416 Keller automatic tool room machine, demonstrating milling of blanking dies and punches from thin metal templates and forming of dies from cement masters; Kello-cater complete unit, with base and overarm and spindle; R-6 Keller cutter and radius grinder, and line of Kellerflex machines. Represented by: P. C. Renno, Henry Schreiber, Harry Reichert and H. P. Loewenberg.

The J. W. Kelley Co., Cleveland. Booth 82.

Machine for washing and quenching metal parts. Represented by: J. W. Kelley, president; H. B. Northrup, secretary, and J. E. Burns.

Kelly Reamer Co., Cleveland. Booth 155.

Line of boring and reaming tools, including single point, two point block type, rigid, adjustable core drills and multiple and shell reamers, also, special tools. Represented by: E. W. Putnam, vice-president and general manager, and Haviland Wright.

Charles F. Kenworthy, Inc., Waterbury, Conn. Booth 255.

Metals that have been bright-annealed in the new Kenworthy Kwik-Brite dry and wet type annealing furnaces; reproductions of other Kenworthy industrial furnaces and metal handling equipment. Represented by: Charles F. Kenworthy, president; Howard A. Kenworthy, designing engineer; Ralph E. Worthington, Selden E. Tracy, Irving W. Chapman.

Keystone Lubricating Co., Philadelphia. Booth 296.

Keystone pneumatic safety lubricating system, showing its adaptability for automatic feed intermittently or continuously; special greases for steel mill work, and lubricants for ball and roller bearings. Represented by: H. A. Buzby, president; C. O. Norstrum, H. M. Ludwick, G. W. Hall, T. B. Little, J. R. Lawrence, S. R. Marshall and F. D. Street.

Kinite Corporation, Milwaukee. Booth 179.

Kinite castings, Kinite weld rod, rolled Kinite bar stock, Patterns for Kinite castings, and metal stampings produced on Kinite dies. Represented by: E. J. Mohr, vice-president; William C. Eakin, William J. Graham, T. A. Moormann and L. L. Clark.

L

Lava Crucible Co. of Pittsburgh, Pittsburgh. Booth 19.

Various types of Super refractories in standard brick, standard tile, special shapes, plastics, cements and graphite crucibles. Represented by: H. E. White, R. P. South, F. South, Jr.

E. J. Lavino & Co., Philadelphia. Booths 81 and 82-A.

Chrome, magnesite and silica refractories, Kromepatch, refractory cement and K-N plastic. Represented by: R. E. Griffith, manager refractories engineering and sales; J. W. Corrison, H. A. Morlock, A. DeMacedo, C. B. Reynolds, J. B. Luckie, H. W. Pigott and P. S. Haserodt.

Leeds & Northrup Co., Philadelphia. Booths 214 and 215 and 192 and 193.

Hump hardening and Homo tempering furnaces consisting of latest Hump method hardening furnaces both for tools and for production work, showing advances in method accomplished during the past year; Homo furnaces for both high and low temperature work will also be shown in operation; pyrometer exhibit consists of L & N potentiometer pyrometers including latest models of automatic controllers, recording controllers, indicating controllers and temperature indicators and recorders; feature of the exhibit will be new indicating controller with visible index and scale over entire width of instrument; optical pyrometers and portable indicators will also be displayed. Represented by: Furnace exhibit: G. W. Tall, assistant sales manager; A. E. Tarr, W. A. Lane and W. C. Roxby; Pyrometer exhibit: Henry Brewer, assistant sales manager; E. B. Estabrook, H. N. McMichael, Earl C. Wood and Carl H. Parker.

E. Leitz, Inc., New York. Booths 281 and 282.

The 1929 model of Leitz Micro-Metallograph with a full line of accessories for micro and macro investigations; the Guthrie-Leitz grinding and polishing machine, a labor and time saving device. Represented by: R. Tvestman, O. Soetbeer, W. Schaaf.

Lincoln Electric Co., Cleveland. Booth 132.

Complete electric arc welding equipment together with a display of various castings replaced by welded steel; also a Linc-Weld motor together with a motor operating under water. Represented by: E. E. Lewis, O. P. Lang, J. W. Kenworthy, E. J. Pfister, D. C. Anderson, A. F. Davis.

Linde Air Products Co., New York. Booths 109, 145 and 146.

Products fabricated by the oxy-acetylene welding process. Represented by: R. W. Boggs, T. C. Fetherston, A. G. Wikoff.

M

Mahr Mfg. Co., Minneapolis. Booth 18.

Operating model of gas fired rotary hearth forging furnace. Represented by: W. G. Barstow, sales manager; C. F. Olmstead, assistant sales manager; A. J. Nordenson, Ray G. White, G. A. Ledebur, E. F. Piea, B. G. Harmon, C. W. Rudolph and A. Tenney.

Marburg Brothers, Inc., New York. Booth 238.

Precision die filing and sawing machines; and samples of work done on these machines. Represented by: Theodore H. Marburg, president; Louis C. Marburg, secretary-treasurer; Francis Marburg.

McCann Harrison Corporation, Cleveland. Booth 25.

Models of two new conveyor automatic furnaces. Represented by: H. P. McCann, president; Edward Busch, eastern sales manager, and Charles L. Stewart, western sales manager.

McGill Metal Co., Valparaiso, Ind. Booth 74.

Various types and sizes of ball bearings, together with several machine parts showing actual application of ball bearings; machine for testing ball bearings under service conditions will be in actual operation. Represented by: Frank R. Schubert, vice-president; W. E. Brownell, treasurer; T. L. Robinson, chief engineer, and William Scrimgeour, Washington district manager.

Metal & Thermit Corporation, New York. Booth 89.

Carbidefree alloys and materials and equipment for Thermit welding, showing improved process of welding with samples of completed welds. Represented by: J. H. Deppeler, H. D. Kelley and R. L. Browne.

Michigan Steel Casting Co., Detroit. Booth 27.

Misco high temperature alloy castings, bars and sheets, including carburizing boxes and tubes, cyanide pots, dipping baskets, rotary furnace retort; also furnace parts, such as rails and plates, and several types of pusher furnace trays and fixtures; Misco alloy chain of several types and Misco alloy rolled bars and rolled sheets. Represented by: F. J. Stanley, general manager; E. D. Flintermann, sales manager; J. D. Corfield, W. E. Broadbelt and J. C. Redmond.

Michigan Tool Co. and Colonial Tool Co., Detroit. Booth 240.

Gear hobs, spline hobs, gear shaper cutters, thread generating cutters, milling cutters, end mills, metal slitting saws, side milling cutters, screw machines and turret lathe tools, spline broaches, keyway broaches and serration broaches. Represented by: J. W. Mull, Jr., general sales manager; T. A. Oleik, E. O. Jenkins and C. M. Conner.

Midvale Co., Philadelphia. Booth 222.

Finish machined forgings, rough steel castings, hardened and ground forged steel rolls, automobile body die with tool steel inserts, Diamond brand tool steel tools and dies, extra high-speed steel cutters, stainless steel bars. Represented by: A. C. Dinkey, president; H. L. Frevert, vice-president; Stuart Hazlewood, vice-president; H. E. Rowe, bar steel sales manager; and others.

Milburn Co., Alexander, Baltimore. Booth 127 and Gas Sec.

Oxy-acetylene equipment, cutting torches, welding torches and regulators. Illuminating gas cutting torches; full line of paint spray equipment; oil burning and preheating equipment and portable carbide lights. Represented by: E. P. Boyer.

Milwaukee Die Casting Co., Milwaukee. Booth 198.

Various types of die castings in aluminum, zinc, lead and tin alloys, and samples which have been polished and plated; also various assemblies to demonstrate application of die castings in connection with the various metal working industries. Represented by: H. F. Schroeder, vice-president, and Charles H. Frantz, sales engineer.

Molybdenum Corporation of America, Pittsburgh. Booth 115.

Molybdenum steels. Represented by: Clifton Taylor, sales manager; William H. Phillips and G. M. Eaton.

Morse Twist Drill & Machine Co., New Bedford, Mass. Booth 212.

Complete line of high-speed and carbon steel drills, reamers, taps, dies and milling cutters; also new forge type high-speed

drill and other special tools. Represented by: F. O. Lincoln, vice-president in charge of sales, and George M. Read.

Mueller Brass Co., Port Huron, Mich. Booth 83.

Brass and copper tubing, brass and bronze nickel-silver rod, brass, bronze and copper nickel-silver forgings, brass, bronze and nickel-silver screw machine parts, and brass and bronze sandcastings. Represented by: W. W. Roach, assistant sales manager, mill products division; B. F. Mueller, assistant sales manager.

N

National Electric Light Association, New York. Booths 182, 218.

A five-reel motion picture film illustrating modern applications of various types of electric furnaces to annealing, carburizing, hardening, vitreous enameling, and steel melting; also an exhibit of various steel parts heat treated in electric furnaces. Represented by: C. E. Russell, C. P. Yoder, D. St. Pierre Du Bose, A. D. Spillman, R. H. Mather.

National Twist Drill & Tool Co., Detroit. Booth 320.

Complete line of twist drills, milling cutters, reamers, hobs, and special tools; what is said to be smallest twist drill in world; new type inserted tooth milling cutter, and new type heavy duty counterbore. Represented by: Harry Butler, assistant sales manager; George Ringstad, E. W. Haines, J. J. Jordan and C. Cornwall.

New Departure Mfg. Co., Bristol, Conn. Booth 190.

Ball bearings.

Norton Co., Worcester, Mass. Booth 51.

Display of alundum and crystolon and refractory ware, such as muffles, hearth plates, crucibles and similar products. Represented by: Harry B. Lindsay, sales manager refractory division.

R. D. Nuttall, Pittsburgh. Booth 135.

Complete new line of reduction gear units and speed reducers. These units all have as features of their design, single helical gears; Timken roller bearings; a rigid, ribbed, three-section case; and a positive splash lubrication system.

O

Tinius Olsen Testing Machine Co., Philadelphia. Booths 269 and 270.

Cloudburst hardness testing machine and equipment for super-hardening steel; Johnson hardness tester for applying Brinell hardness test; Haigh alternate stress testing machine; Herbert pendulum hardness tester; Honda sharpness testing machine for testing cutlery, etc.; Olsen universal testing machine for tension, compression and transverse testing; Olsen direct motor driven production type Brinell hardness tester and hand operated type of machine; latest type of direct motor driven ductility testing machine for sheet metal testing; Olsen polishing machine; various extensometers, including the Olsen-Smith stress-strain recorder; new Olsen-Lundgren dynamic type balancing machine, operated on centrifugal high tension spark principle, and latest Olsen-Lundgren automatic weighing static balancing machine. Represented by: Thorsten Y. Olsen, vice-president; Robert B. Lewis, Jacob Lundgren and Bruce L. Lewis.

P

Page Steel & Wire Co., Bridgeport, Conn. Booth 103.

Page welding wire, featuring the No. 10 package; a flame test, used for comparing various grades of welding wire; photographs and samples of Page bridge wire which was used in the Philadelphia-Camden Bridge and which is now being used in the Detroit International Bridge and the Mount Hope, R. I., bridge. Represented by: W. T. Kyle, L. S. Lankton.

Peerless Machine Co., Racine, Wis. Booth 278.

High-speed metal sawing machines. Represented by: Charles Rasmussen, president; I. M. Ward, vice-president, and A. H. Goetz, sales manager.

Pittsburg Instrument & Machine Co., Pittsburgh. Booth 284.

Precision Brinell testing machine, power-driven Brinell testing machine, hand-operated Brinell testing machine, Brinell microscopes, depth indicator for Brinell testers, sheet metal tester, metallographic grinder, and proving ring for checking Brinell machines. Represented by: Paul Kammerer.

Porter-Cable Machine Co., Syracuse. Booth 333.

Porter-Cable Hi-speed production lathe; Porter-Cable heavy duty universal milling attachment; Syracuse horizontal disk sander, type D-3; Syracuse two belt sander and grinder, type 2B3; Take-About and Super Take-About hand sanders

with bench stands; Porter-Cable portable electric hand saw. Represented by: K. O. Ditmars, D. J. Ridings.

Horace T. Potts & Co., Philadelphia. Booth 166.

Tools and dies made of various grades of tool steel. Represented by: Arthur L. Collins, Henry R. Wimmersberger, Maurice H. Felty, and L. D. Willis, A. W. Ainsworth, Guy P. Bible, Thomas C. Potts, Charles William Potts, J. J. Drexler, Claude Mengel, Stanley L. Bateman, W. H. Dunlap.

Production Machine Co., Greenfield, Mass. Booth 210.

Polishing and punching machines. Represented by: A. H. Behnke, vice-president.

Pyrometer Instrument Co., New York. Booth 151.

Pyro radiation pyrometers; Pyro optical pyrometers; Pyro immersion pyrometers; Pyro surface pyrometers. Represented by: Richard C. Jordan, F. D. Heidorn, O. Raab.

R

Reeves Pulley Co., Columbus, Ind. Booth 176.

Reeves variable speed transmission, unit for obtaining infinite variable speed control and used extensively in connection with continuous heat treating furnaces; improved design of Reeves transmission, embodying all recent improvements. Represented by: C. L. Irwin, T. A. Bergen and Philip C. Talbot.

Charles Reines, Brooklyn. Booth 17A.

George P. Reintjes Co., Kansas City, Mo. Booth 15A.

Display of Reintjes flat arch brick for use in high temperature furnaces; especially where large cross section of the gas duct is required and where head work is limited; also truss arch shapes. Represented by: George P. Reintjes, S. Skouse, John Hawkins.

Riehle Brothers Testing Machine Co., Philadelphia. Booth 291.

50,000-lb. vertical screw testing machine, universal type with new auto type gear box unit; Vickers diamond hardness tester; proving rings, and pamphlets and photographs. Represented by: F. Buckingham, superintendent; George Lawrie and A. Fuller Riehle.

Stanley P. Rockwell Co., Hartford, Conn. Booth 80.

Model LA (laboratory) Rockwell Dilatometer; Model RA (remote control) Rockwell Dilatometer on model furnace; also Rockwell Dilatometer equipment in booth of E. F. Houghton & Co., and in booth of Peoples Gas Light & Coke Co. Represented by: Stanley P. Rockwell, president and treasurer; Warren D. Fuller, vice-president; Raymond W. Woodward, secretary; William A. Stumpf, Kenneth Stumpf.

W. S. Rockwell Co., New York. Booth 63.

Illustrations, drawings and technical data on industrial furnace equipment, and special types of blast gates for controlling air lines. Represented by: M. L. Hollister, R. M. Atwater, J. A. Doyle, C. D. Barnhart, H. J. N. Voltmann.

John A. Roebling's Sons Co., Trenton, N. J. Booth 91.

Welding wire. Represented by: J. L. Unsworth, A. L. Miller, A. E. Gaynor and E. T. Bertram.

The Roessler & Hasslacher Chemical Co., New York. Booth 262.

Cyanide case hardening mixtures; cyanegg; copper cyanide; cadmium oxide; chromic acid; sodium stannate, and R & H drawing salts. Represented by: W. M. Gager, C. H. Proctor, W. J. Schneider and S. C. Harris.

Rotor Air Tool Co., Cleveland. Booth 22.

Rotor type D-1 grinder, standard; Rotor type D-1 grinder, high production model, using Redmanol, bakelite and rubber bonded wheels, 6 in. size, load speed 5000 r.p.m.; D-3 grinder, standard; D-3 grinder, high production model, a new model, using rubber bonded, bakelite and Redmanol wheels, 8 in. size, load speed 4000 r.p.m.; Rotor sander; E-1 drill; E-2 drill; E-5 drill, 29/32 in.; E-5 drill, 1 1/4 in. Represented by: H. P. Bailey, president; K. L. Pohlman, vice-president; G. O. Singer, F. R. Moore, L. K. Berry, F. W. Hammer.

S

George Scherr Co., New York. Booths 180 and 181.

Schuchardt & Schütte new size No. 10 quick-change gear hobber, special worm miller, automatic hob grinder, universal relieving lathe, small gear hobber with fully automatic cycle of operation; full line of Carl Zeiss optical measuring instruments, including a new 40 in. optical precision measuring machine. Represented by: George Scherr, president; Fritz König, secretary; George VandePlanck, George Kaner.

Sentry Co., Taunton, Mass. Booth 64.

No. 1 Model H small carbon steel hardening furnace, No. 1 Model HS small high-speed steel hardening furnace, No. 1

Model L 8 x 16 in. pot furnace (first time exhibited). Represented by: A. A. Harvey, sales manager; P. B. Crocker, treasurer.

Shenango-Penn Mold Co., Dover, Ohio. Booth 227.

Centrifugally cast bronze in various diameters and lengths made of standard and special compositions in the rough, semi-finished and finished in the form of solids, tubes, bushings, sleeves and liners; solids and tubes in the rough, bushings, sleeves and liners in the rough, semi-finished and finished. Represented by: H. S. Bradley, president; G. L. Col-lard, vice-president; F. A. Demms, treasurer; H. M. Wilson, secretary; J. P. Jefferis, manager; H. H. Zollar, P. H. Jef-feris, Rafford Pitt, C. R. Hayes.

Shore Instrument & Mfg. Co., Jamaica, N. Y. Booth 236.

Shore's scleroscopes, C-2 pneumatic and D dial types for test-ing the hardness of metals and materials; durometer and elastometer, improved, for testing rubber and plastic material for density, hardness and elasticity; optical pyrometers, A and B pyroscopes, for heat treating and foundry tempera-tures; Localcase and Localhard, for localizing, carburizing and hardening of steels; the Monotron hardness indicator, latest addition to company's line of precision testing appara-tus. Represented by: F. G. Kendall, sales manager; J. M. Kendall.

Siewek Tool & Die Co., Detroit. Booth 287A.

Small tools and dies.

Simonds Saw & Steel Co., Fitchburg, Mass. Booth 150.

Complete line of circular and band saws for cutting wood or metal; also hack saw blades, files, machine knives and high-speed, carbon and special tool steels; also a new inserted tooth metal cutting saw, developed this year by Simonds engineers, this new saw has a high-speed steel tooth especially shaped for faster cutting with a minimum of power. Represented by: C. R. Pafenbach, steel sales manager; H. B. McDonald, metal saw superintendent.

Sleeper & Hartley, Inc., Worcester, Mass. Booth 231.

No. 2 universal collar, with latest improvements. Represented by: Patsy Mignacca.

David H. Smith & Sons, Inc., Brooklyn. Booth 285.

Sonntag quadruple punch, angle, bar and plate shear notcher, with rolled steel plate frame construction, in two sizes; special new features are new type die blocks which allow clear use of all throat space, also notcher built-in as an integral part of the machine. Represented by: David H. Smith, chairman of the board; Austin D. Smith, president; Dudley J. Smith, vice-president; W. H. Krapohl, manager machinery dept.

Smith Welding Equipment, Eastern Corporation, Philadelphia. Booth 140.

Welding equipment.

Southern Manganese Steel Co., St. Louis.

Assortment of heat and corrosion-resistant alloys in the chrome, nickel series produced under the trade name of Fahrallloy. Represented by: E. F. Mitchell, sales manager; W. M. Black, J. T. Norris, D. M. Powers, F. A. Fahrenwald, A. W. Daniels, general sales manager.

Southwark Foundry & Machine Co., Philadelphia. Booth 217.

One 60,000-lb. testing machine; McCollum-Peters electric telemeter; Whittemore strain gage; and Huggenberger Tensometer. Represented by: H. A. Weaver, general man-ager, Steel City Testing Laboratory; Francis G. Tatnall, manager, testing equipment division, Southwark Foundry & Machine Co.

Spencer Turbine Co., Hartford, Conn. Booth 16.

Spencer Turbo-compressors for supplying air in connection with oil and gas burning industrial furnaces, foundry cupolas, etc. Represented by: S. E. Phillips, president; F. A. Wright, F. D. Bailey, O. J. Dingee.

Standard Alloy Co., Inc., Cleveland. Booth 19A.

Standard alloy carburizing boxes, lead pots, normalizing and pack heating furnace disks and spacers, enameling burning racks, heat resisting conveyor chain grates, furnace trays and shoes, chimney pots, furnace parts and miscellaneous heat and acid resisting castings covering in general the heat treating and chemical field. Represented by: Frank F. Jack-son, vice-president; Harvey M. Smith, sales director; Emer-son M. Williams, treasurer; J. H. Williams, secretary; Charles D. Cutting, Herbert A. Cutting.

Standard Tool Co., Cleveland. Booth 199.

Carbon and high-speed twist drills, reamers, milling cutters, taps, chucks. Represented by: W. P. Ross, sales manager; H. H. Polk, D. M. Dorsheimer, Jr., F. T. McGuire, C. C. Buck.

L. S. Starrett Co., Athol, Mass. Booth 248.

Mechanics' tools. Represented by: D. Findlay, sales manager; A. H. Starrett, master mechanic; D. Moffat, H. E. Masters.

Steel Casting Development Bureau, Philadelphia. Booths 316 and 314.

Steel castings of superior physical properties developed by care-fully controlled heat treatment; panels illustrative of the normal, annealed and heat treated structures of plain car-bon steels and special alloy steels, physical test specimens, photomicrographs. Represented by: George Batty, research director, and representatives of member companies.

Steel City Testing Laboratory, Detroit. Booth 217.

Style A hand Brinell machine; Type O3 power operated Brinell machine, latest model with chain drive; Type P portable hardness testing hammer; SKW adapter for scleroscope; Type R2 sheet metal tester; Southwark-Emery 60,000 lb. capacity universal testing machine; Brinell microscopes. Rep-resented by: H. A. Weaver, general manager.

Sullivan Machinery Co., Chicago. Booth 336.

WG-6 8 x 6 in. gas compressor, belt-driven from electric motor; WL-44 240 cu. ft. 4-cylinder vertical compressor (to furnish air to exhibitors). Represented by: H. C. Sargent, E. F. Pie.

Surface Combustion Co., Toledo, Ohio. Booth A. G. A. section.

Heat treating furnace with two stage burners and automatic temperature control for temperature range of 1200 deg. to 2000 deg. Fahr.; small oven furnace for high-speed steel treating; standard forge furnace; varnish burner; small oven heat treating furnace; circular cyanide hardening furnace; aluminum melting furnace; crucible brass melting furnace. Represented by: F. W. Manker, vice-president; C. B. Phillips, vice-president; C. A. Blesch, W. T. Fulton, Philip Kriegel, F. C. Starr, F. H. Trembley, K. H. Cree, E. A. Weaver.

Swind Machinery Co., Philadelphia. Booth 206.

Machine tools.

T

R. D. Thomas & Co., Philadelphia. Booths 100 and 102.

Westinghouse arc welders, T-grid furnaces, Gibb press and seam welders, Gibb spot welders, Hevi-Duty electric furnaces, Wanamaker arc welding electrodes. Represented by: R. D. Thomas, president, A. M. Taylor, C. M. Rusk.

Thwing Instrument Co., Philadelphia. Booth 276.

Thwing model 28 recorder, exhibited for the first time; Thwing radiation pyrometers (latest developments in this type of pyrometer including the new tube for permanent mount-ing); Thwing A5X pyrometer for non-ferrous metal tempera-tures; Thwing inspector's calibrating and checking set; Thwing electrical resistance thermometers. Represented by: C. B. Thwing, president; E. J. Albert, secretary and general manager; P. P. Bourquin, superintendent; A. S. Hall LeRoy Driscoll.

Timken Steel & Tube Co., Canton, Ohio. Booths 232 and 234.

Reception space. Represented by: A. J. Sanford, W. H. Wiewel, Robert Atkinson.

Torchweld Equipment Co., Chicago. Booth 176.

Gas welding and cutting equipment, improved cutting torches, Torchweld safety pressure regulators, acetylene generators, welding accessories and supplies. Represented by: W. A. Slack, president; R. M. Smith, assistant sales manager; M. N. Pike, L. R. McKean.

Transportation Engineering Corporation, Brooklyn. Booth 100.

Full line of Wanamaker coated electrodes and Rex electrodes, together with arc welding accessories. The Wanamaker coated and Rex electrodes are made in various diameters adapted for various classes of welding and in varying analyses to conform as closely as possible to the parent metal to be welded. Represented by: F. V. McGinness, president; H. W. Stortz, vice-president.

Harold E. Trent Co., Philadelphia. Booth 71.

Electric pot and trough type heat treating furnaces for lead, salt or cyanide; direct heat electric furnaces for steel treat-ing; melting pots for babbitt, solder, tin, etc.; and other Trent industrial equipment. Represented by: H. E. Trent, president; J. V. Calhoun, sales manager; C. M. Adams, J. R. Eves, and others.

Tuthill Pump Co., Chicago. Booth 277.

Full line of high grade rotary pumps, from ½ g.p.m. to 200 g.p.m. for use in heat treating departments or for general plant use in handling of oils for all uses, supplying coolant on machine tools, and thousands of plant uses. Represented by: O. L. Bock, H. C. Osborne.

U

Una Welding & Bonding Co., Cleveland. Booth 138.

Represented by: E. R. Alexander, president; E. W. Kronbach, general manager; A. A. Probeck, vice-president; L. S. Bur-gett, chief engineer; J. B. Austin, research engineer.

Union Mfg. Co., New Britain, Conn. Booth 239.

Lathe chucks; Union-Red roller bearing hoist, a new line. Represented by: H. H. Wheeler, treasurer; E. I. Stevens, G. V. Murphy.

Universal Steel Co., Bridgeville, Pa. and Cyclops Steel Co., Titusville, Pa. Booth 164.

Sheets of carbon and alloy steels, showing hack saw, gin saw, hand saw, circular saw, cutlery, magnet, high-speed, agricultural disk and soft center steels; bars of carbon, alloy and high speed tool steels, ball race, magnet, file and valve steels; sheets and bars of heat resisting and non-corrosive steel and alloys; cold-drawn bars and cold-rolled sheets; finished products from the foregoing; new die steel for hot forming and heading. Represented by, Universal Steel Co.: J. O. Rinek, assistant general manager; U. G. Miller, general superintendent; Frank Garratt, sales metallurgist; H. M. German, metallurgist; H. Copp, Jr.; Cyclops Steel Co.: Charles Evans, vice-president and general manager; F. F. Harter, F. H. Cooke.

Unishear Co., New York. Booth 207.

Mighty Midget Unishear, Model A-14 Unishear, Model O-54 Unishear, Model A-10 Unishear. Represented by: H. J. Heller, vice-president; George B. Shiras, sales manager; H. H. Gildner.

V

Vanadium-Alloys Steel Co., Latrobe, Pa. Booths 156 and 157.

High speed, alloy and tool steels; fractures of same showing the effects of different heat treatments; tools showing typical applications of these steels; cold-drawn, high-speed, alloy and carbon tool steels with products of same. Represented by: Roy C. McKenna, president; Floyd Rose, vice-president; L. D. Bowman, works manager; J. P. Gill, metallurgist; R. B. George, M. W. Caruthers, W. R. Mau, F. W. Potts, D. L. Bardes.

Vanadium Corporation of America, New York. Booth 257.

Ferro vanadium, silico vanadium, aluminio vanadium, vanadium metal (95 per cent), ferrochrome, ferro silicon, Alsifer; vanadium steel railroad springs, valve springs, carbon vanadium automobile crankshafts, forgings, etc. Represented by: Ward A. Miller, vice-president; B. D. Saklatwalla, vice-president, J. A. Miller, Jr., general manager of sales; G. A. Laub, assistant general manager of sales; H. T. Chandler, assistant to president; N. Petinot, assistant to president; G. L. Norris, chief metallurgical engineer; Jerome Strauss, chief research engineer; C. N. Dawe, C. B. Woodworth.

Van Dorn Electric Tool Co., Cleveland. Booth 292.

Standard line of universal tools, such as drills, grinders, electric screw drivers, electric wrenches and electric hammers, as well as reamers. Represented by: F. H. Zulauf, vice-president and general manager; Lyman H. Bellows, general sales manager; Louis Charnicky, S. S. Waters.

Vulcan Crucible Steel Co., Aliquippa, Pa. Booth 224.

High-speed, alloy and carbon tool steels and special steels. Represented by: S. G. Stafford, president, R. M. Kelso, A. D. Beeken, Jr., S. A. Stafford, W. H. Norris, Norman C. Einwechter, C. E. Conway, W. F. Kline.

W

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Booths 133, 135 and 137.

Complete line of portable electric welders, one in operation; sectionalized pot-type electric furnace; double Nuttall gear unit; Nuttall mill unit, and other displays of Nuttall gears. Represented by: T. C. Kelley, W. W. Reddie, A. M. Candy, A. P. Lesnick, William Norberg, G. H. Koch, Mark Dawson and P. H. Grunnagle.

Wheeling Mold & Foundry Co., Wheeling, W. Va. Booth 299.

Section of chilled iron sheet mill roll, section of alloy steel heat treated roll; section of Wheeling metal roll, alloy steel heat treated forging die, and alloy steel hammer ram. Represented by: H. E. Field, president; E. A. Balsley, vice-president; R. C. Heaslett, Craig Adair.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass. Booth 147.

Hy-ten alloy machinery steels; Whelco tool steels in application to special parts, and replica of open-hearth furnace in operation. Represented by: A. Oram Fulton, president; F. H. Lovejoy, vice-president; E. C. Bartlett, S. W. Parker, C. R. Jenks, A. L. Knight, A. F. Erikson, H. B. Briggs, H. M. Foster, G. S. Longley and T. W. Knight.

Whitney Metal Tool Co., Rockford, Ill. Booth 273.

New 18 in. and 24 in. throat depth ball bearing punches. Represented by: Gus Jensen and John Jensen.

Wiedemann Machine Co., Philadelphia. Booth 236-A.

Photographs of plant and various parts. Represented by: Theodore Wiedemann, president; Henry Bockrath, vice-president; Joseph H. Bockrath, secretary, and Otto F. Wiedemann.

Edwin L. Wiegand Co., Pittsburgh. Booth 71.

Complete line of Chromalox products, such as strip heaters, space heaters, immersion units, complete electric heaters, automatic electric water heaters, etc. Represented by: Ernest N. Calhoun, sales manager; C. M. Adams, H. E. Trent, J. V. Calhoun.

J. H. Williams & Co., Buffalo. Booth 226.

Drop-forgings, for automobiles, airplanes, etc.; drop-forged wrenches from chromium-molybdenum and plain carbon steel; monkey wrenches, bull dog wrenches, drop forged clamps, crank handles, eye bolts and hoist hooks. Represented by: J. C. Scanlon, general sales manager, special forgings; Philip Rigby, Walter Linde.

Wilson-Macaulen Co., Inc., New York. Booth 78.

Rockwell hardness testers, indicating pyrometers, recording pyrometers and automatic temperature controllers. Represented by: G. B. Duff and William Printz.

Wilson Welder & Metals Co., Hoboken, N. J. Booth 95.

Model S 200-amp. welding machines, one driven by electric motor, and other by gas engine, in operation; also Wilson Color-tipt welding wire and other accessories. Represented by: T. B. Hasler, president; E. D. Bransome, vice-president; Alexander Churchward, technical manager; J. A. Quarumby, sales manager; Harry Schemm, demonstrator, and representatives from Joseph T. Ryerson & Son, Inc., and Peter A. Frasse & Co., Inc., distributors.

Y

Young Brothers Co., Detroit. Booth 233.

Electric laboratory ovens; working models of continuous conveyor ovens; photographic display; and descriptive literature of various types of ovens. Represented by: George A. Young, president; R. B. Reed, sales manager.

Z

Ziv Steel & Wire Co., Chicago. Booth 225.

Various tools and dies made from company's tool steels, and Darwin & Milner, Inc. tools and dies made from Neor and Cobaltrom PRK-33 steels. Represented by: N. J. Hyslip, vice-president; A. F. Brunck, general sales manager; V. F. J. Tlach, president, Darwin & Milner, Inc.; John R. MacCracken and H. L. Harrison of Darwin & Milner, Inc.

British Methods of Forging Large Seamless Drums

METHODS used by John Broun & Co., Sheffield, England, to manufacture forged drums for extra heavy pressures were described in a recent paper by H. E. Yarrow before the British Association for the Advancement of Science. Mr. Yarrow recommended the use of circular drum-ends or headers, which might be riveted on if the pressure was to be less than 600 lb. per sq. in., but should be closed in without seams for higher pressures.

To secure sound material in the actual forging, sufficient material is removed from the top of the ingot. When cold,

the ingots are cut to length and a hole of considerable diameter is trepanned through them.

In the forging process the ingot is both expanded and drawn, and thus is worked both circumferentially and longitudinally. The closed-in end drums are bored after the completion of the forging process, and when cut to length are closed in, particular care being taken to insure that the deformation of the material takes place gradually. The forgings are then heat treated so that the physical properties of the boiler ends are similar to the rest of the forging.

Precision Heat Treatment for Gears

Six-Zone Annealing, Controlled to 7 Deg., Necessary for
Maximum Machinability—Oil for Quenching
Presses Held to 3 Deg., Plus or Minus

AS outlined in former articles, the heat treating equipment installed at the plant of Dodge Brothers, Inc., Detroit, is placed in two plants, No. 1 for treating machined parts, and No. 2 for treating rough forgings. Units are installed for several general classes of operations: (a) normalizing, quenching and drawing of forgings¹; (b) carburizing,² quenching and drawing; (c) cyanide hardening and drawing; (d) heating in electric furnaces, quenching and drawing; (e) lead hardening. Sometimes combinations of these, such as electric furnace heating and cyaniding, are met.

The present article will describe operations on transmission and ring gears. The former are upset from bars analyzing 0.48 to 0.53 per cent carbon, 0.80 to 1.00 chromium, and 0.15 vanadium. The heat number is stamped

on each gear, and its identity is preserved through to the finished product.

Exact Annealing Gives Maximum Machinability

Dodge transmission gears are annealed in a double tunnel furnace of the pusher type heated by electricity and built by the Electric Furnace Co. The chambers are 46 ft. long, 40 in. wide and are separated by a 12-in. fire wall. The capacity is 1250 lb. per hr. per chamber. The work moves through the chambers in opposite directions, so that the charging end of one tunnel is the discharge end of the other. This permits hot trays to be reloaded and recharged without the necessity of trucking them back to the opposite end.

Operation is automatic and intermittent. A pusher moves the tray into the furnace at a predetermined time interval (approximately 12 min.) and simultaneously dis-

¹ See THE IRON AGE, Aug. 16, page 389.

² See THE IRON AGE, Aug. 30, page 513.

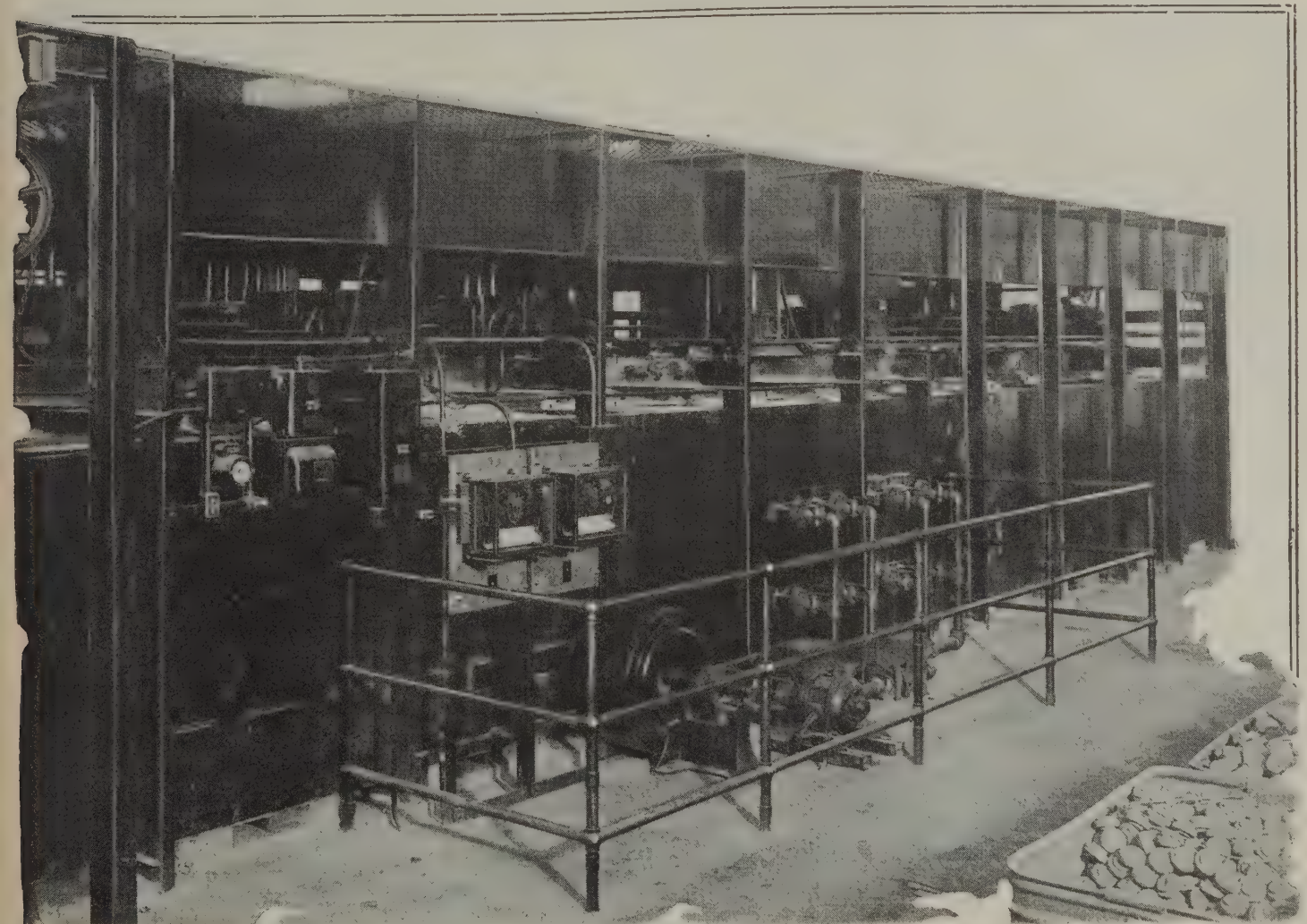


Fig. 1.—Side View of Furnace Annealing Transmission Gears. Work pushed through in trays. Equipment at side includes automatic temperature control, and automatic control of circulating air for cooling zone

charges a tray at the far end. Trays are of alloy steel, 12 x 36 in. in dimensions and are carried on three alloy roller rails. The load is approximately 200 lb. per tray.

The furnace is divided into six zones. First there is a heating zone, then a holding zone and after that a cooling zone, which is followed by three holding zones. Work in the cooling zone is cooled by forced air delivered by a blower through four pairs of cooling ducts made of chrome iron sheets that are located over and under the trays. Thus no air is blown into the furnace hearth. The ducts carry it across and heat is absorbed through the walls of the duct. Each duct has a hand control valve. A common mani-

temperature is electrically controlled by Leeds & Northrup recorders. Temperature is held within a range of $7\frac{1}{2}$ deg., plus or minus.

It is necessary in this furnace to produce and control the above cycle to obtain the desired microstructure, which is coarse lamellar pearlite with some massive ferrite without any sorbite or spheroidal cementite. Experience in the department has shown that this structure gives smoother finished gears from the gear shapers. All annealed blanks are held within limits of 187 to 207 Brinell.

After the transmission gears are annealed in the above described manner for best machinability, they go through

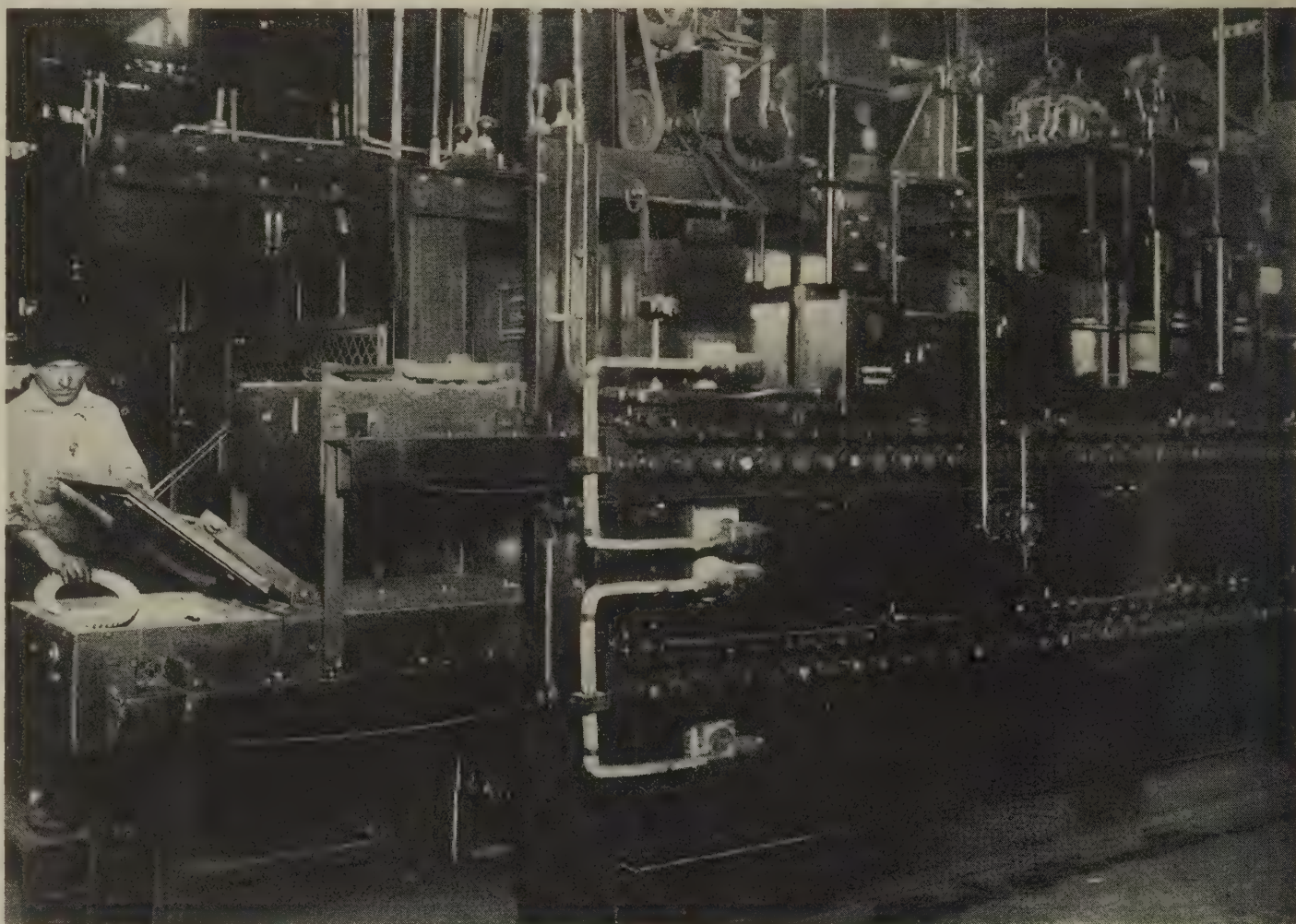


Fig. 2.—Double-Hearth Hardening Furnace for Ring Gears. Hearth bottoms are rollers, ratchet-driven through bars, cranks, and rod to eccentric on top of furnace

fold is run from the fan to the first four ducts and a second manifold to the second four ducts. The air supply of each of these manifolds is automatically controlled from a thermocouple inserted between the first and second ducts in the furnace over the trays, as indicated in one of the accompanying illustrations.

Power and time temperature cycles on this annealing furnace are: Heating zone, 150 kw., 2 hr. to 1600 deg. Fahr.; holding zone, 70 kw., 2 hr. at 1600 deg. Fahr.; cooling zone, no power, 1 hr. 15 min. cooling to 1330 deg.; first holding zone; $1\frac{1}{2}$ hr. at 1330 deg., 10 kw., top and bottom elements; and second and third holding zones 2 hr. 50 min., 15 kw., top and bottom elements. Work enters these holding zones at 1320 to 1330 deg. and is discharged at 950 deg.

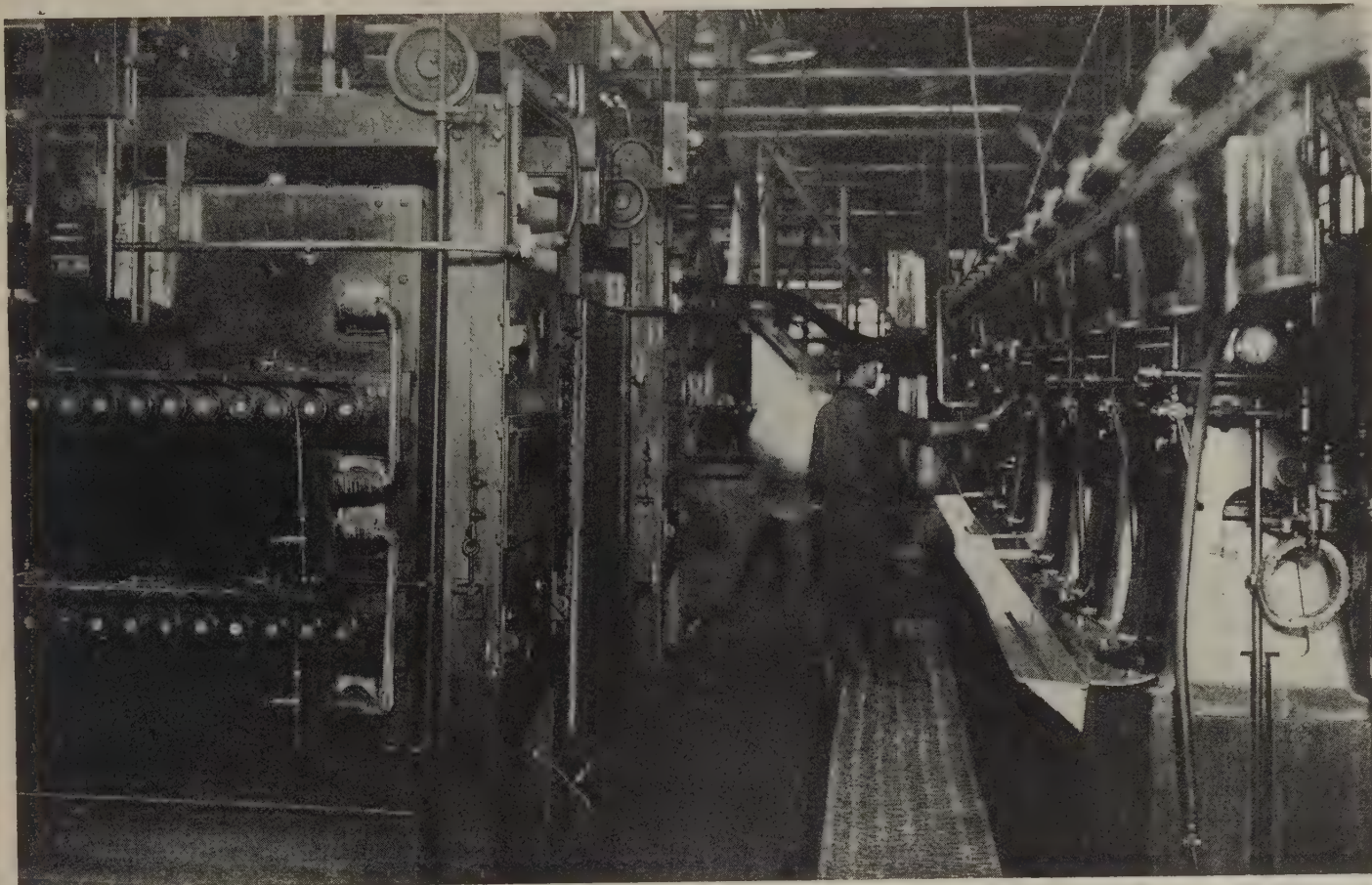
Work therefore remains in the furnace 9 hr. 35 min. There is a separate thermocouple for each zone and the

the various machine operations and are then ready for hardening.

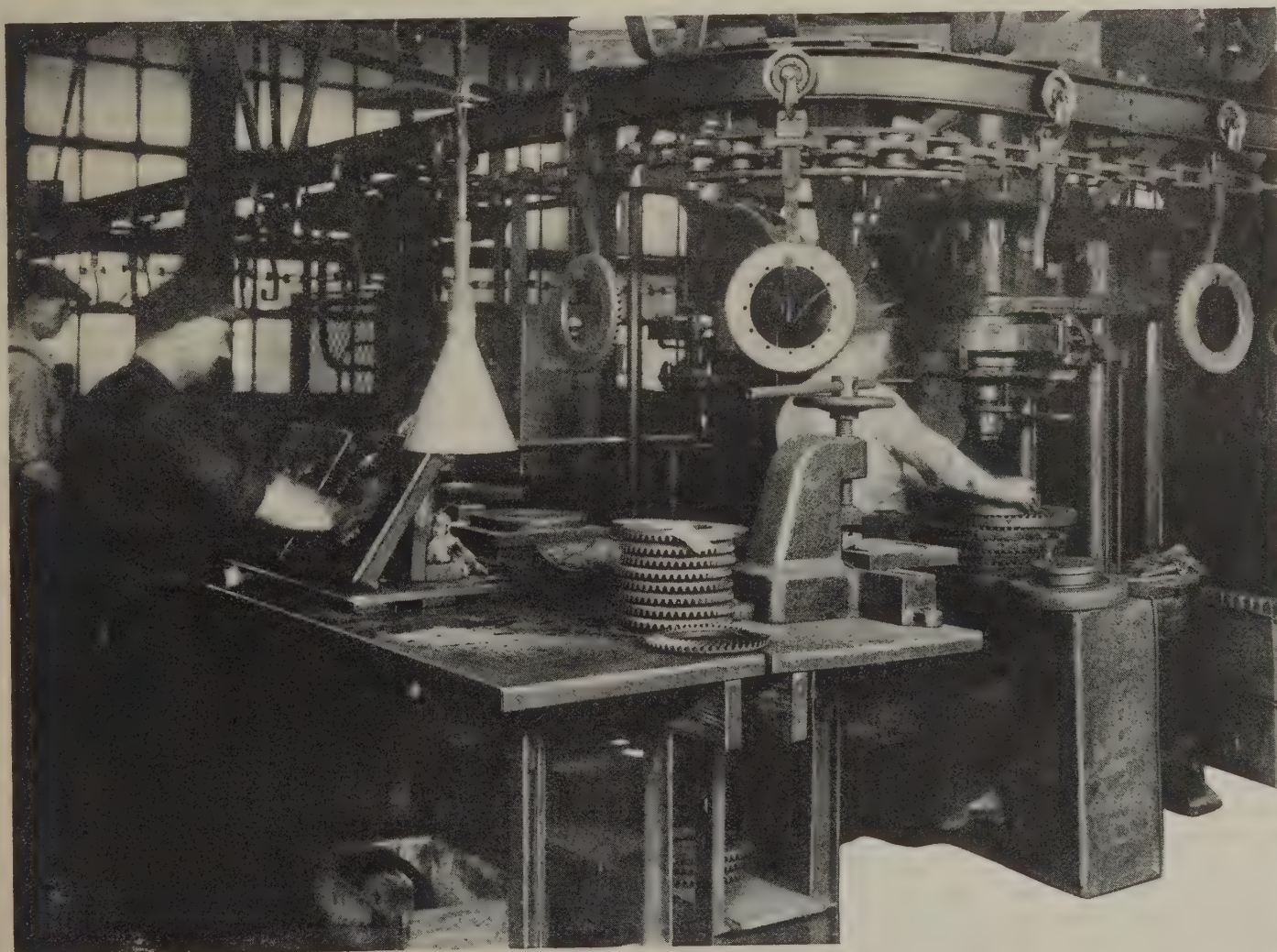
Transmission Gears Hardened from Cyanide Pot

All Dodge transmission gears are hardened by a so-called duplex method, a combination of both electric furnace and cyanide treatment. Equipment for this work includes six 105-kw. rotary furnaces and six electrically heated 30-kw. cyanide pots. Four of these pairs were supplied by the American Metallurgical Corporation and two by the Electric Furnace Co. An oil quenching tank of the conveyor type is provided between each pair of furnaces and the cyanide pot is located near the discharge door of each furnace.

The rotary hearth furnaces are 10 ft. $7\frac{1}{2}$ in. in diameter, the hearth is 18 in. wide and the hearth area 27 sq. ft. On it are 20 stations, 18 of which are active. Each carries



*Fig. 3—(Above) Discharge End of Ring Gear Furnace. Battery of six quenching presses at right
Fig. 4.—(Below) Inspection of Finished Ring Gears for Flatness, Roundness and Hardness*



two fixtures of gears, each fixture holding three or four flat gears, or two clutch gears. Production varies from 450 to 750 lb. per hour.

Gears are kept in the furnace from 48 to 54 min. At the predetermined time cycle, i.e., $2\frac{1}{2}$ min., the hearth moves forward one station, a motor operated door opens automatically, the furnace tender removes the hot fixtures, places them in the cyanide pot and closes the furnace door. Gears are left in the pot exactly one minute and then removed to the old quenching tank. Time for holding the work in the cyanide pot is indicated by a signal light that burns one minute.

The furnace temperature is 1485 deg. Fahr. and that of the cyanide pot 1490 deg. The latter serves the dual purpose of cleaning off any scale and imparting a slight skin hardness. Oil in the quenching system is circulated through Griscom-Russell coolers and is maintained at a temperature of 90 to 110 deg. Fahr. At the front end of each tank is a propeller to promote a better circulation around the hot gears.

From the quenching tank the gears are suspended from a conveyor that passes through a washing machine and returns them to electrically heated drawing tanks. There are two of these tanks, each 5 ft. 10 in. wide and 19 ft. 6 in. long, containing 1000 gal. of oil. The gears, carried in wire baskets, are kept in these tanks for 45 min. at 400 deg. Fahr., after which they are hung on another overhead conveyor that carries them through a washing machine built by the Detroit Sheet Metal Works. They are then taken from the baskets and given a light wire brushing, and inspected for hardness. Gears are held to scleroscope limits of 72 to 76. It is stated that more than 1250 gears will pass before one rejection is encountered.

Each oil drawing tank is heated by twelve 5-kw. Westinghouse units ranged along the sides of the tank. Baffles are located in front of each heater and a propeller in the end of the tank forces the oil through the center of the tank along the conveyor and back inside the baffles past the heaters.

Ring Gears Oil Quenched in Press

Rear axle ring gears for Dodge motor cars, after forging, are annealed at 1700 deg. for 3 hr. in continuous electric furnaces (described on page 390, issue of Aug. 16), one hour of which is at heat, and then cooled in boxes. The next operation is machining, after which they are carburized in a counterflow furnace and box cooled, as shown on page 513, issue of Aug. 30. This produces a case depth of 0.035 in. to 0.040 in. They are then hardened in a roller type hearth furnace (Fig. 2) with a temperature range of 1430 deg. to 1440 deg. in the heating zone, being kept

in the furnace 42 min., quenched in oil in a Gleason press, and drawn 40 min. at a temperature of 300 deg. Gears are then cleaned in a washing machine built by the G. & M. Industrial Equipment Co., Detroit. Hardness inspection follows and then an inspection for flatness and roundness. (Fig. 4.) Straightening is done if necessary. File and scleroscope tests on the finished gear must approach a file hardness and within a scleroscope hardness of 80 to 90.

Two roller hearth furnaces built by the Electric Furnace Co. are used for hardening the ring gears. Each has two tunnels, one above the other. The gears are propelled through the furnace by 30 rollers that form the hearth and are driven outside the furnace walls by ratchet and an eccentric through a speed reducer from the motor located on top of the furnace. This drive is shown at the right center of Fig. 2.

These furnaces are 9 ft. 2 in. long and 24 in. wide and are arranged to bring the gear up to heat in 30 min. and to soak for 12 min. In the first zone of each chamber 23 kw. of energy is required, and 12 kw. in the second zone. Each tunnel delivers 28 gears an hour. A signal flashes 15 sec. before the gear reaches a stop at the discharge end. The loading end shown in Fig. 2 is arranged with trap doors and guides so that the gears must maintain a staggered position one inch apart. Six Gleason quenching presses (Fig. 3) with dies of improved design are located in front of the furnaces. Oil is delivered to the gears in the press at the instant of quenching at 30 lb. pressure through 2-in. lines.

Oil Circulating Systems

Oil for quenching ring gears is carried in a 1000-gal. underground storage tank and is pumped by a centrifugal pump driven by a 50-hp. motor at 40 lb. pressure at the pump and 30 lb. pressure at the quenching machine. It passes through a Griscom-Russell tubular cooler that holds the pressure constant. Water for cooling the oil is taken from a cooling tower. The oil temperature is controlled automatically by Tagliabue air-operated controllers and diaphragm motor valves. These valves are opened and closed by air pressure. Air is admitted or allowed to escape by a Griscom-Russell controller.

Oil for quenching the transmission gears is stored in a 5000-gal. tank, and is pumped and controlled by a similar unit. The control of the oil temperature is very close at the Dodge plant, being within 3 deg., plus or minus, in the ring gear unit and 10 deg., plus or minus, in the transmission gear unit. The capacity of the ring gear unit is 700 gal. of oil per min., and that of the transmission gear unit 600 gal. per min.

Metal Fuselage Becoming More Popular in European Aircraft

A BRIEF comment on the annual exhibition of aircraft held in the Grand Palais, Paris, was printed in *Engineer* for July 20. From this it is gathered that many countries sent planes, and while there is a noticeable trend toward uniformity in the main details of design, it is obvious that each country is developing a type primarily adapted for its needs. For instance, civil aviation in England and Italy desires overseas communication; Germany represents the other extreme in covering its own territory.

"Bristol" machines particularly show sound mechanical construction, in pleasing contrast with the artifice of punching holes and stressing with wires in order to secure lightness which many machines at one time displayed. All the Continental machines which may be regarded as illustrating progress are noted for their clean appearance, and most of the French airplanes are now made with stiffer sections instead of with very small angles riveted and stressed with wires. The old and rather flimsy construction has prac-

tically disappeared. It was noticeable that the majority of machines shown were built almost wholly of metal.

Another feature is the increasing use of reduction gears between the engine and propeller. At one time it was feared that such mechanism would prove unreliable, but the type of gear usually employed has stood up to the work, and is now used on a number of the most prominent machines. There is, consequently, a tendency to adhere to the two-bladed propeller, and this also is often metallic.

The rotary engine has practically disappeared, and the question whether the straight engine or the radial type engine is to be preferred, seems to be answered in favor of the latter. There do not appear to be many cases of straight engines being substituted for the radial type air-cooled engines, and the latter were more strongly represented at the show than formerly, but the Germans use both types, and in Italy the V and W-shaped engines appear to retain their popularity.

Numerous Uses for Bessemer Steel

Cannot Be Duplicated by Open-Hearth Grades for Screw Stock—
Makes Excellent Pipe, Bolts and Implement Bars

BY JOSEPH R. MILLER*

IN these later years Bessemer (that is, acid Bessemer) steel has been passing—for in one after another of the purposes for which it formerly was used it has been replaced by open-hearth steel, and in one use after another it has failed in workability and service.

There are three reasons for this situation. First, open-hearth steel with its control of the phosphorus content is available in increasing quantities, and this, of course, is the greatest of the three reasons. Second, service requirements have grown more and more severe; there are more cold operations and there is greater severity in fabricating methods. Third, Bessemer ores of low phosphorus content are becoming scarcer and the ores now available yield a product somewhat higher in phosphorus than was the case in the old days, when Bessemer steel had a pretty good quality reputation.

Open-hearth steel properly made can be a very good quality material. With the control over phosphorus and the more leisurely method of oxidation, and an opportunity to do more or less complete deoxidizing and refining before tapping, open-hearth has a distinct advantage over Bessemer steel from the standpoint of quality and adaptability. With this better material available, the demands of the steel user and fabricator became more severe. And as men could get steel that would stand it, uses and operations came into vogue that were too severe for Bessemer steel. In this way many people have grown to think it inferior and, like anything else that is peculiar, there are certain things for which it should never be used.

Old-Time Bessemer Steel Was Better

When Bessemer steel was used without much limitation for structural sections and rails it was undoubtedly a better product than now, in other ways beside that of lower phosphorus content. Old Bessemer men maintain that the earlier blast furnace practice produced a better iron for Bessemer operations. It is also likely that the older Bessemer men were more skillful, in the art of blowing, in bringing out the proper quality in the blown metal, aided perhaps by peculiar qualities of virtue in the iron, as they say. Be this as it may, the present problem in the use of this product must take account of it as it is, for any trend for betterment cannot be expected.

In spite of these considerations, there are certain purposes for which Bessemer steel is better fitted than open-hearth steel, and there are many uses to which the two are equally adaptable; and it is in these uses and for the convenience of the duplex process that the Bessemer plant survives.

The qualities which give Bessemer steel value for certain definite uses or combinations of uses are three:

- a. Machineability.
- b. Weldability.
- c. Stiffness.

These qualities are greater in Bessemer steel and they can be combined in unusual ways so as to produce desirable results. For instance, we can make a weldable steel that is easily machineable, while any weldable steel made in the open-hearth furnace will not be particularly easy to

machine, and especially to thread. This makes the Bessemer very good as pipe steel and especially for the internal threads of pipe couplings. This also makes it successful for bolts and rods which are to be threaded and welded. This material, also, will be stiffer and stronger than either iron or weldable open-hearth steel. The combination of weldability and stiffness and superior machineability gives the soft grades of Bessemer steel a place of preference for the agricultural implement trade and similar uses.

With added sulphur, and sufficient manganese content to carry it, different gradations of a free-cutting material are produced: steel for cut thread bolts and nuts, steel for wood screws with more moderate manganese content, and the magnificent Bessemer screw steel, which cannot be duplicated for its purpose by any other steel mixture.

Interchanging in the Higher Carbons

In the higher carbon grades Bessemer steel is made for many special uses, and particularly for the agricultural implement trade, which in the main sticks to its old habits. These grades have the advantage of being a little stiffer in Bessemer. The mills have with permission substituted open-hearth of equivalent stiffness in higher carbons on many occasions, so that an interchangeability has been mostly established. In substituting basic open-hearth steel, in a general way the carbon content must be 0.15 per cent higher than that of Bessemer, but allowances are made for manganese and silicon, as the 15 points of carbon are allowed for the natural inherent difference from the Bessemer.

In structural shapes Bessemer steel is used successfully up to certain thicknesses and sizes. One will follow very closely these rules:

I-Beams—10 in. and smaller, but seldom above 6 in. Channels—10 in. and smaller, but seldom above 8 in. Angles—6 x 6 x 7/16 in. and lighter, but seldom put in 6 x 6-in. angles; the usual limit applied is 6 x 4 x 7/16 in. Tees—All sections 7/16 in. thick and less.

Trouble with Bessemer shapes is experienced at times in cold punching, shearing, curving to a radius, etc. They are especially susceptible to damage in straightening, and for this reason occasionally one fractures when suddenly overstrained, as by a fall or quick jerk in lifting. This is often a cause for undue alarm about their safety in use; with ordinary care in fabrication, however, they are safe for any standard specifications that allow them.

Bessemer steel which runs above the normal manganese content is apt to be brittle. This is somewhat more marked in the grades carrying sulphur, so that the regular Bessemer screw steel is a somewhat brittle mixture, and should not be used for any structural purpose. The bolt steel, however, carries a normal manganese and is not brittle. For the most part these grades are ruled out of structural use by sulphur specification limits.

Fills Out the Section More Closely

In the rolling mills Bessemer steel has a tendency to resist and fills the grooves, and so, on certain sections with deep flanges or sharp corners, it makes a superior dimension. In cold drawing it comes from the die larger and

*245 Melwood Avenue, Pittsburgh.

more uniform in size than open-hearth, and it tends to have a brighter surface. Sometimes these features favor the use of Bessemer.

Attempts have been made to simulate Bessemer qualities by making additions of phosphorus to open-hearth melts. The result is not the same. The phosphorus content is not different and some stiffness is added, with the bad fault of cold shortness to some degree. But it does not to any degree help machineability, and when so added phosphorus destroys welding quality. These experiments make the causes for the easy machining and the good welding qualities of Bessemer steel very obscure.

Knowledge of Facts Will Help Users

There are these special peculiarities which make it necessary to use precautions in applying and in working Bessemer steel. Were these facts well known to users of steel

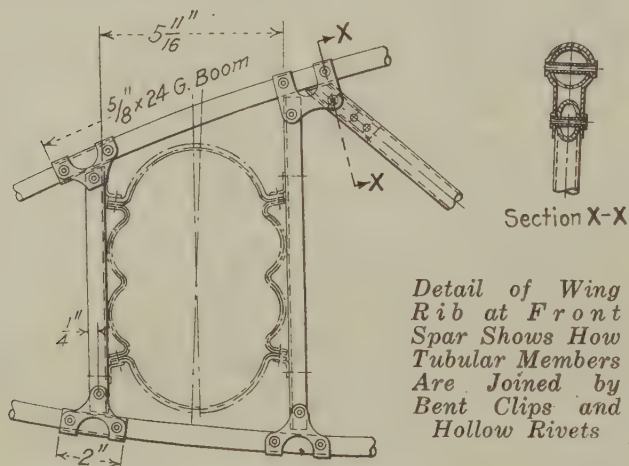
a permanent confidence would be established behind its use. The main points in which the Bessemer grade is inferior depend upon a tendency toward brittleness under shock or under the effects of cold working, such as bending, punching and shearing. This is accentuated in the grades that carry manganese in amounts above normal—say, above 0.50 per cent roughly, or in segregated portions where the phosphorus tests high—say, much above 1 per cent. Besides this cold shortness, certain Bessemer grades show a more or less marked critical temperature in forging, especially when hot bending is involved—a sort of hot shortness without the expected sulphur as a cause.

If a few of these things are remembered, the use of Bessemer can be regulated properly and its application extended in the right channels, and proper care taken in its fabrication so that it is safe to perform the service for which it was specified.

British Flying Boats Made Entirely of Duralumin

Protection Given Against Corrosion by Anodic Oxidation Process—Light Alloy Found Superior to High-Strength Steel or Wood

ALL-METAL flying boats constructed by Short Brothers, Ltd., Rochester, England, are described in great detail in *Engineering* for Aug. 17. A 20,000-mile flight was taken a year ago in one of these boats by Sir Alan Cobham, powered by two Rolls-Royce "Condor" engines. The above



noted article describes a pair of machines constructed during the spring, which have three Bristol "Jupiter" geared engines, each developing 525 hp. at 2200 r.p.m. These are bi-planes of 93 ft. span, weighing 12,404 lb. empty. Each can carry 7596 lb. of load, which includes 15 passengers, pilot, navigator, steward, luggage, instruments, and gas and oil for a 500-mile flight.

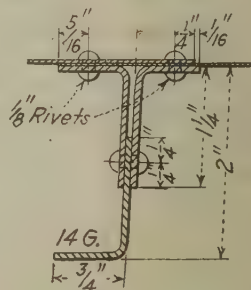
Duralumin, protected against corrosion by the anodic oxidation process, is used for the bracing and the covering of hull, wing floats, and engine nacelles. (The latter are mounted midway between planes.) This light strong alloy forms the main spars, ribs and skeleton bracing of wings, rudder and ailerons. These parts are covered with doped fabric except for walkways of duralumin plate on the lower wing for platforms under the engines and walkways on the wing floats. The builders consider that duralumin is as light in weight as high-tensile steel for skeleton frames, is easier to work, and is also less liable to local injury on account of the greater thickness necessarily employed.

Details of the wing construction are shown in an accompanying illustration. The front spar shown dotted is uni-

form in shape from end to end, and consists of semicircular troughs top and bottom and corrugated sides. These are connected at the lapping flanges by 5/32-in. rivets. The plates are formed in a hand-operated screw press using metal-faced hardwood dies, and afterward finished by rolling. The number of plates used (all of No. 18 gage) depends upon the bending moment to be resisted. Joints between the duralumin tubing forming chords and diagonal bracing of the ribs are made by clips pressed from stainless steel sheet and 1/8-in. hollow rivets.

The hull and the engine nacelles are made of a number of cross frames to which is riveted the outer skin of duralumin sheet, varying from 14 gage to 22 gage. The interior of the hull and nacelles is entirely clear, except for

All Main Frames of Hull Are Made of Double Angles, to Which Outer Surface Is Riveted, and Flanged Plate to Give Lateral Rigidity



the depth of these frames. The latter are of varying construction, depending upon the load requirements; a sketch herewith may be taken as typical of the stronger ones in the hull. Between frames the outer skin is riveted to stiffeners of Vee cross section, the ends of the legs being flanged out for rivets on 2-in. centers. No water-tight packing material is used between the joints in the outer skin, water tightness being secured with a metal-to-metal joint by close riveting below the water line.

Duralumin has these advantages over wood for the construction of that portion of the flying boat which is submerged when in port: Its strength is known with much greater certainty. The weight is less for a structure of equal strength. Water soakage, which may add 500 lb. to the weight of wooden members after some service, is entirely eliminated. Metal hulls remain watertight and may readily be repaired by cover plates if punctured.

The Factory as an "Attractive Nuisance"

An Industrial Plant May Incur Serious Liability Through Injuries to Trespassing Children Attracted by Its Equipment

BY LESLIE CHILDS*

FAILURE to guard factory premises from access by children has frequently proved a costly mistake in management. Under the doctrine of "attractive nuisance" children, attracted by the nature of industrial equipment, may be held to have rightfully entered the premises, upon the implied invitation of the owner.

If such a child suffers injury, through contact with the plant machinery or equipment, the owner may be placed in a difficult position to defend an action for damages. The possible danger to industrial plants in situations of this kind is illustrated in a striking manner in the recent Texas case of *Duron vs. Beaumont Iron Works*, 7 S. W. (2d) 867, which arose under the following facts:

Machinery Attracts Children

In this case the defendant was engaged in the manufacture and sale of iron and machinery. It maintained an A-frame derrick, painted a salmon color, which stood in bold relief against materials and other equipment.

This derrick was upon the defendant's premises, located in a factory district, and access was easy by way of a spur track, which ran by the derrick and was frequently used as a footpath by people traveling in that vicinity. It does not appear that the premises of the defendant were guarded by a fence or otherwise, but there was evidence to the effect that defendant's employees ordered boys away from the derrick, because of the danger of their playing upon it.

On the day of the accident which resulted in this suit, the plaintiff, a boy between 13 and 14 years of age, accompanied by a younger brother, went upon the defendant's premises and began playing around the derrick. The boys in some manner started the boom of the derrick in operation, the plaintiff got his left hand in the cog wheels of the machinery, and all the fingers with the exception of the thumb were mashed off. Plaintiff thereafter brought action for damages against the defendant for the injury suffered.

This action was squarely based upon the doctrine of attractive nuisance—that the derrick was attractive to children of tender years and that, therefore, it became the duty of the defendant so to guard this machinery as to prevent injury to children who might come in contact with it. On the issue as raised, the trial of the cause resulted in a judgment against the defendant of \$5,000. The defendant appealed, and the higher court, in stating the case before it, said:

Attractive Nuisance Defined

"The theory of liability under the attractive nuisance doctrine is that, where the owner maintains a device or machinery on his premises of such an unusually attractive nature as to be especially alluring to children of tender years, he thereby impliedly invites such children to come upon his premises, and, by reason of such invitation, they are relieved from being classed as trespassers, but are in the attitude of being rightfully on the premises.

"Under such circumstances, the law places upon the owner of such machinery or device the duty of exercising ordinary care to keep such machinery in reasonably safe condition for their protection, if the facts are such as to raise the issue that the owner knew, or in the exercise of ordinary care ought to have known, that such children were likely or would probably be attracted by the machinery, and thus be drawn to the premises by such attraction. . . ."

Following the foregoing statement of the legal principle involved, the court turned to the record to ascertain whether or not the evidence was sufficient to hold the defendant liable thereunder. In reviewing the record, and in passing upon this question, the court used the following language:

What the Court Decided

"We think the evidence amply supports the findings of the jury. In the first place, the photograph of the hoisting derrick, . . . shows a device which a jury might conclude was well calculated to attract the eye of childhood. It was painted an attractive salmon color, and stood in bold relief, bright and attractive in the sunlight, while everything else about it was black, dirty and greasy.

"The giant boom . . . at the time of the accident was raised and extended some 40 or 50 ft. in the air. It and the derrick also were latticed with steel strips, which rendered it easy to climb, thus constituting a mute appeal to the climbing propensities of the average boy. Connected with the machine were pulleys, cylinder drum, cogwheels, ropes, and there was a platform leading up to it.

"The machine was not one in such general use as to be familiar to the average child. Each of the boys testified that he was attracted by the machine and went over to examine it and see how it worked. They also stated that they had passed by the machine many times, and had been theretofore attracted by it, but on these occasions had not had time to play with it; that they had made up their minds to go over and see how it worked as soon as they got a chance. . . .

"The device in this case was of such a nature as to be not only attractive for climbing purposes, but the machinery connected therewith which operated the giant boom was reasonably calculated to, and it seems did, arouse the curiosity of the injured boy and his brother. It also appears that the attractiveness of this device had theretofore allured other boys to inspect it. . . . We find no error presented that demands a reversal of the judgment of the trial court. . . . Judgment . . . affirmed."

In the light of this decision and other holdings it would be well for every owner or operator of an industrial plant to ask: "Is there upon my premises any machinery, equipment or condition that may fairly be termed an attractive nuisance?" And, if the answer is in the affirmative, a judicious expenditure, in erecting fences, walls or other barriers that will make the premises proof against access by children may prove a wise investment.

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Forging Machines of Heavier Design

Low-Weight Accurate Forgings Produced, with Pierced Holes That May Be Finished by Broaching

PROGRESS in the manufacture of machine forgings was reflected in the improved forging equipment and methods demonstrated recently by the National Machinery Co., at its Tiffin, Ohio, plant.

New models of high-duty forging machines, ranging in size from 2 to 7½ in., the latter weighing 365,000 lb. and said to be the largest ever built, were shown. These are of more rigid construction than those previously built by the company and are arranged so that the forging tools are maintained in the close alinement necessary for accurate work. To the development of machines of sturdier type is attributed the progress in the methods of manufacture and the improved quality of the machine forgings.

Low weight forgings of the internal displacement type are produced with pierced holes that are accurate within 0.015 to 0.020 in. of size, so that drilling is eliminated and the holes may be finished by broaching or reaming. The newer models also require less material to forge and a minimum of machining to finish. In accuracy of size and shape the forgings are said to approach die castings, and require the removal of only 1/32 to 1/16 in. of metal in finishing.

The majority of the machine-made forgings are produced without flash, and where there is a flash it is usually slight and is trimmed off in the dies. There is considerable saving in the cost of material by buying unannealed stock, it is pointed out, because the stock in being cut hot in the forging

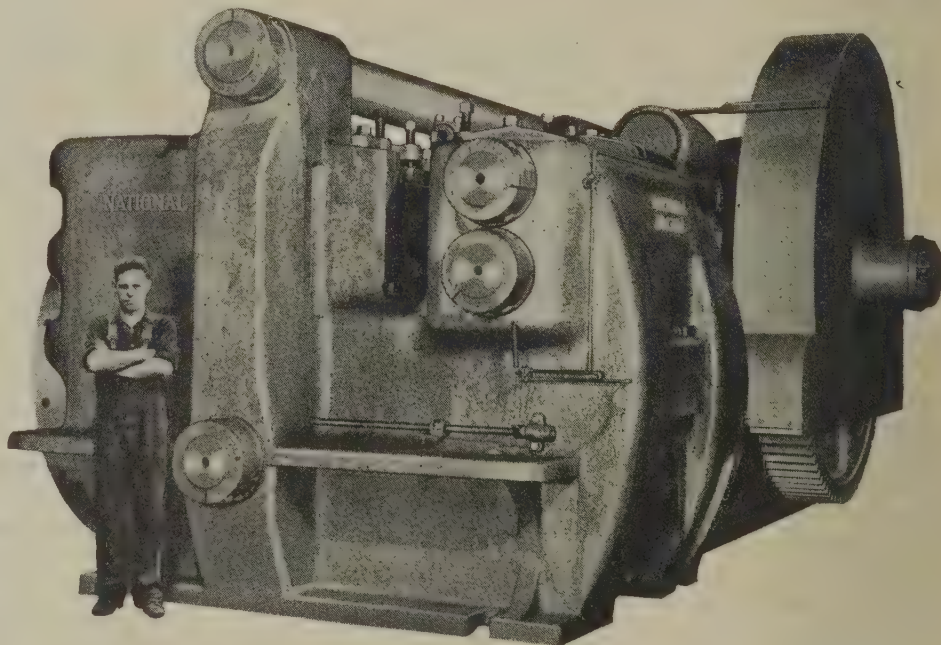
machine does not require annealing. The scrap produced by the forging is limited usually to a short crop end and a very small slug from the hole.

The new machines have short compact bed frames, much of which are located below the floor line. In addition, massive tie bars are used to resist tension stresses. Compactness of the bed frame has been made possible, as in the company's previous line of machines, described in THE IRON AGE of Feb. 18, 1926, by the overarm heading slide which extends over and beyond the crankshaft. This added length of slide, together with the narrow width, is said to provide

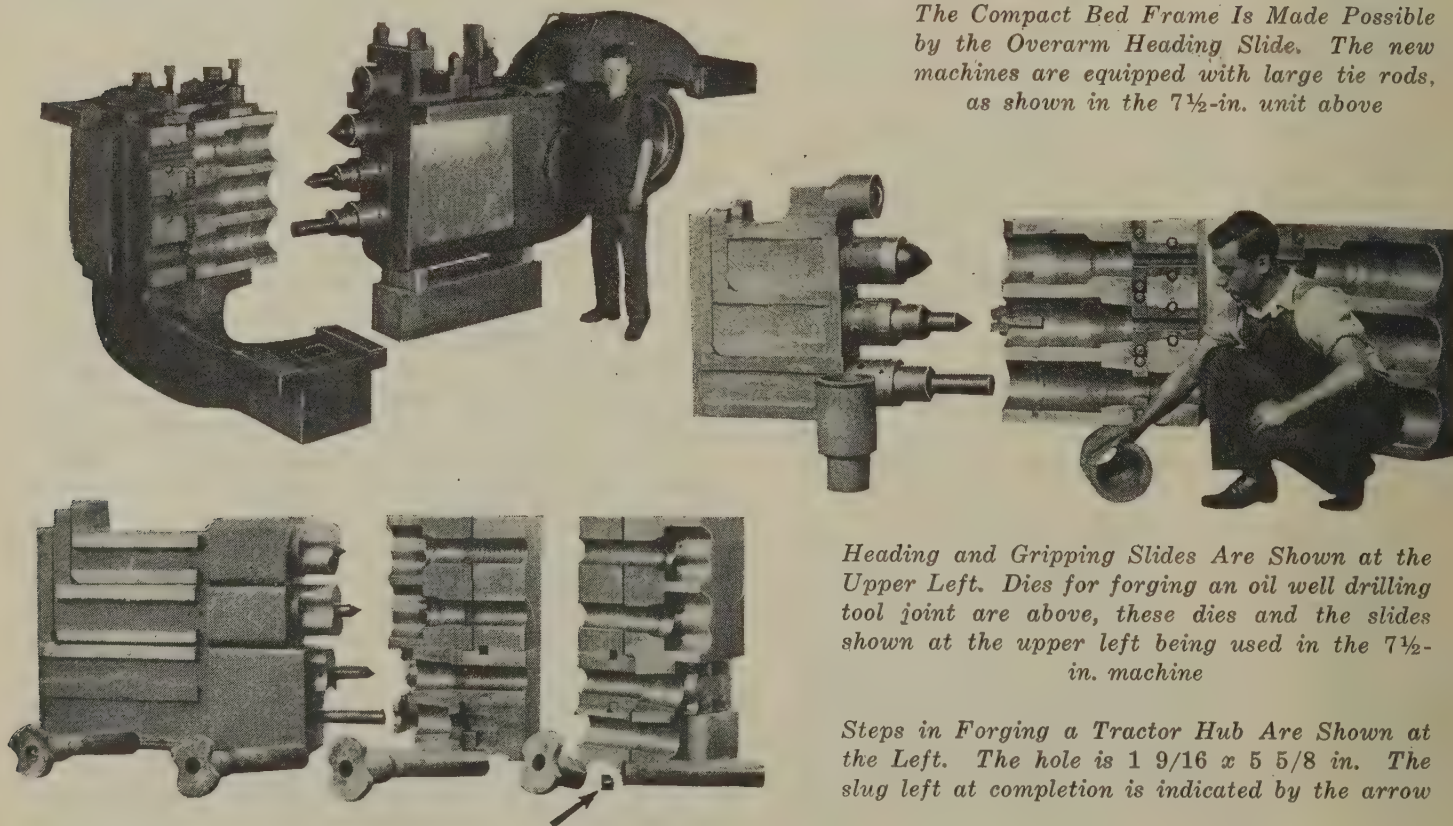
an accuracy of movement to the heading slide that makes possible the internal displacement forging process. The same principle is applied to the grip slide, the long outboard support being a factor in securing close registration of die impressions. This construction, combined with powerful gripping action, is emphasized as keeping the dies closed against the hydraulic action of the heading tools on the hot stock and preventing swollen shanks and part line flash, the elimination of which materially increases the life of the dies.

Forgings Pierced Progressively

Progressive piercing of various types of forgings may be done on these machines. In deep piercing the stock is spread until it reaches the confines of the pierced die impression, there being no extrusion or lengthening of the upset portion. A recent



The Compact Bed Frame Is Made Possible by the Overarm Heading Slide. The new machines are equipped with large tie rods, as shown in the 7½-in. unit above



Heading and Gripping Slides Are Shown at the Upper Left. Dies for forging an oil well drilling tool joint are above, these dies and the slides shown at the upper left being used in the 7½-in. machine

Steps in Forging a Tractor Hub Are Shown at the Left. The hole is 1 9/16 x 5 5/8 in. The slug left at completion is indicated by the arrow

development is a die arranged so that the forging may be partly sheared from the bar, with the shear serving as a backing in the die against which the stock is forced by the piercing tool, thereby squaring the end. Being still attached to the bar, the forging can be transferred to another impression in the die in which the shearing operation is completed.

The making of forgings from the bar and piercing a hole completely through the blank is an important application of deep piercing on these machines. The blank is sheared from the bar, carried over into the die impression and on the same stroke a hole is punched through the blank. The thickness of wall of the pierced forging may range from that ap-

proaching seamless steel tubing up to several times the diameter of the pierced hole.

One application of the new 7½-in. machine, shown in the illustration, is in making a hollow tool joint used in oil well drilling. This forging is 15½ in. long and its outside and inside diameters at the large end are 8¼ in. and 6½ in. respectively. This forging is made in three steps, the first being two internal displacement operations and the third the punching of a small slug in the bottom. This machine weighs 365,000 lb. and requires four flat cars for shipment. The heading slide is 10½ ft. long and the driving motor is 150 hp. The machine is intended for continuous production of various types of large upset work.

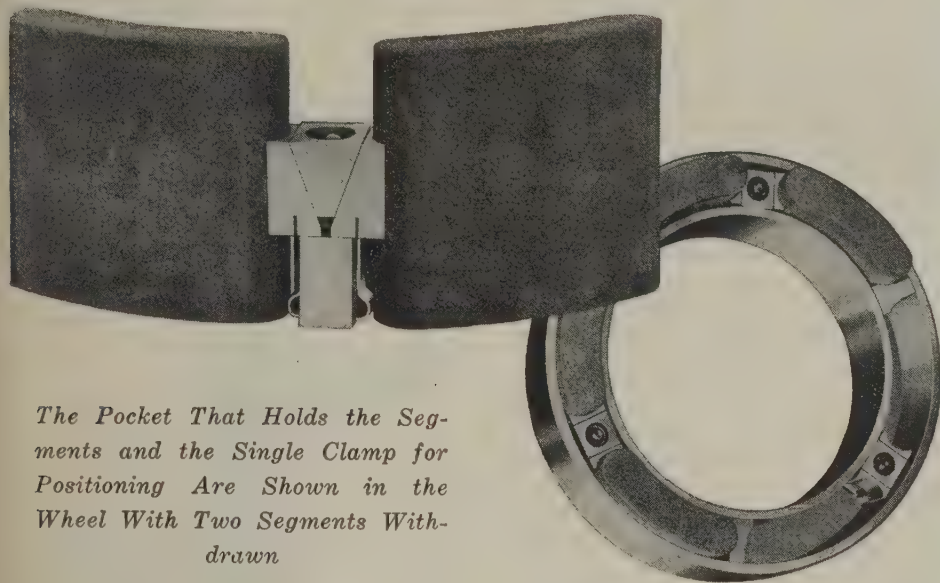
Segment Wheel for Blanchard Grinder

SAVINGS in abrasive cost on medium and broad surface work is claimed for the segment wheel illustrated which has been made available by the Blanchard Machine Co., Cambridge, Mass., for use on its direct-motor-drive No. 16 surface grinder.

Less rapid wearing of the abrasive

of the segments, being round, have no corners to crack off. When the clamping screw is tightened the segments are forced outward against the surface of the chuck body and against the fixed abutments, a large area taking the clamping pressure.

More than 5 in. of the segments,



The Pocket That Holds the Segments and the Single Clamp for Positioning Are Shown in the Wheel With Two Segments Withdrawn

segments, as compared to a cylinder wheel, is said to be due to the spaces between the segments, which allow the particles ground from the work to escape easily from under the wheel. It is stated that on suitable work the life of the segments is about twice that of the cylinder wheel. Cutting is cooler and faster, less power is used and a wider variety of work can be ground without changing the grade of the segments.

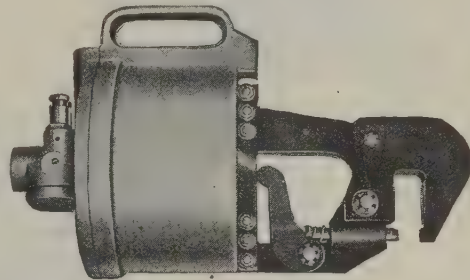
Six abrasive segments held in position by three simple clamping devices are carried by a chuck, the body of which is machined from a solid piece of steel and is rust proofed. The three fixed abutments and three clamping units are of aluminum bronze, the screw in the clamping unit being of stainless steel. The ends

which when new are 6 in. deep, can be used and as they wear down they may be set out a distance of 2 in. from the chuck. This adjustment is made by running the magnetic chuck under the wheel, unclamping the segments, one pair at a time, dropping them down to the face of the magnetic chuck, using a sheet of cardboard or other material to protect its surface, and then reclamping in place. The clamping screws are located so that dirt cannot get into the threads to interfere with the removal of the wedge.

The segment wheel is not adapted for pieces that cannot be held securely, such as gear blanks which rest on a small hub, or work which is high and has little area in contact with the magnetic chuck.

Portable Machine for Squeezing Light Rivets

A NEW portable pneumatic riveter that squeezes instead of hammers light rivets into place is being manufactured by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, in two sizes. The smaller unit, weighing 8 lb., is designed for driving steel rivets up to ⅜ in. in diameter, duralumin rivets up to 5/32 in. and aluminum rivets up to



Squeeze Riveter for Light Sheet Metal Parts. Interchangeable yokes adapt the machine for pieces of various size

3/16 in. The larger machine weighs 16½ lb. and has capacity for driving 3/16 in. steel rivets, 5/16-in. duralumin rivets and ⅝-in. aluminum rivets.

The yoke is arranged so that it may be removed conveniently and replaced by another. Interchangeable yokes, which provide different sizes of gap and reach, permit use of the one machine for a variety of work.

Engineers Consider Fuel Problems at Cleveland

THE second National Fuels meeting conducted under the auspices of the Fuels Division of the American Society of Mechanical Engineers was held at Hotel Cleveland, Cleveland, Sept. 17 to 20, with a registered attendance of about 750. Victor J. Azbe, chairman of the Fuels Division, presided at the opening session. Thirty technical papers were presented during the four-day meeting. Separate sessions were held for various subjects and industries. These included industrial, powdered fuels, heat transfer, fuel characteristics, smoke abatement, refractories and stoker, central station and other sessions. The sessions were well attended and a great deal of interest was shown in the discussions.

Another fuels meeting is being planned for next year, to be held in the East, probably in New York.

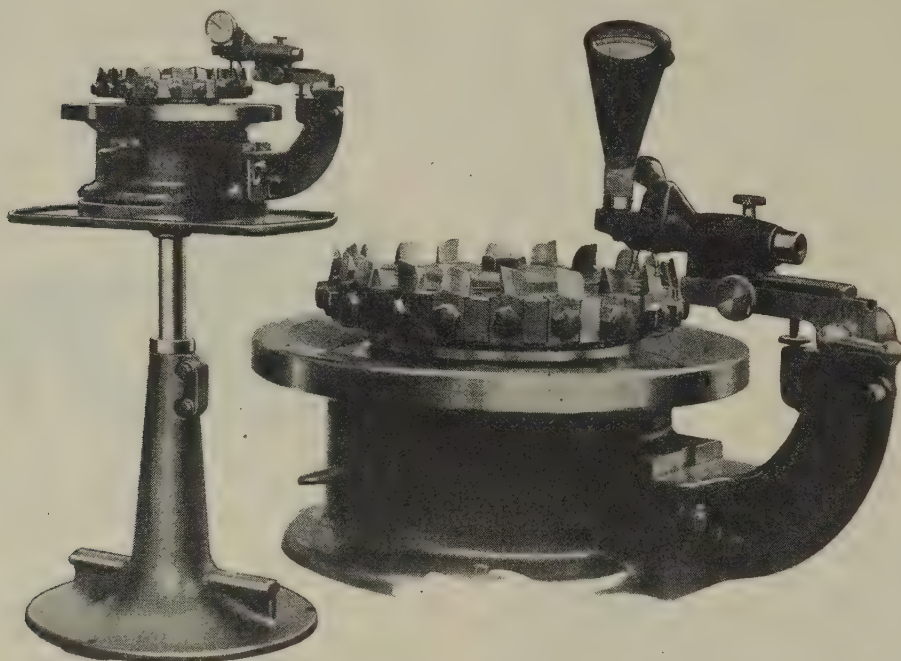
Abstracts of several of the papers read last week will appear in later issues of THE IRON AGE.

The Aetna-Standard Engineering Co. is moving its quarters from the Realty Building in Youngstown to the Home Savings & Loan Building, where it has leased larger space. The company is also concentrating its engineering department in Youngstown, bringing engineers from Warren and Ellwood City, Pa.

Gleason Spiral Cutter Truing Fixture

CIRCULAR cutters used in connection with Gleason spiral bevel gear generators may be trued up accurately on the fixture illustrated,

accommodates the various sizes of spiral bevel gear cutters and has a large handwheel attached directly to it for turning the cutter to the point



The Fixture Facilitates Accurate Truing of Spiral Bevel Gear Generator Cutters

which has been placed on the market by the Gleason Works, Rochester, N. Y.

Heretofore these cutters have been checked, in most cases, on the generators. The truing fixture not only permits more accurate and more convenient checking of the cutters, but it releases the more expensive machines for production work. After truing, the cutters may be placed on the generator and used without further checking, provided the cutter spindle of the generator runs true.

The fixture is of simple design and is mounted on a rigid base, which is adjustable for height. The spindle

desired for checking. A lever at the front of the fixture serves to lock the spindle, this lock being used also when mounting or removing the cutter from the spindle. The spindle is mounted on carefully selected precision ball bearings and is ground in its own bearings. It is stated that the runout is thus reduced to within 0.00005 in.

Several different measuring instruments may be used in connection with the truing fixture, all of which read to 0.0001 in. By the use of a finger device operated through a system of levers, one indicator is used for checking both the inside and the outside of the cutting blades.

New Slip Roll Former

A SLIP roll former which is a departure from its split-bearing top roll lifting type machine has been brought out by the Niagara Machine & Tool Works, Buffalo. A special gear arrangement permits parting the front rolls sufficiently to allow

folded edges of sheets to pass through.

Arrangement of the machine may be seen in the illustration. A trigger release and knurled roll handle are located on the same end of the machine and upon completion of the forming operation the trigger

The Trigger Adjacent to the Roll Handle Permits Simultaneous Release and Pulling Forward of the Roll



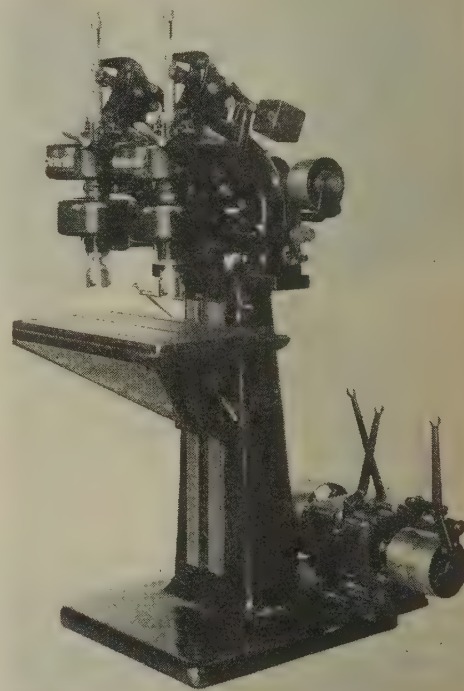
release is pulled and the top roll swung forward in one movement. It is stated that this is accomplished in less time than is necessary in opening rolls of the split-bearing type.

The machine is provided with a heavy box section base to assure permanent alinement of rolls, bearings and housings, and tie rods are not employed. A full bearing sleeve is provided on the movable end of the front roll, which in the operating position is held in place by the trigger mechanism. When the upper roll is moved forward to permit removal of the work, the bearing sleeve remains in place on the roll, protecting the bearing from dirt and grit. Gears are of steel, machine cut, and are entirely inclosed.

Sheet metal up to No. 22 gage may be formed on the machine, three sizes of which, with rolls 2 in. in diameter and 30, 36 and 42 in. long, respectively, are available. The weight of the machine ranges from 195 to 265 lb.

Roller Bearing Speed-Box for Garvin Tappers

FOR use on Garvin No. 2-X and No. 2-BG automatic tapping machines, the Western Machine Tool Works



Four Selective Speeds Are Provided by the Speed Box, Which Is Taper Roller Bearing Equipped

Holland, Mich., has brought out a new tapered roller bearing speed-box which is intended to eliminate the single-speed speed-reducer. The speed-box may be furnished either for direct motor drive or single pulley drive machines, the latter being illustrated herewith. For direct motor drive, a base is furnished; for single pulley drive arrangement the unit is bolted directly to the base of the tapping machine. Four selective speeds are provided so that direct shifting

may be made from one speed to another.

The speed box is equipped throughout with Timken tapered roller bearings. Gears are of chrome-nickel steel, heat-treated and hardened. Long bearings are provided for the two sliding cone gears to prevent chattering and to facilitate shifting. The gears are of coarse pitch and the ends of the teeth are rounded for easy engagement. The gears, bearings, shafts, shifter forks and lever fulcrums are lubricated by the bath of oil in the

box. Shift levers are located within convenient reach of the operator.

All shafts are ground and are provided with fine threaded nuts for close adjustment of the roller bearings, the adjustment being made from the outside of the box. With a 1200-r.p.m. motor the spindle speeds of the No. 2-X automatic tapper are 223, 300, 432 and 582 r.p.m. and of the No. 2-BG tapper, 56, 76, 109 and 149 r.p.m. With an 1800-r.p.m. motor the spindle speeds of the No. 2-BG machine are 84, 114, 163 and 224 r.p.m.

The first station of the machine is without a tool head and is for unloading and loading the work. The other five stations have tool heads, which are arranged for rapid traverse downward and to the left to the point of cutting, where the feed motion is engaged. The tools feed through the cut and are then retired from the surface and returned to their initial high position.

Clearance is provided for turning work up to 4 in. in diameter for the maximum length of 12 in. and for 10 in. in diameter up to approximately 7¾ in. above the spindle. There is also clearance for facing flanged pieces. Setting of tools on the slides may be by individual or block-type combination tool-holders; they are firmly secured in place and are accessible for adjustment or change of tool bits. Individual speeds and feeds for each head are obtained by means of change gears on brackets in the upper compartment.

Multi-Au-Matic Center Lathe Announced by Bullard Company

A SIGNIFICANT development in manufacturing equipment for the automotive and other industries employing quantity-production metal cutting methods is a Multi-Au-Matic center lathe, announced recently by the Bullard Machine Tool Co., Bridgeport, Conn. The new machine is offered as providing for shaft turning the economies afforded by the chucking type of Multi-Au-Matic, one model of which was described in THE IRON AGE of Dec. 8, 1927.

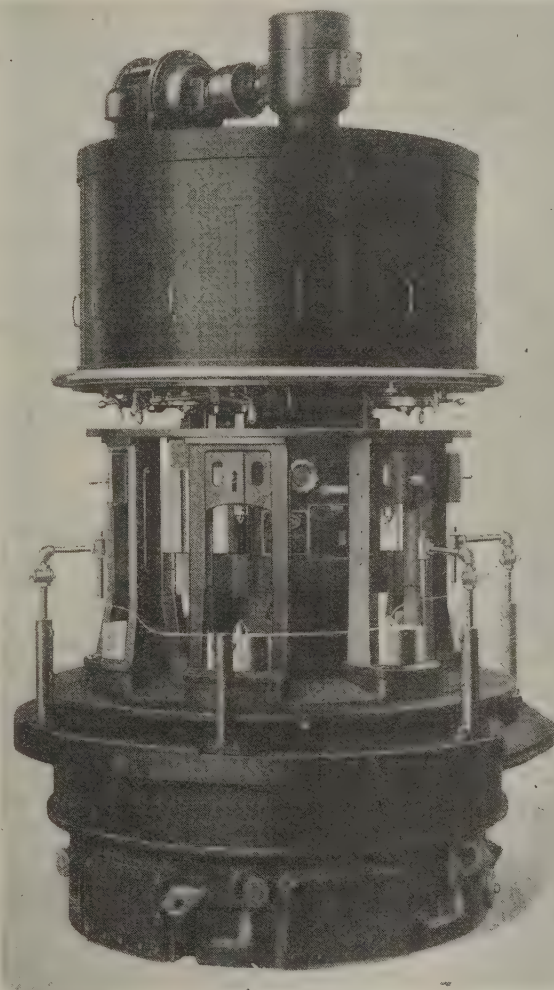
The number of automotive and other parts for which the new machine is adapted is said to be as great as in the original chucking field, the savings in production time being also comparable. As an example of the latter the company cites a reduction from 3½ min. per piece in machining the spindle and brake drum flange of a steering knuckle forging on a single-spindle machine to 50 sec. on the Multi-Au-Matic center lathe. The time on a stem pinion requiring 4½ min. on a horizontal machine is reduced to 50 sec.

On the Multi-Au-Matic lathe six pieces are in process at one time and the individual operations on each piece are in sequence. Spindle speeds and tool feeds at each station can be set to suit the exact requirements of the work at the respective stations, which is emphasized as not only assuring maximum efficiency in each work unit, but as offering a further economy in tools, tool grinding and down time for tool change. It also permits intensive tooling without crowding and inaccessibility and facilitates the balancing of all operations and work units to be completed in the same length of time. The independent speed and feed arrangement at each station is further said to be easier on the tools and the work.

Pieces to be machined are set vertically, on end, between centers. In addition to concentricity in running and wearing of the work spindle on its bearings, a number of advantages are claimed for the vertical mounting. A live center tail-stock is mounted above, between guides secured to the work-spindle carrier, and is held firmly in place by a steady-ring. These tail-stocks are adjustable to accommodate work up to 12 in. in length between centers. The tail-center is

operated by a lever, one movement of which drops the center in place and binds it. The work is held and driven at its lower end by a power-operated chuck or other device mounted on the work spindle, and the pressure of all

*PARTS for
Which the
Multi-Au-Matic
Center Lathe Is
Adapted Are Said
to Be as Numerous
as in the
Original Chucking
Field. There
are six stations,
one of which is
for unloading and
loading the work,
and operations
are in sequence.
Spindle speeds
and tool feeds at
each station can
be set to suit exact
requirements.
The work is
mounted vertically,
on end, between
centers. Clearance
is provided for
turning work up to
4 in. in diameter for
a length of 12 in.*



feeding cuts, except in underfacing, is carried against this lower bearing.

The registering position of the work spindle in operation is not directly below the tool head as in the Multi-Au-Matic for chucking work, but is between the tool faces of the column. The arrangement is such that the tool slides and heads on the faces of the column are vertically and horizontally traversed to the point of cutting and retired to permit clearance in indexing the work.

Thorough attention has been given to the lubrication of bearings and other wearing parts, and a complete coolant system has been provided. The drive is by a 10-hp. constant speed motor through flexible coupling. The height of the machine to the top of the drive bracket is 128 in. and floor space requirements are a circle approximately 77 in. in diameter. In addition space of 25 x 29 in. is required for the coolant tank.

Heavy Increase in Orders for Steel Castings

WASHINGTON, Sept. 24.—Orders for steel castings in August totaled 80,932 tons, or 56 per cent of the capacity of 144,200 tons of the 129 reporting producers, according to the Department of Commerce. This represented a sharp increase over July orders, which amounted to 66,667 tons, or 46 per cent of capacity. Production also rose in August, aggregating 86,809 tons, or 60 per cent of capacity, against 78,324 tons, or 54 per cent of capacity, in July.

For the eight months ended with August orders were 654,529 tons, or 57 per cent of capacity, compared with 674,963 tons, or 59 per cent of capacity, for the corresponding period of last year. Production for the first eight months of 1928 totaled 690,063 tons, or 60 per cent of capacity, while for the eight-month period of 1927 production was 714,953 tons, or 62 per cent of capacity.

Of the August orders, 25,171 tons was for railroad specialties, being 37 per cent of this class of capacity, against 20,483 tons, or 30 per cent of such capacity, in July. Bookings of miscellaneous castings in August totaled 55,761 tons, or 73 per cent of this kind of capacity, against 46,184 tons, or 60 per cent of such capacity, in July.

Production of railroad castings in August was 27,157 tons, or 40 per cent of this class of capacity, compared with 27,501 tons, or 41 per cent of such capacity, in July. The output of miscellaneous castings in August was 59,652 tons, or 78 per cent of such capacity, against 50,823 tons, or 66 per cent of such capacity, in July.

Automobile Production Breaks Monthly Record

WASHINGTON, Sept. 21.—Totalling 458,513, production of passenger cars and trucks in the United States broke all records in August. The passenger car output was 398,689 units and 59,824 trucks were produced. The previous record of passenger car production, 397,332, made in October, 1925, was exceeded by 1357 last month, while the previous truck production record of 58,651, in September, 1925, was exceeded by 1173. The previous record of combined passenger car and truck production was 442,114 units, in October, 1925, now exceeded by 16,399. Passenger car and truck production in July, 1928, totaled 391,180.

Production of both passenger cars and trucks during the first eight months of 1928 totaled 3,051,304, of which 2,702,514 were passenger cars and 348,790 were trucks. Output during the corresponding period of last year was 2,646,285 units, of which 2,313,869 were passenger cars and 332,416 were trucks. Only in 1926 was the 1928 record surpassed, with 3,144,466 units in eight months, of which 2,801,720 were passenger cars and 342,746 trucks. Truck production this year

has made the highest total ever reached in the first eight months. Not only has it exceeded that of the first eight months of 1926, but also that of 1925, which showed in 12 months the greatest total of trucks (505,245) ever yet made in this country.

August production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, was as follows: Passenger cars, 24,274; trucks, 6971. This compares with 20,122 and 5104 respectively in July, and with 10,139 and 2387 in August of last year.

Foundry Equipment Orders Rise

Bookings of members of the Foundry Equipment Manufacturers Association in August were larger than for any month except May, this year, since 1924. The index of both gross orders and net orders for 19 companies was 278, using average monthly shipments for the years 1922, 1923 and 1924 as a base of 100. The index of gross orders in May, 1928, was 335.6. The index of shipments in August was 154.1, while unfilled orders at the end of the month stood at 467.2, or about the equivalent of three months' shipments at the current rate.

Employment Gains in Ohio Metal-Working Plants

Employment in Ohio iron and steel companies increased 3 per cent in August as compared with July, and 7 per cent as compared with August, 1927, according to the current bulletin of the bureau of business research of Ohio State University. The improvement was shared by 95 of the 160 reporting companies. In the first eight months of 1928 the average number of wage earners was 2 per cent less than during the same period last year. The index for the machinery group in August stood at 110, or 1 per cent greater than in July and 3 per cent greater than in August, 1927. The increase came from 57 of the 94 reporting concerns. Among automobile and automobile parts manufacturers the August employment index of 94 is four points higher than in July and 16 points higher than in August, 1927.

Increase in Coke Production

Production of by-product coke in August is reported by the United States Bureau of Mines at 3,994,924 net tons. This represents a gain of more than 2 per cent over the July figure of 3,911,082 tons. Correspondingly there was a gain in output of beehive coke, from 271,000 tons to 288,000 tons, making the total coke produced in August 4,282,924 tons. The gain over July was almost precisely 100,000 tons. Compared with August, 1927, the gain was 116,500 tons, or nearly 3 per cent.

Steel Furniture Orders Are Far Above Last Year

WASHINGTON, Sept. 22.—Orders for steel furniture in the "business group" in August were valued at \$2,619,230, against \$2,594,216 in July, according to reports received by the Department of Commerce from 34 producers. Shipments were valued at \$2,564,633 and \$2,515,482 respectively, and unfilled orders at \$2,118,633 and \$2,071,553 respectively. Orders for the eight months ended August, 1928, were valued at \$23,805,868, against \$20,655,390 for the corresponding period of last year.

Orders in the "shelving group" in August were \$863,420, compared with \$713,330 in July, according to reports received from 16 manufacturers. Shipments were valued at \$836,104 and \$722,516 respectively, and unfilled orders at \$734,365 and \$705,655. Orders for the eight months ended August, 1928, were valued at \$6,138,545, compared with \$4,997,919 for the corresponding period of last year.

Further Rise in Commodity Price Index

Commodity prices in August are reported by the United States Bureau of Labor Statistics at 98.9, on a base of 100 as the average of 1926. This is a fractional increase over the July figure of 98.3, which itself recorded a gain from the 97.6 of June. The figure was 95.2 in August, 1927; hence the year has shown an increase of 3.7 points, or about 3.8 per cent.

Foods, fuels and metals recorded the principal gains during the month. The latter advanced from 98.6 in July to 100.4 in August. This was brought about by fractional advances in iron and steel and non-ferrous metals and a substantial advance in the automobile index. A year ago the metal index stood at 98.

Immigration 20,682 in July

WASHINGTON, Sept. 22.—Immigrants entering the United States in July totaled only 20,682, while the number of emigrants was 7804, according to the Bureau of Immigration. The bulk of the immigrant aliens came from countries in the Western Hemisphere, with Canada and Mexico leading the list. These two countries, with 5234 and 4927 respectively, contributed almost one-half of the total, while Central and South America and the West Indies sent 895.

Germany led the list of European countries, contributing 2205, followed by Italy, 1885, while the Irish Free State sent 1024, Great Britain, 1020, the Scandinavian countries, 778, and Poland, 367. Of the emigrants, nearly 80 per cent, or 6205, went to Europe. Italy, with 1624, received the largest number, while 1060 went to Germany, 599 to Great Britain, 406 to Greece and 416 to Poland.

Offers Tools of Widia Alloy

Higher Efficiency Claimed, Based on Increased Cutting Speeds, and Ability to Hold Cutting Edge

TOOLS and tool bits of Widia alloy, manufactured by Fried. Krupp Steel Works, Essen, Germany, as noted in *THE IRON AGE* of March 17, 1927, are being placed on the American market by Thomas Prosser & Son, 15 Gold Street, New York. This alloy, which in hardness is said to be only slightly inferior to a diamond, is available in a wide variety of shapes and in sizes up to 1 x 1 x 4 1/4 in.; also as points for drills ranging in diameter from 1/8 to 2 1/4 in. The material does not require heat treatment and except for brazing to the shanks and grinding by a special wheel developed for the purpose, the tool bits are ready for use as manufactured.

Claims for the higher efficiency of the Widia tools are based entirely on the greatly increased cutting speeds made possible while retaining the feeds and cuts usually employed with high-speed steel. It is claimed that the metal operates efficiently even with its cutting edge at a bright red heat, as it has no temper to be drawn, and the ability of the alloy to hold a cutting edge is said to be several times greater than that of high-speed steel. Tools of the Widia metal are used successfully for intermittent cuts, and to illustrate the effectiveness of the tool under these conditions the makers cite a recent test of one of the cutters in machining an 1 1/4-in. cast iron workpiece of 200 Brinell hardness, having two slots 1 3/8-in. wide extending the full length. The feed was 0.036 in., the depth of cut 0.59 in. and the cutting speed 655 ft. per min. The intermittent cutting caused by the two slots is said to correspond to 400 blows per min. at the edge of the tool, which at the completion of the test is said to have suffered no injury.

Cutting Qualities Unaffected by Sand or Slag

The cutting qualities of the alloy are also unaffected by sand or slag and in the machining of bakelite, light alloys used for automobile pistons and other material having abrasive characteristics, the tool bits are said to give unusual service. The increased efficiency of the Widia tools as compared to high-speed steel, using the chip cross-section multiplied by the cutting speeds as the basis, expressed in percentage, is given by the company in part as follows: Cast iron, 400 Brinell, 200 per cent; cast iron, 160 Brinell, 600; brass, 800; hard rubber and similar materials, 500; cast iron with silicon up to 16 per cent, 200; manganese steel, 12 per cent mn., 150; rustless steels, 300; and chilled iron, 65 to 90 scleroscope, 400 per cent. Steels of different tensile strengths are said to be machined at 75 to 200 per cent increase in efficiency as compared with high-speed steel.

Widia metal can be brazed to carbon tool steel, but not to high-speed steel,

the brazing being done with brass or copper, preferably the latter, at 1150 deg. C. The flame should be reducing, so that when using gas, there should be an excess of gas. The quality of the material is affected by a direct flame and therefore it is desirable to do the brazing in a muffle furnace or to protect it by a wall of fireproof material. After preparing the surfaces of the tip and shank so that they make close contact throughout, the tip is put in place, and the shank and tip heated. The brazing material is then put between the tip and shank and heated until the brazing material runs off on all sides. The tip is then pressed on the shank by means of a light pressure, and the tool then placed in pulverized electrode carbon in order to cool slowly and to protect the edge from the influence of the oxygen in the air.

Sharp Edge Essential

A prerequisite to the successful working of the Widia tools is a sharp edge, which is obtained by means of special grinding wheels. These can be furnished in grades for rough and finish grinding. Wet grinding is preferred and grinding speeds of 3936-4920 ft. per min. are recommended. Overheating by dry grind-

ing must be avoided, as well as too sudden cooling by water, because overheating or sudden cooling tends to crack the material. The grinding machine should be of such design and in such condition that vibration is eliminated. The grinding is said to be accomplished in the same time and at the same cost as the grinding tools of high-speed steel.

When used for intermittent cuts the tool is held very close to the cutting tip and is fixed very firmly to eliminate vibration and chatter, which must also be absent in the case of revolving tools of Widia metal. To avoid damage to these tools, they must be removed from the cutting position when the machine is stopped for gaging of the work or for other reasons. For heavy cuts a side slope of 3 to 5 deg. is recommended so that the chip may be guided to one side of the tool.

Tool angles recommended for turning, boring and milling with the Widia alloy range from a clearance of 4 deg. and a lip angle of 82 to 86 deg., for chilled iron to 6 to 8 deg. clearance and 60 to 75 deg. lip angle for cast steel. For planing tools the clearance is 4 deg. and the lip angle is approximately 5 to 10 deg. greater than that of the turning tools. In planing and shaping operations it is necessary that the tool be lifted from the work on the return stroke of the tool. In turning, the tool must be located at or slightly above the center line of the work and, in boring, the tool should be at the center line.

Electrochemists Honor Edison

The American Electrochemical Society, in session at Charleston, W. Va., Sept. 20 to 22, bestowed upon Thomas A. Edison, a member of the society since the year of its inception, the distinction of honorary membership. Edison's achievements in the electrochemical field are well known. His alkaline storage battery set a new standard for high capacity at minimum weight. He has also contributed many valuable processes and products in the electrochemical plating art. The phonograph record owes its very existence to high perfection in electroplating.

Cartel Output to Be Unchanged in Last Quarter

WASHINGTON, Sept. 25.—The International Steel Cartel at a meeting in Luxemburg, Sept. 14, voted to continue production during the closing quarter of 1928 at 7,321,750 metric tons, the level maintained in the earlier quarters of the year, says a cablegram received by the Department of Commerce from the commercial attaché in Brussels.

Following the action of the conference at Düsseldorf, July 13, when the Central European Steel Cartel was

abolished, Czechoslovakia, Austria and Hungary were allotted separate ton-nages instead of the group allotment that had been in effect. The combined allotment, however, continues the same as when they were in the Central European Steel Cartel.

At a meeting, Sept. 10, the machine-wire cartel voted to increase the export price of its product 2s. 6d. (61c.) per ton.

Pittsburgh Steel Co. Profits Decline

The Pittsburgh Steel Co., Pittsburgh, had net income after all charges in the year ended June 30, 1928, of \$1,342,141. This compares with \$1,951,958 in the previous fiscal period and with \$2,533,577 in the year ended June 30, 1926. Other comparisons with the 1926-27 period are not available. Total inventories as of June 30, 1928, amounted to \$11,086,199 as against \$9,105,955 on June 30, 1926. The largest gain was shown in finished steel products, the stock at the end of the 1928 fiscal year having stood at \$3,617,727, as compared with \$2,319,124 in 1926. Average number of employees at the company's steel works in the 1927-28 period was 4520 as against 4834 in the 1925-26 fiscal year. Shipments of finished steel products during the most recent period amounted to 384,083 net tons.

Discuss Aircraft Manufacture

Mechanical Engineers on Ohio River Trip Deplore Relative Ease of Establishing Plants

ASHLAND, KY., Sept. 25.—With approximately 225 members and guests on board the steamboat Cincinnati, en route to Ashland, Ky., to inspect the continuous sheet mills of the American Rolling Mill Co., the first technical session last night of the national machine shop practice meeting of the American Society of Mechanical Engineers created more than normal interest. A paper by Hugh W. Roughley, quality manager Wright Aeronautical Corporation, Paterson, N. J., read in the author's absence by L. C. Morrow, described in detail the inspection methods and quality control in the manufacture of aircraft engine parts and was the feature of the session. That the airplane industry is getting out of the purely experimental stage to a stabilized basis, comparable with that of the automobile industry fifteen to twenty years ago, was the report made by Eric Oberg on the consensus of opinion of men attending an aircraft meeting held at Wichita, Kan., last week. The greatest need of the industry today

is a small reliable reasonably priced motor for small planes. Unfortunately the airplane industry is one of the cheapest lines in comparison with the price of the product into which a manufacturer can put his resources. Little equipment is needed and the time necessary for getting into production is remarkably short, so that many builders who know nothing about the business are attracted to that field. The result is likely to be that the industry will acquire a bad reputation from which it will require much time to recover.

Bennett Chapple, vice-president American Rolling Mill Co., made a short talk in regard to the continuous rolling of sheets at Ashland. R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., presided in the absence of Capt. E. E. Aldrin, Wright Field, Dayton, Ohio. After the trip through the Armco plant today, the technical sessions will be continued tonight aboard the Cincinnati and Wednesday morning at the Hotel Sinton, Cincinnati.

bring the building code of New York into conformity with the codes adopted by practically all cities of the United States as a result of our recommendations. We hope that steel construction, rendering buildings fireproof, will ultimately supplant all of the present non-fireproof structures."

New Sales Agency for Copper Formed

The Phelps Dodge group of copper producers has formed a new selling agency through which to market its copper, to be known as the Phelps Dodge Sales Co., Inc. Beginning Oct. 1, the new company will market all copper heretofore sold by the Phelps Dodge Corporation and the Nichols Copper Co., control of which is owned by the Phelps Dodge Corporation. That will include the product of the Phelps Dodge Corporation, the Calumet & Arizona Mining Co., the C'd Dominion Co., also of the Nichols Copper Co., and its clients, including the United Verde Extension Mining Co. and the Granby Consolidated Mining, Smelting & Power Co., Ltd.

The officers of the Phelps Dodge Sales Co., Inc., will be Walter Douglas, chairman of the board; C. Walter Nichols, president; Gordon R. Campbell, vice-president; A. T. Thomson, secretary and treasurer; Walter C. Bennett, chairman of the advisory committee; Charles A. Austin, manager of sales, and Martin H. Crego, assistant manager of sales.

The directors will be Walter Douglas, C. Walter Nichols, Gordon R. Campbell, Cleveland E. Dodge and Walter C. Bennett. Mr. Douglas, the chairman of the new company, is the president of the Phelps Dodge Corporation, while Mr. Nichols is president of the Nichols Copper Co.

The offices of the Phelps Dodge Sales Co. will be at 99 John Street, New York.

Scrap Freight Rates Asked on Defective Material

WASHINGTON, Sept. 25.—Briefs have been filed with the Interstate Commerce Commission by steel makers, jobbers and others interested, asking that rates no higher than the billet or scrap rate be established from Pennsylvania, Ohio, West Virginia and Kentucky points to Youngstown, Cleveland and Detroit on wasters and other defective materials. Tariffs proposed by the carriers, now under suspension, call for the same rates on wasters as those applying on prime finished material. The proposed billet or scrap rate, the briefs contend, would be in conformity with the commission's decision in the Wrought Washer Mfg. Co. case.

from the Harvard Graduate School of Business, Soldiers' Field Station, Boston, or from A. H. Oberndorfer, Siver Steel Casting Co., Milwaukee, chairman awards committee, National Industrial Advertisers' Association.

New York Favors Structural Steel Standard

An amendment increasing the working stress in structural steel has been adopted by the New York Board of Aldermen, which is expected to save builders in that city approximately \$6,000,000 on current contracts for new structures. The amendment is based upon a standard specification of steel construction recommended by the American Institute of Steel Construction and was introduced by a committee representing the New York and Brooklyn chapters of the American Institute of Architects, the American Institute of Consulting Engineers, the Building Trade Employers Association, the Iron League of New York and the New York and National Boards of Fire Underwriters.

The old building code permitted a basic working stress of 16,000 lb. per sq. in., but under the amendment the basic working stress may be increased to 18,000 lb. per sq. in. This reduces the amount of steel going into a building roughly by 10 per cent. By reason of this change, estimated on current contracts, the city itself will save about \$500,000 a year on school buildings alone.

Commenting upon the amendment, Charles F. Abbott, executive director American Institute of Steel Construction, said: "The amendment will

\$2,000 Award for Best Industrial Advertising

Again the Harvard advertising awards committee of the National Industrial Advertisers Association has announced the annual Bok award of \$2,000 for the best industrial advertising campaign for 1928 appearing in newspapers and periodicals. Closing date of this competition is Dec. 31.

To enter competition for this award, the industrial advertisers must submit a manuscript describing the campaign, its functions and its application, together with reproductions of the "ads" as they appeared and a statement of the analysis of the market on which the campaign was founded. The manuscript and the ads must be submitted in prescribed form, the details of which may be secured

Exhibit of Highway Equipment at Mexico City

A special train carrying 450 American delegates to the second Mexican Highway Congress will leave San Antonio, Tex., Sept. 28, en route to Mexico City. A feature of the congress will be an exhibition of highway building equipment, covering 125,000 sq. ft. of floor space. Exhibits will be shown by 100 manufacturers of the Western Hemisphere, of which 85 will be from the United States.

Steel Barrel Shipments

Shipments of steel barrels by members of the Steel Barrel Manufacturers' Association in August totaled 380,343 units. The volume of business for the month was \$1,093,889. Unfilled orders at the end of August were for 358,581 units. Productive capacity was engaged during the month at an average of 56 per cent, light barrel capacity being employed at 63 per cent, against 27 per cent for I.C.C. barrels.

Acheson Establishes Prize Fund

Inventor of Graphite and Carborundum Donates \$25,000 for Benefit of American Electrochemical Society

AT the fifty-fourth convention of the American Electrochemical Society at Charleston, W. Va., Sept. 20 to 22, Dr. Edward Goodrich Acheson, known the world over for his electric furnace products, presented to the society \$25,000 as a trust fund. This is to form the basis of an award every second year of a gold medal and a prize of \$1,000 to any man who has made a distinguished contribution to any of the branches fostered by the American Electrochemical Society.

Dr. Edward Goodrich Acheson was born on March 9, 1856, at Washing-



EDWARD G. ACHESON

ton, Pa., where his grandfather, coming from Ireland, settled in 1788. In 1880 Doctor Acheson entered the employ of Thomas A. Edison at Menlo Park, N. J., then a "fountain head of chemical knowledge and experiment." His first position was that of assistant draftsman under John Kruesi, father of the present president of the American Electrochemical Society. In July, 1881, Doctor Acheson was sent as first assistant engineer of the Edison interests to the electrical exposition in Paris. He returned to the United States in 1884 and for a time was connected with the Consolidated Lamp Co. of Brooklyn and the Standard Underground Cable Co. of Pittsburgh. The spirit of experiment was strong with him, and electrical and chemical problems engaged his spare hours.

Early in 1891, Doctor Acheson produced in the electric furnace the first sample of carborundum, the well-known abrasive and refractory. Not long after the invention of carborundum, Doctor Acheson produced the first large sample of artificial graphite. He took ordinary coke and heated it to extremely high temperatures in his electric furnace, the hard brittle coke being transformed into a soft,

unctuous product, graphite. And this graphite, which he thus produced artificially, was better and purer than the natural mineral "plumbago" or "black lead" as natural graphite is commonly called. Today about 20,000,000 lb. of Acheson graphite is produced annually. The applications number a thousand and one: Lubricants, electrodes, crucibles, etc. The tungsten wire of the incandescent lamp owes its existence to "aquadag," an aqueous lubricant of "defloculated Acheson graphite." The range of American guns was increased 20 per cent by surfacing the inner walls with graphite. The product is so fine that it will pass through a chemist's filter paper, which ordinarily retains the finest precipitate.

Doctor Acheson's name is widely known. His career has been a fascinating and fertile one. Untiring in his zeal and highly skilled in the experimental art, he has transformed into realities the visions of his active and imaginative mind.

Wages and Hours in Radio Manufacturing

Analysis of labor conditions in the radio manufacturing industry has been made, by the United States Bureau of Labor Statistics, in such form that the manufacture of radio receiving sets, of loud speakers and of tubes are handled separately. The number of establishments covered was 23, 19 and 18 respectively, with total employees of 10,070, 2428 and 2213 in the three branches of the industry.

Average hours in making receiving sets were 48.4 for a full-time week and 45.8 for the typical week actually worked. These figures are for the latter half of 1927, radio manufacturing being a seasonal occupation, with greatest activity in the second half year. Average earnings were 59c. an hour for male employees and 38.4c. for female, giving an aggregate of 50.8c. for all workers. In this branch of the industry, 58 per cent of the employees were male. Earnings in a full-time week averaged \$28.62 for male employees, \$18.55 for female and \$24.59 for all employees.

In the manufacture of radio speakers the male employees outnumbered the female almost two to one. Average hours were 47.8 in a week. Hourly earnings averaged 55.5c. for male employees and 39.9c. for female, being 50.2c. for all employees. Full-time earnings weekly were given as \$26.86 for male employees, \$18.67 for female and \$24 average.

Making of radio tubes showed a large preponderance of female employees, who aggregated five-sixths of the total. Average hours in a full-time week were 48.6. Earnings of male employees averaged 60.2c. an

hour against 40.7c. for females and 44.4c. for all employees. Earnings in a full-time week showed an average of \$29.44 for males, \$19.74 for females and \$21.58 for all employees.

Leading Malayan Tin Companies Merged

Consolidation of important Malayan tin producing companies has just been concluded under the aegis of the Anglo-Oriental Mining Corporation with a view to arranging for single technical direction and a coordinated policy in marketing. Although the names of the companies concerned have not yet been disclosed, it is understood that they control, or will control between them, approximately 12 per cent of the world output of tin.

This is the most recent of several significant mergers in the tin producing industry reported this year. Earlier in the year a large number of Nigerian companies, controlling 65 per cent of the Nigerian output, were absorbed into a single group called the Associated Tin Mines of Nigeria, with a single sales and technical organization. Since then the Anglo-Oriental group, which controls this merged group, has been drawing together a large number of concerns in Burma, Siam and Malaya into a single cooperating organization called the Anglo-Oriental (Malaya), Ltd.

The significance of the latest consolidation is that all these groups will now be associated under single control and the marketing of the greater proportion of the world's tin will in effect be in the hands of three great combines the Dutch, the Patino interests and the Anglo-Oriental group.

German Works to Increase Electric Steel Output

HAMBURG, GERMANY, Sept. 11.—Completion of the new Ruhrtalkraftwerke (Ruhr Hydroelectric Power Plant) some time this winter is expected to greatly increase German production of electric steel, which for the past two years has been from 14,000 to 16,000 tons a month. The power station is being constructed with the financial aid of the steel works in the Ruhr and will supply a part of its current to these plants, which plan to use it to increase their production of electric steel. In some quarters it is estimated that output will be about doubled, while crucible steel production will be further curtailed. As German consumption of electric and crucible steel is only about 20,000 tons a month, it is expected that a large portion of the increased output of electric steel will be exported.

The seventh national exposition of power and mechanical engineering at the Grand Central Palace, New York, Dec. 3 to 8, will include the marine field.

Seek Equalized Freight Rates for Coke

Producers and Consumers of By-Product Coke to Meet Oct.

1 in Attempt to Formulate Satisfactory Schedule

WITH an increased output of by-product coke for domestic use in the Central Western States and with keener competition for a market for this fuel, which in the case of steel plant coke ovens means the disposal of surplus coke, by-product coke producers have renewed their efforts to have new rail rates established on their domestic coke output. They will attempt to agree among themselves upon certain fixed rates between producing and consuming points in the Central Freight Association territory and secure the adoption of these rates in place of the mileage rates that have been proposed by the railroads. Formerly all by-product coke rates were on a mileage basis in this territory. As additional steel plant coke ovens were built and as the output was also increased by new ovens built by commercial and gas plants there was considerable departure from these mileage rates, resulting in a chaotic rate situation. This unsatisfactory situation still exists. In some cases there were different rates covering movements in opposite directions between the same two points. This condition exists today between Valley points and Erie, Pa., the Valley rate to Erie being \$1.51 per ton and the rate from Erie to the Valley \$1.76 per ton.

Coke producers have held meetings at various times during the past three years to attempt to work out rate schedules between producing and consuming points that would replace the present rates, but they have been unable to reach an agreement. Because

of the failure of these efforts a new committee was organized last year known as the Producers and Consumers Coke Committee, which is continuing the work.

While the by-product coke producers were trying to iron out their differences of opinion over rail rates, the railroads of the Central Freight Association in June, 1927, prepared a new mileage rate scale for by-product coke, which is still pending. Some of the rates per ton proposed in this scale are as follows:

20 miles and under, \$1.01; 50 to 60 miles, \$1.51; 80 to 90 miles, \$1.89; 100 to 120 miles, \$2.14; 120 to 140 miles, \$2.27; 200 to 225 miles, \$2.77; 300 to 325 miles, \$3.28; 500 to 525 miles, \$4.16; 725 to 750 miles, \$4.67.

Committee to Meet Oct. 1

The Producers and Consumers Committee has held various meetings, at which conflicting views were presented. Another meeting will be held about Oct. 1, and the committee plans to stay in session until it reaches an agreement, even if it takes a week. This committee is under the chairmanship of Murray N. Billings, traffic manager Illinois Steel Co., Chicago. If the committee succeeds in agreeing, its proposed rates will be submitted to the carriers for their approval as a substitute for the mileage rates suggested by the railroads.

With by-product coke producers seeking new markets for their output, Michigan seems to have become the important battleground for ovens in

adjoining districts. Some producers, perhaps looking out for their own interests, want low rates for long hauls and high rates for short hauls. Others want high rates for long hauls and low rates for short hauls. Another proposal that will be considered is for the establishment of a separate and lower rate scale for blast furnace coke, which in some cases is shipped a considerable distance to furnaces that are under the same ownership as the coke ovens. While domestic coke is usually shipped in single car lots, furnace coke is moved in large volume, sometimes in full trainloads. For this reason it is maintained the railroads can carry this coke cheaper than domestic coke.

Booklet on Spiegeleisen

Feeling that the value of spiegeleisen has never been adequately stressed, the New Jersey Zinc Co., New York, has issued a booklet of 12 pages, which discusses the history, grades and uses of this alloy, as well as methods for sampling and analyzing. An interesting feature is a table giving the equivalent value of spiegeleisen and 80 per cent ferromanganese.

Details of mass manufacturing of vehicles and parts will be discussed in addresses to be given at the convention of the Production Division of the Society of Automotive Engineers to be held in Detroit Nov. 22 and 23. The annual four-day meeting of the society will take place in Detroit, Jan. 15 to 18, following the annual dinner in New York, which will be part of the society's participation in the National Automobile Show in that city.

New Testing Laboratory of American Gas Association At Cleveland

THE building, here shown, which has just been completed for the American Gas Association and which will be given over largely to the testing of gas appliances, is "dedicated to promote and develop the gas industry to the end that it may serve the best interests of the public to

the fullest possible extent." The structure provides 3200 sq. ft. of office space, 8700 sq. ft. for storage and 14,700 sq. ft. for appliance testing and research. Three rooms are given over to the uses of the 200 manufacturers who make up the membership of the association.



This Issue in Brief

Demand for special steels is widespread. While much of the expanding tonnage of high-grade steels is absorbed by the automotive and railroad industries, makers of all sorts of equipment are participating in the demand.—Page 741.

* * *

Hardens transmission gears by duplex method. A combination of electric furnace and cyanide treatment is used in Dodge plant. Furnace temperature is 1485 deg. Fahr. and cyanide pot 1490 deg.—Page 762.

* * *

Finds duralumin superior to high-strength steel or wood for flying boat construction. The aluminum alloy, protected against corrosion by the anodic oxidation process, is used for bracing and for covering hull, wing floats, and engine nacelles. It is considered less liable to local injury than steel, on account of the greater thickness employed.—Page 766.

* * *

Commodity price average continues to rise. August index of Bureau of Labor Statistics was 98.9, against 98.3 in July and 95.2 in August, 1927, an advance of 3.8 per cent in one year. The average of 1926 was 100.—Page 772.

* * *

New cutting tools are said to be almost diamond-hard. Greatly increased cutting speeds claimed for new Krupp alloy. Ability to hold a cutting edge is several times greater than that of high-speed steel, maker declares.—Page 773.

Uniform machinability, toughness and soundness are gained by use of new deoxidizer in making steel, producer declares. Harmful aluminum oxide or aluminum carbide inclusions are said to be eliminated in the ladle by adding a carbon-free alloy of aluminum, silicon and iron.—Page 742.

* * *

New testing machine could pull apart a 26-in. billet of structural steel, says maker. Yet this universal testing machine, said to be the largest in existence, is so sensitive that it responds to a slight pressure of the hand.—Page 749.

* * *

Succeeds in making a twist drill which will cut high-manganese steel castings. New drill, running at 50 r.p.m., with 0.0075-in. feed, cuts nine holes through 1½-in. material with one grind.—Page 750.

* * *

For aircraft welded construction, chrome-molybdenum steel is said to be most suitable. The heated joint air-hardens on cooling and thus regains nearly all the original strength.—Page 742.

* * *

Where machinability, weldability and stiffness are needed in combination, Bessemer steel is superior to open-hearth, metallurgist declares. Possession of these three qualities gives Bessemer a preference for agricultural implement trade and similar uses.—Page 765.

* * *

Manufacturer held liable for injuries received by child trespassing on plant property. Manufacturer should have guarded premises, court rules.—Page 767.

Quenches ring gears in press. After carburizing and hardening, Dodge ring gears are quenched in oil in a press and drawn 40 min. at a temperature of 300 deg. Fahr.—Page 764.

* * *

Under effects of cold-working Bessemer steel has a tendency toward brittleness. This is accentuated when manganese content is above normal. Bessemer shapes are especially susceptible to damage in straightening.—Page 765.

* * *

Will growth of "industrial institutes" curtail straight competition? No, says editorial writer. But blind competition may be eliminated, for which both buyers and sellers should be thankful. Exchange of business statistics among competitors permits business to be done in the daylight.—Page 778.

* * *

Automobile production close to record. During first eight months of 1928 the total output of passenger cars and trucks was 3,051,304. Only in 1926 was this surpassed, with 3,144,466 units in eight months.—Page 772.

* * *

High machinability is produced by annealing transmission gears to obtain a microstructure of coarse lamellar pearlite, with some massive ferrite, without any sorbite or spheroidal cementite.—Page 762.

* * *

Smaller as well as larger companies are cooperating in simplification, Department of Commerce reports. Fourteen per cent of 212 producer-acceptors behind 10 simplified practice recommendations are capitalized under \$100,000.—Page 774.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Competition in Darkness or Daylight?

THE organization of industrial institutes and their effect upon competition are viewed with concern in some quarters. Thus, the *New York Journal of Commerce* writes: "This new kind of competition proves upon analysis to be the antithesis of the economist's definition, implying as it usually does some sort of agreement to combine or at least to cooperate to reduce the intensity of the competition already existing." Here the implication is that this will lead to some new kind of governmental regulation.

The "new competition" is indeed different from the old, as Arthur J. Eddy showed in his book under that title some years ago. In former times competition was haphazard and produced violent cycles, which were but imperfectly understood. In periods of strong demand producing capacity was extended, generally too much, the result being that industries became overbuilt and overmanned, with the ensuing evils of a cut-throat struggle for business, unemployment and general loss. The pendulum then would overswing the other way and upon revival of demand industries would be found to be underbilt and prices would tend to rise extravagantly.

It may be declared as a principle that an extravagant rise in prices is the premium offered for new capacity, while conversely an extravagant decline is nature's method of extinguishing an excess. During the World War this principle exhibited itself in acme. When the price for spelter rose to 25 cents per pound buyers were simply advancing the cost of building new plant, to be amortized perhaps in a year. In peace such orders are far less imperative than in war, but the theory is the same. In practice the great difficulty was that no one had any means of gaging what the market was saying. Its tenor was clear but its pitch certainly was not.

In our modern development this has been changed in that we are able to translate into numerical expressions what was formerly only vague sentiment. There is just the difference between doing business in the daylight and in the dark. There is no curtailment of straight competition. There may be an elimination of blind competition, and for that everyone should be thankful. If blind competition occasionally produces bargains for buyers and profitless activity for sellers, oppositely it leads to the strangulation of buyers and temporarily to plums for sellers. Contraction of fluctuations is so beneficial that it is welcomed by both buyers and sellers. If academic economists have any different definition of the meaning of competition or its working, they will do well to revise their dogmas.

Does the Public Know Us?

AT a recent meeting of the Lake Superior Mining Institute, held jointly with the iron and steel division of the American Institute of Mining and Metallurgical Engineers, Thomas T. Reed of the latter organization emphasized the undoubted fact that the public as a whole has no real appreciation of the importance of the iron and steel industry to our modern machine-made civilization. Engineers, constructors and manufacturers readily recognize that iron and steel are fundamental. Even though they work in wood, or silk, or sugar beets, the machinery which brings in the raw materials, which actually does the work, which finally delivers the goods at home or abroad is impossible except for ample and ready supplies of iron.

But the public generally does not stop to think that things made of iron and steel cultivate the farms, pack the foodstuffs, weave the textiles, transport all commerce, and carry all passengers. Ask a man at random, and he would probably say (thanks to publicity) that electricity is the most potent mechanical influence in his life; but he would fail to visualize the large quantities of iron, steel and copper without which electricity could not be generated or transported to his many utilities.

The same is true of steam, of coal, of transportation. Whatever aspect of everyday life one views it is machine made; in its present form it needs steel and iron in increasing amounts—but sad to say, the average man does not comprehend it.

It is important that this mutual relationship between the ordinary citizen and the iron and steel industry be brought home to him. To achieve this object would be the justification of a most determined publicity effort. The whole industry could not do better than to foster jointly such an attempt. Just now we hear much from contending politicians, vying for the farmer's vote, as to the essential nature of agriculture; how it must be fostered, how all artificial handicaps must be removed, how it may even be subsidized. While the iron and steel industry does not expect any coddling, nor does it need it, a proper appreciation of its importance would avoid some well-meaning but misdirected actions against trusts and "malefactors of great wealth." An intelligent golden-rule policy of live-and-let-live would naturally be set in operation. That such a consummation is possible is proved by the public attitude toward the telephone system, as rich and complete a monopoly as could be wished, yet well managed enough to acquire the confidence and good-will of the vast majority of the people.

Prosperity is a mutual thing. If one section of our

country suffers, or one nation in the world family, its condition affects economic life in a wide area. Contrariwise expanding wealth creates more wealth. Such facts are now becoming generally appreciated. It remains to associate with them in the popular mind a vivid realization of the necessity for a sound condition in the fundamental industries, those that underly modern civilization. Of such industries iron and steel is chief.

Why This Stock Market?

FEDERAL RESERVE banks appear to have suspended their efforts to control the stock market. At the same time, commercial banks have essayed to discourage the private lending of money on call. The rate for call money continues high. Nevertheless, the stock market pays but scant attention to any of these conditions. Indeed, there has been a renewed bull movement, with a broader participation in the stock market than ever before. The business of New York brokerage houses that emanates from their branches as far west as San Francisco and as far south as New Orleans is immense. Hence, four-million-share days.

The public has gone into the market with its own money to a greater extent than ever, buying outright or preserving large equities. Thus, it is not shaken out by breaks. The public also is showing unusual discrimination, selecting those securities that give good promise, for economic reasons, of increase in value. Hence, it is disregarding of low immediate dividend yield.

The man who is convinced that the mail order houses, for example, are going to do increased business and to earn greater profits because they are working a major economy in retail merchandising is not deterred by any figuring that their present dividend to himself as a stockholder will be only 3 per cent. And if he is investing his own money he will be quite indifferent to a call rate of 8 per cent.

The same man will not touch the stocks of textile manufacturing companies with a ten-foot pole, for they offer nothing appealing to his imagination.

When we say "the public," we mean the composite judgment of the investors and business men of the country, and it may be sounder than that of academic experts. The present speculative era does not look at this stage like one that involves the flyers of milliners, actresses and small tradesmen. It is more an expression of confidence in the growth of the country and a study of the new things which promise profits in producing goods and services that are wanted by an increasing population.

At the same time it is not exempt from liability to the excesses which have brought unpleasant reckonings on other occasions. Even the best reasoned upward movements, with all the resources and brains that have been behind them, have attracted an unthinking but highly impressionable following which eventually proves their undoing.

AUTOMOBILE and motor truck exports from the United States have grown this year to an extent quite justifying the industry's assiduous cultivation of foreign fields. To Aug. 1, 233,200 passenger cars had been sent abroad, an increase of about 30 per cent over

the 179,100 cars exported in the like period of 1927. There has been a 12 per cent increase this year in exports of motor trucks—71,700 against 63,900 last year for the seven months. A continuance of passenger car exports at the rate of the first seven months would give a year's total around 400,000, which is somewhat more than the largest month's output the industry has had. Similarly, a continuance of the seven months' average of motor truck exports would mean that about 25 per cent of the year's output had gone abroad. At such proportions, this branch of our export trade means much to the steel and foundry industries, accounting for no small part of the year's increased demand for sheet and bar steel, alloy steel and forgings, as well as copper, tin and other metals.

Steel Consuming Records

AS the time of the presidential election approaches the tonnage of steel is making a still more favorable showing. In this department of THE IRON AGE of June 21, under the caption "An Active Presidential Year," it was pointed out that half the year was virtually ended and had "made a very fair showing" in trade generally. Now we are less than one-third as far away from the election and the showing is still better.

Three items as to steel consumption are of particular interest in this connection. Fabricated structural steel lettings as reported for August at 356,250 net tons made a new high record for any month, and shipments at 300,000 net tons also made a new high record for any month. Production of automobiles and trucks in the United States, reported at 458,429 for August, also made a new high record for any month. Production of the agricultural implement industry in this year as a whole is making a new high record, by a substantial margin.

Now and then it is said there are those who argue that members of one of the political parties have a desire in presidential years to manufacture prosperity for its influence upon the election. That might be theoretically applicable to fabricated structural steel, but it fails utterly as to automobiles and agricultural implements. Members of both parties buy automobiles and the farmers are not known to have indulged in any concerted action to influence the election by buying farm implements. Their campaign activities follow a much less expensive course.

Barring a totally unexpected slump, steel ingot production this year, as we have pointed out, will make a new calendar year record, and it is no small thing in these post-war years for it to do this. In eight of the 15 pre-war years steel ingot production made a new high record, but six years elapsed after the war before the 1917 record was passed, 1925 accomplishing the feat. Then 1926 made another record, but 1927 fell below both those years.

Production in this year to Sept. 1 was above 1926 by nearly 4 per cent, and it is significant that July and August gained more over 1926 than did the first six months. One might venture to expect that the remaining months of this year will bring larger gains than 4 per cent over the same months of 1926, particularly as that year showed sharp declines in November and December from the October rate, while merely a 4 per

cent gain for the whole year seems a conservative guess. That would make 49,000,000 tons of ingots for the year, against 43,776,717 tons last year, 46,936,205 tons, the previous record, in 1926, 40,881,392 tons in the apparently boom year of 1920, and about 30,280,000 tons in both 1913 and 1912.

The reference is wholly to what is commonly called "steel," measured by the steel ingot. Steel castings have not been doing particularly well. Rolled iron had dropped from 1,678,257 tons in 1913 to 544,344 tons last year. Iron castings have had little growth in the last 15 years or more. Some of the gain in steel has been at the expense of other ferrous products. There are, however, gains in the total of all ferrous products. It is a detail that on account of increasing supplies of scrap the gains in pig iron are smaller. Pig iron made a new record in 1923, and this year will run 20 to 25 per cent above the mean of 1912 and 1913.

Quantity Discounts on Steel

QUITE a while ago the suggestion was made that steel mills might well arrange quantity discounts on some of their products, merchant bars being particularly mentioned. Nothing came of the suggestion, but the success mills have had in the last year with various changes in sales terms indicates that the possibility of making this one has greatly increased. The wire mills established a new and better proportioned card of size extras on nails; the bar mills adopted lump sum extras for small quantities of a size; the sheet and cold rolled strip mills are revising their cash discount, and in various other ways sales practice has been changed.

The essence of the proposed quantity discount is that it relates the price received to the actual cost of production. It would be made in accordance with the quantity of one section (and one analysis or quality) specified for shipment at one time. A mill cost is reduced when there is a run of a given length. Sometimes mills can make the saving by combining specifications, sometimes they can not. Frequently the cus-

tomer could arrange a larger specification if it were to his advantage. Many customers now furnish such runs but do not obtain an advantage by doing so.

Some mills have definitely expressed a desire to get away from the idea that the total purchases in a year should influence the price. The majority of their customers, in point of number, heartily agree with this view. The customer desires to be on even terms with his competitor, and the smaller buyer naturally asks the mill how he is expected to grow if his larger competitor secures cheaper raw material. With the proposed system, the smaller buyer would specify less frequently, thus accumulating sufficient demand for a given size to obtain the quantity discount.

Some efforts to realine prices have failed, probably because they merely named an invariable quantity, irrespective of size, requisite to command the discount. In merchant bars, to illustrate, there should be one tonnage in case of half-inch rounds and a much larger tonnage in case of four-inch rounds, to command the discount. A carload of half-inch rounds makes quite an order for a mill; a carload of four-inch rounds is relatively a small thing.

Inasmuch as there is already an extensive card of extras on bars, according to section and size, it would not be hard to introduce an additional column or columns to indicate the amount to be specified for shipment at one time in order to command a quantity discount. These figures would be determined by a study of mill costs. The saving in cost would be shared between the producer and the customer.

Such a system would help the trade get away from the condition of there being different bases for invoice prices at a given time according to the class of trade, something that has always been difficult to handle. In the old days, when market prices had the way of advancing by successive stages, the matter of preference was handled in large part by giving the preferred buyers contracts farther ahead. The system was crude but it seemed to work rather well. Conditions are different now, as forward business is no longer done to the same extent, and new practice is needed to cover the point that production costs vary according to the length of the run on a given size and section.

CORRESPONDENCE

Dwight and Lloyd-Greenawalt Patent Litigation

To the Editor: In your issue of Sept. 13, page 674, is a statement purporting to be an account of the litigation between the Dwight & Lloyd Sintering Co. and myself. I consider this statement not only very unfair to me, but also unfair to your numerous readers who have been vitally interested in this litigation. Therefore I am inclosing you a copy of the decision handed down by the Court of Appeals of this circuit, and also a copy of Judge Thacher's decision in the District Court.

The heading of your article is misleading, and you will notice that there is no truth whatever in the statement that Dwight and Lloyd are "recognized as the inventors of this contribution to the art and its importance acknowledged." The court did say that the Dwight and Lloyd apparatus went into extensive use, which is not denied by anyone.

Originally nine patents were involved, and the suit with reference to all of these was dismissed by Judge Thacher. No appeal was taken on two of the nine patents, leaving seven patents that were appealed. The basic Dwight and Lloyd patent was disposed of by the court on the basis of laches, so it was not necessary for the court to go into the question of infringement, the decision maintaining that "To allow them to hold in reserve this patent appears to us to invite just those delays which are so oppressive an incident to patent suits. If we are to recognize such an excuse, we weave one more thread in the mesh which entangles those who must pass through their mazes." Judge D. J. Thacher, in the original decision, said that "Assuming infringement, I am entirely satisfied that Greenawalt honestly believed he was not infringing. This belief was confirmed and encouraged by the plaintiff's acquiescence, with full knowledge and without objection, in all that he did."

The sintering pan patent is disposed of on the basis that it is invalid if infringed. The invalidity is based upon the Eldred patent, No. 885,328.

Two of the claims of the so-called "iron patent" are held invalid because "The process apparently appears to us completely anticipated by Heberlein's patent, No. 844,355. . . .

The merit of the invention (Dwight's) is its avoidance of silicates; it does not appear that merely to use the carbonaceous material when the ores did not contain their own combustible proved a great step in the art."

The other two claims of the iron patent were held invalid if infringed, the court holding that the matter so introduced was a new invention, also that "the delay was for over two years after Greenawalt's plant was in operation, and if his process involves temperature control at all, a disputed question, the amendment was too late."

Ignition claims in two of the Dwight patents are held invalid for the reason that the invention "was new matter which he was no longer entitled to claim since Greenawalt had already more than two years earlier been using such a process to set fire to the ore." The claims of the other ignition patent are held invalid because an application was renewed more than two years after the original application had been allowed.

You will notice that this is a sweeping decision in my favor, and that Dwight and Lloyd did not succeed in a single one of the numerous claims sued upon, and that four of the patents were invalidated and two more practically so.

JOHN E. GREENAWALT.

New York, Sept. 20.

[The title of the article of Sept. 13, to which Mr. Greenawalt takes exception, was "Dwight and Lloyd Patent Decision Affirmed." It did not say, as Mr. Greenawalt seems to imply, that the Dwight and Lloyd claims were sustained. The Court of Appeals did affirm the decision of the United States District Court, as is stated in the first sentence of the article, and that was practically all that with safety could be put into a headline, so complicated was the litigation and so hedged and qualified were various findings of the court.—EDITOR THE IRON AGE.]

Michigan College Studies Copper and Iron Ores

In 1927 the State Legislature appropriated to the Michigan College of Mining & Technology, Houghton, Mich., the sum of \$50,000 per year for two years, for research on iron and copper. The Governor found it necessary, despite his strong approval of the work, to cut the first year's appropriation to \$25,000, and this sum became available July 1, 1927. On June 27, 1928, the college was able to announce that the copper mining research, in cooperation with the United States Bureau of Mines, had demonstrated that the copper loss in the amygdaloid tailings could be reduced from 4½ lb. per ton to about 1½ lb. Dr. W. O. Hotchkiss, president, in an address before the Lake Superior Mining Institute, Sept. 7, said that these new findings will not only result in marked savings in present operations, but will enable many deposits formerly considered worthless to be opened or reworked.

A study of the possibility of removing sulphur from some of the high sulphur iron ores has been carried on for two years—first with funds supplied by mining companies and later with college research funds. While interesting scientific results have been obtained, nothing has yet been discovered that leads the investigators to hope for the solution of the economic problem.

The largest problem, and one which in Dr. Hotchkiss' opinion is a long and arduous one, is the problem of "manufacturing" iron ore from low grade deposits not of present economic value.

Type Metal Contracts During Solidification

Contrary to the general belief that type metal alloys expand during solidification, a research by Y. Matayama (directed by Professor K. Honda) indicates that a small contraction actually occurs during freezing, although less in amount than in many other metals. Good impressions are made in modern type machines more because a certain pressure is applied to the molten metal in the mold. Furthermore the surface tension of the type metal alloys is small, this being responsible for good fluidity and ready flow into finely engraved depressions in the mold. The

alloys used at present are also cheap and of low melting point; an improved metal must have these present characteristics and expansion during solidification as well.

A thermobalance was used to determine density at changing temperature. Results as published in *Science Reports*, Tohoku Imperial University, January, 1928, as shown in the accompanying table.

Mullite and Other Special Refractories

The possibilities resulting from the use of the sillimanite group of minerals, including cyanite and andalusite, for refractories has been a live subject in recent years. The physical and chemical properties of these materials are of a most promising nature. Their proper use in brick-making has, however, required careful study and the full merit of the present products has not been established in many types of service. Their field will broaden in the future, filling the positions that cannot be satisfactorily met by other materials. The comparative cost of the raw materials will necessarily limit their use and place them in the class of specialties, in the opinion of Stuart M. Phelps expressed in Technical Bulletin No. 21, American Refractories Institute.

A noteworthy refractory material of this class is the cast mullite. This product, which is simply a casting from an electric furnace melt, is of considerable interest. Raw materials of the composition necessary to produce mullite are used for the melt and after being cast the shapes are annealed. The finished product has almost no pore spaces and is, therefore, specially resistant to slag action. It has been found that the addition of low percentages of certain materials will substantially alter the properties of the finished casting, especially with regard to slag action. It is logical to expect that this principle will be applied to the manufacture of refractories of other compositions. Chrome, magnesite and spinel compositions made in this way should prove to be of value to the steel industry.

In recent years a highly calcined kaolin refractory has been marketed and like other special materials it is becoming established in certain limited uses. This product, by reason of the purity of the clay used in manufacturing and the exceedingly high temperature to which it is fired, possesses some unusual properties for clay refractories.

Alloy	Composition	Melting Point	Contraction During Solidification
Pure lead.....	.....	.....	3.4 per cent
Pure tin.....	.....	.....	2.8 per cent
Pure bismuth.....	.....	.....	Expands 3.3 per cent
Pure antimony.....	.....	.....	Expands 0.95 per cent
Lead-antimony.....	Pb:Sb 85:15	.....	2.39 per cent
Monotype metal.....	Pb:Sb:Sn 76:16:8	.....	2.06 per cent
Linotype metal.....	Pb:Sb:Sn 79:16:5	248 deg. C.	2.06 per cent
Stereotype metal.....	Pb:Sb:Sn:Cu 83.75:11.75:4:0.5	244 deg. C.	2.04 per cent
Electrotype metal.....	Pb:Sb:Sn 92:4:4	230 to 285 deg. C.	2.61 per cent
Superior type metal....	Pb:Sb:Sn 50:25:25	240 to 307 deg. C.	1.24 per cent
Commercial type metal.	.....	.....	2.35 per cent
Tin-Zinc	Sn:Zn 90:10	.....	2.64 per cent

Iron and Steel Markets

Rail Buying Movement Begins

Over 150,000 Tons of Rails Bought—Volume of Steel Business and Pressure for Deliveries Stiffen Price Situation

EXPANDING demands from the railroads, together with unabated pressure for material by the automobile industry, are strengthening the position of steel producers.

The inflow of business in the last month of this quarter has proved more than enough to sustain a high rate of output—it has resulted in a gain. The operations of Steel Corporation plants now average 85 per cent of ingot capacity, compared with 75 per cent a month ago. The rate of a leading independent is 86 per cent. Among the producing districts, Chicago, Pittsburgh and Youngstown alike have increased production, in each case reaching an average of close to 85 per cent.

Mill backlogs, after being built up by liberal specifications against expiring contracts, have been reinforced by orders for 155,500 tons of rails, mostly for winter rolling. Of this total the Louisville & Nashville bought 50,000 tons, the Chesapeake & Ohio 45,500 tons, the Union Pacific 40,000 tons and the Great Northern 15,000 tons. The New York Central and the Pennsylvania are expected to enter the market shortly for 200,000 tons each.

With the launching of the customary fall rail buying movement come more insistent reports that the railroads will soon make liberal purchases of rolling stock.

The large volume of business on the books and still coming, in some cases with increased emphasis on prompt shipment, has stiffened the mills' attitude on prices. The failure of producers to fix a uniform deadline for shipping orders against third quarter contracts for bars, plates, shapes and sheets caused confusion, which they hope to prevent three months hence by general adherence to Dec. 15 as the last day for specifications.

Now that specifying is drawing to a close for those mills that are accepting releases until the end of September, price uncertainty appears to be passing. While many buyers are not yet showing an interest in forward commitments, the number of fourth-quarter contracts so far closed is larger than expected.

At least one large user of bars succeeded in covering at 1.85c., Pittsburgh, but a preponderant number of contracts for bars, plates and shapes closed to date have brought 1.90c. to 2c., a full advance of \$2 a ton over third quarter figures.

Specifying was heaviest in sheets, and some buyers

are covered for fully 60 days; yet the price advances asked for fourth quarter are apparently not impeding contracting.

With some consumers, particularly the automobile industry, prices have become secondary to deliveries. The motor car makers, after setting a new monthly record for production in August, are taking more steel than ever before at this season and expect to maintain present operations through October. Mills face a pressure for shipments indicating that much of the steel now being rolled is passing directly into consumption. In certain instances buyers are dividing orders among several producers to insure deliveries when wanted.

The improved tone of prices of finished steel has extended to semi-finished material, and it now seems probable that fourth quarter contracts will carry advances of \$1 a ton on sheet bars and \$1 to \$2 a ton on billets and slabs.

A decline in inquiry for fabricated steel and backwardness of pending projects, reported from some market centers, has caused mills to extend protections on plain material and has raised doubts regarding the trend of construction activity.

In pig iron, the fourth quarter buying movement is largely over, although sales by Cleveland producers totaled 35,000 tons for the week. Fortified by liberal bookings, furnaces are holding firmly to recent price advances. Blast furnace stocks are being reduced, and, if demand holds at the present rate through the coming quarter, producers that had large accumulations early this year will have little stock iron left. Shipping orders from the automotive industry indicate that it will take as much iron next month as in September.

Scrap prices, although as a rule no longer rising, remain strong.

British makers of ferromanganese, according to our London cable, have raised prices \$5 a ton, to \$110, American seaboard, duty paid.

Copper advanced another ¼c. a lb. to 15.25c., delivered Connecticut Valley, on Sept. 24. Sales for the month establish a new recent record at over 200,000 net tons, of which 70,000 tons is for export.

THE IRON AGE composite price for pig iron has advanced for the third consecutive week, now standing at \$17.71 a gross ton, within 4c. of the highest level to date this year, reached in February. The finished steel composite remains unchanged for the eighth week at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
No. 2, fdy., Philadelphia.....	\$20.76	\$20.76	\$20.26	\$20.26
No. 2, Valley furnace.....	17.00	17.00	16.50	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	20.94
No. 2, Birmingham.....	16.25	16.25	16.25	17.25
No. 2 foundry, Chicago*.....	18.50	18.50	18.00	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	16.25	16.25	16.00	17.00
Valley Bessemer, del'd P'gh....	19.01	19.01	18.76	19.76
Malleable, Chicago.....	18.50	18.50	18.00	19.50
Malleable, Valley.....	17.25	17.25	17.00	17.50
Gray forge, Pittsburgh.....	18.26	18.26	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.75

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.14½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
Sheets, black, No. 24, P'gh....	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.40	3.40	3.40	3.85
Sheets, galv., No. 24, Chicago dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
Heavy melting steel, P'gh.....	\$16.75	\$16.75	\$16.00	\$15.50
Heavy melting steel, Phila....	15.50	15.50	13.00	14.00
Heavy melting steel, Ch'go....	13.00	13.00	12.75	12.25
Carwheels, Chicago.....	13.50	13.50	12.75	13.75
Carwheels, Philadelphia.....	16.50	16.00	15.50	15.50
No. 1 cast, Pittsburgh.....	15.00	15.00	14.75	15.00
No. 1 cast, Philadelphia.....	17.00	16.50	15.50	16.50
No. 1 cast, Chicago (net ton)..	15.00	15.00	14.25	14.50
No. 1 RR. wrot., Philadelphia..	15.50	15.00	13.50	15.50
No. 1 RR. wrot., Chicago (net)	12.00	12.00	11.25	11.00

Coke, Connellsville, Per Net Ton at Oven:	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	15.25	15.00	14.75	13.25
Electrolytic copper, refinery...	15.00	14.75	14.50	12.90
Zinc, St. Louis.....	6.25	6.25	6.25	6.20
Zinc, New York.....	6.60	6.60	6.60	6.55
Lead, St. Louis.....	6.32½	6.32½	6.22½	6.00
Lead, New York.....	6.50	6.50	6.40	6.25
Tin (Straits), New York.....	48.62½	48.00	47.50	58.75
Antimony (Asiatic), N. Y. ...	11.00	10.87½	10.25	10.50

Pittsburgh

Steel Orders and Specifications Exceeding Those of Last Month—High October Production Assured

PITTSBURGH, Sept. 25.—The steel market continues to disprove the theory that the exceptional summer activity was at the expense of fall business. In all finished products except wire products and tin plate, which usually are quiet at this time of the year, the report uniformly still is of maintained demand, with tonnage releases generally exceeding those of August.

In some cases the delivery promises of mills are not sufficiently prompt to bring them the orders. A buyer of bars seeking 100 tons of a size found it necessary to split the order between makers to insure delivery when wanted. The demand, particularly from the motor car builders or those serving them, is featured by its urgency. Steel consuming industries are normally busy for the time of year, and close observance of purchasing in strict accord with real needs has prevented any building of stocks.

Additional business stimulant is found in the continued effort of steel manufacturers to secure higher prices, to which was coupled the setting of a time limit as to acceptance of specifications on contracts. Although full success has not attended these efforts, the desire for better returns has not abated. Because a lack of uniformity as to the limiting date on third quarter contracts is held to be responsible for the failure of mills to gain their price objective, it is noted that they

are setting Dec. 10 or 15 as the deadline on specifications on fourth quarter contracts.

It is becoming apparent that steel manufacturers will have to be satisfied with a lower minimum than 2c., base, on fourth quarter bar, plate and shape business. Sheet makers are getting a good many fourth quarter contracts at the prices they named several weeks ago, but they also have much business taken at lower prices that will be an obligation against

fourth quarter production. The average prices on fourth quarter strips will not be materially higher than those of the second and third quarters of this year. An advance of \$1 to \$2 a ton in prices, plus the charges contained in the new card of chemical extras, is proposed on billets, slabs and sheet bars for shipment in the final quarter.

If there is a definite tendency to steel plant operations, it is upward, notably in the Youngstown district, which is feeling the full effect of heavy demand from the automotive industry and a good demand for seamless oil country pipe and for line pipe. The general average of ingot production is close to 85 per cent of capacity, with the independent companies doing somewhat better than the Steel Corporation plants. September production will show up strongly in comparison with either of the two preceding months, and there is promise of a good October from the momentum of this month, even should there be some abatement, as is expected, in automobile industry demands and a falling off in structural lettings.

Pig iron is not doing enough to provide a real test of the higher prices, which makers recently announced.

The advance in scrap has stopped with a decline of mill buying and the fact that the demand now is chiefly from dealers, who recently went short and who are naming prices calculated to net them a profit on their sales.

Pig Iron.—A moderate amount of business is being done in foundry iron and in all cases at the full quotation of \$17, Valley furnace, for the base grade. In other directions sales are few and small and provide no real test of prices. It is said that there is no basic iron to be had at less than \$16.50, Valley furnace, and one of the steel companies which ordinarily has some of this grade for sale has let it be known that it does not expect to have any for market during the remainder of the year on account of the size of its finished steel orders. However, no sales of this grade have yet been reported at more than \$16.25 and it is not easy to get users to bid even that price, as they are well covered and at the moment would be interested in additional supplies only as a speculation. The quotation of \$17 for basic iron may be interpreted merely as an announcement that those naming the price are out of the market. The actual price will probably be established when a steel foundry seeking 2000 tons for December shipment closes. No important sales of Bessemer and malleable iron are reported. The Republic Iron & Steel Co. is starting up its one idle Haselton stack to maintain pig iron production lost through the shutting down of the Trumbull-Cliffs furnace at Warren, Ohio. The Claire furnace, Reliance Coke & Furnace Co., Sharpsville, Pa., which it was said some time ago would be blown out Nov. 1 will probably be kept in blast to the end of the year or later.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$16.25 to \$17.00
Bessemer	17.25 to 17.50
Gray forge	16.50
No. 2 foundry.....	17.00
No. 3 foundry.....	16.50
Malleable	17.25 to 17.50
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Hot-Rolled Flats.—Strip business is maintaining a surprisingly high rate,

with all makers in this area reporting tonnage releases to be well in excess of those of last month. This activity reflects the unusually high rate of motor car production. Reports that automobile manufacturers are figuring on as big a production in October as in this month are credited, but there is some doubt whether the orders for steel will hold up correspondingly. While the Ford Motor Co. is steadily expanding production, the maker of another low-priced car is winding up production of the present model and is yet to release much steel on the new model to come out about Nov. 1. Strip prices are steady at substantially the levels which ruled during the past two quarters. Prices also hold well on hoops and bands, in which business is fairly active.

Cold-Rolled Strips.—Business is active and prices are firm at 2.75c. to 2.85c., base, according to the size of buyer's requirements. These are practically the prices that have ruled during the past five months. It is said that sales at 2.65c., base, during that period were few and were for especially attractive tonnages.

Coke and Coal.—Cool weather is stimulating the demand for coal and coke for heating purposes. While heating coke is available at, as low as \$2.50 and commonly is selling at \$2.65, some buyers prefer standard furnace grade at a higher figure. This demand, plus the fill-in demand from pig iron producers, is keeping the market well cleaned up of spot supplies of furnace coke, and prices are firm. The demand for spot foundry coke is more active. Prices, though no higher, are firm. The coal market, particularly for slack grade, is still weak. Even in domestic sizes, for which demand is good, prices are kept down by abundant supplies.

Semi-Finished Steel.—Fourth quarter prices on billets, slabs and sheet bars are beginning to crystalize, and while all makers have not yet announced the new quotations, it is probable that the market will be established at \$33 for sheet bars, \$34 for 4 x 4-in. billets, or equivalent area of slabs, and \$35 for small billets and

slabs, with the size and chemical extras announced more than a month ago to apply. These prices represent an advance of \$1 a ton on sheet bars and from \$1 to \$2 a ton on billets and slabs over the third quarter contract prices. For that period the price of sheet bars was generally \$32, while on billets and slabs there were contracts carrying both \$32 and \$33. Incidentally, the new price setup reverses the former order in which sheet bars commanded a premium of \$1 a ton over billets. The base price of forging quality steel is still a little indefinite; some producers have renewed present arrangements carrying a base price of \$38 for the final quarter of the year, while others now quoting \$34, base, for billets are maintaining the former extra of \$5 a ton for forging quality, and one important producer has announced a base price of \$40. Non-integrated manufacturers are taking out steel freely on third quarter contracts and some of the strip makers are said to have sizable stocks of billets and slabs. The decline in billets, slabs and sheet bars in the third quarter was directly associated with heavy melting steel scrap at \$14 and basic pig iron at \$15.25; in the past month or so, heavy melting steel has advanced to \$17 and basic iron has actually sold \$1 a ton above its low point and now is held at \$17, Valley furnace. The higher prices on semi-finished steel also have a connection with the higher prices that are being sought for several of the finished products, since with higher raw material costs, those who buy their steel would be expected to take a firmer stand on the finished lines. Wire rods are steady at \$42, base Pittsburgh and Cleveland, for either prompt or fourth quarter shipment.

Bars, Plates and Shapes.—There continues to be heavy specifying against expiring third quarter contracts, and manufacturers are growing more confident of their ability to obtain some advance over third quarter contract prices on business for the final quarter of the year. The eagerness of buyers to get in specifications, which has made the past week an-

THE IRON AGE Composite Prices

Finished Steel

Sept. 25, 1928, 2.348c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.348c.
One year ago.....	2.346c.
10-year pre-war average.....	1.689c.

• Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Sept. 25, 1928, \$17.71 a Gross Ton

One week ago.....	\$17.63
One month ago.....	17.34
One year ago.....	18.09
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.75, Feb. 14;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland.....	1.95c. to 2.09c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Birmingham.....	2.05c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60 ft. lengths.....	1.90c. to 2.00c.
F.o.b. Pittsburgh mills, cut lengths. 2.15c. to 2.25c.	
F.o.b. Birmingham.....	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.75c. to 1.85c.
F.o.b. Chicago Heights mill.....	1.85c. to 1.95c.

Iron

Common iron f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.05c.
F.o.b. Lackawanna.....	1.95c. to 2.00c.
F.o.b. Bethlehem.....	2.00c. to 2.05c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base. Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.84c. to 2.94c.
No. 24, del'd Philadelphia.....	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (1½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95

Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel.....	0.25	3.00
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld			Iron		
Steel	Black	Galv.	Inches	Black	Galv.
1/8.....	45	19½	1/4 to ¾.....	+11	+39
1/4 to 3/8.....	51	25½	1/2.....	22	2
1/2.....	56	42½	3/4.....	28	11
3/4.....	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			
			Lap Weld		
2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	53	40½			
			Butt Weld, extra strong, plain ends		
1/8.....	41	24½	1/4 to ¾.....	+19	+54
1/4 to 3/8.....	47	30½	1/2.....	21	17
1/2.....	53	42½	3/4.....	28	12
3/4.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			
			Lap Weld, extra strong, plain ends		
2.....	53	42½	2.....	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 2¾ in.....	37
3 in.....	40
3¼ to 3¾ in.....	42½
4 to 13 in.....	46
	3¾ to 4 in..... 9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb....	5 Fives
12,000 lb. to 21,000 lb....	6 Fives
21,000 lb. and over.....	7 Fives
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1½ to 1¾ in.....	55	3½ to 3¾ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	45
2½ to 2¾ in.....	42		

Hot Rolled

2 and 2½ in....	40	3¼ to 3½ in..	56
2½ and 2¾ in..	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in..	48

Less carload, 4 points less. Add \$3 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

other big one for Pittsburgh district mills, is taken to mean that buyers expect to pay higher prices in the fourth quarter. Since all manufacturers did not insert a limiting clause as to when third quarter contract specifications must be in—and all deliveries against these contracts cannot be completed until after the turn of the fourth quarter—the actual prices for the final period are not yet clearly defined. Against reports that one large user of bars has been covered for the next quarter at under 1.90c., base Pittsburgh, are those that many larger users are signing up at 1.90c. and that the smaller consumers are contracting at 1.95c. and also at 2c. The price paid by individual buyers on third quarter contracts seems to govern the price they will be called upon to pay, not only for bars, but plates and shapes; a \$2 a ton advance is being sought.

Wire Products.—Nails still are slow, but there is a fairly good demand for most of the other wire products. Prices are steady here and are reported to be holding well in other markets.

Tubular Goods.—Seamless oil country pipe and oil and gas line pipe still are the bright spots in the tubular division of the market. While no additional pipe lines of size have lately been placed, most makers are well supplied with orders, and in seamless casing and drill pipe the demand still is strong, notably from southern California. Pipe for building construction and heating is only moderately active and lapwelded pipe for oil country consumption is very dull. Good demand still is noted for mechanical tubes from the motor car builders, but boiler tube business could be better.

Sheets.—There is no letdown in business or mill operations. The American Sheet & Tin Plate Co. last

week operated at 90 per cent of capacity and the general average of independent producers was not far from that mark. While the lower rate of discount to be allowed for cash in 10 days on and after Oct. 1 still is being objected to by jobbers and one of the larger motor car companies, the change is being accepted in other directions. It is also observed that the higher prices asked for fourth quarter on black, galvanized and blue annealed sheets are not impeding contracting for that period. Most buyers will enter the final quarter with lower-priced sheets due them, but those who have occasion to come into the market will doubtless find quotations firm at 2.75c., base, for black, 3.50c., base, for galvanized, and 2c., base, for blue annealed. There is still an urgency about shipping instructions that is taken to mean an absence of speculation in the present demand, and reports from the consuming industries generally are that they are normally busy for this time of the year, while the motor car industry is taking more tonnage than ever before at this season. That industry now is figuring on maintaining its present gait through next month.

Tin Plate.—Business and mill operations are tapering, as usual at this time of the year, but none of the makers expect that the dip this year will be severe, as the demand for general line tin plate is good and export business lately has been improving.

Cold-Finished Steel Bars and Shafting.—There is some resistance to 2.20c., base Pittsburgh, on fourth quarter contracts, but consumers generally are signing up at that figure. Specifications on third quarter contracts, meanwhile, remain heavy and evidence is lacking that the tonnages released are for other than immediate consumption.

Rails and Track Supplies.—The Pennsylvania Railroad is taking bids until Sept. 27 for 2500 tons of tie plates and 875 tons of spikes. The Chesapeake & Ohio Railroad has followed its recent spike award to a southern Ohio mill with another inquiry for 3000 kegs. In a prospective way, the market for track supplies is active, but current business is light. Light-section rails are slow, but standard-section rail requirements for 1929 are expected to begin reaching the market in the next week or 10 days.

Old Material.—The market has stopped advancing and its tone is a shade easier. Consumers who needed supplies are covered as a result of recent purchases and the only buyers are the dealers who took the orders. They are bidding \$16.50 to \$16.75 for heavy melting steel, and with no mill buying and one melter holding up shipments, they are getting fair-sized tonnages. But there are no offerings of railroad steel under \$17. The pressure for deliveries of scrap, which accompanied the August upturn in steel works operation and started the

scramble among dealers to cover short sales at advancing prices, has subsided materially. There is still a sizable short interest in steel works scrap, but whether this means still higher prices depends on whether there is another bulge in steel ingot production. There is usually a short interest in this grade, and it becomes acute when steel production is to be increased and there is a demand for deliveries from several consumers at the same time. Machine shop turnings are slightly easier, with \$11.75 now the top of the market, and on the blast furnace grades \$12.50 appears to be all that is obtainable, as against \$13, the recent top.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$16.50 to \$17.00
Scrap rails	16.00 to 16.50
Compressed sheet steel....	16.50
Bundled sheets, sides and ends	15.00 to 15.50
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary....	16.75 to 17.25
Heavy breakable cast.....	12.75 to 13.25
No. 2 railroad wrought....	16.50 to 17.00
Heavy steel axle turnings..	14.50 to 15.00
Machine shop turnings....	11.50 to 11.75
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.50 to 18.00
Railr. coil and leaf springs	17.50 to 18.00
Rolled steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 20.50
Low phos., mill plates.....	18.50 to 19.00
Low phos., light grade.....	17.50 to 18.00
Low phos., sheet bar crops	18.50 to 19.00
Hvy. steel axle turnings..	14.50 to 15.00
Electric Furnace Grades:	
Low phos. punchings.....	17.50 to 18.00
Hvy. steel axle turnings..	14.50 to 15.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.50
Short mixed borings and turnings	12.50
Cast iron borings.....	12.50
No. 2 busheling.....	11.00 to 11.50
Rolling Mill Grades:	
Steel car axles.....	18.50 to 19.50
No. 1 railroad wrought....	12.50 to 13.00
Sheet bar crops.....	17.50 to 18.00
Cupola Grades:	
No. 1 cast.....	15.00 to 15.50
Rails 3 ft. and under....	16.50 to 17.00

To Aid Industry in Securing Census Statistics

The American Management Association, 20 Vesey Street, New York, has appointed a committee to co-operate with the Government in planning the collection of official statistics on marketing and distribution with special reference to the 1930 census. H. A. Richmond, director marketing and distribution, Policyholders Service Bureau, Metropolitan Life Insurance Co., New York, is chairman of the committee. Companies or persons wishing the Government to gather certain statistics in connection with the 1930 census are requested to get in touch with the chairman and present suggestions.

The Oliver Iron & Steel Corporation, Morris & Bailey Division, Pittsburgh, announces the appointment of Edgar T. Ward's Sons Co., Pittsburgh, as its mill representative and warehouse distributor of cold-rolled strip steel in Indiana, Illinois, western Michigan, Wisconsin and Missouri.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and over.....	\$32.00 to \$34.00
Rerolling, under 4-in. to and including 1½-in.	33.00 to 35.00
Forging, ordinary.....	38.00 to 40.00
Forging, guaranteed	43.00

Sheet Bars

Per Gross Ton

Open-hearth or Bessemer.....	\$32.00 to \$33.00
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Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$32.00 to \$34.00
Smaller than 8 in. x 2 in.....	33.00 to 35.00

Skelp

Per Lb.

Grooved	1.85c. to 2.00c.
Sheared	1.85c. to 2.00c.
Universal	1.85c. to 2.00c.

Wire Rods

Per Gross Ton

*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85%, concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines.....	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines.....	1.00 to 1.20

Ferromanganese

Per Gross Ton

Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$83.50 to \$88.50
75%	130.00 to 140.00
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	.95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines.....	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

Per 1000 f.o.b. Works

First Quality	Second Quality
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

Per Net Ton

Standard size	\$45.00
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Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	.70
†Carriage bolts	.70
Lag bolts	.70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	.70
Hot-pressed nuts, blank or tapped, square.....	.70
Hot-pressed nuts, blank or tapped, hexagons.....	.70
C.p.c. and t. square or hex. nuts, blank or tapped	.70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	.70
Semi-finished hexagon castellated nuts, S.A.E.....	.70
Stove bolts in packages, Pittsburgh.....	.80, 10 and 2½
Stove bolts in packages, Chicago.....	.75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	.80, 10 and 5
Stove bolts in bulk, Chicago.....	.75, 20, 10, 5 and 2½
Tire bolts	.60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base Per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(¾-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	.70 and 10
F.o.b. Cleveland	.70 and 10
F.o.b. Chicago	.70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	.80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	.80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread.....	.85 and 5
Upset set screws.....	.80, 10 and 10
Milled studs	.70 and 5

Chicago

Steel Business Sufficient to Support 84 Per Cent Mill Operation—Rail Orders Total 100,000 Tons

CHICAGO, Sept. 25.—New business and specifications coming to Chicago district steel mills remain at the high level of recent weeks and are ample to support an ingot production at 84 per cent of capacity. The opening of fall rail buying, which in the week has totaled 100,000 tons, and the rather widespread belief that large railroad equipment purchases will be made before the end of the year offset to some extent the lack of confidence in the continuance of the present high demand from the building construction and automobile industries. Although deliveries of steel to automobile companies remain at a high rate, there is speculation as to how long this will continue. The sustained demand from the agricultural machinery industry is an important factor in the market.

Fourth quarter contracting is moving slowly. In fact, it is disappointingly small in total volume, considering that the turn of the quarter is less than a week away. Orders are larger in number, but smaller in size. Heavy specifications of recent weeks have resulted in the crowding of rolling schedules to the point where some third quarter tonnage will necessarily be delivered in October.

The No. 10 blast furnace at Gary, which was banked several weeks ago, has been brought back into service. There are now 24 active steel mill furnaces of 36 in this district.

Coke.—Shipments continue at a high rate and producers are drawing on stocks. Prices are firm at \$8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets.—Fourth quarter contracting is practically completed. Prices are firm. Future obligations compare favorably both in number and size with commitments for the three months' period now ending. Specifications are a trifle lighter, but stocks held by farm machinery builders are reported low and increased releases from that source are expected early in October.

Pig Iron.—The local pig iron market continues to show a moderate amount of activity. Large inquiries, among which is included 1000 tons for a melter in Milwaukee, are less numerous, and, with fourth quarter requirements well covered, there is also a drop in the number and volume of spot orders. Prices are firm, as indicated by sales during the week. Several users are showing interest in first quarter iron. Sales of silvery iron are fairly active, and prices show greater strength. A boat carrying a cargo of iron which grounded several weeks ago in Lake Erie has not reached its destination at Milwaukee, and it is now reported that it has been unloaded at Detroit.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	19.00
Malleable, not over 2.25 sil.....	18.50
High phosphorus	18.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A carload of ferromanganese has been purchased by a Chicago user at \$105, seaboard. Prices for this commodity are strong, and there are intimations of advances for

first half deliveries. Users of ferrosilicon are issuing liberal specifications. An order for 250 tons of 19 to 21 per cent spiegeleisen has been placed at \$33 a ton, Hazard, Pa. This sale, as do others, indicates the stronger position of prices for this commodity.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Over 8000 tons of plates have been ordered from Western mills for oil storage tanks to be erected in the Southwest. There is in the making an inquiry for 8000 to 10,000 tons of oil tankage steel for a producer in California. This business has come into the market rather unexpectedly. Shipments of pipe made from plates are heavier and promise to expand further as releases are made against recent heavy tonnage contracts. Mills are now receiving specifications for the tonnage required for the Great Northern car orders, including the equipment to be built in this railroad's own shops. Otherwise, the railroad car market is unusually quiet. Reports heard a week ago that cars will come into the market in good number by December are now more persistent, though positive statements to this effect are not to be had. Wear and tear on equipment now in use, earnings of railroads and the replacement of old wooden cars are given as reasons for an expected buying movement. On the other hand, there is no shortage of cars and the stress of moving farm products probably has passed the peak. Prices for plates are steady at 2c. to 2.10c. per lb., Chicago. Deliveries are satisfactory to buyers, particularly since producers make a close study of rolling schedules and adjust shipments to meet the needs of users, even at the risk of crowding into October tonnages that were specified against third quarter contracts.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Mild steel bar mills are operating at close to capacity. Two weeks of heavy specifications have extended deliveries. Rolling schedules

are better arranged, affording lower mill costs. Road machinery builders remain busy, and changes in the rate of specifying by the automobile industry are chargeable principally to new models. Orders from agricultural manufacturers indicate that they are enjoying the heaviest fall business on record. New buying is larger, and prices appear to be well established at 2c. to 2.10c. per lb., Chicago. Spot purchases of iron bars are more numerous, but forward buying is dull. Prices are unchanged at 2c., Chicago. Forward contracting in alloy steel bars has progressed rapidly this week, and indications are that the buying movement for the final period will be fully as heavy as for the third quarter. The total volume of specifications received in the last seven days compares favorably with shipments. Rail steel bars have been advanced \$2 a ton to 1.95c. per lb., Chicago Heights. This increase in price followed a steady buying movement, during which most of the quarterly contracts were closed. Shipments are steady, and both Chicago Heights mills continue to operate on double turn.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c. to 1.95c., base, Chicago Heights mill.

Structural Material.—Higher prices for fabricated material and tightening in building loans now appear as the major factors in holding the local structural demand in check. Prices asked by shops are not far from \$5 a ton higher than in midsummer. This advance is not all that fabricators had hoped to get, in view of small profit or none at all, and so at the moment they are holding rigidly to the gain already made. The backwardness of pending projects has made it necessary that mills give protection on the prices on which bids have been based. The deadline was originally set at Sept. 15, but that has now been pushed forward to Oct. 1 and even further extensions may be asked for. The contract for the Fine Arts Building, Chicago, calling for 5000 tons, will not come before the South Park Commissioners until about the middle of October. Revisions in the design of the Patterson Estate Building, Chicago, are delaying that project. Shops in Chicago and Milwaukee are busy, but backlogs are dwindling. Old projects, though numerous, are moving slowly, while new plans are few in number. Prices for structural material are steady at 2c. to 2.10c. per lb., Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Wire Products.—Not much can be said about the wire market other than that it is steady, but shows as yet very little of the impulse of fall buying. Forward purchasing has made some progress, and, judging by the character of orders and the insistence on prompt shipments, there is little room to suspect that speculation has entered this market. Mills are slowly building backlogs, the total at the

end of the third week in September having been larger by a fair margin than at the corresponding time a year ago. Specifications from the manufacturing trade are steady, but the needs of distributors are spotty and uncertain. The jobbing trade is developing slowly, being particularly spotty in the Central West and in the Northwest.

Rails and Track Supplies.—Rail purchases aggregate over 100,000 tons, of which 15,000 tons is for immediate delivery and the remainder is for shipment in November, December and in the early months of 1929. The Chesapeake & Ohio has ordered 45,500 tons, of which 39,000 tons will be rolled in Western mills. One-half of the 15,000 tons placed by the Great Northern will come to Chicago mills. The Union Pacific order for 40,000 tons will be divided, 30 per cent to local producers and the remainder to the Colorado mill. It is reported here that the Louisville & Nashville has ordered 50,000 tons of standard-section rails from the Tennessee Coal, Iron & Railroad Co. Recent purchases are affording steady operation of rail mills, the rate being about 50 per cent of capacity, and the annual repair period is no more definitely settled upon than it was a week ago. Sales of light rails are confined to scattered car lots. It is reported that two Western railroads are rapidly shaping their 1929 rail requirements. Business in track accessories is light and operations are pointing downward.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cold Rolled Bars.—Fourth quarter contracting is making rapid headway at prices that are well established at 2.20c. per lb., Chicago. Specifications have grown a trifle in the week and producers are operating steadily at 80 per cent of capacity.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is re-

ported to have taken 725 tons of 42-in. pipe for Milwaukee at \$33, Birmingham, or \$41.50 a ton delivered. The market is quiet except for car lot orders. Delivery on small business is prompt. Contractors are anxious to complete work before cold weather and they are asking for rush shipments against old contracts.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Old Material.—This market continues active, as many users buy to replace stocks that were depleted during the late summer months. Dealers are now willing to pay as high as \$13.75 a gross ton, delivered, for heavy melting steel for delivery against old obligations. Steel mills are drawing heavily against old commitments. In a number of cases producers are holding back supplies in anticipation of higher prices. Among railroad lists this week are 1800 tons offered by the Nickel Plate and 1500 tons by the Chicago, Milwaukee, St. Paul & Pacific.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$13.00 to	\$13.50
Shoveling steel.....	13.00 to	13.50
Frogs, switches and guards, cut apart, and misc. rails	14.75 to	15.25
Hydraul. compressed sheets	11.50 to	12.00
Drop forge flashings.....	9.50 to	10.00
Forg'd, cast and r'l'd steel carwheels	16.50 to	17.00
Railr'd tires, charg. box size	16.50 to	17.00
Railr'd leaf spring cut apart	16.50 to	17.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	15.25 to	15.75
Coil springs	18.00 to	18.50
Electric Furnace Grades:		
Axle turnings	13.50 to	14.00
Low phos. punchings.....	15.50 to	16.00
Low phos. plate, 12 in. and under	15.00 to	15.50
Blast Furnace Grades:		
Axle turnings.....	11.00 to	11.50
Cast iron borings.....	10.00 to	10.50
Short shoveling turnings..	10.00 to	10.50
Machine shop turnings....	6.75 to	7.25
Rolling Mill Grades:		
Iron rails	14.75 to	15.25
Rerolling rails	16.00 to	16.50
Cupola Grades:		
Steel rails less than 3 ft..	17.00 to	17.50
Angle bars, steel.....	16.25 to	16.75
Cast iron carwheels.....	13.50 to	13.75

Malleable Grades:		
Railroad	15.00 to	15.50
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb. heav.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00

Per Net Ton		
Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and transoms	20.00 to	20.50
Iron car axles.....	24.50 to	25.00
Steel car axles.....	16.25 to	16.75
No. 1 railroad wrought...	12.00 to	12.50
No. 2 railroad wrought...	11.50 to	12.00
No. 1 busheling.....	10.00 to	10.50
No. 2 busheling.....	5.75 to	6.25
Locomotive tires, smooth..	12.50 to	13.00
Pipes and flues.....	9.00 to	9.50

Cupola Grades:		
No. 1 machinery cast.....	15.00 to	15.50
No. 1 railroad cast.....	14.50 to	15.00
No. 1 agricultural cast....	13.00 to	13.50
Stove plate	11.25 to	11.75
Grate bars	12.25 to	12.75
Brake shoes	11.25 to	11.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Sheet prices are firm, and it is believed by some observers of the market that an advance is not far in the future. Spot sales are numerous and specifications are in such volume that deliveries have been extended. Hot mills are engaged at close to capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Large tonnage awards and inquiries are lacking. Competition is keener for small lots. Dealers are aiming for stability in prices on large orders for billet steel reinforcing bars. The level now sought is 2.30c. a lb., Chicago warehouse. Rail steel reinforcing bars have been advanced \$2 a ton by warehouses. The Great Lakes Construction Co. is low bidder on the general contract for the 124th Field Artillery Armory, Chicago. This bid, however, is far above the estimate of cost and it is probable that bids will be rejected. New business and fresh inquiries are shown on page 802.

Tin Plate.—Shipments to date are running a trifle heavier than in the corresponding part of the last half of 1927. Spot orders are fairly numerous at unchanged prices.

Railroad Equipment

Central of Vermont Will Buy 500 Freight Cars

PURCHASE of 100 gondola cars by the Western Maryland and of 20 locomotives by the Canadian National were the outstanding transactions of the week's business, details of which follow:

Belt Railway of Chicago has purchased five eight-wheel switching locomotives from Baldwin Locomotive Works.

Western Maryland has ordered 100 gondola cars from Bethlehem Steel Co.

Sanitary District of Chicago has purchased 16 30-yd. air-dump cars and four 20-yd. air-dump cars from Magor Car Co.

Pittsburgh & Shawmut has ordered four caboose cars from Pressed Steel Car Co.

American Oil Co., Baltimore, has ordered two three-compartment tank cars from General American Tank Car Corporation.

Denver & Salt Lake is inquiring for one business car.

Canadian National Railways have bought 20 of a total inquiry for 55 locomotives from American Locomotive Co.

Central of Vermont is inquiring for 500 automobile cars.

Steel Mill to Be Built in Oklahoma

The Tulsa Rolling Mill Co., Tulsa, Okla., has authorized construction of a new plant at Sand Springs, Okla., to consist of two main one-story units, 135 x 430 ft., and 132 x 135 ft., for rolling mill and open-hearth plant.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.20c. to 2.80c.
Reinforc'g bars, rail steel.....	2.10c. to 2.80c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb.	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Philadelphia

Fourth Quarter Steel Contracting Light—Sheet Mills Well Filled—Further Scrap Advances

PHILADELPHIA, Sept. 25.—Contracting for fourth quarter is rather limited. Sheet mills are heavily booked with specifications for early delivery and in most cases have sufficient tonnage on their books to maintain a good rate of operation for the next 60 days. This situation has developed from the activity of consumers in anticipating their requirements before Oct. 1, so as to obtain the benefit of the 2 per cent discount for cash in 10 days, which is to be discontinued by the mills Oct. 1. In consequence, a real test of present prices, which are firm, is expected to develop later in the quarter when mills have less tonnage on their books. Some last quarter contracts for steel bars have been made, large preferred buyers securing 1.90c., Pittsburgh, and others 1.95c. and 2c., Pittsburgh. On the few plate contracts closed thus far, the price range has been from 2.05c., Coatesville, for preferred buyers to 2.15c., Coatesville, for smaller users.

Pig Iron.—Pig iron prices are firm at \$20, base furnace, on foundry grade, but with most consumers covered for the last quarter, and with sufficient iron in some instances to carry them over the first of the new year, no real test of the present prices has developed. Foundry iron buying is confined to small orders. There is a moderate demand for low phosphorus iron at unchanged prices. A large consumer at Trenton, N. J., is reported to have closed for a small tonnage of Bessemer iron with an eastern Pennsylvania steel company furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X.	21.76
Basic (del'd east. Pa.)	\$19.00 to 19.25
Gray forge.	19.75 to 20.25
Malleable.	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Mills are well booked with fourth quarter tonnage and have a large volume of specifications against present contracts. Fourth quarter commitments are being made at 1.90c., Pittsburgh, or 2.22c., Philadelphia, with large buyers, with 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., Philadelphia, applying on smaller contracts. Deliveries are extended, most mills promising not less than three to four weeks.

Shapes.—Although fabricated steel prices are stronger than for some time, there is little change in shape quotations. Contracts for fourth quarter have been made in a few instances at 2.11c., Philadelphia, or on a basis of 2.05c., Pencoyd, Pa. Tonnages are being delivered on recent contracts made at 1.95c., Pencoyd, or 2.01c., Philadelphia.

Plates.—Buyers are beginning to show some interest in contracts for last quarter, and in a few cases requirements have been covered at 2.05c., Coatesville, paid by large preferred buyers, to 2.15c., Coatesville, or 2.25c., Philadelphia, for the smaller

tonnages. With a number of desirable shipbuilding contracts in prospect, shipyards in this district are looking forward to more activity than in many months. Mills report that the railroads are specifying heavily against current contracts.

Sheets.—The volume of specifications and new contracts is smaller than that of the early part of the month, when buyers were endeavoring to secure the benefit of the 2 per cent discount for cash in 10 days, which terminates Oct. 1. Most mills are well booked for the next four to five weeks or longer and are maintaining the present price level firmly at 2c. to 2.10c., Pittsburgh, on blue annealed, 2.75c., Pittsburgh, on black, and 3.50c. to 3.60c., Pittsburgh, on galvanized. It is pointed out that a test of the strength of present prices may not develop until later in the fourth quarter, when mills have reduced the present backlog of tonnage on their books. Large consumers are said not to be accumulating stocks.

Warehouse Business.—There has not been much increase in the volume of buying during the month. September has been satisfactory, however, from the viewpoint of prices, which have been quite steady.

Imports.—In the week ended Sept. 22, 850 tons of Indian pig iron arrived at this port, also 2000 tons of

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, $\frac{1}{4}$ -in. and heavier	2.60c.
Plates, $\frac{3}{8}$ -in.	2.80c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished $1\frac{1}{2}$ x $1\frac{1}{2}$ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 2.75c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats.	3.95c.
Steel hoops	3.50c.
Steel bands, No. 12 to $\frac{3}{8}$ -in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
$\frac{1}{4}$ -in.	5.30c. to 5.80c.
$\frac{3}{8}$ -in.	5.50c. to 6.00c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

chrome ore from Portuguese Africa and 35 tons of ferromanganese from the United Kingdom. Steel arrivals consisted of 334 tons of structural shapes from Belgium and 30 tons from France, 136 tons of steel bars from Belgium and 37 tons from France, 724 tons of steel blooms from France and 10 tons of steel hoops from the United Kingdom.

Old Material.—No. 1 heavy melting steel is unchanged at \$15.50 to \$16 per ton, delivered, but most other grades show advances of 50c. a ton or more. The market continues strong, but the recent rapid advance of prices, resulting from activity of dealers in filling contracts, has begun to diminish. Heavy breakable cast has been bought by an eastern Pennsylvania consumer at \$17 per ton, delivered, and stove plate has brought \$13 per ton, delivered. No. 2 melting steel has been sold at \$13 per ton to a Harrisburg mill.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 13.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., hvy., 0.04% and under	18.00 to 19.00
Couplers and knuckles	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
No. 1 blast f'nace scrap	10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50 to 15.00
Shafting	19.00 to 20.00
Steel axles	22.00 to 23.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	16.50 to 17.00
No. 1 cast	17.00 to 17.50
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	15.50 to 16.00

Plan Session With Gear Manufacturers

One session of the semi-annual meeting of the American Gear Manufacturers Association, which will be held at the Statler Hotel, Buffalo, Oct. 11-13, will be in conjunction with the machine shop practice division of the American Society of Mechanical Engineers. It will be held on the evening of Oct. 13.

Papers on "High-Speed Gearing—Some Requirements and How They Are Attained Commercially" and "Pratt & Whitney Gear-Shaving Process," by Ira Short, Westinghouse Electric & Mfg. Co., Philadelphia, and H. D. Tanner, Pratt & Whitney Co., Hartford, respectively, will be presented.

For storing road building and snow removal machinery for the Pennsylvania highway department the Blaw-Knox Co., Pittsburgh, will supply 23 steel storage buildings, mostly 40 x 128 ft. in size.

Cleveland

Recent Steel Specifications Have Given Mills Large Backlogs—Contracting Now Being Done for Fourth Quarter

CLEVELAND, Sept. 25.—There has been a slight falling off in specifications for steel bars, plates and structural material in the past week, which is due to the shutting off by most of the mills of the acceptance of orders against third quarter contracts. With these specifications, mills have heavy backlogs. While consumers are not yet taking a great deal of interest in the fourth quarter, outside mills have already closed quite a few contracts for that delivery at the new prices of 1.90c. to 2c., Pittsburgh, for steel bars, plates and structural material and 1.95c. to 2.05c., Cleveland, for steel bars. Although local bar mills have not definitely named prices for the fourth quarter, they appear to be tending toward a 1.90c., Cleveland, base, at which some business has been taken. Some buyers of structural material and plates have secured protection at present prices for material for work that they are figuring on.

Some resistance to price advances has developed from automobile manufacturers in the Detroit territory. These have placed heavy orders for their October requirements. Most automobile companies are scheduling a heavy output for October. The Chevrolet Motor Car Co. has discontinued shipping orders for steel for its present models and is in the market for stampings for its new models, on which it is expected to get under production about Nov. 1. The slowing down by this company while it is changing over to new models will probably cause a noticeable temporary falling off in the demand for steel from the motor car industry, as the Chevrolet company has been operating on a schedule of over 5000 cars per day.

Lake shipyards have received an inquiry for two car ferries, each requiring 2800 tons of steel, this being the first inquiry from this source for new boats for several months.

Pig Iron.—Sales by Cleveland interests in the past week aggregated 35,000 tons, which was about the same as in the previous week. The activity was largely in western Ohio, Indiana and in the Buffalo district. Locally, the market is at a standstill, as most foundries are covered for the remainder of the year. The market has a firm tone, but there are no further changes in prices. Sales of foundry and malleable iron by Cleveland furnaces for outside shipment were made at \$17.50, establishing the recent 50c. a ton advance. Another Lake furnace, which is now on an \$18 base, made several sales at that price. In Michigan, prices range from \$18 to \$18.50, furnace. The outstanding

feature of the market is the continuance of the heavy demand. Shipments with some sellers this month so far show a gain over the corresponding period in August, which was a surprisingly good month. Shipping orders from the automotive industry indicate that automobile foundries will take as much iron in October as during the present month. Furnace stocks are being reduced considerably, and, if the demand holds up to present levels during the last quarter, furnaces that had large stock piles early in the year will have little iron in stock on Jan. 1.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.50
S'th'n fdy., sil. 1.75 to 2.25	22.25
Malleable	18.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace....	\$16.50 to 17.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Strip Steel.—Specifications for hot-rolled strip are keeping producers busy, although they do not have heavy backlogs. Large consumers are under contract for the last quarter at third quarter prices. Consumers of cold-rolled strip are rather slow in placing contracts. This product is quoted at 2.75c., Cleveland, to large buyers and at 2.85c. to small consumers.

Semi-Finished Steel.—Consumers are asking for fourth quarter quotations, but the price locally has not been definitely determined. Shipments are still being made against \$32 and \$33 contracts for sheet bars, billets and slabs.

Cold-Finished Steel Bars.—Consumers, particularly those making standard products, have specified heavily against third quarter contracts. Some fourth quarter contracts have been closed at 2.25c., Cleveland, or \$2 a ton above the current price. Makers are following some of the hot-rolled bar mills in setting Dec. 10 as the deadline for specifications against fourth quarter contracts.

Wire Products.—Wire continues to move well and is firm in price. Nails are rather quiet, and price irregularities still exist in some sections.

Reinforcing Bars.—The Nickel Plate

Railroad has placed 600 tons for track extension work in Cleveland. Inquiry is light. Efforts to get warehouse prices on higher levels are still being made, but so far have not met with much success.

Warehouse Business.—Some of the jobbers have announced that they will follow the mills in placing the one-half of 1 per cent discount in effect Oct. 1. Demand is fair, and there is little deviation from regular prices.

Sheets.—Quite a few current orders and contracts for the fourth quarter have been taken at the new prices of 2.75c., Pittsburgh, for black, 2c. for blue annealed and 3.50c. for galvanized. Sheet manufacturers appear satisfied with their efforts to get prices on a higher basis. Some of the mills are still taking specifications from contract customers who will be using sheets bought at the lower prices through October, so that the hardest test of the market may not come before the end of next month. Up to the present, the only deviation reported from the regular quoted prices is on blue annealed sheets. In Detroit, some of the large consumers in the automotive field have secured a 1.95c. price and a round-lot inquiry in this territory brought out a concession.

Old Material.—The market appears to have become fairly well stabilized at the prices that have prevailed recently. There is a moderate amount of activity on the part of dealers, who are paying \$14 for No. 1 heavy melting steel and \$10.50 for blast furnace scrap to cover short orders. While supplies are not excessive, dealers claim they are getting all the scrap they want at quoted prices. Large scrap lists for October are coming from the Michigan automobile plants. The lists already out include: Buick, 7300 tons; Dodge Brothers, 4600 tons, and Oakland, 2000 tons.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.75 to	\$14.00
No. 2 heavy melting steel.	13.25 to	13.50
Compressed sheet steel....	13.00 to	13.50
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings....	11.50 to	12.00
Machine shop turnings....	8.50 to	9.00
No. 1 railroad wrought....	11.50 to	12.00
No. 2 railroad wrought....	13.50 to	14.00
No. 1 busheling	10.50 to	11.00
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00

Acid Open-Hearth Grades		
Low phos. forging crops....	16.00 to	16.50
Low phos., billet, bloom and slab crops	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00

Blast Furnace Grades		
Cast iron borings....	10.00 to	10.50
Mixed bor'gs and short turn'gs	10.00 to	10.50
No. 2 busheling	10.00 to	10.50

Cupola Grades		
No. 1 cast	16.00 to	16.50
Railroad grate bars....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25

Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Coke.—Ohio by-product foundry coke has been reestablished at \$7.75, Painesville, for October. Highly competitive conditions have developed in

Warehouse Prices, f.o.b. Cleveland

Base per Lb.

Plates and struct. shapes....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.40c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg....	2.85

*Net base, including boxing and cutting to length.

the by-product domestic coke market as a result of an increase in output. Detroit, which is a large consuming point, is rather commonly looked on as a dumping ground. Valley producers quote domestic coke at \$4.50 per ton ovens for egg and \$3.75 to \$4 for nut. The Cleveland delivered prices are \$6 for egg and \$5.50 for nut.

Bolts, Nuts and Rivets.—Bolt and

nut makers report that buyers are signing fourth quarter contracts freely at the present 70 per cent discount. Specifications are holding up to recent volume. Most of the tonnage contracted for during the quarter will be taken out. Stocks are low and prompt shipments are called for. Rivet consumers are beginning to send in fourth quarter contracts based on present prices.

New York

Buffalo Iron Now at \$17 Minimum in District—Steel Contracts Made for Fourth Quarter

NEW YORK, Sept. 25.—Demand for pig iron is declining, as is to be expected following general contracting for fourth quarter, but prices are still gaining in strength. Furnaces are well booked and, in some cases, have fallen behind somewhat in deliveries. Those producers selling on a Buffalo base, or the equivalent, are now uniformly adhering to a minimum of \$17, Buffalo, for No. 2 plain foundry iron. Foundry melt is holding its own, on the average, although there are still some jobbing foundries on an unsatisfactory operating basis. It is believed that the recent advance in pig iron prices stimulated castings orders, at the same time having a tendency to stiffen castings prices. While most melters have covered at least a substantial part of their fourth quarter needs, virtually no buying for first quarter has been reported. Buffalo furnaces, although not soliciting business for fourth quarter, have advanced prices 50c. a ton for that delivery. The Worthington Pump & Machinery Corporation, New York, has closed for 2000 tons for its Harrison, N. J., Holyoke, Mass., and Western plants. The American Radiator Co. has purchased 1500 to 2000 tons of foundry iron for its Gloucester, N. J., works. This company is completing extensive improvements to its blast furnace plant at North Tonawanda, N. Y.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25		\$21.91
*Buf. No. 2, del'd east.		
N. J.		20.28
No. 2, del'd east. N. J.		
tidewater	\$19.51 to	20.01
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—The report in our British cable on another page that British producers of ferromanganese have increased their export price about £1 per ton has not yet been reflected in this market. The British advance would mean a price of \$110, seaboard, duty paid, but inquiry today has not uncovered any authorization for an advance above the prevailing

price of \$105. Sales in the past week of ferromanganese have been confined to carloads. In spiegeleisen one consumer took about 250 tons and there have also been sales of carloads and small lots, all for delivery this year.

Plates, Shapes and Bars.—Contracting for fourth quarter has started somewhat later than usual, but in the past week nearly all mills have covered a good many of their regular customers at prices ranging from 1.90c. to 2c., Pittsburgh, on bars and from 2.19½c. to 2.29½c., New York, on shapes and from 2.22½c. to 2.32½c., New York, on plates. The smaller contracts have in nearly all instances taken the top prices, representing a full advance of \$2 a ton. Some mills have restricted the 1.90c., Pittsburgh base, on steel bars to buyers using 1000 tons or more within the quarter. Although some consumers will be permitted to specify against third quarter contracts until the end of this week, most of the specifications are in. On purchases for delivery after Oct. 1, not covered by third quarter contracts, the new prices will apply. September specifications for bars and structural shapes in particular and to a lesser extent in plates will run large. The leading Eastern producer of structural material reports that its September tonnage will be the largest for any month this year. One of the first inquiries resulting from the damage done in Porto Rico by the recent hurricane is for 350 tons of plates for a penstock. The New York Central will receive bids up to Oct. 2 on its fourth quarter steel requirements, and the Delaware, Lackawanna & Western is taking bids this week on its needs for the rest of the year. The New York Central and Pennsylvania railroads are expected to come into the market within a week or two for their 1929 rail requirements, about 200,000 tons or more in each case.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; struc. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets and Strips.—Some mills are accepting orders this week for black sheets at 2.65c. and for galvanized sheets at 3.40c., Pittsburgh, but beginning Oct. 1 the new prices, which are \$2 a ton higher, will apply. In

view of the fact that nearly all buyers have sufficient sheets on order to provide for their requirements for a month or six weeks, little contracting for fourth quarter has been done. Hot-rolled strip steel buyers are covering for the remainder of the year at 1.90c., Pittsburgh, for 6 to 12 in., at 2c. for 3 to 6 in. and at 2.20c. for less than 3 in. The larger buyers of cold-rolled strip are having no difficulty in placing orders for last quarter requirements at 2.75c., Pittsburgh, although small buyers are being asked to pay 2.85c.

Warehouse Prices, f.o.b. New York

Base per Lb.

Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ½ in.	
and larger	3.65c.

Open-hearth spring steel, bases, 4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10

Carriage bolts, cut thread:	
¾ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10

Coach screws:	
¾ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12

Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+9
1-1½-in. butt	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—Jobbers report a decided improvement in the volume of orders in the past week, but some price shading is still in evidence, especially on sheets and structural material. The improved situation at the mills is viewed with satisfaction by warehouse sellers, who expect as a result an increasing volume of prompt shipment business and a firmer tone in their prices.

Cast Iron Prices.—Southern makers of pressure pipe have announced an advance in the Birmingham price of \$2 a ton to \$36 to \$37 per ton, base. Northern foundries, however, continued to quote from \$35.60 to \$36.60 per net ton, delivered New York. Buying is almost entirely of small lots, many of less than 100 tons, to complete installations. Utility companies are providing most of the present activity.

Prices per net ton, deliv'd New York:
Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Reinforcing Bars.—More than 2000 tons of bars was placed during the week for jobs of 100 tons or more, and the general run of small orders was considerably heavier than usual. This is attributed to the advance of \$2 a ton in price which is to be effective Oct. 1. A number of large jobs now under active negotiation will probably be closed before that date. Pending work continues to accumulate. Foundations for a bridge over the Kill van Kull connecting Staten Island and New Jersey will require about 500 tons and 400 tons will be needed for a building for the Brooklyn Ash Removal Co., Inc., in Brooklyn. About 550 tons of bars for another building for this company has been let to the McClintic-Marshall Co.

Coke.—Standard furnace coke prices are strong. For delivery into the next quarter, producers are asking about \$3 per net ton, Connellsville, with \$3.25 per ton asked on contracts for delivery over the entire quarter. For prompt shipment the usual market is \$2.85 per ton. Standard foundry coke is quiet at \$3.50 per ton, Connellsville. Special brands are still quoted at \$4.85 per ton, ovens, or at \$8.56 per ton delivered to northern New Jersey and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Prices on most grades show a further slight advance on the basis of offers by dealers and brokers, but the extreme activity caused by the covering on lower priced contracts has begun to decrease. No. 1 heavy melting steel is quoted at \$14 per ton, delivered Bethlehem, and \$15, delivered Coatesville, Pa., and Claymont, Del. Yard grade of heavy melting steel is being bought at \$11.75 per ton, Pottsville, \$12.50 per ton, delivered Harrisburg and Phoenixville, Pa., while as much as \$12.75 has been offered by some brokers.

Stove plate for steel works is quoted by dealers at \$12.50 per ton, delivered, machine shop turnings at \$11.50 per ton, delivered, and heavy breakable cast at \$16.50 per ton, delivered Harrisburg, Pa., and Florence, N. J.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.50
Heavy melting steel (yard)	\$8.00 to 9.00
No. 1 hvy. breakable cast.	12.50 to 13.50
Stove plate (steel works).	8.75 to 9.00
Locomotive grate bars....	9.25 to 9.75
Machine shop turnings....	7.50
Short shoveling turnings..	7.50
Cast borings (blast furn. or steel works)	6.50 to 7.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles.....	18.00 to 18.50
Iron car axles.....	24.75 to 25.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	7.25 to 7.75
No. 1 railroad wrought...	10.75 to 11.25
No. 1 yard wrot., long....	8.75 to 9.25
Rails for rolling.....	11.50 to 12.00
Cast iron carwheels.....	13.00 to 13.50
Stove plate (foundry)....	9.00 to 9.50
Malleable cast (railroad).	10.00
Cast borings (chemical)...	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.) cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	14.00

Bethlehem Objects to Proposed Water Freight Rates

H. G. Crawford, traffic manager Bethlehem Steel Co., voiced the objections of that company to rail and water rates from Eastern ports to the Southwest proposed by the Interstate Commerce Commission in the Southwestern rate case at a hearing at the rooms of the Merchants' Association of New York on Tuesday.

"The proposed basis as set forth by the commission," he said, "would either minimize our shipments to Houston and Galveston or force us to use unregulated lines or outside charters, with at least some penalty to the purchaser who had built up his business on the service accorded by the standard lines.

"Moreover, it would reduce the spread to which our Eastern location entitles us as compared with shipments originating in the Pittsburgh district and create an artificially high basis which is bound to affect us adversely in the competition we must face at the Gulf ports.

"To the Eastern producer the rail-ocean rates are of first importance, and their level controls in a large measure his ability to market his steel at Texas ports. I have previously pointed out that every steel manufacturer in Eastern territory is within 100 miles of New York, Philadelphia or Baltimore. The rail haul is therefore relatively short, as compared with the water haul, and the water rate has not for many years exceeded the 30c. level. Business is actively solicited on this basis.

"Most of the points reached by ocean-rail routes from Eastern producing points to Texas destinations are subject to the seaboard territory

blanket rates of 87c. for 100 lb. as a maximum. This rate covers a wide range in both trunk line and Southwestern territory.

"The blanket rate idea is wrong in principle. It produces gross inequalities as between origin points. It holds down the long haul rate and gives no corresponding reduction to the shorter haul. As applied to Trunk Line-Texas traffic, it acts as a distinct handicap to Eastern manufacturers and deprives them of the benefits that would accrue to an Eastern location. It brings the Pittsburgh producer, through the application of a special rate concession, to the very threshold of our Eastern plants, without imposing upon him any of the disadvantages of an Eastern mill. We oppose the present adjustment as wholly illogical and unfair and urge its abolishment in any final realignment made as the result of this hearing."

Standard Proposed for Brass Seated Unions

WASHINGTON, Sept. 25.—A proposed commercial standard for black and galvanized types of brass seated malleable iron or steel screwed unions for use with standard weight pipe was approved at a general conference here yesterday held under the auspices of the commercial standards unit of the Bureau of Standards, Department of Commerce. It was agreed that new production, in accordance with the schedule as defined by the standard, would be in order May 1, 1929, with an extension until Nov. 1, 1929, for industry to use up existing stocks.

The standard will be subject to annual review by a standing committee so that it may be kept abreast of any changes taking place in the art. Members of this standing committee are: Robert E. Bryant, Jefferson Union Co., Lockport, N. Y.; Myron H. S. Affleck, Star Mfg. Co., Providence, R. I.; Stanley G. Cady, Rhode Island Fittings Co., Providence, representing the manufacturers; the Standard Sanitary Mfg. Co., Fleck Brothers, the General Fire Extinguisher Co., and the Hajoca Corporation, Philadelphia, representing the distributors; the Master Plumbers' Association, the Master Steamfitters' Association, the American Gas Co., and the Heating and Piping Contractors National Association, representing the consumers.

Pipe Plant in Prospect at Everett Furnace

An arrangement has been pending between the Warren Foundry & Pipe Co., Phillipsburg, N. J., and the Mystic Iron Works, Everett, Mass., for the establishment by the former company of a foundry for small sizes of cast iron bell and spigot pipe close to the furnace. Property has not been acquired for this purpose, final action awaiting decision of the city to close permanently certain streets now traversing the site.

St. Louis

Increase in Pig Iron Buying Follows Price Advance—Steel Specifications Satisfactory—Price Gains in Scrap

ST. LOUIS, Sept. 25.—A marked improvement in buying of pig iron has followed recent price advances. Consumers seemingly are more impressed with the strength of the price situation. The St. Louis Gas & Coke Corporation sold 7600 tons at the 50c. advance announced Sept. 14; the largest lot was 4300 tons of foundry iron bought by a radiator company. An East Side melter took 1000 tons and an Iowa jobber bought 400 tons of foundry grades, while 600 tons of low phosphorus iron went to a Southern pipe manufacturer. A local melter purchased 300 tons of malleable. The stove interests in Belleville, Quincy and St. Louis, especially those concentrating on novelty types of enameled heaters, are busy, as are jobbing foundries specializing in light castings. Tractor manufacturers are operating at full capacity and are planning to increase production. September shipments of pig iron promise to exceed those of August.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd	20.67
Northern malleable, deliv'd	20.16
Northern basic, deliv'd	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Buying of domestic grades of coke has been stimulated by cooler weather, and it is expected that it will steadily increase from now on. Takings of metallurgical coke are increasing.

Finished Iron and Steel.—Jobbers of sheets have been more active in placing orders with mills within the last few weeks in an effort to get in under the wire before the discount rate is cut from 2 per cent to one-half of 1 per cent. Orders received this week by some interests will bear the lower discount. Specifications for plates, shapes and bars have been satisfac-

tory. Business with structural fabricators is quiet. The American Bridge Co. got the only award, 400 tons for a new zinc plant at East St. Louis. Warehouse business was lighter than in the preceding week.

Old Material.—The market for old material made further price gains during the week. Dealers are paying more for some items to cover contracts and also in anticipation of higher prices being paid by consumers. However, the mills are not buying except for immediate needs, and are showing slight interest in the market. Heavy melting steel, heavy shoveling steel, railroad springs, No. 2 railroad wrought, are up 25c., while machine shop turnings, rails for rolling, iron car axles, and No. 1 machinery cast are 50c. higher; railroad malleable is 75c. up and wrought iron bars and transoms are \$1 higher.

Railroad lists are the lightest in months, and shipments of material from other sources are small. Railroad lists include: International-Great Northern, three carloads; Frisco Lines, seven carloads, and Chicago, Milwaukee, St. Paul & Pacific, 10 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$12.00 to \$12.50
No. 1 locomotive tires....	12.50 to 13.00
Heavy shoveling steel.....	12.00 to 12.50
Miscel. stand-sec. rails	
includ'g frogs, sw'ches	
and guards, cut apart..	13.25 to 13.75
Railroad springs.....	14.50 to 15.00
Bundled sheets.....	8.25 to 8.75
No. 2 railroad wrought....	12.00 to 12.50
No. 1 busheling	9.00 to 9.50
Cast iron boring	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling.....	14.50 to 15.00
Machine shop turnings....	8.00 to 8.50
Steel car axles	18.00 to 18.50
Iron car axles.....	26.50 to 27.00
Wrot. iron bars and trans.	19.25 to 19.75
No. 1 railroad wrought....	10.75 to 11.25
Steel rails, less than 3 ft..	15.50 to 16.00
Steel angle bars	13.50 to 14.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast....	14.00 to 14.50
Railroad malleable.....	12.50 to 13.00
No. 1 railroad cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and	
under	20.50 to 23.50
Relay. rails, 70 lb. and	
over	26.50 to 29.00

Boston

Export Scrap Market Is More Active—Pig Iron Sales Drop Off—Coke Demand Good

BOSTON, Sept. 25.—The past week in the pig iron market was one of the quietest this year. Most of the large melters have covered fourth quarter requirements but none has bought for first quarter. Current sales are to small foundries which overstayed the market and which are reluctant to pay advanced prices, or larger foundries needing special brands for mixture purposes. Recent sales included Alabama, Buffalo, Champlain, Mystic, Pennsylvania and some imported irons. Sales of Mystic iron were the smallest in many weeks. Based on the present rate of New England melt, next month should bring a resumption of buying for fourth quarter and also some first quarter buying. It is believed that first quarter buying will run at least 50 per cent ahead of that for first quarter of this year.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91
*Buffalo, sil. 2.25 to 2.75..	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to 8.77 from Alabama.

*All rail rate. †Rail and water rate.

Imports.—During the first half of September, 1278 tons of foreign pig iron was received at Boston, consisting of 534 tons of Dutch, 644 tons of

Indian and 100 tons of Scotch. On Sept. 15, 10,030 tons of Wabana ore arrived at the Mystic Iron Works, Everett, Mass.

Coke.—New England ovens have increased their foundry coke output and have made some progress toward catching up on back orders. Indications are the ovens will make no change in their contract price of \$11 a ton delivered, within a \$3.10 freight

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
	Per Cent Off List
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot pressed nuts.....	.50 and 5
Cold-punched nuts	.50 and 5
Stove bolts	.70 and 10

*Including quantity differentials.

rate zone on Oct. 1. That price has not been changed since early this year. Domestic coke is selling in volume. A record turnover in domestic fuel by the New England Coal & Coke Co. and the Providence Gas Co. is expected. The New Haven coke plant is not yet in production.

Cast Iron Pipe.—Massachusetts will close bids Sept. 26 on 316 tons of 6, 8 and 10-in. pipe and 12 tons of special fittings for the new State Hospital at Waltham, Mass. Harry T. Stephens, United Bank Building, 152 Market Street, Paterson, N. J., is in the market for 1200 ft. of 6-in. pipe for a Massachusetts water works. Private pipe business continues in good volume, although it is not as heavy as a week ago. Pipe makers are still willing to make sizable concessions on large pipe because they are not sold ahead to the extent they were a year ago. They are well filled up with small pipe business; consequently prices on these sizes are quite firm. A small consignment, 135 pieces, of cast iron pipe from Antwerp was unloaded in Boston recently, the first importation of pipe here since September, 1927.

Fabricated Steel.—Prospective fabricated steel business has dropped off in the past month and shops will have to curtail operations in the fourth quarter unless new business develops. Two months ago it was believed they had sufficient backlogs to carry them through 1928, but, with a slowing up in new work and high operating schedules, jobs have been completed sooner than was expected. It is probable that the United Shoe Machinery Corporation's new building in Boston and a large downtown office building

will come up for figuring within two months.

Old Material.—The upswing in old material prices has been checked, temporarily at least. Brokers are still moving sizable tonnages out of New England, mostly into the Pittsburgh territory. Yards adjacent to New England foundries are disposing of considerable machinery and textile cast, although the supply of the latter has materially dropped within the past two months. In addition, sizable tonnages of No. 1 machinery cast are going to the Pittsburgh district. A local broker is loading 3000 tons of street railway rails, automobile scrap and other material for Baltimore. It is intimated that this material is going to Europe. Within the next week or two a steamer will load several thousand tons of scrap, mostly automobile, at Boston for export to Danzig. New England will probably ship many thousands of tons of scrap abroad between now and Jan. 1.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$10.50 to \$10.75
Scrap T rails	10.00 to 10.50
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	8.00 to 8.50
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	8.00 to 8.50
Forge flashings	8.50 to 9.00
Blast furnace borings and turnings	6.00 to 6.50
Forge scrap	6.00 to 6.50
Shafting	14.00 to 14.50
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00
<i>Prices per gross ton deliv'd consumers' yards:</i>	
Textile cast	\$14.00 to \$14.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	13.50 to 14.00
Stove plate	10.00 to 10.50
Railroad malleable	15.00 to 15.50

rational subsidiaries; strip mills are operating at nearly 100 per cent.

The Sharpsville Furnace Co. plans to blow in this fall its merchant stack, idle since June; the Struthers Furnace Co. may start its merchant furnace, idle most of the year; the A. M. Byers Co., Pittsburgh, is also scheduled to operate its Mattie blast furnace at Girard. The Sheet & Tube company will take off one of its two active furnaces in its Brier Hill group.

The Republic Iron & Steel Co. is making constant minor improvements at its Warren properties, acquired by purchase of the Trumbull Steel Co. It is also preparing for the operation of Steel & Tubes, Inc., recently purchased. Under the new management, the company has introduced drastic economies in the operation of its plants.

The Sharon Steel Hoop Co. has made trial runs of new cold-strip steel installations at Sharon, Pa., which will get into production during the year's final quarter.

The Byers company is increasing the production of puddled iron by the Aston process at its leased plant in Warren, and the successful production of this iron on a commercial basis is creating wide interest. However, heavy expenditures will have to be made by the company for the conversion of its product into finished or rolled form.

European Open-Hearth Output Large, Exports Small

HAMBURG, GERMANY, Sept. 8.—While the use of open-hearth steel in Continental steel-producing countries is rather large in some instances, exports of this grade are insignificant. In Germany, the relation of Thomas steel to open-hearth steel production is 45 to 55, but in export business the relation is about 90 to 10, except for plates, on which the ratio is 60 to 40. Obviously, German manufacturers consume practically all the German open-hearth production, some of which is exported in the form of machinery and hardware products.

Output of Thomas and open-hearth steel in Luxemburg is in a ratio of 98 to 2, and no open-hearth grade is exported. In Belgium, the relation of Thomas to open-hearth production is 80 to 20 and in export sales it is 98 to 2. Of the average French production of nearly 800,000 tons of steel monthly, about 75 per cent is Thomas steel, while that grade represents 95 per cent of total exports. In Poland, 65 per cent of the total steel output is open-hearth metal. In export trade, however, only about 35 per cent of its shipments is open-hearth steel and the rest is Thomas grade. Czechoslovakia exports about 40,000 tons of steel monthly, of which more than 90 per cent is Thomas quality, whereas 40 per cent of the 100,000 tons of steel produced each month is open-hearth grade.

Youngstown

Market Developments Encouraging to Valley Producers—Unfilled Tonnage Larger Than at Opening of Third Quarter

YOUNGSTOWN, Sept. 25.—There is a distinct note of encouragement in the iron and steel trade developments affecting this area. Production schedules are climbing and the price structure is strengthening. Output in the Mahoning Valley reaches a peak for the year in the last week of the third quarter. The independent industry enters the fourth quarter with larger unfilled tonnages than at the beginning of the third quarter. Sheet makers are booked four to six weeks ahead. Producers of full-finished sheets expect to operate at a capacity rate well into November. Black sheets are strengthening at 2.75c.

It is safe to say that not at any time this year have prospects for the steel industry in northeastern Ohio been so favorable as they are now. The August payroll of over \$7,000,000 established a new monthly record for the year. Third quarter earnings of independent steel companies will be

larger than for either of the two preceding quarters, thus reversing the situation which ordinarily prevails in this respect.

The Republic Iron & Steel Co. adds this week a blast furnace in its Haselton group, anticipating the blowing out for repairs and relining of the stack at Warren operated by the Trumbull-Cliffs Furnace Co. This resumption gives the Republic company four active furnaces in the Haselton group.

The Youngstown Sheet & Tube Co. is averaging 78 per cent operation at all of its properties, and is at 83 per cent in the Youngstown district. Its seamless tube mills are on double turn. Of 20 tube mills in this area, 15 are under power; 113 of 127 sheet mills are rolling; independent tin mills are active at close to a capacity rate; bar mills are operating at 65 per cent with the independents, and at 75 per cent with the Steel Corpo-

Pacific Coast

Cast Iron Pipe Leads in Activity—Fair Volume of Business in Steel Products

SAN FRANCISCO, Sept. 22 (*By Air Mail.*)—Awards of steel products during the past week were by no means heavy, but a fair volume of business is pending. The cast iron pipe market was the most active and three fair-sized projects were placed. Among these were 1500 tons for Signal Hill, Cal., and 1467 tons for Clearwater, Cal., both booked by the American Cast Iron Pipe Co. No action has yet been taken on the inquiries put out by the Shell Oil Co. and the General Petroleum Corporation for oil storage tanks requiring over 9000 tons of plates.

Pig Iron.—Trading in foundry pig iron is limited to unimportant lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—While a number of projects involving lots of from 20 to 50 or 60 tons of reinforcing steel bars were placed this week, larger awards were limited to three jobs. The Pacific Coast Steel Co. took 200 tons for a plant for the Simmons Co., San Francisco, and an unnamed interest secured 390 tons for an apartment and 130 tons for a club building in Los Angeles. Bids were opened this week on 525 tons for the Bernal Cut project, San Francisco. About 600 tons is involved in buildings for the Government at Fort Lewis, Wash. Bids have been opened on 225 tons for a hotel at Santa Cruz, Cal. Low prices on out-of-stock material continue to prevail in the San Francisco and Los Angeles districts, and 1.80c., base, appears to be general.

Plates.—The Steel Tank & Pipe Co. of Oregon took the only large job involving plates. This called for 175 tons for a 54-in. welded pipe line at Tacoma, Wash. Action is expected during the next week or 10 days on the inquiries for 14 82,000 bbl. tanks for the General Petroleum Corporation, Los Angeles, calling for 5000 tons and on the inquiries of the Shell Oil Co. for 15 80,000 bbl. tanks, involving 4600 tons. Bids will be called

for next week on 1200 tons for a pipe line at Hood River, Ore. Plate prices continue to range from 2.20c. to 2.25c., c.i.f.

Shapes.—Only one structural shape award exceeding 100 tons was placed during the week. The Golden Gate Iron Works took 150 tons for an apartment in San Francisco. Bids will be opened next week on 243 tons for the Gardiner bridge over the Yellowstone River in Montana and bids have been called for by the Great Western Power Co., San Francisco, for the India Basin power plant involving close to 2000 tons of material. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe awards this week were the heaviest since the last week of April and totaled 4096 tons. The American Cast Iron Pipe Co. took 1502 tons of 4 to

18-in. Class B pipe for Signal Hill, Cal., and 1467 tons of 4 to 10-in. Class B pipe for Clearwater, Cal. George Nelson & Co. were awarded 949 tons of 8 to 30-in. Class C pipe for the improvement of Denny Hill, Seattle. San Diego placed 178 tons of 4 to 10-in. Class B pipe for the improvement of Mount View Drive with V. R. Dennis Construction Co. Pending business is of light proportions, with only four projects pending. These involve 142 tons of 4 to 14-in. Class B pipe for Oxnard, Cal., bids on which will be opened Sept. 25; from 263 to 537 tons of 2 to 12-in. Class B pipe for Phoenix, Ariz.; 282 tons of 6 to 12-in. Class B and C pipe for Sixth Avenue, N. W., Seattle, and 22,000 tons for the East Bay Municipal Utility District in Oakland.

Standard Pipe.—Movement of oil country goods in the southern part of the State continues unabated, and some fair-sized lots of well casing have been booked. Demand for line pipe tonnage is light. Standard steel pipe is in better demand and distributors are beginning to replenish depleted stocks.

Canada

Structural Steel Leads in Activity in Dominion Markets—15,000 to 20,000 Tons in St. John, N. B., Projects

TORONTO, ONT., Sept. 25.—Pig iron sales for the week failed to reach the high average of the two or three weeks previous, but business continues at a satisfactory level. Upward of 60 per cent of melters have covered to the end of the year, and although additional contracts are continually being closed, the rush appears to be over. One forward contract for about 5000 tons of iron was booked last week, but most of the current demand is for spot delivery. A stiffening in prices has had a tendency to bring lagging buyers into the market.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00

Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Structural steel sales continue to hold a prominent place in the iron and steel markets of this country, and at the moment there is little prospect of a decided slump. Contracts awarded during the week include 2000 tons to the Dominion Bridge Co., Montreal, for a bridge over the ship canal at Welland, Ont., and 1000 tons of reinforcing bars to the Canadian Bridge Co., Walkerville, Ont., for a distillery plant at Amherstburg, Ont., for Border Brewers & Distillers, Ltd. In addition, about 5000 tons was placed in lots ranging from 100 to 400 tons. Prospects in-

clude 15,000 to 20,000 tons for a bridge and 12 warehouse buildings at St. John, N. B., for the St. John Harbor Commissioners; 1500 tons of structural steel and 300 tons of reinforcing bars for Pathological Building for University of Toronto, Toronto; 8000 tons of structural steel for office building in Montreal for H. M. Caiserman & Henry Rieder; 1000 tons reinforcing bars for office building at Bleury and Sherbrooke Streets, Montreal, for J. Lewinson, 5010 Sherbrooke Street West; 400 tons reinforcing bars for garage for C. T. A. Hart, St. Catharine and Chomedey Streets, Montreal.

Old Material.—Following the strong demand for old material during the past two or three weeks, business has fallen off, but is still holding at a fairly high level. The prospect of higher prices has resulted in considerable new business being placed both for spot and future delivery. Prices are strong but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.00	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00

Per Net Ton	
No. 1 machinery cast	15.00
Stove plate	9.00
Standard carwheels	13.00
Malleable scrap	13.00

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{1}{4}$ -in. and over	3.15c.
Small angles, under $\frac{1}{4}$ -in.	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger	5.65c.
Com. wire nails, base per keg	\$3.40
Cement c'd nails, 100-lb. keg	3.40

Buffalo

Higher Pig Iron Prices Established on Small Sales—Scrap Strong on Active Demand

BUFFALO, Sept. 25.—Pig iron business is being taken at the advanced prices quoted, but not in volume. Prices appear to be holding firm on the small lots being sold in the district and in New England. The only inquiry for a sizable lot is for 500 to 1000 tons of foundry from the Westinghouse Air Brake Co. This is reported to have been closed. First quarter business is being quoted at 50c. more per ton than last quarter business. Operations are unchanged.

Prices per gross ton, f.o.b. furnace:
No. 2 fdy., sil. 1.75 to 2.25 \$17.00 to \$18.00
No. 2X fdy., sil. 2.25 to 2.75 17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25 18.50 to 19.50
Malleable, sil. up to 2.25 17.50 to 18.50
Basic 17.00 to 17.50
Lake Superior charcoal 27.28

Finished Iron and Steel.—Bar and shape prices are firm at 2.10c., Buffalo, with demand good. Some bar deliveries have been slowed up. Sheets are quite active, with black firm at 2.75c.; galvanized at 3.50c. to 3.60c., and automobile body at 4c. Bolt and nut prices are good, and the operation is better than average. Reports on Canadian steel business are very favorable, the best in years. The contract for fabricating the steel, about 1150 tons, for the Bliss & Laughlin plant in Buffalo has been awarded.

Old Material.—Prices of No. 1 heavy melting steel have stiffened to \$15.75 to \$16. The latter price is said to have been paid for part of several thousand tons. Dealers are said to be paying \$15 to \$15.50 for strictly No. 1 heavy melting steel. The largest consumer of scrap in this territory is expected to come in the mar-

ket very shortly. It is said that considerable lots of machine shop turnings, No. 2 steel and shoveling turnings are being shipped out of this district, attracted by better prices in Pittsburgh. More scrap is said to have been purchased here within the past month than during the previous six months.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades
No. 1 heavy melting steel \$15.75 to \$16.00
No. 2 heavy melting steel 13.00
Scrap rails 14.50 to 15.00
Hydraulic comp. sheets 13.00
Hand bundled sheets 11.00 to 11.50
Drop forge flashings 13.00 to 13.50
No. 1 busheling 14.25 to 14.75
Hvy. steel axle turnings 12.00 to 12.50
Machine shop turnings 7.00 to 7.50
No. 1 railroad wrought 13.00 to 13.50

Acid Open-Hearth Grades
Knuckles and couplers 16.50 to 17.00
Coil and leaf springs 16.50 to 17.00
Rolled steel wheels 16.50 to 17.00
Low phos. billet and bloom ends 17.00 to 17.50

Electric Furnace Grades
Hvy. steel axle turnings 12.00 to 12.50
Short shov. steel turnings 11.50 to 12.00

Blast Furnace Grades
Short shov. steel turnings 11.50 to 12.00
Short mixed borings and turnings 9.50 to 10.00
Cast iron borings 9.50 to 10.00
No. 2 busheling 10.50 to 11.00

Rolling Mill Grades
Steel car axles 18.00 to 18.50
Iron axles 21.00 to 22.00

Cupola Grades
No. 1 machinery cast 15.00 to 15.50
Stove plate 13.50 to 14.00
Locomotive grate bars 12.00 to 12.50
Steel rails, 3 ft. and under 17.00 to 17.50
Cast iron carwheels 13.00 to 13.50

Malleable Grades
Industrial 16.00 to 16.50
Railroad 16.00 to 16.50
Agricultural 16.00 to 16.50

Birmingham

Pig Iron Sales Increase Slightly—Steel Demand Steady and Is Keeping Southern Mills Well Scheduled

BIRMINGHAM, Sept. 25.—Pig iron sales during the week showed an increase over those of the previous week. The market is firmer. A few of the orders extend through the fourth quarter at the current price of \$16.25. Practically all October requirements have been covered and a good portion of the November iron is under contract. Shipments approximate the

make, with a little surplus iron being moved. A few instances of increased melt have been noted among the foundries and machine shops. Furnace operations remain unchanged; of the 18 furnaces in blast, nine are on foundry, seven on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil. \$16.25
No. 1 fdy., 2.25 to 2.75 sil. 16.75
Basic 16.25

Finished Steel.—Last week's sales and inquiries were up to the average of the past few weeks. Mill schedules are better filled than at any time in recent months. Structural shapes are active and the sheet market is strong. A good volume of finished steel has been shipped by barge down the Warrior River for distribution in

the Southwest, principally Texas. The Tennessee company is completing work on a new cotton tie mill at Fairfield. Structural steel business is improving a little. Reinforcing bar awards are in small lots, but the total volume is fairly satisfactory. For the past two weeks the Tennessee company has been operating six open-hearths at Ensley and six at Fairfield, while the Gulf States Steel Co. has been working four at Alabama City.

Cast Iron Pipe.—The only tonnage of importance to develop in several weeks is a project at Dallas, Tex., requiring about 16,000 tons, and a fair-sized project at Mobile, Ala., still pending. Aside from these, the market is quiet. Plant operations are being maintained by the usual run of small orders. Shipments are up to the average and are about equal to output. Makers are adhering to the quotations of \$34 to \$35 on 6-in. and larger sizes.

Coke.—Domestic coke is in active demand, but activity in foundry coke is limited, as all of the important consumers are covered through the year and most of them through the first quarter of next year. A few spot sales are being made. Shipments on contracts have increased a little in the last few days. Quotations are unchanged from the \$5 base for both spot and contract coke.

Old Material.—A steady volume of small-lot sales has followed the recent advances in prices. Consumer interest is greater than at any time in several months, and the market has a fairly firm tone.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel \$10.00 to \$11.00
Scrap steel rails 11.50 to 12.00
Short shoveling turnings 8.00 to 8.50
Cast iron borings 8.00
Stove plate 13.50
Steel axles 19.00 to 20.00
Iron axles 21.00 to 22.00
No. 1 railroad wrought 10.00 to 10.50
Rails for rolling 14.00
No. 1 cast 15.00
Tramcar wheels 13.00 to 14.00
Cast iron carwheels 13.00 to 13.50
Cast iron borings, chem. 13.50 to 14.00

Detroit Scrap Market

DETROIT, Sept. 25.—The market on old material continues strong in the district. Prices are the same as quoted a week ago.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov. steel \$12.00 to \$12.50
Borings and short turnings 8.00 to 8.50
Long turnings 7.00 to 7.50
No. 1 machinery cast 14.00 to 15.00
Automobile cast 19.00 to 20.50
Hydraul. comp. sheets 11.50 to 12.00
Stove plate 11.00 to 12.00
No. 1 busheling 9.50 to 10.00
Sheet clippings 7.50 to 8.00
Flashings 10.00 to 10.50

Total apparent consumption of babbitt metal in August was 4,755,662 lb., compared with 4,692,825 lb. in July and with 5,496,659 lb. in August, 1927, according to reports received by the Department of Commerce from 31 firms.

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struc. shapes 3.40c.
Soft steel bars 3.30c.
Reinforcing bars 2.75c.
Cold-fin. flats, sq. and hex. 4.45c.
Rounds 3.95c.
Cold rolled strip steel 5.85c.
Black sheets (No. 24) 4.20c.
Galv. sheets (No. 24) 4.70c. to 5.05c.
Blue ann'd sheets (No. 10) 3.70c.
Com. wire nails, base per keg \$3.65
Black wire, base per 100 lb. 3.90

Cincinnati

September Orders for Sheets Unusually Heavy—Pig Iron Trade Dull But Prices Are Firm

CINCINNATI, Sept. 25.—Pig iron sales dropped off sharply in the past week, and inquiries before the local trade are negligible. Sellers are of the opinion that most consumers have contracted for their requirements during the remainder of the year and that there will be little important buying in the next 30 days. The slackening of interest, however, has not affected prices, which remain firm. This strength is attributed to the fact that the furnaces supplying users in this district have well-filled order books and are not keen about soliciting further business at the moment. At least one northern Ohio seller is reported to have withdrawn from the market. Lake interests are said to be holding to a minimum of \$17.50, base furnace, while Alabama and Tennessee companies are adhering to \$16.25, base Birmingham. Jackson County silvery furnaces have on hand a liberal volume of specifications and orders. At Ironton, there is only a small tonnage of unsold iron in furnace yards.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$18.89 to \$19.89
So. Ohio malleable 20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25 19.94
Ala. fdy., sil. 2.25 to 2.75 20.44
Tenn. fdy., sil. 1.75 to 2.25 19.94
So'th'n Ohio silvery 8 per cent 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Warehouse Business.—Sales this month are closely paralleling those of August. Bars, structural shapes and plates are the leading products in volume of orders. Aside from continued irregularities in common wire nails at Louisville, prices are steady.

Finished Material.—Orders and specifications booked by district sheet makers in September are considerably in excess of output, which has been maintained at almost 100 per cent of capacity. Demand from various consuming lines has been well balanced, and indications are that the flow of business from diversified sources will continue in the immediate future.

Sales of electrical sheets have been of substantial volume, while shipments to automobile manufacturers have not slackened. The fourth quarter schedule of prices has become more firmly established, and no deviations are noted. Movement of wire products is better. Common wire nails are being shipped into Cincinnati at a delivered price under \$2.69 per keg, but an effort is being made to set up that figure as minimum for the remainder of the year. Activities in structural steel are showing signs of a recovery after a somewhat dull period so far as fresh bookings are concerned.

Coke.—The coke market continues to show strength. Demand from foundries using by-product coke has been well sustained, and the colder weather has begun to stimulate the sale of domestic grades. By-product foundry will remain at \$7 per net ton, f.o.b. ovens, during October. Domes-

tic schedules also will be unchanged, with egg size selling at \$4.50, ovens, and walnut at \$3.50.

Old Material.—Dealers' activities have continued to give the market an element of strength, although prices in the past week have remained virtually stationary. District steel plants are taking normal tonnages on current contracts. Railroads this month have been securing exceptionally good prices for their scrap, dealers in some cases having paid considerably more than present selling schedules warrant.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:
Heavy melting steel \$12.50 to \$13.00
Scrap rails for melting 13.00 to 13.50
Loose sheet clippings 9.25 to 9.75
Bundled sheets 10.00 to 10.50
Cast iron borings 8.50 to 9.00
Machine shop turnings 8.00 to 8.50
No. 1 busheling 10.50 to 11.00
No. 2 busheling 6.00 to 6.50
Rails for rolling 13.00 to 13.50
No. 1 locomotive tires 13.00 to 13.25
No. 2 railroad wrought 12.50 to 13.00
Short rails 17.00 to 17.50
Cast iron carwheels 12.00 to 12.50
No. 1 machinery cast 16.00 to 16.50
No. 1 railroad cast 13.00 to 13.50
Burnt cast 8.00 to 8.50
Stove plate 9.25 to 9.75
Brake shoes 10.25 to 10.75
Railroad malleable 12.25 to 12.75
Agricultural malleable 11.25 to 11.75

Detroit

Employment Records Broken—High Production Rate Continues at Leading Automobile Plants

DETROIT, Sept. 25.—Detroit's industrial employment has again broken all records, according to the labor barometer of the Detroit Employers' Association. The total, as of Sept. 18, is 300,759, an increase of 415 over the figure of Sept. 11. The corresponding figure of a year ago was 196,834.

A new line of commercial cars and trucks will soon be introduced by the Chrysler Corporation. These units will run in the half-ton and three-quarter-ton class, and are probably forerunners of a complete line of trucks which will include units of larger capacity.

The total August production of the Chrysler Corporation, including the newly acquired Dodge property, will run about 55,000 units. It is estimated that the total production for the Chrysler Corporation will reach a half million units during the year. It is reported that 40,000 employees are now at work in the Chrysler plants.

In August the General Motors Corporation shipped 186,653 units to its sales offices, whereas in August, 1927, it shipped 155,604 units. Deliveries to customers during the past month amounted to 187,463 against 158,619 a year ago. Total sales to dealers for the first eight months were 1,439,442. Sales to consumers in the same period were 1,427,924.

It is estimated that Olds Motor Works will in September nearly equal its August production of 7773 units, which was a record.

Additions to the plants of the Seaman Body Co. are expected to increase capacity to 1200 units a day. This becomes necessary to handle the recent order from the Nash Motors Co. New buildings and equipment will cost approximately \$2,000,000, and all plants will run at full capacity well into the winter.

Steel Fabricators to Meet in November

The sixth annual convention of the American Institute of Steel Construction, Inc., will be held at Biloxi, Miss., Nov. 13 to 17, inclusive. Problems of merchandising and of standardizing of products, says Charles F. Abbott, executive director of the association, will be the chief subjects for discussion.

Standardization already accomplished by the institute, Mr. Abbott adds, is saving the builders of the United States approximately \$30,000,000 per annum on current contracts.

The fall meeting of the American Refractories Institute will be held Oct. 24 at the William Penn Hotel, Pittsburgh. The meeting will be devoted to the discussion of specifications and will be a continuation of the specification symposium of the spring meeting at White Sulphur Springs, W. Va.

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.
Plates and struc. shapes 3.40c.
Bars, soft steel or iron 3.30c.
New billet reinfrc. bars 3.15c.
Rail steel reinfrc. bars 3.00c.
Hoops 4.00c. to 4.25c.
Bands 3.95c.
Cold-fin. rounds and hex. 3.85c.
Squares 4.35c.
Black sheets (No. 24) 3.90c.
Galvanized sheets (No. 24) 4.75c.
Blue ann'l'd sheets (No. 10) 3.45c.
Structural rivets 3.85c.
Small rivets 65 per cent off list
No. 9 ann'l'd wire, per 100 lb. \$3.00
Com. wire nails, base per keg 2.95
Cement c'd nails, base 100 lb. keg. 2.95
Chain, per 100 lb. 7.55
Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in. \$18.00
4-in. 38.00
Seamless steel boiler tubes, 2-in. 19.00
4-in. 39.00

Non-Ferrous Metal Markets

Copper Again Advanced, Tin Active and Strong, Lead and Zinc Quiet and Steady

Copper.—Quotations have again been advanced $\frac{1}{4}$ c., electrolytic copper now selling for 15.25c., delivered in the Connecticut Valley, with the price of Copper Exporters, Inc., standing at 15.50c., c.i.f. European ports. Demand from consumers, both foreign and domestic, particularly the former, has been so heavy for another week that the advance was attributed to this as the main cause. As early as Saturday, Sept. 22, electrolytic copper sold at 15.25c., delivered in the Connecticut Valley, but the actual announcement of the advance was not made until Monday,

Metals from New York Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	50.50c. to 51.50c.
Tin, bars.....	52.50c. to 53.50c.
Copper, Lake.....	16.25c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	32.50c. to 33.50c.

Metals from Cleveland Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	53.88c.
Tin, bar.....	56.88c.
Copper, Lake.....	16.00c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	8.00c.
Lead, American pig.....	6.85c. to 7.10c.
Lead, bar.....	9.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.50c.
Babbitt metal, high grade.....	57.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	31.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.50c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	24.62 $\frac{1}{2}$ c.
Copper.....	25.50c.
Brazed Brass Tubes.....	27.75c.
Brass Rods.....	17.50c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 25	Sept. 24	Sept. 22	Sept. 21	Sept. 20	Sept. 19
Lake copper, New York.....	15.25	15.25	15.00	15.00	15.00	15.00
Electrolytic copper, N. Y.*.....	15.00	15.00	14.75	14.75	14.75	14.75
Straits tin, spot, N. Y.	48.62 $\frac{1}{2}$	49.00	....	49.00	48.00	48.00
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price $\frac{1}{4}$ c. higher.

Sept. 24. September will record a new record for total sales, exceeding the heavy demand in May. The total for the month to Sept. 22, inclusive, is estimated at over 200,000 tons, of which at least 70,000 tons was for export. Most domestic consumers are covered for October and November and sales at present are largely for December. Foreign consumers have taken about 60 per cent of their October requirements, 40 per cent for November and about 25 per cent for December. Some producers are out of the market for certain deliveries. Higher prices are predicted by some and not expected by others. Further heavy buying for foreign consumption might cause an increase, but yesterday and today, Tuesday, the market was much quieter. Lake copper is also higher at 15.25c. to 15.37 $\frac{1}{2}$ c., delivered, with sales made as far ahead as December.

Tin.—Sales for the week ended Saturday, Sept. 22, were about 1500 tons, bringing the total for the last five weeks close to 8000 tons. Friday, Sept. 21, was the most active day, with 800 tons changing hands. During the week consumers bought some, but the bulk was taken by dealers, with October-November delivery largely involved. Yesterday, Monday, was active with 400 tons taken by dealers. Today, Tuesday, the market was very quiet with spot Straits quoted at 48.62 $\frac{1}{2}$ c., New York. London prices were considerably higher than a week ago, with spot standard quoted at £223 10s., future standard at £219 and spot Straits at £226. The Singapore market was £221. Arrivals thus far this month are 8065 tons with 5420 tons reported afloat.

Lead.—A heavy business was done yesterday, Monday, and the market was quite active Tuesday, with quota-

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products were advanced $\frac{1}{4}$ c. per lb. on Sept. 24, following a similar advance on Sept. 17. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products. Freight up to 15c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.
Seamless Tubes—	
High brass.....	24.62 $\frac{1}{2}$ c.
Copper.....	25.50c.

Rods—	
High brass.....	17.50c.
Naval brass.....	20.25c.
Wire—	
Copper.....	17.25c.
High brass.....	20.25c.
Copper in Rolls.....	23.00c.
Brazed Brass Tubing.....	27.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.75c.	14.25c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms.....	11.00c.	12.00c.
Brass, heavy.....	7.25c.	8.25c.
Brass, light.....	6.25c.	7.25c.
Hvy. machine composition.....	9.75c.	11.00c.
No. 1 yel. brass turnings.....	9.00c.	9.625c.
No. 1 red brass or compos. turnings ..	9.00c.	10.00c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.625c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Zinc.....	10.00c.
Lead, wide.....	9.75c.
Seamless Tubes—	
Brass.....	26.12 $\frac{1}{2}$ c.
Copper.....	27.00c.
Brass Rods.....	17.50c.
Brazed Brass Tubes.....	27.75c.

tions steady and unchanged at 6.32½c., St. Louis, for September and October, and 6.35c., for November. The quotation of the leading interest is unchanged at 6.50c., New York, as the contract price.

Zinc.—Due to a large curtailment last week in ore production in the Joplin district, the tone of the market is considerably stronger. Production of ore for the week ended Saturday, Sept. 22, was estimated at 4500 tons, as against 11,800 tons the week before. Shipments were over 8200 tons, so that stocks of ore were reduced, with the estimated total now standing at about 47,100 tons. Some business in prime Western zinc is reported each day, but the market is not particularly active. Prices are evidently stabilized at 6.25c., East St. Louis, or 6.60c., New York. Ore prices are unchanged at \$40, Joplin.

Antimony.—Because of very small August-September shipments from China and also because of heavy buying by dealers, Chinese metal is higher at 11c. to 11.25c., New York,

duty paid, for spot and 10.75c. and up for futures. There is a stronger attitude among sellers.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 25.—Sales are moderately active in a market in which prices for tin and lead are higher. Prices for old metals are steady.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 49.50c.; lead, 6.45c.; zinc, 6.35c. in less-than-carload lots; antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards of 30,000 Tons—New Projects at 10,300 Tons Are Lowest in Several Months

AWARDS reported during the week amounted to 30,000 tons, the largest having been a railroad bridge at Toledo, Ohio, calling for 4500 tons. The total of new projects was only 10,300 tons, one of the lowest figures of the year. Awards follow:

BOSTON, 200 tons, bridge across River Street, to Boston Bridge Works, Inc.

BOSTON, 162 tons, stores and offices on Washington Street, to New England Structural Co.

BOSTON, 125 tons, office building on Newbury Street, to A. L. Smith Iron Works, Inc.

STATE OF VERMONT, 150 tons, highway bridge, to American Bridge Co.

BRISTOL, CONN., 300 tons, factory building for New Departure Mfg. Co., to Berlin Construction Co., Inc.

NEW YORK, 2200 tons, Doctors' Hospital at Eighty-seventh Street and East End Avenue, to Hedden Iron Construction Co.

NEW YORK, 2100 tons, apartment building at 1001 Park Avenue, to Hedden Iron Construction Co.

NEW YORK, 1800 tons, store building at 721 Fifth Avenue, to A. E. Norton, Inc.

NEW YORK, 700 tons, widening of Park Avenue between Fifty-seventh and Seventy-second Streets, to Phoenix Bridge Co.

ITHACA, N. Y., 650 tons, Plant Industries Building for Cornell University, to Kellogg Structural Steel Co.

STANDARD OIL CO. OF NEW JERSEY, 1000 tons, several tanks in Texas, to unnamed local fabricators.

CARNEYS POINT, N. J., 125 tons, for Du Pont Engineering Co., to American Bridge Co.

BELLE, W. VA., 130 tons, power station for Du Pont Engineering Co., to Virginia Bridge & Iron Co.

MORGANTOWN, W. VA., 575 tons, South Park bridge, to McClintic-Marshall Co.

WASHINGTON, 700 tons, building for

Daughters of American Revolution, to Barber & Ross.

WASHINGTON, 270 tons, Main Street bridge, to unnamed fabricator.

MONTGOMERY, ALA., 150 tons, high school, to Ingalls Iron Works Co.

HARRISBURG, PA., 350 tons, 23 State Highway Department machinery storage buildings, to Blaw-Knox Co.

PITTSBURGH, 3200 tons, 20 coal barges for Crucible Fuel Co.; 12 barges, 1920 tons, to American Bridge Co.; 8 barges, 1280 tons, to Jones & Laughlin Steel Corporation.

FORD CITY, PA., 450 tons, extensions for Pittsburgh Plate Glass Co., to McClintic-Marshall Co.

BUFFALO, 1150 tons, Bliss & Laughlin plant, to Lackawanna Steel Construction Co.

BUFFALO, 200 tons, addition for Houde Engineering Co., to R. S. McMannus Steel Construction Co.

LANSING, MICH., 120 tons, viaduct; from Jarvis Engineering Co., general contractor, to Massillon Bridge & Structural Co.

LOCKLAND, OHIO, 1000 tons, building for Tennessee Copper & Chemical Co., to unnamed fabricator.

TOLEDO, OHIO, 4500 tons, Maumee River Bridge for Toledo Terminal Railroad Co., to American Bridge Co.

CINCINNATI, 175 tons, building for Cincinnati Sheet Metal Roofing Co., to Southern Ohio Iron Works.

SOUTH BEND, IND., 900 tons, machine shop, to Indiana Bridge Co.

NEW YORK CENTRAL RAILROAD, 150 tons, bridge at Kankakee, Ill., to Mount Vernon Bridge Co.

STATE OF ILLINOIS, 750 tons, armory for

124th Illinois Artillery, to Mississippi Valley Structural Steel Co.

CHICAGO, 170 tons, addition to building at 123 West Madison Street, to Wend-nagel & Co., local.

CHICAGO, 230 tons, warehouse for Central Steel & Wire Co., to Reuter Brothers, local.

CHICAGO, 1040 tons, building for University of Chicago, to Lakeside Bridge & Steel Co.

CHICAGO, 1760 tons, two junior high schools, to unnamed bidder.

MONSANTO, ILL., 450 tons, chemical plant, to American Bridge Co.

MILWAUKEE, 250 tons, building No. 33 for International Harvester Co., to Lakeside Bridge & Steel Co.

ST. PAUL, MINN., 500 tons, addition to Selms-Stemle plant, to Minneapolis Steel & Machinery Co.

EAST ST. LOUIS, ILL., 400 tons, electrolytic zinc plant for Evans-Wallower Zinc Co., to American Bridge Co.

SCHALL, ARK., 900 tons, building for Arkansas Portland Cement Co., to Kansas City Structural Steel Co.

SAN FRANCISCO, 150 tons, apartment building at Laguna and Waller Streets, to Golden Gate Iron Works.

TACOMA, WASH., 175 tons plates, 54-in. welded pipe line, to Steel Tank & Pipe Co.

TULSA, OKLA., 500 tons, Bliss Hotel, to Patterson Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

STATE OF MAINE, 300 tons, highway bridge.

NEW YORK, 500 tons, apartment building at Second Avenue and Twenty-first Street; Schroeder & Koppel, Inc., general contractor.

STATE OF NEW YORK, 700 tons, highway bridges.

HARRISBURG, PA., 400 tons, Zembo Temple. WASHINGTON, 2500 tons, Government Printing Office.

WASHINGTON, 500 tons, work on Arlington Memorial Bridge.

PHILADELPHIA, 550 tons, Circle Theater, Day & Zimmermann, general contractor.

CLEVELAND, 150 tons, factory building for Gears & Forgings, Inc.

CLEVELAND, 500 tons, plant extensions for Eaton Axle & Spring Co.

JOLIET, ILL., 1750 tons, bridge across Des Plaines River for Rock Island Railroad.

CHICAGO, 1550 tons, armory, Mississippi Valley Structural Steel Co., low bidder.

HASTINGS, NEB., 900 tons, dam.

Proposes Research on Strength of Jacketed Vessels

The Boiler Code Committee of the American Society of Mechanical Engineers has recommended to the society's main research committee that an investigation be made into the collapsing strength of jacketed vessels, digesters, enamelled tanks, vacuum stills, and similar vessels. There seems to be no general agreement among engineers on the proper formulas to be used for such designs.

It is realized that extensive experimental work may be required but the main research committee believes that industry will be willing to support an investigation if it has a real need for the information. Accordingly that committee is now circularizing manufacturers and users interested.

PERSONAL

ALONZO F. ALLEN has been appointed secretary and treasurer of the American Steel & Wire Co., Cleveland. He has been secretary and assistant treasurer of the company. His appointment follows the retirement on pension of J. R. THOMAS, treasurer, and the resignation of R.



A. F. ALLEN

R. HAMPSON, assistant treasurer in the company's New York office. Mr. Allen's promotion follows a decision of the company to combine the offices of secretary and treasurer. J. G. NELSON, who has been assistant secretary at Cleveland, has been made assistant secretary and treasurer there; R. S. WHITE has been made assistant secretary and assistant treasurer in New York and C. S. CAWTHORNE has been named to the same positions in Chicago. Mr. Thomas had been connected with the company and its predecessor 43 years. His first position was in the Salem, Ohio, plant, which was operated by the Salem Wire Nail Co. and later taken over by the American Steel & Wire Co.

Officers elected by the Metals Coating Co. of America, 495 North Third Street, Philadelphia, at a recent directors' meeting were RICHARD L. BINDER, president; GEORGE RUCK and RUDOLPH H. SCHROEDER, vice-presidents; E. WARING WILSON, treasurer, and JOSEPH C. MERKEL, secretary.

JOSEPH J. BEEMAN has been appointed district engineer and sales representative in Michigan for the Despatch Oven Co., Minneapolis, with headquarters at 4037 Blaine Avenue, Detroit, and will be in charge of sales of the company's small industrial ovens and its large continuous conveyor ovens. J. G. PARKER has been named to serve the company in a similar capacity in western New York, and will have headquarters at 333 Jackson Building, Buffalo.

J. W. SPENCER, JR., for a number of years identified with the New York office of the Ross Heater & Mfg. Co., Inc., Buffalo, has been placed in charge of a new branch office which the company has opened at 121 North Broad Street, Philadelphia.

H. D. ROSENKRANS has been appointed district manager of a new office which has been opened at 50 Church Street, New York, by the Niagara Machine & Tool Works, Buffalo, to serve the metropolitan New York territory. He has been associated with the company for nine years and has served in the engineering, advertising and sales departments. The company manufactures machines and tools for sheet metal working.

E. J. PHILLIPS, who has been identified with the Detroit sales organization of the Van Dorn Electric Tool Co., Cleveland, has been transferred to San Francisco and will be succeeded in the Michigan territory by his brother, GEORGE PHILLIPS. J. F. SPAULDING has been placed in the Van Dorn Baltimore office to succeed JACK BEGGS, who has been removed to the company headquarters at Cleveland.

HAL F. WRIGHT has been appointed assistant to the general manager of sales for the American Chain Co., Inc., and associated companies, Bridgeport, Conn.

Dr. C. L. MANTELL, consulting chemical engineer, has returned to the department of chemical engineering at Pratt Institute, Brooklyn, for the school year, after having served as assistant editor of *Chemical and Metallurgical Engineering* during the summer months.

J. E. SULLIVAN, former superintendent of last furnaces and ore docks at the Sparrows Point plant, Bethlehem Steel Co., has been made vice-president of Edgar E. Brosius, Inc., engineer, Pittsburgh.

HARRY SAXER, who has been superintendent of blast furnaces at the Aliquippa works, Jones & Laughlin Steel Corporation, has been promoted to assistant general superintendent of that works, succeeding GRENVILLE LEWIS, resigned. Mr. Saxer has been succeeded by R. A. FIELD, who has been assistant superintendent of blast furnaces at Aliquippa. Mr. Saxer has been identified with the company for 20 years, for five years at the Eliza furnaces, Pittsburgh, and for the remainder at the Aliquippa furnaces, first as assistant superintendent and then as superintendent. In the latter position he was largely responsible for the changes in the lines of the Aliquippa furnaces which added mate-

rially to their capacities and in the case of No. 5 furnace to its setting several new high production records. In March this year that furnace produced 30,287 gross tons of pig iron, a daily average of 977 tons, and lately it has been averaging more than 1000 tons daily. He is a charter member of the Eastern States Blast Furnace and Coke Oven Association and has taken an active part in its affairs.

CLYDE H. TENEYCK, for a number of years in the operating department of the Illinois Steel Co., Chicago, has resigned to become associated in an executive capacity with Bliss & Laughlin, Inc., Harvey, Ill., manufacturer of cold-rolled steel bars and shafting. Mr. TenEyck has been identified with the steel industry for 20 years.

FRANK B. PARKER, general manager of Briggs & Turivas, Inc., dealer in scrap iron and steel and iron and steel products, Blue Island, Ill., has been made vice-president and general manager of the company.

H. E. STOCKER has joined the Chicago sales organization of the Hendey Machine Co., Torrington, Conn.

B. E. KIBBEE, vice-president in charge of sales for the Sharon Steel Hoop Co., Sharon, Pa., has been elected a director of the company.

WILLIAM M. CORSE, consulting metallurgical engineer, Washington, spoke on "Development of Business Through Research," at the annual sales convention of the Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating and polishing equipment and supplies, which was held Sept. 11 to 15 at Asbury Park, N. J. FREDERICK G. SPACE, purchasing agent Seymour Mfg. Co., Seymour, Conn., spoke on "Sales Ethics," and L. C. MORROW, managing editor *American Machinist*, New York, on "The Increasing Interest in Metal Finishing." In the closing address VAN WINKLE TODD, president of the New Jersey company, predicted a continuance of prosperity in the plating industry.

J. C. WILLIAMS, vice-president and general manager Weirton Steel Co., Weirton, W. Va., has returned from a two months' European tour.

C. EDWIN CLARK, who has been superintendent of the mechanical department at the Lackawanna, N. Y., plant, Bethlehem Steel Co., has been made assistant general manager of the company's Sparrows Point, Md., plant.

WALTER BLOCK and A. D. FIELDS, formerly with the consulting engineering firm of Clark, MacMullen & Riley, Inc., New York, have opened offices as consulting engineers at 17 East Forty-fifth Street, New York, and will specialize in industrial plant design and equipment.

OBITUARY

PAUL ARMSTRONG, president and one of the founders of the Armstrong Brothers Tool Co. and Armstrong-Blum Mfg. Co., Chicago, died at his home at River Forest, Ill., on Sept. 20, in his sixty-sixth year. He had



PAUL ARMSTRONG

been in failing health for several months. He was born at Perth, Scotland, and came to this country at the age of three, when his parents made Chicago their home. In 1893 with his brothers, John, Hugh and James, he founded the Armstrong Brothers Tool Co. for the manufacture of machinists' tools. It has been said that Paul Armstrong was more largely responsible than any other man for the universal adoption of the tool holder system in the use of machine tools.

HENRY C. BANDAUI, one of the founders and for several years president of the Kohver Pattern Co., Milwaukee, died Sept. 16, following a paralytic stroke. He was 51 years of age and had lived in Milwaukee since 1903.

WILLIAM J. BRYSON, retired civil engineer and a member of the board of directors of James B. Clow & Sons, Chicago, died Sept. 16 at Lake Placid, N. Y. His first employment was with the United States Government in 1865 as an engineer on fortifications near Washington. For a number of years until 1900 he was assistant engineer for the Chicago & Alton Railroad.

HENRY S. LYONS, president of the Mystic Steamship Co. and vice-president of the Massachusetts Gas Companies, Boston, died of pneumonia in New York on Sept. 21.

WALTER C. ARTHURS, since 1903 president Mount Vernon Car Mfg. Co., Mount Vernon, Ill., died suddenly while nearing that city on his return with his family from a summer vacation at Hackensack, Minn. He

was born at Hillsboro, Ill., 63 years ago, but had lived in Mount Vernon ever since the car company was established in 1890.

DAVID AHLIN, since 1924 engineer in charge of acetylene installations for the Keith Dunham Co., Chicago, and one of the outstanding figures in the acetylene industry in the United States, died suddenly on Sept. 6. He was born at Stockholm, Sweden, in 1880, and was graduated from the Swedish Naval Academy. He first began to devote his attention to the use of acetylene when employed by the De Laval company and the Swedish Gas Accumulator Co. in Sweden, and while associated with the latter company, he made his first trip to the United States in 1910. In this coun-

Reinforcing Steel

Iowa Road Work Calls for 9000 Tons

HIGHWAY work in Iowa, calling for 9000 tons, brought the total of new projects reported during the week to 12,000 tons. The following awards, totaling 5400 tons, included no jobs of outstanding size:

BOSTON, 175 tons, Boston & Maine Railroad baggage terminal, to Concrete Steel Co.

NEW YORK, 400 tons, subway section 2, route 106; from La Rocca Construction Co., general contractor, to Fireproof Products Co.

BROOKLYN, 550 tons, building for Brooklyn Ash Removal Co., Inc., to McClintic-Marshall Co.

BROOKLYN, 300 tons, foundation work for Abraham & Strauss department store building, to Concrete Steel Co.

JAMAICA, N. Y., 110 tons, Suffolk Title & Guaranty building, to Carroll-McCreary Co., Inc.

NEWARK, N. J., 200 tons, substation for Public Service Production Co., to Joseph T. Ryerson & Son, Inc.

NEWARK, 120 tons, Essex County Vocational School, to Tidewater Structural Materials Corporation.

STATE OF NEW JERSEY, 150 tons, road work, to Concrete Steel Co.

STATE OF NEW JERSEY, 200 tons, road work near Riverton; from Cizzienti Brothers, general contractors, to Taylor-Davis Co., Philadelphia.

NEW BRUNSWICK, N. J., 150 tons, distributing station for Public Service Production Co., to Igoe Brothers.

CLEVELAND, 600 tons, Nickel Plate Railroad grade crossing elimination work, to Pattison Leitch Co.

CHICAGO, 260 tons of rail steel bars, apartment building on Winthrop Avenue, to Calumet Steel Co.

CHICAGO, 100 tons of rail steel bars, Rockeby Apartments, to Concrete Engineering Co.

CHICAGO, 200 tons, addition to Victory Mfg. Co. plant, to unnamed bidder.

CHICAGO, 100 tons, building for Peoples' Furniture Co., to Concrete Engineering Co.

CHICAGO, 120 tons, apartment building on

try he became identified with the American Gas Accumulator Co. and in 1911 was made chief engineer of the Commercial Acetylene Supply Co., New York, holding that position until 1924.

JOSEPH R. DILWORTH, president Dilworth, Porter & Co., Pittsburgh, manufacturers of railroad supplies, died at his summer home at Southampton, N. Y., on Sept. 21, aged 68 years. He was born in Pittsburgh, but had lived in New York for a number of years.

FRED M. JOHNSON, general manager Brammer Washing Machine Co., Davenport, Iowa, died on Sept. 14.

FRED W. SYKES, for 27 years in charge of the Lake Street, Chicago, warehouse of the American Steel & Wire Co., died Sept. 21 following an attack of acute indigestion. He would have been 60 years old next April. Before taking charge of the warehouse he was employed by the Illinois Steel Co.

Oakdale Avenue, to Concrete Engineering Co.

CHICAGO, 165 tons, garage, to Barton Spiderweb System, Inc.

MOBILE, ILL., 500 tons of rail steel bars, building for Deere & Co., to Republic Iron & Steel Co.

NORTH PLATTE, NEB., tonnage unstated, building for Swift & Co., to Concrete Engineering Co.

EAST ST. LOUIS, ILL., 100 tons, electrolytic zinc plant for Evans-Wallower Zinc Co., to Laclede Steel Co.

ST. LOUIS, 325 tons, hotel and office building at Twelfth Boulevard and Olive Street, to Missouri Rolling Mill Corporation.

SAN FRANCISCO, 200 tons, Simmons Bed Co. plant, to Pacific Coast Steel Co.

LOS ANGELES, 130 tons, club building, South Los Angeles Street, to unnamed company.

LOS ANGELES, 390 tons, apartment building, Ocean View Avenue, to unnamed company.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 500 tons, foundation work on Kill Van Kull Bridge; Converse Construction Co., general contractor.

NEW YORK, 185 tons, addition to Evander Childs High School; bids opened Sept. 25.

BROOKLYN, 400 tons, building for Brooklyn Ash Removal Co., Inc.

CHICAGO, tonnage not stated, two junior high schools; Thorgerson & Erickson, low bidder on general contracts.

CHICAGO, 200 tons, building for Commonwealth Edison Co.; MacDowell Construction Co., low bidder.

CHICAGO, 370 tons, armory; Great Lakes Construction Co., low bidder.

STATE OF IOWA, 9000 tons, highway work. OAKLAND, CAL., 140 tons, office building, Fourteenth and Franklin Streets; bids being taken.

SAN FRANCISCO, 170 tons, apartment building, 2160 Pacific Street; bids being taken.

SAN FRANCISCO, 190 tons, apartment building, Chestnut and Larkin Streets; bids being taken.

SAN FRANCISCO, 525 tons, Bernal Cut project; bids opened.

SANTA CRUZ, CAL., 225 tons, hotel; bids opened.

Tin Plate Plan Divides Foreign Fields

Welsh-American Agreement Sets Quotas for Canada, South America
and Italy—British Advance Export Ferromanganese Price

(By Cable)

LONDON, ENGLAND, Sept. 24.

THE Welsh-United States tin plate agreement, ratified last week, is now understood to concern only sales to Canada, South America and Italy, parts of which markets are to be reserved for United States mills, all other markets to be free. The United States must not exceed a 30 per cent quota for exports.

Cleveland pig iron is still quiet, but the outlook is regarded more favorable. Domestic purchasing is for delivery up to one month only, because of the uncertainty about the new railroad rates effective in December. Export inquiry is increasing.

Bolckow, Vaughan & Co. have blown out one furnace producing foundry grade and blown in a furnace on ferromanganese. Hematite iron is improving with quotations steadier as stocks have diminished.

Ferromanganese prices have been advanced for export as a result of improved Continental demand. Canada has bought 1500 tons of spiegel-eisen, which was shipped from Tees last week. Foreign ore is quiet and Bilbao Rubio prices are unchanged.

Domestic demand for finished steel is moderately active except in ship-building material. Export demand is increasing slowly with India especially interested in buying.

Galvanized sheets are active and demand for black sheets is better, particularly in light gages for Japan, on which mills are fully sold for some time.

Continental markets are strong with a sustained demand from overseas and British users are buying sparingly because of the advancing tendency of the market. The International Steel Cartel meets again Dec. 13. The International Tube Cartel met at Vienna, Sept. 21 and 22.

German pig iron output in August was 1,031,000 metric tons. Luxembourg production in July was 233,500 tons of pig iron and 224,000 metric tons of steel. Polish output in July was 56,000 tons of pig iron and 122,000 tons of steel.

Tin plate is moderately active, with makers enthusiastic about the future. Tin plate bar makers are engaged on heavy bookings and considering an advance in prices.

with 201,518 tons in June. Production of 757,000 metric tons in July was about 40,000 tons less than in the previous month. Prices continue strong, with the domestic market still advancing. At present there is discussion of the possibility of establishing a publicity office to promote new uses of steel in France. There is also a movement for the establishment of an export bureau for the mechanical trades, which would act as an information center in promoting exports of French iron and steel.

Pig Iron.—Demand is satisfactory, and at the next meeting of producers and consumers of phosphoric foundry iron it is expected that a large tonnage will be set aside in October for domestic users, with prices unchanged. The entente of French, Belgian and Luxembourg producers of pig iron has advanced the price of phosphoric foundry iron for Belgian consumers by 5 fr. (20c.) per metric ton, bringing it to 595 Belgian francs (\$23.20), f.o.b. Athus or Sterpeniche. Very little competition from Dutch hematite iron is reported in the North, except for a few shipments entered under the "temporary admission" agreement. Exports of pig iron were 51,797 tons in July and imports 2857 tons, compared with 39,876 tons of exports and 7555 of imports in June.

Semi-Finished Material.—Export prices are firmer, with blooms at £4 15s. to £4 16s. (\$23.09 to \$23.33) per metric ton, f.o.b. Antwerp, billets at £4 17s. 6d. to £4 18s. 6d. (\$23.69 to \$24.06), f.o.b. Antwerp.

Finished Material.—Merchant prod-

French Exports Decrease

Domestic Demand Heavy and Mills Are Well Filled—Export Information Bureau Advocated

PARIS, FRANCE, Sept. 11.—Increased domestic requirements for iron and steel are reflected in the smaller ex-

port total for July, which showed only 153,116 tons of iron and steel products shipped out of the country compared

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. maker works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35 to 5.48
Cleveland No. 1 fdy.....	3 8½	to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy.....	3 6		16.04
Cleveland No. 4 fdy.....	3 5		15.80
Cleveland No. 4 forge.....	3 4½		15.68
Cleveland basic (nom.)..	3 5		15.80
East Coast mixed.....	3 10		17.11
East Coast hematite.....	3 10½		17.23
Rails, 60 lb. and up.....	7 15	to 8 5	37.66 to 40.10
Billets.....	6 2½	to 6 15	29.77 to 32.81
Ferromanganese.....	13 15		66.83
Ferromanganese (export)	14 0		68.04
Sheet and tin plate bars,			
Welsh.....	6 0		29.16
Tin plate, base box.....	0 18	to 0 18¼	4.37 to 4.43
Black sheets, Japanese			
specifications.....	13 7½		65.00
Ship plates.....	7 12½	to 8 2½	1.63 to 1.74
Boiler plates.....	9 0	to 10 10	1.92 to 2.25
Tees.....	8 2½	to 8 12½	1.74 to 1.84
Channels.....	7 7½	to 7 17½	1.58 to 1.69
Beams.....	7 2½	to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 5	to 7 15	1.55 to 1.66
Steel hoops.....	9 0	to 10 0	1.92 to 2.14
Black sheets, 24 gage...	9 15	to 10 0	2.09 to 2.14
Galv. sheets, 24 gage...	13 10	to 13 12½	2.93 to 2.99
Cold rolled steel strip, 20			
gage, nom.....	16 0		3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

	(Per Metric Ton)			
Foundry pig iron (a):				
Belgium.....	£3 3s.	to £3 5s.	\$15.32	to \$15.80
France.....	3 3	to 3 5	15.32	to 15.80
Luxembourg.....	3 3	to 3 5	15.32	to 15.80
Basic pig iron (nom.):				
Belgium.....	3 3	to 3 4	15.41	to 16.38
France.....	3 3	to 3 4	15.41	to 16.38
Luxembourg.....	3 3	to 3 4	15.41	to 16.38
Coke.....	0 18		4.37	
Billets:				
Belgium.....	5 0		24.30	
France.....	5 0		24.30	
Merchant bars:				
Belgium.....	6 5		1.37	
France.....	6 5		1.37	
Luxembourg.....	6 5		1.37	
Joists (beams):				
Belgium.....	5 5		1.14	
France.....	5 5		1.14	
Luxembourg.....	5 5		1.14	
Angles:				
Belgium.....	6 0		1.30	
½-in. plate:				
Belgium (a).....	6 15		1.50	
Germany (a).....	6 15		1.50	
⅜-in. ship plate:				
Belgium.....	6 10		1.44	
Luxembourg.....	6 10		1.44	
Sheets, heavy:				
Belgium.....	6 1		1.33	
Germany.....	6 1		1.33	

(a) Nominal.

ucts continue to advance, and most mills are unable to offer shipment in less than three months. On certain sizes of shapes deliveries are four to five months. Steel bars are quoted on the Brussels Bourse at £6 2s. to £6 2s. 6d. per ton (1.35c. to 1.36c. per lb.), f.o.b. Antwerp, and normal specifications of beams range from £4 18s. to £4 18s. 6d. per ton (1.08c. to 1.09c. per lb.), with British specifications at £4 19s. to £4 19s. 6d. (1.09c. to 1.10c. per lb.) per ton, Antwerp. Export prices on sheets are firm at £6 9s. per ton (1.42c. per lb.) for 6 mm., and at £6 12s. per ton (1.46c. per lb.), Antwerp, for 3 mm. In the domestic market sheets are strong in

the lighter gages. Mills are quoting five to six weeks' delivery on plates and medium-gage sheets, and there is a substantial volume of inquiry. Deliveries on the lighter gages extend to two months or more, with prices tending to advance. Total exports of sheets in July were 14,286 tons, compared with 17,820 tons in June, while imports were 445 tons in July and 440 tons in June.

Rails.—The next meeting of the European Rail Makers Association is scheduled to be held in Paris, Sept. 21. French exports of rails in July totaled 42,416 tons, of which 12,656 tons went to Germany. Only 32,193 tons of rails were exported in June.

the privately owned companies. Imports included a wide range of rail sections, but 40 per cent of the total was in 100-lb. and heavier rails. Of the total steel produced in Japan and imported during 1927, importations represented about 36 per cent. Only in pipe, wire rods and I-beams did the imports exceed the domestic output. In the case of round steel bars imports represented only about 14 per cent of the total sold in the country, while in sheets imports were about 40 per cent of the total.

Prices of Imported Steel High

Recent quotations on Continental steel obtained by importers in New York have been close to 2c. per lb., duty paid, Atlantic port, on Thomas grade steel bars and 1.83c. to 1.88c. per lb., duty paid, on structural material. At these prices it is practically impossible to do business with American consumers. But foreign steel is still being sold, as occasionally importers find a mill in France, Belgium or Germany willing to accept certain sizes to complete a rolling, at slightly less than the usual quotations.

Japanese Steel Output Greater

More Than Half of Domestic Needs Furnished in Most Products—Tin Plate Order Goes to American Mills

NEW YORK, Sept. 25.—Export trade with the Far East is beginning to improve, but purchases from both China and Japan are limited to small lots, except in the case of large companies covering their usual requirements. One such purchase, 60,000 base boxes of tin plate, 14 x 18¾-in. and 10 x 20-in., was made last week by the Nippon Oil Co. from two large Japanese trading companies. The order is understood to have been distributed equally among five American mills. No inquiry for light-gage black sheets is reported here, but this is not considered unusual, as the leading Japanese maker, the Kawasaki Dockyard Co., Kobe, is reported to have a considerable supply of sheets in stock.

Latest Japanese reports on production and importation of steel products indicate that in most cases Japan is producing a large part of the country's requirements. The total production of steel in Japan by the Government Works and privately owned mills during 1927 was 1,277,826 metric tons. Adding 731,109 metric tons of imported steel, the total estimated consumption in Japan was, 2,008,935 metric tons. The following table gives the output, in metric tons, of the Government Works and private interests, and the imports for 1927:

	Production		Imports	Total
	Government Works	Private Plants		
Sheets	161,928	163,582	224,955	555,465
Tin plate....	14,706	.....	61,052	75,758
Rails	165,950	4,139	88,854	258,943
Bars:				
Round ..	102,275	237,686	57,230	397,191
Square ..	19,860	9,435	6,983	36,278
Flat	37,584	29,979	19,152	86,715
Angles (equal) ..	66,093	60,862	26,227	153,182
Angles (unequal) ..	28,399	4,893	11,966	44,958
Channels ..	32,772	.....	26,096	58,868
I-beams ...	15,491	.....	36,495	51,986
Wire rods... 49,032	5,395	109,090	163,517	
Pipe	47,777	52,003	99,780	
Carwheels ..	7,638	11,215	796	19,649
Total, all products	698,363	579,463	731,109	2,008,935

Rail production, as shown in the table, covers 12 to 100-lb. sections in the case of the Government Works and mostly sections less than 20 lb. by

Krupp Works Building Steel Mills for Japan

HAMBURG, GERMANY, Sept. 11.—According to a recent report, Friedrich Krupp A. G., through its Grusonwerk at Magdeburg, has received an order from the Kawasaki Dockyard Co., Kobe, Japan, for rolling mill equipment to produce sheets of No. 22 gage and lighter. The Krupp works will ship a rail mill of 35,000 tons annual capacity to the Government Steel Works at Yawata, Japan, some time next month.

Formation of Sheet Cartel Considered in Germany

HAMBURG, GERMANY, Sept. 10.—Negotiations have been resumed among steel sheet producers for the formation of a sheet syndicate, and the two principal producers, Otto Wolff & Co., Cologne, and Wolff, Netter & Jacobi, Hausach, South Germany, are understood to have reached an agreement.

The sheet industry is apparently facing the need of some control such as might be exercised by a syndicate, as at present No. 20 gage sheets are selling at lower prices than plates. Sheets of this gage are quoted to domestic consumers at about 158 m. (\$37.64) per ton, whereas the lowest quotation on plates is 160 m. (\$38.71) per ton.

Another unusual condition in the sheet market is the level of export prices, which are higher than domestic instead of being 15 to 25 per cent lower as in the case of other products. For export, No. 25 gage sheets are quoted at £10 17s. 6d. to £11

(\$52.85 to \$53.46) per ton, f.o.b. port, whereas prices to domestic consumers range from 195 to 198 m. (\$46.45 to \$47.16) per metric ton.

German Machine Builders Open Paris Office

PARIS, FRANCE, Sept. 11.—The Syndicate of German Machine Tool Manufacturers has decided to establish an office in Paris to handle the large orders being placed with them on reparations account. Negotiations are reported to have been opened with several large French automobile manufacturers, which may result in contracts for German machine tools amounting to several million francs, with credit terms of three to 10 years.

It is reported by the French General Post Office that a bill is to be introduced in the Chamber of Deputies calling for the construction of 200 steel railroad mail cars, 20 meters long, all to be delivered before the end of 1929. Of the total purchase, 100 will be placed with French builders and the remainder with Germany on reparations account.

"Production of High Alumina Slags in the Blast Furnace" is the title of Technical Paper No. 425 of the United States Bureau of Mines by T. L. Joseph, S. P. Kinney and C. E. Wood. The 32-page pamphlet gives the results of 10 years of investigations conducted under a cooperative agreement between the Aluminum Co. of America and the University of Minnesota School of Mines' Experiment Station.

Machinery Markets and News of the Works

Machinery Industry Active

Plants Operating at High Rate on Unfilled Orders
and Outlook Continues Very Satisfactory

MACHINE tool trade developments continue highly favorable. Reports vary as to whether September volume will equal that of August. Some sellers have enjoyed an increased business, while others have had less. But taking into account the high rate at which many machine tool plants are operating, the large amount of unfilled business and the steady volume of orders and inquiries, a slight fluctuation downward this month need not be seriously regarded.

Some plants are not only working the full daylight schedule, but are doing some night work. The orders on hand, plus the present volume of new business, are sufficient to maintain this rate during the remainder of the year. Nothing short of a decided slump in orders next month can prevent a very satisfactory fourth quarter. And no such falling off in buying is yet in sight.

A substantial volume of recent business in the Central States has come

from the automotive industry, the widespread buying in that field being attributed to changes in models and the imperative need of reducing manufacturing costs to meet competition. Other sources of new business are the oil companies in the Southwest and the aviation industry.

The Eaton Axle & Spring Co., Cleveland, is in the market for special milling and grinding machinery and miscellaneous shop equipment for a large plant extension. It is reported in Chicago that the Ford company is planning to resume the manufacture of tractors at Fordson, Mich., and may buy equipment. The Allis-Chalmers Mfg. Co. is negotiating for equipment for its West Allis, Wis., plant. It has recently completed purchases for its tractor plant at Springfield, Ill.

Among the principal buyers in the East are the General Electric Co., Schenectady; North East Electric Co., Rochester, and Pratt & Whitney Aircraft Co., Hartford.

boring mills, one 2500-lb. steam hammer, two heavy-duty axle lathes, a Racine saw and a Cincinnati high-speed tapping machine. Pratt & Whitney division sold three vertical shapers, a deep-hole drilling machine, seven 1 x 18-in. automatic lathes, production hand milling machine, rotary surface grinder and 16 x 60-in. lathe.

Contract has been let by General Cable Co., 420 Lexington Avenue, New York, to Doullut & Erwin, Inc., Meaher Building, Mobile, Ala., for one-story wire and cable mill, 120 x 540 ft., at Mobile, to cost more than \$500,000 with equipment.

A. J. Schwarzler, 367 East 167th Street, New York, has had plans drawn for a three-story ice-manufacturing plant, to cost about \$150,000 with equipment. Project will include an automobile service, repair and garage building. Charles Schaefer, 332 East 149th Street, is architect.

American Seal Kap Corporation, Natick, Mass., manufacturer of metal bottle caps, etc., has purchased two factory buildings, 90 x 240 ft., in Long Island City, here-

tofore occupied by Type Founders Corporation, and will remove to new location.

New York Edison Co., Irving Place and Fifteenth Street, New York, has awarded general contract to Ken Well Construction Co., 45 East Seventeenth Street, for addition to power plant at foot of Fourteenth Street, fronting on East River, to cost approximately \$2,000,000. Thomas E. Murray, Inc., 55 Duane Street, is engineer.

Bart and John P. Walther, 103 East 125th Street, New York, architects, have awarded general contract to J. H. Deeves & Brother, 4 East Thirty-ninth Street, for one-story wire annealing works at 539-53 East 118th Street, for a company whose name is temporarily withheld, to cost about \$40,000 with equipment.

Empire Oil & Refining Co., 60 Wall Street, New York, operated by Cities Service Co., same address, is planning new oil refinery in eastern Iowa, with initial capacity of 10,000 bbl., to be increased later to 20,000 bbl. Project will include construction of 10-in. steel pipe line from Augusta, Kan., to refinery, with booster station facilities for capacity of 40,000 bbl. daily. Development is reported to cost more than \$1,000,000.

Following merger of Direct Control Valve Co., 101 Park Avenue, New York, and Lawler Water Feed & Damper Regulator Co., Mount Vernon, N. Y., under first noted name, arrangements have been made for a stock issue to total \$750,000, portion of proceeds to be used for expansion, including development of plant of Milwaukee Valve Co., Milwaukee, a subsidiary, where production will be largely concentrated.

Andrew J. Thomas, 2 West Forty-sixth Street, New York, architect, has plans for two-story addition, 75 x 200 ft., to automobile service, repair and garage building at 335 East Forty-seventh Street, including improvements in present building, to cost about \$110,000.

Ovens, power equipment, conveying and other machinery will be installed in new three-story and basement plant to be erected by General Baking Co., 420 Lexington Avenue, New York, at Norfolk, Va., to cost over \$125,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Texas Corporation, 17 Battery Place, New York, is planning extensions in oil refinery at Lockport, Ill., to increase capacity from 7500 to 15,000 bbl. per day. A trunk pipe line will be constructed from vicinity of Tulsa, Okla., to refinery site. Company is also planning to enlarge capacity of three refineries in Texas and one in Wyoming, including additional connections with pipe line system. Entire project is reported to cost over \$2,000,000 with equipment.

Clarence D. Chamberlin, technical advisor and director of Crescent Aircraft Corporation, Lindenhurst, L. I., has purchased factory property at Jersey City, N. J., totaling 10 acres of land, with buildings aggregating 120,000 sq. ft. floor space, and will remodel for manufacture

New York

NEW YORK, Sept. 25.—Among the buyers of machine tools in the last week were the General Electric Co., Schenectady; the North East Electric Co., Rochester, N. Y., and the Pratt & Whitney Aircraft Co., Hartford, Conn. R. Hoe & Co., New York, printing press manufacturers, bought a large Ingersoll milling machine and are expected to close shortly on about eight planers, some of large size. The volume of business so far this month has been equal to that of August, and some sellers report that their sales are running ahead of last month's. Developments of the past week indicated, as have those of previous weeks, that machine tool buying is on a steady, healthy basis and that the present volume of activity may be expected to continue throughout the fall.

Niles-Bement-Pond Co. reports sales of a 48 x 48-in. x 16-ft. Time Saver planer, 6-ft. radial drill, three 36-44-in. side-head

The Crane Market

BUSINESS in overhead electric cranes continues rather limited with only a small volume of new inquiry and buyers slow to place orders. Although the locomotive crane field is quiet at present, subway contracts not yet awarded and a water supply tunnel contract from Yonkers, N. Y., to Brooklyn are expected by sellers to provide some new contractors' requirements in cranes and

shovels. Among the contractors who may have equipment requirements in connection with subway construction are La Rocca Construction Corporation, Rosenthal Engineering Contracting Co., and D. C. Serber, Inc., all in New York. The Colonial Sand & Gravel Co., New York, is reported to have closed on a crawl-tread locomotive crane.

Among recent purchases are:

Steel Company of Canada, Ltd., Hamilton, Ontario, two 175-ton ladle cranes and one charging machine from Morgan Engineering Co.

Youngstown Sheet & Tube Co., Youngstown, 40-ton, 85-ft. span mill crane from Morgan Engineering Co.

Century Electric Co., St. Louis, 10-ton, 76-ft. span, overhead electric crane from Manning, Maxwell & Moore, Inc.

of airplanes and parts. Chamberlin Aeronautical Corporation, recently organized, and Crescent company will occupy plant jointly, each developing manufacture of different types of aircraft. It is understood that works at Lindenhurst will be removed to new location.

Board of Education, New Milford, N. J., plans installation of manual training equipment in new three-story high school to cost \$400,000, for which bids have been asked on general contract. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Lionel Corporation, 605 East Twenty-first Street, Irvington, N. J., manufacturer of electric toys, has plans for new one and two-story plant in Hillside district, 390 x 620 ft., to cost over \$200,000 with equipment. Austin Co., New York, is architect and engineer.

Newark Transformer Co., 17 Frelinghuysen Avenue, Newark, manufacturer of electric power equipment, has acquired property at 62 Sherman Avenue, 25 x 100 ft., and plans construction of an addition, to cost about \$40,000.

New England

BOSTON, Sept. 25.—Large machine tool users have not been a market factor in months. Business placed with dealers in September has been mainly from Connecticut firms. In the past week \$30,000 worth of tools was sold to one company. Small tools continue active.

According to latest reports available from the United States Employment Bureau, Massachusetts metal-working establishments are operating at capacity and certain cities indicate a shortage in high-skilled labor. In Maine, the majority of machine shops are moderately busy and in one section iron works are operating overtime. In Connecticut, metal-working plants in general are working overtime, while in Rhode Island a shortage of high-skilled workmen continues. In Vermont the situation is spotty, but on the whole optimistic. The few New Hampshire metal-working plants are operating, approximately, on a normal basis.

Lyman Gun Sight Corporation, Middlefield, Conn., has plans for extensions. Details will be announced later.

Work has been started on a \$40,000,000 hydroelectric plant and dam at Munroe, N. H., and Barnet, Vt., for New England Power Co., Worcester, Mass. Lester W. Branch, St. Johnsbury, Vt., is engineer.

Plans will be ready this week for a \$145,000 storage service unit at Middletown, Conn., for Connecticut Power Co., 266 Pearl Street, Hartford. Davis & Walldorff, 17 Whitney Avenue, New Haven, are architects.

Kendall, Taylor & Co., 142 Berkley Street, Boston, architects, close bids Sept. 28 on a \$225,000 fire alarm signal headquarters and other fire department improvements, to include, if possible, a small machine shop, for Newton, Mass. Public building commissioner, City Hall annex, will pass on final papers.

Plans will be ready about Oct. 16 for a municipal sewage disposal plant at Fields Point section, Providence, R. I. T. J. Hill Pierce, City Hall, Providence, has plans.

Contract has been let by French Mfg. Co., Waterbury, Conn., manufacturer of bronze and copper tubing, to Torrington Building Co., Torrington, Conn., for one-story addition, 60 x 200 ft., to cost about \$50,000 with equipment.

Hygrade Lamp Co., Salem, Mass., manufacturer of incandescent electric lamps, has purchased Vosburgh Miniature Lamp Co., Orange, N. J., specializing in small electric lamp units, and will remove latter works to Salem, where expansion will be carried out. A few months ago, Hygrade company acquired Triumph Lamp Co., Indianapolis, and has consolidated with its organization at Salem.

Gilbert & Bennett Co., Georgetown, Conn., manufacturer of wire cloth, has awarded general contract to H. Wales Lines Co., Meriden, Conn., for a one-story addition for mechanical cleaning. Greenwood & Noerr, 847 Main Street, Hartford, Conn., are engineers.

Goss & De Leeuw Machine Co., New Britain, Conn., manufacturer of chucking machinery and parts, has awarded general contract to Aberthaw Co., Boston, for one-story addition, 100 x 175 ft., to cost about \$50,000 with equipment.

H. T. McCluskey & Sons, Inc., 525 Grand Avenue, New Haven, Conn., manufacturer of wire cloth, has awarded general contract to Emil W. Lundstrom, Hamden, Conn., for one-story addition, 42 x 60 ft. Dwight E. Smith, New Haven, is architect.

Board of Works, Springfield, Mass., has taken out a permit for a new pumping station for municipal water system, to cost \$90,000 with pumping units and other equipment.

South Atlantic

BALTIMORE, Sept. 25.—Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, manufacturer of metal bottle caps, bottle-capping machinery, etc., is having plans completed by L. R. White, Hearst Tower Building, architect, for one and two-story addition, 150 x 600 ft., to cost over \$175,000 with equipment. Bids will be asked on general contract in October.

International Harvester Co., 606 South Michigan Avenue, Chicago, has asked bids on general contract for new factory branch, storage and service plant for motor truck division at Baltimore, one story, 125 x 250 ft., to cost over \$125,000 with equipment. W. D. Price, company headquarters, is engineer, in charge.

Carolina Power & Light Co., Raleigh, N. C., is disposing of bond issue of \$2,500,000, part of proceeds to be used for extensions and improvements in power plants and system.

Board of District Commissioners, District Building, Washington, will receive bids until Oct. 5 for cast iron lamp posts and fittings, including 60 post bases; 50 frames for fire alarm posts; 25 lamp post shafts; 30 frames for police patrol posts.

Franklin Mineral Products Co., Franklin, N. C., John Davenport, general manager, will erect new mica grinding mill, comprising main one-story unit, 30 x 185 ft., with grading plant, 30 x 100 ft., boiler house and other buildings, to cost about \$55,000 with machinery.

Medley Mfg. Co., Columbus, Ga., has been organized to take over and expand local plant and business of Tom Huston Mfg. Co., manufacturer of peanut-shelling machinery and kindred equipment.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 4 for centrifugal pumping units, car-wheels, and other equipment, Panama Schedule 1903.

Raymond C. Snow, Bona Allen Building, Atlanta, Ga., architect, has plans for one-story and basement automobile service, repair and garage building, 100 x 165 ft., to cost about \$100,000 with equipment.

Merchants' Storage & Refrigeration Co., Baltimore, recently organized by George H. Jarboe, 4001 Frederick Avenue, and associates, has acquired former local plant of Shafer Refrigerating Co., and will remodel for new cold storage and refrigerating unit, including installation of additional equipment.

Board of Education, Winston-Salem, N. C., plans installation of manual training equipment in two new junior high schools, one to be within city limits and other at South Winston-Salem; also in new high school for colored students. New structures will be built in connection with school expansion program to cost \$2,500,000, for which bond issue will soon be sold.

Bureau of Yards and Docks, Navy Department, Washington, will receive bids (no closing date announced) for 125-hp. return flue fire box boiler, with fuel oil burner, stack and accessories, for naval air station at San Diego, Cal., specification 5483.

Buffalo

BUFFALO, Sept. 24.—Plans have been filed by Houde Engineering Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of automobile shock absorbers, etc., for one-story plant unit to cost \$75,000.

Nichols & O'Connor, Cahill Building, Syracuse, N. Y., architects, have plans for a one-story automobile service, repair and garage building, to cost \$140,000 with equipment.

Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive products, is planning construction of three-story factory branch and distributing plant at Detroit, to cost over \$60,000 with equipment.

Department of Correction, Albany, N. Y., is planning construction of new one-story mechanical shop at State prison at Auburn, N. Y.

Cherry-Burrell Corporation, Little Falls, N. Y., has been organized to take over D. H. Burrell & Co., manufacturer of dairy machinery, with local plant, and J. G. Cherry Co., Cedar Rapids, Iowa, maker of similar equipment, as well as Cherry-Bassett Co., a subsidiary of last-noted, John W. Ladd Co., Detroit, Wright-Ziegler Co., Boston, and Milwaukee Dairy Supply Mfg. Co., Milwaukee, all manufacturers of like machinery, including ice cream freezers, etc. Consolidated organization has arranged for bond issue of \$2,000,000 to provide for merger and expansion in output.

Board of Contract and Supply, Utica, N. Y., is considering one-story equipment storage and distributing plant, with mechanical department, to cost about \$50,000.

Chisholm-Moore Hoist Corporation, recently at Cleveland, removed its general offices to Tonawanda, N. Y., on Sept. 1. Branch office with complete line of hoists will be continued at Cleveland.

Pittsburgh

PITTSBURGH, Sept. 24.—There is still a fairly active inquiry for machine tools in this district and while actual sales leave something to be desired a few firms are well satisfied with recent transactions. One company handling a line of special pipe mill tools has done enough business to consider September a good month.

The Steel Co. of Canada, has distributed orders for ladle cranes, chargers and other steel works equipment through a local consulting engineer and it is expected that the cement mill equipment will soon be placed for the Davison Coke & Iron Co., which recently acquired the Neville furnace of the American Steel & Wire Co. and now is engaged in construction work on a by-product coke plant and power house in addition to the cement works. A large order for power plant equipment for this company recently was placed. In addition to purchases of motors for its blooming and billet and bar mills, the Youngstown Sheet & Tube Co. has bought two compressors for the blooming mill.

Peters Gas Coal Co., Finleyville, near Washington, Pa., is said to be planning to rebuild part of tipple recently destroyed by fire, with loss over \$75,000 with equipment.

James H. McQuade & Sons Co., Magee Building, Pittsburgh, contractor, has ac-

quired property, 100 x 130 ft., at Bloomfield, for equipment and machinery storage and distributing plant, with repair facilities.

Parkersburg Rig & Reel Co., Harris Street, Parkersburg, W. Va., manufacturer of oil well machinery, parts, etc., has awarded general contract to Plate Construction Co., 726 Jeanette Street, for one-story addition to cost about \$75,000 with equipment.

Continental Refining Co., Oil City, Pa., has plans for a two-story addition to cost about \$30,000.

Board of County Commissioners, City-County Building, Pittsburgh, has fund of \$1,500,000 for purchase of land and construction of airport, including hangars, service and repair shops, oil storage and other buildings. City Council is arranging to cooperate and will contribute additional fund of about \$500,000.

General offices and drafting rooms of Steel Frame House Co., a subsidiary of McClintic-Marshall Co., have been transferred from Leetsdale, Pa., to Oliver Building, Pittsburgh.

Homestead Valve Mfg. Co., Inc., Homestead, Pa., manufacturer of valves and vapor cleaning machines, has purchased plant on Narrows Run Road near Coraopolis, Pa., and will remove factory and offices to new location Oct. 1. Property consists of 108-acre tract with three-story factory building, office building, foundry and additional structures which will be used for pattern shop and storage.

Cleveland

CLEVELAND, Sept. 24.—Machine tool sales were good the past week, showing some gain over the early part of the month. Good sized orders were placed by two or three Michigan automobile companies. There was a fair amount of activity in single machines in the Cleveland territory, largely from manufacturers of automobile parts. The Eaton Axle & Spring Co., Cleveland, is in the market for special milling, grinding and other machinery to equip a plant extension. Machine tool manufacturers are getting quite a little business from the airplane industry, indicating the growing importance of that industry as an outlet for machine tools. Turret lathes are moving in fair volume, although September sales will fall somewhat below those of August.

Eaton Axle & Spring Co., Cleveland, is having plans prepared for a \$1,000,000 extension to its East 140th Street plant, providing additional floor space of 120,000 sq. ft.

Superstructure will be started by Hahn Mfg. Co., 5332 Hamilton Avenue, Cleveland, for one-story machine shop, 40 x 73 ft., to cost about \$37,000 with equipment.

W. S. Tyler Co., 3600 Superior Avenue, Cleveland, manufacturer of wire cloth, ornamental bronze and iron products, etc., has plans for a five-story addition, 66 x 100 ft., to cost more than \$200,000 with equipment.

Goodyear Zeppelin Co., operated by Goodyear Tire & Rubber Co., Akron, Ohio, has secured award from Navy Department, Washington, for construction of two dirigibles, to cost approximately \$8,000,000, and contemplates establishment of new plant to carry out project.

General Fire Extinguisher Co., Warren, Ohio, operated by Grinnell Co., Providence, R. I., is said to be arranging for

use of part of adjoining plant of Warren Iron & Steel Co., recently acquired, for expansion.

Detroit

DETROIT, Sept. 24.—Contract has been let by Long Mfg. Co., 2768 East Grand Boulevard, Detroit, manufacturer of automobile radiators, clutches, etc., to Edward Chase, Detroit, for a two-story addition, to cost more than \$50,000 with equipment. George V. Pottle, David Whitney Building, is architect.

Buick Motor Co., Flint, Mich., has plans for a three-story factory branch, service and repair building at Dallas, Tex., to cost \$110,000 with equipment.

Kalamazoo Stationery Co., Harrison Street, Kalamazoo, Mich., has filed plans for a power plant, 50 x 50 ft., to cost \$50,000 including equipment.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has plans for a one-story addition, 80 x 100 ft., to cost about \$40,000 with equipment. Albert Kahn, Marquette Building, is architect and engineer.

Plans have been arranged for a merger of Bennett Pump Corporation, Muskegon, Mich., manufacturer of pumping machinery and parts, and Service Station Equipment Co., Ltd., Toronto, manufacturer of kindred machinery. A holding company will be formed with capital of \$6,500,000 to carry out consolidation; each organization will maintain present identity. An expansion program will be carried out. Thomas Bennett will head new company.

Steel & Tubes, Inc., 224 East 131st Street, Cleveland, has awarded a general contract to H. G. Christman Co., Stevens Building, Detroit, for initial unit of new one-story plant, 210 x 500 ft., at Ferndale, Mich.

Clark Equipment Co., Buchanan, Mich., manufacturer of automobile axles, transmissions, metal wheels, etc., is completing work on one-story addition, 180 x 255 ft., at branch plant at Battle Creek, Mich., to be occupied within next 60 days. An office and executive building has been completed at latter works, and space formerly used for such service will be given over to production. Extensions will be made at branch plant at Berrien Springs, Mich.

Detroit Gasket Mfg. Co., 6309 Hamilton Avenue, Detroit, has awarded general contract to J. H. Reidinger Co., 6537 Russell Street, for one and two-story addition, with boiler house, to cost about \$75,000 with equipment. C. W. Brandt, 2111 Woodward Avenue, is architect.

Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive and refractory materials, has broken ground for general warehouse and sales office building at Detroit. It will be three stories and basement, 110 x 250 ft., containing 50,000 sq. ft. of floor space. General contract has been let to Walbridge-Aldinger Co. and erection will be under supervision of L. J. Call, engineer Carborundum Co., Niagara Falls.

Aluminum Steel Products Co., Plainwell, Mich., has been organized to manufacture aluminum levels and aluminum castings. It has rented former local plant of Wolverine Casting Co. and has installed machinery removed from plant at Royal Center, Ind. Company is prepared for operation and no additional equipment will be purchased.

Wings, Inc., 309 Dearborn Building, Dearborn, Mich., has been organized as manufacturers' agent for materials, ac-

cessories and parts used in manufacture of airplanes; to distribute airplanes and accessories through dealer organization and to operate flying school. Later company expects to take on lines of steel tubing and stream line wire and will construct buildings. C. V. Burnett is secretary and treasurer.

Milwaukee

MILWAUKEE, Sept. 24.—While new orders are not quite as numerous as earlier in the month, the September total of sales is expected to compare favorably with August. Inquiry continues active and the outlook for October business is considered favorable. Current sales run mainly to single items, but these are of good number and cover a wide range of industries. Automotive needs have declined somewhat after the heavy buying of the past three months.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., is taking estimates on equipment for a hydroelectric power plant, costing \$150,000, at Rockton, Ill., consisting of two 600-kva. generators, two 750-hp. turbines, and auxiliaries. Bids on building will not be taken until equipment has been purchased. Company also will buy a 500-hp. boiler for a new boiler house at Beaver Dam, Wis. E. J. Kallewang is chief engineer.

Thompson Brothers, DePere, Wis., boat builders, will erect a one-story factory and warehouse addition, 100 x 160 ft., and are in market for wood and metal-working machinery.

Northern Conveyor Co., Janesville, Wis., contemplates erection of additions to double its capacity. Company erected an extension and increased its area 50 per cent last spring but is overcrowded. Detailed plans for further construction and equipment are under way.

Prentice-Wabers Products Co., Wisconsin Rapids, Wis., manufacturer of gas-line camp cook stoves, metal tables, chairs and cots, has placed contracts for a factory and warehouse addition, 70 x 176 ft., and a loading platform, 10 x 176 ft.

Nash Motors Co., Kenosha, Wis., has started work on additions to its branch factory at Racine, Wis., which will cost over \$600,000. A new enameling unit with an "A" type oven and body storage house of 100,000 sq. ft. are principal items. Gear and axle shop, forge and heat treating departments and power plant also will be enlarged. D. M. Averill is general manager of Racine division.

Board of Regents, University of Wisconsin, expects to be ready about Nov. 1 for bids for construction of new mechanical engineering building, plans for which are being drawn by Arthur Peabody, State architect, Madison. An appropriation of \$577,000 is available. M. E. McCaffrey is secretary of Board of Regents.

Hill-Hubbell Co., 160 Fremont Street, San Francisco, has placed general contract with Meredith Brothers Co., 253 Washington Street, Milwaukee, for a brick and steel shop, 50 x 150 ft., on property of A. O. Smith Corporation, Milwaukee, for processing electrically welded steel pipe made by Smith company for oil and gas fields. H. Hough is manager at Milwaukee.

Zenith Foundry Co., 567 Seventy-fifth Avenue, West Allis, Milwaukee, is building a shop addition costing about \$20,000.

Simonds-Worden-White Co., Dayton, Ohio, has purchased R. J. Dowd Knife

Works, Beloit, Wis. B. H. Meyer will be manager of Beloit works, but general offices will be in Dayton. Purchasing company is a recent consolidation of several firms in cutlery industry.

Milwaukee Foundry Equipment Co., 284 Seventh Avenue, Milwaukee, manufacturer of molding machines, has acquired tract of 92,000 sq. ft. and will erect manufacturing building.

Chicago

CHICAGO, Sept. 24.—With the close of the third week in September it is evident that sales for this month will not reach the August total, but will compare favorably with July which was considered good. Orders are more widely scattered and there is less broadcast inquiry, but business is coming quietly and in good volume from all sections of this district.

Studebaker Corporation, South Bend, Ind., is studying future requirements and Nash Motors Co., Racine, Wis., is building an addition. It is reported that Ford Motor Co. is planning to resume manufacture of tractors and will need some machine tool equipment. Allis-Chalmers Mfg. Co. has completed purchases for its tractor plant at Springfield, Ill., and is negotiating for equipment for its West Allis, Wis., plant. Chicago, Milwaukee, St. Paul & Pacific list is active.

Gray Goose Airplane Co., Hearst Building, Chicago, will build a hangar, 116 x 117 ft., to cost \$50,000.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a substation, 100 x 160 ft., to cost \$200,000. MacDowell Construction Co., 140 South Dearborn Street, is general contractor.

Ketler-Elliott Erection Co., Chicago, will build a three-story foundry and machine shop, 80 x 90 ft. It will cost \$90,000.

Fire and an explosion wrecked two-story brick factory of Rome Co., maker of bed springs, 1313 South Fifty-fifth Court, Cicero, Ill., with damage estimated at \$150,000.

Accurate Steel Treating Co., Inc., Chicago, has removed to its new plant at 2226-28 Austin Avenue. Considerable additional equipment has been installed.

Oldfield Engineering Co., 2632 West Twenty-sixth Street, Chicago, manufacturer of gas plant equipment, is erecting two one-story units on site, 150 x 679 ft., recently acquired at Cicero, Ill., to total about 24,000 sq. ft. of space, and will remove to new location, with installation of additional equipment. Other structures will be built at Cicero later. Initial project will cost more than \$85,000. Otto Randolph, Inc., 53 West Jackson Boulevard, is engineer and contractor.

International Harvester Co., 606 South Michigan Avenue, Chicago, is said to have plans for one and two-story additions to plant at Rock Island, Ill., to cost more than \$500,000 with equipment. Contract has been let to H. K. Ferguson Co., Cleveland, for a new unit at Canton, Ill., plant, for grinding and steel shearing service, to cost \$100,000 with equipment.

Knight Soda Fountain Co., 2701 North Kildare Avenue, Chicago, manufacturer of soda fountains and accessories, has asked bids on general contract for one-story addition, to cost about \$40,000 with equipment. G. W. Klewer, 5 North La Salle Street, is architect.

City Council, Benson, Minn., will rebuild municipal electric light and power

plant, to cost more than \$45,000 with equipment. Arthur L. Mullergren, Board of Trade Building, Kansas City, Mo., is engineer.

Rapid City Airplanes, Inc., Rapid City, S. D., has plans for a hangar, with machine and repair facilities, at municipal airport at Huron, S. D., to cost about \$25,000.

M. L. Kramer, 134 North La Salle Street, Chicago, architect, has awarded general contract to Callner Construction Co., same address, for three-story automobile service, repair and garage building, to cost about \$300,000 with equipment.

Dahlin Brothers & Davis Mfg. Co., Minneapolis, Minn., manufacturer of furniture, has purchased site, 175 x 200 ft., at Burlington, Iowa, for new branch factory to cost about \$40,000 with equipment.

About \$1,000,000 damage was done to several plants by tornado which swept factory district in Rockford, Ill., Sept. 14. Loss to Elco Tool & Screw Co. was \$200,000; National Lock Co., \$10,000; Estwing Mfg. Co., \$100,000; Rockford Chair Co., \$200,000; South Union Furniture Co., \$75,000, and Mechanics Machine Co., \$10,000.

Philadelphia

PHILADELPHIA, Sept. 24.—Board of Education, Keystone Building, Philadelphia, is considering installation of manual training equipment in new four-story high school at Front and Ashaales Streets, to cost more than \$2,000,000, for which plans are being drawn by Irwin T. Catharine, address noted, architect for board. Similar installation is also proposed in senior high school to be erected at Moore and Mifflin Streets, to cost more than \$1,000,000, for which plans are being prepared by same architect.

Philadelphia Rapid Transit Co., Mitten Building, Philadelphia, has filed plans for one-story car shop, to cost about \$65,000 with equipment.

Railway Track-Work Co., East Thompson and Clementon Streets, Philadelphia, has plans for a new one-story machine shop, 56 x 100 ft., to cost about \$40,000 with equipment.

Philadelphia Air Terminal, Inc., Philadelphia, represented by Francis B. Biddle, Morris Building, attorney, has been organized to establish and operate a local airport. About 140 acres has been secured at South Philadelphia and plans are under way for hangars, repair and reconditioning shops, oil storage and other buildings. Project is reported to cost about \$1,000,000.

White Co., 842 East Seventy-ninth Street, Cleveland, manufacturer of motor trucks, has awarded general contract to Barclay White & Co., 22 North Thirty-sixth Street, Philadelphia, for one-story and basement factory branch, service and repair station, 75 x 100 ft., Philadelphia, to cost more than \$75,000 with equipment. Hadlow, Hughes & Hicks, Conrad Union Mortgage Building, Cleveland, are architects.

Board of Education, Pleasantville, N. J., is planning installation of manual training department in new two-story high school in Ansley Park section to cost about \$600,000, for which revised plans are being prepared by S. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., architect.

Reading Coal & Iron Co., Reading Terminal, Philadelphia, is reported plan-

ning construction of new coal breaker near Locust Summit, Pa., with electrically-operated machinery, to cost more than \$400,000 with equipment. Company has begun construction of new breaker at Westwood, Pa., to cost close to same sum.

Board of Education, Scranton, Pa., plans early call for bids on general contract for four-story addition to technical high school, to cost about \$500,000 with equipment. A. J. Ward, Scranton-Lackawanna Office Building, is architect. Tudor Williams, Scranton Life Building, is supervising engineer.

American Welding Co., Carbondale, Pa., is planning enlargements to double, approximately, size and capacity, to cost more than \$100,000. Company is a subsidiary of American Car & Foundry Co., 30 Church Street, New York.

Cincinnati

CINCINNATI, Sept. 24.—While machine tool orders have been in fairly good volume, the September total is expected to fall considerably below that of August. However, this is not a surprising development in view of the fact that August bookings attained "boom" proportions. There are, of course, several exceptions to the general run of activities, at least two important builders having reported that sales this month are from 15 to 25 per cent above those of August. That the present satisfactory conditions are likely to continue during the remainder of September and in October is the opinion of local machine tool executives, based on the large volume of pending inquiries.

A substantial portion of business placed in the past 30 days is traceable either directly to automobile manufacturers or to companies dependent upon the automotive industry. The widespread buying in that field is attributed to changes in equipment necessitated by building new models and to the need of reducing manufacturing costs to meet low-priced competition. Another source of recent orders is oil companies in the Southwest and also companies making tools for use in oil fields.

Production of Cincinnati machine tool builders is being sustained on a high plane and unfilled orders on hand are sufficient to insure the maintenance of present operating schedules indefinitely.

Trailer Co. of America has been organized in Cincinnati as a holding company and has acquired control of Trailmobile Co. of that city and Lapeer Trailer Corporation, Lapeer, Mich. Both companies will continue to operate as separate manufacturing and selling organizations under direction of J. Englaender, president, and S. B. Winn, vice-president and general manager. Caleb W. Shipley, former president of Trailmobile Co., has retired from management of that company.

City Council, Columbus, Ohio, contemplates construction of municipal airport, with hangars, repair and service shops, oil storage and other buildings. A fund of \$180,000 is being arranged for project.

New mill of Tennessee Copper & Chemical Co., Copperhill, Tenn., one story, 210 x 420 ft., will be located at Evandale, Ohio, instead of Copperhill, previously announced. It will cost over \$400,000 with equipment.

Gilbert Chevrolet Co., 2131 Gilbert Avenue, Cincinnati, local representative for Chevrolet automobile, has plans for four-

story service, repair and sales building to cost about \$100,000 with equipment. Architectural department, General Motors Corporation, Detroit, is in charge.

Knoxville Power & Light Co., Knoxville, Tenn., is planning for installation of new converter station for power service for traction lines, to cost about \$50,000.

Gardner-Harvey Container Co., Middletown, Ohio, recently organized by Edward T. Gardner and associates, has awarded general contract to F. K. Vaughn Co., Hamilton, Ohio, for new mill to manufacture corrugated box-board containers, comprising main one-story plant, 120 x 540 ft., with storage and distributing building, 54 x 200 ft., to cost \$300,000, of which more than \$100,000 will be used for equipment. Management, Engineering & Development Co., Dayton, Ohio, is engineer.

Metal Aircraft Corporation, Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story plant, to cost about \$60,000 with equipment.

LeBlond-Schacht Truck Co., Eighth and Evans Streets, Cincinnati, has purchased O. Armleder Motor Truck Co., Twelfth and Plum Streets, and will operate as subsidiary. New company will be organized as division of purchasing company to operate Armleder department. It is purposed to concentrate production largely at works of purchasing company, which will be expanded.

St. Louis

ST. LOUIS, Sept. 24.—Contract has been let by Chandeysson Electric Co., 4092 Bingham Avenue, St. Louis, manufacturer of plating electric units and kindred apparatus, to Widmer Engineering Co., Roosevelt Building, for one-story addition, to cost \$60,000 with equipment.

Skelly Oil Co., 2605 Walnut Street, Kansas City, Mo., is having plans drawn for a two and four-story oil storage and distributing plant, 60 x 160 ft., to cost about \$40,000 with equipment. Stephen C. Kenney, Gloyd Building, is architect.

American Crystal Co., 1031 Schafeld Building, Cleveland, is arranging for development of mineral properties near Caddo Gap, Ark., where about 350 acres has been secured, installation to include pumping machinery, electric power equipment, drills, etc.

City Council, Texarkana, Ark., has acquired 200 acres as site for municipal airport, and contemplates construction of hangars, repair and reconditioning shops, oil storage and other buildings.

Jerpe Cold Storage Co., 1116 Douglas Street, Omaha, Neb., has plans for four-story cold storage and refrigerating plant addition, to cost about \$65,000 with equipment. J. T. Allen and N. S. Wallace, Brandeis Theater Building, are architects.

Layton, Hicks & Forsythe, Oklahoma City, Okla., architects, have plans for five-story automobile service, repair and garage building, to cost more than \$100,000 with equipment.

Arkansas Natural Gas Corporation, George T. Koch, Ardis Building, Shreveport, La., chief engineer, has awarded contract to Booth & Flinn, Inc., 1942 Forbes Street, Pittsburgh, for construction of pipe line from Clarksville to Little Rock, Ark., about 105 miles, to cost more than \$500,000 with compressor stations and other mechanical equipment.

Texaco Oil Co., Third and M Streets, Lincoln, Neb., has plans for new storage

and distributing plant to cost about \$40,000 with equipment.

Missouri Pacific Railroad is in market for one 44-in. side head-boring and turning mill, motor-driven, with four-jaw independent chuck table.

City Council, Poplar Bluff, Mo., has approved report of special committee recommending calling special election to vote \$225,000 bonds for new filtration plant, additional water tower, and installation of meters on all hydrants for city's waterworks.

Conveying machinery, power, processing and other equipment will be installed in new mill at Denver, of Ralston Purina Co., 827 South Eighth Street, St. Louis, to cost about \$500,000. Project will include a power house.

Gulf States

BIRMINGHAM, Sept. 24.—Officials of Kane Boiler Works, Inc., Galveston, Tex., have organized new company of same name, with capital of \$200,000, to take over and expand present plant and business.

Kansas City Southern Railroad Co., Kansas City, Mo., is arranging an expansion program at Dowling yards, near Beaumont, Tex., to include new engine house, machine shop, power house and other units, entire project to cost more than \$500,000, including additional yard facilities, turntable, etc.

Roller Stock Guards Corporation, Anniston, Ala., recently organized with capital of \$50,000 to manufacture roller type steel cattle guards for railroads, has acquired local property for erection of one-story plant, to cost close to \$30,000 with equipment. M. P. Lightfoot is president.

E. J. Roberts, Comanche, Tex., and associates are planning construction of new ice-manufacturing plant at Mineral Wells, Tex., to cost \$50,000 with machinery.

State Board of Control, Austin, Tex., is considering construction and operation of State-owned cement mill for initial output of 500 bbl. per day, to cost about \$500,000 with machinery.

Smith Brothers Properties, Inc., 117 Villita Street, San Antonio, Tex., has awarded general contract to McKenzie Construction Co., Travis Building, for seven-story automobile service, repair and garage building, 90 x 100 ft., to cost over \$250,000 with equipment.

Texas-Worth Tool Co., Fort Worth, Tex., oil well tools and equipment, has leased a building at 2400 West Seventh Street, and will remodel for new manufacturing plant.

Rome Electric Range Co., Huntsville, Ala., is completing plans for new plant, with initial unit one story, 50 x 250 ft., to cost over \$60,000 with equipment.

Edcouch Machine & Electric Co., Edcouch, Tex., A. P. Peters, head, has awarded general contract to Stone & Phillips, Wescalo, Tex., for two-story machine shop, to cost about \$30,000 with equipment.

Pan-American Airways, Inc., Miami, Fla., recently organized, has purchased 130 acres at N. W. Thirty-sixth Street and Forty-second Avenue, and plans construction of new airport, including hangars, service and repair shops, oil storage and other buildings, to cost about \$50,000. Headquarters are at 100 East Forty-second Street, New York. Delano & Aldrich, 126 East Thirty-eighth Street, are architects.

Worsham Buick Co., Pacific Avenue and Olive Street, Dallas, Tex., representative for Buick automobile, has filed plans for three-story service, repair and sales building, 152 x 215 ft., to cost \$175,000 with equipment. C. H. Griesenbeck, Dallas, is architect.

Todd Dry Dock & Shipbuilding Co., Mobile, Ala., has acquired 10 acres of waterfront property adjoining plant, and plans construction of additional units, to cost over \$100,000 with equipment.

Gulf Power Co., Pensacola, Fla., is disposing of a preferred stock issue of about \$720,000, a portion of proceeds to be used for extensions and improvements in power plants and system.

Pacific Coast

SAN FRANCISCO, Sept. 20.—Plans are being considered by Bach Aircraft Co., Los Angeles, for new plant at Metropolitan Airport, near North Hollywood, to consist of parts and assembling departments. Airport organization has plans for two hangars, 100 x 130 ft., with machine and repair facilities, and will begin work soon. Waldo Waterman is manager of Metropolitan Airport.

Stauffer Chemical Co., Los Angeles, will build a one-story machine shop in connection with new plant at Dominguez Junction, near Compton, for which general contract has been let to Union Iron Works, Los Angeles. Project will cost about \$100,000 with machinery.

Los Angeles Can Co., Los Angeles, is planning to rebuild part of plant destroyed by fire Sept. 15, with loss of about \$200,000 including equipment.

Richfield Oil Co., Bartlett Building, Los Angeles, has plans for new oil storage and distributing plant on Sacramento River, near Sacramento, Cal., to cost about \$750,000 with equipment. Project will include machine shop, automobile service and repair building, pumping station and other units. Henry Carr is company engineer at Los Angeles, in charge.

J. H. Henry and associates, Pasadena, Cal., care of H. E. Tabor, Pasadena, engineer, has plans for lumber mill, with machine shop, power house and auxiliary structures near Pinehurst, vicinity of Medford, Ore., to cost about \$175,000 with equipment.

Arizona Edison Co., Douglas, Ariz., is planning new power house at Naco, Ariz., and will remove present steam-operated electric station at Bisbee, Ariz., to that location, where additional equipment will be provided for increase in output. Extensions will be made in transmission lines.

Texas Co., Yeon Building, Portland, has filed plans for a one-story pipe shop, with power house and pumping station at its oil storage and distributing plant on St. Helens Road, to cost about \$35,000 with equipment.

Inland Empire Paper Co., Spokane, Wash., has authorized plans for expansion at its mill at Millwood, near Spokane, to double present capacity, and to cost more than \$250,000 with machinery.

Pacific Coast Cement Co., 3801 Marginal Way, Seattle, has plans for two new units, to cost about \$45,000 with equipment.

Municipal power department, Seattle, has plans for new municipal hydroelectric power plant at Diablo dam, to cost \$3,000,000 with machinery and transmission lines. A bond issue has been arranged. W. D. Barkhuff is city engineer.

Fir-Tex Insulating Board Co., St. Helens, Ore., recently organized by Herbert Fleishhacker, San Francisco; Kenneth D. Dawson, Portland, and associates, has plans for new mill at St. Helens, with initial units covering area of 100 x 1400 ft. A power house, machine shop and other units will be built. Project is estimated to cost \$2,000,000 with machinery. H. F. McCormick, St. Helens, will be an official of new company.

Indiana

INDIANAPOLIS, Sept. 24.—Studebaker Corporation, South Bend, Ind., has plans for one-story addition, 62 x 302 ft., to cost about \$80,000 with equipment. Company is also having plans drawn for one-story oil storage and distributing building, 72 x 180 ft., to cost about \$40,000 with equipment. Lockhart & Fett, Associates Building, are architects for both structures. Permit has been secured for new one-story unit to cost about \$50,000, and for a one-story machine shop, 307 x 425 ft., to cost approximately \$270,000 with equipment.

Conveying machinery, power and other equipment will be installed in new powdered milk plant to be built by Hoosier Milk Condensery Co., Bluffton, to cost close to \$50,000 with machinery.

National Tile Co., Anderson, Ind., has plans for a one-story addition, 88 x 415 ft., with tunnel kiln, loading racks, kiln cars, and other equipment, to cost more than \$100,000.

Roxana Petroleum Corporation, 520 Meyer-Kiser Building, Indianapolis, has plans for a two-story and basement, 70 x 100 ft., storage and distributing plant, to cost close to \$30,000 with equipment.

Board of Education, Kokomo, Ind., is said to be planning installation of manual training equipment in four-story addition to high school, to cost more than \$190,000 with equipment. H. B. Bartlett, 1050 North Delaware Street, Indianapolis, is architect.

Canada

TORONTO, Sept. 24.—Machine tool buying in this market continues in good volume. Inquiries are more general and many are expected shortly to be placed. Electric power development is responsible for a growing call for machinery, and new undertakings in this line indicate a continued demand. Steel mills and foundries are also showing considerable interest in the market: the automotive industry is still a big factor.

Walker Brothers, Thorold, Ont., are in market for a second-hand steam engine, 50 to 75 hp.

City Council, Peterborough, Ont., contemplates purchasing two pumps for intermittent pumping station at Maurice and Smith Streets plant.

Mississippi Iron Works, Ltd., Almonte, Ont., contemplates moving its plant to Hull, Que., and it is understood that a new works will be erected.

Johnston Welding & Radiator Co., 2692 Dundas Street West, Toronto, will build an addition and purchase considerable new machinery and tools.

International Harvester Co., of Canada, Ltd., Sherman Avenue North, Hamilton, Ont., has awarded contract to Humphrey Brothers, 214 Wellington Street,

East, for an addition, 60 x 120 ft., to its foundry, to cost \$40,000.

Western Canada

It is reported that Fraser Companies, Ltd., Fredericton, N. B., is arranging for erection of a pulp and paper plant at Prince George, B. C., with daily capacity of 600 tons.

Dominion Government has granted a 30-year lease to North Western Power Co., subsidiary of Winnipeg Electric Co., Winnipeg, to develop hydroelectric power at Seven Sisters Falls power site. Construction work will be started immediately, and a railroad 14 miles long will be built from Whitemouth Junction to site. About \$8,000,000 will be spent on project.

Foreign

BIDS will be received by Electricity Supply Commission of South Africa, Cape Town, until Oct. 26 for plant and equipment for a hydroelectric power station and outdoor substations at Cape Province, Inquiry No. 236.

Swedish Chamber of Commerce of United States, 25 Beaver Street, New York, has received an inquiry, Ref. 278, from a company in Sweden, interested in purchase of American-made air compressors and floor-scraping machines.

Foreign Light & Power Co., organized by J. G. White & Co., 37 Wall Street, New York, and Motor-Columbus Corporation for Electrical Enterprises, Baden, Switzerland, is disposing of a preferred stock issue of \$5,000,000 and will soon arrange additional financing in amount of \$3,500,000 for power acquisitions and development in France, Germany and Italy, including generating stations, transmission lines, etc. New company will be under direction of J. G. White Engineering Corporation, 43 Exchange Place, New York.

Argentine Department of Public Works, Buenos Aires, has approved a project for five new pier docks in north outer port of local harbor, to include mechanical handling machinery, conveying apparatus, loading equipment, etc. Project will cost about 6,185,550 pesos (about \$2,600,000).

Department of Finance, Republic of Chile, Santiago, Senor Don Pablo Ramirez, minister of finance, is disposing of bond issue of \$16,000,000 in United States for construction of railroads, port works, irrigation lines, sewage and waterworks, and public buildings, including mechanical and power equipment.

Broken Hill Proprietary Co., Newcastle, New South Wales, Australia, has approved plans for construction of coke oven plant, with by-products divisions, to cost \$5,000,000 with equipment.

Venezuela Gulf Oil Co., 21 State Street, New York, has closed negotiations with Mexican Seaboard Oil Co., 120 Broadway, and its subsidiary, Venezuelan Seaboard Oil Co., for lease of 40,000 acres on west coast of Lake Maracaibo, Venezuela. Leasing company plans early development for oil production and will install drilling machinery, pipe lines, storage and distributing facilities and other mechanical equipment.

Boston steel treaters will hold their ninth annual banquet and smoker on Monday evening, Oct. 1, at the University Club, Trinity Place, Boston. This will introduce the 1928-1929 program of the Boston chapter of the American Society for Steel Treating.

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Obtaining a Satisfactory Zinc Coating

Some Factors Affecting the Quality of Zinc for Hot Galvanizing—Why Iron Is Harmful and Lead Is Not

BY WALLACE G. IMHOFF

ONE of the best ways to obtain a high-quality zinc coating is through the use of a good, reliable brand of zinc for galvanizing purposes. This immediately brings up the question "what factors affect the quality of zinc for zincing?"

Metals may be of practical value because of their chemical composition or because of their physical properties. The American Society for Testing Materials has set a standard for the chemical composition of "Prime Western Slab Zinc," which is that such zinc shall not contain over 1.60 per cent of lead and 0.08 per cent of iron. Prime Western slab zinc is the standard zinc used for galvanizing.

By the time the zinc has reached the coating stage, that is, is hot, molten metal in the galvanizing pot, it contains other metals besides those set by the standards for such zinc. Some of these are put into the zinc purposely; others find their way into the metal during the regular daily operation

of the galvanizing pot. It is of special interest to know about all the metals that are in the zinc, to know how they got there and to know what effect these metals have upon the quality of the zinc coating and the physical properties of the zinc.

Metals found in hot zinc in galvanizing baths are lead, iron, cadmium, aluminum, tin and, occasionally, antimony. Only two of these, lead and iron, are mentioned in the standards for prime Western slab zinc. So it is seen that in some cases it has been thought not undesirable to put other metals in, and in other cases it has been found impossible to keep other metals out. Some of the metals are present in large quantities; others are present in very low percentages. The important thing to know is what metals are present and in what quantities.

Since zinc is present in the largest quantity, it is only natural to ask "Is it possible to galvanize with pure zinc?"

WALLACE G. IMHOFF, formerly metallurgist of the electrical materials department of Hubbard & Co., Pittsburgh, is a consulting metallurgical engineer in pickling and galvanizing at Pittsburgh. His practical experience in the galvanizing field covers 15 years, beginning in the galvanizing department of the American Steel & Wire Co., Rankin, Pa. His technical training was at the Carnegie Institute of Technology, Pittsburgh. He later studied at the University of Wisconsin, Harvard University and the University of Pittsburgh.

In the years following he became actively engaged in the practical operating end of the blast furnace, the basic open-hearth furnace and the electric furnace. After 16 months as a lieutenant in the Air Service, Mr. Imhoff again resumed his work in the steel business as assistant to the general superintendent of an Eastern steel plant.

In 1920 he became research engineer for the Sheet Metal Ware Association of New York and Buffalo, investigating the field of hot galvanizing for 15 large steel companies. This work was carried on for five years at Mellon Institute of Industrial Research, University of Pittsburgh. The investigations included all the troubles that the practical galvanizer is likely to encounter, as well as improved methods in galvanizing. A number of patents were taken out, including one in the field of electric galvanizing.



One of the best practical galvanizers in the country once remarked that the zinc in use was too pure for galvanizing purposes. There at least is still some doubt as to whether spangles can be obtained when pure zinc is used.

It is of interest perhaps to mention briefly some of the qualities of very pure zinc, the purest sheet zinc available. This zinc contains considerably less than 0.1 per cent of impurities. The cost of such metal is, of course, so high that it would be impractical to use it for commercial galvanizing purposes, even in a small way.

A sheet of this metal was found to be soft and ductile. It could be easily bent back and forth without showing any signs of splitting or cracking at the bend. It was very difficult to dissolve this metal in acid as compared with dissolving ordinary samples from slab zinc suitable for galvanizing. Our photomicrograph of this pure rolled sheet zinc shows that the grains are very fine, having been mashed and broken in the rolling process. No other metals or impurities can be seen, even under the microscope.

To discover what would happen from galvanizing with pure zinc, experiments were made with one of the very best quality commercial slab zincs, as shown by the analyses of two samples below:

	Sample 1, Per Cent	Sample 2, Per Cent
Zinc	99.25	99.46
Lead	0.80	0.52
Iron	0.02	0.02

This was very pure zinc, although it contained considerable lead. Before any metallic additions were made, a large number of sheets were galvanized and very good spangles were produced on them. This shows that spangles can be obtained without the addition of aluminum or making other metallic additions to the bath. No additions were made to the bath for three days, and sheets were galvanized to discover what would happen under these conditions. In the photomicrograph of this slab zinc the large size of the zinc crystals shows that the metal was cast and not rolled. No impurities can be seen in the metal, although at a much higher magnification they would perhaps become visible.

After three or four days' operation the zinc began to show evidences of contamination with iron. It was noticed that a scum of zinc oxide was formed much more quickly over the surface of the bath. During the first day's operation the bath surface stayed bright and mirror-like, and when the sheets were drawn through it they were bright and had a good spangle on them.

Surface Oxidation Causes Trouble

In a couple of days, however, the surface became dusty, looking, dull, and it was no longer possible to skim a bright mirror-like surface. As fast as the skimmer was drawn over the top the surface closed behind it, leaving a dusty, yellow surface through which to draw the sheet. Thus it is seen that, when no metallic additions are made to the bath, the surface quickly oxidizes after a few days of operation. It is also clear that spangles can be obtained by simply using zinc with no metallic additions, but for only a short period of time.

Hannah and Rhead* state that "pure zinc alone is incapable of producing a spangle." The zinc used here contained small amounts of lead and iron and may possibly have had a large enough quantity to develop a spangle. All metals have a skin and show surface tension, much the same as the skin on the surface of water. Pure zinc is no exception. The mechanism of the formation of the spangle seems to be that this skin breaks up into pieces on the surface of the galvanized iron, leaving some places bright and others dull. Thus pure zinc should give what is ordinarily known as a spangle.

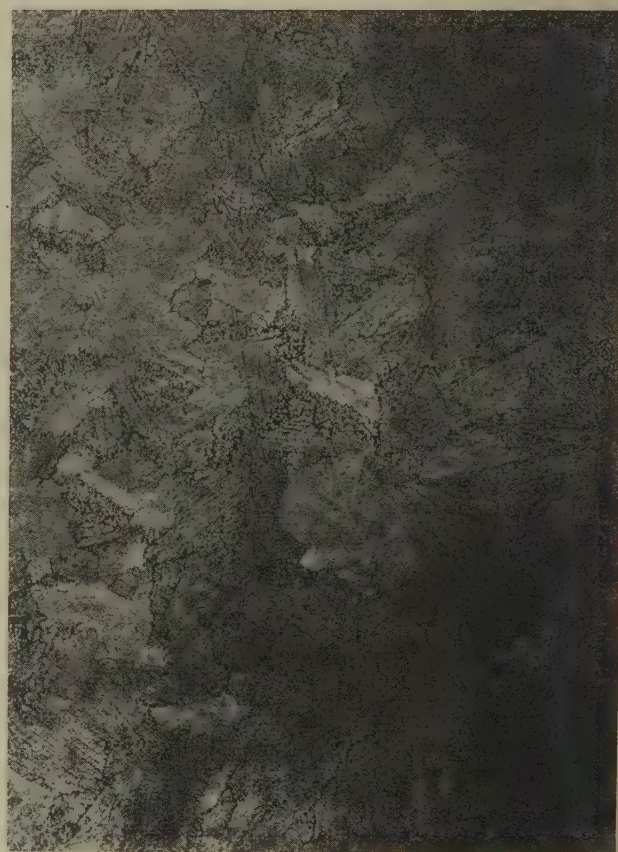
But, from a practical standpoint, pure zinc will not give

*"Crystallization Effects on Galvanized Iron," by J. Dickson Hannah and E. L. Rhead. *Journal of the Institute of Metals*, Vol. XXX (1923), page 93.

a spangle, for pure zinc quickly becomes contaminated with small amounts of iron. Also, the surface of the metal oxidizes quickly, producing a dull, powdered luster, which prevents the formation of the spangle. What really happens is that the metallic skin which produces the spangle is gone, and in its place are the very fine particles of non-metallic oxide. Therefore no spangle can form, because the material to form it is no longer there. It may be perhaps physically possible to obtain a spangle with pure zinc, but it is not possible from a practical standpoint, because the zinc cannot long be kept pure under practical conditions.

Why Lead Rarely Gives Trouble

Lead does not seem to be harmful in zinc, for two reasons: First, it alloys with zinc only in very small amounts; second, any excess lead over the amount that will alloy with the zinc settles to the bottom of the pot, and is entirely harmless from a galvanizing standpoint unless it becomes too deep. If lead were lighter than zinc, and thus came to the surface of the bath, it would quickly oxidize at zinging temperatures, and perhaps be harmful.



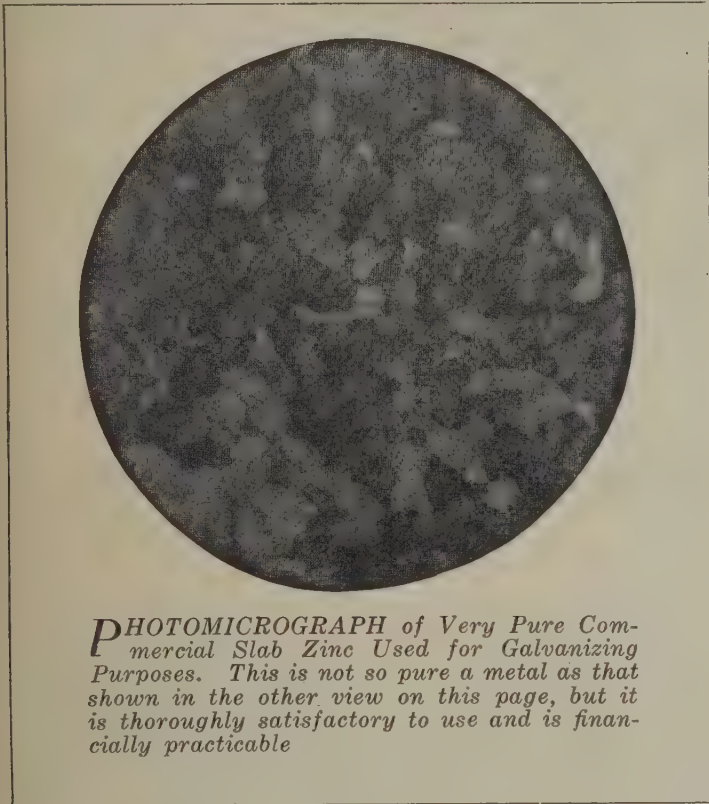
TOP Surface of a Slab of Commercial Zinc High in Iron Content. This kind of metal is apt to be brittle and to decrease the resistance of the coating against corrosion

Hannah and Rhead added a considerable quantity of lead (sufficient to saturate the zinc and leave an excess) to molten pure zinc. They state: "It was found that a spangled coating could be produced readily, and that there was an optimum temperature for the production of spangle grains of maximum size. This temperature was found to lie about 30 deg. C. above the melting point of zinc. It cannot be absolutely fixed at a definite value for articles of varying mass, owing to the impossibility of deciding upon the average size of the spangle grains on a sheet, with sufficient definiteness."

They state that the addition of lead or bismuth facilitates the production of the spangle, but in the discussion

of their paper John Welding said that he had never found it necessary to add lead to the galvanizing bath.

It was also interesting to note what J. Garland, Cossipore, India, had to say in regard to lead in the zinc bath. He was interested to note the conclusion that the presence of lead was necessary to the production of the spangle. He found that on pails dipped at a temperature of 890 deg.



PHOTOMICROGRAPH of Very Pure Commercial Slab Zinc Used for Galvanizing Purposes. This is not so pure a metal as that shown in the other view on this page, but it is thoroughly satisfactory to use and is financially practicable

Fahr. the spangle was most pronounced, and he had come to the conclusion that the dipping temperature was the chief factor for its production. But since reading the authors' paper, he had looked up the analyses reports of the zinc used in his work, and found that it contained 1.9 per cent lead.

Discussions of other authorities on galvanizing have shown that, from the practical standpoint, lead has not been found to be harmful in zinc. The objections to large quantities of lead from a practical angle have been due to price, and to the fact that it settles to the bottom of the kettle. This raises the dross up into a level at which the articles galvanized must pass through it, thereby keeping the dross stirred up and producing a very inferior, low-quality coating. It is not uncommon in practice to have to dip out excess lead when this happens.

Difficulties Caused by Iron

Iron, the third impurity found in zinc for hot zinking purposes, is by far the most important. The limit set for iron by the American Society for Testing Materials is 0.08 per cent. Most of the practical galvanizer's troubles come from iron in the zinc. Hence some explanation is necessary to account for the difference between this very low percentage in the metal, as bought, and the high percentages of iron found both in the molten zinc bath and in the galvanized coatings.

Iron, although specified low in the standards, at times may be high in slab zinc. This was found to be true by most galvanizers during the war period, and for a few years after the war. At present, however, most of the slab zinc on the market meets the requirements of the standard set for metal for this purpose. But it is only a matter of good business policy to check up all the slab zinc when it is received.

Physical appearance and chemical analyses will quickly show the quality of the metal. These facts are best illus-

trated by an example of a large shipment of slab zinc that did not meet the standard. This metal was prime Western zinc, and not remelt zinc. It is not to be inferred, however, that most of the slab zinc on the market today is of low quality, because exactly the opposite is true; most of it is well within the limits set as a standard.

Deleterious Metal Easily Detected

The purpose of this illustration is to show how a high iron content affects both the physical and chemical qualities of slab zinc, and how it may be detected. All slab zinc should be analyzed according to the method given by the American Society for Testing Materials as a standard for sampling and analyzing slab zinc.

After doing this and finding the zinc not up to standard, it was decided to check the results by some additional samples and analyses. Our third illustration shows the top surface of one of the slabs of metal. The metal was not all like this, and the strange part of it was that other slabs, without this crystallization, were even higher in iron content. That the iron had segregated to the middle in this slab is shown by the analyses of two samples from this crystallized area.

	Per Cent Iron
Sample 1.....	0.238
Sample 2.....	0.255
Average	0.246

Attention was then turned to the better looking area of the slab, which appeared to be composed of purer metal. Samples from these areas showed the following results:

	Per Cent Iron
Sample 1.....	0.0952
Sample 2.....	0.0535
Sample 3.....	0.0714
Sample 4.....	0.0416
Average	0.0654

Thus it can be stated definitely that the chemical composition of the zinc does affect its physical appearance and fracture, for the average of the two samples drilled in



PHOTOMICROGRAPH of Pure Rolled Sheet Zinc Containing Less Than 0.1 Per Cent of All Other Metals. This material is too expensive to be used for commercial galvanizing

the poor-looking area was 0.246 per cent iron content, as compared with 0.0654 per cent iron content for the clear crystalline area. This difference in the appearance of the fracture of the slab through these two areas was easily detected, also. Iron in zinc has the tendency to give the metal a brass-yellow color and to give the grain a fine, sandy ap-

pearance. Pure metal has a bluish luster and large, bright crystals. Zinc high in iron is very brittle; pure metal is somewhat ductile.

Other slabs were drilled and the average of all showed high iron content. It was found after going over many slabs that, first, the physical appearance is affected by the chemical composition of the zinc; second, the most highly contaminated part of the metal is found toward the center of the slab; third, iron gives the zinc a fine, sandy fracture and a light brass-yellow discoloration; fourth, pure metal is highly crystalline and has a bluish luster, and the surface of the slab is smooth and clean.

With a good, high-quality prime Western zinc, it takes from two to three weeks to saturate the metal with iron so that dross will settle out. If the kettle is overheated this will occur, of course, much sooner. Iron tends to make the coating brittle and to decrease its resistance to corrosion.

Cadmium is found in some zincs and has not found favor, especially from the sheet galvanizers. It tends to produce very fine, small spangles, which in themselves are not attractive.

Aluminum has been put in the zinc bath for some time and is very desirable when the bath is open—that is, not entirely covered with molten sal-ammoniac flux. It tends to give the coating a bright appearance, and keeps down excessive oxidation of the zinc. It is very desirable in obtaining a good spangle.

Tin, also, has been used for some time by the sheet galvanizing industry, and it is the tin that develops the large spangle on sheets.

Antimony often finds its way into the zinc bath, due to the charging of scrap metal into the galvanizing pots. It tends to make the coating brittle and will cause considerable trouble by giving a yellow discoloration on the sheet, if put in in too large amounts.

Cooperative Investigations on Die Castings

High Melting Brasses, Aluminum-Base Alloys, and Low Melting Zinc-Base Castings Studied in England

B RITISH die casting industry (according to speakers before the Institute of Metals, Liverpool, Sept. 5) suffered a serious setback as the result of bad work a generation ago, and buyers are still skeptical about its ability to furnish castings of uniformly high quality. In view of the resulting stagnant condition, leading firms organized a research into certain phases of the technical situation, and some of the results attained during the past four years were presented before the meeting mentioned. Representatives of the industry present at the meeting freely acknowledged that a considerable improvement in practice had resulted from these investigations.

High-Speed Steel Dies Favored

Although the question of metals for dies was not intensively studied, much discussion centered on this matter. Suitability of various steels for molds and cores when casting copper-rich alloys were investigated by agitating samples in the melted alloy for one to three hours. Marked differences in attack were noted. High-carbon steel and heat-resisting steels were little corroded, but soft and mild steel were rapidly attacked. Chromium plated steel resisted attack excellently, but the plating tended to flake off as a result of alternate heating and cooling. No comparative figures were given for cast iron, from which permanent molds are frequently made in England. Some heat-resisting irons have been investigated by the Cast Iron Research Association and had successfully been used for severe service. From the discussion it appeared that high-speed steel is favored for dies for the industry, although it was noted that one steel from one source might act very differently from a similar steel from another manufacturer. Another speaker emphasized the important part played by the die designer and tool maker; the commercial success of more than one firm depended upon the development of a staff of such highly-skilled specialists.

A more extensive investigation was made into the properties of aluminum-base castings, made in permanent molds without pressure. Castings studied were

4 per cent copper
8 per cent copper
12 per cent silicon
4 per cent copper, 3 per cent silicon
"Y alloy" (Cu: Ni: Mg 4: 2: 1½)
"L-5" (Cu: Zn 3: 13)

Satisfactory results were obtained in both test bars and tubular flanged forms except for the first two mentioned. Hot shortness was thought to be responsible. In a supplementary investigation the impact strength of these alloys was found to be unimpaired at temperatures up to within 45 degrees of commencement of melting. Shrinkage cavities in some castings were controlled by close regulation of the mold temperature, although it was admitted that a change in mold design might have had a similar effect. One of the speakers asserted that tensile strengths reported for the 12-per cent silicon alloy were at least 2000 lb. below what he would regard as good works practice. Dr. Rosenhain said this occurred rarely; nearly always the complaint is that the laboratory can get better results with refined control.

Sixteen zinc-base alloys, having copper and tin, or copper and aluminum (plus further additions of nickel, cadmium, lead or magnesium), were studied in the form of test pieces made in pressure machines operated by hand. It was found that porosity depends almost entirely on the kind of pull given the lever, although this effect is minimized with wide gates. In sound test pieces the tensile strength is little affected by reasonable changes in casting conditions. Such castings were tested after accelerated aging (exposure to hot moist air or steam). It was found that chemical variations in the compositions studied had insignificant effect on rate of growth as compared with the form and mechanical condition of the casting itself. From a practical standpoint, a manufacturer of these low melting alloys declared that the casting temperature, temperature of mold, size of gate and vent, and type of pull, were all important variables, but they depended on the size and character of the casting. It is axiomatic that the metal should be at as low a temperature as could be conveniently worked, and that the mold should be cool enough to promote ready solidification, yet warm enough to allow the whole of the metal to get in before it began to solidify. In view of the complicated form of die castings, no standardized gate could be adopted. The type of pull of the lever operating the plunger is doubtless important, and varies with the skill of the workman. It is being found that the more viscous alloys of zinc-aluminum-copper could be cast in the same conditions as the pressure die castings in aluminum and aluminum alloys most successfully.

Gear Blanks with Minimum Waste

New Method Places Toughest Part of Bar
Where Teeth Will Be Cut, Thus
to Promote Strength

BY C. A. MCGRODER

UNIFORMITY of grain structure where it is most needed and a minimized waste of material are the outstanding improvements effected by a new method of manufacturing bevel ring gear blanks, as developed and perfected in the forge department of Dodge Brothers Corporation, Detroit. Using 4½-in. chrome-vanadium steel bar stock, this new process, through a novel heading operation, turns the outside surface of the bar out and away from its center, until it lies at right angles to the original bar. This places the best of the metal, that portion of it which has been most refined in the rolling process, on the face of

the ring blank, where the teeth will be cut. It also leaves the grain of the steel running in the general direction in which the teeth will be cut, straight out from the center of the ring, thus rendering the gear-cutting operation easier.

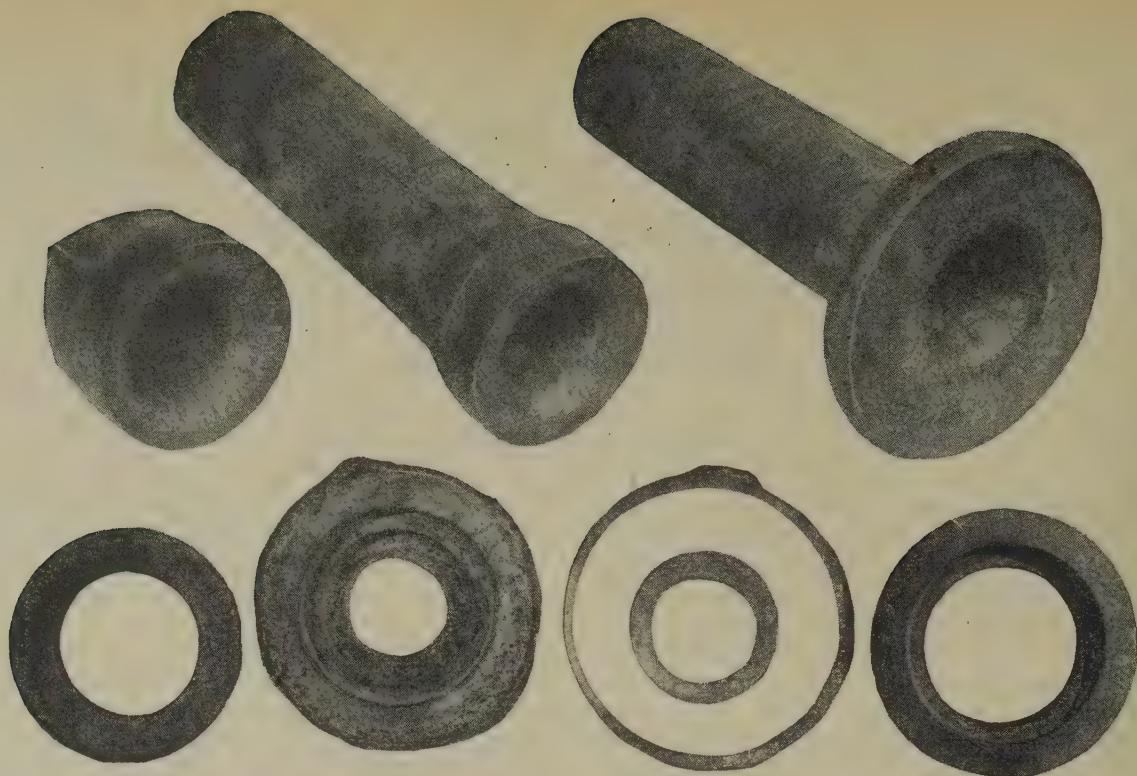
Earlier methods failed to produce uniformity of grain direction and structure and wasted a much higher percentage of the material in scrap. Most commonly used of these is a plan of piercing a hole in the center of a short section of round bar stock, after it has been flattened out to the required thickness and diameter. This leaves the



Under the Gravity Drop Hammer, or Board Hammer, at Right, Below, the Rough Ring or "Doughnut" Produced by the Horizontal Heading Machine Receives Several Blows Which Shape It into the Ring Gear Blank, with Slight Flashings on Both Inside and Outside. The crank-action trimming press at its left removes the flashings, after which the blank receives another blow or two under the drop hammer to insure accuracy of dimensions

Into This Heading Machine (Above) with 6-In. Capacity Are Fed Bars of 4½-In. Stock, 12 Ft. Long. The dies are in two positions, the first of which presses far into the heart, forcing the outside surface or "skin" of the bar to lie back in a circular flange, approaching the shape and dimensions of the rough blank or "doughnut." The next position brings the shaping of the "doughnut" nearer completion and shears it from the bar, leaving the new bar end with a deep impression in its center, which is the beginning of the next "doughnut"





At Right at Top Is the End of a 12-Ft. Bar After the Heading Machine Has Completed Its First Operation, Pushing into the Center of the Bar and Forcing the Outside Surface to Form One Side of the Circular Flange. This shows the side of the ring blank which will be composed largely of metal from the center of the bar. The metal from the bar surface forms the other side of the ring, where the gear is eventually cut. In the center is the remainder of the bar after the partly formed blank has been sheared off by the heading machine's second operation, leaving a depression in the center of the bar which is to be the hole in the next "doughnut." At left is the end of a bar worked down too short for the jaws of the heading machine. These rough ends are just large enough to be flattened out or "pancaked," to have the center punched out and to be made into two ring blanks by the process formerly employed

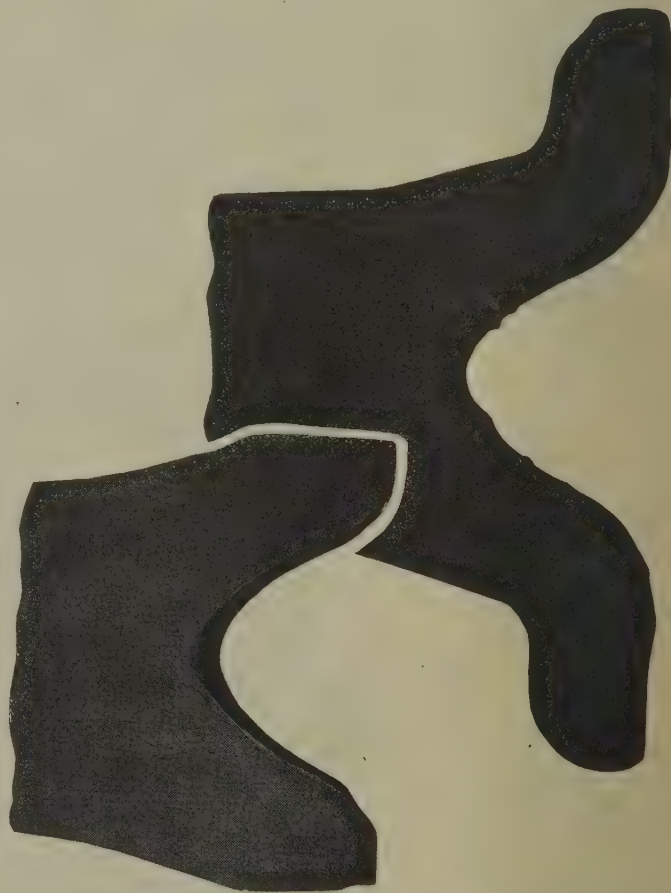
Four Stages in the Production of the Ring Blank After It Leaves the Horizontal Heading Machine. At the left is the rough "doughnut"—the partly formed gear blank turned out by the heading machine. Next is the same "doughnut" after it has received several blows from the drop hammer and still bears the flashings, which are to be removed by the trimming hammer. The two irregular circles are the flashings removed by the trimming press. The ring at right is the completed blank, ready for machining

better surface metal on the outside of the ring. In consequence the teeth are tougher near the outside diameter than they are at their narrower ends, on the inside diameter.

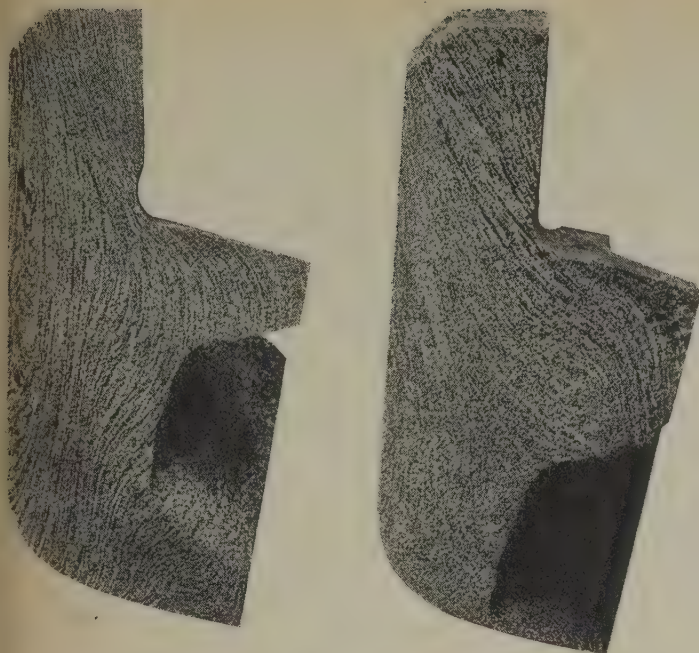
Another widely used method is to bend a piece of flat bar stock, which has been rolled to approximately the required shape, into a circle and then weld the ends together. Two shortcomings of this method are that the grain of the metal in the completed ring blank lies almost at right angles to the teeth that will be cut in it, and the characteristics of the metal (both chemical and structural) at the welding point differ widely from those prevailing elsewhere in the blank. Both of these conditions render more difficult the gear-cutting operation. A third method is to split a "buttonhole" lengthwise in a piece of round bar stock and then enlarge the opening until it approximates a circle. But this leaves, at opposite sides of the ring, two sections where the grain is irregular.

In the present method 12-ft. bars of $4\frac{1}{2}$ -in. round chrome-vanadium steel are used, containing 0.17 to 0.20 per cent carbon, 0.15 to 0.20 per cent vanadium and 1 per cent chromium. These are heated in an oil-fired furnace and fed into a 6-in. National heading machine, which is driven by a 75-hp., three-phase motor. Tests have shown that the unusually large flywheel with which this heading machine is equipped enables it to deliver momentarily over 300 hp. when the maximum pressure is developed in the upsetting operation.

Two operations are provided for by the dies of the heading machine—the first, upsetting; the second, shearing. The upsetting die punches into the center of the bar and mushrooms the stock out into a tulip-shaped, circular flange, with the more highly refined metal from the surface of the bar on its inside face, where the teeth of the gear will be cut. An air lift raises the bar from the first to the second position and the second operation shears the rough ring or "doughnut" from the bar, leaving a deep depression in the center of the bar, which is to become the hole in the next gear blank.



Etched Sections Showing Just the End of a Bar Going Through the Heading Machine. At left is the bar after the first blow from the heading die, which has punched into the center of the bar, forcing the surface metal out into a circular flange approaching the shape and size of the completed gear blank. This places the more highly refined metal from the bar surface on the face of the blank, where the teeth will be cut. At right the same bar has received the second blow from the heading machine, which helps to shape the ring blank and shears it from the bar



Etched Sections of Completed Ring Gears. The illustration at left shows the chief advantage of the new method. Here the grain of the metal lies in the best possible direction, straight out from the center of the ring, with the more highly refined metal from the surface of the bar in the teeth of the gear, where strain and wear are greatest. At the right the more highly refined metal from the surface of the bar can be clearly seen on the side away from the teeth. The "doughnut" used in this piece was intentionally placed face downward in the drop hammer, for experimental purposes

After being reheated in another oil-fired furnace the "doughnut" receives several blows under a 3000-lb. gravity drop hammer, or board hammer, which shapes it into the

required dimensions of the ring gear blank, leaving only slight flashings on the inside and outside peripheries of the ring. While still hot the blank is placed in a crank-action trimming press, which removes the flashings. The trimmed blank is returned to the drop hammer, where it receives another blow or two under the forming dies to insure accuracy of shape and dimensions. So accurate are the dies of the heading machine, the drop hammer and the trimming press that the flashings removed by the press from a single blank weigh only 28 oz. This is practically all of the metal wasted in scrap by this new method, a remarkably small proportion.

Operators on the heading machine, which produces an average of 200 rough blanks an hour, find it possible to feed about 10 ft. of the 12-ft. bar into the machine while the regular gripping dies are in operation. The remaining short ends are allowed to accumulate until there is a large enough quantity on hand to make it worth while to fit up the machine with special dies adapted to gripping these short pieces.

But even with these special dies the heading machine is incapable of using up the bar to the end. A short length is left over, containing about enough metal for two more blanks. This is sawed into two pieces, which are flattened out under a drop hammer until they are about the thickness and diameter of the "doughnut" produced in the heading machine. A hole is punched in the center of each piece, which then is put under the drop hammer and trimming press, where it receives the same treatment given the "doughnuts" produced by the heading machine. The two small pieces punched from the center of these blanks add slightly to the amount of material wasted in scrap from each bar, but the waste for each ring gear produced is still much lower than that from any method of production previously used.

Aluminum Productive Capacity Rapidly Expanding

SUCH data as are available seem to convince a writer in "Mineral Industry, 1927," that world production of aluminum is steadily increasing, and is now in excess of 200,000 metric tons annually. The writer goes on to speculate just how far this increase is to go, and what the results will be. Fifteen years ago France and the United States produced almost all of the world's supply of bauxite, but since that time extensive deposits of high-grade bauxite have been developed in half a dozen different countries, and the production is now trebled, with the new producing areas furnishing over half the output. There has also been a corresponding increase in smelting capacity; the enormous new Canadian plant of the Aluminum Co. of America at Arvida, Quebec, went into production in 1926, and exports from Canada to the United States increased to 23,170 net tons in 1927 from 11,240 the year previous.

The most significant recent move in the world's market was the organization during 1926 of the Aluminum Cartel, which includes the principal European producers, thus dividing the field between the two forces, the cartel on the one hand, and the Aluminum Co. of America on the other hand, each controlling about one-half the world's producing capacity of metal.

These three factors—plentiful supply of bauxite, extension of smelting capacity and organized competition—may result in a marked increase in production and a corresponding lowering of prices. On the other hand, many users, particularly in the automobile industry, have been substituting steels of high strength and low corrodibility for aluminum at lower cost and with little increase in weight.

Figuring back from the value of new aluminum produced in the United States (Bureau of Mines figure of \$39,266,000) and the average price of 25.4c. per lb., "Mineral Industry" says that 1927 production amounted to something over 150,000,000 lb. The plant at Massena, N. Y., contributed about half the production, the remainder coming from Niagara Falls, N. Y., Alcoa, Tenn., and Badin, N. C. Imports totaled 68,389,641 lb., while 16,051,477 lb. of ingot, plate and tube were exported.

The five aluminum plants operating in Norway have a rated capacity of about 26,000 metric tons of metal annually; the production in 1926 was 24,429 tons. In addition, two other plants, each of 10,000 tons capacity, are under construction, and the 7000-ton plant of the Norsk Aluminum Co. (controlled by the Aluminum Co. of America) is to be enlarged to 11,000 tons; this will bring the total capacity of Norway to about 50,000 tons annually.

Experiments with high-pressure steam locomotives have been hampered by the necessity for using turbines to generate the power with expensive intermediate gearing between turbine and driving axles. Nevertheless there has been in operation in Europe for over a year a "Schmidt-Henschel" locomotive generating steam at 1400 lb. per sq. in. in a tubular boiler, and delivering it at 900 lb. to the prime mover. The tubes are of nickel steel; distilled water is used for make up, and the engine has run about 30,000 miles without tube troubles. Another high-pressure locomotive of different design is also running on the Swiss railroads.

Electric Normalizing and Annealing

Eight Furnaces Handle Alloy Steels at Various Heating Cycles—Large Pit Furnaces a Feature—Air Blast for Cooling

ONE result of efforts by the Timken Roller Bearing Co., Canton, Ohio, to settle annealing questions raised by its production of alloy steels has been the installation of a bank of electric annealing furnaces that, individually and collectively, present several features.

The problem of utilizing electric heat in this particular case was complicated by a number of factors. Of these one of the most outstanding was the volume of production demanded. Another was that several different types of steel were made, each of which required a special annealing cycle and subsequent course of treatment. In fact, some of the factors involved threatened to make the general use of electric heat impractical, in spite of manifest advantages.

The difficulties were overcome, however, and a group of eight furnaces has been installed; they form a total connected load of 3600 kw. Two more are projected for installation in the near future that will increase the total to 5450 kw. As the furnaces have all been specially designed for their particular work, an individual description of the different types may be of interest.

Pit Furnaces for Slow Cooling

Probably the most remarkable of the group, in point of size and novelty of design, are the two 850-kw. pit annealing furnaces. These furnaces were specially built for annealing high-carbon chrome steel, or any other steel where the annealing cycle calls for a slow cooling. The long

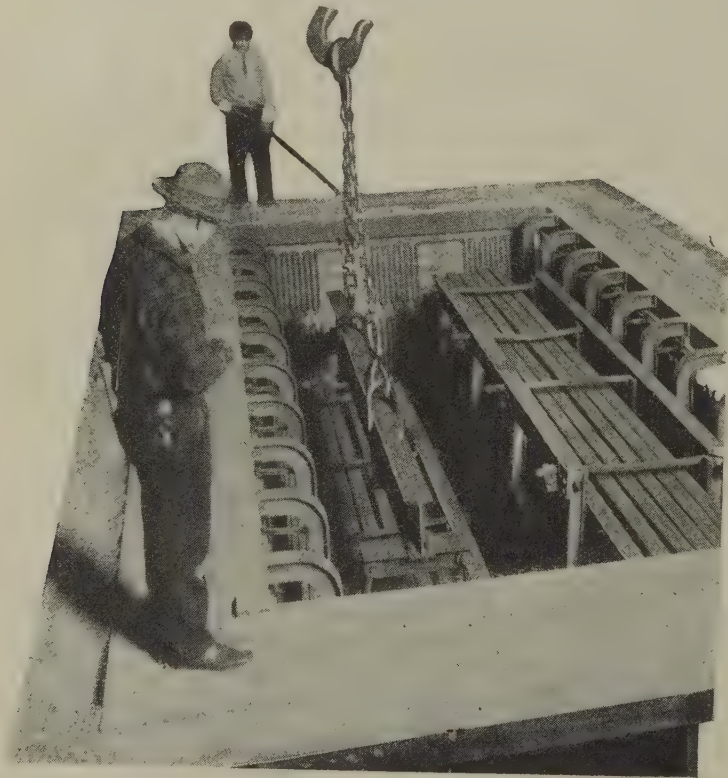
cycles required have, hitherto, been a decided obstacle to the use of electric heat for annealing such steels on anything approaching a quantity basis. In a well-insulated furnace the cooling time was usually so long that production was seriously delayed. In the case of these particular furnaces, this difficulty has been overcome by the introduction of a novel feature in the furnace construction.

Each furnace is 9 ft. wide and 21 ft. long inside, with a loading depth of 6½ ft., and accommodates charges of bar or tube stock of weights up to 50 tons. The covers are separately framed structures, weighing about 25 tons each, fitting in sand seals around the top of the pit. They are handled off and on the furnaces by a special electric traveling gantry crane running on tracks at the floor level on each side of the furnaces.

The heating elements are of the T-grid type, and are mounted on the side walls and bottom of the pit. They are divided electrically into two circuits, one including the side wall elements and the other those in the bottom. Each circuit is provided with individual control which gives two sets of connections, one a 440-volt, three-phase Y for high starting input, and the other, 440-volt single-phase series for soaking heat. The first has a power demand of 425 kw. for each circuit, or 850 kw. total, and the latter 142 kw. for each, or 284 kw. total. The charge is stacked in cradles, and loaded as shown in one of the illustrations, which also shows the method of mounting the resistors and the method of protecting them from damage during charging or discharging by means of heavy heat-resisting alloy guides.

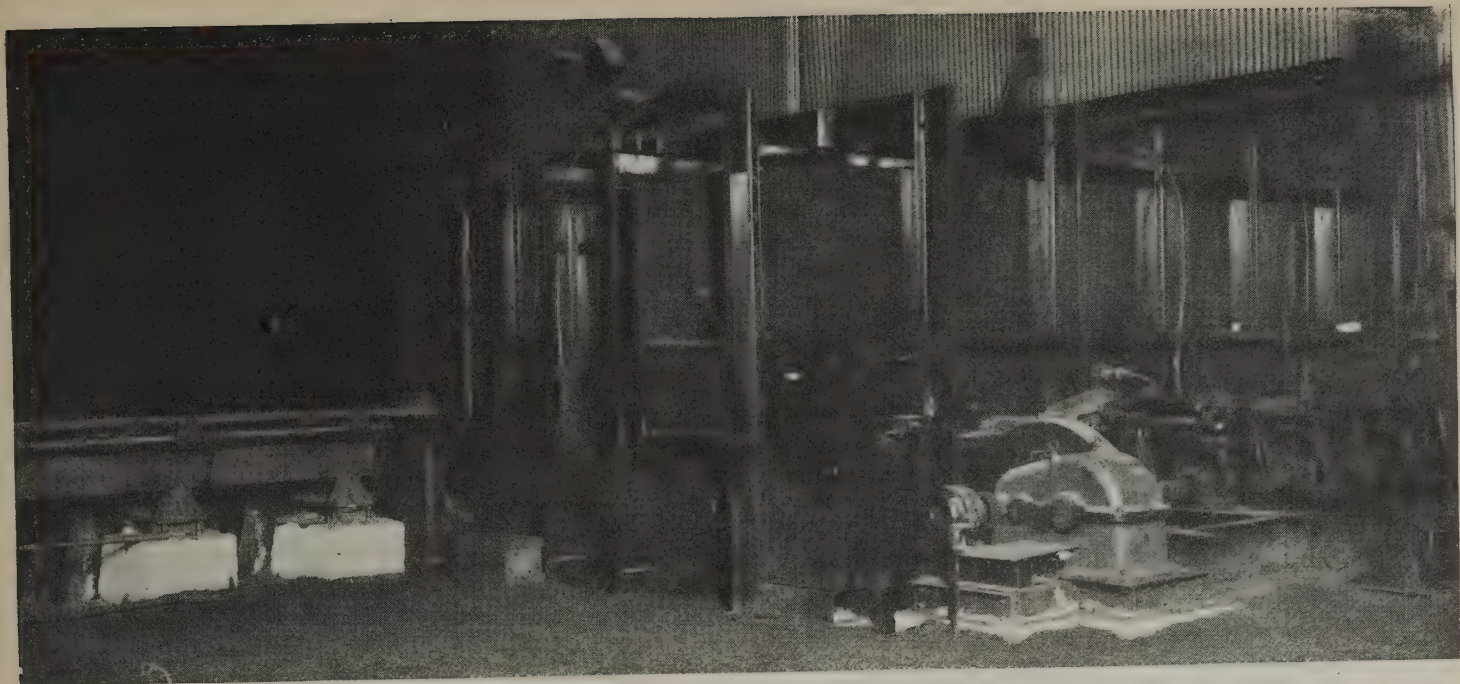
Air Blast Accelerates Cooling

The operation of the furnace is briefly as follows: The material is brought up to annealing temperature (1450 deg. Fahr.) as rapidly as possible, at which point the circuit



Two 850-Kw. Pit Type Furnaces (Right) Used for Long-Time Annealing of High-Carbon Chrome Steel. Interior of the furnace and method of protecting heating units are shown above





The 700-Kw. Pusher Type Normalizing Furnace with Tubes Being Pushed Upon the Run-Out Table

is cut over from the Y connection to series, and the temperature is held long enough to insure uniform heating. The charge is then slowly cooled through its critical range, the process being carefully regulated to insure the exact metallurgical results desired.

After the critical range is passed, cooling is accelerated by means of an air blast system, which consists of a series of pipes built into the furnace through which cooling air is forced by means of two 20-hp. motor-driven high-pressure centrifugal blowers. It is this forced cooling system that has rendered long time annealing practical on a commercial basis in these furnaces. It has eliminated the possibility of exposing the charge to the air before it has cooled sufficiently, and, at the same time, it removes the objectionable feature of too long a cooling period. The total annealing time from charge to charge is just about cut in half by the use of forced cooling. A third 850-kw. pit furnace of the same general construction and operating principle, will be installed shortly.

Chrome Steel Normalized in Special Furnace

All high-carbon chrome steel is, before annealing in the pit furnaces, normalized in a 700-kw. pusher type nor-

malizing furnace. This is also used to normalize certain low-carbon steels, and for processing steels that have to meet cold shear tests. It is 12 ft. wide and 21 ft. long inside, and is capable of handling bars up to 5 in. square and 20 ft. long, or tubes of corresponding dimensions. It is equipped with three pusher mechanisms, two being located at the charging end and one at the side. The latter was developed to push the charge across the width of the furnace interior from the charge to the discharge side. It consists of five rails crossing the furnace interior at equal intervals, and terminating on the discharge side in a large trough which delivers to a flight conveyor for returning the carrier shoes to the transverse pusher.

The actual pushing is done by a number of shoes, or baulks, in each trough, which are pushed across by the rods of the pusher mechanism proper. The charge rests on these shoes, and is carried across the furnace by the movement of the shoes in the trough. When the shoes come to the discharge side they are delivered to the conveyor and returned to the loading side for use. The pusher mechanism is so designed that the motor circuit is tripped at the completion of one revolution of the cams, so that the distance of movement is limited. The other pushers are of

Side Pusher Mechanism of the Normalizing Furnace That Shoves the Charge from the Charging to the Delivery Side. The conveyor which carries the shoes under the furnace for re-insertion can be seen in the right center



the rod type, and serve to push the charge in and out of the furnace, respectively.

The T-grid heating elements are mounted partly on the furnace roof, and partly in transverse wells located between the piers which support the cross pusher shoe troughs. Electrically, the heating elements are divided into four separate circuits, each with individual control.

The operation of the furnace is quite simple. The stock to be normalized is pushed in by a motor-driven pusher. By virtue of the electric connections that have been adopted, it is subjected to a high initial heat on entering, the degree of which is lowered as it moves across the furnace. Arrived at the finishing, or delivery side, the work is pushed out of the furnace onto a run-out table which is equipped with manipulators, which deliver it to a motor-driven cooling bed. From the bed it is delivered directly to the cradles in which it is to be loaded into the pit annealing furnaces.

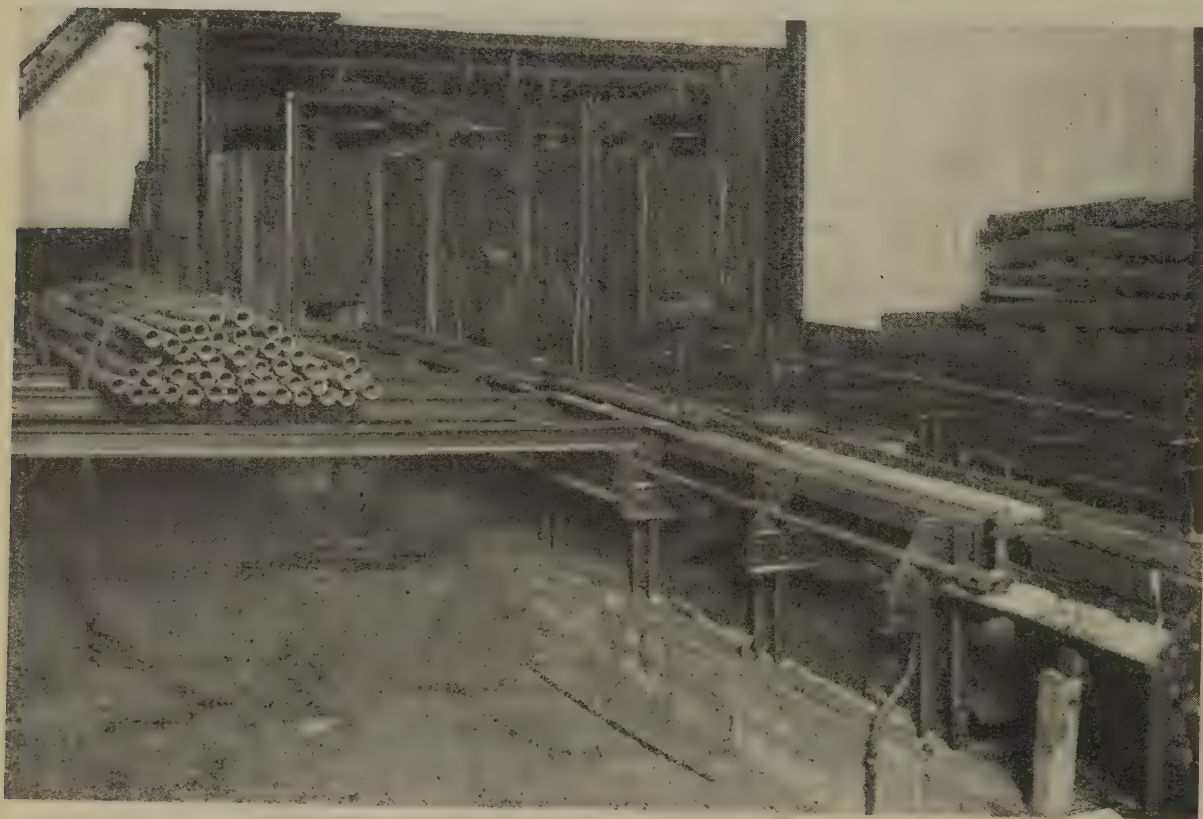
The controls for all the motor-driven operations, including the side pusher, are located on the charging side so that the furnace can be operated by one man. Some idea

have been grouped into three zones, two door zones, and a central or main zone. As to the mounting, part of the grids are mounted on the roof and part underneath the hearth, so as to produce a uniform distribution of temperature in the furnace interior, with a consequent even heating of the charge.

Two small circular pit furnaces have been installed for treating rod in coils. They are rated 100 kw. each and are separately supplied from 440/125 volt, single-phase transformers. They can be seen in an accompanying picture just to the right of the hearth type furnace just described.

Two Car Type Furnaces for Bar Stock

Miscellaneous bar stock, especially that which does not require annealing cycles of over 24-hr. duration, or which can be discharged into the open air at high temperatures, is annealed in two car type furnaces. One of them, a 315-kw. furnace, was built by William Swindell & Brothers, Pittsburgh. The inside dimensions are 22 ft. long, 6 ft. 4 in. wide and 5½ ft. high. The car dimensions are 20 ft. long, 6 ft.



Normalizing Furnace from the Charging Side, Showing the Charging and Discharging Pusher Rods, and Their Control

of the method of control can be obtained from one of the illustrations. The capacity of the furnace is about 150,000 lb. of stock per day, with a power consumption of about 200 kwhr. per ton. An additional furnace for normalizing work will be installed later in the year. It will be rated at 1000 kw.

Normalizing Small Lots

Heat treatment of bar or tube stock of various alloy steels is accomplished in a 300-kw. hearth type furnace. This furnace is also used for the normalizing of small lots of steel which it is impractical, for one reason or another, to handle in the large unit. The furnace is of the double end type, being about 20 by 6 by 4 ft. inside. The stock to be annealed is charged in at one door by a motor-driven pusher and, after it has been uniformly heated, pushed out of the other onto a receiving table. This table is tilted by another motor-driven mechanism, and the stock dumped into an oil-filled quenching tank. It is removed from the tank by a motor-driven conveyor.

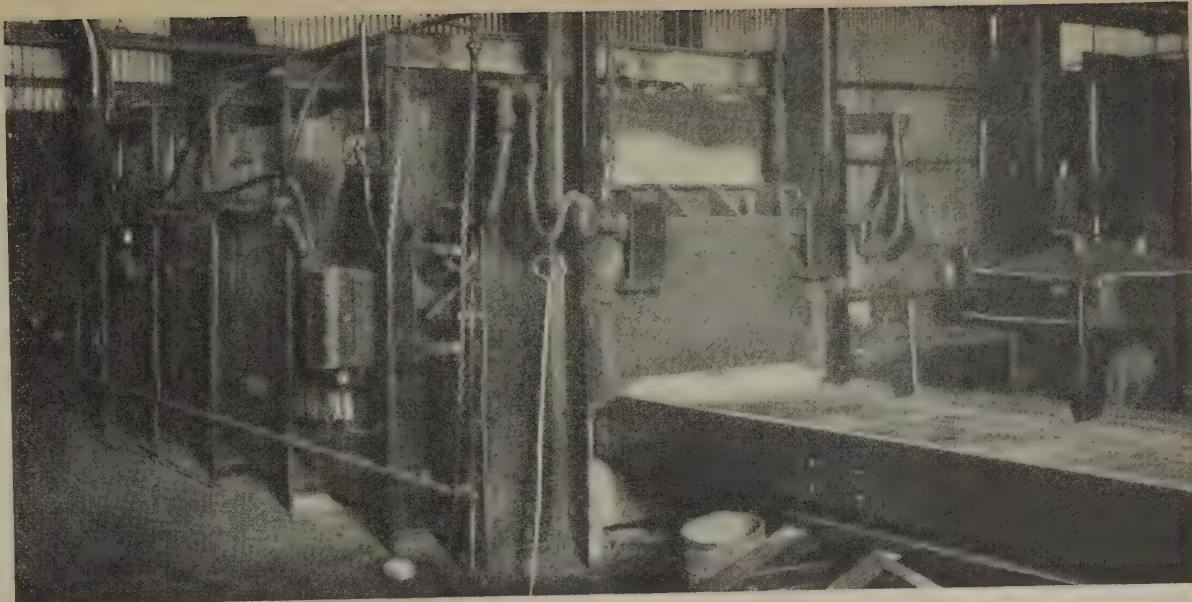
In order to compensate for any local cooling that may take place at the ends near the doors, the heating elements

wide and about 3 ft. high. The normal rating of the furnace is 20,000 lb. per charge, but the car will carry a load of twice that, if necessary.

The heating elements are mounted on the roof and side walls of the furnace proper, and on the car bottom. The latter is divided into 13 wells, by firebrick piers built up from the car bed. The elements are mounted in these wells, and the whole covered with interlocked alloy sheets that form the hearth. The elements are directly connected to the 440-volt, 3-phase supply circuit, two connections being available, 3-phase delta for high initial heat, and 3-phase Y for holding or soaking heat. Automatic temperature control is obtained by means of a Leeds & Northrup potentiometer type single point controller recorder. The average economy is 355 kwhr. per ton.

The car is moved in and out of the furnace by a motor-driven rack and pinion mechanism. Connection for the elements on the car body is made by a bushing and coupling located at one side of the door. A very elaborate system of sand seals has been adopted to prevent uneven temperatures in the furnace interior due to the leakage of air from the

The 300-Kw. Hearth Type Furnace Used for Heat Treating Bar or Tube Stock. The two 100-kw. circular pit coil furnaces can be seen in the right background



outside. The door is provided with a seal at both top and bottom, and there is a seal on each side of the car, which engages with a knife edge on the furnace wall. The furnace is also equipped with vertical cooling ports in the side wall, by which the rate of cooling can be accelerated if desired.

The second car type furnace, furnished by the General Electric Co., differs considerably in its design and construction. The inside working dimensions are 28 ft. long, $4\frac{1}{2}$ ft. wide and $2\frac{1}{2}$ ft. high, the overall sizes being $34 \times 9\frac{1}{2} \times 16$ ft. The car proper is 33 ft. long, $5\frac{1}{2}$ ft. wide and has an overall height of $5\frac{3}{4}$ ft. It is equipped with a cradle which raises the charge above the lower level of the heating elements on the side wall.

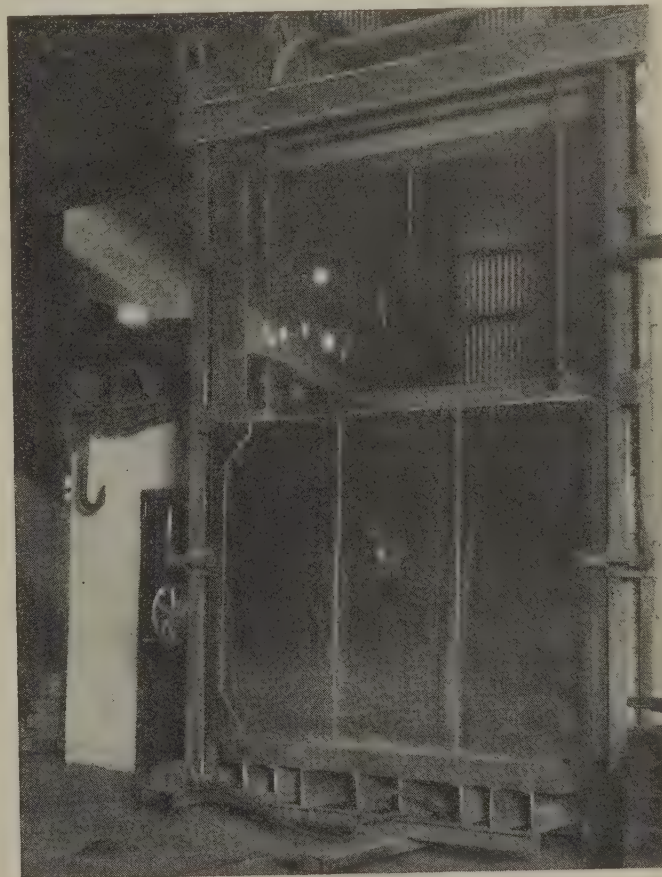
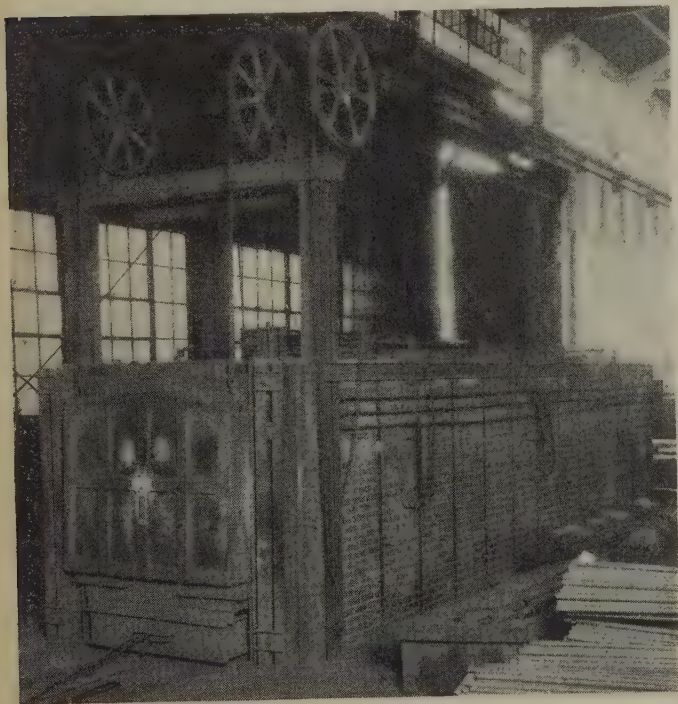
The heating elements are all mounted on the side walls, there being none on the roof or on the car. They are divided into two zones, each with separate control. The design of the elements proper is such that extra heat is provided near the door to compensate for door losses. Their location

on the walls brings the lower ends below the level of the charge on the car, so that heat may be radiated up through the charge. The furnace is supplied with power at 220 volts, each zone forming a separate circuit. Two connections are available for each circuit delta for high heat and a Y for soaking heat. The power consumption of the first is 230 kw. per zone, or 460 kw. total, and that of the other 153 kw. per zone, or a total of 306 kw. The furnace has a normal capacity of 10 tons but, like the other car type furnace, it has 100 per cent overload capacity. On a maximum heating cycle of 9 hr., the power consumption averages about the same as that of the other furnace.

High temperature insulation is the subject of a 20-page treatise prepared for distribution by Celite Products Co., Los Angeles, containing information whereby the loss of heat through various kinds of walls may be computed, and upon which an economical insulated design may be based.

A 315-Kw. Car Type Furnace (Right) Used for the Annealing of Stock Requiring Short Annealing Cycles

A 460-Kw. Car Type Annealing Furnace (Below)



Discuss Machine Tool User Problems

Lubrication, Hardness of Metals to Be Cut, Tooling Service,
Fabricated Frames and Productive Capacity

WAYS and means of bettering machine shop practice and of meeting problems which confront the user of machine tools were discussed at the second annual meeting of the Machine Shop Practice Division of the American Society of Mechanical Engineers, at the Hotel Sinton, Cincinnati, Sept. 24 to 27. To the symposiums on aeronautic machine shop problems, on lubrication and on the use and application of machine tools in modern manufacturing methods were contributed seven papers by men

selected as eminently qualified to speak on these subjects. A delightful trip on the Ohio River steamer Cincinnati to Ashland, Ky., to inspect the continuous sheet mill of the American Rolling Mill Co., constituted a novel departure from the routine procedure of most conventions. Three of the technical sessions were held on board the Cincinnati and one at the Hotel Sinton. About 275 members and guests registered at the meeting, and of this number 225 made the journey to Ashland.

Theory and Practice of Bearing Lubrication

FROM the standpoint of arousing controversial comment the paper by Forrest E. Cardullo, chief engineer G. A. Gray Co., Cincinnati, presenting "A Theory of the Lubrication of Cylindrical Bearings," was outstanding. After building up his theory, Mr. Cardullo deduced from it certain general considerations regarding the design and operation of bearings. Assuming, as seems reasonable, that the minimum film thickness is the most important of the factors which determine whether or not a bearing will operate successfully, he arrived at the conclusions embodied in the following general rules:

1. The load-carrying capacity of a bearing is proportional to its diameter.
2. The load-carrying capacity is proportional to the operating viscosity of the lubricant, that is, to the viscosity of the lubricant at the temperature which the lubricating film attains in operation.
3. The load-carrying capacity is proportional to the speed of rotation in revolutions per minute.
4. The load-carrying capacity is proportional to the surface speed of the journal, since this is proportional to the product of the diameter and the speed in revolutions per minute.
5. The load-carrying capacity of a bearing is a function of its length: For very short bearings, such as eccentric straps, it is proportional to the cube of the length. For very long bearings, it is proportional to the length. For bearings of the usual proportions, the load-carrying capacity is proportional to some power of the length greater than the first and less than the third.
6. The power loss in a bearing is proportional to the square of the diameter.
7. The power loss is proportional to the length.
8. The power loss is proportional to the square of the speed in revolutions per minute.
9. The power loss is proportional to the square of the surface speed of the journal.
10. The power loss is inversely proportional to the operating clearance.
11. The power loss is proportional to the operating viscosity of the lubricant.

These rules, said Mr. Cardullo, lead directly to the following conclusions regarding the ultimate rise in temperature of a bearing operating continuously: The rise in temperature of a bearing is independent of its length; is proportional to its diameter; is proportional to the operating viscosity of the lubricant; is proportional to the square of the number of revolutions per minute; and is inversely proportional to the running clearance.

Mr. Cardullo pointed out that these rules assume certain conditions which never are realized in practice—that the

box and the journal are both truly round and perfectly smooth, that they are rigid and maintain their shape, and that their axes are parallel and are not affected by deflections produced by the load. In fact, the rules formulated are indicative merely of the general trend of the behavior of bearings.

Lubrication Grooves in Bearings

In a paper on "Grooving Bearings in Machines," G. B. Karelitz, research engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, said that a large number of machine bearing troubles would be eliminated and wear would be decreased were more attention paid to the fundamentals of lubrication during the design of machines. Viscosity alone cannot be relied upon as a test for a good lubricant. Its oiliness is just as important, as this property greatly decreases friction between the surfaces in contact. Furthermore, the oiliness apparently determines the ability of the lubricant to adhere to the rubbing surfaces, which is essential for maintaining an efficient load-carrying oil film.

The mechanical design of a bearing must be developed with the importance of fluid lubrication kept always in mind, Mr. Karelitz declared. The lubricant must be fed into the bearing at a point where the pressure of the oil is low or even preferably where a vacuum is expected, as on the "up-side" of a sleeve bearing. It is important to leave uninterrupted the bearing zone, where the load-carrying oil film is formed.

Indiscriminate cutting of grooves in a bearing may be harmful. The function of grooves is primarily to distribute oil from the source of supply over the complete length of the bearing. Wherever possible, they must be confined to the unloaded portion of the bearing; the loaded part should be left free from interruptions. It appears that an angle of about 45 deg. to 60 deg. must be had between the line of oil admission and the load line to allow building up an efficient load-carrying oil film.

While an essential feature of fluid lubrication is a continuous rotation of the journal in the bearing at a comparatively high speed, unfortunately in many instances this condition is not fulfilled, said Mr. Karelitz.

How Railroads Use Their Machine Tools

LARGE sums of money are spent annually by railroads in making changes in machine tools and in shop surroundings, to keep up with the increased areas and weights of parts to be machined and maintained, said L. A. North, shop superintendent Illinois Central Railroad, Chicago, in a paper dealing with "Machine Tools—Their Use and Application in the Railroad Industry." He declared that the number of parts to the locomotive, as well as weights, are increasing

constantly. This fact makes it necessary to establish new methods and higher production to maintain costs at a satisfactory level. In this direction many shop kinks have been developed by officers and by shopmen, while machine tool builders also have made valuable suggestions. Mr. North emphasized that the "man factor" is an important consideration. If the workman can be induced to realize the necessity for proposed changes, and to become interested in

future betterments, his efforts will enter largely into the further advancement of this undertaking.

Explaining the attitude of the railroad toward introduction of new tools and new methods, Mr. North observed that the "field for external and internal grinding has been developed to some extent. Many parts formerly turned, planed or slotted are now finished in a far shorter time by grinding. Metal is saved, which in itself adds to the life of the part being machined." Piston rods, air reverse cylinders, air fire-door opener cylinders, grate-shaker cylinders, stoker engines, crank pins and driving axles are among the parts which are being ground, instead of being machined by some other less efficient and less satisfactory method.

Mr. North pointed out that "some thought has been given to tire grinding, also some experimental work has been done on reducing flat spots on car wheels. Unless a very small amount of metal were to be removed, tire grinding would not interest railroad management, as grinding on the flange would slow up this operation compared with machine turning and would destroy any saving that otherwise would be effected." Grinding of locomotive cylinders and of piston-valve bushings would furnish a smoother surface than the present method. Increasingly, grinding will be used for future operations, as machines are designed for that purpose.

Milling machines are taking a prominent part in railroad shop practice, according to Mr. North. Further develop-

ment of millers can be brought about and production can be increased and cheapened by a closer study of machine-work needs, the tool builder keeping in mind the introduction of harder and tougher metals employed in locomotive construction. In regard to drilling operations, there is slight use for the full radial. Such angle drilling as is necessary can be done either on the semi-radial drill or on vertical drill presses with tilting tables. When multiple-spindle drills are utilized, they should be fitted with a simple and suitable chuck for rapidly clamping and securing parts to be machined.

Special chucking features and forming tools used in conjunction with high-speed tools and specially designed heavy-duty machines have reduced machining time, have enabled railroad shops to keep pace with the increased areas and parts to be machined, and have relieved the fatigue of the operator and added to his personal comfort.

In turning bar stock from which cap screws, hex-head machine bolts, studs and other parts are made, Mr. North said that close study is required, to avoid spending money for waste material, which otherwise would be saved in labor if this operation were used. The time reduction by means of a special chucking feature has been substantial on this one class of work, the saving probably running as high as 10 per cent. Lapping and honing are of interest to railroad machine shops only in regard to machining airbrake parts.

Tractor and Implement Makers' Use of Machine Tools

MANY machine tool builders unfortunately think that their customers do not understand how to use machine tools effectively and that the ideas of the customers are untenable if in contradiction to the broad experience of the machine tool manufacturer, said Max Sklovsky, chief engineer Deere & Co., Moline, Ill., in discussing "Machine Tools in the Implement and Tractor Industries." Undoubtedly many users of machine tools are ignorant of many of the problems in the design of the equipment; nevertheless, machine tool makers would profit by taking note of the actual experience of machine tool users.

Machine tools used in the manufacture of implements today represent an investment of \$200 per employee, while other production machinery averages \$2,500 per employee. On the other hand, the unit machine tool investment in the tractor industry is about \$1,500, or seven and one-half times as great as in the implement industry, whereas other production machinery is approximately \$1,000 per employee. These figures, according to Mr. Sklovsky, justify the statement that the present-day tractor is largely a machine shop product.

The tendency is to apply machine tools to a greater degree in the manufacture of implements, because machined steel parts are being substituted for castings and cut gears for cast gears, while ball and roller bearings have become necessary, to provide increased resistance to wear. All of these changes call for more careful machining. Precision of manufacture applies not only to the tractor, but also to the implement. Machine tool manufacturers, therefore, can look forward to the greater use of machine tools by implement builders. However, implements require forging ma-

chines rather than machine tools, and machine tool builders cannot expect to find as large a market in the implement industry as in the tractor industry.

Greater Ruggedness Now Required

Protection of wearing parts, principally the various bearings, and their proper lubrication are two factors essential in good machine tools today, declared Mr. Sklovsky, who further stated that machine tools must be built not only for rapid production, but also with rigidity and strength far beyond the standards of a decade ago. Interchangeability of wearing parts is more desirable than their repair, and on this account ball or roller bearings properly adapted are preferable to solid bearings.

Rigidity of machinery where chiseling tools are used is universally recognized as essential, but many designers have overlooked one element of rigidity—that of the joints. Parts of machine tools are most generally designed with sufficient rigidity, but the fastening of these by means of bolts or studs is usually insufficient. Therefore, declared Mr. Sklovsky, "look to your joints" would be a valuable slogan for machine tool designers.

Chatter is the most serious drawback in obtaining proper results from machine tools, he said. Any such detriment inherent in the construction can be and should be overcome by machine tool builders. When this defect is eliminated, users can readily look to the design of their own product and parts, and to the condition of the materials used therein, for the elimination of further difficulties with machining operations.

Standard Machines with Special Fixtures Give Flexibility

"MOST of the equipment which we install must be suited for general conditions, and yet be adapted to high production," said J. R. Weaver, superintendent Manufacturing Equipment Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., who took as his topic "Some Practices in the Use of Machine Tools in the Electrical Industry." He declared that work in the electrical business is so diversified that standard machines with special holding fixtures are used extensively. Another way to attain reduction of costs has been to arrange several machines in sequence in charge of one operator.

While the Westinghouse company believes that fixtures should be designed and built by the manufacturer of the machine tool, and installed on it during its process of con-

struction, such practice has been inconvenient because it delays delivery of the machine. However, in building its own fixtures, the company endeavors to take advantage of machine tool builders' experience.

Choosing the Tool for a Given Job

Mr. Weaver expressed the opinion that "on some work, especially on form surfaces, planing is much more economical than milling, for the reason that we can maintain our form and size with the least expenditure. However, on flat surfacing, especially where there are a lot of pads to be finished, the milling machine is better adapted than the planer. We do considerable surface grinding on castings, and we find this to be a very economical way of finishing

surfaces, providing there is not more than $\frac{1}{4}$ in. of metal allowed for the finish."

Since all manufacturers are reducing as far as possible the amount of finish on their castings and forgings, Mr. Weaver said, it looks as though, if this trend continues, some time in the future the equipment will be of lighter construction, of high speed and easily handled, depending on the development of cutting tools. It is hard to predict just how much improvement can be obtained from redesigning machine tool equipment, but it appears as though manufacturers have gone as far as possible, so that users must turn in other directions rather than to machine tools to realize further savings in production costs.

Suggests Fabricated Machine Frames

Mr. Weaver said that his company has gone extensively into welded fabricated steel construction work on its apparatus, and suggested that it might be possible, to some extent at least, to apply the same construction to machine tools. He explained that the company has gone into this construction on jigs and fixtures and has reduced costs and

has advanced deliveries about three weeks on each jig. He mentioned the fact that Westinghouse has been experimenting with some special alloy steel on which cutting speeds and certain other operations have been increased as much as 250 per cent, with good results. This special alloy steel, combined with fabricated steel construction, would mean that machine tools ought to be built for and run at a much higher speed than at present.

The company's experience in applying chromium plating to cutting tools shows that, on cutting materials other than metals, the process has been successful; but, when cutting steel and cast iron, the plating chips off at the cutting edge.

For handling alloys of aluminum, copper, brass and zinc, Mr. Weaver's company has set up three processes: 1. Die casting, by which castings are made from zinc-base alloys and aluminum. 2. Permanent molding, by which castings are made from iron aluminum bronze, or aluminum alloy. 3. Hot pressing, which is used on castings or forgings designed from forged brass or copper. The utilization of these processes has aided substantially in reducing, as well as in some cases entirely eliminating, machining.

Production Per Man-Hour Dominates in Automobile Plants

SPEAKING for the automobile industry, L. L. Roberts, mechanical superintendent Packard Motor Car Co., Detroit, in a paper read in the author's absence by H. K. Parsons, Cincinnati Milling Machine Co., Cincinnati, declared that "production per man per hour is of more importance in the selection of a machine than floor space, but economy in the use of floor space is desirable. A machine of compact design has many advantages over one with projecting arms, brackets and levers, which make the latter type difficult to place in a progressive lineup as well as liable to damage in transportation."

Individual motor drives are preferred to belt drives, although the former are more expensive and cost probably as much to maintain. However, the individual motor drive shows a saving in power consumption, presents a clean-cut appearance and lends itself readily to the installation of conveyor chutes, etc., for the transportation of parts in process. Hopper feeds are desirable and should be installed wherever the design of the part will allow their use without too many complications in the design of the hopper feed mechanism.

Extensive Repairs Not Favored

It is not the policy of the Packard Motor Car Co. to repair machines where the cost of repairing is over half of the purchase price of a new machine. Extensive repairs are made only when the machine is of a special type and therefore would have a small resale value, and where the purchase of new equipment would show no substantial saving.

Answering the question of what actuates the purchase of new equipment, other than for purposes of expansion, Mr. Roberts replied that "it has been the general policy of the Packard Motor Car Co. to purchase any single machine or battery of machines which, when all the factors involved in the manufacturing costs are computed, shows that it will pay for itself within a reasonable length of time through its greater efficiency."

The speaker said that too much stress cannot be laid on the importance of proper tooling in regard to cutting tools, holding jigs and fixtures. The cutting tool set-ups should be made so as to allow for quick removal from the machine. The piping installation carrying the coolant to the cutters should be made to be readily detached or moved, to facilitate its adjustment and replacement. Holding fixtures should be so designed as to make it possible to clear chips from their locating and clamping points with the smallest amount of time loss, after the removal of the part being machined.

Who Should Provide the Tooling?

With regard to the problem of whether a prospective machine tool user should purchase a machine with complete tooling, or should buy only the machine and tool it up with the aid of his own tool engineers, Mr. Roberts explained that his company's practice has been to have machinery builders

submit complete proposals covering the tooling and the methods by which the operations are to be performed. Advice is usually given in advance by the company as to the general requirements of production, quality of finish, tolerances, previous operations performed and the locating points to be used.

Certain parts difficult to clamp without springing under the cut, on account of the nature of their design, have been considered more suitable for machining on a surface grinder than on a milling machine. Such parts as stamped crankcase gear covers, side wheel carrier brackets, exhaust and inlet manifolds, rear axle cases, motor inlet and outlet water flanges and rocker lever housings have been economically machined on this type of grinder. Many parts were ground for one-half of the former cost of milling.

Radical departures are often made from long-accepted methods of machining motor parts on account of some machine tool improvement, said Mr. Roberts. "As an example: there are eight balance counterweights assembled on a Packard crankshaft. Three counterweights formerly were forged, machined on two flat sides and joint side by surface grinding, and then contour turned in a lathe to a radius approximately the same as the crankarm, with a special fixture holding eight of the parts. As 2000 of these parts were required daily, this method was quite costly and needed four grinders and two lathes. Two high-powered milling machines with hydraulic feeds are now used instead; one machine is for cutting the weights to length, 16 at a time, from rolled bar stock, and the other machine is for form milling the radius formerly turned in lathes. These two machines easily produce 2000 counterweights in a 9-hr. day."

Inspection on Aircraft Engines

In the manufacture of Wright aircraft engines, inspection is of paramount importance, said Hugh W. Roughley, quality manager Wright Aeronautical Corporation, Paterson, N. J., in a paper on "Inspection Methods and Quality Control in the Manufacture of Aircraft-Engines Parts," which was read by L. C. Morrow. From the time the raw material enters the factory until the finished engine is finally tested and packed for shipment, all materials and every operation are subjected to the exacting scrutiny of a large force of specialists.

Commenting on Mr. Roughley's paper, R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., observed that the large number of alloy steels going into Wright motors is of interest. In fact, the wide range of materials may be partly responsible for the improvements in airplanes. If so, it is an indication that standardization of materials should not be carried too far.

Tool Makers Must Guard Supremacy

That one-half of the machine tools bought by his company do not give the accuracy assured by their guarantee

was the statement of J. E. Padgett, Spicer Mfg. Co., Toledo, Ohio, in the discussion which closed the final technical session. He stressed the point that few machine tool salesmen know their own product as they should.

Progress in European Machine Tools

Engineers in European countries are profiting by the things being done in an industrial way by the United States, declared Fred A. Geier, president Cincinnati Milling Machine Co., in a short, informal talk. Mr. Geier, who has just returned from Europe, said that there is still need for more careful planning and designing of machines in this country. He emphasized that Americans should abandon the idea of

the supremacy and invulnerability of their machine designs. At the recent British machine tool exposition he noted evidences of considerable improvement in British tools.

R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt.; L. C. Morrow, managing editor *American Machinist* and chairman of the Machine Shop Practice Division, A.S.M.E.; and Walter W. Tangeman, sales manager Cincinnati Milling Machine Co., presided at the technical sessions. The local committee on arrangements consisted of Mr. Tangeman, chairman, E. F. DuBrul, F. E. Cardullo, Solomon Einstein, E. A. Muller, C. Luhn, A. Pletz and C. Fox. Visits to Cincinnati metal-working plants formed part of the program for those present.

Interactions Between Steel and Slag

Cooperative Program at Pittsburgh Uses Special Furnaces and Crucibles to Determine Best Steel Making Conditions

TO prosecute the five-year research into steel making problems jointly undertaken by the United States Bureau of Mines, Carnegie Institute of Technology, and a group of 29 steel companies (described in *THE IRON AGE*, Oct. 27, 1927, page 1171), the bureau's electric furnace laboratory was moved from Seattle, Wash., to the Pittsburgh station. It contains a 50-kva. Ajax-Northrup high-frequency furnace, shown in the accompanying view, capable of melting 125 lb. of metal. A 35-kva. furnace of similar design is used for making smaller melts, particularly for making up synthetic slags. Most of the ingots for the studies on deoxidation are made in a 250-lb. Moore 'Lectromelt furnace, and there are other smaller furnaces used for special work.

One of the most troublesome details found during the experimental work is the preparation of crucibles to withstand the various slags at high temperatures. For basic slags, crucibles made of fused magnesia bonded with hydrochloric acid have been most successfully used. Small fused magnesia crucibles with no bonding material have been made by firing in graphite in the small induction furnace. A melt of pure iron, saturated with iron oxide and

covered with a pure iron oxide slag, showed only 3 per cent MgO in the slag after holding four hours in such a crucible at 1550 to 1700 deg. C. Silica crucibles are used for acid slags, but it has been found well nigh impossible to prevent erosion of the crucible with acid slags high in iron oxide. Graphite crucibles are used whenever a reducing type of slag is being made and when the carbon content of the metal is not required to be low; graphite is also used in making up some of the synthetic slags.

The practical aspect of such slag studies may be inferred from the common saying among steel-makers that the way to make steel is to make good slags and let the steel take care of itself. A large portion of the research program is therefore centered on the properties of slags: how many impurities a slag will absorb from the steel in a given length of time; how fast does iron oxide, the agent for the removal of carbon, manganese, phosphorus, silicon, and other impurities from the metal, dissolve in the metal from a given type of slag; what changes occur in other physical properties with changes in slag composition. These are some of the questions which are being answered in this Bureau of Mines research work.



The Metallurgical Laboratory at Pittsburgh for Investigating Steel Making Problems Contains Besides the 50-Kva. Electric Furnace Here Shown, Several Other Furnaces, Including One for Studying Deoxidation

Chromium Steel for Railroad Rails

High-Manganese and Bessemer Steel Rails Also Defended
by Metallurgists—Low Alloy Gives Prolonged
Life Under Heavy Traffic

IN 1913 some heats of acid Bessemer steel containing 1 per cent chromium were made at the Stocksbridge Works (near Sheffield, England) of Samuel Fox & Co., Ltd., rolled into 100-lb. rails, fabricated into eight complete crossings and installed at important junctions on the London, Midland & Scottish Railway. Results were so satisfactory that supplies of the same analysis have been continued, but since 1921 the steel has been made in the acid open-hearth. In describing this material before the May meeting of the British Iron and Steel Institute, Thomas Swinden and P. H. Johnson quote a report by the division engineer for the railroad system as follows:

"One crossing was laid at the departure end of a station where speed was restricted to 30 miles per hour. The line is in a cut through a deep bed of clay and drainage is difficult. This crossing gave a better life than one of 0.55 per cent carbon Bessemer steel, but the increase was not considered altogether satisfactory.

"Another, laid at the entrance to a very busy station, is exceeding the most sanguine expectations, the life of the high-carbon Bessemer steel crossing being two and one-half years, whereas the chromium crossing has already had a life of 13½ years and is not yet worn out.

"Another crossing at the same station on the departure lines had a life of six and one-quarter years, against two years of the 0.55 per cent carbon steel. This particular crossing was considered the most important on account of heavy traffic, and its life is conclusive evidence of the efficiency of this class of steel.

"A further crossing has had a life of 12¼ years, while the remainder of that particular junction has been replaced a second time during that period.

"A trailing crossing in the main line where trains are passing regularly at a speed of 70 miles per hour is wearing so well that the decrease in depth per annum can be attained only by using the vernier caliper."

In addition to these data on actual wear, Messrs. Swinden and Johnson give the following comparative data:

	Bessemer Chromium Steel, Per Cent	Open-Hearth Chromium Steel, Per Cent	Basic Open-Hearth Carbon Steel, Per Cent
Chemical Analysis			
Carbon	0.50	0.50	0.55
Manganese	0.85	0.80	0.85
Silicon	0.20	0.23	0.15
Sulphur	0.04	0.03	0.03
Phosphorus	0.05	0.04	0.03
Chromium	1.00	0.95	...
Tensile Properties			
Ultimate strength.....	133,000 lb.	137,000 lb.	114,000 lb.
Elongation, per cent....	9.3 in 3 in.	13.3 in 3 in.	16.7 in 3 in.
Reduction in area.....	13.9%	38.0%	25.6%
1-ton Falling Weight			
After third 12-ft. drop..	3.3 in.	4.0 in.	5.0 in.
Not broken at.....	90 ft.-tons	72-ft.-tons	...
Brinell hardness.....	...	270	215

It was found that the chromium steel rails as rolled were capable of being drilled without difficulty and would not air-harden after heating for bending. The ingots rolled well, and were hot-sawn, cold-straightened and milled without difficulty. The extreme toughness under the falling tup (weight 1 gross ton, striking nose 5-in. radius, bearings 4 ft.

3 in. apart) and the high tensile strength indicated that the material was quite suitable for track work, despite the deficient elongation and reduction in area of the early Bessemer heats.

The microstructure of the rail as rolled is a dense mixture of sorbite and very fine pearlite, with a fine broken network of ferrite. The structure at the surface is somewhat finer grained. After a reheating to 950 deg. C. and air-blast cooling, about the only change is that the amount of free ferrite is materially reduced. Such heat treatment increases the hardness only 20 Brinell units, and also materially improves all the tensile properties of the Bessemer steel.

Higher Carbon Reduces Impact Resistance

Carbon should be limited to 0.55 per cent or less, in the opinion of the authors. Such steel is unbroken after successive blows of a 1-ton tup totaling 83 ft.-tons and causing a deflection of 7 in. Raising the carbon to 0.61 per cent gives a harder and stronger rail, but the ductility drops. Such a rail will break on the fifth blow of such a schedule: 7 ft. drop, 20 ft., 20 ft., 12 ft., and 12 ft., a total of 71 ft.-tons.

From such results as the above the authors have concluded that the problem of a more durable rail would be better solved by an increase in alloy content, particularly manganese and chromium, rather than by heat treating a plain carbon rail, or by increasing the carbon content and at the same time limiting the manganese (which is the trend in British specifications).

Discussion of the paper naturally brought in the comparative value of the Sandberg process of heat treating rails. J. H. Whiteley wondered whether chromium steel would develop the "gray spot" sometimes seen after sorbitizing by the Sandberg process. In a broken section, this minute gray spot indicated an internal burst caused by rapid cooling. He felt it was closely allied to the internal fractures frequently found in American high-carbon rails even after normal cooling on the hot bed.

John Millar, engineer of the London & North Eastern Railway, said that road had used switch points and frogs made from steel very similar to that described, except that the chromium was 0.71 per cent. These were installed in very heavy electrified service and the switch points, for instance, gave 2½ years of life as compared to 11 months for ordinary steel. Frogs and crossings lasted twice as long as carbon steel. In all, his company had worn out 250 tons of the chromium steel in special trackwork, and in no case had any flaw or fracture been discovered. Experimenting is now proceeding on a much larger scale; attention has recently been turned toward heat treatment after manufacture.

Manganese in Carbon Steel Could Safely Go to 1 Per Cent

D. Sillars said that, while many railroads insisted on the standard specification (0.55 to 0.65 per cent carbon, not over 0.8 per cent manganese) others did not, and his firm had commonly furnished tonnages of 1 per cent manganese rail and even a little higher. From a practical point, variable air-hardening, because of various rates of cooling on t

hot bed, caused trouble when manganese was above 1.2 or 1.3 per cent. Such rails would have to have special heat treatment. In his opinion, any steel, no matter how well made, would have "gray spots" in the fracture if a bulky portion were sufficiently rapidly cooled, since such occurrences are due to internal stresses. Chromium steels without nickel have a practical fabricating advantage because they are quite machineable, even when fairly high in chromium and having a high tensile strength.

One difficulty in depending upon manganese to give the necessary hardness in rails, in the opinion of the president of the institute, F. W. Harbord, was that this element would ordinarily be adjusted by a ladle addition, and consequently could not be controlled so accurately as the carbon in the bath. In his experience all alloy steels are distinctly sensitive to sudden changes in temperature, and consequently he felt that uniformity in final product could not be easily attained. For instance, a large tonnage of rails containing a

fractional percentage of chromium had to be normalized before it would pass the drop test.

One of the authors, P. H. Johnson, in reply, came to the defense of the Bessemer rail. He was in charge of rail inspection and testing for the Midland Railway from 1900 to 1920, and all rails laid during that period were of acid Bessemer steel. Statistics of the Board of Trade for that same period showed that the Midland had the smallest number of breakages of any railroad in Great Britain. Chemical specifications were as follows:

Carbon	From 0.40 to 0.50 per cent
Phosphorus	Not exceeding 0.07 per cent
Sulphur	Not exceeding 0.06 per cent
Manganese	1.10 per cent

The silicon was not mentioned.

A point worth noting is that test pieces from head and foot of these Bessemer rails showed very close to the same tensile properties. Basic open-hearth rails give a much greater variation—a matter he could not explain satisfactorily.

Principles of Steel Mill Lubrication

Friction, Which Absorbs Nearly Half of the Engine or Motor Power, Is Target of Lubricant

BY E. P. MALLISON*

CORRECT lubrication results from the complete and continuous separation of the rubbing surfaces of gears, pinions and bearings by an oil film of sufficient strength to resist the pressures, and with minimum fluid friction. There must be arrangements for a continuous supply, without waste, of clean, cool lubricant of the proper quality.

Increases in the size of ingots rolled, development of the high-speed motor-driven continuous mill and stiff competition in the steel market have increased the value of reliable lubrication, as well as operating economy. Higher costs of modern machinery make both replacement and shutdown exceedingly expensive.

Reliable tests of a reversing mill engine have shown that about 30 per cent of the power is used in deforming the steel, that is, in the actual rolling process. About 27 per cent is used in overcoming idle friction of the engine parts. Another 13 per cent is used in overcoming roll journal friction. About 9 per cent is used in overcoming pinion and spindle friction. The remaining 21 per cent is used in producing acceleration of the parts in reversing. From this analysis, friction absorbs 49 per cent of the total power and only 30 per cent shows up usefully in the product.

Anti-Friction Bearings a Great Help

Development of roller bearings capable of sustaining the great loads involved has materially reduced roll-neck power consumption. Recent tests on modern strip mills, oil lubricated and equipped with latest refinements, indicate a power requirement about half that used in older strip mills of corresponding sizes. On these continuous mills, the power required in overcoming the pinion, gear and spindle friction is 12 to 15 per cent of the total power.

Primarily, lubrication in a modern mill is applied by means of a circulating oiling system. The system includes a main supply line with branches to the various elements to be lubricated, a common return line to take the individual returns from each element, a suitable tank for receiving and cooling the return oil and separating from it

the water and heavy impurities, a means of cleaning and purifying the oil and storage capacity for clean oil.

Oil is applied to the gears under a pressure of 20 to 30 lb. to the square inch, by properly designed spray nozzles. The nozzles deliver the oil close to the pitch line, so that at the moment of contact the gear teeth are generously lubricated. Oil to the pinions is supplied at the top of the housing and cascaded into the engaging teeth by suitably arranged baffle plates.

Choice and Care of Lubricants

Selecting the proper lubricant is an important matter. It must possess enough body to establish on the working surfaces a film of sufficient strength to resist rupture from the pressures imposed. These pressures are most severe on the engaging teeth of pinions, because of the shock loads involved. The lubricant must be adaptable for use in a circulation system, involving the constant reuse of the same quantity of oil.

Natural enemies of lubrication are heat, air, water and solid impurities. Air and heat cause a certain amount of oxidation of the oil, forming some products that are soluble and others that are insoluble. Water combines with products of oil oxidation and other foreign impurities to form emulsions. The activity of these agents is overcome by using an oil of maximum chemical stability, by removing water and solids from it, and by reducing the soluble oxides. Cooling, cleaning and settling the oil further this corrective action.

An addition of 1,300,000 kw. to the electricity supply of the four States of Illinois, Wisconsin, Indiana and Michigan in the three years ended Dec. 31, 1927, is noted in a report of the power survey committee of the Great Lakes Division of the National Electric Light Association. This gives these four States a total energy supply of 4,556,000 kw. About 10 per cent comes from hydro-electric stations, and the remainder is steam-generated. The four States have nearly 17.5 per cent of the total supply of electrical energy in the United States.

*Vacuum Oil Co., New York. Abstract of a paper presented before the Philadelphia district section of the Association of Iron and Steel Electrical Engineers.

New 32-In. Stroke Draw-Cut Shaper

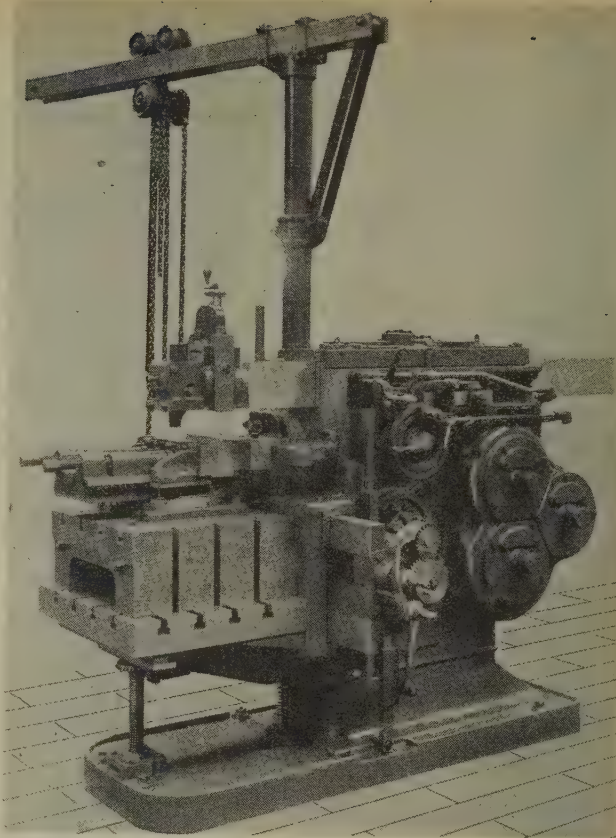
A 32-IN. high-duty draw-cut shaper, similar in design to its larger draw-cut machines, but incorporating a number of improvements, has been added to the line of the Morton Mfg. Co., Muskegon Heights, Mich.

The lower table and outer support is of new design. It is of angle bracket type and is considerably lower than the saddle, giving clearance of 31½ in. between the ram and lower table, which permits the finishing of large and bulky castings. The lower table has at its outer end an automatically adjusted outer support which is secured directly to the cross-rail of the machine. It is raised and lowered by screws of large diameter operating in independently adjustable nuts bolted to the extension base. Two vertical feed screws are used. The horizontal feed of the table is 32 in. and the vertical feed 16 in.

The ram, of high-carbon steel, is 6 x 6½ in. and has bearing surface on four sides. The clutches, reversing mechanism for operating the clutches and the stroke adjustment are the same as on the company's other draw-cut shapers. The feed is of automatic relieving type with large friction surfaces.

The machine is provided with power rapid traverse. Splash lubrication is employed for clutches and journals subject to heavy cutting strain. The

The Lower Table and Outer Support Are of New Design. It provides clearance of 31½ in. between the ram and lower table for bulky work



adjustable back bearing forms a stop against which work may be placed, this bearing being said to transfer the thrust of the cut directly against the column of the machine.

Equipment includes crane with ½-ton hoist of two-speed type, a steel

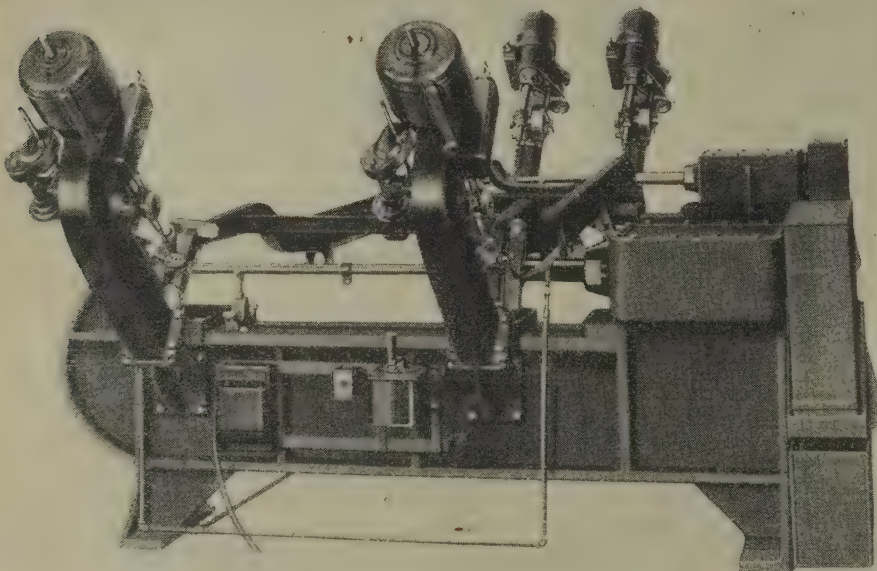
head, a swivel vise with 14-in. opening, and a 28 x 32-in. T-slotted top plate. The machine will accommodate shell planing, shoe and wedge and rod brass attachments for railroad work. It can be furnished either for belt or motor drive.

Chassis Frame Assembly Press

THE chassis frame assembly press illustrated is offered by the Hanna Engineering Works, 1765 Elston Avenue, Chicago, as an important adjunct to a chassis frame riveting installation when one or more tubular

cross members must be pressed into the horns or outriggers which have been previously riveted to the side bar channel webs.

The press rams open wide to permit quick loading of the frame parts.



The Press Rams Open Wide to Permit Loading of the Frame Parts. They advance rapidly to the work and stop automatically when the side bar channels are spaced properly

The rams act in unison, advancing rapidly until they engage the side bar channel, when the speed is reduced automatically and stopping automatically, when the side bar channels are properly spaced. Standard drill heads with automatic feed engagement, reverse and quick return, are used for drilling the holes for the rivets which dowel the tubular cross members in place. The machine is self-contained, with motor drive, limit switch controls, drilling coolant pump and sump, and pump for lubricating the moving parts.

Simplified Practice in Many Items

Simplified practice recommendations have been issued by the United States Bureau of Standards for steel barrels and drums, die-head chasers, metal lath, roofing ternes and steel lockers. Copies of these recommendations may be obtained at 5c. each from the Superintendent of Documents, Government Printing Office, Washington.

Each of the papers gives the history of the project with which it is concerned, and gives in tabular form the accepted standards that have been adopted by the various committees and have been accepted by 80 per cent or more, in each case, of the productive capacity of the country.

Gear Hobbing Machines for Helical, Herringbone, Spur and Other Gears

THE Newark Gear Cutting Machine Co., 69 Prospect Street, Newark, N. J., has added a new hobbing machine to its "Spirit of Production" line of gear cutting machinery. The machine is built in both plain and universal types and has capacity for hobbing gears up to 18 in. in diameter under the overarm that ties together the vertical stanchions. Without the overarm gears 24 in. in diameter can be cut.

The universal machine is intended primarily for helical, herringbone and spur gears and worm wheels. A distinguishing feature is an improved differential mechanism for hobbing helical and herringbone gears, which mechanism permits separate and easy control of the lead, feed and indexing trains of gearing, so that for a given helical angle and pitch only the number of teeth need be considered when changing over the machine. Any desired feed may be obtained and changed at any time without losing the helical path and without recalculating gear train ratios. The plain type machine, which is primarily for spur gears, spline shafts and worm wheels, does not require the differential mechanism, although it can be furnished as an extra.

Frame, stanchion, work-spindle and its housing, and the feed parts are the same in both types of machine. With the horizontal cutting principle long shafts and gears that are integral with their shafts may be handled conveniently. The work-spindle is bored $2\frac{1}{2}$ in. for this purpose.

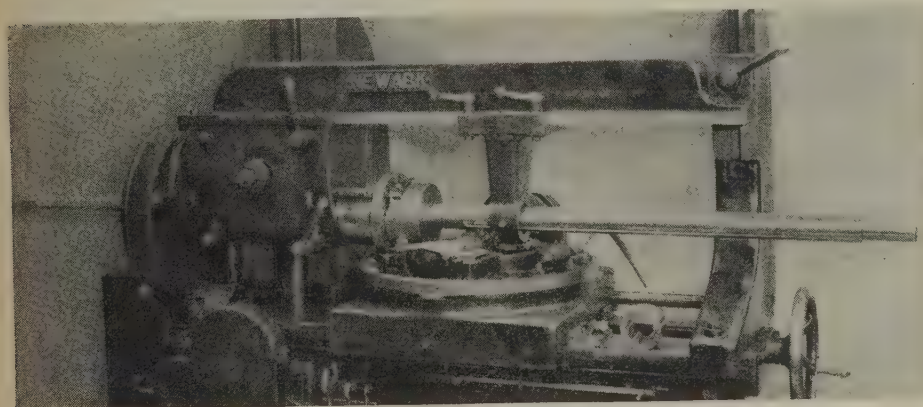
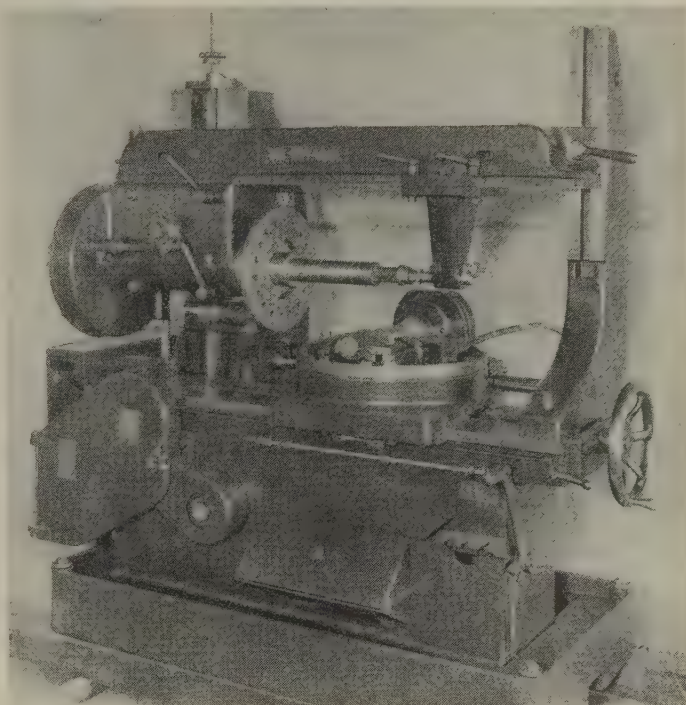
in the center of the ring gear conveys the cutting compound and chips to a chip box in the frame of the machine. Provision is made for rapid traverse of the cutter carriage in both directions whether or not the hob is revolving.

Automatic lubrication is provided for the gear box mechanism. Speed change gears are driven by square shafts, and lead, feed and indexing gears by double-key shafts, the keys

being integral with the shafts. The master worm wheel is generated in place on its own bearings and the master worm is mounted in tapered roller bearings.

Extra equipment for special work can be furnished. The illustration shows a tangential attachment for generating worm wheels, with taper hobs, or star cutters or with fly tools when hobs are not available. The attachment functions rapidly and smoothly and may be applied to the machine conveniently by first removing the outer cap bearing of the cutter spindle. The rapid traverse mo-

An Improved Differential Mechanism Is a Feature of the Universal Type Hobbing Machine. The cutter spindle is located close to the frame ways to give increased rigidity

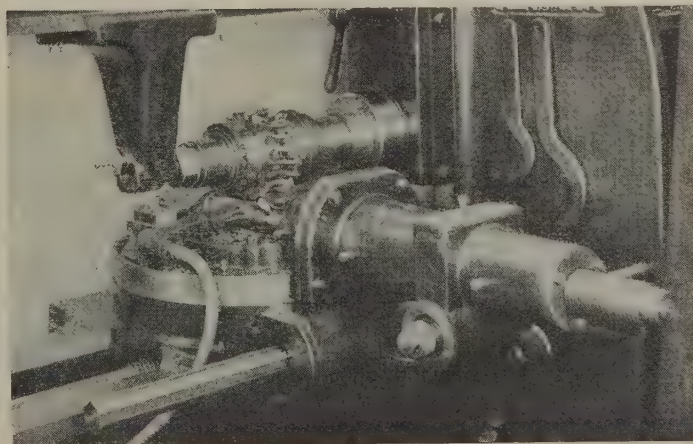


The cutter drive is arranged so that the cutter spindle is brought very close to the frame ways, which gives increased rigidity. Power is received from a splined side-shaft through a hardened and thread-ground worm mounted in Timken bearings, and is transmitted to a combined worm-wheel and bevel gear ring and then to a bevel gear ring mounted directly on the hob spindle. It is pointed out that three rotating gear members thus perform the function of two distinct pairs of gears. The ring gear also acts as a flywheel to steady the cutting action, and it is completely guarded and out of the way. A hole

Long Multiple Spline Shafts May Be Hobbed Automatically on the Attachment Shown Above. The tangential attachment, at the right, is for generating worm wheels with taper hobs or star cutters and fly tools

tion and differential mechanism function with this attachment. An attachment for automatically hobbing long multiple spline shafts can also be furnished, this attachment illustrated herewith. The regular cutter carriage is clamped to the frame ways when this attachment is in use, and the regular feed mechanism is disengaged. Shafts being splined are fed through the work spindle automatically.

The machine uses hobs up to $4\frac{1}{2}$ in. in diameter and 5 in. long, and has capacity for cutting teeth of 4 diametral pitch in steel at a fast rate,



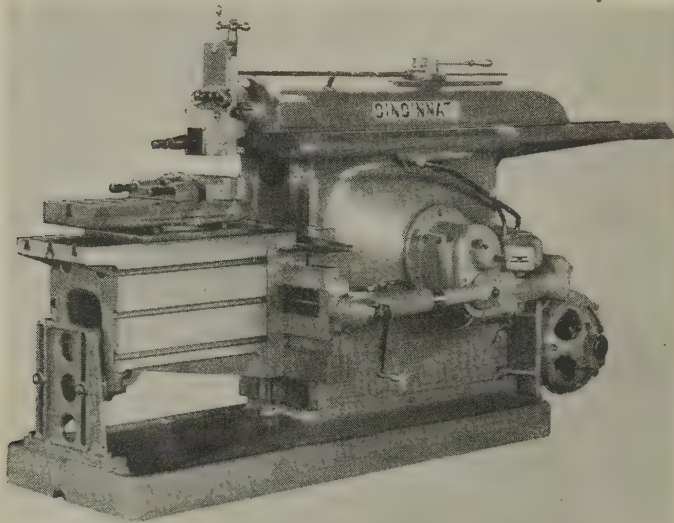
and occasionally teeth of 3 d. p. Teeth of 3 d. p. can be cut in cast iron. Hob speeds range from 38 to 145 r.p.m. and feeds from 0.015 to 0.250

in. per revolution of the work. A 5-hp. motor is used. The net weight of the machine is approximately 6000 lb.

New 36-In. Rapid-Traversal Shaper

A NEW 36-in. rapid-traverse shaper designed to combine the speed and convenience of a small machine with the strength and power of a large shaper has been brought out by the Cincinnati Shaper Co., Cincinnati. The machine has a ram 6 ft. 4 in. long, with a bearing in the column of 3 ft. 10 in. It occupies floor space of

nient speed and cross-feed changes, automatic oiling, centralized control, improved "spring throwout" hand feed and quick-control indicators, which tell at a glance the feed, speed and length of stroke being used. A full length taper gib with single screw adjustment is provided. One wrench is used for all adjustments.



Power Rapid Traverse to the Table Is Provided. Lubrication is automatic

5 ft. 2 in. by 12 ft. 1 in. The strokes per minute range from 8 to 102 and the cross feeds, 11 in number, range from 0.010 to 0.170 in.

In addition to power rapid traverse to the table, features include conve-

The shaper is furnished either with single pulley belt drive or arranged for motor drive.

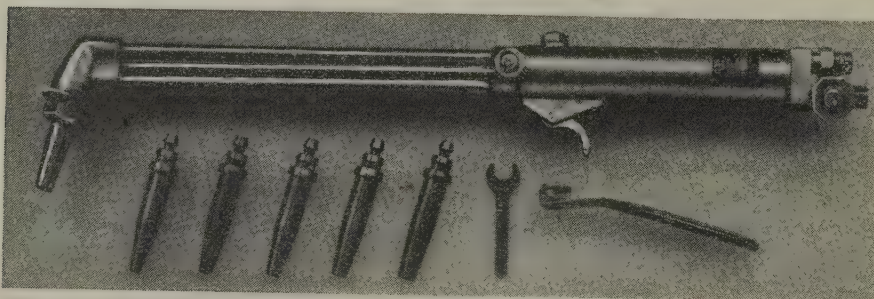
A universal table with a rocking top is available for use on the machine.

New General-Purpose Cutting Torch

THE Air Reduction Sales Co., 342 Madison Avenue, New York, is placing on the market a new general-purpose cutting torch with improved high-pressure valve, interchangeable trigger or lever control and replaceable valve seat. The torch is fitted with the new standard hose connections and is furnished with either 75 or 90-deg. angle head. The weight with tip is 3½ lb. and length, over all, 21 in.

The high and low-pressure oxygen tubes and the acetylene tube are of seamless brass, and are silver-soldered to the head and rear end. The valve

controlling the oxygen cutting jet is made accessible for examination or replacement by removing a screw cap directly above the trigger. The torch uses the range of tips from No. 1 to No. 8. Interchangeable tips for acetylene, hydrogen, city gas or other fuel gases, and choice of medium or low-pressure acetylene tips are available. Standard oxygen hose connection is for ¼-in., inside diameter, hose, and acetylene hose connection for 5/16-in. hose. The new cutting torch is furnished singly or as part of a complete outfit.

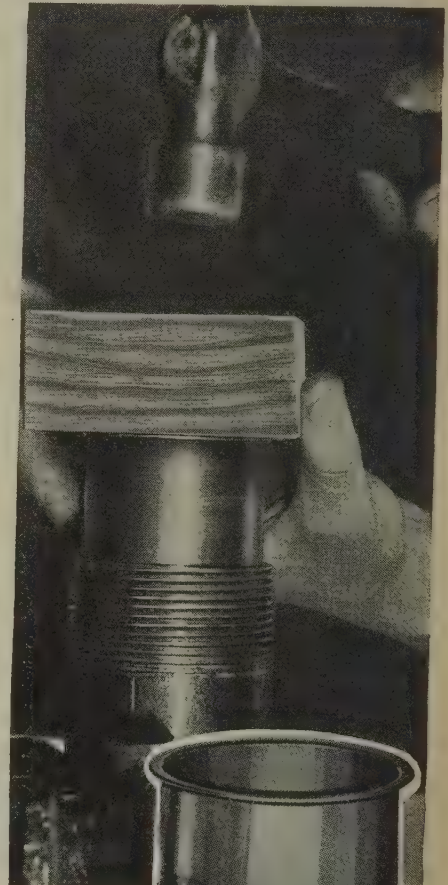


Oxygen and Acetylene Tubes of Seamless Brass, Silver Soldered to the Head and Rear End, Are Used

Non-Corrosive Sleeve for Pipe Ends

IT has been noticed that corrosive action in pipe lines is usually most severe at the ends, where threading operations have left the least metal to withstand it. This is thought to be the result possibly of eddy currents set up at joints. The two pipe lengths joined end to end seldom or never butt closely together; it results that the short space of increased diameter at the sleeve coupling acts as an expansion chamber, setting up a scouring agitation which also enhances corrosive action.

To avoid the waste of leaks at such



Pipe Saver Is a Tapered Sleeve Driven into Threaded End to Protect Against Internal Corrosion

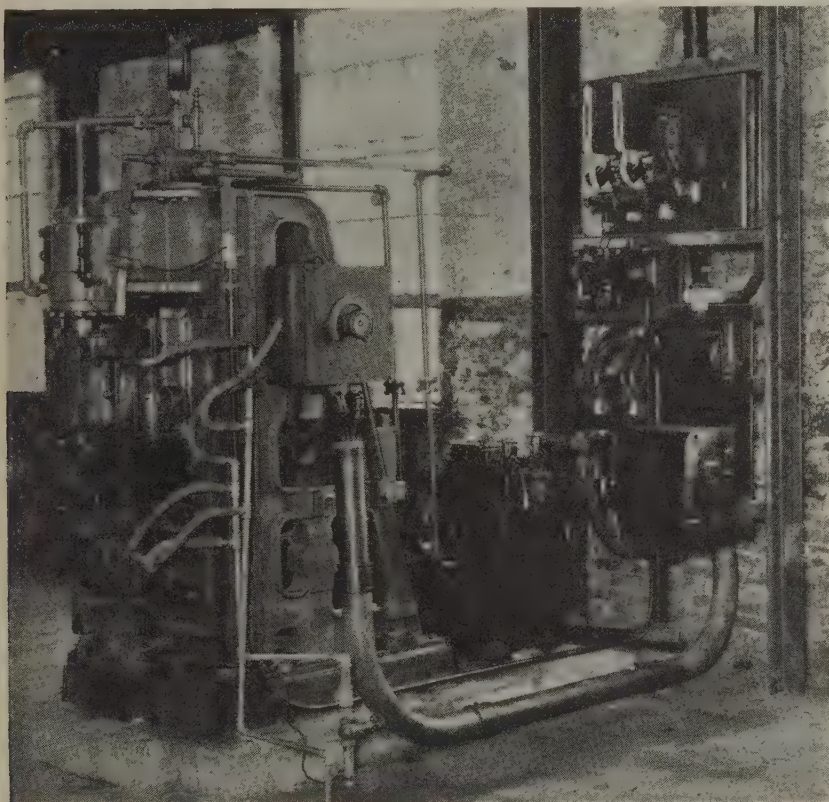
joints, and the expensive replacement of leaky pipe lines, the Pipe-Saver Corporation of America, Carthage, N. Y., has placed on the market the "pipe-saver" illustrated. It consists of a sleeve of non-corrosive alloy to be driven into the reamed end of a threaded pipe. It has a slight lip at its end, flanged outward the thickness of the pipe wall. This holds the pipe-saver in place and also threads into the coupling. The device also has a taper calculated to assure tight fit, notwithstanding any slight variation in internal diameter of the pipe.

Massive Spot Welder

SPOT-WELDING of structural members or plates up to $\frac{1}{2}$ or $\frac{5}{8}$ in. thick may be done on Model 40-AV, designed by Thomson Electric Welding Co., Lynn, Mass. It is a rugged machine, designed for heavy clamping pressures and large trans-

turn is of such a size that the clamping pressure is 14,000 lb. Hose connections are for cooling water to the welding dies.

Control is simple. Current control for different thicknesses of material is obtained through a five-point regu-



Pushbutton Control for the Welding Circuit Makes for Ease in Operating

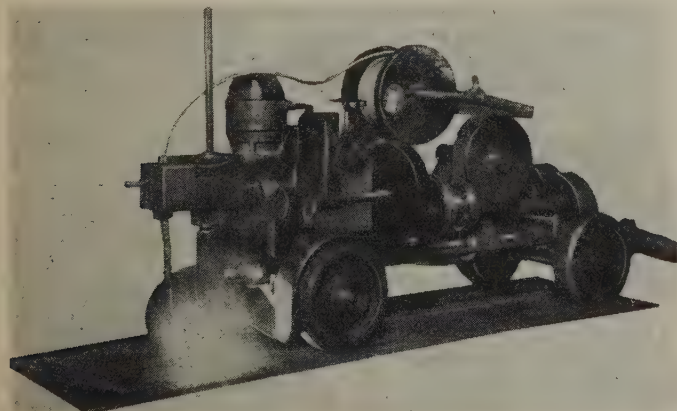
former capacity (250 kva.). The lower horn may be fixed in any one of three positions, giving a maximum opening of $10\frac{1}{2}$ in. The upper terminal is attached to the piston rod from a hydraulic cylinder and has a 3-in. stroke. As shown by the illustration, a $7\frac{1}{2}$ -hp. motor-driven oil-gear pump is mounted on the same foundation to the rear, capable of delivering a pressure of 1000 lb. per sq. in. to the upper cylinder, which in

lator switch mounted at the side of the welder and connected with tapped primary coils of the transformer. Operation of the welding circuit is controlled through a pushbutton switch mounted on the pressure control lever at front of the machine—this switch being connected with a magnetic contactor. A four-way manually controlled hydraulic valve for controlling the hydraulic system supply is mounted on top of the welder.

Tractor-Type Arc Welder for Lap and Butt Welds

AN automatic tractor-type arc welder utilizing the "electronic tornado" principle, outlined in THE

IRON AGE of June 28, page 1810, and used for making lap and butt welds on large tank bottoms and roofs, large



High Speeds and Uniform Welding of Tank Bottoms, Large Pipe and Other Work Are Claimed

pipe and on similar work, has been made available by the Lincoln Electric Co., Cleveland. High welding speeds, from 50 to 75 ft. per hr. on $\frac{1}{4}$ -in. lap joints and smooth and uniform welds are important claims.

The machine, illustrated herewith, consists of an electronic tornado head mounted on a self-propelled four-wheel-drive carriage. Power is supplied through a flexible cable and in using the machine it is only necessary to position it over the seam to be welded and to start the arc; the electrode and fibrous autogenizer are fed automatically as the tractor travels forward. In making lap welds additional filler metal is not required. It is stated that the heat of the carbon arc fuses the edge of the top plate to the lower plate, making a leak-proof joint. In making butt welds a filler strip is laid over the seam to be welded.

Management Meeting at Chicago, Nov. 13-15

The American Management Association, New York, will hold its autumn convention at the Palmer House, Chicago, Nov. 13 to 15. Preliminary plans call for a paper on the research activities of various companies by Dr. Z. C. Dickinson, professor of economics, University of Michigan, followed by discussions of the various types of research. One session of the meeting will be given over to the subject of compensation of executives and another to budgeting. Bryce Stewart, Industrial Relations Counselors, Inc., will speak on "The Financial Aspects of Pension Plans," and C. R. Dooley, manager personnel and training, Standard Oil Co. of New Jersey, on "Employment and Adjustment of Older Workers." The report of a committee on trends in industrial health practice will be presented by J. Walter Dietz, superintendent of industrial relations at the Kearny, N. J., plant of the Western Electric Co., Inc.

The third technical meeting of the Institute of Management will be held at the same place on Nov. 12 and the semi-annual conference of the association's office executive group on Nov. 16. W. J. Donald, 20 Vesey Street, New York, is managing director of the association.

Receivers Appointed for Eagan-Johnson Company

Upon application of the Bethlehem Steel Co., in friendly action, the United States District Court has appointed Daniel C. Eagan and the Pennsylvania Title & Trust Co., Chester, Pa., to act as co-receivers in equity and administer the affairs of the Eagan-Johnson Steel & Iron Co., Crum Lynne, Pa. Permission for the receivers to operate the company's plant has been granted by the court and interests identified with the company are actively developing plans for reorganization.

Business Analysis and Forecast

Large Business Volume to Be Expected

Movement of P-V Line Indicates Stable Conditions—
Automobile Industry Holds the Key
to Demand

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

IN spite of pronounced activity, amounting to a boom, in the automobile business, and improvement in the copper and petroleum industry, business conditions continue very mixed, with no pronounced general upward trend. There has been a fair seasonal expansion and the average of industrial activity is about 8 per cent above normal, but the underlying general trend is only about sideways. This conforms to the forecasts made by the P-V line in recent months, during which time this barometer has held about horizontal.

The most important favorable factor is the large buying power shown by the average person, which is reflected in the high rate of automobile production and the good volume of retail sales. The general stability of commodity prices is also to be mentioned. The most important unfavorable factors are found in the money situation and in building activity. Excessive speculation on the stock exchange is also an unfavorable condition. The farm situation is neither very good nor very bad, as reduced prices of the chief cash crops are tend-

ing to offset increased yields. The whole situation is dangerously dependent on continued large volume in the automobile industry.

As to the future, it now seems reasonably certain that no large recession in business is possible this year. There is no great maladjustment in business, outside of finance, and even the financial situation pertains more to the stock market than to business. A severe liquidation in stocks would unquestionably affect business unfavorably for a time, but not deeply. In some respects business would be

Factors in the General Business Outlook

Favorable Factors

- (1) *The automobile business continues extraordinarily active.*
- (2) *Retail trade is in good volume.*
- (3) *Increased activity and earnings appear in the copper industry; the oil business shows improvement.*
- (4) *No important general maladjustments in industry now apparent.*
- (5) *Commodity price average firm and quite stable; scrap, pig iron and copper are higher.*
- (6) *Machine tool orders resumed rising trend in August.*
- (7) *Farm situation moderately good.*
- (8) *Most leading companies in strong financial position and have good earnings.*
- (9) *Mercantile inventories are light.*

Unfavorable Factors

- (1) *Sharp declines in building contracts and permits indicate approach of a downward movement.*

- (2) *Money is increasingly tight, with time money at $7\frac{1}{4}$ to $7\frac{1}{2}$ per cent, the highest in seven years; net demand deposits decline, while brokers' loans and commercial loans increase; member bank borrowings large.*
- (3) *Wild speculation continues on stock exchange, with no regard to fundamentals.*
- (4) *Some indications point to intrusion of speculative spirit in business (automobiles, copper, chain stores.)*
- (5) *Wheat and cotton prices are low.*
- (6) *Railroad freight traffic is relatively low—below the same period of the last two years.*
- (7) *Post office receipts declined in August.*
- (8) *August exports indicated a declining trend.*
- (9) *Business failures numerous; collections mostly poor.*
- (10) *Political situation uncertain.*

benefited. No reliable statistical barometers forecast a decline in general business.

But it seems equally certain that no large expansion is in sight. Too many unfavorable factors exist and conditions are too mixed to suggest much of an upward movement. It is difficult to see how a general advance can occur, with building activity on the decline and the investment market dulled by high money rates.

We conclude, therefore, that a practically stable level of business is in prospect. A relatively small seasonal expansion is likely to be shown by the September and October figures, and probably seasonal declines in basic industries will be considerable in November and December. Money

rates will continue high. Building activity will recede.

Large Business Volume Predicted

OUR chief barometer of general business, the P-V line, continues above normal and pursues a general sidewise trend. It rose slightly in July and August, though not sufficiently to indicate any considerable improvement in business conditions. The small upturn was due chiefly to a little rise in the level of commodity prices, while the physical volume of trade remained about the same. These conditions, we infer, indicate some improvement in the demand for commodities, in purchasing power or de-

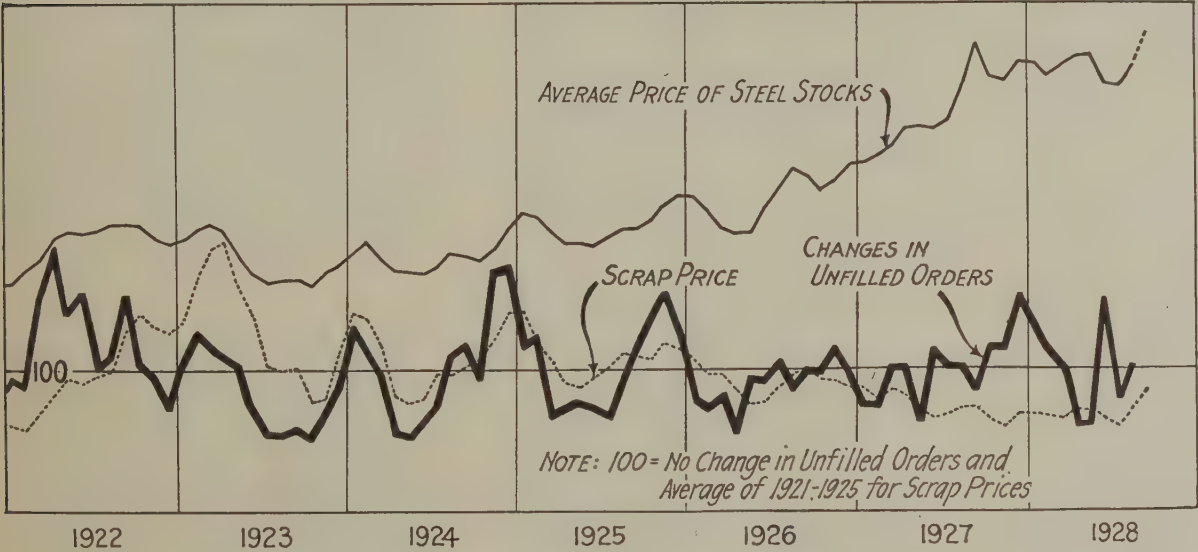
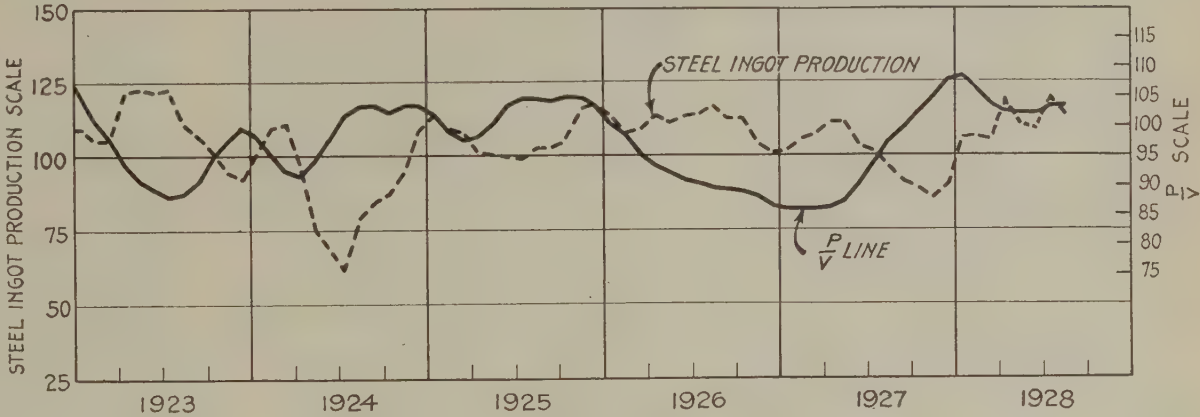
sire to buy, or both. This barometer forecasts a fairly stable and large volume of business during the remainder of the year, with fair to good earnings for the average company.

Our adjusted index of steel production continues right in line with the barometer, and the slight gain in the latter tends to support the opinion that steel-making activities will at least show seasonal gains. No recession is yet indicated.

Exceptionally Heavy Automobile Output

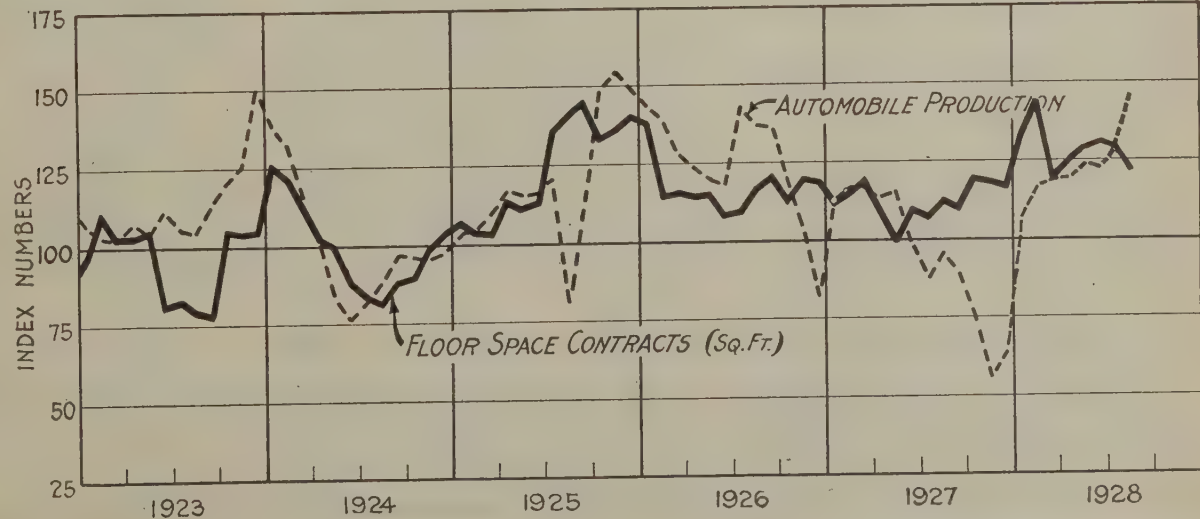
THE second chart shows that the automobile boom continues, while new building contracts are on the decline. Final official figures show a

Sidewise Movement of P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Indicates Stable Business Conditions and Large Volume. Steel production (adjusted) continues high



Unfilled Orders Are Moving Narrowly About the Axis; Stock Prices, Though at a Much Higher Level, Are Irregular and Scrap Prices Are Considerably Better

Both Building Activity and Automobile Output Showed Continued Strength in August, Though the Former Dropped Considerably. Tapering off is to be expected



total of 489,800 passenger cars and trucks produced in the United States and Canada in August. The previous high was 474,500, in July, 1926. The August production compares with 416,400 the month before. It may truly be said that the automobile business has reached boom proportions. Never in the history of the country has there been such a volume of buying of new cars, chiefly in the lower priced groups. The production of Chevrolets has been enormous, and Ford output is steadily growing. It is now easily possible that automobile production in 1928 will exceed that of 1926.

When we allow for seasonal conditions, the gain is the more notable. Our adjusted curve of automobile output, shown in the chart, rises sharply to the highest point since December, 1925. On the adjusted basis, production was exceeded only in October, November and December of 1925, though July, 1926, was nearly as high. A seasonal decline is usually apparent in September and becomes more pronounced in the last quarter. Though current reports indicate that September production will be little below August, it seems reasonable to expect a considerable letdown thereafter.

As adjusted, the automobile production curve is near the peak reached in November, 1925. The question arises, are we not again near a peak? And just as automobile production slumped after November, 1926, will it not now fall off before long? We know of no way to forecast definitely, but an early peak and a subsequent decline seem probable. (1) Past performance in 1923 and 1925 indicate such results. (2) The automobile curve usually follows the building curve, and the latter has already turned down. (3) There is some limit to the number of cars that people can buy in any given short period, and movements like the present usually come in waves, with troughs following the crests. Allowing for the long-time trend of automobile production, the present rate is considerably above normal and a period of above-normal production cannot last indefinitely.

Apparently the people of this country are plunging on automobiles much as they are on stocks. Perhaps the paper profits they are piling up in the stock market have something to do with the matter.

But the building figures tell a different story. The volume of building contracts turned downward in August almost as sharply as automobile production rose. New contracts awarded, measured in floor space, amounted to only 78,873,000 sq. ft., against 82,125,000 sq. ft. in July, although the usual seasonal trend calls for an increase

of over 2 per cent. Our adjusted index, based on the average for 1921-1927 as 100, was 121.1, which compares with 129.5 in July and 130.6 in June. This represents the lowest annual rate since March. Coming just at the time when the effect of higher money rates should begin to be perceptible, the decline may be taken as marking the end of the upward trend in the building cycle, which began in June, 1927.

Moreover, the contemplated new construction as reported by the F. W. Dodge Corporation fell sharply in August to the lowest point since October, 1927. Our adjusted index for the month is only 111 per cent of the average for 1921-1925, in comparison with 122 per cent in July and 127 per cent a year ago. The figure is relatively low as compared with contracts actually awarded.

Finally, the building permits, covering the construction of residences, stores and office buildings in cities and towns, are estimated for August at \$275,000,000, against \$281,000,000 in July and over \$302,000,000 a year ago. In this case the adjusted index, allowing for seasonal conditions, is 110, against 118 in the preceding month and 140 in February, which was the peak of the year. (The average for 1921-1925 equals 100.)

Another significant fact is that the volume of long-term real estate bonds issued in August fell off sharply. In that month they amounted to only \$21,947,000, in comparison with \$48,495,000 in July and \$32,247,000 a year ago.

Of course, a large volume of actual construction is under way at present, for the contracts awarded during the last few months are now being carried out. In a few months, however, the actual construction will feel the effects of the reduction of new permits and contracts awarded.

Speculation in Steel Stocks and Scrap

STEEL stocks as a group, led by the United States Steel Corporation, pushed through to a new high in September. Some considered the movement in United States Steel common as a speculative maneuver designed to support the general market when it showed signs of going stale, while others regarded it as based on improved earnings prospects and a sign of fundamental strength. That purely speculative considerations played a part, however, is perhaps suggested by the belated character of the move. Unquestionably steel company earnings will show gains in the third quarter, with both volume of production and prices higher.

Steel scrap prices have moved quite

similarly to the average price of the steel stocks, and in September averaged higher than in any month since early 1927.

Unfilled orders of the Steel Corporation, however, showed little more than a merely seasonal gain in August, and the rate-of-change line in the chart is thus only about level with the base line, though this is an improvement over the preceding month.

We are unable to draw many inferences from these facts. Evidently speculation is active both in steel stocks and in steel scrap, while forward buying of steel is but moderate. Probably the fact that the very similar situation last September marked a peak in scrap and steel stock prices has some significance.

Output of Steel Barrels Continues High

Steel barrels produced in August are reported by the Department of Commerce at 677,313, representing 57.8 per cent of capacity of the 27 companies reporting. This is a gain of nearly 5 per cent from the 647,844 units made in July and, with the exception of May and June of this year, represents the largest monthly output ever made. It compares with 615,152 units in August, 1927.

For the first eight months of the year, the 1928 production has been 5,033,749 barrels, the largest ever recorded. It represents an increase of about 10 per cent from last year's 4,585,126 units, which was the previous high record. Shipments have held close to production, the difference in the first eight months, having been less than 5000 barrels in an output of more than 5,000,000.

Construction costs are higher than at any time since last December, according to statistics compiled by the Associated General Contractors of America. The rise is attributed to an increase in the average prices paid by contractors for the basic construction materials, particularly concrete aggregates and lumber. The average of wages paid in the construction industry remained unchanged during August.

Immigration for the fiscal year ended June 30, 1928, was 500,631, comprising 307,255 immigrants and 193,376 non-immigrants, according to the Bureau of Immigration. The 1928 figures reflected a decrease of 37,370, or 6.9 per cent, compared with 1927.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Oct. 18—Position of Iron and Steel Producers; Nov. 1—Activity in Steel Consuming Industries.

Steel Corporation May Resume Ojibway Construction

TORONTO, ONT., Oct. 2.—The Essex County Council has agreed to a fixed assessment for the Canadian Steel Corporation, Ojibway, Ont., a subsidiary of the United States Steel Corporation. The assessment is to run for 10 years on the industrial property of the company. If the Ontario Legislature passes special legislation to legalize the agreement, the company is expected to proceed with the establishment of steel works at Ojibway.

Under the proposed agreement, assessment upon the industrial area is fixed at \$900,000 from 1929 to 1931, inclusive, conditional upon 500 bona fide employees being engaged at the works by the end of 1931. The assessment for the following three years is to be \$1,100,000, with the further condition that 800 men are engaged at the end of that period; and in 1934 the assessment goes to \$1,300,000 for the next three years.

The Canadian Steel Corporation has owned a large tract at Ojibway for more than 15 years. Several millions of dollars have already been invested in the plant and a blast furnace is partly erected, but so far no operations have been carried on there. There is also on the site a wire mill which is not yet ready for operation, though considerable equipment has been removed from Hamilton, Ont., to Ojibway.

Recent developments and arrangements with regard to assessment, etc., are taken to indicate that the steel company is preparing to finish at least a part of the proposed plant and start operations. Ward B. Perley is president of the Canadian Steel Corporation.

Increase in Imports of Pig Iron

Imports of pig iron in August are reported by the Department of Commerce at 12,990 tons. This is the largest total since April and is more than double the July movement of 6055 tons. More than half the imports came from British India, with the bulk of the remainder from the United Kingdom and the Netherlands.

Compared with last year, the imports of the first eight months show a gain of nearly 12 per cent. Shipments coming in from United Kingdom have been two and a half times

as great as last year, while those from Germany have almost disappeared. Details of the month, with comparisons, appear in the table.

Iron and Steel Institute Announces Program

At the thirty-fourth general meeting of the American Iron and Steel Institute, to be held at Hotel Commodore, New York, Oct. 26, the following technical program has been provided:

"An Acoustic Laboratory for the Testing of Music and Other Steel Wires," by W. B. White, acoustic engineer American Steel & Wire Co., Chicago.

"Uniformity, Continuity and Magnetic Testing," by A. V. deForest, research engineer American Chain Co., Bridgeport, Conn.

"Steel Requirements of the Aircraft Industry," by H. J. French, senior metallurgist Bureau of Standards, Washington.

"Recent Observations of Some European Iron and Steel Conditions," by C. A. Meissner, United States Steel Corporation, New York.

"The Present Status of Structural Steel Welding," by F. T. Llewellyn, president American Welding Society, New York.

"Steels Used by the Automotive Industry," by W. J. MacKenzie, vice-president Interstate Iron & Steel Co., Chicago.

The usual banquet will be held in the evening.

Pittsburgh Mill Ships by Water to Northwest

Included in a tow of nine barge loads of steel products of the Jones & Laughlin Steel Corporation, which left Pittsburgh Sept. 30, was one barge load of wire products, which will be turned over to the Federal Barge Line at Cairo, Ill., for delivery to Minneapolis, which is one of the ports of the upper Mississippi Barge Line at present being operated by the Federal Government. This marks the first all-water shipment of steel from Pittsburgh to the Northwest. It also marks another step by Pittsburgh mills in the efforts to expand their markets which had been limited by high railroad freight rates.

Steel Mail Cars Demanded in Proposed Bill

WASHINGTON, Oct. 2.—Representative M. Clyde Kelly of Pittsburgh has announced that he will reintroduce at the next session of Congress a bill which provides that after Jan. 1,

1930, all cars or parts of cars used for the railroad postoffice service shall be of steel construction, the style, etc., to be determined by the Postmaster-General. Railroad interests have opposed the bill which they claim, if enacted into law, would cost them ultimately \$60,000,000 together with the scrapping of \$30,000,000 of present equipment. They contend that the legislation is unnecessary because the railroads are already making headway for equipping their trains with safe mail cars. A companion bill to the Kelly measure was introduced in the Senate by Senator Dale of Vermont but was amended before being passed by that body. The latter bill was so amended that it would not apply to trains operated upon branch lines, independent short line railroads, narrow gage or electric railroads.

Russian Company in Berlin Handles Manganese Ore

HAMBURG, GERMANY, Sept. 15.—It is understood that the Manganerz Export Co., Berlin, has been established to handle exports of Russian manganese ores from the Caucasus. The company is owned by the Russian Government and, it is understood, replaces the organization formed by the Harriman interests, which recently relinquished their concessions in Georgia. The German firm of Rawack & Grünfeld, Berlin, controls exports of manganese ore from the Russian Nikopol mines, so that the entire exports of the Caucasus are now centralized in Berlin.

Germans Experiment with Sponge Iron Process

HAMBURG, GERMANY, Sept. 15.—The Eisenschwanngesellschaft G. m. b. H. has been established through a combination of the interests of the Vereinigte Stahlwerke A. G. and Friedrich Krupp A. G., for the purpose of producing sponge iron by the direct reduction process under the Swedish Norsk-Staal patents. It is understood that a plant with a capacity of 20,000 tons a year is planned for experimental purposes. If the process proves satisfactory, it will be introduced into a few departments of the Krupp and Vereinigte Stahlwerke plants.

All products formerly sold by the Waterbury Mfg. Co. and the U. T. Hungerford Brass & Copper Co. are now sold under the Chase name and mark, according to an announcement by F. S. Chase, president Chase Brass & Copper Co., Inc., Waterbury, Conn. Chase Brass & Copper Co. warehouses were established in 1921 in various cities and last year the Chase Companies, Inc., bought the assets of the U. T. Hungerford Brass & Copper Co., which also had brass and copper warehouses in a number of cities.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT

	August		Eight Months Ended August	
	1928	1927	1928	1927
United Kingdom	2,550	.....	37,327	14,935
British India	7,495	9,703	34,269	37,900
Germany .....	.....	560	95	8,371
Netherlands	1,333	2,422	17,673	19,468
Canada .....	.....	.....	378	689
France .....	.....	1,000	300	1,500
Belgium .....	.....	399	202	699
Norway	321	.....	412	.....
All others	791	.....	3,684	1,218
	12,990	14,084	94,340	84,780

Hearings on Youngstown to Ohio River Railroad

WASHINGTON, Oct. 2.—Arguments were made on Thursday of last week before the Interstate Commerce Commission on the application of the Pittsburgh, Lisbon & Western Railroad for authority to construct two branch lines to connect the Youngstown district with the Ohio River.

Attorneys for the applicant contended that the new lines would move substantial tonnages which are not now moving, having reference to shipments of coal from western Pennsylvania to the Youngstown district and of steel from that district to Southern and Southwestern markets.

Attorneys for the railroads contested the claim, arguing that the only effect of the new lines would be to deprive the trunk carriers serving the Youngstown district of some of the tonnage they now carry. They also attacked the relationship between the Pittsburgh Coal Co. and the Pittsburgh, Lisbon & Western and Montour railroads, which the coal company owns. It was insisted by them that the fact that the Pittsburgh Coal Co. owns terminal facilities at Smith's Ferry, Pa., where one of the new branches would begin, raised a serious question as to whether there would be discrimination against other shippers. Attorneys for the applicant replied that instead of shippers being discriminated against they would likely get reduced prices on coal through the rail and river route and that the new line would benefit the public.

The report of the examiner who conducted the hearings in the case was favorable to the new construction.

Increased Imports of Iron Ore

August iron ore imports are reported by the Department of Commerce at 225,538 gross tons, compared with 183,256 tons in July and 188,892 tons in June. The August incoming movement was the greatest since February. It represented, however, a shrinkage of more than 25 per cent compared with August, 1927, when 303,586 tons came in.

Imports in the first eight months reached 1,677,206 tons, a reduction of about 11 per cent from last year's 1,879,180 tons to the same date. This reduction has been mainly at the expense of Sweden, where the mine

strike resulted in cutting off almost 90 per cent of what came in during the preceding year. There was an increase of 55,000 tons in imports from Chile, which have amounted this year to considerably more than half the total. Details of the month, compared with the preceding year and the eight months of the two years, are shown in the table.

Doehler Die Casting Co. Buys Equipment

The Doehler Die Casting Co., 386 Fourth Avenue, New York, has purchased from the Metal Mold Castings Co., Buffalo, its permanent mold casting equipment, dies, molds and other relative equipment which will be added to Doehler permanent mold department. The Metal Mold Castings Co. will discontinue its business.

Crumwold Furnace Sold

The Crumwold furnace at Emaus, Pa., owned by the Reading Iron Co., Reading, Pa., has been sold to the H. Sofransky Co., Allentown, Pa., and will probably be scrapped. The stack was built in 1872, rebuilt in 1909 and last relined in 1920. It had an annual capacity of 62,000 tons of foundry and forge pig iron and was last operated in 1920.

Lower Freight Rates on Scrap Recommended

WASHINGTON, Oct. 2.—Rates on scrap iron and steel, in carloads, from Newport News, Va., to certain destinations in Maryland, Delaware, New Jersey and eastern Pennsylvania would be reduced by 47c. to \$1.73 per gross ton and from Newport News, Norfolk, Portsmouth and Richmond, Va., by 72c. per gross ton if the Interstate Commerce Commission act favorably on recommendations made in a report proposed by Examiner T. Leo Haden, announced last Saturday.

The report covers two cases, one being that of the Newport News Shipbuilding & Dry Dock Co., Newport News, which complained against the rates from Newport News to Maryland, Delaware, New Jersey and eastern Pennsylvania consuming points.

The other complaint was made by the United Iron & Metal Co., Baltimore, against the rates from Newport News, Norfolk, Portsmouth and Richmond to Baltimore. In disposing of

the latter case the examiner recommended that the present rate of \$3.78 per gross ton be reduced to \$3.06 and that reparation be awarded to the complainants on that rate basis.

In the Newport News Shipbuilding cases involving rates from Newport News, which, generally, takes the same rates as Norfolk and Richmond, the examiner recommended the following reductions from Newport News.

To	(In Gross Tons)	Pres- ent Rate	Recom- mended Rate	Reduc- tion
Baltimore and Sparrows Point, Md.	3.78	\$3.06		72c.
New Castle, Claymont, Del.; Chester, Coatesville, Philadelphia, York, Modena, Pa.	3.78	3.31		47c.
Columbia, Phoenixville, Conshohocken, Birdsboro, Lebanon, Reading, Pa.	4.79	3.56	\$1.23	
Pencoyd, Pa.	4.28	3.56		72c.
Harrisburg, Steelton, Pa.	4.54	3.56		98c.
Bethlehem, Pa.	5.54	3.81		1.73
Roebing, N. J.	5.04	3.56		1.48
Burnham, Williamsport, Pa.	5.67	4.06		1.61

Republic to Weld Pipe Up to 7-In. Electrically

YOUNGSTOWN, Oct. 2.—Recent acquisition of Steel & Tubes, Inc., by the Republic Iron & Steel Co. has aroused much interest in pipe-making processes, and a moot topic is whether the ordinary method of furnace welding of pipe will eventually be supplanted by systems now employed by Steel & Tubes and the A. O. Smith Corporation, Milwaukee, which use electricity for the welding agency on plates and strips previously bent cold.

Control of the Johnson patents for making electrically welded pipe passed to the Republic company through its absorption of Steel & Tubes, Inc. The latter has been making pipe up to 4 in. in diameter of No. 11 gage steel, and now has a machine under construction which will make pipe of 7-in. diameter of No. 10 or No. 11 gage wall thickness.

Elmer T. McCleary, president Republic Iron & Steel Co., says that his company has not yet worked out the reorganization of Steel & Tubes, Inc., or plans for extending the application of the patents obtained in the purchase of that company.

The Youngstown Sheet & Tube Co. engineers have been working on a plan for introducing electric welding, and it is said that the details are on paper for attaching to existing plate mills the equipment for bending and electrically welding plates into pipe. The Petroleum Iron Works, Sharon, Pa., has been experimenting for some time with an electric welding process.

The A. O. Smith Corporation has demonstrated the success of the system on the larger sizes of pipe and has been able to make pipe down to 8 in. diameter by its method, the interesting feature of which is the speed of production. Running on 24-in. pipe, that company has stated its ability to produce six to eight miles per day.

SOURCES OF AMERICAN IMPORTS OF IRON ORE (In Gross Tons)

	August		Eight Months Ended August	
	1928	1927	1928	1927
Chile	130,800	121,300	948,300	893,600
Cuba	33,500	22,000	234,786	272,613
Spain	544	7,698	16,747	11,617
Sweden	41,881	41,881	19,614	195,134
French Africa	52,474	74,579	334,605	337,623
Canada	870	5,513	45,192	13,303
Other countries	7,350	30,615	77,962	155,290
Total	225,538	303,586	1,677,206	1,879,180

Conference Board for New York Iron Trade

Representatives of the warehousemen's associations and the iron contractors' associations in metropolitan New York met on Sept. 26 to organize a Conference Board for the general benefit of the iron trade in the territory. An equal number of representatives of the warehousemen's associations, the Iron and Steel Warehouse Institute and the Iron and Steel Dealers Credit Association of Greater New York, and of the contractors' associations, including the Allied Building Metal Industries, the Iron League of New Jersey, the Associated Iron Masters of Manhattan, Bronx and Westchester and the Iron League of Brooklyn and Long Island were present and selected George Boochever, attorney for the Iron League of Brooklyn and Long Island, as counsel and secretary. He was formerly treasurer of the Manhattan Knitting Mills, New York, and while in that field he drafted the code of ethics which was adopted by the National Knitted Outerwear Association.

Form New York Chapter of Scrap Institute

David Strauss, president Continental Iron & Steel Co., New York, was elected chairman of the New York chapter of the Institute of Scrap Iron and Steel, at a meeting of scrap iron dealers of New York and surrounding territory, on Sept. 27, at the Hotel Astor. The other officers of the New York chapter are: Thomas G. Watson, Brooklyn, first vice-chairman; Howard Vandewater, W. Vandewater, Inc., Brooklyn, second vice-chairman; Al Gerson, Harlem Metal Corporation, New York, secretary; Louis Fisher, Fisher Brothers Scrap Iron & Steel Co., New York, treasurer; and John McGrath, McGrath Iron Co., Inc., Brooklyn, Charles Pfeiffer, Charles Pfeiffer & Co., Inc., New York, and Harry Daly, Harry A. Daly Iron & Steel Co., Long Island City, executive committee. Herman D. Moskowitz, M. Samuels & Son, presided at the New York conference.

The New York chapter is the first of ten chapters to be organized through the Eastern section of the United States. The scrap iron dealers of Philadelphia, Chester, Pa., and Wilmington, Del., and neighboring communities met at dinner at the Manufacturers Club, Philadelphia, Oct. 2, to organize a chapter for the Philadelphia district. Joseph G. Hitner, Henry A. Hitner Sons Co., president of the institute, acted as host.

As a result of a conference addressed by Benjamin Schwartz, director general of the institute, in Springfield, Mass., New Haven and Hartford, Conn., arrangements are being made for a State conference in Hartford on Oct. 10 for the purpose of organizing a Connecticut chapter and electing officers.

Among recent applications for membership in the institute are Joseph

Freedman Co., Inc., H. Goodman & Sons, and Barney Carlson, Springfield, Mass.; B. Barowsky, Holyoke, Mass.; Berman Bros., Continental Iron & Steel Co., Hausman-Wimmer Co., Thomas F. Kelly, Luria Brothers, New York Scrap Iron Co., M. Samuels & Sons, Inc., S. Snyder Corporation, Harlem Metal Co., Thomas G. Watson, New York; Harry A. Daly, Long Island City; Kingston Scrap Iron & Metal Co., Kingston, N. Y.; Charles Pfeiffer & Co., Inc., Fisher Brothers Scrap Iron & Steel Co., New York, and United Scrap Iron & Steel Co. and John V. McGrath Iron Co., Inc., Brooklyn.

Discuss Airplane Making at Wichita

Airplane engines and commercial plane production were the chief topics of discussion at an aeronautic meeting held on Sept. 21 and 22 at Wichita, Kan., under the auspices of the aeronautic division of the American Society of Mechanical Engineers. The future supply of engines, the lack of which has been seriously handicapping the manufacture of airplanes, was considered by Richard M. Mock, of the Bellanca Aircraft Corporation, in a paper at the engine session. He discussed the various types of engines on which experiments are now being made, and also those ready to go into production. R. K. Cummings, chief of the automotive power plant section, Bureau of Standards, Washington, dealt with methods and requirements in testing commercial airplane engines of medium power.

The transition of airplane construction from its formative period to one of mass production was emphasized at a symposium on commercial plane production, at which papers were presented by Walter H. Beech, president Travel Air Mfg. Co.; E. E. Porterfield, Jr., president American Eagle Aircraft Co., Kansas City, and Jerome Lederer, Aertech, Moline, Ill. The second day of the meeting was given over to inspection of local plants at Wichita, which this year are producing 25 per cent of the country's airplanes.

Ryerson Acquires E. P. Sanderson Co.

The plant, merchandise and good will of the E. P. Sanderson Co., Kendall Square, Cambridge, Mass., have been acquired by Joseph T. Ryerson & Son, Inc., Chicago. The Sanderson plant, which is one of the largest iron and steel warehouses in New England, will give the Ryerson company a large increase in plant facilities and tonnage and enable it to maintain better service in the shipment of iron and steel in New England. The kindred lines of the two companies include steel bars, reinforcing bars, shafting, I-beams, channels, angles, tees, steel sheets, steel plates, boiler tubes, rivets, bolts, nuts, etc.

New England Association Holds Fall Outing

The New England Iron & Hardware Association held its annual fall outing on Tuesday, Sept. 25, at the Tedesco Country Club, Swampscott, Mass., approximately 100 members and guests attending. The afternoon was given over to a golf tournament and the evening to dinner and presentation of prizes.

A. P. Chase, Chase, Parker & Co., Boston, with the best gross golf score, was awarded a handbag donated by Franklin E. Bragg, N. H. Bragg & Sons, Bangor, Me., president of the New England organization. Mr. Chase also won the Damon cup, donated by the Fitchburg Hardware Co., Fitchburg, Mass., which has been played for by members for three or four years.

C. B. Doten, H. L. Doten & Sons, Boston, with the second best score, was awarded a clock donated by the Bethlehem Steel Co. The best net score was halved by A. B. Peck, American Screw Co., Providence, R. I., and George M. Heath, Atlas Tack Co. Mr. Heath won the toss and selected a golf bag donated by the Central Alloy Steel Corporation, while Mr. Peck took a silver platter given by the John B. Varick Co., Manchester, N. H. With the second best net score eliminated, George E. McClintock, John B. Varick Co., with a third was awarded a dozen golf balls, as was E. C. Church, E. C. Church Co., Providence, with the fourth best net score. Three players had the fifth best net score: Peter Gray, Peter Gray & Son, Inc., Cambridge, Mass.; L. W. Barta, Avery & Saul, South Boston; and Samuel Boyed, E. Corey Co., Portland, Me. Mr. Boyed won the toss and was given a dozen golf balls. The golf balls were donated by the American Steel & Wire Co., Boston; the Standard Horse Shoe Co., Boston; and the Belcher, Loomis Hardware Co., Providence.

Columbia Steel Corporation Buying Tin Mill Units

YOUNGSTOWN, Oct. 2.—L. A. Jones, general purchasing agent Columbia Steel Corporation, San Francisco, is in the East making purchases for the new 6-mill tin plate plant which that company will build at its Pittsburg, Cal., works and which is expected to be completed and in operation next March. The new plant will be of conventional modern type, in which no attempt will be made at the outset of operations to employ, as is being done in some Eastern plants, the continuous mill for breaking down the bars. Automatic doublers, shears, a Gray type black pickling unit and all of the tinhouse equipment will be furnished by the Aetna-Standard Engineering Co., Youngstown. Six stands of hot and a like number of cold mills and the drives for them are to be let by Mr. Jones during his visit.

Manufacturers' Cooperation in Simplification

Answering the question, "Do the smaller manufacturers participate in simplification?" the division of simplified practice of the United States Department of Commerce says that 46 per cent of the 212 producer-acceptors behind 10 simplified practice recommendations are capitalized at \$500,000 and over, 26 per cent between \$100,000 and \$500,000, and 14 per cent below \$100,000. The capitalization of the remainder is not reported. Analysis of the published credit ratings of the 212 acceptors shows 41 per cent rated at \$500,000 and over; 32 per cent between \$75,000 and \$500,000; 12 per cent between \$3,000 and \$75,000, and 15 per cent "not reported."

Included in the 10 recommendations reviewed are:

	Items Reduced		Per Cent Reduction
	From	To	
Files and rasps...	1,351	475	65
Range boilers.....	130	13	90
Builders' hardware:			
Items	6,948	5,130	26
Finishes	100	29	71
Eaves trough and conductor pipe..	21	16	24
Steel lockers.....	65	17	74
Sidewalk, floor and roof lights:			
Sizes	120	6	95
Styles	80	5	94
Shapes	10	2	80
Wrought iron and wrought steel pipe, valves and fittings:			
Sizes of valves and fittings...	20,000	19,238	4
Sizes of pipe....	62	49	21

All of these have been in operation sufficiently long to permit determination of the adherence accorded them by their producer-acceptors. The average adherence, i.e., per cent of product conforming to the terms of the simplification program, is 90.3 per cent. Since the division of simplified practice does not indorse and publish any recommendation until the latter has been accorded 80 per cent acceptance by the industry, according to volume of output, the figures indicate that the smaller as well as the larger companies are cooperating in simplification.

German Automobile Output Shows Increase

HAMBURG, GERMANY, Sept. 17.—Automobile production in this country is registering a steady gain, although, compared with the output of motor cars in the United States, it is of negligible size. In 1913 the total output of automobiles in Germany was 11,700; in 1925 the production was 55,000 cars; in 1926, 54,500; in 1927, 72,000 cars, and the estimate for 1928 is about 100,000. Among European producing countries Germany now ranks third; Italy was third in 1927.

About 50 per cent of the German motor car industry is controlled by the

Opel Werke Russelsheim and its subsidiary companies. In addition to making 50 per cent of the passenger cars manufactured, this interest annually produces about 17,000 commercial vehicles, trucks and buses, a large proportion of which are exported. Since 1925 the average price per car manufactured in Germany has decreased about 38 per cent. In addition to the probable domestic production of 100,000 cars this year, about 22,000 cars will have been assembled by American and French plants in Germany.

German Engineers Building African Steel Plant

HAMBURG, GERMANY, Sept. 18.—Two leading engineers of Gutehoffnungshütte, Oberhausen, have been sent to South Africa, where they will work with Dr. Lilges of Gutehoffnungshütte on the construction at Daspoort of a steel works for the South African Iron & Steel Corporation, owned by the South African Government. When the plant is completed, more engineers may be sent to South Africa to aid in its operation.

New England Industrial News

The Union Water Meter Co., Worcester, Mass., pioneer in that special line, has celebrated its sixtieth business year. H. A. B. Etheredge is president and Edward S. Otis is treasurer.

George S. Case, president Peck, Stow & Wilcox Co., Southington, Conn., states that the company is completing a revamping of its mechanical equipment in the various plants. By the end of 1928 the company should be in a mechanical position to increase annual profits.

Production at the Anaconda Copper Mining Co.'s subsidiary, the American Brass Co., Ansonia, Conn., never before has been as high as it is today. Business is in such a volume that it has been necessary to reopen the so-called West rod mill, closed several years as a result of the erection of more modern shops.

The Indian Motorcycle Co., Springfield, Mass., enjoying one of the most prosperous periods in its history, is continually endeavoring to widen its field of production. The company is endeavoring to perfect a motor for electric refrigeration, a smaller unit than now generally in use and simple in design. It also is developing a shock absorber, a new four-cylinder car and new motor cycle models.

The Lyman Gun Sight Corporation, Middlefield, Conn., recently acquired the gun telescope sight business of the Winchester Repeating Arms Co., New Haven, Conn., and the rights to make Garand high-speed mechanism for Garand rifles. The Middlefield company recently purchased the J. Stevens Arms Co., Chicopee Falls, Mass. It is now the largest manufacturer of gun sights in this country.

Steel Industry Thriving in Czechoslovakia

While imports of iron and steel into Czechoslovakia during the first six months of 1928 increased, totaling 142,494 metric tons, as against 90,467 tons for the corresponding period of 1927, and exports declined, amounting to 323,855 tons, compared with 334,515 tons, the industry of that country appears to be enjoying a favorable degree of activity, according to reports received by the Department of Commerce from Prague.

The great bulk of imports into Czechoslovakia during the six-month periods of both years consisted of pig iron, 73,314 tons having come in during the 1927 period and 123,813 tons during the first six months of 1928. On the other hand, exports of pig iron during the first six months of 1927, totaling 74,020 tons, were almost equalled by outgoing shipments of some of the finished lines. For the first six months of 1928 exports of pig iron, totaling 52,222 tons, were greatly exceeded by exports of some of the finished lines, including sheets and plates, with 78,678 tons, and pipe and tubes, with 69,000 tons. Exports of bars amounted to 45,446 tons; of wire, 22,645 tons, and of miscellaneous lines, 52,998 tons. Production of both iron and steel was reported to be greatly in excess of the 1927 output.

Under the new agreement with the Continental Steel Entente, Czechoslovakia retained its previous general relation to the entente, but received a concession in that it was permitted unlimited domestic production. The export quota is 432,836 tons. Production of the Czechoslovakian industry during the first six months of 1928 is estimated at 765,000 tons of pig iron and 929,000 tons of raw steel, as against 604,000 tons of pig iron and 733,000 tons of steel during the corresponding period of 1927.

In large measure exports from Czechoslovakia find their markets in adjoining or other nearby countries. The bulk of pig iron exported in 1928 went to Hungary, with considerable tonnage going to Austria and Jugoslavia. Billets were sold chiefly in Rumania, although Germany took fairly large tonnages in March and April. Iron and steel bars find a wide market. Some reach the United States, but the best outlets for this line are Rumania, Bulgaria and Great Britain, with lesser quantities going to Germany, Austria and Switzerland. Much of the iron and steel imported into Czechoslovakia is brought in from the same countries that are its best export markets.

The American Steel & Wire Co. has placed in operation a new hot-rolled strip mill at its Cuyahoga works, Cleveland. It has a capacity for rolling material in widths from 1 in. to 3½ in. and in thicknesses from No. 23 gage to ¼ in. The product of the new mill will be used exclusively in the company's cold-rolled strip mill.

This Issue in Brief

Fairly stable and large volume of business during the remainder of the year, with fair to good earnings for the average company, is forecast by P-V Line.—Page 833.

* * *

Dies of high-speed steel favored for copper-rich die castings. Tests reveal that mild steel corrodes rapidly. Chromium plated steel resists attack, but frequent heating and cooling causes the plating to flake off.—Page 814.

* * *

Cuts annealing time in half by forced cooling. After critical range is passed, cooling of material in electric furnace is accelerated by air blown through system of cooling pipes.—Page 818.

* * *

In a bearing operating continuously, rise in temperature is independent of the length of the bearing, says machine tool builder. Temperature increase is proportional to bearing diameter, to operating viscosity of lubricant, and to the square of number of r.p.m., and is inversely proportional to the running clearance.—Page 822.

* * *

"Man factor" is an important consideration in industrial improvements. If the workman can be induced to realize the necessity for proposed changes, his efforts will contribute largely to the success of the undertaking.—Page 822.

* * *

Increase in machined surfaces on farm equipment point to larger use of machine tools. Machined steel parts are being substituted for castings, cut gears for cast gears, and anti-friction bearings are more widely employed, says farm equipment manufacturer. All these changes call for more careful machining.—Page 823.

Chromium-plated cutting tools chip off at the cutting edge when working on steel or cast iron, says electric equipment manufacturer. But the plated tools are satisfactory when used on materials other than metals.—Page 824.

* * *

Can galvanizers produce spangles if pure zinc is used? Yes, but only for a short period of time, says metallurgist, for after a few days the bath surface oxidizes if no metallic additions are made to the bath.—Page 812.

* * *

Stronger ring gear blanks, with very little waste metal, are produced by upsetting process. An upsetting die punches into the center of the bar and mushrooms the head into "doughnut" shape, with the highly refined metal from the surface of the bar on the side of the "doughnut" where the teeth of the gear will be cut.—Page 816.

* * *

Porosity in zinc-base die castings depends almost entirely on the kind of pull given the lever, investigators declare. Tensile strength of sound castings is little affected by reasonable changes in casting conditions.—Page 814.

* * *

Electric furnace for normalizing alloy steel has three pusher mechanisms, two at the charging end and one at the side. The latter pushes the charge across the width of the furnace, from charge to discharge side. Pushing is done by shoes operating in troughs, which are returned to the loading end by a conveyor.—Page 819.

* * *

Export business in machinery and steel continues to grow. Machinery sales for first eight months exceed same period of 1927 by more than 13 per cent, while finished steel sales gain 9 per cent.—Pages 870-872.

Buys new equipment when cost of repairing old is over half the purchase price of the new machine. Automobile manufacturer makes extensive repairs to old equipment only when the machine is of a special type and when it would have only a small resale value.—Page 824.

* * *

Low-chromium alloy steel rails last several times as long as Bessemer rails in many kinds of service. The alloy rails can be drilled without difficulty and do not air-harden after heating for bending.—Page 826.

* * *

Friction absorbs almost one-half the power created by rolling mill engine, says lubricating engineer. About 27 per cent of power is used in overcoming friction in engine parts, 13 per cent in overcoming rolling mill friction, and 9 per cent in overcoming pinion and spindle friction.—Page 827.

* * *

In galvanizing bath lead is not harmful, says metallurgist, for it alloys with zinc only in very small quantities, the excess lead settling to the bottom of the pot. But high iron content affects both the physical and the chemical qualities of slab zinc.—Page 813.

* * *

Compactness an important factor in machine tool design, says automobile manufacturer. The compactly built machine has many advantages over the machine with projecting parts, which make it difficult to place in progressive lineup.—Page 824.

* * *

Net gain during September of 14 blast furnaces in operation presages heavier production in October. Particularly significant was the gain of five merchant stacks, accompanied by an increase of 5½ per cent in daily production of merchant iron.—Page 844.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Better Selling of Steel

FULLY granting that the steel trade needs better merchandising methods, as has been urged by C. M. Schwab and others for a year past, it is worth while to reflect upon the great improvement in present methods over those in force before the war. Then the sellers were opportunists, carried along, and quite nicely at times, by circumstances. They criticized their methods and talked about reforms which they never seriously attempted to make. In a strong market they simply sold farther and farther ahead at successively rising prices. The sales were in the form of "contracts" which really amounted to options given the buyers. In a weak market they strove to squeeze specifications out of the remaining contracts, making downward price readjustments from time to time as circumstances seemed to force them. They complained of "the contract evil" because some customers nursed their contracts and avoided paying anything like the full open market advances while in a declining market they refused to specify; i.e., they chose not to exercise their options, which no longer had any value.

There was so little understanding of the rationale of equitable distribution of merchandise that mills talked of "enforcing" contracts and "making contracts binding," when the apparent transactions represented by the "contracts" were not by their nature susceptible of such treatment, since they were not actual sales. The only feasible reform was to abolish that form of contracting and the mills were afraid to attempt anything of that sort.

Today there is true merchandising, even though it may not be altogether good merchandising. The seller considers the circumstances of the buyer and would not force him to a loss on account of his having signed some sort of a paper. Rarely if ever did they force losses in the old days but there was much difference in profits between customers according to the kind of contract or option they had secured long previous, by chance or skill. Some customers profited hugely.

Nowadays all business is conducted on small margins and mills recognize that their customers need to be placed on the same basis as competitors. That is good merchandising and it is a vast improvement over the old way. There are contracts now, but they are only quarterly, a much smaller proportion of the steel moves under contract than formerly, and the ambition of mills is to set up a general practice requiring the completion of a quarter's specifications by the 10th or 15th of the last month in the quarter.

In several finished steel lines an improvement has been made by setting up quantity differentials for small lots in a shipment. This is better than the practice

of the recent past, but comparison cannot be made with earlier pre-war years, for then there was practically no such thing as small-lot shipments by mills. As a rule they were not in position to make such shipments.

In respect to quality extras the mills have not kept pace with the times. Steel used to be pretty much the same. Now there is increasing variety, as new uses and new requirements arise. This diversity will continue, and if its demands upon salesmanship are to be properly met prices and extras must be fitted to the cost of production and to the relative values of the materials furnished.

From Winnipeg to Buenos Aires

FIGURES could be assembled in imposing array giving in tens of millions the value of our iron and steel exports and in hundreds of millions the value of automobiles, machinery and equipment made largely from iron and steel. But the important conclusion from such a showing would be that this export movement is so large a part of our total production that its continuance or disappearance might mean the difference between prosperity and hard times at home.

Other analyses would show the destination of these exports. Getting down to essentials, we should find that America, North and South, is our own best customer. Canada absorbs most, due to propinquity and the common interests of these English-speaking nations. But an increasing amount goes south to Latin America. Our southern customers include Cuba and the other islands, Mexico and other Central American republics, and all the great states in South America. Trade with many of these has risen sharply since the war for three principal reasons: because United States corporations have developed properties and concessions within the borders of our southern neighbors, because the Governments of the latter have been large borrowers in Wall Street, and because our own export organizations have been able to meet open competition for available business.

Such facts have been the basis of statements made more than once in these columns that the countries to the south of us offer the best outlet for our future surplus in manufactures. Ways and means of fostering this trade have been discussed. Not least among these business aids are a sympathetic understanding between the peoples and ready means of communication.

Both of these will be promoted mightily by the construction of a broad, modern highway down the backbone of the two continents. The project has already had some publicity. The daily press has reported that President Coolidge and Herbert Hoover have approved

it. We are bound to hear more about it, for it is a logical way of bringing the people of these two continents into closer contact and of promoting good feeling. What would change the average Kansan's contempt for a "greaser" sooner than an automobile trip to Mexico City over a cement pavement? Nor would a Sonora rancher use the scornful "gringo" if he could tour the United States.

The tremendous traffic over our own Lincoln Highway (to mention but one) indicates what might be expected of a north-and-south route in times of peace. What such a protected, inland road would mean in war time has been understood ever since the Romans built their indestructible roads, and has been demonstrated in every war fought in the last 2000 years. "Communications" the commanding officer must safeguard first of all. In our own defense the highway would carry north essential supplies of rubber, manganese, nitrates, food-stuffs, releasing fleets of cruisers and cargo ships for other services. In our neighbors' defense it would carry south all the machinery of modern war.

Communications, mutual understanding, trade, defense, all require such a road. It should not be long postponed.

Labor as a Commodity

ONE of the inconsistencies in the tenets of labor unions is their insistence that labor is not a commodity and their common treatment of labor questions as if it were. This may be explained, however, in that it is a truism that labor is not a commodity; but it is likewise true that labor theoretically obeys the economic laws (especially that of supply and demand) which commodities obey. The national economy of this and every other country is a composite of goods and service. All of us are salesmen. The stevedore sells his muscle. The engineer sells his knowledge. In each case and in every other the remuneration is determined by the supply of the kind of service that can be rendered and the demand for it. The man who is unique can well nigh get whatever he asks if any one needs him. The man who is ordinary can get only a competitive price, unless competition be nullified; and that is a great objective of labor unionism. Perhaps it is the one great objective, and perhaps it is this that underlies the emphasized reiteration that labor is not a commodity.

The stage hands of New York, who number about 2000, were recently discussing with their employers the matter of increased remuneration, and they secured advances to \$82.50 per week for carpenters and electricians, while ordinary stage hands are now to get \$6.75 per performance. We conjecture that the art of being a stage hand does not require more than a few days training, and no doubt many college graduates would be attracted by the handsome remuneration named. But what would happen if they applied for these jobs? We need not answer the question. This is an example of the noncompetitive condition labor unions create in what they say is not a commodity.

So it is with building mechanics and men of many other vocations in unionized territory who assume the principles and practice of a monopoly for their respective guilds. Competition between workers in the sense of an open market is the last thing in the world they think of permitting. Their only deference to

economic law is to increase their efficiency when demand is poor and to decrease it when demand becomes strong. This may explain in part why their leaders do not like to have labor referred to as a commodity.

Heavy Steel Export Movement

IRON and steel exports from the United States in August were larger than in any month since early 1921. However, so much scrap was included that the amount of finished material was less than that recorded for each of six months in the past seven-and-a-half years. Of the 287,297 tons exported in August, no less than 70,538 tons was iron and steel scrap. The highest previous tonnage of scrap went out in June—64,918 tons. The five months ended with August have shown an outward scrap movement of 279,272 tons, each of these months having been above 40,000 tons. Only once before (September, 1920) was 40,000 tons reached. Italy, Germany, Japan and Canada have been buyers of American steel melting scrap for some months on an unusual scale.

Finished products exported in August amounted to 179,085 tons, the largest total since the 196,734 tons of January, 1927. Semi-finished exports were 20,020 tons, the largest (except for last May) in eight years, or since August of 1920. Pig iron and ferroalloys, at 9445 tons, fell below the previous month, but with that exception led all the months since June, 1926. The total of iron and steel exports for the eight months, excluding scrap, was nearly 14 per cent ahead of last year's for the like period. With scrap included, the eight months' tonnage was above the twelve months' total of 1925 or 1924.

Coal Value Lower in Strike Year

DESPITE the union bituminous coal strike which began April 1, 1927, and technically is not ended yet, the average value of coal at mines decreased from 1926 to 1927. Bituminous coal dropped from \$2.06 to \$1.99. Anthracite, with no strike, dropped from \$5.62 to \$5.26. Bituminous prices are running still lower this year.

The final figures now compiled show total bituminous coal production in 1927 at 517,763,352 net tons, which represents 9.7 per cent decrease from 1926. The price record shows that there was an ample supply of coal. The decrease in tonnage may be ascribed in part to the laying in of stocks late in 1926 against the expected strike, to a little decrease in industrial activity in the latter part of 1927, and to the exceptional 1926 exports due to the British coal strike.

It is not true that the total consumption of bituminous coal has been decreasing. Demand merely failed to increase as formerly, and thus with increasing capacity prices could not hold. The gain in production has been insignificant in recent years. It was rapid through 1912 and 1913, each of those years making a new record by a large margin; but the combined production of 1926 and 1927 exceeded the 1912-13 production by only 17.5 per cent, with a lapse of 14 years. Widespread economies in the use of coal account for the small increase, when the service rendered, with

the large expansion in industrial operations, increased so greatly.

In the bituminous industry the average number of days worked decreased from 1926 to 1927 by $7\frac{1}{2}$ per cent, from 215 days to 199 days, when production, as shown above, decreased by slightly less. The average output per man per day increased from 4.50 to 4.55 net tons, showing that the switching of production from union to non-union did not involve a decrease in efficiency.

The quantity of coal coked at mines decreased from 17,751,549 tons in 1926 to 10,719,633 tons in 1927, showing a further dwindling in the amount of beehive coking. The 1927 quantity coked was only 2.1 per cent of the total production.

Bituminous production is running still lighter this year. All this simply means that there is no hope of coal miners receiving what could be called good wages, when there are so many more men anxious to mine coal than the coal requirements of the country can engage. More light could be thrown upon this vexed coal problem if more attention were given to the mental or human side. Why do men become coal operators and coal miners? Many have become operators because they chanced to own coal lands and were not willing to wait until the demand really worked around to them.

WITH a world's production of over 206,000 metric tons, last year made a new record for the aluminum industry, assuming the correctness of data published by a German statistical bureau. American pre-eminence is marked, domestic plants producing 75,000 tons or 36 per cent of the total, against 35 per cent in

1926. American consumption (including Canada) at 88,000 tons last year compares with 106,000 tons in 1926; but there was a marked increase in the German consumption, which was 35,900 tons, or 60 per cent more than in 1926. In the next year or so, however, American consuming industries promise to forge ahead, as the development and use of new light, strong alloys are rapidly extending. In this connection the expansion of our aircraft industry is a highly important factor. World production and consumption of aluminum are now about three times the rate just before the war, while American output is over four times and consumption about two-and-a-half times that of 1913.

AN illuminating example of the counterplay of economic forces is quoted in a recent British official report on business in Belgium. Commenting on the difficulties of the machinery manufacturers, it notes the formation of various amalgamations and cartels for control of the markets at home and abroad, evidently for one main purpose—to increase the amount of money secured for the product. That such a movement can be carried too far, and also is vulnerable to attack, appears from a statement on the next page of the same report: "The Garagists' Association has secured the cooperation of the trade association of motor car dealers to form a 'Tires Purchase Syndicate' for breaking the monopoly exactions of the tire manufacturers' ring, and for facilitating distribution and supply of tires to members." Whenever producers organize a really effective monopoly, consumers set out forthwith to "break the ring!"

CORRESPONDENCE

Investors and the Stock Market

To the Editor: Your editorial on page 779 of the Sept. 27 issue asks "Why This Stock Market?" and then answers the question very ably. While I agree with all you say, I think there is another factor that is generally overlooked.

I refer to the present stagnant and depressed condition of the real estate market, especially with respect to one and two family private residences. The time is not so far back when the average man of the middle class in income, having secured his own home and accumulated additional reserve, bought another similar residence to rent. Here was a transaction he knew how to handle, which yielded him a safe income, also a probable increase in value, and gave him community prestige. But times have changed. A private residence for rent is at best only likely to bring normal interest on its cost, and oftentimes only pays expenses, with no return on the investment. Many residential centers are overbuilt; the trend toward apartment houses in our large cities is in full swing, and houses are not renting. The man of small means with a little surplus hesitates at putting it in a house to rent today. He thinks of all the problems of painting, repairs, taxes, uncollected rent, vacant property, and inability to sell when he wants to; and unless he believes the particular property has business possibilities he turns to the stock market.

Why? Because in the stock market he has but three problems to face—when to buy, when to hold and when to sell. All details of the management of the investment are

out of his hands; he has nothing to watch but the stock quotations. If he has made an unfortunate buy, he can liquidate at any time, take his loss and start over. Not so with private residential real estate. He has the ever recurring details to decide and often he cannot sell when he would like to, at any price. Is it any wonder that, having discovered the stock market, which he can enter with a small investment, gradually increasing his holdings, he is going to it to an increasing extent? If, as pointed out in the editorial, he is investing in sound organizations and businesses regardless of present dividend rates, his regularly increasing participation is increasing the demand and putting prices up gradually to a high level. This situation is, to my mind, no small factor in the answer to the question, "Why this stock market?"

JOHN F. HARDECKER.

Brooklawn, N. J., Sept. 28.

Railroad Facts

A year book on railroad information, 1928 edition, has been put out by the Western Railways' Committee on Public Relations, Chicago. It consists of 96 pages with diagrammatic illustrations and a five-page index. The book shows the growth of the railroad physical plant in mileage, locomotives, cars, etc., with comparisons with other countries, the growth in the money investment of the plant, the growth in car loadings year by year, and a considerable amount of collateral or derived information of special interest to those studying the railroad situation. Particularly are shown the reductions in fuel required for a given traffic performance, the elimination of car shortages, increase in freight train speeds and in tonnage carried by the average train.

Fabricated Structural Steel

New York Subways Call for 15,100 Tons—Week's Awards Total 33,850 Tons and New Projects 41,000 Tons

WITH two sections of the New York subway calling for 15,100 tons, and approaches to the Detroit River tunnel, 4500 tons, new projects reported during the week totaled 41,000 tons. Awards amounted to 33,850 tons, the largest having been a manufacturing building at Meadville, Pa., requiring 4500 tons. Awards follow:

BOSTON, 127 tons, building alterations on Boylston Street, to unnamed fabricator.
STATE OF VERMONT, 150 tons, highway bridge, to American Bridge Co.
NEW YORK, 2000 tons, addition for R. H. Macy & Co., to Levering & Garrigues Co.
NEW YORK, 1300 tons, building in East Tenth Street for Sailors Snug Harbor, to Hedden Iron Construction Co.
NEW YORK, 1200 tons, apartment building at 101st Street and Fifth Avenue, to Harris Structural Steel Co.
NEW YORK, 1000 tons, apartment building at 107th Street and Broadway, to Easton Structural Steel Co.
NEW YORK, 238 tons, New York Central Lines, Mott Haven yard improvements, to Jones & Laughlin Steel Corporation.
HEMPSTEAD, N. Y., 200 tons, Professional Building, to Hay Foundry & Iron Works.
GOWANDA, N. Y., 250 tons, State bridge, to American Bridge Co.
JEROME, PA., 160 tons, Hillman Coal & Coke Co. coal storage bins, to Jones & Laughlin Steel Corporation.
MERCER COUNTY, N. J., 100 tons, bridge, to N. A. K. Bugbee.
PHILADELPHIA, 550 tons, Circle Theater at Frankford, to Bethlehem Fabricators, Inc.
PHILADELPHIA, 210 tons, building at Broad and South Streets for Southwestern National Bank, to S. G. Matthews, Philadelphia.
PHILADELPHIA, 260 tons, mill building for Heintz Mfg. Co., to Lehigh Structural Steel Co.
MEADVILLE, PA., 4480 tons, plant for Viscose Co.
WAYNESBORO, VA., 2400 tons, buildings for Du Pont Engineering Co., to Virginia Bridge & Iron Co.
QUANTICO, VA., 300 tons, Marine barracks, to Virginia Bridge & Iron Co.
WASHINGTON, 2300 tons, office building for Southern Railway Co., to Barber & Ross.
CANTON, N. C., 150 tons, bridges, to Austin Brothers Co.
PENSACOLA, FLA., 200 tons, airplane hangar and station, to Ingalls Iron Works Co.
TUSCALOOSA, ALA., 180 tons, Gulf States Paper Corporation plant, to Ingalls Iron Works Co.
MEMPHIS, TENN., 950 tons, floor repairs for Harahan Bridge, to American Bridge Co.
CINCINNATI, 550 tons, building for Container Corporation of America, to Oregon Bridge Co.
LOCKLAND, OHIO, 1000 tons, manufacturing building for Tennessee Copper & Chemical Co., to Fort Pitt Bridge Works; reported last week to unnamed fabricator.
ZOARVILLE, OHIO, 270 tons, highway bridge; from E. Elford & Sons Co., general contractor, to Massillon Bridge & Structural Co.
CLEVELAND, 430 tons, building for Eaton Axle & Spring Co., to McClintic-Marshall Co.
GRAND FORKS, N. D., 1177 tons, Red River bridge, to Minnesota Steel & Machine Co.
GREAT NORTHERN RAILROAD, 1900 tons, bridges, to American Bridge Co.

CHICAGO, 2800 tons, garage, to American Bridge Co.
STATE OF ILLINOIS, 1000 tons, highway bridges, distributed among several unnamed fabricators and Continental Bridge Co.
ST. LOUIS, 200 tons, bridge for Southern Railway, to American Bridge Co.
GROTTO, WASH., 140 tons, crane runway for Northwestern Portland Cement Co., to Wallace Bridge & Structural Steel Co.
SAN FRANCISCO, 1550 tons, five 80,000-bbl. tanks for Shell Oil Co., to Western Pipe & Steel Co.
SAN FRANCISCO, 100 tons, hotel, Eddy Street near Hyde, to McClintic-Marshall Co.
STOCKTON, CAL., 130 tons, two plants for Fibreboard Products Co., one at Antioch and one at Stockton, to Moore Drydock Co.
SANTA BARBARA, CAL., 1550 tons, five 80,000-bbl. tanks for Rio Grande and Barnsdall Oil companies, to McClintic-Marshall Co.
LOS ANGELES, 1200 tons, Richfield Oil building, to Llewellyn Iron Works.
LOS ANGELES, 800 tons, three apartment buildings, to Union Iron Works.
SAN DIEGO, CAL., 725 tons, warehouse for Navy Department, to Llewellyn Iron Works.
SAN DIEGO, 525 tons, Fox Realty building, to Llewellyn Iron Works.
SANTA ANA, CAL., 100 tons, store, Second Street and Broadway, to Union Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 15,100 tons, subway work; 3600 tons in section 5-A, route 109, bids Oct. 9, and 11,500 tons in section 2-A, route 108, bids Oct. 11.
NEW YORK, 500 tons, Junior League building in East Seventy-first Street; George A. Fuller Co., general contractor.
STATE OF NEW YORK, 200 tons, highway bridges.
ROCHESTER, N. Y., 450 tons, baseball grandstand.
WILKES-BARRE, PA., 400 tons, Bell Telephone Co. building.
BALTIMORE, 1600 tons, pier shed at McComas Street terminal improvement.
VIRGINIAN RAILWAY, 300 tons, bridge.
DETROIT, 4500 tons, approaches to Detroit River tunnel.
CINCINNATI, 2000 tons, building for Union Gas & Electric Co.; bids Oct. 10.
CHICAGO, 2600 tons, three junior high schools.
CHICAGO, 850 tons, two buildings for University of Chicago.
CHICAGO, BURLINGTON & QUINCY RAILROAD, 1500 tons, bridge and other work.
ILLINOIS CENTRAL RAILROAD, 400 tons, bridge work.
DULUTH, MINN., 1500 tons, reconstruction of bridge.
DAVENPORT, IOWA, 500 tons, bridge for Chicago, Rock Island & Pacific.
HERMANN, MO., 2500 tons, toll bridge across Missouri River.
PITTSBURG, CAL., 2500 tons, tin plate mill building for Columbia Steel Co.; bids received.

LOS ANGELES, 2000 tons, Bullock's department store, Wilshire Boulevard; bids received.

LOS ANGELES, 160 tons, apartment building at Beverly Hills; bids being taken.
OLYMPIA, WASH., 230 tons, Kalama River bridge; general contract to Gilpin Construction Co., Astoria, Ore.
OLYMPIA, 120 tons, Coweeman River bridge; general contract to J. J. Badraun, Portland, Ore.
PORTLAND, ORE., 243 tons, Gardiner bridge over Yellowstone River in Montana; bids opened.
HOOD RIVER, ORE., 1200 tons plates, pipe line; bids Oct. 10.

Steel Tariff Agitation On in Canada

TORONTO, ONT., Oct. 2.—Conflict has arisen between the two largest steel companies in Canada as to the fiscal policy best suited to their interests. Over a year ago the British Empire Steel Corporation applied to the Tariff Advisory Board for a recommendation favorable to a bounty on steel and the removal of the drawback on coal used in its production. The Steel Co. of Canada, Ltd., Hamilton, Ont., through its president, Ross H. McMaster, has just filed a lengthy brief with the Tariff Board now in session at Ottawa, Ont., opposed to the British Empire Steel Corporation's argument. It opposes the bounty system as a means of aiding the industry as distinguished from a tariff, while it also strongly resists any proposal of removing the drawback on coal used in the production of steel. The general claim is that what is proposed by the British Empire Steel Corporation is not for the benefit of the steel industry as a whole, but instead only for one company and one locality, the Maritime Provinces, a policy which is not considered in the public good.

The application of the Algoma Steel Corporation for tariff changes will be heard by the Advisory Tariff Board, at Ottawa, beginning today. Alterations suggested in the application would abolish drawbacks in some instances and impose new or higher duties in others. It is proposed to abolish the drawback of 99 per cent of duty on steel for springs and axles used in the manufacture of automobiles. The brief says: "It is acknowledged that the automobile industry is reasonably protected under the present Canadian tariff and there appears no justification for allowing spring steel or axle steel bars for automobiles to be imported from foreign sources under a rebate of 99 per cent of the duty." The proposed changes would still allow such steel to come in under the drawback when used in the manufacture of agricultural implements. It is also asked that imported spiral spring steel be no longer subjected to a 99 per cent drawback when used in the manufacture of railroad spiral springs. The brief urges the imposition of a duty of 35 per cent ad valorem general and British preference on alloy steel.

Small Gain in September Iron Output

Daily Rate Last Month Gained 897 Tons or Nearly One Per Cent
Over August—Net Gain of 14 Furnaces

SEPTEMBER pig iron output, from data collected largely by wire on Oct. 2, made a small increase over August. There was, however, a large net gain in furnaces, most of them put in operation during the closing days of the month. Seventeen were blown in and three shut down, a net gain of 14.

Total September coke pig iron output was 3,062,314 gross tons or 102,077 tons per day for the 30 days as contrasted with 3,136,570 tons or 101,180 tons per day for the 31 days in August. This is an increase of 897 tons per day or 0.88 per cent. In August the increase was 2089 tons or 2.1 per cent. The September daily rate last year was 92,498 tons, which

was a decline from August of that year of 2575 tons. As in August this year, the September output showed an increase over the preceding month, contrasting with decreases last year.

Capacity Active on Oct. 1

On Oct. 1 there were 197 furnaces active having an estimated operating rate of 106,755 tons per day. This compares with an operating rate of 98,730 tons per day for the 183 furnaces active on Sept. 1. Many furnaces during September were operated at a higher rate than in August.

Of the 17 furnaces blown in during September, six were Steel Corporation stacks, five belonged to independent steel companies and six to mer-

chant producers. Only two Steel Corporation stacks were blown out and one merchant stack. Thus the gain for the month was nine steel-making furnaces and five merchant.

Steel and Merchant Iron

Steel-making iron last month was made at the rate of 82,590 tons per day or slightly less than the 82,642 tons per day in August. There was an increase in the merchant iron daily rate of production in September over August, or 19,487 tons per day against 18,538 tons per day.

Furnaces Blown In and Out

During September the following furnaces were blown in: One Susque-

Daily Average Production of Coke Pig Iron in the United States
by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year....	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,978	95,199	99,091
Aug.	60,875	87,241	103,241	95,073	101,180
Sept.	68,442	90,873	104,543	92,498	102,077
Oct.	79,907	97,528	107,553	89,810	.....
Nov.	83,656	100,767	107,890	88,279	.....
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107,043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	September (30 days)	August (31 days)	July (31 days)	June (30 days)
New York and Mass.	183,557	188,399	192,126	199,045
Lehigh Valley.....	78,272	72,648	64,921	60,640
Schuylkill Valley.....	51,116	52,231	53,855	52,434
Lower Susq. and Leba- non Valleys.....	30,680	33,153	30,079	29,207
Pittsburgh district.....	622,023	628,471	586,923	606,223
Shenango Valley.....	86,136	86,691	88,366	101,543
Western Pennsylvania ..	138,021	138,253	120,389	117,833
Maryland, Va. and Ky..	113,108	112,555	111,741	116,691
Wheeling district.....	149,813	157,507	154,636	145,717
Mahoning Valley.....	309,512	307,547	287,688	291,174
Central and North'n Ohio	328,382	376,706	379,277	349,952
Southern Ohio.....	45,363	46,367	44,339	40,810
Illinois and Indiana....	609,891	625,452	636,961	635,201
Mich., Minn., Mo., Wis.,	.....	.....	.....	.....
Colo. and Utah.....	112,030	113,737	122,875	127,085
Alabama.....	197,367	188,896	189,383	200,643
Tennessee.....	7,043	7,957	8,265	7,802
Total	3,062,314	3,136,570	3,071,824	3,082,000

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
September, 1927.....	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931
June	81,630	21,103	102,733
July	79,513	19,578	99,091
August	82,642	18,538	101,180
September	82,590	19,487	102,077

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

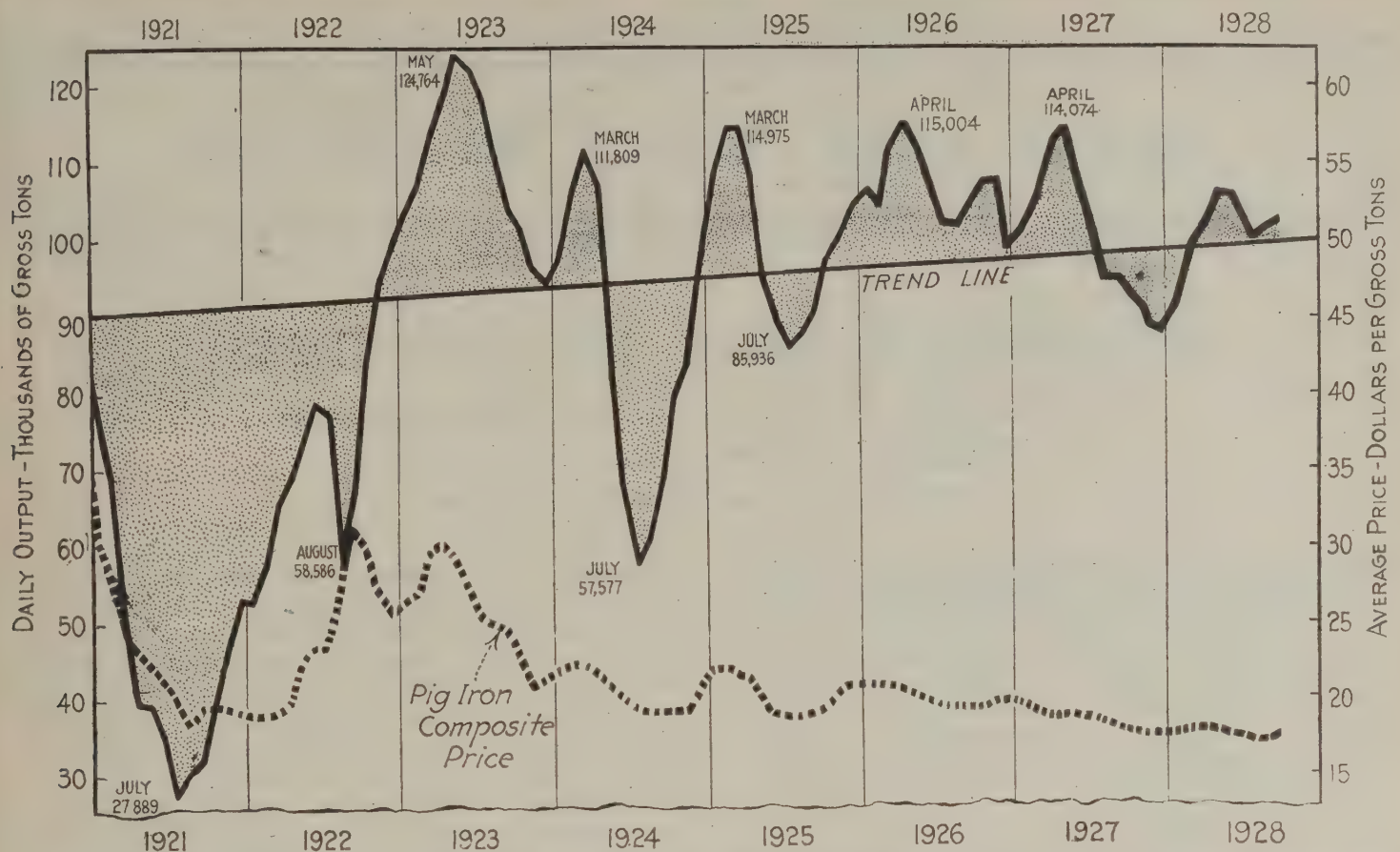
	Oct. 1		Sept. 1	
	Number in Blast	Capacity per Day	Number in Blast	Capacity per Day
New York:				
Buffalo	11	5,640	10	5,380
Other N. Y. and Mass....	2	880	2	835
New Jersey.....	0	.....	0	.....
Pennsylvania:				
Lehigh Valley.....	6	2,600	6	2,350*
Schuylkill Valley.....	5	2,000	4	1,685
Susquehanna Valley.....	2	940	2	990
Ferromanganese	0	.....	0	.....
Lebanon Valley.....	0	.....	0	.....
Ferromanganese	1	80	1	75
Pittsburgh District.....	35	22,100	31	19,190
Ferromanganese	2	320	2	300
Shenango Valley.....	6	3,300	5	2,780
Western Pennsylvania ..	9	4,400	9	4,300
Ferromanganese	1	180	1	180
Maryland	5	2,770	5	2,620
Wheeling District.....	8	4,990	8	5,070
Ohio:				
Mahoning Valley.....	18	10,400	17	9,650
Central and Northern....	18	10,945	18	11,700
Southern	4	1,540	4	1,490
Illinois and Indiana....	30	20,960	28	19,660
Mich., Wis. and Minn....	5	2,200	5	2,170
Colo., Mo. and Utah.....	4	1,600	3	1,150
The South:				
Virginia	1	145	1	220
Ferromanganese	0	.....	1	80
Kentucky	2	760	2	680
Alabama	19	7,700	15	5,840
Ferromanganese	1	70	1	70
Tennessee	2	235	2	265
Total	197	106,755	183	98,730

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months,
Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	3,082,000
½ year.....	19,848,461	19,430,678	18,520,921
July	3,223,338	2,951,160	3,071,824
Aug.	3,200,479	2,947,276	3,136,570
Sept.	3,136,293	2,774,949	3,062,314
Oct.	3,334,132	2,784,112	.....
Nov.	3,236,707	2,648,376	.....
Dec.	3,091,060	2,695,755	.....
Year*	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in September Was 0.88 Per Cent More Than in August; Composite Prices Substantially Unchanged
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

hanna stack of the Hanna Furnace Co. in the Buffalo district; the Brooke furnace in the Schuylkill Valley; one Carrie and one Clairton stack of the Carnegie Steel Co., one Midland stack of the Pittsburgh Crucible Steel Co. and one Monessen stack of the Pittsburgh Steel Co. in the Pittsburgh district; one Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley; the Sharpsville furnace in the Shenango Valley; one Joliet and one Gary stack of the Illinois Steel Co., one Federal furnace and one Iroquois stack of the Youngstown Sheet & Tube Co. in the Chicago district; one furnace of the Colorado Fuel & Iron Co. in Colorado; one furnace of the Gulf States Steel Co., one

Woodward stack of the Woodward Iron Co. and one Bessemer and one Fairfield stack of the Tennessee Coal, Iron & Railroad Co. in Alabama.

The three furnaces blown out or banked were the Pulaski stack in Virginia and one Joliet and one South Chicago furnace of the Illinois Steel Co. in the Chicago district.

Possibly Active Stacks Unchanged

The Crumwold furnace of the Reading Iron Co. in the Lehigh Valley has been sold and will probably be dismantled. The new No. 6 Fairfield stack of the Tennessee Coal, Iron & Railroad Co. at Fairfield, Ala., was blown in during the month, leaving the number of possibly active fur-

naces in the United States unchanged at 339.

Fabricated Plate Orders Much Higher

WASHINGTON, Oct. 2.—Orders for fabricated steel plate in August totaled 47,245 tons, or 59.9 per cent of the capacity of the 51 companies reporting to the Department of Commerce. Orders in July were 35,959 tons, or 46.8 per cent of capacity. August orders were distributed as follows: Oil storage tanks, 24,807 tons; refinery materials and equipment, 1724 tons; tank cars, 892 tons; gas holders, 1814 tons; blast furnaces, 429 tons; stacks and miscellaneous, 17,579 tons.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1926	1927	1928	1926	1927	1928
Jan.	2,599,876	2,343,881	2,155,133	29,129	31,844	22,298
Feb.	2,272,150	2,256,651	2,274,880	22,309	24,560	19,320
Mar.	2,661,092	2,675,417	2,588,158	24,064	27,834	27,912
Apr.	2,677,094	2,637,919	2,555,500	24,134	24,735	18,405
May	2,687,138	2,619,078	2,652,872	23,159	28,734	29,940
June	2,465,583	2,343,409	2,448,905	25,378	29,232	32,088
½ year.....	15,362,933	14,876,355	14,675,448	148,173	166,939	149,963
July	2,461,161	2,163,101	2,464,896	26,877	26,394	32,909
Aug.	2,424,687	2,213,815	2,561,904	23,557	21,279	24,583
Sept.	2,436,733	2,090,200	2,477,695	25,218	20,675	22,278
Oct.	2,578,830	2,076,722	.....	28,473	17,710	.....
Nov.	2,484,620	1,938,043	.....	31,903	17,851	.....
Dec.	2,322,180	1,987,652	.....	31,627	20,992	.....
Year	30,071,144	27,345,888	.....	315,828	291,840	.....

*Includes output of merchant furnaces.

Tests of the new Diesel type aircraft engine developed by Capt. L. M. Woolson, of the Packard Motor Car Co., are being made at the Packard proving grounds near Utica, Mich. Col. J. G. Vincent, vice-president in charge of engineering for Packard, is directing the work. Dr. Hermann Dornier, a German authority on Diesel engines, and Adolph Widman have been assisting Captain Woolson in the development work. The new Packard engine weighs less than 3 lb. per hp. developed, as compared with 100 lb. per hp. for light Diesel engines previously produced.

Iron and Steel Markets

Market Gains in Strength

Fourth Quarter Advances in Sheets, Bars and Shapes

Established in Sales—Basic Pig Iron in

Valleys Up 75c. a Ton—Scrap Higher

HEAVY bookings, lengthening deliveries and added strength in prices of both finished and primary materials place the iron and steel industry on an unusually stable basis as it enters the final quarter of the year.

The September bulge in specifications against third quarter contracts gave steel producers excellent backlogs. Mills are four to six weeks behind on deliveries of bars and some finishes of sheets, and the size of their obligations is influencing their attitude on prices.

A test of the market was not expected so soon after the close of a quarter, but an encouraging volume of business has already been placed at fourth quarter prices, which for black and galvanized sheets, bars, plates and shapes represent an advance of \$2 a ton.

This fact points to a demand for steel that is based on actual consumption. While buyers, in some cases, have been rebuilding their stocks, there has been no evidence of speculative purchases. The flow of business this year has been even steadier than in 1927. The decline from the peak rate of output in April to the low point in June was only 17 per cent, compared with a 30 per cent dip last year.

Pressure on the mills for steel has resulted in the lighting of additional blast furnaces. Out of 17 stacks blown in during September, 10 were started in the last week of the month. The net gain in active furnaces was 14, of which nine were steel works units. Such an increase may indicate a further expansion in steel output in October, which in the past has frequently been the premier month in production in the second half of the year. Heavier pig iron output may be dictated also by the growing scarcity of scrap.

An increasing quantity of scrap is being shipped out of the country, and a considerable amount is being diverted to new domestic markets. Exports of scrap in August, at 70,500 tons, were the largest on record, representing nearly one-fourth of our total outward movement of iron and steel. Shipments of scrap from Detroit, one of our largest producing centers, are moving more largely by water to Lake Erie ports instead of by rail, as formerly, to the Valleys. Lake shipments so far this season to one Buffalo consumer alone total 200,000 tons.

A direct result of the diversion of Detroit district scrap is an advance of 75c. a ton on basic pig iron in the Valleys. An inquiry for 12,000 tons of that grade found producers uninterested because they expect to consume all that they can make.

Meanwhile heavy melting scrap has advanced 25c. a ton at Pittsburgh and Chicago, and 50c. at Philadelphia. Prices at Pittsburgh are the highest since January, 1927.

Among the consuming industries, the railroads are taking a more prominent role. The Detroit, Toledo & Ironton has placed 12,500 tons of rails, and purchases by the New York Central and the Pennsylvania are expected next week. The Canadian National is inquiring for 15,000 tons. The rail buying movement, it is believed, will result in fully as large bookings as that of a year ago.

The Louisville & Nashville plans to purchase 2000 cars, and the Santa Fe is a prospective buyer of equipment. The Canadian National has ordered 55 locomotives, and is inquiring for five additional engines and 1500 box cars, besides tank and passenger cars.

Prospective construction work likely to be placed in the fourth quarter calls for 425,000 tons of structural steel, not including projects of less than 1000 tons each. Mill bookings of structural shapes in September were the largest of any month this year.

The buoyancy of consumption is indicated by the continued pressure for shipments, following heavy deliveries in the third quarter. Shipments by Chicago mills in that period were 15 per cent larger than in the preceding quarter. Steel ingot production at Chicago is now slightly over 85 per cent, which continues to be the average rate of the Pittsburgh district, as well as the Steel Corporation subsidiaries. Sheet production is particularly high, exceeding 90 per cent of the capacity of the country.

Pig iron production in September, according to data collected by THE IRON AGE, was 3,062,314 tons, compared with 3,136,570 tons in August. The average output per day, however, showed an increase, although it was less than 1 per cent. Nevertheless, with the blowing in of furnaces toward the end of the month, the daily capacity of stacks in blast Oct. 1 was 106,755 tons, against 98,730 tons Sept. 1.

This sharp gain appears warranted, in part, by the record of nine months' production. The steel ingot tonnage so far this year will prove to be some 10 per cent greater than that of the corresponding period of 1927, while the pig iron output is 1 per cent less, comparing the same periods. In both 1926 and 1927, for every 100 tons of steel made 83 tons of pig iron was produced. So far in 1928 the ratio is 100 to 75.

Both of THE IRON AGE composite prices have advanced, that for pig iron reaching \$17.84 a gross ton, the highest figure since the end of October, 1927. The finished steel composite is 2.362c. a lb., compared with 2.348c. in the previous eight weeks.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pige Iron, Per Gross Ton:	Oct. 2, 1928	Sept. 25, 1928	Sept. 4, 1928	Oct. 4, 1927
No. 2 foundry, Philadelphia...	\$20.76	\$20.76	\$20.26	\$20.26
No. 2, Valley furnace.....	17.00	17.00	16.50	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	20.94
No. 2, Birmingham.....	16.25	16.25	16.25	17.25
No. 2 foundry, Chicago*.....	18.50	18.50	18.00	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	17.00	16.25	16.00	17.00
Valley Bessemer, del'd P'gh...	19.01	19.01	18.76	19.76
Malleable, Chicago*.....	18.50	18.50	18.00	19.50
Malleable, Valley.....	17.25	17.25	17.00	17.50
Gray forge, Pittsburgh.....	18.26	18.26	18.01	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:	Oct. 2, 1928	Sept. 25, 1928	Sept. 4, 1928	Oct. 4, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	32.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.75

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.75
Steel bars, Chicago.....	2.09	2.00	2.00	1.85
Steel bars, New York.....	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.17½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.14½	2.14½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 2, 1928	Sept. 25, 1928	Sept. 4, 1928	Oct. 4, 1927
Sheets, black, No. 24, P'gh....	2.75	2.65	2.65	3.00
Sheets, black, No. 24, Chicago	2.75	2.75	2.75	3.10
dist. mill.....	3.50	3.40	3.40	3.85
Sheets, galv., No. 24, P'gh....	3.60	3.60	3.60	3.95
Sheets, galv., No. 24, Chicago	2.00	2.00	2.00	2.15
dist. mill.....	2.10	2.10	2.10	2.35
Sheets, blue, 9 & 10, P'gh....	2.55	2.55	2.55	2.55
Wire nails, Pittsburgh.....	2.60	2.60	2.60	2.60
Wire nails, Chicago dist. mill..	2.40	2.40	2.40	2.40
Plain wire, Pittsburgh.....	2.45	2.45	2.45	2.45
Plain wire, Chicago dist. mill..	3.20	3.20	3.20	3.25
Barbed wire, galv., P'gh.....	3.25	3.25	3.25	3.30
Barbed wire, galv., Chicago	3.25	3.25	3.25	3.30
dist. mill.....	\$5.25	\$5.25	\$5.25	\$5.50
Tin plate, 100 lb. box, P'gh....				

Old Material, Per Gross Ton:	Oct. 2, 1928	Sept. 25, 1928	Sept. 4, 1928	Oct. 4, 1927
Heavy melting steel, P'gh....	\$17.00	\$16.75	\$16.00	\$15.00
Heavy melting steel, Phila....	16.00	15.50	13.00	14.00
Heavy melting steel, Ch'go....	13.25	13.00	12.75	12.00
Carwheels, Chicago.....	13.75	13.50	12.75	13.75
Carwheels, Philadelphia.....	16.50	16.50	15.50	15.50
No. 1 cast, Pittsburgh.....	15.00	15.00	14.75	14.75
No. 1 cast, Philadelphia.....	17.00	17.00	15.50	16.50
No. 1 cast, Ch'go (net ton)....	15.00	15.00	14.25	14.50
No. 1 RR. wrot., Phila.....	15.50	15.50	13.50	15.50
No. 1 RR. wrot., Ch'go (net)..	12.00	12.00	11.25	10.50

Coke, Connellsville, Per Net Ton at Oven:	Oct. 2, 1928	Sept. 25, 1928	Sept. 4, 1928	Oct. 4, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	15.25	15.25	14.75	13.25
Electrolytic copper, refinery...	15.00	15.00	14.50	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	6.00
Zinc, New York.....	6.60	6.60	6.60	6.35
Lead, St. Louis.....	6.32½	6.32½	6.22½	6.00
Lead, New York.....	6.50	6.50	6.40	6.25
Tin (Straits), New York.....	49.75	48.62½	48.00	59.50
Antimony (Asiatic), N. Y.....	11.50	11.00	10.12½	11.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Industry Starts Fourth Quarter With Large Supply of Orders—Basic Pig Iron Advances 75c.

PITTSBURGH, Oct. 2.—The final quarter of the year starts with the steel industry very well supplied with orders—the result of the September rush of specifications on third quarter contracts and the fact that in a number of products buyers were able to get mills to take additional business for immediate specification, but for shipment at mill convenience. Steel makers are well satisfied with the business side of the picture, and, while they have not succeeded in lifting prices on fourth quarter contracts as high as they desired, some advance has been obtained.

Steel works operations still are strong and at fully 85 per cent of capacity, and blast furnace operations are higher than they have been, four local steel works stacks having been blown in recently.

The undertone of the steel market is stronger, and there is a confident feeling among steel manufacturers. Some are beginning to believe that the consumption of steel is closer to what might be termed easy running capacity than has been supposed. That the flow of business has been steadier so far this year than it was last year is indicated by the fact that the fluctuation in the rate of ingot production from the high point in April and the low point in June was slightly less than 17 per cent, against a 30 per cent variation in the first eight months of last year.

While lately there has been some evidence that consumers were rebuilding their stocks, there is no sign that any of the buying recently or over the year to date has been at all speculative.

Primary materials attract attention this week, with something of a "pinch" in basic iron, the price of which has risen very sharply in the anxiety of consumers to secure supplies. The scarcity of scrap enters into the basic iron situation, as a diversion of scrap from its former channels, due to water-borne movements from Detroit to Eastern steel pro-

ducing centers, is the primary reason for one large inquiry for basic iron. Heavy melting steel has moved to solid ground at \$17, under fresh mill buying*and the fact that a shortage still exists.

Pig Iron.—Inquiries for basic iron totaling more than 20,000 tons have developed that there is very little of this grade for sale, and, in the anxiety of consumers to secure some, the price has risen sharply. As much as \$17, Valley furnace, has been obtained for approximately 2200 tons, or 75c. a ton advance over the nominal minimum price of a week ago. Smaller lots also have been moved at that price, and, while one sale of between 2000 and 3000 tons is noted at \$16, Valley furnace basis, it developed that the iron was below standard grade and the price obtained for it was fully 75c. a ton above that at which it was offered several weeks ago. Moreover, a Youngstown steel company reports having been obliged to refuse an order for about 12,000 tons, not because of an unsatisfactory bid, but because the prospect is that this maker will not have any surplus basic iron during the remainder of the year. It is not believed that yard supplies of this grade are exhausted, but the high rate of steel works engagement, to say

nothing of a marked scarcity of steel works grades of scrap and the consequent higher melt of pig iron, has given this kind of iron a value it did not recently have. Those who have supplies are not disposed to sell and those who are short of scrap want iron badly. This combination of circumstances usually produces just such a situation as the existing one. An Ohio steel company, which has not been able to get as much scrap as formerly on account of the diversion of Detroit supplies by water to Cleveland and Buffalo, has bought some iron against an inquiry totaling 15,000 tons. A few weeks ago it bought that amount from a Cleveland steel maker. Several other melters also are in the market for good-sized blocks. Two of the inquiries originated from Valley steel companies, which shortly will put out their own furnaces for repairs and relining and are anxious to accumulate reserve supplies. The strength of basic iron is individual, as prices of other grades have not been affected except sentimentally, and this is seen in higher asking prices rather than in actual sales prices. Foundry iron remains at \$17, Valley furnace, for the base grade, and the business of the week does not warrant a change in malleable and Bessemer grades. The Carnegie Steel Co. has put on one Clairton furnace, but will take one of that group off in the next week or 10 days. One of its Carrie furnaces also has resumed. The Pittsburgh Steel Co. and the Pittsburgh Crucible Steel Co. each has put on a furnace lately, and the Sharpsville furnace of the Davison Coke & Iron Co. was blown in Oct. 1. W. P. Snyder & Co. make the average price of Valley basic and Bessemer iron for September \$16.50 and \$17.20.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	\$17.25 to 17.50
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.25 to 17.50
Low phos., copper free....	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Fourth quar-

ter prices for billets, slabs and sheet bars are not yet fully established. While several mills have announced a basis of \$34, Pittsburgh, for 4-in. billets and equivalent area of slabs, with an extra of \$1 a ton for smaller sizes down to 1½ x 1½ in., there has been very little contracting to date, as the principal buyers—non-integrated strip manufacturers—have accumulated a considerable stock and seem disposed to use up these supplies before making fresh purchases. There is additional reason for delay in the fact that fourth quarter contracts for strip steel carry practically the same prices as those for the second and third quarters. Almost all makers of sheet bars have announced \$33, Pittsburgh, as the fourth quarter contract price, but acceptance by one or two makers of business for this period at the third quarter price indicates a range of quotations of \$32 to \$33. Forging quality billets for this quarter have been entered at \$38 by some makers, but others want \$39 and \$40, figuring an extra of \$5 or \$6 a ton over a base price of \$34 for rerolling billets. The new chemical extras are being applied and the need for a separate quotation for guaranteed analysis steel is thereby obviated. Wire rods are steady at \$42, base Pittsburgh and Cleveland. Mills have quite generally moved to a minimum of 1.90c. on pipe skelp; demand is only moderately active.

Bars, Plates and Shapes.—Makers in this territory start the final quarter of the year with a minimum price of 1.90c., base, on these products, and insist that this is the large-lot price, with buyers taking smaller tonnages paying \$1 or \$2 a ton more. In a general way, however, 1.90c. and 1.95c. are the prevailing prices, with 2c., base, being obtained only from very small buyers or for tonnages that are unattractive from a mill viewpoint. It is early for much specifying on fourth quarter contracts, because there are few buyers who have exhausted steel ordered on third quarter commitments. Demand for bars is heavy, and promptness of deliveries, to which buyers have long been accustomed, is not possible because almost all mak-

ers have three to four weeks' business scheduled. Structural shapes are moving well, but real activity is lacking in plates. Fabricated steel inquiry is reported good, and a feature is the large number of factory buildings in the pending business.

Rails and Track Supplies.—Current business is moderate in rails and track accessories, light-section rails and small spikes finding only a limited demand, but the annual rail buying movement has opened and the mills are expecting soon to have sufficient business to give standard-section rail mills full engagement throughout the winter.

Wire Products.—There is not much activity in nails, but other wire products appear to be moving steadily. Prices are well maintained, but reports that an advance was under consideration find no verification.

Tubular Goods.—The demand continues strong for seamless pipe for deep oil well drilling, and most makers are well supplied with pipe line business. In other directions, business is only moderately active, lapwelded oil country pipe being really slow, since there is not much drilling at present in the shallow well fields.

Sheets.—The interesting feature of the situation is the stronger price stand that most makers now are taking. Full order books have placed producers in an independent position, with respect both to prices and deliveries. It is no longer possible for buyers to place orders on a basis of deliveries to start within a week, as has been the case most of the year, and there are instances where the best promise is from three to four weeks. Price shading has not entirely disappeared, but on new business the mills generally are holding firmly to 2.75c., base, for black, 3.50c., base, for galvanized and 2c., base, for blue annealed. There still is some opposition to the lower rate of discount for cash, which became effective Oct. 1, but no evidence that the mills are yielding. A high rate of consumption is indicated by the fact that more than 90 per cent of the country's sheet making capacity is in operation.

THE IRON AGE Composite Prices

Finished Steel

Oct. 2, 1928, 2.362c. a Lb.

One week ago.....	2.348c.
One month ago.....	2.348c.
One year ago.....	2.346c.
10-year pre-war average.....	1.689c.
Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.	

	High		Low
1928	2.364c.,	Feb. 14;	2.314c.,
1927	2.453c.,	Jan. 4;	2.293c.,
1926	2.453c.,	Jan. 5;	2.403c.,
1925	2.560c.,	Jan. 6;	2.396c.,
1924	2.789c.,	Jan. 15;	2.460c.,
1923	2.824c.,	Apr. 24;	2.446c.,
			Jan. 2

Pig Iron

Oct. 2, 1928, \$17.84 a Gross Ton

One week ago.....	\$17.71
One month ago.....	17.34
One year ago.....	18.09
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.84,	Oct. 2;	\$17.04,
1927	19.71,	Jan. 4;	17.54,
1926	21.54,	Jan. 5;	19.46,
1925	22.50,	Jan. 13;	18.96,
1924	22.88,	Feb. 26;	19.21,
1923	30.86,	Mar. 20;	20.77,
			Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.22c. to 2.32c.
Del'd New York.....	2.24c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Large lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.80 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel.....	0.25	3.00
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/8.....	45	19½	25½	1/4 to 3/8..	+11	+39	
1/4.....	51	25½	31½	1/2.....	22	2	
3/8.....	56	31½	37½	3/4.....	28	11	
1/2.....	60	37½	43½	1 to 1½..	30	13	
3/4.....	62	43½	49½				
1 to 3....	62	50½	56½				
2.....	55	43½	49½	2.....	23	7	
2½ to 6..	59	47½	53½	2½.....	26	11	
7 and 8..	56	43½	49½	3 to 6..	23	13	
9 and 10..	54	42½	48½	7 to 12..	26	11	
11 and 12.	53	40½	46½				

Lap Weld

2.....	53	42½	48½	2.....	23	9	
2½ to 4..	57	46½	52½	2½ to 4..	29	15	
4½ to 6..	56	45½	51½	4½ to 6..	28	14	
7 to 8....	52	39½	45½	7 to 8....	21	7	
9 and 10..	45	32½	38½	9 to 12..	16	2	
11 and 12.	44	31½	37½				

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	1½ in.....+18
2½ to 3 in.....	1¾ to 1½ in.....+8
3 in.....	2 to 2½ in.....—2
3½ to 3¾ in.....	2½ to 3 in.....—7
4 to 4½ in.....	3¾ to 4½ in.....—9
5 to 6 in.....	

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel		Charcoal Iron
Under 5000 lb..	4 Fives	1 Ten
5000 lb. to 12,000 lb....	5 Fives	2 Tens
12,000 lb. to 21,000 lb.....	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1¼ to 1½ in..	55	3¼ to 3½ in..	50
1½ in.....	39	4 in.....	53
2 to 2½ in....	34	4½, 5 and 6 in..	45
2½ to 3 in....	42		

Hot Rolled

2 and 2½ in....	40	3¼ to 3½ in..	56
2½ and 3 in....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in..	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Tin Plate.—The seasonal slump in demand and in mill operations is slighter than usual, owing to a good demand for general line tin plate and some export demands of fair size, which partly offset the loss of packers' can business. The general average of tin mill engagement is about 75 per cent of capacity, though some producers are running at a higher rate.

Cold-Finished Steel Bars and Shafting.—Makers now report free acceptance on the part of consumers of the \$2 a ton advance in prices on fourth quarter contracts. Little tonnage yet is moving at 2.20c., base, because third quarter contracts did not contain a clause making it necessary to have specifications in before the quarter ended. In fourth quarter contracts there is a stipulation that specifications must be in by Dec. 10.

Boiler Tubes.—Leading makers of welded steel boiler tubes have made a slight revision in prices of the larger sizes, effective Oct. 1. Heretofore, the card discount on sizes 4 in. to 14 in. has been 46 per cent; under the new method of quoting, sizes greater than 6 in. in diameter are discontinued and the old discount of 46 per cent applies to 4-in. to 4½-in. tubes, while for 5-in. to 6-in. tubes, a new discount of 40 per cent has been named. Roughly, this means an advance of \$12 a ton on the larger sizes, one point in the discount being approximately \$2 a ton. Supplementary discounts are the same as they have been for several months.

Hot-Rolled Flats.—September was a heavy month in strip specifications, and makers have order books sufficient to keep them busy most of this month. A recession in buying is expected this month, as it is believed that November automobile production will fall somewhat from the present rate. Prices are steady.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—The market has developed a fresh burst of strength in the steel works grades, chiefly as a result of a purchase by the Steel Corporation for one of its Pittsburgh district plants of about 20,000 tons of heavy melting steel at \$17. This sale seems to have established that grade at that price. No higher price has been obtained, but dealers seem unable to buy for any lower figure. The market also is stronger on compressed sheets, which have sold at as high as \$17. The events of the week have given a generally stronger tone to the entire market. Machine shop turnings are not salable at more than \$11.50, as the principal user, after buying at that price, withdrew from the market, and dealers with short orders do not appear willing to go above \$11 to cover. One mill in the district still is holding up shipments on orders, but the sustained rate of steel works operations is keeping up the demand for shipments generally, and dealers are finding it hard to cover their short sales. The October scrap list of the Baltimore & Ohio Railroad, which closes Oct. 8, contains 9575 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	\$17.00
Scrap rails	\$16.50 to 17.00
Compressed sheet steel	16.50 to 17.00
Bundled sheets, sides and ends	15.00 to 15.50
Cast iron carwheels	15.25 to 15.75
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	12.75 to 13.25
No. 2 railroad wrought	17.00 to 17.50
Heavy steel axle turnings	15.00 to 15.50
Machine shop turnings	11.00 to 11.50

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.50 to 18.00
Railr. coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 20.50
Low phos., mill plates	18.50 to 19.00
Low phos., light grade	17.50 to 18.00
Low phos., sheet bar crops	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50

Electric Furnace Grades:	
Low phos. punchings	17.50 to 18.00
Hvy. steel axle turnings	15.00 to 15.50

Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 12.75
Short mixed borings and turnings	12.50 to 12.75
Cast iron borings	12.50 to 12.75
No. 2 busheling	11.25 to 11.75

Rolling Mill Grades:	
Steel car axles	18.50 to 19.50
No. 1 railroad wrought	12.50 to 13.00
Sheet bar crops	18.00 to 18.50

Cupola Grades:	
No. 1 cast	15.25 to 15.75
Rails 3 ft. and under	17.50 to 18.00

Cold-Rolled Strips.—All makers in this area are well supplied with business as a result of heavy September specifications. Average prices for the final quarter of the year will be higher than in the past two quarters, since producers were able to secure a slight advance from the large users.

Bolts, Nuts and Rivets.—Signed fourth quarter contracts are coming in well, and makers expect heavier specifications than in the past two quarters owing to the prospect of increased railroad demands. Prices are

holding well. Most makers of rivets are observing \$2.90, base, per 100 lb. on large sizes and 70 to 70 and 10 per cent discount for small rivets.

Coke and Coal.—The spot coke market still is very firm, but not quotably higher than in the past few weeks. The coal market is featured by a stronger situation in household grades, but the production of these grades means an excessive supply of slack, which is selling at very low prices.

Increased Rail Shipments This Quarter Forecast

WASHINGTON, Oct. 2.—Estimates of an increase of 7.3 per cent in carload shipments of iron and steel during the last quarter of the current year as against the corresponding period of 1927 have been made by the 13 Shippers' Regional Advisory Boards, according to the American Railway Association. The estimated carload shipments of iron and steel during October, November and December of the present year are 388,280, compared with 361,805 for the fourth quarter of last year. Other commodities included in the 29 which are expected to show increased shipments are coal and coke; ore and concentrates; castings, machinery and boilers; agricultural implements and vehicles, other than automobiles, and automobiles. The carload shipments of the 29 commodities estimated for the last quarter of 1928 are approximately 9,279,472 cars, an increase of 4.9 per cent or 431,599 cars.

Included in the estimated increases are the following:

	(In Carloads)		Per Cent Inc.
	Actual, 1927	Est., 1928	
Iron and steel ..	361,805	388,280	7.3
Coal and coke ..	3,033,956	3,157,032	4.1
Ore and concentrates ..	352,274	385,731	9.5
Castings, machinery and boilers	55,516	58,569	5.5
Agricultural implements and vehicles, other than automobiles ..	30,620	32,825	7.2
Automobiles, trucks and parts	152,150	197,116	29.6

The thirty-fourth annual meeting of the Ohio Valley Improvement Association at the William Penn Hotel, Pittsburgh, opened Tuesday evening, Oct. 2, with a banquet, at which there was not only a full attendance of the membership of the association, but a large representation of steel company executives interested in the development of the inland waterways for the shipment of their products. On Wednesday, the Jones & Laughlin Steel Corporation entertained the delegates at luncheon at the Chartiers Heights Country Club. Today (Thursday) visitors will be guests of the Carnegie Steel Co. on an inspection trip on the Monongahela River.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$32.00 to \$34.00
Rerolling, under 4-in. to and including 1½-in.	33.00 to 35.00
Forging	38.00 to 40.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$32.00 to \$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$32.00 to \$34.00
Smaller than 8 in. x 2 in.	33.00 to 35.00

Skelp

	Per Lb.
Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens.	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines....	1.00 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines.....	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
	First Quality Second Quality
Pennsylvania ...	\$43.00 to \$46.00 \$35.00 to \$38.00
Maryland	43.00 to 46.00 35.00 to 38.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00 35.00 to 38.00
Kentucky	43.00 to 46.00 35.00 to 38.00
Missouri	43.00 to 46.00 35.00 to 38.00
Illinois	43.00 to 46.00 35.00 to 38.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh .80, 10 and 2½	
Stove bolts in packages, Chicago .75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	.80, 10 and 5
Stove bolts in bulk, Chicago .75, 20, 10, 5 and 2½	
Tire bolts	.60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base Per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(¾-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	.80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	.80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread.....	.85 and 5
Upset set screws.....	.80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Industry Now on Unusually Stable Basis—Backlogs Have Expanded—Price Situation Stronger

CHICAGO, Oct. 2.—The opening of the final quarter finds the steel business on an unusually stable basis. Forward contracting, which had lagged up to the last days of September, suddenly became active. Backlogs have expanded rapidly. Sales in the week brought the total for September well above the aggregate in August. Both specifications and shipments gradually expanded throughout September, so that deliveries in the third quarter exceeded by not less than 15 per cent the shipments in the second three months of this year. Specifications in the last week compare favorably with the best week so far this year, though at present it is notable that car tonnage is small and rail releases are not yet an important factor.

Prices for plates, shapes and bars are showing greater strength at 2c. to 2.10c. per lb., Chicago. Heavy purchases in the last few days indicate that buyers' resistance is lessening.

Deliveries, except in structural material, are being crowded further into the future. Shipments on most sizes of bars are now about five weeks.

Ingot output is a shade higher at 85 per cent of capacity. Pressure by purchasers for best possible deliveries and the tendency for users to plan schedules further in advance reflect the higher speed of industry and lay at rest the fear expressed by some that the fall steel market was becoming speculative and that users were building stocks beyond immediate requirements. In some instances consumers have been forced to carry larger stocks because delayed deliveries have made it necessary to keep on hand a more comfortable margin of steel.

Pig Iron.—The center of interest in this market lies in the accelerated rate of shipments. The melt in local and nearby foundries is expanding and insistence on prompt deliveries is more common. Malleable foundries producing a larger portion of light than of heavy castings are operating at close to capacity. Miscellaneous sales of charcoal iron are numerous, the aggregate of all orders being close to 1000 tons. Prices of this grade are steady at \$24, furnace. A local steel mill furnace that of late has been giving trouble and which may go down for repairs is producing some iron that is being offered through brokers.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	19.00
Malleable, not over 2.25 sil.....	18.50
High phosphorus	18.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Several carloads of spiegeleisen have been placed at \$33, Hazard, Pa. It is reported that a direct shipment of this commodity is now on the water bound from England to Chicago. Prices for ferro-

manganese are strong at \$105, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Plates.—Specifications for plates continue to come from a wide variety of users and in a large aggregate tonnage. Car shops are operating at low capacity, but tank makers and fabricators of pipe from plates are busy. Closer control of oil well output is checking orders for tanks. One lot of 8000 tons for this purpose is still before the trade. Prices are steady at 2c. to 2.10c. per lb., Chicago.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Soft steel bar mills in the Chicago district are operating within a point or two of capacity. Specifications have been unusually liberal this week, and deliveries for most sizes have been extended to five weeks, though some sizes can still be delivered in three weeks. Heavy releases have recently been made by drop forgers, while makers of cold-drawn bars are in need of larger quantities. From the viewpoint of Chicago producers of steel, there has been no let-down in the automobile industry as a whole. Ford is reported to have reached an output of 5300 cars a day. Current orders for rail steel bars are numerous at 1.95c. per lb., Chicago Heights. Specifications from barn equipment makers are smaller, but the bed industry is busier. Deliveries range from two to three weeks. Producers are asking \$1 to \$2 a ton more for iron bars. New buying is sluggish and specifications are small. Prices for alloy steel bars are firm, and specifications are steady. Fourth quarter contracts are about equal in tonnage to third quarter commitments.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Structural Material.—Orders for structural material total 6600 tons for the week. The bulk of this is for bridge work. The Great Northern has ordered 1900 tons, and a bridge at Grand Forks, N. D., takes 1200 tons. The American Bridge Co. will supply 2800 tons for a garage in Chicago. Fresh inquiries include 6000 tons for

miscellaneous bridge work. Competition among fabricators is keener, especially for large jobs. Demand for structural material is the lightest of the heavy tonnage steel products.

Mill prices on plain material, per lb.: 2c. to 2.10c., base, Chicago.

Rails and Track Supplies.—Among fresh inquiries for standard-section rails this week is 15,000 tons for the Canadian National. Several large railroads are said to have their 1929 programs mapped out and will make definite inquiry before the middle of the month. Users have ordered a few carloads of light rails. Miscellaneous track accessory orders total 6000 tons. The 12,000 to 15,000 tons needed by the Chesapeake & Ohio is still before the trade, according to reports here. Releases against recent rail purchases are liberal. Output remains unchanged. The Chesapeake & Ohio rail order for 45,500 tons, mentioned last week, was distributed as follows: 19,380 tons each to the Illinois and Inland steel companies and 6740 tons to the Bethlehem Steel Co.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. **Per lb.:** Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—The Glamorgan Pipe & Foundry Co. bid \$43 per ton, delivered, and the United States Cast Iron Pipe & Foundry Co. quoted \$44 on 2120 tons of 6, 8 and 12-in. pipe for Chicago. The freight rate from Birmingham to Chicago is \$8.20, bringing the low bid to \$32.08, Birmingham. On small tonnages, sellers are readily obtaining \$35 a ton, Birmingham, for 6-in. and larger diameters, and in several instances \$37 has been obtained. Though prices have not definitely risen to higher levels, dealers appear to be anxious to put in effect advances for average sizes and small tonnages. Sales are few in number and inquiries are scarce. Railroads and public utilities have ordered a few carloads.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Sheets.—Prices remain strong, and some observers feel that advances are near at hand. Mill backlogs are heavy. Spot sales are numerous and afford a real gage of present prices. Hot mills are engaged at close to capacity, and specifications have been in such volume that deliveries have been extended to a range of three to four weeks. Shipments to barrel and light tank manufacturers are large, and the roofing trade is busy, now being in the midst of a very active fall season.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications in September fell below the total in August, but consumers' stocks

seem now to have been reduced to a minimum, and, with greater industrial activity, there is a noticeable pickup in the total volume of releases against commitments. Agricultural implement manufacturers and the railroads are among those that are in need of larger quantities. Prices are steady.

Warehouse Business.—Effective Oct. 1, warehouses adopted a cash discount of one-half of 1 per cent on sheets and cold-rolled strip. Warehouses have dropped the extra of 10c. per 100 lb. on blue annealed sheets on gages No. 8 and No. 10 in widths of 40 in. and over.

Cold-Rolled Strip.—Business remains brisk at 2.75c. to 2.85c., base, per lb., Cleveland. Specifications are heavy and output is not far from the capacity of mills.

Old Material.—Heavy melting steel has moved up 25c. a ton and many other grades of scrap iron and steel are proportionately higher in price. For the most part, individual sales are smaller than might be expected with business as brisk as it is now, but buyers are moving cautiously and are not ready to admit that the market is as strong as pictured by dealers. This condition, however, has prevailed for several weeks, during which time the market has steadily moved upward. It is reported that brokers are paying as high as \$14 a gross ton, delivered, for heavy melting steel to be shipped against old obligations. Likewise, in cast iron borings and rerolling rails, dealers are paying prices that are 25c. to 50c. above the quotations on heavy tonnage sales. A steel mill has bought a round tonnage of borings at \$10.50 a gross ton, and late last week brokers were offering \$10.25 to cover old orders taken at \$10, delivered. Shipment of industrial scrap, especially from automobile manufacturing plants, is heavy. Foundries, including makers of malleable castings, are busy and their purchases of scrap are liberal, though for immediate requirements only. A broker is reported to have paid \$17.75 a gross ton for re-

rolling rails. This is about 75c. above prices said to have been paid by users. The recovery of the local scrap market is clearly indicated by the fact that billings by brokers in September were larger than in any previous month this year. Among railroad offerings this week are 40,000 tons by the Pennsylvania and 6000 tons by the Chicago & North Western.

*Prices deliv'd Chicago district consumers:
Per Gross Ton*

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$13.25 to	\$13.75
Shoveling steel.....	13.25 to	13.75
Frogs, switches and guards, cut apart, and misc. rails	15.00 to	15.50
Hydraul. compressed sheets	11.75 to	12.25
Drop forge flashings.....	9.50 to	10.00
Forg'd, cast and r'l'd steel carwheels	17.00 to	17.50
Railr'd tires, charg. box size	17.00 to	17.50
Railr'd leaf spring cut apart	17.00 to	17.50
Acid Open-Hearth Grades:		
Steel couplers and knuckles	15.50 to	16.00
Coil springs	18.00 to	18.50
Electric Furnace Grades:		
Axle turnings	13.50 to	14.00
Low phos. punchings.....	15.50 to	16.00
Low phos. plate, 12 in. and under	15.50 to	16.00
Blast Furnace Grades:		
Axle turnings.....	11.00 to	11.50
Cast iron borings.....	10.25 to	10.75
Short shoveling turnings..	10.25 to	10.75
Machine shop turnings....	6.75 to	7.25

Rolling Mill Grades:		
Iron rails	14.75 to	15.25
Rerolling rails	16.50 to	17.00

Cupola Grades:		
Steel rails less than 3 ft..	17.00 to	17.50
Angle bars, steel.....	16.25 to	16.75
Cast iron carwheels.....	13.75 to	14.00

Malleable Grades:		
Railroad	15.00 to	15.50
Agricultural	12.50 to	13.00

Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00

Per Net Ton		
Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and trans- soms	20.50 to	21.00
Iron car axles.....	25.50 to	26.00
Steel car axles.....	16.25 to	16.75
No. 1 railroad wrought...	12.00 to	12.50
No. 2 railroad wrought...	11.75 to	12.25
No. 1 busheling.....	10.00 to	10.50
No. 2 busheling.....	5.75 to	6.25
Locomotive tires, smooth..	13.00 to	13.50
Pipes and flues.....	9.00 to	9.50

Cupola Grades:		
No. 1 machinery cast.....	15.00 to	15.50
No. 1 railroad cast.....	14.50 to	15.00
No. 1 agricultural cast....	13.00 to	13.50
Stove plate	11.25 to	11.75
Grate bars	12.25 to	12.75
Brake shoes	11.25 to	11.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—The jobbing business gives no indication of the lively trade that producers had expected during the early weeks of fall. Added to dullness in the Central States and in the Northwest is a slowing down of fence business in the South. The manufacturing trade, in contrast with business done with distributors, is unusually heavy, purchases in September having been larger than in any month this year. Fourth quarter contracting has moved rapidly in the last week, with the result that the bulk of requirements for the next three

months has been covered. It is noticeable that estimates of future requirements are more conservative than in the last quarter. Shipments from mills balance well with production, which now stands at 65 per cent of capacity.

Reinforcing Bars.—Among awards this week is 600 tons of billet steel reinforcing bars for construction work at Stickney, Ill. Lettings are more numerous in sizes from 50 to 200 tons and dealers' order books are growing. Some shops are engaged at close to capacity, with the outlook favorable for steady output well through October. Contractors are rushing jobs that are under way and requests for prompt shipments are insistent. Prices again have turned to the weak side. Efforts to advance rail steel reinforcing bars \$2 a ton are meeting with strong resistance. Billet steel bars out of Chicago warehouse have touched a new bottom at 2.15c. a lb. for lots of 100 tons and more. Quotations on smaller business are proportionately lower.

Coke.—Shipments of by-product foundry coke remain heavy, and prices are firm at \$8 a ton, f.o.b. local ovens. All ovens in this district are lighted.

Index to Wholesale Prices

Revised index numbers of wholesale prices, using 1926 as a basis of 100 and giving monthly figures for the principal groups of products and sub-groups, from the beginning of 1913 to the middle of 1928, have been published by the United States Bureau of Labor Statistics. The pamphlet covers 32 pages of tables, with one introductory page. In extending these numbers back to 1913, allowance was made for variations in the importance of commodities as developed year by year.

The United States Treasury Department has filed a brief appealing the decision early this year by Justice Fischer, sitting in the Customs Court, that reinforcing bars should be classified as structural material taking a duty of 20c. per 100 lb. instead of as bars with a duty of 30c. per 100 lb. A brief has also been submitted to the Customs Court of Appeals by attorneys for the defendant in the litigation, Henry L. Exstein Co., 233 Broadway, New York, and a court hearing is expected some time next month.

The American Sheet & Tin Plate Co. has started on a program of betterments at its Vandergrift, Pa., works, the principal part of which is in expanding the annealing capacity of the plant and the addition of normalizing furnaces. An old warehouse is to be razed to provide space for the new furnaces. Annealing capacity has been inadequate at this plant and the plans of the company call for the doubling of the present capacity.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.15c. to 2.50c.
Reinforc'g bars, rail steel.....	2.00c. to 2.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Philadelphia

New Steel Contracts Show \$2 Advance to Consumer— Heavy Melting Steel 50c a Ton Higher

PHILADELPHIA, Oct. 2.—Most of the steel being shipped is evidently destined for immediate or early consumption, so that very little material is accumulating in stocks. This is also true of pig iron and iron and steel scrap. In the last week of September, specifications against third quarter steel contracts were heavy and there was substantial contracting for bars and plates for this quarter, in practically all cases at a \$2 a ton advance to the buyer, based on the price of his previous contract. Structural shapes are firmer at 2.05c., Pencoyd, Pa. Sheet mills have specifications on their books sufficient to occupy them for the next six weeks and have apparently succeeded in applying the new discount of one-half of 1 per cent for cash in 10 days, although the 2 per cent discount will appear on a large percentage of invoices this month, as specifications were furnished by the buyers prior to Oct. 1.

Pig Iron.—Except for purchases of carload or 100-ton lots of foundry iron, the market is inactive. Consumers, however, are in most cases pressing for prompt deliveries against their contracts and evidently are using iron as rapidly as it is received. Furnace stocks are also decreasing, and it is estimated that in the Buffalo district furnace stocks have in the past three months been reduced fully 125,000 tons. This is attributed in part to shipments to consumers, but also to increased use of their own iron by steel company producers. Eastern Pennsylvania furnaces are comfortably booked with tonnage and are maintaining a \$20 base, furnace, on foundry grades. On Sept. 28 the Brooke furnace at Birdsboro, Pa., was blown in, having been out of blast since May 1 for rebuilding. Low phosphorus demand is fair; the northern New York producer, which recently went out of blast, is reported to have considerably reduced its stock at the furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to	
2.25 sil.	\$20.76
East. Pa. No. 2X, 2.25 to	
2.75 sil.	21.26
East. Pa. No. 1X.....	21.76
Basic (del'd east. Pa.)....	\$19.00 to 19.25
Gray forge.....	19.75 to 20.25
Malleable.....	21.00 to 21.50
Stand. low phos. (f.o.b.	
N. Y. State furnace)....	22.00 to 23.00
Cop. br'g low phos. (f.o.b.	
furnace).....	23.00 to 23.50
Va. No. 2 plain, 1.75 to	
2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Consumers are requisitioning heavily on current contracts. The price is unchanged at \$105 per ton, seaboard, the quotation of domestic producers and importers. The advance last week of \$5 a ton in the price quoted for export by British producers was apparently applied only to European markets, as importers here have received no notice of a price revision.

Billets.—Some mills are asking \$34 per ton for small lots of rerolling quality, but on a substantial tonnage \$33 per ton, Pittsburgh, for rerolling and \$38, Pittsburgh, for forging quality are still available quotations.

Bars.—Contracting for fourth quarter delivery is reported to have been

heavy, particularly in the past week. Mills are generally booked with tonnage sufficient to occupy them for the next four to six weeks. In most cases, contracts have been made at \$2 a ton advance to the consumer. Buyers who have been receiving deliveries on contracts at 1.80c., Pittsburgh, have made new commitments at 1.90c., Pittsburgh, and those with 1.85c. per lb. contracts for third quarter, have bought for the remainder of the year at 1.95c., Pittsburgh. Small lots are bringing 2c., base Pittsburgh, so that the range for Philadelphia delivery is quotable at 2.22c. to 2.32c. per lb.

Shapes.—Prices are beginning to show more stability with the new quarter, as it is generally understood that contracts at 1.90c. and 1.95c. per lb., Pencoyd, Pa., terminated with September. Mills are now asking 2.05c., Pencoyd, as a minimum. Fabricating shops are well occupied with tonnage and maintaining a better level of prices on recent bids.

Plates.—Consumers exhibited but little interest in last quarter contracts until the final week of the quarter, when a good volume of new business was booked at advances of \$2 a ton, prices ranging from 2.05c., Coatesville, to large or preferred buyers, to 2.15c., Coatesville, on small tonnages. The average contract price has been 2.10c., Coatesville, or 2.20c., delivered Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.60c.
Plates, ⅜-in.	2.80c.
Structural shapes.....	2.60c.
Soft steel bars, small shapes, iron	
bars (except bands).....	2.70c.
Round-edge iron.....	3.50c.
Round-edge steel, iron finished 1½	
x 1½ in.....	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforc. steel bars, sq. twisted and	
deform.	2.50c. to 2.75c.
Cold-fin. steel, rounds and hex....	3.45c.
Cold-fin. steel, sq. and flats.....	3.95c.
Steel hoops.....	3.50c.
Steel bands, No. 12 to ⅝-in., inclus.	3.25c.
Spring steel.....	5.00c.
*Black sheets (No. 24).....	3.85c.
†Galvanized sheets (No. 24).....	4.60c.
Blue ann'd sheets (No. 10).....	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails.....	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Sheets.—Sheet mills which permitted customers to specify against third quarter contracts up to the last day of September received very heavy shipping orders last week. In addition, there was a considerable amount of contracting for the fourth quarter at the new prices, which are 2.75c. for black, 3.50c. for galvanized and 2c. for blue annealed, Pittsburgh base. The extra of 10c. per 100 lb. for widths of blue annealed greater than 45 in. is evidently being much more firmly adhered to by the mills than was true in the third quarter. Although a considerable portion of the sheet shipments this month will take the 2 per cent cash discount, the new discount of one-half of 1 per cent is now in effect on all specifications received on or after Oct. 1.

Old Material.—Prices on most grades have become steadier. Mills are receiving sufficient scrap for their present requirements. A Harrisburg user has bought stove plate at \$13, yard steel at \$13 and heavy breakable cast at \$17, and is now offering 50c. a ton less than these prices. No. 1 steel has been bought by a Claymont, Del., consumer at \$16 a ton, a 50c. a ton advance from the last previous purchase price of the same buyer. The largest eastern Pennsylvania consumer of heavy melting steel is reported to have closed on a tonnage recently, but no price is named. The situation in low phosphorus scrap, couplers and knuckles and rolled steel wheels renders it difficult to determine the price to a consumer. One large producer of low phosphorus has recently refused to sell at \$20 a ton, yet brokers say that there is no consumers' market at present. A similar situation exists in the market on steel wheels and couplers and knuckles.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.....	\$16.00
Scrap T rails.....	\$15.50 to 16.00
No. 2 heavy melting steel.....	13.00 to 13.50
No. 1 railroad wrought.....	15.50 to 16.00
Bundled sheets (for steel	
works).....	11.00 to 11.50
Machine shop turnings (for	
steel works).....	11.50
Heavy axle turnings (or	
equiv.).....	12.50 to 13.50
Cast borings (for steel	
works and roll. mill)....	11.00 to 11.50
Heavy breakable cast (for	
steel works).....	16.50 to 17.00
Railroad grate bars.....	12.50 to 13.00
Stove plate (for steel	
works).....	12.50 to 13.00
No. 1 low phos., hvy.,	
0 04% and under.....	19.00 to 20.00
Couplers and knuckles....	17.00 to 17.50
Roller steel wheels.....	17.00 to 17.50
No. 1 blast f'nace scrap....	10.00
Wrot. iron and soft steel	
pipes and tubes (new	
specific.).....	14.50 to 15.00
Shafting.....	19.00 to 20.00
Steel axles.....	22.00 to 23.00
No. 1 forge fire.....	11.00 to 11.50
Cast iron carwheels.....	16.50 to 17.00
No. 1 cast.....	17.00 to 17.50
Cast borings (for chem.	
plant).....	14.50 to 15.00
Steel rails for rolling.....	15.50 to 16.00

Warehouse Business.—Jobbers report a fair volume of buying, and prices are quite firm. September was a fair month. The size of orders for all products is beginning to show improvement, which jobbers attribute to the well-filled condition of the mills.

Imports.—In the week ended Sept. 29, pig iron arrivals at this port totaled 2477 tons, of which 2075 tons was British and 402 tons was Dutch iron. A total of 271 tons of iron ore was received, 261 tons from Spain and

10 tons from the United Kingdom; 4768 tons of manganese ore came in from British West Africa. Steel arrivals consisted of 146 tons of structural shapes from Germany and 122 tons of steel bars from Sweden.

Cleveland

Heavy Specifications at Close of Third Quarter and New Contracting Produce Added Strength

CLEVELAND, Oct. 2.—Heavy specifications for steel bars, structural material and plates came out during the last few days of September against third quarter contracts. With higher prices prevailing for this quarter, very little tonnage was left unspecified on expiring contracts. Some of the local sales offices report that the tonnage entered in September broke previous records of the year, with the exception of one month. A goodly number of fourth quarter contracts were taken during the week at \$2 a ton above the prices the same consumers paid in the last quarter. Many of these were closed at 1.90c. to 1.95c., Pittsburgh, for steel bars, plates and structural shapes, with some at 2c., although the higher price usually applies to small buyers of miscellaneous lots who are not likely to contract.

A local mill has announced that it will hold to the Pittsburgh mill price for steel bars for the fourth quarter, using Cleveland as a basing point. However, some local consumers have been able to contract for the fourth quarter at 1.85c., Cleveland. Outside mills, using Cleveland as a basing point on steel bars, are naming 1.95c. to 2.05c., Cleveland. Some of the plate consumers are buying only for current needs, not being fully convinced that present prices will hold.

Specifications from the automotive industry are holding close to the recent volume. Several of the motor car companies are sounding out the market with inquiries for first quarter prices for sheets and hot-rolled strip steel. The Chevrolet Motor Car Co. is in the market for stampings for its new models for deliveries extending through the first quarter, and some of the stamping plants that are figuring on this work are asking for prices on blue annealed sheets for deliveries extending over six months, but mills are not ready to make quotations that far ahead.

The Wheeling & Lake Erie Railroad has purchased 1000 tons of rails from the Carnegie Steel Co.

Pig Iron.—Several inquiries for foundry and malleable iron totaling 20,000 tons or more came out during the week. An Indiana melter asked for 6000 tons and a Michigan foundry for 3000 tons, both wanting malleable

grades. One producer may open its books this week for the first quarter at a 50c. a ton advance over the current market price. Others have not yet given consideration to first quarter prices. Sales for this quarter continue to taper off. Cleveland interests booked 26,500 tons during the week. Foundries are pretty well covered for the remainder of the year, and it is expected that additional buying will be mostly in small-lot orders from consumers who will need more iron or from those who buy from hand to mouth. The only change in the price situation on foundry and malleable grades is a firmer tone in the Michigan market, where there has been a spread of from \$18 to \$18.50. The lower price has disappeared. For outside shipment, Cleveland furnaces quote foundry and malleable iron at \$17.50. Interest in the basic market has been stirred by two inquiries. One of these from the Central Alloy Steel Corporation is for 15,000 tons for October-November shipment. Both prospective buyers were unable to find a producer who would sell basic at \$17. Cleveland furnaces have no basic to sell, but one Valley producer stated that it might make a sale at \$17.50. The last basic sale was at \$16.25. Shipping orders are holding up to recent volume, and there is no sign of a slowing down in the demand from the automotive industry.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.50
S'th'n fdy., sil.	1.75 to 2.25	22.25
Malleable	.....	18.50
Ohio silvery, 8 per cent.	.....	28.00
Basic Valley furnace	.....	17.00
Stand. low phos., V'ley fur.	\$26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—A fair amount of business has been taken at regular prices, both in orders for early shipment and in fourth quarter contracts. Good order books are helping to strengthen the price structure, as some of the

mills are four weeks behind on deliveries on black sheets and six weeks behind on auto body sheets. Black sheets appear well established at 2.75c., Cleveland. Blue annealed sheets, on which there has been some shading, are now holding rather firmly at 2c. No price deviation is reported on galvanized sheets, although these have not been well tested.

Semi-Finished Steel.—A local producer has sold 1500 tons of billets at \$34, Cleveland, for the fourth quarter, and it is expected that this price will be definitely established, with sheet bars \$1 a ton lower. Consumers are still taking heavy shipments against \$32 and \$33 contracts.

Wire Products.—Many consumers have covered for the fourth quarter at the regular quotations, which are being maintained by leading producers. However, there is price shading in some sections. Manufacturers' wire is in heavy demand.

Reinforcing Bars.—Inquiry has improved. Rail steel bars have been advanced \$2 a ton to 1.85c., mill. Some jobbers have advanced the stock price to 2.25c., Pittsburgh, or 2.44c., Cleveland.

Warehouse Business.—Cleveland jobbers on Oct. 1 advanced warehouse prices \$2 a ton on black and galvanized sheets. Other prices are unchanged. Warehouse business is good.

Iron Ore.—Shipments of Lake Superior ore by water during September amounted to 8,748,286 tons, a gain of 1,518,245 tons over those of the same month last year. The total movement up to Oct. 1 was 41,265,979 tons, or a decrease of 1,117,978 tons, compared with the same period last year. September shipments fell off about 500,000 tons compared with August. Present indications are that the movement for the season will be quite a little ahead of last year's.

Coke.—Domestic by-product coke is moving in good volume at \$4.50, Ohio ovens, for egg size. There is not much activity in foundry coke, which is unchanged at \$7.75, Painesville, for Ohio by-product coke and at \$3.50 to \$4.85, ovens, for Connellsville coke.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fair from practically all consuming industries, as well as from jobbers. September orders fell slightly below those of August, during which the volume was unusually good for a summer month. The industry is operating at 60 to 65 per cent of capacity. Rivet orders are moderate.

Strip Steel.—Specifications for hot-rolled strip continue to come out in good volume, but there is little new business, as all except the very small consumers are covered at the third quarter prices. Mills have taken quite a few fourth quarter contracts for cold-rolled strip at 2.75c., Cleveland and Pittsburgh, and the market now appears well established at that

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'd sheets (No. 10)	3.35c.
No. 9 ann'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

price. Some small-lot business is being taken at 2.85c.

Old Material.—The market is very firm and several grades have advanced. To cover on short orders, dealers are paying the maximum prices that have prevailed recently. A Youngstown mill is reported to have bought No. 1 heavy melting steel at \$16, and dealers are offering up to \$15.75, delivered, to cover against this order. There have been some transactions in No. 2 heavy melting steel at \$13 to \$13.25. Machine shop turnings have advanced 50c. a ton. For this grade, dealers are paying \$9.50, delivered Cleveland, and \$11.50, delivered Youngstown. Cast scrap has also advanced 50c., a round lot bringing \$17 locally. Dealers are paying \$10.50 for blast furnace scrap. The scrap offered by Michigan automobile companies last week brought good prices. As the Pittsburgh market on heavy melting steel is \$1 a ton higher than the Valley market, while the Youngstown district has only a 50c. a ton advantage in freight rates from Detroit, scrap from the

latter city is moving more heavily to Pittsburgh than to Youngstown.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$13.75 to	\$14.00
No. 2 heavy melting steel.	13.25 to	13.50
Compressed sheet steel....	13.00 to	13.50
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	12.00 to	12.50
Machine shop turnings....	9.00 to	9.50
No. 1 railroad wrought....	12.00 to	12.50
No. 2 railroad wrought....	13.75 to	14.25
No. 1 busheling.....	11.50 to	12.00
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops....	16.00 to	16.50
Low phos., billet, bloom and slab crops	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	10.25 to	10.50
Mixed bor'gs and short turn'gs	10.25 to	10.50
No. 2 busheling.....	10.25 to	10.50
Cupola Grades		
No. 1 cast.....	16.50 to	17.00
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

New York

Steel Bids to Railroad Show Strength of Prices— Pig Iron Market Quiet

NEW YORK, Oct. 2.—The pig iron market is quiet, reflecting the fact that most of the larger buyers have placed contracts for the current quarter. In line with their recent announcement of an advance for first quarter, some Buffalo producers have introduced a clause in fourth quarter contracts stipulating that iron not shipped by Jan. 1 will be marked up 50c. a ton. A current inquiry calls for 500 tons for delivery in the first quarter, but otherwise there are no evidences of interest in iron for that period. Business, for the most part, consists of relatively small tonnages for early shipment. Sales in this district during the week totaled about 8500 tons. Stocks on furnace banks have been reduced, and in some cases certain grades of iron are not available for prompt delivery. The movement of wheat on the State barge canal has passed its peak, and a larger amount of pig iron is moving by water. The season is so late, however, that it is doubtful whether Buffalo producers will succeed in piling much stock iron at New Jersey ports. Buffalo foundry iron is unchanged at \$17, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25.....		\$21.91
*Buf. No. 2, del'd east.		
N. J.		20.28
No. 2, del'd east. N. J.		
tidewater	\$19.51 to	20.01
East. Pa. No. 2 fdy., sil.		
1.75 to 2.25.....	20.89 to	22.02
East. Pa. No. 2X fdy., sil.		
2.25 to 2.75.....	21.39 to	22.52
East. Pa. No. 1X fdy., sil.		
2.75 to 3.25.....	21.89 to	23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation has booked 1400 tons for an automobile garage and service station in Manhattan. Other sizable awards during the week were 850 tons for a causeway at Jones Beach, L. I., to E. T. Edwards; 550 tons for a barracks on Governor's Island, to Igoo Brothers, and 500 tons for two sections of the subway and 340 tons for a dam at Albany, N. Y., to the McClintic-Marshall Co. The activity of the market was prompted by a \$2 increase in price which became effective Oct. 1. For shipment from mill, distributors are now quoting 2c., Pittsburgh, and are adhering to the policy of shipping only in 40, 50 and 60-ft. lengths. On shipments cut to length the general quotation is 2.25c., Pittsburgh mill warehouse, or 2.59c., on cars at New York. Out of New York warehouse, prices are unchanged at 2.80c. per lb. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons, and 3.24c. for less than 2 tons, all delivered at job.

Ferroalloys.—Sales of 200 to 300 tons of ferromanganese are noted at \$105, seaboard, together with transactions in spiegeleisen of several carloads and small lots at unchanged prices. British agents of ferromanganese producers have not been notified of any advance in this market.

Plates, Shapes and Bars.—At the opening of bids today (Tuesday) by the New York Central Railroad on its fourth quarter requirements, there was a general adherence among bidders to the prices that have recently been reported as covering the range which the steel mills are asking in-

dustrial users of steel for the remainder of the year. The Carnegie Steel Co. quoted 1.90c., Pittsburgh or Youngstown, on plates, shapes and bars for delivery to points west of the Buffalo district, while for Eastern shipment its quotation was 2c., West Seneca, N. Y. The Otis Steel Co. quoted 1.90c., Cleveland, on plates, and the Corrigan-McKinney Steel Co. and the Bourne-Fuller Co. quoted 1.90c., Cleveland, on bars, while the Republic Iron & Steel Co. named 1.90c. at Youngstown on bars. The Jones &

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger..	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+9
1-1½-in. butt	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—		
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass		Per Lb.
Nos. 18 to 20.....	3.60c. to	3.80c.
No. 22.....	3.75c. to	3.95c.
No. 24.....	3.80c. to	4.00c.
No. 26.....	3.90c. to	4.10c.
No. 28*	4.05c. to	4.25c.
No. 30.....	4.30c. to	4.50c.

Sheets, Galvanized

Per Lb.	
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Laughlin Steel Corporation quoted 2c., Pittsburgh, on all three products; the Bethlehem Steel Co.'s price was 2c., West Seneca, N. Y.; the Youngstown Sheet & Tube Co.'s quotation was 2c., Youngstown. The Donner Steel Co. quoted 2c., Buffalo, on bars. Eastern plate mill quotations varied, the Lukens Steel Co. asking 2.10c., Newberry Junction, the Central Iron & Steel Co., 2.05½c., Newberry Junction, or 2.12½c., West Albany, and the Alan Wood Iron & Steel Co.'s price was 2.18½c., Newberry Junction. Chicago mills quoted 2.05c., mill, on all three products, while the Granite City Steel Co. put in a price of 2c., mill, on plates. These prices were generally from \$1 to \$3 a ton higher than were quoted on the New York Central's inquiry for third quarter. During the past week, a good deal of fourth quarter contracting has been done, with prices ranging from 1.90c. to 2c., Pittsburgh, on bars; from 2.22½c. to 2.32½c., New York, on plates, and from 2.19½c. to 2.29½c., New York, on shapes. Mills which permitted customers to specify against third quarter contracts up to the last day of September received very heavy specifications last week. Most of the Eastern plate mills fixed no time limit for specifications, and they were among those which received large shipping orders last week, some buyers specifying as much as 2000 tons for stock. Although Dec. 10 or 15 is the time limit for specifications for bars and shapes in fourth quarter contracts, some of the plate mills will permit specifying up to Dec. 25.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.32½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c.

Cast Iron Pipe.—Orders for pressure pipe seldom exceed 100 tons, and most of the buying is limited to car-load lots or less. Even the large privately owned public utility companies are buying a few hundred tons of pipe at a time. One such corporation, which buys in New York, closed last week on about 250 tons of water pipe. Prices continue at about \$35.60 to \$36.60 per net ton, delivered New York, the quotation of Northern makers, and at \$36 to \$37 per ton, base Birmingham, the price of Southern foundries. The State of New York is inquiring for 168 tons of 6-in. to 30-in. Class A pipe for shipment to an institution at Orangeburg, N. Y. The State of Massachusetts is in the market for about 350 tons of 6-in., 8-in. and 10-in. Class B pipe for Waverly, Mass.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Sheets.—Sales of black and galvanized sheets in lots ranging from 100 to 300 tons have been made within the past few days at the new prices, namely 2.75c., Pittsburgh, for black and 3.50c. for galvanized. Some buyers evidently had overstayed the market in the expectation that the \$2

advance on black and galvanized would not become effective. Mills have such large backlogs that they are not interested in orders at less than the new prices, which seem to be firmly established. In blue annealed sheets, an indication of the stronger position taken by producers is the almost uniform insistence on an extra of 10c. per 100 lb. on widths exceeding 45 in., whereas in the third quarter this extra was frequently waived.

Warehouse Business.—Jobbers report an increase in the size of individual orders, especially in structural steel and bars, users evidently being unable to obtain early deliveries from the mills. Black, galvanized and blue annealed sheets are firmer in price, a reflection of the well-filled condition of mills. One large jobber in this district has recently shipped about 200 tons of galvanized and black sheets to Porto Rico, where immediate shipment for use in reconstruction work was a factor. September business was considerably in excess of that done in August, and the month ranked favorably with earlier months of the year.

Coke.—Standard furnace coke continues firm, producers quoting from \$2.85 to \$3 per ton, Connellsville. Standard foundry coke is quoted at \$3.75 per ton, Connellsville, for ordinary grades and special brands are unchanged at \$4.85 per net ton, ovens. Delivered prices of special brands are \$8.56 per ton to northern New Jersey and Newark, and \$9.44 to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is now being bought at \$14.50 to \$15.50 per ton, delivered eastern Penn-

sylvania, the lower price being for shipment to Bethlehem, Pa., and the higher quotation on tonnages for Coatesville, Pa., and Claymont, Del. Yard grade ranges from \$11.75 per ton, delivered Pottsville, Pa., to \$13 per ton, delivered Conshohocken, Pa. Brokers buying blast furnace scrap have advanced buying prices to \$10 per ton, delivered. Foundry grade of stove plate is being bought at \$12 per ton, delivered to a consumer at West Mahwah, N. J. Most eastern Pennsylvania consumers of scrap are better supplied than a fortnight ago, and in one instance a mill has temporarily reduced its offering price for heavy breakable cast, stove plate and yard steel by 50c. a ton, having received on old contracts a heavy tonnage of material, which will require several days to unload and pile.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.50 to \$12.00
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	12.50 to 13.50
Stove plate (steel works).	8.75 to 9.00
Locomotive grate bars....	9.25 to 9.75
Machine shop turnings....	7.50
Short shoveling turnings..	7.50
Cast borings (blast furn. or steel works)	6.50 to 7.50
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	18.00 to 18.50
Iron car axles.....	24.75 to 25.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	7.25 to 7.75
No. 1 railroad wrought...	10.75 to 11.25
No. 1 yard wrot., long....	8.75 to 9.25
Rails for rolling.....	11.50 to 12.00
Cast iron carwheels.....	13.00 to 13.50
Stove plate (foundry)....	9.50 to 10.00
Malleable cast (railroad)..	10.00
Cast borings (chemical)...	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast.....	\$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.)	14.50
cupola size	
No. 2 cast (radiators, cast boilers, etc.)	14.00

Railroad Equipment

Canadian National Inquires for 1500 Box Cars

PURCHASE of 35 locomotives by the Canadian National, in addition to the 20 mentioned last week, and an inquiry from this road for 1530 freight and 43 passenger cars featured the equipment market during the week. Other inquiries included 500 underframes for the Great Northern and from 200 to 400 tank cars for the Union Tank Line. Details of the week's business follow:

Canadian National has distributed orders for 55 locomotives as follows: 20 4-8-4 Northern type to American Locomotive Co. through Montreal Locomotive Works, Ltd., as mentioned in THE IRON AGE last week; 10 eight-wheel switching locomotives to Montreal Locomotive Works, Ltd.; 15 Santa Fe type and 10 eight-wheel switching to Canadian Locomotive Co. Road has made additional inquiry for five locomotives of modified design Mountain type, and also expects

to buy 1500 box and 30 tank cars, 25 first-class coaches, 16 sleeping cars and two combination baggage and smoking cars.

Central Vermont has ordered two 2-10-4 type locomotives from American Locomotive Co.

Illinois Terminal Co. is inquiring for one Mikado type locomotive.

Denver & Rio Grande Western has made inquiry for four dining cars.

American Railroad of Porto Rico has ordered 100 cane cars from Gregg Co., Ltd.

Freeport Sulphur Co., New York, is inquiring for 15 steel hopper car bodies.

Great Northern is inquiring for 500 underframes in addition to 2000 recently placed with its own shops.

New York, New Haven & Hartford has ordered 10 transformer cars from Osgood-Bradley Car Co.

Union Tank Line is inquiring for 100 to 200 10,000-gal. tank cars and 100 to 200 6500-gal. tank cars.

Cerro de Pasco Copper Corporation, New York, has ordered 20 freight cars from American Car & Foundry Co.

San Francisco

Oil Tank Awards Take 3000 Tons of Plates — Structural Lettings of 4000 Tons

SAN FRANCISCO, Sept. 29 (*By Air Mail*).—Among the developments in the iron and steel markets on the Pacific Coast this week was the placing of over 3000 tons of plates and 4000 tons of structural shapes. The plates were for oil storage tanks for the Shell Oil Co. and the Rio Grande and Barnsdall oil companies.

Pig Iron.—Movement of foundry pig iron continues limited to small lots, and no large inquiries have come up for quotations recently. No change in quotations is noted.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Only two awards of reinforcing steel bars exceeding 100 tons were reported. The largest letting involved 500 tons for the India Basin power plant of the Great Western Power Co., San Francisco, and was placed with the Pacific Coast Steel Co. New inquiries include 575 tons for buildings at Fort Lewis, Wash. An award is expected next week on 1800 tons for a college building at Berkeley. Importations in June totaled 2487 tons.

Plates.—The feature of the plate market this week was the award of five 80,000-bbl. tanks, involving 1550 tons, for the Rio Grande and Barnsdall oil companies, Santa Barbara, Cal., to McClintic-Marshall Co. and five 80,000-bbl. tanks, calling for a like tonnage, for the Shell Oil Co. at Martinez, Cal., booked by the Western Pipe & Steel Co. Pending tankage business includes 10 80,000-bbl. tanks for the Shell Oil Co. at Domingues, Cal., involving 3100 tons, and 5000 tons for 14 82,000-bbl. tanks for the General Petroleum Corporation, Los Angeles. Bids are to be opened Oct. 10 on 1200 tons for a pipe line at Hood River, Ore. No change in prices is noted, 2.20c. to 2.25c., c.i.f., representing the market.

Shapes.—Bookings of structural material were heavy this week and included 1200 tons for the Richfield Oil Building, Los Angeles, placed with the Llewellyn Iron Works, 550 tons for a factory addition at Tacoma,

Wash., 725 tons for a warehouse at San Diego, and 325 tons each for two apartments in Los Angeles. McClintic-Marshall Co. was low bidder on 2500 tons for a mill building at Pittsburg, Cal., for the Columbia Steel Corporation. Pending business exceeds 10,000 tons and includes 2000 tons for a power plant at San Francisco for the Great Western Power Co. and 2000 tons for a department store in Los Angeles. Imports during June totaled 1455 tons. No change in prices on plain material is noted, 2.35c., c.i.f., being firm.

Cast Iron Pipe.—A lull in demand

for cast iron pipe developed in the week. The American Cast Iron Pipe Co. took 200 tons of centrifugal pipe for Fifty-first Avenue N. E., Seattle, and the United States Cast Iron Pipe & Foundry Co. secured 212 tons for the Hamford Street sewer tunnel in Seattle. Bids were opened this week on 142 tons of 4 to 14-in. Class B pipe for Oxnard, Cal. No new inquiries developed. In June, 1231 tons was imported.

Steel Pipe.—Demand for oil country goods, especially oil well casing, continues unabated and pipe mill representatives report a better movement of standard steel pipe. Importations of tubular products in June totaled 2169 tons.

Coke.—Sales and inquiries for foundry coke are light and have involved small tonnages. Importations in June totaled 4901 tons.

St. Louis

Steady Buying of Pig Iron—Steel Mills in Strong Position —Scrap Prices Make Further Gains

ST. LOUIS, Oct. 2.—Buying of pig iron continues at a moderately heavy rate, and the market is firm at unchanged prices. The St. Louis Gas & Coke Corporation sold 5000 tons, including 2000 tons of basic iron and 500 tons of foundry, to local melters for prompt shipment, the remainder being for fourth quarter delivery. The leading Southern maker sold 1000 tons, including 400 tons to a specialty maker in the district, for shipment in the remainder of the year. An Iowa wheel manufacturer took 1000 tons of foundry iron, two implement manufacturers each took 300 tons of foundry iron, and a California melter bought 300 tons of malleable from the Granite City maker. Implement manufacturers are enjoying a heavy melt, as are jobbing foundries catering to agricultural lines. Stove plants are making heavy shipments, and are busy on new work.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd.	20.67
Northern malleable, deliv'd.	20.16
Northern basic, deliv'd.	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Colder weather has greatly stimulated the sale of domestic coke to dealers, and there is generally a better feeling in this field. Buying of foundry grades continues on an immediate need basis.

Finished Iron and Steel.—The Laclede Steel Co. and the Missouri Rolling Mills Corporation have advanced the price of reinforcing bars \$2 a ton. An advance of \$2 a ton on plates, shapes and bars also was effective on Oct. 1. Mills have accumulated a heavy backlog of orders for galvanized sheets as a result of the

rush to buy before the discount rate on these items was cut from 2 per cent to one-half of 1 per cent, and purchasing has stopped abruptly. Specifications for other products are satisfactory. Business with structural fabricators is quiet.

Old Material.—Further advances were made in prices of some items of old material during the week, and the whole list is strong. While there was very little buying by consumers, it is known that several mills are in need of scrap and will buy as soon as they and the dealers get together on prices. Dealers are short of some items, and further strength is given to the market here by improved conditions elsewhere. Miscellaneous standard section rails, railroad springs, machine shop turnings, No. 1 machinery cast and No. 1 railroad cast are 50c. higher; bundled sheets and stove plate are up 75c., and steel car axles are 25c. up. Railroad lists: Pennsylvania Lines, 43,120

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 7/8-in. and over.	3.15c.
Small angles, under 7/8-in.	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.	3.75c.
Spring steel, 1/4-in. and thicker.	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, 1/2-in. and larger.	5.65c.
Com. wire nails, base per keg.	\$3.40
Cement c'd nails, 100-lb. keg.	3.40

tons; Chicago, Burlington & Quincy, 4175 tons; Union Pacific, 2500 tons; Chicago, Indianapolis & Louisville, 585 tons; Missouri Pacific, 108 carloads; Chicago Milwaukee, St. Paul & Pacific, 104 carloads; Nickel Plate, 56 carloads; Big Four, 22 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$12.00 to \$12.50
No. 1 locomotive tires.....	12.50 to 13.00
Heavy shoveling steel.....	12.00 to 12.50
Miscel. stand.-sec. rails	
includ'g frogs, switches	
and guards, cut apart..	13.75 to 14.25
Railroad springs.....	15.00 to 15.50
Bundled sheets.....	9.00 to 9.50
No. 2 railroad wrought...	12.00 to 12.50
No. 1 busheling	9.00 to 9.50
Cast iron boring.....	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling.....	14.50 to 15.00
Machine shop turnings....	8.50 to 9.00
Steel car axles.....	13.25 to 13.75
Iron car axles.....	26.50 to 27.00
Wrot. iron bars and trans.	19.25 to 19.75
No. 1 railroad wrought...	10.75 to 11.25
Steel rails, less than 3 ft..	15.50 to 16.00
Steel angle bars	13.50 to 14.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.50 to 13.00
No. 1 railroad cast.....	13.50 to 14.00
Stove plate	11.75 to 12.25
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and	
under	20.50 to 23.50
Relay. rails, 70 lb. and	
over	26.50 to 29.00

Youngstown

Steel Mills Well Supplied With Business

YOUNGSTOWN, Oct. 2.—Steel makers are so well supplied with business and are so definitely committed on production for the next 30 days that it is becoming difficult for buyers to interest them in additional tonnage except at the full fourth quarter prices. The quotations for the final quarter represent substantial advances in most finished products over those which have prevailed in the quarter just concluded and which are the bases of the bulk of the business now on the books for shipment this month.

On sheets, all makers in this area now are firm on new business at 2.75c., base, for black, 3.50c., base, for galvanized and 2c., base, for blue annealed. Strip prices for the remainder of this year are the same as those ruling during the second and third quarters on hot-rolled, but on cold-rolled an advance of \$2 a ton has become well established, with the large lot price 2.75c., base, compared with 2.65c. in the third quarter. Fourth quarter contracts for steel bars have been entered at 1.90c., 1.95c., and 2c., base, prices having been determined by what the individual buyers paid on third quarter contracts. These prices are \$2 a ton higher than those of the previous quarter.

However, it will probably be another month before the higher prices begin to become effective in invoices, because it was not possible to shut off specifications entirely on the heavy rolled products on third quarter contracts until the last day of September.

Sheet mill bookings include considerable tonnage entered as third quarter business for shipment at convenience of the mill, which will be an obligation on this quarter's production. There will be improvement in the mill net prices on sheets, however, as every maker is firm in the plan for the lower discount for cash. On the base gages of sheets, the discount on galvanized sheets falls from 7c. per 100 lb. to 1.75c. at 3.50c., base; on black from 5.50c. per 100 lb. to 1.37½c. at 2.75c., base, and on blue annealed from 4c. to 1c. per 100 lb. on a base price of 2c.

Strictly new business is not heavy, but high mill engagement is not dependent upon active new buying in the presence of large obligations, and the insistence of consumers on very prompt shipments. This urgency for supplies runs to almost all products, but is especially marked in those finding ultimate use in automobiles. Ingot production is easily 85 per cent of capacity, and, of the 26 steel works blast furnaces in the Mahoning and Shenango Valleys, 18 are making iron. In the finishing mills, the highest rate of operation is at the sheet mills, of which only a small percentage are

idle. Tin plate mills are not doing so well as in the summer, but operations are making a good showing compared with this time last year. Strip mills capacity is largely engaged, and so are the bar mills. Seamless pipe mills and those producing the larger sizes of welded pipe are active, reflecting a strong demand for deep well casing and drill pipe and for oil and gas pipe lines. The wire mills are merely jogging along.

Primary materials are featured by a strong demand for basic iron and an indifference on the part of producers for business. Inquiries amounting to 12,000 tons of this grade recently have reached local producers, and have been turned down, not because the price was unsatisfactory, but because merchant furnaces appear to have none of this grade and the steel producers feel they will need all the iron they have or will produce during the remainder of the year. There is a very tight situation in the steel works grades of scrap, but most melters appear to have bought some time ago when prices were lower and now are merely demanding deliveries on those purchases and thus are escaping the higher prices lately reached.

Birmingham

Pig Iron Producers Well Booked—Steel Mills Enter Last Quarter with Good Backlogs

BIRMINGHAM, Oct. 2.—The weekly volume of new business in the pig iron market is holding up well and from the standpoint of forward bookings producers are in a better position than at any time in the past several months. Buying is principally in moderate lots. Considerable iron is yet to be purchased for the fourth quarter. Shipments last week dropped slightly from the average of the past few weeks. Production of foundry iron has been increased by the blowing in of No. 3 Woodward furnace of the Woodward Iron Co. on Sept. 29. This furnace was blown out on Aug. 21 for relining. Nineteen furnaces are now in blast, of which 11 are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—Fourth quarter prices are in effect with an advance of \$2 a ton on bars, plates and shapes. Blue annealed sheets are now being quoted at 2.15c. Other sheet prices are unchanged. The one-half of 1 per cent discount rate was placed in effect on Oct. 1. Both orders and inquiries were unusually heavy during the past week and backlogs were further increased. New business booked during September was ahead of that in August, which was one of the best months of the year. All lines are active with the exception of steel rails. Specifications against contracts

are running heavy. The structural steel market shows signs of recovering from the recent dull period. The Ingalls Iron Works Co. has orders for 100 tons for two airplane hangars at Pensacola, Fla., and 180 tons for the Gulf States Paper Corporation, Tuscaloosa, Ala. The Nashville Bridge Co. is beginning the fabrication of about 3000 tons of steel for the Chef Mentour and Rigolets bridges in Louisiana. New business of bar manufacturers has been good. New bookings of the Connors Steel Co. include 450 tons of bars for a school at New Orleans, 175 tons for a hotel at Huntsville, Ala., 150 tons for a school at Knoxville, Tenn., and 120 tons for a bridge at Mobile, Ala. Reeves Brothers are at work on an order for 66 oil storage tanks ranging in capacity from 55,000 bbl. to 120,000 bbl. No change has been made in open-hearth operations. The Tennessee company has 12 active, six at Fairfield and six at Ensley, and the Gulf States Steel Co. continues with four at Alabama City.

Cast Iron Pipe.—Pressure pipe manufacturers continue to book a steady volume of small orders sufficient to maintain plant operations at a normal rate for this season. A good volume of business is pending and makers expect some worthwhile tonnage shortly. Stocks are still being drawn upon occasionally. Prices have been advanced \$2 a ton; quotations now are \$36 to \$37 on 6-in. and larger sizes.

Coke.—Consumers' requirements for foundry coke for the last quarter are covered. Practically all the important buyers have also covered for the first quarter. The usual amount of spot business is being done. There is a good run of orders for domestic coke. Quotations are unchanged from the \$5 base for both spot and contract coke.

Old Material.—The market has become fairly stable at the prices which have prevailed for the past three weeks. Some activity is noted in all

lines, but orders are largely for present needs. Shipments to mills continue active.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$10.00 to \$11.00
Scrap steel rails.....	11.50 to 12.00
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	19.00 to 20.00
Iron axles.....	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Canada

Structural Steel Orders Feature Markets—Large Railroad Purchases Expected Before End of Year

TORONTO, ONT., Oct. 2.—While the railroads have not placed their rail business for 1929 it is understood that large tonnages will be allotted before the end of the year. The Canadian National Railways placed orders for 55 locomotives with Canadian companies and is inquiring for five more, and is also in the market for 1500 50-ton box cars and 30 tank cars, 25 first-class coaches, two combination baggage-smoking cars and 15 sleepers.

The output of pig iron in Canada has declined somewhat from that of the high monthly average of June, but it is still greater than that of a year ago. August production amounted to 91,522 long tons, which was a slight decline from the 95,422 tons of July, but was 28,288 tons greater than that produced in August, 1927. For the eight months of this year, the total was 654,957 tons.

Pig Iron.—A rush of lagging melters to cover last quarter needs featured business in this market during the week. While tonnages involved in individual contracts were comparatively small, they totaled about 5000 tons. There are still a few who have not covered to the end of the year, but a large majority have bought. It is estimated by local blast furnace representatives that bookings for the last quarter exceed those of former quarters this year by about 15 per cent. Spot sales have continued in good volume. Radiator and sanitary ware manufacturing concerns have been extensive buyers both for spot and future delivery. While the agricultural implement industry is recognized as one of the largest consumers of pig iron in Canada, it procures practically its entire supply in the United States markets, because it has the advantage of duty-free iron. Canadian prices are strong.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable.....	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable.....	25.00
Basic.....	24.00
Imported Iron, Montreal Warehouse	
Summerlee.....	33.50
Carron.....	33.00

Structural Steel.—Most of the orders awarded during the past week were confined to lots under 500 tons, but two or three larger contracts were also closed and others are still pending. The Dominion Bridge Co., Montreal, reports orders for 5000 tons for the new Eaton Building in Toronto, and 6000 tons for the Dominion Square Building in Montreal. John T. Hepburn, Ltd., Toronto, has the contract to supply 500 tons of structural steel for building at University Avenue and Elm Street, Toronto. The Trussed Concrete Steel Co., Walkerville, Ont., has contract for 750 tons of steel for

office building for S. E. Dinsmore, Ltd., Windsor, Ont. The Disher Steel Construction Co., Toronto, received an order for 250 tons of reinforcing bars for car barns at Oshawa, Ont., for Canadian National Electric Railways. For a new office building at Yonge and Colborne Streets, Toronto, for the Crown Life Insurance Co., about 5000 tons of steel will be required; 300 tons of reinforcing bars will be needed for the new Balfour Building, St. Lawrence Boulevard, Montreal.

Old Material.—Spot sales were strongly featured in transactions of the week. Shipping orders against old contracts, however, are appearing at regular intervals, and the movement of scrap is large. Heavy melting steel, turnings, machinery cast, wrought iron and steel axles are in the greatest demand. Prices are firm in the Toronto and Montreal markets.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel....	\$9.00	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	16.00	16.00
Stove plate.....	13.00	13.00
Standard carwheels.....	16.00	16.00
Malleable.....	13.00	13.00
	Per Net Ton	
No. 1 machinery cast....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

Buffalo

Pig Iron Prices Firm—Steel Mills Operating at 90 Per Cent—Scrap Prices Move Higher

BUFFALO, Oct. 2.—The steadiness of the pig iron price situation is shown by a sale of 250 tons to a district melter by a local furnace at \$17.50, furnace, for No. 2X grade and at \$18.50 for No. 1X. For shipment outside this immediate district, local furnaces are adhering to a \$17 base for delivery during the remainder of this year and to \$17.50 for first quarter. For delivery within the local territory, quotations are 50c. a ton higher both for last quarter and first quarter. Predictions of another price advance are prevalent. Inquiry now before local sellers amounts to about 2000 tons. The Hanna Furnace Co. has lighted its new stack, now having three in blast in this district. Pig iron ship-

ments by barge canal for the week ended Sept. 29 were 900 tons.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00 to \$18.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50 to 19.50
Malleable, sil. up to 2.25.....	17.50 to 18.50
Basic.....	17.00 to 17.50
Lake Superior charcoal....	27.28

Finished Iron and Steel.—Bar, shape and plate prices are firm at 2c. to 2.10c., Buffalo. Some bars have been sold for 2.05c., Buffalo, and on small lots, 2.10c. is being obtained. Sheet business is very good at the recently established prices. A structural job amounting to 650 tons at Ithaca, N. Y., was awarded to a local fabricator. Average steel mill operation is about 90 per cent. Reinforcing bar business has tapered. Warehouse business continues to improve.

Old Material.—A large purchase of No. 1 heavy melting steel, No. 2 heavy melting steel and hydraulic compressed sheets was made during the week at \$15.50 for the No. 1 grade. Between 10,000 and 15,000 tons is said to have been bought. At the same time, \$16 has been paid for strictly No. 1 steel. A few sales of railroad malleable at \$15.50 to \$16 are re-

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

ported, and some No. 1 machinery cast was sold at \$15.25 to \$15.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$15.50 to	\$16.00
No. 2 heavy melting steel.	13.50 to	14.00
Scrap rails	14.50 to	15.00
Hydraulic comp. sheets...	13.50 to	14.00
Hand bundled sheets.....	11.00 to	11.50
Drop forge flashings.....	13.50 to	14.00
No. 1 busheling.....	14.50 to	15.00
Hvy. steel axle turnings..	13.00 to	13.50
Machine shop turnings....	7.25 to	7.75
No. 1 railroad wrought....	13.50 to	14.00
Hvy. steel axle turnings..	13.00 to	13.50
Acid Open-Hearth Grades		
Knuckles and couplers....	16.50 to	17.00
Coil and leaf springs.....	16.50 to	17.00
Rolled steel wheels.....	16.50 to	17.00
Low phos. billet and bloom ends	17.00 to	17.50
Electric Furnace Grades		
Short shov. steel turnings.	12.00 to	12.50
Blast Furnace Grades		
Short shov. steel turnings.	12.00 to	12.50
Short mixed borings and turnings	10.00 to	10.50
Cast iron borings.....	10.00 to	10.50
No. 2 busheling.....	11.00 to	11.50
Rolling Mill Grades		
Steel car axles.....	18.00 to	18.50
Iron axles	21.00 to	22.00
Cupola Grades		
No. 1 machinery cast.....	15.25 to	15.50
Stove plate	14.00 to	14.50
Locomotive grate bars....	12.00 to	12.50
Steel rails, 3 ft. and under.	17.00 to	17.50
Cast iron carwheels.....	13.00 to	13.50
Malleable Grades		
Industrial	16.00 to	16.50
Railroad	16.00 to	16.50
Agricultural	16.00 to	16.50

Detroit Scrap Market Stronger

DETROIT, Oct. 2.—Some further price advances have been registered during the past week in the scrap market in this district. Borings and short turnings and long turnings are 50c. higher. There is no sign of weakness, and dealers generally do not look for recessions from present prices in the near future.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$12.00 to	\$12.50
Borings and short turnings	8.50 to	9.00
Long turnings.....	7.50 to	8.00
No. 1 machinery cast.....	14.00 to	15.00
Automobile cast	19.00 to	20.50
Hydraul. comp. sheets....	11.50 to	12.00
Stove plate	11.00 to	12.00
No. 1 busheling.....	9.50 to	10.00
Sheet clippings	7.50 to	8.00
Flashings	10.00 to	10.50

Italian Government Buys Steel Plant

HAMBURG, GERMANY, Sept. 15.—The Italian Government, according to a recent announcement, has acquired the Armstrong steel works at Pozzuoli, near Naples. The plant has a capacity of 80,000 tons a year. This will be the only Government-owned steel works in Europe, outside of Russia. Production of electric steel in Italy is expected to total about 300,000 tons this year, compared with 255,000 tons in 1927.

Boston

Pig Iron and Scrap Prices Are Stronger—Domestic Demand for Coke Rushes Ovens

BOSTON, Oct. 2.—Not more than 2500 tons of pig iron was sold through Boston brokers in the past week. The largest individual sale reported was 500 tons of No. 2X by the Mystic Iron Works to a Connecticut foundry at 75c. a ton higher than was quoted by that stack a fortnight ago, and equivalent to a shade under \$17.50 a ton, Buffalo. Otherwise, sales were largely in car or 100-ton lots and included Buffalo, Alabama, western Pennsylvania, New York State and Indian iron, the last named at \$21.25 to \$21.75 a ton on dock here, duty paid. The feature of the market has been the activity in shipments on contracts. Foundries evidently are endeavoring to stock up before cold weather sets in. The rail and water movement from the Buffalo district into New England has been heavier than at any previous time this season, and stocks of regular grades of iron in Buffalo furnace yards are reported as down to practically nothing.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91
*Buffalo, sil. 2.25 to 2.75..	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to 8.77 from Alabama.
*All rail rate. †Rail and water rate.

Coke.—New England ovens are swamped with business. The New England Coal & Coke Co. is still behind on foundry coke deliveries, with little indication of catching up during

the next fortnight. Last week's colder weather created a large demand for domestic coke. The company last week reduced its stock pile more than 2000 tons, and on Oct. 1 advanced its retail price in the Boston district from \$12.50 a ton to \$13. The Providence Gas Co. is slightly behind on domestic coke deliveries, but is up to date on foundry coke. Both companies quote foundry coke at \$11 a ton, delivered within a \$3.10 freight rate zone. On Sept. 24 the first oven of the New Haven, Conn., coke plant was pushed.

Warehouse Business.—The movement of iron and steel out of warehouses has been gathering momentum since Labor Day. Consumers are still taking conservative amounts of stock, but are buying more often. Warehouses are holding more rigidly to listed prices.

Old Material.—With liberal shipments now going to eastern Pennsylvania, while those to the Pittsburgh district are holding up well, the old material market is more active. Continued buying of scrap for export also contributes to the activity. There is a narrow market for railroad and yard wrought, but practically all other kinds of scrap are selling, and prices generally are strong, with an upward tendency. Some brokers have raised their price on heavy melting steel 25c. a ton to \$11, on cars, shipping point; steel turnings and mixed borings and turnings are up 25c. to \$6.75, on cars, and specification pipe is 50c. higher at \$10, on cars. At least one shipper last week paid as high as \$7.50 a ton, on cars, for forge scrap, but \$7 appears to be the general limit. The same shipper paid \$15 a ton, on cars, for shafting, which is 50c. more than most brokers have been offering. It is estimated that 10,000 tons of scrap will be exported from Boston between now and Jan. 1. On Oct. 8 the Boston & Albany Railroad will close bids on 1000 tons of No. 1 rails and miscellaneous scrap.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$10.75 to	\$11.00
Scrap T rails.....	10.00 to	10.50
Scrap girder rails.....	9.50 to	10.00
No. 1 railroad wrought...	9.00 to	9.50
No. 1 yard wrought.....	8.00 to	8.50
Machine shop turnings....	6.25 to	6.75
Cast iron borings (steel works and rolling mill).	6.50 to	6.60
Bundled skeleton, long....	8.00 to	8.50
Forge flashings	8.50 to	9.00
Blast furnace borings and turnings	6.25 to	6.75
Forge scrap.....	6.50 to	7.00
Shafting	14.50 to	15.00
Steel car axles.....	15.50 to	16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to	10.00
Rails for rolling.....	9.50 to	10.00
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to	\$14.50
No. 1 machinery cast.....	15.50 to	16.00
No. 2 machinery cast.....	13.50 to	14.00
Stove plate	10.00 to	10.50
Railroad malleable	15.00 to	15.50

Warehouse Prices, f.o.b. Boston Base per Lb.

Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts.....	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Sheet Specifications Heavy and Prices Are Firmer—Pig Iron Quiet but Quotations Are Steady

CINCINNATI, Oct. 2.—The pig iron trade has been quiet in the past week. Most buyers have contracted for their needs until the end of the year, so that sales have been confined to small miscellaneous lots. The only sizable inquiry is from the Anderson Stove Co., Anderson, Ind., for 500 tons of foundry iron for first quarter delivery. Despite the lack of interest on the part of consumers, prices are being well maintained. Lake Erie iron is quoted at \$17.50, base Cleveland, while Alabama and Tennessee furnaces are asking \$16.25, base Birmingham. Practically all of the yard stocks of foundry iron at Ironton are reported to have been sold, and, since no merchant furnace is active at that point, prices are merely nominal.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$18.89 to \$19.89
So. Ohio malleable..... 20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25.. 19.94
Ala. fdy., sil. 2.25 to 2.75.. 20.44
Tenn. fdy., sil. 1.75 to 2.25 19.94
So'th'n Ohio silvery 8 per cent 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Sheet specifications booked in the past week by a large manufacturer in this district have been the largest in the history of the company and all operating units have sufficient unfilled orders to insure production at full capacity for the next two weeks or longer. The tonnage demand has been well distributed among consuming industries. The roofing season in the South is fully up to normal, and in some cases sales have exceeded the average. Sheet makers apparently are having no difficulty in maintaining prices, which have been well stabilized at 2c. to 2.10c., base Pittsburgh, for blue annealed, 4c. for automobile body, 2.75c. for black and 3.50c. to 3.60c. for galvanized. Bars, structural shapes and plates are reported to be selling at 1.95c., base Pittsburgh, to large buyers and at 2c. to small users. Fabricators have increased operations slightly, although

they are having difficulty in getting enough business to sustain current production schedules. The wire market is dull. Common wire nails are bringing \$2.69 per keg, delivered Cincinnati.

Coke.—A sharp upward turn in specifications for by-product foundry coke in the last two weeks of September carried shipments for the month almost 25 per cent above those of August. Colder weather has brought a better demand for domestic grades. As predicted a week ago, prices in this district will not change during October. By-product foundry coke at Detroit remains at \$9, delivered to local consumers, and at \$10, delivered to users outside of the Detroit switching area. Movement of beehive coke from the Wise County and New River districts has been fair.

Wise County foundry coke is selling at a minimum of \$4.25, ovens, and furnace coke at \$3.50.

Old Material.—While shipments to consumers are holding up well, dealers have divergent opinions regarding the course of the market in the next 30 days. Quotations are unchanged. Much interest is being shown in prices which railroads will get this month for their scrap. The Big Four has a list of about 2500 tons closing today.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$12.50 to \$13.00
Scrap rails for melting....	13.00 to 13.50
Loose sheet clippings.....	9.25 to 9.75
Bundled sheets	10.00 to 10.50
Cast iron borings.....	8.50 to 9.00
Machine shop turnings....	8.00 to 8.50
No. 1 busheling.....	10.50 to 11.00
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires....	13.00 to 13.25
No. 2 railroad wrought....	12.50 to 13.00
Short rails	17.00 to 17.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	16.00 to 16.50
No. 1 railroad cast.....	13.00 to 13.50
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.25 to 10.75
Railroad malleable	12.25 to 12.75
Agricultural malleable....	11.25 to 11.75

Export Trade Remains Quiet

Prices Unchanged Despite Strong Domestic Market—Foreign Steel Sold Here With Difficulty

NEW YORK, Oct. 2.—Export trade continues rather small, with such foreign markets as Japan, China, Cuba and South America buying only limited quantities of steel products. Prices for export are substantially unchanged from the level of previous weeks, despite greater strength in the domestic market. Tin plate is quoted at about \$5.20 per base box, c.i.f. Japanese port, and light-gage black sheets are about \$76 per ton, c.i.f. Japan.

Importers of steel in New York are still disposing of small tonnages of Continental material, but at a low margin of profit, because of the high prices prevailing in Europe. Such business as has been done is attributable to the firmness of American mill prices, especially on bars. Recently 150 to 200 tons of foreign plain steel bars is reported to have been sold to a consumer here at 2.08c. per lb., duty paid. Importers are still able to offer hot-rolled hoops at about 2.40c. per lb., duty paid, for No. 18 gage, which is several dollars a ton under the domestic mill price, except in certain territories where American producers have met foreign competition.

The Government is understood to be preparing a test case on the marking of material with the country of origin, which is expected to come before the Customs Court about Oct. 17. The defendant is to be the Standard Sales Co., New York.

Final decision of the Customs Court of Appeals on the appeal of the Government from the decision of Justice

Fischer classifying reinforcing bars as construction material, subject to a lower duty than plain bars, is expected about Oct. 11.

Continental Rail Prices May Be Advanced

HAMBURG, GERMANY, Sept. 15.—It is generally expected that at the next meeting of the European Rail Makers Association export prices on rails will be advanced from the present level of £6 7s. 6d. (\$30.98) per ton to £6 10s. (\$31.59) per ton, for eastern Asiatic markets. For all other foreign markets, except Europe, it is expected that the price will be advanced to £6 12s. 6d. (\$32.20) per ton. The price to European buyers, it is believed, will be £6 15s. (\$32.80) per ton. The reason given for the smaller advance to the Asiatic buyers is that higher prices might result in the loss of the Far Eastern markets to American mills.

It is announced by the United Steel Works, Düsseldorf, Germany, licensee of the American Rolling Mill Co., Middletown, Ohio, for the production of Armco products in Germany, that business in this material has developed satisfactorily. Demand is especially good for boiler plates and tubes of Armco iron. The licensee has just begun to produce Armco wire.

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

Non-Ferrous Metal Markets

**Copper Quiet and Strong,
Tin Active and Higher, Lead
Steady and Unchanged, Zinc
Quiet and Firm**

Copper.—September set a new record in total sales at close to 250,000 net tons, according to reliable estimates. Between 145,000 and 150,000 tons was for domestic consumption. The foreign sales at about 100,000 tons, while very large, did not equal by about 5000 tons the heavy transactions last May. Domestic buying extended as far ahead as December and it is generally admitted that consumers have bought all their October and November requirements and at least 75 per cent of those for December. If the amount probably bought in excess of requirements for October-November is recognized, it is probable

Metals from New York Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	51.00c. to 52.00c.
Tin, bars.....	53.00c. to 54.00c.
Copper, Lake.....	16.25c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	13.25c. to 13.75c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½.....	32.75c. to 33.75c.

Metals from Cleveland Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	55.00c.
Tin, bar.....	57.00c.
Copper, Lake.....	16.00c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar.....	9.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	59.00c.
Solder, ½ and ½.....	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.50c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	24.62½c.
Copper.....	25.50c.
Brazed Brass Tubes.....	27.75c.
Brass Rods.....	17.50c.

From New York Warehouse	
Delivered Prices, Base Per Lb.	
Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 2	Oct. 1	Sept. 29	Sept. 28	Sept. 27	Sept. 26
Lake copper, New York.....	15.25	15.25	15.25	15.25	15.25	15.25
Electrolytic copper, N. Y.*.....	15.00	15.00	15.00	15.00	15.00	15.00
Straits tin, spot, N. Y.	49.75	49.95	....	49.50	49.75	49.00
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32½	6.32½	6.32½	6.32½	6.32½	6.32½
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

that domestic needs for the rest of the year are well provided for. Foreign consumers must still buy about one-third of their October normal requirements, about two-thirds of their November needs and considerable for December. Quotations are unchanged at the recent advance, with electrolytic selling at 15.25c., delivered in the Connecticut Valley, and at 15.50c., c.i.f. European ports, which is the official quotation of Copper Exporters, Inc. As the month opens, the market is naturally quiet and will probably continue so for some little time, although foreign buying may be somewhat active. On Oct. 1, mining companies advanced the wages of their miners 10 per cent, which is estimated to increase the cost of refined copper from ⅜c. to ½c. per lb. This has been taken care of in the recent advances in the price of refined metal. Lake copper is moderately active and strong at 15.25c., delivered.

Copper Averages.—The average price of Lake copper for September, based on daily quotations in THE IRON AGE, was 14.95c., delivered. The average price of electrolytic copper was 14.70c., refinery, or 14.95c., delivered in the Connecticut valley.

Tin.—Because of strong manipulation in London, which has tended to cause excitement in the New York market, sales have been large to both consumers and dealers. For the week ended Saturday, Sept. 29, about 2000 tons changed hands, making the total for the last 10 weeks about 10,000 tons. Sales last week included deliveries all the way from spot to January and February. Flotation of mining shares in London is said to have pushed the market up in the last few days. Business this week, Monday and Tuesday, has been moderately active with spot Straits tin quoted Tuesday at 49.75c., New York, the highest since early in June. Prices in

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not been changed since the advance of Sept. 24. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.
Seamless Tubes—	
High brass.....	24.62½c.
Copper.....	25.50c.

Rods—	
High brass.....	17.50c.
Naval brass.....	20.25c.

Wire—	
Copper.....	17.25c.
High brass.....	20.25c.
Copper in Rolls.....	23.00c.
Brazed Brass Tubing.....	27.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.75c.	14.25c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms.....	11.00c.	12.00c.
Brass, heavy.....	7.25c.	8.25c.
Brass, light.....	6.25c.	7.25c.
Hvy. machine composition.....	9.75c.	11.00c.
No. 1 yel. brass turnings.....	9.00c.	9.625c.
No. 1 red brass or compos. turnings ..	9.00c.	10.00c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.625c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Zinc.....	10.00c.
Lead, wide.....	9.75c.
Seamless Tubes—	
Brass.....	26.12½c.
Copper.....	27.00c.
Brass Rods.....	17.50c.
Brazed Brass Tubes.....	27.75c.

Obituary

GEORGE D. McILVAINE, formerly secretary of the National Pipe and Supplies Association and of the Enameled Sanitary Ware Manufacturers Association, died in Pittsburgh, Sept. 28. He had long been prominent in trade association work, and in recognition of his efforts in this direction, was elected one of the early presidents of the American Trade Association, an organization composed of executives of trade associations. Born in Chambersburg, Pa., 58 years ago, he was graduated with the class of 1889 from Lafayette College, of which he later became a trustee. Ill health forced him to relinquish his secretaryship of the pipe and supplies and the sanitary ware associations a few years ago, but he was elected honorary secretary of both organizations. He also was secretary of the American Shovel Institute and the Forged Tool Society.

FRED I. TEALE, sales representative of Eaton, Rhodes & Co., Cincinnati, pig iron and coke dealers, died at his home in Norwood, Ohio, Sept. 28, after a two months' illness. He was one of the best known salesmen in the southern Ohio pig iron trade. For many years he was associated with Rogers, Brown & Co., first at Buffalo and later at Cincinnati. Shortly after Rogers, Brown & Co. and Crocker Brothers consolidated, Mr. Teale was appointed resident agent at Cincinnati for the M. A. Hanna Co. Recently he resigned this position to become connected with Eaton, Rhodes & Co.

J. C. YARNELL, for 17 years Western sales manager at Detroit for the Clark Brothers Bolt Co., Milldale, Conn., died suddenly at Kalamazoo, Mich., on Sept. 25. Prior to his connection with the bolt industry, Mr. Yarnell had been engaged in the wagon and carriage spring business.

JAMES PARKER, president Kitts Mfg. Co., Oswego, N. Y., maker of steam specialties, died at his home in that city on Sept. 23, aged 62 years.

THOMAS R. TIMOTHY, manager Chester works, American Sheet & Tin Plate Co., Chester, W. Va., died at St. Francis Hospital, Pittsburgh, Sept. 27. He was born at Leechburg, Pa., 52 years ago and had been identified with the company for 35 years, starting as sweeper in the mill at Leechburg and serving as a hot mill foreman at the Cambridge and Martins Ferry, Ohio, works of the company before his promotion 16 years ago to the management of the Chester works.

Horace T. Potts & Co., Philadelphia, have sold an acre of ground at the extreme east of their warehouse property in North Philadelphia to the International Harvester Co., which is expected to erect a service station for trucks.

London Tuesday were higher than a week ago, with spot standard quoted at £224, future standard at £220 17s. 6d. and spot Straits at £224 10s. The Singapore price was £225 10s., up nearly £4 in the week. Statistics for September did not create a favorable impression. Shipments from the Straits were 8310 tons, with Banca shipments at 1717 tons, both larger than expected. American deliveries into consumption were 6685 tons, which was well below estimates. There was an increase in the world's visible supply of 1468 tons, bringing the total on Oct. 1 to 19,924 tons.

Lead.—Business continues in satisfactory proportions, and prices are unchanged and strong. In the outside market, quotations stand at 6.32½c., St. Louis, for October, and 6.35c. for November. The leading interest continues to quote 6.50c., New York, as its contract price.

Zinc.—Extreme quietness pervades the market, but prices continue firm and unchanged at 6.25c., East St. Louis, or 6.60c., New York. Production of ore in the Joplin district was high last week at about 10,500 tons, but it is expected every fourth week the output will be decidedly curtailed.

Antimony.—Because of curtailed

stocks here and a fairly active demand for the metal, Chinese antimony is higher at 11.50c., New York, duty paid for spot and 10.87½c. to 11c., for future.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 2.—Sales of copper for immediate use are larger and prices have advanced. Quotations on tin are higher under the influence of foreign markets. The old metal market shows a more quiet tone but prices are unchanged.

Prices, per lb., in carload lots: Lake copper, 15.50c.; tin, 51.50c.; lead, 6.45c.; zinc, 6.35c. in less-than-carload lots; antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Awards of 8100 Tons—1800 Tons in New Work

AWARDS of 8100 tons, reported to THE IRON AGE during the last week, included 1400 tons for a garage in New York. New projects, calling for only 1800 tons, included no jobs of outstanding size. Awards follow:

WORCESTER, MASS., 400 tons, telephone building, to Jones & Laughlin Steel Corporation.

WALTHAM, MASS., 100 tons, State hospital, to Barker Steel Co.

NEW YORK, 1400 tons, Packard garage and service station, to Jones & Laughlin Steel Corporation.

NEW YORK, 500 tons, two sections of subway; 100 tons in section 5-B, route 109, from Cornell Contracting Corporation, and 400 tons in section 1, route 106, from George H. Flinn Corporation, to McClintic-Marshall Co.

NEW YORK, 550 tons, Government barracks on Governor's Island; from James McWilliams, general contractor, to Igloe Brothers.

JONES BEACH, N. Y., 850 tons, causeway; from C. H. Earle, general contractor, to E. T. Edwards, Columbia, Pa.

ALBANY, N. Y., 340 tons, Alcove dam, to McClintic-Marshall Co.

RED BANK, N. J., 100 tons, sewage disposal plant, to Igloe Brothers.

RUTHERFORD, N. J., 100 tons, Erie Railroad bridge, to McClintic-Marshall Co.

KNOXVILLE, TENN., 150 tons, science building, to Connors Steel Co.

NEW ORLEANS, 450 tons, McDonough School, to Connors Steel Co., Birmingham.

MOBILE, ALA., 120 tons, Fowl River bridge, to Connors Steel Co.

HUNTSVILLE, ALA., 175 tons, Russell Erskine Hotel, to Connors Steel Co.

JACKSONVILLE, FLA., 100 tons, Jacksonville Title & Trust Co. building, to Connors Steel Co.

STICKNEY, ILL., 600 tons, construction

work for Sanitary District, to Barton Spiderweb System, Inc.

CHICAGO, 140 tons of rail steel bars, garage, to Concrete Steel Co.

CHICAGO, 200 tons, building for Commonwealth Edison Co., to Olney J. Dean & Co.

CHICAGO, 200 tons, apartment hotel, awarded by Gamm Construction Co. to an unnamed bidder.

CHICAGO, 600 tons of rail steel bars, building at 4940 East End Avenue, to Calumet Steel Co.

HIGHLAND PARK, ILL., 100 tons, Moraine Hotel, to Concrete Engineering Co.

EVANSTON, ILL., tonnage not stated, store and apartment building for Victor C. Carlson, to Kalman Steel Co.

STATE OF ILLINOIS, 300 tons of rail steel bars, State road work, to Calumet Steel Co.

SEATTLE, WASH., 100 tons, three small jobs, to Northwest Steel Rolling Mills.

SAN FRANCISCO, 500 tons, Great Western Power Co. plant at India Basin, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

ASBURY PARK, N. J., 300 tons, convention hall; Turner Construction Co., general contractor.

WASHINGTON, 450 tons, Arlington Memorial Bridge.

CHICAGO, tonnage not stated, apartment building at 4728 East End Avenue.

CHICAGO, 225 tons, apartment building at 5912 Commonwealth Avenue; Olsen & Urbain, architects.

CHICAGO, 100 tons, apartment building at 3021 Washington Boulevard; E. F. Bahrens, architect.

OAK PARK, ILL., tonnage not stated, four-story office and store building; Holabird & Root, architects.

FORT LEWIS, WASH., 575 tons, three Government buildings; Chrisman & Snyder, general contractors.

LOS ANGELES, 170 tons, apartment building, Ninth and Union Streets; bids being taken.

PERSONAL

E. F. SCOTT, who has been engineer on layout, design and equipment of foundries for the Austin Co., Cleveland, has been appointed secretary-manager of the Ohio Foundries Association, Inc., succeeding ARTHUR J. TUSCANY, who recently became manager of the Gray Iron Institute.



E. F. SCOTT

Mr. Scott has been in close contact with the foundry industry for several years in engineering and sales work and has also devoted a great deal of attention to the business problems of the foundry. He is a member of the American Foundrymen's Association and has written texts and papers on subjects relating to some of the technical problems of the foundry industry. He assumed his new position Oct. 1, with headquarters in Cleveland.

FRANK HURD, formerly superintendent of the Gadsden and Sheffield, Ala., furnaces of the Sloss-Sheffield Steel & Iron Co., Birmingham, has been made superintendent of the Vanderbilt furnaces of the Woodward Iron Co. at Vanderbilt, Ala.

GEORGE L. BITTING, director of sales Bunting Brass & Bronze Co., Toledo, has tendered his resignation, effective immediately. He has announced no specific plans for the future.

A. M. LYMAN, for 15 years identified with the sales department of the American Cast Iron Pipe Co., Birmingham, has become associated with the sales organization of the Birmingham Foundry & Machine Co., Birmingham.

B. W. ROGERS has been appointed representative at Akron, Ohio, for the Falk Corporation, Milwaukee, and will have headquarters at 225 Cen-

tral Savings & Trust Building. He has recently been identified with the B. F. Goodrich Co. in that city and previously was associated with the Allis-Chalmers Mfg. Co.

J. A. WRIGHT has resigned as sales manager National Cast Iron Pipe Co., Birmingham, and is devoting his time to private business interests at Pensacola, Fla.

D. WALKER WEAR has been elected president of the Stowe Mfg. Co., Binghamton, N. Y., succeeding the late CHARLES F. HOTCHKISS.

ARTHUR C. TOZZER, vice-president Turner Construction Co., in charge of the Boston territory, has been elected executive vice-president of the company, with headquarters at the main office, 420 Lexington Avenue, New York. WILLIAM H. NYE, who has been Boston contract manager, has been named to succeed Mr. Tozzler as vice-president in charge of the Boston office, 178 Tremont Street.

L. S. MONROE has resigned as advertising manager Electric Controller & Mfg. Co., Cleveland, to become associated with the Copperweld Steel Co., Glassport, Pa.

ARTHUR F. SCHERER, Cincinnati district sales manager Wheeling Steel Corporation, has resigned, and Hu-



H. B. MILLER

BERT B. MILLER, for the past year in the Detroit district sales office, has been named to succeed him. Mr. Scherer has been associated with the Wheeling corporation or its subsidiaries for the past 16 years. He intends to enjoy a long period of rest on the Pacific Coast. Mr. Miller has been engaged in the steel business for 21 years. Starting in 1907 as clerk

with the Otis Steel Co., he was elected secretary of that company in 1919, and resigned that position in March, 1927, to go with the Wheeling Steel Corporation.

A. V. WILLGOOS, chief engineer of the Pratt & Whitney Aircraft Corporation, Hartford, Conn., gave an illustrated talk on engines manufactured by his company, at a meeting of the New Britain, Conn., section of the American Society of Mechanical Engineers on Sept. 27. He will address the Boston section this month on the same subject.

H. E. CHILCOAT, who has been engaged in consulting commercial engi-



H. E. CHILCOAT

neering work since 1926, has been appointed manager of sales for the air dump car division, Koppel Industrial Car & Equipment Co., Pittsburgh. He began his business career in 1900 in the employ of the Pennsylvania Railroad. In 1906 he became associated with the Westinghouse Air Brake Co. as traveling inspector, with headquarters at Richmond, Va. Later he was transferred to the company's sales department at Pittsburgh, continuing in sales work until 1918. He then resigned to become manager of the Clark Car Co., Pittsburgh, holding that position until 1926.

PROF. FRANK P. MCKIBBEN, consulting structural and bridge engineer, will lecture before various engineering societies throughout the country during the winter on the application of electric arc welding to the noiseless construction of buildings, based upon the experience of the General Electric Co. and other companies. On Oct. 4, Professor McKibben will speak before the Rochester (N. Y.) Engineering Society, and on Oct. 11 at the fall meeting of the American Welding Society.

P. A. TERRELL, formerly manager of the new industries division of the Mississippi Power Co., has taken

charge of central station and railroad sales for the Copperweld Steel Co., Chicago. He was graduated in electrical engineering from the Alabama Polytechnic Institute in 1917 and spent the following nine months on the General Electric Co. test course at Schenectady, N. Y. After serving in the Marine Corps during the war, he joined the Alabama Power Co., remaining with it until May, 1927, when he became identified with the Mississippi company.

F. H. WILLCOX and L. E. L. THOMAS, vice-presidents, and GORDON FOX, electrical engineer, of the Freyn Engineering Co., Chicago, returned Sept. 18 from a four months' business trip to Russia, where this company is constructing two steel mill units for the Soviet Government.

A. H. TISCHER has been appointed representative in southern and central Indiana and Louisville, Ky., for the Foote Brothers Gear & Machine Co., Chicago, and will have headquarters at 704 North Alabama Street, Indianapolis.

A. J. FORSCHNER, who in July of this year was appointed vice-president of the Atlas Conveyor Co., 20 South Fifteenth Street, Philadelphia, has also taken over the duties of secretary of the company. In this capacity he succeeds E. A. THUMBERT, who left the company Aug. 6.

JOHN M. WATSON, SR., has resigned as general manager of the Canonsburg Steel & Iron Works, Canonsburg, Pa. He had been associated with the company for 27 years. D. M. STEMBLE has been elected vice-president and general manager.

J. B. JOHNSON, chief of the material branch of the United States Air Corps, McCook Field, Dayton, Ohio, will speak Oct. 4 before the Cincinnati chapter of the American Society for Steel Treating on "The Application of Metallurgy in Aircraft Production."

NORMAN F. MELVILLE has resigned as manager of metallurgy and inspection for the Superior Steel Corporation, Pittsburgh. He had been with the Columbia Steel Co. at both its Elyria, Ohio, and Butler, Pa., plants.

E. J. KULAS, president Otis Steel Co., Cleveland, sailed Sept. 28 for a several weeks' trip through Europe.

F. A. BUCHDEA has been elected vice-president, and H. C. STUCESSEY, treasurer, of the Eaton Axle & Spring Co., Cleveland. They were formerly treasurer and assistant treasurer respectively.

J. R. GORMAN has been elected vice-president and general manager of the Transue & Williams Steel Forging

Corporation, Alliance, Ohio, and HAROLD O. BARKER, a partner in the banking house of Jesup & Lamont, New York, has been elected chairman of the board. Mr. Barker became interested in the company about a year ago and in the spring was elected a director and became chairman of the executive committee. He has also been elected chairman of the Murray Body Corporation, Detroit.

F. R. FISHBACK, president Electric Controller & Mfg. Co., Cleveland, has been elected vice-president in charge of the apparatus division of the National Electrical Manufacturers' Association, of which ALFRED E. WALLER is managing director. He was elected by the executive committee of the board of governors to replace N. A. WOLCOTT, resigned. Mr. Fishback was formerly sales manager of the Electric Controller company but was made vice-president and secretary of that company in 1924 and the following year was elected president. As vice-president of the apparatus division of the N. E. M. A., he will represent a group which includes about 85 per cent of all the manufacturers of electrical apparatus and machinery in the country.

FRED A. DOOLITTLE has been appointed field representative in the Central States for the Gray Iron Institute, Cleveland. He has had considerable contact with organization activities and a broad experience in personnel work. For four years he was membership secretary of the American Plan Association in Cleveland. For the past year he has been engaged in forming an association of apartment house owners in Cleveland. During the war he served as captain in the regular army and spent his time in organizing personnel departments in the Eastern territory and in assisting in settling labor disputes in arsenals and navy yards.

R. K. WEBER has been elected president of the Mount Vernon Car Mfg. Co., Mount Vernon, Ill., succeeding the late W. C. Arthur. H. H. CUST has been made vice-president, succeeding Mr. Weber.

ALOYSE MEYER, president of the International Steel Cartel, the European association which includes all the important steel producing countries of the Continent, arrived recently in New York and has started on a trip to the centers of steel production in the United States. Mr. Meyer has been president of the cartel for about one year, having been selected as its head as president of one of the largest European steel companies, the Acieries Reunies de Burbach-Eich-Dudelange in Luxemburg. He expects to return to New York in time to attend the meeting of the American Iron and Steel Institute, Oct. 26.

CHARLES WARDLOW, managing director of S. & C. Wardlow, Ltd., Shef-

field, England, maker of cutlery sheets and file steel, will arrive in this country next week to visit A. Milne & Co., 745 Washington Street, New York, the firm's agent for the United States and Canada.

GEORGE H. CHARLS, president National Association of Flat Rolled Steel Manufacturers, will address the meeting of the Pressed Metal Institute to be held in Buffalo, on Friday afternoon, Oct. 12.

TERRENCE HANLON, formerly associated with the Pennsylvania Wood & Iron Co., Buffalo, has been placed in charge of an office which has been opened at 602 Genesee Building, Buffalo, by the Hausman & Wimmer Co., Pittsburgh, dealer in steel and iron and steel scrap. EDWARD R. JONES, recently with the Rochester Iron & Metal Co., Rochester, N. Y., is associated with Mr. Hanlon.

L. C. WILSON, for eight years vice-president and general manager of the Federal Malleable Co., West Allis, Wis., has been appointed assistant to PAUL LLEWELLYN, president Interstate Iron & Steel Co., Chicago.

L. DUDLEY CARR has been appointed assistant superintendent of the Auburn, N. Y., works of the International Harvester Co. He succeeds ADELBERT P. JONES, who has been made superintendent of the company's Canton, Ill., plant.

WILBUR F. HELMER, formerly chief engineer of the F. L. Hughes Co., Rochester, N. Y., has been made general manager of the Utica Structural Steel Corporation, Utica, N. Y., recently formed as a reorganization of the Andrews Iron & Steel Corporation. He replaces GEORGE W. ANDREWS, who was general manager of the Andrews corporation. The company plans an addition to its East Utica plant.

F. H. MOYER has been elected president of the Mackintosh Hemphill Co., Pittsburgh. He has been identified with this company for the past two years, most of the time as executive vice-president.

H. C. WEIDNER, general manager Townsend Co., New Brighton, Pa., has been elected president, succeeding the late R. T. TOWNSEND. Mr. Weidner has been with the Townsend organization for 15 years and has been active in the bolt, nut and rivet industry for 28 years. Before becoming general manager, he was for several years general sales manager.

Debevoise-Anderson Co., pig iron, coke and coal, has moved from 114 Liberty Street to suite 1201, 117 Liberty Street, New York.

Tin Plate Agreement Runs Three Years

Plan Effective Now Expected to Increase Welsh Exports—Wage and Freight Advances in Germany May Raise Steel Prices

(By Cable)

CLEVELAND pig iron is still quiet, especially for export, and consumers are looking for lower prices, but makers are maintaining a firm market. Hematite iron is active both at home and for export and stocks have considerably diminished so that prices are steadier. Foreign ore continues quiet.

Finished steel is active in the domestic market, but is generally quiet in export trade. Cammell, Laird & Co., Ltd., has secured a contract for one vessel of 12,000 tons for the Blue Star Line. Workman, Clark & Co. of Belfast are to build six 9000-ton vessels for Andrew Weir & Co., which enables them to resume operations at their south yard, which has been closed since the old company disbanded. The contract for a dockyard at Singapore has been placed by the Admiralty with Sir John Jackson,

Ltd., of London. The work is to be completed within 7 years.

Welsh tin plate bar makers are booked with good orders from the Welsh tin plate mills. Tin plate is moderately active with forward sales at 18s. 3d. (\$4.43) per base box, f.o.b. works port. Consumer interest is increasing. The Welsh-United States agreement on tin plate operates for three years from Oct. 1.

Galvanized sheets are strong as a result of makers' well sold order books and the substantial strength of Continental steel prices. Japan has been a steady buyer of light gage black sheets and makers are sold up to the end of the year.

Continental iron and steel prices are strong, with continued export demand and makers well booked with orders. Belgian output in August was 329,000 tons of pig iron and 332,000 tons of steel.

turn Welsh mills will have a free hand in other markets, probably throughout Europe.

Taking the exports of the two nations as 100 per cent, Wales will receive a quota of 70 per cent and the United States 30 per cent, so that Welsh makers will have a possible outlet for an additional 1,000,000 base boxes a year. With the announcement of these negotiations an optimistic tone prevails in Wales, and makers are looking forward to a period of prosperity. Their order books from October to the end of December are well filled, and some have made sales into next year. Consumers realize that the period of low prices on tin plate is ended unless there is a decided decline in the cost of production. But the cost of Continental steel has increased greatly, and Welsh steel makers are beginning to profit from that situation.

The tone of the iron and steel business as a whole has improved. Although the number of British furnaces in blast at the end of August, 130, was small, demand for pig iron shows signs of revival, consumers being more inclined to consider their winter requirements. In the domestic market British makers are holding their own, but abroad they still encounter strong competition in some quarters.

In finished products, mills engaged in the production of light material are busy and likely to continue so for a considerable period of time. Cer-

Tin Plate Agreement Aids Welsh

Mills May Increase Exports by 1,000,000 Boxes Annually—British Heavy Rolled Products Still Quiet

LONDON, ENGLAND, Sept. 18.—Interest in the iron and steel market recently has centered in the negotiations just concluded between United States and Welsh tin plate makers for the elimination of unnecessary export competition. Precise details of the scheme are still lacking, pending

the return from the United States next week of representatives of Welsh producers. Meanwhile it has been disclosed that sections of certain overseas markets are to be reserved for United States manufacturers, particularly those in which America has large capital investments, and in re-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' work with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17 1/2s.		\$4.25	
Bilbao Rubio ore*.....	1 2	to £1 2 1/2s.	5.35	to \$5.48
Cleveland No. 1 fdy.....	3 8 1/2	to 3 9 1/2	16.64	to 16.89
Cleveland No. 3 fdy.....	3 6		16.04	
Cleveland No. 4 fdy.....	3 5		15.80	
Cleveland No. 4 forge...	3 4 1/2		15.68	
Cleveland basic (nom.)..	3 5		15.80	
East Coast mixed.....	3 10		17.11	
East Coast hematite.....	3 10 1/2		17.23	
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to 40.10
Billets.....	6 2 1/2	to 6 15	29.77	to 32.81
Ferromanganese.....	13 15		66.83	
Ferromanganese (export)	14 0		68.04	
Sheet and tin plate bars,				
Welsh.....	6 0		29.16	
Tin plate, base box.....	0 18	to 0 18 1/4	4.37	to 4.43
Black sheets, Japanese				
specifications.....	13 7 1/2		65.00	
Ship plates.....	7 12 1/2	to 8 2 1/2	1.63	to 1.74
Boiler plates.....	9 0	to 10 10	1.92	to 2.25
Tees.....	8 2 1/2	to 8 12 1/2	1.74	to 1.84
Channels.....	7 7 1/2	to 7 17 1/2	1.58	to 1.69
Beams.....	7 2 1/2	to 7 12 1/2	1.53	to 1.63
Round bars, 3/4 to 3 in..	7 5	to 7 15	1.55	to 1.66
Steel hoops.....	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage...	9 15	to 10 0	2.09	to 2.14
Galv. sheets, 24 gage....	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage, nom.....	16 0		3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):	£3 3s.	to £3 5s.	\$15.31	to \$15.80
Belgium.....	3 3	to 3 5	15.31	to 15.80
France.....	3 3	to 3 5	15.31	to 15.80
Luxemburg.....	3 3	to 3 5	15.31	to 15.80
Basic pig iron (nom.):				
Belgium.....	3 3	to 3 4	15.31	to 15.55
France.....	3 3	to 3 4	15.31	to 15.55
Luxemburg.....	3 3	to 3 4	15.31	to 15.55
Coke.....	0 18		4.37	
Billets:				
Belgium.....	5 2		24.79	
France.....	5 2		24.79	
Merchant bars:				
Belgium.....	6 7 1/2		1.40	
France.....	6 7 1/2		1.40	
Luxemburg.....	6 7 1/2		1.40	
Joists (beams):				
Belgium.....	5 5		1.14	
France.....	5 5		1.14	
Luxemburg.....	5 5		1.14	
Angles:				
Belgium.....	6 0		1.30	
1/4-in. plate:				
Belgium (a).....	6 15		1.50	
Germany (a).....	6 15		1.50	
3/8-in. ship plate:				
Belgium.....	6 10		1.44	
Luxemburg.....	6 10		1.44	
Sheets, heavy:				
Belgium.....	6 1		1.33	
Germany.....	6 1		1.33	

(a) Nominal.

tain sections of the heavier industries, such as the construction and engineering branches, are well occupied, but there is still not enough tonnage for the heavy plate mills and some plants are obliged to operate alternate weeks. New shipbuilding is improv-

ing, but the volume of tonnage coming to the steel makers is not sufficient to compensate for the lack of export demand. Except for specialties, such as tin plate and galvanized sheets, export business in finished iron and steel is on a very small scale.

Belgian Industry and Finance Is Sound

British Official Publication Reviews Economic Situation of Iron and Steel and Metal Working

BELGIAN anxiety about the commercial depression which it was supposed would follow the currency stabilization during October, 1926, has not been justified, according to a "Report on the Economic Situation in Belgium," written at the end of 1927 and just published by the British Department of Overseas Trade. The British coal strike, and the rise of French and Italian currency presented some unexpected markets for Belgian products at the end of 1926. These aids were temporary, yet the trade balance has steadily improved so that at the beginning of 1928 gold was being shipped from United States to Belgium, the budget showed a comfortable surplus, and large reductions had been made in the national debt.

Cartels and amalgamations have been formed in many industries, including metallurgical, automobile and railroad supply. Another noteworthy trend is the production of finished products rather than the exportation of crude materials. Machinery manufacture is one of the few industries showing an unsatisfactory condition. Employment is high: only 1.7 per cent of all industrial workers are totally unemployed; 3.8 are partially employed. Such labor troubles as have arisen have been rapidly adjusted. Due to the restricted purchasing power of the currency and the special taxes imposed for the period 1926-1930, Belgian imports are restricted, but the report concludes that in view of the general healthy condition of all the country, commercial prospects are distinctly favorable.

Narrow Profit in Iron and Steel

Turning specifically to the iron and steel trade, the report notes that operations during the first quarter of 1927 were conducted at a narrow margin of profit, except on the part of one or two of the leading interests. Competition was keen with Germany, Luxemburg and especially France, and the trade from the Far East, India and South America was abnormally small and did not improve until the middle of the year. On account of a limited home market, Belgian producers are said to be more dependent upon exports than steel makers in other countries.

The following associations or cartels were formed during the year:

Product	Scope	Expiration Date
Wire	Germany, France, Belgium, Luxemburg	June 30, 1928
Bolts and nuts	Belgium	
Machinery	Belgium	
Pig iron	France, Belgium, Luxemburg	Jan. 1, 1929
Tubes	International	

Wages were increased 2½ per cent on Feb. 1, 1927. Two hundred and three thousand one hundred and forty-three persons are engaged in the

metallurgical industry, according to the census on Oct. 1, 1926, that counted 1,080,331 engaged in all industrial establishments employing 10 or more workers.

As above noted, trade in miscellaneous machinery is very unsatisfactory, due to high tariffs in most importing countries and sharp competition by England and Germany. In 1891 7295 workmen were employed in the machinery industry, while in October, 1927, the number had dropped to 4235. As a consequence increased specialization of producing plants is clearly recognizable.

Belgian Prices Are Strong

Mills Offer Deliveries Into January and Are Unable to Accept All Sizes—Export Trade Improving

ANTWERP, BELGIUM, Sept. 15.—Mills are still fully engaged and prices are strong, having advanced further on some products, particularly beams and rods. Considerable business is being booked and many orders are of good size. Export demand is good, with a steady volume of trade from Japan and India and increased interest shown by Chinese buyers.

More active demand from foreign consumers of steel has apparently been caused in part by the independent position of most Continental mills. French producers are firm in their quotations and not actively seeking new business. German sellers are either out of the market temporarily or quoting further advances in prices. As a result, buyers seem to be willing to accept quoted prices without making any serious attempt to secure concessions. In most cases, mills are unable to accept all sizes, so that when a range of sizes is ordered the buyer often finds it necessary to divide the business. Deliveries extend through December and even into January on the small sizes of bars and rods.

Semi-Finished Material.—Prices are strong and show a continued tendency

Steady expansion in the motor car industry is noted. Some 7000 machinists and 7400 carriage workers are employed, and in 1927 they produced about 1000 trucks and 5000 passenger automobiles. The most progress is in heavy buses for interurban transport. Various mergers and liquidations seem to indicate the evolution of an all-Belgian standard chassis, especially adapted to the nation's peculiar road requirements. Differentiation would therefore be limited to engines and bodies.

Firearm Factories Stagnant

The great industry in firearms centering at Liege is stagnant, due to customs and police regulations in most importing countries. Whereas in 1913 some 1,370,000 weapons were proofed by the official testing board, the number dropped to 550,000 in 1926. Automatic pistols and breech-loading shotguns showed the least decline.

In the Grand Duchy of Luxemburg the important iron industry has been handicapped by preferential railroad rates granted to Belgian producers, two increases in wages, compulsory charges for social welfare purposes, and slowly declining pig iron prices. The international cartel did not bring the expected results, but two of the principal producers have amalgamated, and a cooperative society of all pig iron makers has been formed to make international arrangements and allocate the orders. The net results of these handicaps and helps has been capacity furnace operation and a 9 per cent increase in both iron and steel production over 1926.

to advance. Business in blooms is small, because of the lack of available supplies. Prices range from £4 9s. (\$21.63) per metric ton for 8-in. to £4 16s. (\$23.33) per ton for 4-in. blooms. Billets are offered only occasionally and quotations are nominal at £4 17s. (\$23.57) per ton for 3-in. and £4 18s. 6d. (\$23.93) for 2-in. billets. Demand for sheet bars is good, but supplies are small. For a nominal assortment £5 (\$24.30) per ton is being asked by sellers. All these quotations are f.o.b. Antwerp.

Pig Iron.—Business is satisfactory and prices are firm, especially for export. Quotations now range up to £3 5s. (\$15.80) per ton, f.o.b. Antwerp, for No. 3 phosphoric foundry iron. The domestic price continues unchanged at 117 Belgas (\$16.25), f.o.b. furnace. Thomas steel-making iron is quoted at £3 1s. to £3 3s. (\$14.82 to \$15.31) per ton, f.o.b. Antwerp, for export and at 115 Belgas (\$15.97) per ton in the domestic market. Bessemer hematite is offered at \$18, furnace, to meet the competition of the British product.

Finished Material.—Demand is con-

siderably in excess of the available supply of material, and mills are fully booked with tonnage for the next two or three months. Deliveries, in some cases, extend into January on small sizes of bars, rods and beams. With many makers unable to accept any but certain sizes on which rolling schedules are not completed, prices are firm and size extras are fully maintained. Quotations for steel bars are £6 2s. 6d. to £6 3s. per ton (1.35c. to 1.36c. per lb.), and £6 5s. per ton

(1.37c. per lb.) is obtained occasionally for special specifications or prompt shipment. German mills are asking £6 5s. per ton (1.37c. per lb.) rather generally, but are usually able to accept any sizes specified and offer earlier delivery than Belgian makers. Beams are quoted at £5 per ton (1.10c. per lb.), f.o.b. Antwerp, and hot-rolled hoops, at £7 2s. 6d. per ton (1.57c. per lb.). Corrugated reinforcing bars are about £6 6s. per ton (1.39c. per lb.), f.o.b. Antwerp.

German Domestic Sales Better

Expected Price Advance Based on Freight and Wage Increases Brings Buying Movement

BERLIN, GERMANY, Sept. 17.—Rhenish-Westphalian experts calculate that the 11 per cent increase in railroad freight rates, which becomes effective Oct. 1, will involve an increase in steel production*cost of between 1.50 and 2 m. (35c. and 50c.) a ton. As this addition to the cost of production cannot be passed on to foreign buyers, the suggestion has been made that domestic prices be advanced 2 to 3 m. (50c. to 72c.) per ton. No formal step in this direction has yet been taken, and it is expected that the syndicates will decide to await the result of the pending wage negotiations. Consumers are strongly opposed to a price increase, which would be the third this year. Since December, 1927, the domestic price of bars has been increased from 134 m. (\$32.03) to 141 m. (\$33.70) per ton, the export price has risen approximately from 95m. (\$22.70) to 122 m. (\$29.16), and the price at which the Ingot Steel Syndicate delivers to exporting manufacturers has advanced from 93 m. (\$22.22) to 113.50 m. (\$27.23) per ton. It is claimed, therefore, that the steel industry can easily bear the small increase in production cost caused by the rise in freight rates.

The home iron and steel market improved in the first half of September. Orders were accelerated in anticipation of a price advance. Pig iron has changed little, but an increase in activity is expected late in the year. Pig iron production in August was 1,030,837 metric tons, compared with 1,115,503 tons in August, 1927.

The export market is extremely active, but Germany cannot take full advantage of this, as the Stahlwerksverband is severely rationing sales abroad, so that the German export quota of 300,000 tons a month, as fixed by the International Steel Cartel, shall not be exceeded. Firm Continental prices and active markets are expected to continue.

The domestic wire rod and wire markets are weak, but export is satisfactory, and prices are firm, except for barbed wire, in which American competition is encountered. French wire manufacturers are attempting to negotiate a national combination, which would facilitate the reestablishment of the International

Wire Cartel. The International Wire Rod Cartel has raised the export price by 2s. 6d. (60c.) a ton to £6 2s. 6d. (\$29.76) per ton, f.o.b. port. The German Mittelblech-Ver $\ddot{u}$ einigung (Medium Gage Sheet Syndicate) has been prolonged until the end of 1928, prices and selling conditions being unchanged.

The International Steel Cartel has decided to retain unchanged the production program of its members at 29,287,000 tons a year. The next meeting of the cartel will be Dec. 13. No progress was made at this month's meeting toward establishment of separate selling syndicates for different products. Poland's entry into the cartel depends upon the preliminary negotiation of a German-Polish steel agreement. Negotiations have begun, but there is not much confidence of success.

In the second quarter of 1928, as in the first, all member countries of the International Steel Cartel (Germany, France, Belgium, Luxemburg and the Saar) exceeded their production quotas. The quarterly production quota is 7,320,000 tons, but the total output of the members in the second quarter was 8,100,000 tons and in the first quarter 8,580,000 tons. Germany, whose quarterly quota is 3,160,000 tons, produced 3,710,000 tons in the second quarter and 4,210,000 tons in the first.

The Mannesmann Tube Corporation has decided to increase its capital stock by 25,000,000 m. to finance new construction in Hucking.

The engineering industry reports less domestic business, but a slight increase in foreign orders. Reports from Belgrade state that the United Steel Works and the General Electricity Co. have made a joint offer to the Serbian Ministry of Communications to deliver all necessary railroad material during the next few years, including locomotives, cars, rails, signaling apparatus and construction machinery and equipment, on terms of 10 to 15 years' credit.

Three South-German locomotive-manufacturing corporations, the S $\ddot{a}$ chsische Maschinenfabrik of Chemnitz, Maschinenfabrik Esslinger of Neckar and Maschinenbau A. G. of Karlsruhe, have entered into a col-

laboration agreement. This move is in opposition to the agreement made in August between the four North-German companies, Henschel, Borsig, Schwartzkopff and Maffei, and the aim is to defend state rights as guaranteed by the Railroads Law of 1920. Under this law the state railroads passed under control of the Reich, but orders for materials and equipment were to be distributed among the former railroad-owning states as before. Prussia was to receive 88.4 per cent of locomotive orders, Bavaria 4.9 per cent, Saxony 3.16 per cent, W $\ddot{u}$ rttemberg 1.41 per cent, and Baden 2.13 per cent. The South-German companies consider that the North-German combination is a threat to their rights, and it demands that the state quotas shall be increased and not reduced.

The Automobile Manufacturers' Association reports extremely good business. This year production of private cars exceeded that of 1927 by 36 per cent and sales by 39 per cent. The association points out that Germany's automotive production this year has shown a greater percentage of increase than that of any other country in the world. Eighteen leading bicycle-manufacturing firms have agreed to form an association in the general interest of efficient production and to combat over-production. Fixing of production quotas is expected to follow. Solingen cutlery manufacturers have formed a commission to determine the best methods of carrying on a joint publicity campaign. Domestic business in cutlery is dull and export, after averaging more than 600 metric tons a month early in the year, declined in July by about 20 per cent. No improvement is expected until the Christmas demand develops.

German Steel Workers Demand Increase

(By Radio)

BERLIN, GERMANY, Oct. 1.—All syndicates' domestic prices are unchanged for October. The Steelworkers' labor union has denounced the wage agreements and demands increases. The employers have refused and declare that if the demand is persisted in a general advance in steel prices will ensue.

The European Rail Makers' Association has increased prices by 2s. 6d. (61c.) per ton. The International Tube Cartel has retained its prices unchanged.

The pig iron market is quiet and export is declining. The domestic steel market is more active, orders being placed in expectation of a rise in prices. The export market is firm with a heavy overseas demand for steel bars.

Pig iron and steel production are slowly declining. The output of pig iron in the first eight months of this year exceeds the output in the same months of 1927, but the production of steel and rolled products is slightly less than 1927.

Largest Exports Since February, 1921

One-Fourth of August Total Was Scrap—Imports
Much Above July and Slightly Higher
Than a Year Ago

WASHINGTON, Sept. 28.—Aggregating 287,297 gross tons, exports of iron and steel products from the United States in August were the largest since February, 1921, when they amounted to 393,328 tons, and exceeded the July, 1928, exports of 253,336 tons by 33,961 tons, or 13.4 per cent. For the eight months ended Aug. 31, exports were 1,899,375 tons, or 399,664 tons above the 1,499,711 tons exported for the corresponding period of last year, a gain of 26.6 per cent. Exports for the eight months of 1928 moved at a higher monthly average, approximately 249,000 tons, than for any period since 1920, when the average was 392,400 tons. The total for the calendar year will greatly exceed 2,000,000 tons, which, it is understood, the railroads required before making permanent the temporary reduction of 20 per cent in freight rates on export shipments of

iron and steel beginning last January.

Imports in August were 69,914 tons—22,084 tons, or 46.2 per cent above the 47,830 tons in July. For the eight months ended Aug. 31 however, imports dropped 1 per cent, to 507,639 tons from 512,942 tons in the corresponding period of last year.

Scrap exports in August—70,538 tons—set a record for all time, and aided materially in swelling the total outgoing shipments of iron and steel. Of the scrap exports, 27,006 tons went to Japan, 24,536 tons to Italy, 9458 tons to Canada, 7834 tons to Poland and Danzig, and 863 tons to Mexico. Record shipments of scrap also were made during the eight months ended Aug. 31, with a total of 364,776 tons. Each of the last five months has registered above 40,000 tons, a figure never reached but once before (September, 1920).

The average daily shipment of exports in August was 9268 tons—higher than in any month for some time past, and comparing with 8172 tons in July. The daily average export movement for the eight-month period ended Aug. 31 was 7784 tons. Gains in exports in August were made in 16 classes, scrap rising 26,755 tons over July, while rails with a total of 23,999 tons made a gain of 12,920 tons. Decreases were made in shipments of plain structural material, with a loss of 7440 tons; plates, with a reduction of 2449 tons, galvanized sheets with a decrease of 1760 tons, and steel bars with a drop of 1382 tons.

For the eight months scrap represented 19 per cent of the exports; tin plate, 8.9 per cent; boiler tubes and welded pipe, 8.85 per cent; rails, 7.6 per cent; black steel sheets, 6.8 per cent; plain shapes, 6.25 per cent;

Exports of Iron and Steel from the United States

(In Gross Tons)

	August		Eight Months Ended August	
	1928	1927	1928	1927
Pig iron.....	8,404	4,854	42,331	31,575
Ferromanganese.....	1,041	138	7,039	527
Scrap.....	70,538	23,491	364,776	145,700
<i>Pig iron, ferroalloys and scrap.....</i>	<i>79,983</i>	<i>28,483</i>	<i>414,146</i>	<i>177,804</i>
Ingots, blooms, billets, sheet bar, skelp.....	16,400	9,072	89,350	59,023
Wire rods.....	3,620	1,612	25,737	10,903
<i>Semi-finished steel.....</i>	<i>20,020</i>	<i>10,684</i>	<i>115,087</i>	<i>69,926</i>
Steel bars.....	12,517	10,050	97,184	75,971
Alloy steel bars.....	1,231	284	9,825	3,736
Iron bars.....	180	243	2,469	3,356
Plates, iron and steel.....	12,199	12,385	98,573	93,946
Sheets, galvanized.....	13,581	10,936	103,998	111,986
Sheets, black steel.....	19,069	12,283	128,530	118,685
Sheets, black iron.....	1,297	1,436	10,140	11,579
Hoops, bands, strip steel.....	5,121	2,480	37,806	31,027
Tin plate; terne plate.....	22,374	16,119	169,001	188,731
Structural shapes, plain material.....	14,333	14,086	118,715	93,452
Structural material, fabricated.....	6,716	7,854	63,166	45,282
Steel rails.....	23,999	12,534	144,664	125,179
Rail fastenings, switches, frogs, etc.....	2,681	2,987	32,742	23,504
Boiler tubes, welded pipe and fittings.....	30,948	16,095	176,275	188,763
Plain wire.....	3,867	2,287	30,833	21,827
Barbed wire and woven wire fencing.....	5,494	5,212	49,463	33,846
Wire cloth and screening.....	235	200	1,297	1,570
Wire rope.....	509	338	3,473	3,062
Wire nails.....	905	728	10,937	5,493
Other nails and tacks.....	754	893	6,856	5,711
Horseshoes.....	37	62	306	347
Bolts, nuts, rivets and washers, except track.....	1,038	1,212	8,800	8,171
<i>Rolled and finished steel.....</i>	<i>179,085</i>	<i>130,704</i>	<i>1,305,053</i>	<i>1,195,224</i>
Cast iron pipe and fittings.....	2,998	1,819	22,893	17,949
Car wheels and axles.....	1,494	999	10,062	12,026
Iron castings.....	643	1,131	7,805	7,860
Steel castings.....	507	603	6,844	5,335
Forgings.....	1,318	222	7,347	3,491
<i>Castings and forgings.....</i>	<i>6,960</i>	<i>4,774</i>	<i>54,951</i>	<i>46,661</i>
All other.....	1,249	1,107	10,138	10,096
Total.....	287,297	175,752	1,899,375	1,499,711

Imports of Iron and Steel Into the United States

(In Gross Tons)

	August		Eight Months Ended August	
	1928	1927	1928	1927
Pig iron.....	12,990	14,034	94,340	84,780
Ferromanganese*.....	2,721	4,062	30,017	19,214
Ferrosilicon†.....	94	581	491	332
Scrap.....	5,394	4,681	31,923	41,863
<i>Pig iron, ferroalloys and scrap.....</i>	<i>21,615</i>	<i>23,408</i>	<i>159,611</i>	<i>152,676</i>
Steel ingots, blooms, billets and slabs.....	1,338	922	14,421	8,578
Iron blooms, slabs, etc.....	1,042	2,597	11,054	10,087
Wire rods.....	2,380	3,519	25,479	18,665
<i>Semi-finished steel.....</i>	<i>911</i>	<i>1,133</i>	<i>12,091</i>	<i>11,847</i>
Rails and splice bars.....	19,084	16,079	118,962	104,021
Boiler and other plates.....	707	496	4,062	3,224
Sheets and saw plates.....	1,566	420	17,565	9,488
Steel bars.....	8,270	6,926	63,574	63,448
Bar iron.....	67	189	1,452	2,996
Hoops, bands and cotton ties.....	2,176	3,923	13,599	24,062
Tubular products (wrot.).....	4,456	2,587	28,429	41,772
Nails, tacks, staples.....	894	539	5,757	4,545
Tin plate.....	32	35	783	958
Bolts, nuts, rivets and washers.....	6	65	160	249
Round iron and steel wire.....	412	196	2,342	2,919
Barbed wire.....	384	111	2,359	3,082
Flat wire; strip steel.....	224	199	1,518	1,805
Steel telegraph and telephone wire.....	15	178	31	31
Wire rope and strand.....	186	140	1,157	1,660
Other wire.....	53	13	373	304
<i>Rolled and finished steel.....</i>	<i>39,443</i>	<i>33,051</i>	<i>274,861</i>	<i>276,411</i>
Cast iron pipe.....	6,288	8,343	45,536	63,269
Castings and forgings.....	188	125	2,152	1,921
Total.....	69,914	68,446	507,639	512,942
Manganese ore*.....	25,996	22,964	131,490	230,797
Iron ore.....	225,538	303,586	1,677,206	1,879,180
Magnesite (dead burned).....	6,981	....	38,391	53,524

*Manganese content only.

†Chromium content only.

‡Silicon content only.

Destination of Iron and Steel Exports from the United States (In Gross Tons)

Country of Destination	August, 1928	January Through August		Country of Destination	August, 1928	January Through August	
		1928	1927			1928	1927
North and Central America and West Indies.....	116,659	888,588	740,668	Europe	43,230	225,265	136,897
Canada and Newfoundland.....	95,638	731,157	564,746	Belgium	1,779	10,766	3,239
Cuba	6,029	43,553	64,764	France	257	3,203	3,893
Mexico	8,773	55,547	58,689	Greece	9	1,893	2,507
Guatemala	198	6,297	5,104	Italy	27,208	79,583	37,867
Panama	1,323	11,023	13,400	Netherlands	103	1,535	2,119
Salvador	209	2,402	3,183	Russia	608	2,584	5,643
British West Indies.....	715	5,597	9,626	United Kingdom.....	3,944	35,408	49,536
Other West Indies.....	2,529	21,962	12,643	Other Europe	9,322	90,293	32,093
Other Central America.....	1,245	11,050	8,513	Far East	82,289	473,467	362,674
South America.....	44,492	302,383	246,530	British Malaya	937	4,793	6,552
Argentina	9,247	66,990	55,042	China	5,457	69,715	38,308
Brazil	8,528	59,463	51,532	Dutch East Indies	7,628	25,369	26,178
Chile	9,408	49,700	28,869	India and Ceylon.....	3,794	18,120	21,143
Colombia	3,143	45,740	40,729	Japan and Chosen	51,482	261,643	189,001
Peru	1,223	15,511	25,358	Kwangtung	4,569	9,048	15,868
Uruguay	947	6,385	7,700	Philippine Islands.....	5,936	61,064	37,416
Venezuela	11,693	54,902	35,517	Australia	1,747	10,942	19,128
Other South America.....	303	3,692	1,783	New Zealand	218	1,429	810
				Other Asia and Far East.....	521	11,344	8,270
				Africa	627	9,672	12,942
				British South Africa.....	187	4,001	5,900
				Egypt	8	3,414	2,924
				Mozambique	123	913	3,304
				Other Africa	309	1,344	814
				Total	287,297	1,899,375	1,499,711

galvanized sheets, 5.5 per cent; plates, 5.2 per cent; steel bars, 5.1 per cent, and ingots and semi-finished material, 4.7 per cent.

Of the rails exported in August, 4466 tons went to Canada, 2071 tons to Brazil, 1208 tons to Mexico and 929 tons to Japan. Tin plate exports in August, amounting to 22,374 tons, were widely distributed, Canada taking 4775 tons; Japan, 4025 tons; Argentina, 3099 tons; Brazil, 1355 tons, and Mexico, 1113 tons. Of the 19,069 tons of black steel sheets exported during the month 9291 tons went to Canada and 7719 tons to Japan. Canada took 2613 tons of the 12,199 tons of plates exported in August and 2613 tons of the 13,581 tons of galvanized sheets exported that month, while the Philippine Islands took 2232 tons of the latter. Of the 12,517 tons of steel bars exported in August, Canada took 8145 tons and the United Kingdom 1766 tons. Venezuela was the destination of 7730 tons of the 15,164 tons of casing and oil line pipe exported during the month, while 2954 tons went to Java and Madura and 1223 tons to Mexico. Of the 10,214 tons of black welded pipe exported during the month, 1933 tons went to Canada, 1443 tons to Japan, 1300 tons to Argentina and 1241 tons to Venezuela.

Increases in the eight months' exports ended Aug. 31, over the corresponding period of last year, were made in 27 classes and were most marked in scrap, ingots and semi-finished steel, plain structural shapes, steel bars and rails. The principal losses were in tin plate, boiler tubes and welded pipe and galvanized sheets.

Of the August exports, Canada, continuing in first position, took 95,314 tons; for the first eight months the total going to that country was 563,980 tons. Japan and Chosen took 51,482 tons in August and 189,001 tons during the eight months.

August imports showed gains in 20 groups, chiefly in structural shapes, whose total of 19,084 tons reflected an increase of 7892 tons over the July

imports of this product. Pig iron, with a total of 12,990 tons, showed an increase of 6935 tons over July, and steel bars, with a total of 8270 tons, a gain of 3278 tons. Imports declined in six groups, but only two, cast iron pipe and rails, were of importance, the former showing a drop of 1443 tons and the latter a decrease of 523 tons. Of the pig iron imports, 7485 tons came from India and 2550 tons from the United Kingdom. Of the

United States Imports of Iron and Steel Products in August

From	Gross Tons
Austria	94
Belgium	17,367
Czechoslovakia	25
France	14,138
Germany	10,267
Italy	44
Netherlands	2,291
Norway	1,514
Poland and Danzig.....	538
Sweden	2,914
Switzerland	17
United Kingdom.....	5,357
Europe	54,566
Canada	7,819
Mexico	32
British India	7,495
Japan	1
China	1
Total	69,911

imports of steel bars, 2641 tons came from France, 2637 tons from Belgium, 1754 tons from Germany and 1104 tons from Sweden. Of the plain shapes imported in August, 10,816 tons came from Belgium, 5100 tons from France and 2709 tons from Germany.

Of the 6288 tons of cast iron pipe imported that month, 4763 tons came from France and 1523 tons from Belgium. "Other pipe" imports, chiefly seamless tubes, totaled 4456 tons, of which 1938 tons came from Germany, 1216 tons from the United Kingdom, 538 tons from Poland and Danzig, 398 tons from Canada and 136 tons from France. Of the 911 tons of rails imported in August, 823 tons came from Canada.

Belgium led as the greatest single

source of imports in August, providing 17,367 tons. France was second with 14,138 tons, and Germany was third with 10,267 tons. Canada furnished 7819 tons, and India, 7495 tons.

Higher Production of Malleable Castings

Production of malleable castings in August is reported by the Department of Commerce at 61,833 tons, compared with 54,373 tons in July and with 51,394 tons in August of last year. Except for last March, the August tonnage was the highest since March, 1927. Shipments in August were 58,914 tons, a gain of 10 per cent over the July shipments of 52,694 tons. These figures compare with 50,258 tons in August, 1927.

Orders booked, at 56,415 tons, were somewhat less than the month's production, but represented the largest amount since last March and, with that exception, the largest since February, 1927. Capacity was engaged in August to the extent of 68.5 per cent.

For the first eight months, production was 472,508 tons against 450,692 tons last year. Shipments were 450,676 tons against 440,620 tons in 1927. Orders booked were 436,761 tons against 402,913 tons last year. All figures are from 130 "identical" plants.

A new oxygen plant of the Linde Air Products Co. has started operations at Akron, Ohio. It will supply the nearby demand for oxygen used in welding and cutting by the oxy-acetylene process.

The fall meeting of the American Refractories Institute, originally scheduled for Pittsburgh, has been transferred to the Vanderbilt Hotel, New York. The date of the meeting is Oct. 24.

Machinery Exports Continue Heavy

August Shipments Only 7.3 Per Cent Below

July—Agricultural Implements 31

Per Cent of Total

WASHINGTON, Sept. 28.—Exports of machinery of all kinds in August aggregated \$44,303,235 in value, against \$47,814,163 in July, the latter having set the highest record in seven and one-half years. The August shipments were almost \$3,000,000 in excess of those of August of last year, when the total value was \$41,042,546. For the eight months ended Aug. 31, 1928, the total of \$331,863,954 was \$38,900,988 in excess of similar shipments for the corresponding period of last year, with a total of \$292,962,966.

Exports of industrial machinery in August were valued at \$19,173,465, compared with \$21,094,582 in July and with \$17,493,611 in August, 1927. For the eight months ended Aug. 31, exports of industrial machinery were valued at \$149,488,032, against \$136,117,937 for the corresponding period of last year. Exports of power-driven metal-working machinery in August were valued at \$2,650,532, compared with \$2,562,201 in July and with \$1,683,994 in August of last year. For the eight months ended Aug. 31, exports of this class of ma-

chinery were valued at \$17,357,134, against \$12,193,040 for the corresponding period of 1927.

Exports of power-driven metal-working machinery listed in THE IRON AGE table numbered 833 in August, valued at \$1,712,938, against 1111, valued at \$1,734,060, in July.

Following the trend that was so pronounced in July, exports of machinery in August were raised to their high level largely by reason of the heavy shipments of agricultural implements, which were valued at \$13,697,000, a drop of only 2.1 per cent from the record-breaking \$13,996,000 of July.

Imports of machinery and vehicles in August were valued at \$2,729,543, compared with \$2,306,665 in July and with \$1,895,311 in August of last year. For the eight months ended with August, the value was \$18,970,787, against \$18,904,646 for the corresponding period of last year. Imports of industrial, office and printing machinery in August amounted to \$1,829,834, against \$1,516,328 in July and \$1,215,700 in August of last year.

For the eight months ended with August, the total was \$11,776,942, compared with \$11,326,725 for the corresponding period of last year.

Imports of machinery listed in THE IRON AGE table were valued in August at \$2,081,751, against \$1,606,365 in July and \$1,270,993 in August of last year. For the eight months ended with August, the value was \$13,916,841, against \$13,061,582 for the corresponding period of last year, showing a gain of 6½ per cent.

Drop in Steel Boiler Orders

Orders for steel boilers in August covered 1649 units, with 1,459,652 sq. ft. of heating surface. This was the smallest amount since May, although the differences have been slight. It compares with 1,528,053 sq. ft. in July and with 1,568,536 sq. ft. in August of last year. In the first eight months of 1928 the total was 10,582,669 sq. ft., a drop of about 10 per cent from the 11,619,091 sq. ft. of the corresponding period in 1927.

Machinery Exports from the United States

(In Thousands of Dollars)

	August		Eight Months Ended August	
	1928	1927	1928	1927
Locomotives	\$343	\$147	\$1,994	\$4,304
Other steam engines.....	420	149	682	1,016
Boilers	105	248	801	1,345
Accessories and parts.....	61	35	424	325
Automobile engines.....	1,246	847	10,593	8,814
Other internal combustion engines.....	875	618	5,864	4,931
Accessories and parts.....	272	185	2,525	2,454
Electric locomotives.....	43	11	1,112	313
Other electric machinery and apparatus	708	512	5,317	5,236
Excavating machinery.....	601	461	5,081	3,148
Concrete mixers.....	113	92	727	811
Road-making machinery.....	212	131	1,570	1,535
Elevators and elevator mach'ry.....	318	383	2,942	3,337
Mining and quarrying mach'ry.....	1,070	1,106	9,103	9,175
Oil-well machinery.....	1,613	1,599	10,019	13,522
Pumps	572	505	3,885	4,455
Bending and power presses....	245	169	1,369	868
Machine tools*.....	1,489	912	10,578	7,395
Forging machinery	72	130	537	676
Other metal-working machinery and parts.....	572	540	4,111	3,216
Textile machinery	1,052	1,022	8,976	7,279
Sewing machines.....	694	798	5,892	6,254
Shoe machinery	191	167	1,244	1,129
Flour-mill and gristmill machinery	26	55	303	373
Sugar-mill machinery.....	288	443	2,784	2,252
Paper and pulp-mill machinery.....	155	262	2,086	2,684
Sawmill machinery.....	74	61	624	542
Other woodworking machinery.....	230	109	1,274	954
Refrigerating and ice-making machinery	613	590	6,413	4,977
Air compressors	473	558	4,607	4,122
Typewriters	1,106	1,522	14,296	13,947
Power laundry machinery.....	76	163	755	1,141
Typesetting machines.....	321	430	3,024	2,895
Printing presses.....	564	821	4,079	4,272
Agricultural machinery and implements.....	13,697	11,851	81,686	63,766
All other machinery and parts.....	13,793	13,406	114,587	99,500
Total.....	\$44,303	\$41,043	\$331,864	\$292,963

*Principal details in another table.

Imports of Machinery Into the United States

(By Value)

	August		Eight Months Ended August	
	1928	1927	1928	1927
Metal-working machine tools.....	\$30,584	\$23,738	\$397,731	\$281,279
Agricultural machinery and implements.....	277,835	268,958	3,506,061	4,071,941
Electrical machinery and apparatus.....	190,322	186,346	989,405	1,219,646
Other power-generating machinery.....	366,389	90,822	489,697	137,108
Other industrial machinery	914,834	566,300	6,490,752	5,834,754
Vehicles, except agricultural	301,787	134,829	2,043,195	1,516,854
Total.....	\$2,081,751	\$1,270,993	\$13,916,841	\$13,061,582

Exports of Power-Driven Metal-Working Machinery

	August, 1928		July, 1928	
	No.	Value	No.	Value
Engine lathes	86	\$243,694	52	\$93,350
Turret lathes.....	37	129,768	36	103,363
Other lathes	91	193,436	115	341,636
Vertical boring mills and chucking machines.....	17	36,068	11	14,297
Thread-cutting and automatic screw machines.....	58	98,399	65	87,811
Knee and column type milling machines	50	91,789	28	74,931
Other milling machines.....	60	101,102	62	280,113
Gear-cutting machines.....	43	141,695	35	105,066
Vertical drilling machines....	44	86,024	109	136,196
Radial drilling machines.....	14	48,622	6	12,903
Other drilling machines.....	81	61,128	375	108,626
Planers and shapers.....	52	105,532	24	40,461
External cylindrical grinding machines	32	201,025	99	216,122
Internal grinding machines....	54	146,143	39	85,537
Metal-working tool-sharpening machines	59	28,513	55	33,648
Total	833	\$1,712,938	1,111	\$1,734,060

Machinery Markets and News of the Works

Machine Tool Trade Active

September Orders Closely Approximated Those of August—
Automobile Companies Buying

MACHINE tool orders turned upward in the last week of September, and the total for the month closely approximated that of August, which was an unusually good month. Automobile manufacturers and companies making automobile parts and accessories contributed a considerable share of recent business, though the diversification of buying was an outstanding feature.

Moreover, the volume of pending business indicates that there will be no marked letdown in purchases this month. Production in machine tool plants in the Cincinnati district is being maintained at the highest rate since 1919-1920. Unfilled orders at many plants have increased to an extent which, with normal business during the next month or two, assure steady operations during the remainder of the year. Orders taken by Chi-

cago dealers in the first nine months of the year were the largest for any like period since 1920.

Although railroad buying is conspicuously light, the orders from general industrial lines are extremely satisfactory in volume. The changes in models by some of the automobile companies have resulted in needs for new equipment.

Chicago trade prospects are enlivened by the report that the International Harvester Co. will probably spend about \$500,000 for equipping its Rock Island, Ill., plant, and the Allis-Chalmers Co., West Allis, Wis., is making a survey of equipment needed for the production of a light farm tractor. The Seaman Body Corporation, Milwaukee, and the Nash Motors Co., Racine, Wis., will shortly make extensive purchases for new plant additions.

New York

NEW YORK, Oct. 2.—The volume of inquiry for machine tools is steady and comes from widely distributed sources. Although there are few buyers of large lots, numerous orders for single tools are being received. R. Hoe & Co., New York, recent purchasers of a large Ingersoll milling machine, are considering the purchase of another, which will probably reduce the number of planers to be bought. Other new equipment may also be required by this company. The General Electric Co. continues as a buyer of machine tools for Schenectady, having ordered a shaper, a bending machine and a lathe last week. New inquiries call for eight 16 and 18-in. engine lathes and a No. 2 Baker key-seating machine. Manufacturers of airplanes are not active buyers of tools, except the Curtiss Aeroplane & Motor Co., Buffalo, which is buying a few single tools for its Buffalo plant.

Niles-Bement-Pond Co. reports following sales: Three No. 3 axle lathes, a combination journal turning and axle lathe, two 30-in. x 22-ft. Time-Saver lathes,

three Morris radial drills, a Cincinnati 6-in. high-speed automatic tapper, a Cincinnati high-speed 4-spindle drill, a Ransom grinder and a Boye & Emmes 18-in. x 12-ft. lathe. Pratt & Whitney division sold six lathes, a No. 10 hand milling machine, one 8-in. rotary surface grinder and two 14-in. vertical surface grinders, an automatic worm grinder, a 3A universal die sinker, a No. 2 jig boring machine and a 12-in. vertical shaper.

Plans have been approved by Ford Motor Co., Detroit, for expansion and improvements at Green Island, N. Y., plant, with installation of equipment for manufacture of shock absorbers of about 6000 units per day. Parts, assembling and service work as heretofore handled at this plant will be discontinued.

Board of Trustees, American Museum of Natural History, Columbus Avenue and Seventy-seventh Street, New York, has plans for a five-story power plant and service building to cost more than \$750,000 with equipment. Trowbridge & Livingston, 527 Fifth Avenue, are architects and engineers.

Packard Motor Car Co. of New York, Broadway and Sixty-first Street, has awarded general contract to Turner Construction Co., Graybar Building, for new eight-story service, repair and sales

building on Eleventh Avenue, extending from Fifty-fourth to Fifty-fifth Street, to cost about \$1,500,000 with equipment. Plant at Long Island City will be removed to new location and additional machinery provided. Albert Kahn, Marquette Building, Detroit, is architect; Frank S. Parker, 119 West Fifty-seventh Street, New York, is associate architect.

Steel & Tubes, Inc., Scott Avenue, Brooklyn, has plans under way for one-story addition, to cost over \$50,000 with equipment. Austin Co., 120 Broadway, New York, is architect and engineer.

Union Free School District No. 9, Pleasantville, N. Y., is said to be planning installation of manual training equipment in a proposed high school to cost about \$400,000. Tooker & Marsh, 101 Park Avenue, New York, are architects.

New York Railways Corporation, 123 West 146th Street, New York, has filed plans for a two-story motor bus garage, service and repair building at Lexington Avenue and 100th Street, to cost about \$100,000 including equipment.

F. J. Ross, 4200 White Plains Avenue, New York, architect, has plans for a multi-story automobile service, repair and garage building, 100 x 100 ft., to cost over \$150,000 with equipment.

Funk Printing Press Co., 150 Nassau Street, New York, manufacturer of printing presses, parts, etc., has acquired property between Princeton Junction and Plainsboro, N. J., for new plant, with one-story initial unit, 40 x 400 ft., to cost over \$100,000 with equipment. Company will establish new industrial community, with housing development for employees.

Brinkerhoff Electric Co., 171 Franklin Street, New York, manufacturer of electric lamps, etc., has plans for new two-story and basement plant, with foundations for third story, at West New York, N. J., 70 x 180 ft., to cost more than \$75,000 with equipment. Lockwood, Greene & Co., 1 Pershing Square, New York, are architects and engineers.

Newark Transformer Co., 17 Frelinghuysen Avenue, Newark, manufacturer of electric power equipment, has engaged Joseph Kennedy, 44 Grove Street, Arlington, N. J., architect, to prepare plans for two-story plant, 25 x 100 ft., on Sherman Avenue, to cost about \$40,000 with machinery.

Lackawanna Railroad Co., 90 West Street, New York, is planning for electrification of portion of suburban system from Hoboken to Dover, N. J., and vicinity, 173 miles, to overhead contact system, to cost \$14,000,000 with equipment, exclusive of power plant. Construction of steam-operated electric generating plant on Hackensack River, where property has been secured, is under consideration, to cost about \$4,000,000. Project is scheduled for completion within 15 to 18 months.

Gates-Day Aircraft Corporation, 909 East Twenty-third Street, Paterson, N. J., manufacturer of commercial and military planes, etc., is disposing of a common

The Crane Market

NEW inquiry for both electric overhead and locomotive cranes continues rather small. Some fair business is evidently in prospect from subway contracts about to be awarded in New York and for which contractors have been asking prices on crawl-tread locomotive cranes, truck cranes and steam shovels. One such contract requires a crane and a steam shovel with boom to operate in a tunnel with 17-ft. of headroom. One of the larger locomotive crane inquiries pending at present is a list of six small crawl-tread cranes for the Pennsylvania

Railroad. But little new inquiry has developed for overhead crane equipment, but there is a good volume of old inquiries in the market, several of which are expected to close soon. The Missouri Public Service Commission has authorized the Missouri Pacific Railway and the Universal Carloading Co. to install a gantry crane at the railroad's freight house at Second and Biddle Streets, St. Louis.

Among recent purchases are:

Western Electric Co., Kearny, N. J., 5-ton, 95-ft. span, electric crane from Cleveland Crane & Engineering Co.

Pittsburgh Pipe & Coupling Co., 5-ton, 45-ft. span crane from Box Crane & Hoist Corporation.

Deere & Co., Moline, Ill., ¾-yd., 80-ft. span crane and 5-ton, 3-motor, 86-ft. span overhead electric crane from Milwaukee Electric Crane & Mfg. Corporation.

McClintic-Marshall Co., Marova Plant, Chicago, 15-ton, 5-ton auxiliary, 80-ft. span overhead electric crane from Milwaukee Electric Crane & Mfg. Corporation.

stock issue to total \$3,000,000, part of fund to be used for expansion in output. Company also operates a subsidiary, Gates Flying Circus & Aviation Co., Teterboro, near Paterson. Ivan R. Gates is president.

Royal-Dutch-Shell Co., London, England, operating Asiatic Petroleum Co., 65 Broadway, New York, and other properties in United States, has purchased substantial interest in Flintkote Co., Rutherford, N. J., manufacturer of roofing products, and will take active part in management. A fund of about \$9,000,000 will be secured by Flintkote organization, a portion to be used for expansion in plants and facilities. Factories are being operated at Rutherford, Cincinnati, Chicago Heights, and New Orleans. Headquarters are at 31 St. James Avenue, Boston.

American Telephone & Telegraph Co., 195 Broadway, New York, has plans under way for new testing and repeater station, four stories, 45 x 76 ft., at Morristown, N. J., to cost about \$100,000 with equipment. Voorhees, Gmelin & Walker, 101 Park Avenue, New York, are architects.

International Oxygen Co., Newark, has taken over business of Tariffville Oxygen & Chemical Co., Tariffville, Conn., and has organized Tariffville Oxygen Co. as New England division of International company. New company will continue manufacture of oxygen, hydrogen and acetylene and will also handle products of International company.

Chicago Watchman's Clock Co., Inc., has removed its New York office to 70 East Forty-fifth Street, in charge of H. R. Kirkland and John G. Earl. August H. Nanz is no longer connected with company.

New York Central Railroad Co., Grand Central Terminal, New York, has awarded general contract to Walsh Construction Co., Herald Building, Syracuse, N. Y., for one and two-story repair shop at Garrison, N. Y., including signal station, to cost \$40,000 with equipment.

Buffalo

BUFFALO, Oct. 1.—Property at Tonawanda, N. Y., has been acquired by Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, as site for new works, and plans for initial unit will be drawn soon. It will be equipped for production of aircraft motors for commercial purposes, including parts manufacture and assembling, and will cost more than \$750,000.

Ritter Dental Mfg. Co., 404 West Avenue, Rochester, N. Y., is said to be ar-

ranging early call for bids on general contract for one-story addition to manufacture dental chairs, instruments, etc., to cost about \$200,000 with equipment. C. A. Carpenter, Temple Building, is architect.

Francis E. Cunningham, 10 South Goodman Street, Rochester, and associates have organized Cunningham-Hall Aircraft Corporation, with capital of \$350,000, and plan early operation of plant to manufacture commercial airplanes and parts. James C. Dryer, East Avenue, Brighton, N. Y., is also interested in company.

Binghamton Light, Heat & Power Co., Binghamton, N. Y., is arranging an expansion and improvement program, including construction of high-tension transmission line from city to Scranton, Pa., about 80 miles, with power substations, switching stations, etc., to cost more than \$250,000. Company is under direction of General Gas & Electric Corporation, 50 Pine Street, New York.

Metallurgical Equipment & Supply Co., Binghamton, N. Y., care of Samuel Tour, 123 North Street, Batavia, N. Y., recently organized by Mr. Tour and associates with capital of \$50,000, plans operation of local plant to manufacture furnaces and machinery for metallurgical production. Walter N. Grounseil, 60 Johnson Avenue, Binghamton, is also interested in company.

South Atlantic

BALTIMORE, Oct. 1.—Locke Insulator Corporation, Charles and Cromwell Streets, Baltimore, manufacturer of high-tension electric insulators, is planning a one-story addition to cost about \$45,000 with equipment.

Baltimore & Ohio Railroad Co., Baltimore, has approved plans for a group of electrically-operated pumping stations and water treating plants on Cumberland division, to cost about \$1,000,000 with machinery, including sites at Evitts Creek, Md.; Green Spring, Sir John's Run, Miller, Martinsburg and Brunswick.

J. E. Sperry, Calvert Building, Baltimore, architect, has plans for multi-story automobile service, repair and garage building, to cost over \$450,000 with equipment.

Richmond Car Works, Inc., Richmond, Va., subsidiary of Standard Steel Car Co., Frick Building, Pittsburgh, is arranging an expansion and improvement program, including additional building units and new equipment to cost close to \$500,000.

Board of Education, Raleigh, N. C., is considering installation of manual training equipment in new three-story and basement high school, to cost \$280,000, for which superstructure will soon begin. William H. Dietrick, Professional Building, is architect.

Public Improvement Commission, City Hall, Baltimore, has authorized appropriation of \$608,000 for extensions and improvements in Vernon pumping plant, with installation of electrically-operated pumping machinery and auxiliary equipment, to replace present Mount Royal steam-operated pumping station, which will be abandoned. Charles F. Goob is chief engineer.

Dixie Aircraft Corporation, Lynchburg, Va., R. S. Skinner, president, has purchased 65-acre tract near Hampton, Va., as site for new airport, including hangar, service and repair building and other units. An airplane assembling plant is under consideration. Project will cost approximately \$65,000.

General Purchasing Officer, Panama Canal, Washington, is asking bids until Oct. 17 for air compressor, boiler, pump, gasoline engine, bolts, nuts, reamers, wire rope, insulated wire, and other equipment. Panama Schedule 1904.

American Enka Corporation, 114 East Thirty-second Street, New York, plans construction of a power station, pumping plant, machine shop and other units at proposed rayon mill on 2100-acre tract near Asheville, N. C., entire project to cost more than \$6,000,000.

Steuart Brothers, Inc., 151 Twelfth Street, N. E., Washington, is planning construction of four-story automobile service, repair and garage building on Fifth Street, N. E., to cost about \$130,000 with equipment.

Taylor Iron Works & Supply Co., Broadway, Macon, Ga., is planning construction of one-story foundry, boiler shop and pattern works, to double present capacity, to cost over \$60,000 with machinery.

New England

BOSTON, Oct. 1.—Used tool dealers appear to have been more active than new the past week, a condition that has not developed for a long time. In general dealers in this line of equipment have done more business than in several weeks. Presses, small and medium, screw machines, and lathes from 12 to 24-in. have been the best sellers. A Connecticut used tool dealer has sold automatic machinery, very largely turret lathes and

gear and screw making equipment, in the Massachusetts and Rhode Island territories with satisfying results. The same dealer reports larger sales in Connecticut during September than in any month since early spring.

Local dealers in new tools have been handicapped by the sale of the excess tools of the abandoned Lowell plant of the Saco-Lowell Shops. The best of this equipment has been sold. Inquiries for new tools are more numerous, especially for high priced production units.

Small tools are moving well and September sales by some houses have established a new high record for this year.

Davidson Fan Co., 15 Brooks Street, Newton, Mass., has awarded contract for a new two-story, 50 x 100 ft., plant.

City of Springfield, Mass., has started work on a two-story, 137 x 180 ft., junior high school addition to contain vocational shops. E. C. and G. C. Gardner, 35 Lyman Street, Springfield, are architects.

Builders Iron Foundry Co., Coddington Street, Providence, has started work on a one-story plant, 44 x 103 ft. It is understood that all of the necessary equipment has not been purchased.

City Council, Cranston, R. I., is considering installation of seven pumping plants in connection with extensions and improvements in municipal sewage system, with waste disposal and treating plants, to cost \$2,826,500. A fund of \$2,500,000 has been authorized by State legislature for work. Fay, Spofford & Thorndike, 44 School Street, Boston, are consulting engineers.

Board of Education, Hartford, Conn., has authorized installation of manual training department in addition to be built at Alfred Plant junior high school, West Hartford, for which bids will soon be asked on general contract. Russell F. Baker, Hartford, is architect.

National Packaging Machine Co., 445 Watertown Street, Newtonville, Mass., has awarded general contract to F. L. Fox, 101 Milk Street, Boston, for a four-story addition, to cost over \$60,000 with equipment.

Packard Motor Car Co., 1089 Commonwealth Avenue, Boston, is revising plans for new four-story service, repair and sales building, 115 x 230 ft., to cost over \$200,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect and engineer.

New Departure Mfg. Co., Bristol, Conn., has let contract to Aberthaw Co., Boston, for one-story addition to forge shop, 130 x 200 ft.

Milwaukee

MILWAUKEE, Oct. 1.—Estimates of September machine-tool business indicate about the same average as August, and for many plants October opens with a large volume of orders. The outlook is considered very favorable, and production schedules will probably have to be kept at the present level until after Jan. 1 to make specified deliveries. Local buying of equipment continues excellent.

Allis-Chalmers Mfg. Co., Milwaukee, is about to purchase equipment for its tractor department at main works in West Allis for production of a small tractor to supplement line of farm tractors.

Northwestern Steel & Iron Works, Eau Claire, Wis., has placed contracts for a one-story addition, 48 x 100 ft.

Advance Car Mover Co., 930 East John Street, Appleton, Wis., is building a new factory to manufacture a device to move freight cars in yards by manual means. General contract has been let to Austin Co., Cleveland.

Chicago & North Western Railway Co., 226 West Jackson Boulevard, Chicago, contemplates erection of a new round-house, machine shop and storage building at Iron River, Mich.

John Strange Paper Co., Washington Street, Menasha, Wis., has plans by Orbison & Orbison, consulting engineers, Appleton, Wis., for a new boiler house to cost about \$75,000.

Bids close Oct. 16 in office of John Jedwabny, Jr., city clerk, Menasha, Wis., for construction and equipment of an addition to municipal water and light plant to cost \$75,000. An additional Diesel engine with generator, motors, switch-board and appurtenances is specified.

Maynard Electric Steel Casting Co., 1328 Twenty-second Avenue, Milwaukee, has placed contracts for construction of a one-story foundry addition, 100 x 121 ft.

C. C. Nielson and Axel O. Nielson have acquired interest of John C. Burkell in Nielson Machine Co., Racine, Wis., and will continue business under original title.

Philadelphia

PHILADELPHIA, Oct. 1.—Plant of McFarland-Meade Co., Seventy-first Street and Kingsessing Avenue, Philadelphia, on 2-acre tract heretofore used for manufacture of metal sash, doors, etc., has been acquired by Wilkening Mfg. Co., Fifteenth and Mount Vernon Streets, operating Duoflex Piston Ring Co., and will be occupied by last noted organization. Present plant will be removed to new location and additional equipment installed. F. W. Wilkening is president.

United States Gypsum Co., Chicago, has authorized construction of new plant for manufacture of gypsum products on 7-acre tract at Fifty-eighth Street and Schuylkill River, Philadelphia. Initial units will cost over \$500,000 with machinery. Company is said to contemplate paper mill at same location.

Heintz Mfg. Co., Front and Olney Streets, Philadelphia, manufacturer of steel automobile bodies, has asked bids on general contract for a one-story addition, to cost about \$27,000.

General Motors Truck Co., Twenty-third and Carpenter Streets, Philadelphia, with headquarters at Pontiac, Mich., has arranged for erection of new service, repair and sales building at Wilmington, Del., to be built by E. M. Harris, 2214 Chestnut Street, Philadelphia, to cost \$250,000 with equipment.

Hercules Powder Co., Wilmington, Del., is carrying out an expansion program at Parlin, N. J., including construction of several new buildings, with compressor plant, 60 x 90 ft. Air compressors, pumps, tanks and other equipment will be installed. Project will cost more than \$150,000.

Hobson Flatware Co., Lansdale, Pa., manufacturer of chromium and nickel plated ware, has taken option on two-acre tract at Lambertville, N. J., as site for new plant, and plans to break ground for first unit this month. It is reported to cost about \$75,000 with equipment. Works at Lansdale will be removed to new location.

Pennsylvania Gypsum Co., Chester, Pa., has approved an expansion and improve-

ment plan at local mill, with installation of additional machinery for manufacture of gypsum building products. A new pier will be built and equipped with unloading, conveying and other apparatus for handling gypsum rock. Company is said to be projecting plans for new plant at Brooklyn.

Board of Education, Kingston, Pa., is said to be planning installation of manual training equipment in new two-story high school to cost \$750,000, for which superstructure will soon begin. Mack & Sahm, Coal Exchange Building, Wilkes-Barre, Pa., are architects.

Beaver Saw Filing Machine Co., York, Pa., care of Robert F. Fluhrer, York, attorney, now being organized by local interests, is planning early operation of plant for manufacture of tools for sharpening hand and circular saws and kindred equipment.

Reading Iron Co., Reading, Pa., will establish a new cut nail and galvanizing plant at Pottstown, Pa. Present unit at Birdsboro, Pa., will be discontinued and equipment removed to Pottstown mill where facilities will be provided for larger output.

Keystone Aircraft Corporation, Bristol, Pa., is planning an expansion and improvement program, including installation of additional equipment. Arrangements are being made for sale of stock to an amount of \$1,050,000, a portion of fund to be used for extensions.

Lehigh Valley Coal Co., Wilkes-Barre, Pa., is reported planning construction of new electrically-operated coal breaker between Maysville and Kulpmont, to cost more than \$500,000 with machinery.

American Telephone & Telegraph Co., 15 Dey Street, New York, has awarded contract to Morton C. Tuttle Co., Boston, for design and construction of transoceanic telephone transmitting station at Lawrenceville, N. J. Development will include two buildings, 76 x 96 ft. and 60 x 76 ft., two stories and basement. Antenna system 4500 ft. long on steel towers will transmit to Europe, and development will later include circuits to South America.

Chicago

CHICAGO, Oct. 1.—September sales of machine tools have been numerous and the month closes only a trifle less active than August. Orders taken by Chicago dealers in the first nine months of 1928 establish a record for similar periods since 1920 and fresh inquiry gives promise that October business will be large. Outstanding among prospects is a probable purchase of \$500,000 worth of machine tools by the International Harvester Co. for its Rock Island, Ill., plant.

Allis-Chalmers Mfg. Co. is expected to purchase some equipment to manufacture a light tractor at its West Allis plant. Seaman Body Corporation, Milwaukee, and Nash Motors Co., Racine, Wis., will make early purchases for plant additions. Miscellaneous business is active. Chicago, Rock Island & Pacific has ordered two planer-shapers.

Work has been started on foundation of a 60 x 120-ft. addition for Lappen Foundry, Crookston, Minn.

Plans are being completed by All-Steel Equipment Co., Griffith Avenue, Aurora, Ill., manufacturer of factory and office equipment and fixtures, for a one- and two-story addition to cost \$25,000. Her-

bert E. Spieler, Graham Building, is architect.

General Engineering Works, 340 West Huron Street, Chicago, manufacturer of screw machine products, has purchased property on West Division Street for new one-story plant, to cost more than \$85,000 with equipment.

General Laundry Machine Co., 1223 South Talman Avenue, Chicago, has authorized plans for a new one-story plant, to cost close to \$100,000 with equipment. F. E. Davidson, 53 West Jackson Boulevard, is architect.

Public Service Co. of Colorado, Fifteenth Street, Denver, has awarded a general contract to F. H. Cowell, Central Savings Bank Building, for a new equipment storage and distributing plant, with repair department, to cost about \$110,000 with machinery.

Elco Tool & Screw Co., Rockford, Ill., has awarded general contract to Bakken & Anderson, 1102 Broadway, for rebuilding portion of two-story plant recently destroyed by tornado, to cost over \$150,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects.

City Council, Baudette, Minn., is considering installation of municipal electric light and power plant, using Diesel engine units, to cost about \$30,000.

Washburn-Crosby Co., Chamber of Commerce Building, Minneapolis, Minn., is said to be planning to rebuild part of flour mill A, recently destroyed by fire, with loss of about \$200,000 including equipment.

Knapp Brothers Mfg. Co., Cicero, Ill., manufacturer of metal building products, metal trim, etc., has plans for new one-story plant at Joliet, Ill., 120 x 600 ft., to cost over \$100,000 with equipment.

Michael George Pen Co., Grand Haven, Mich., manufacturer of fountain pens, has approved plans for a new one-story plant, 60 x 145 ft., at Libertyville, Ill., to cost about \$65,000 with equipment.

Martin Machine Works formerly at 228 South Laffin Street, Chicago, is now located in new quarters at 2234-36 Walnut Street.

Cincinnati

CINCINNATI, Oct. 1.—Machine tool buying took an upward turn the past week with the result that sales, in September closely approximated those in August. Automobile manufacturers and companies making automobile parts have continued to supply the bulk of current business, although the diversified sources of recent bookings testify to the healthy condition of industry in general. Builders specializing in equipment for automobile makers report signs of an expansion in demand for their product in the Detroit district.

The volume of pending orders is unusually heavy and indicates no let-down in purchases of machine tools for at least the next month. Production in local plants is being maintained at a high rate with the largest number of workers since 1919-1920. Unfilled orders have accumulated to such an extent that a slowing up in operating schedules may not come before the end of the year. A local company has received an order for four special lathes, valued at approximately \$35,000, from Europe. A Detroit company has contracted for five large lathes.

Contract has been let by Container Corporation of America, Inc., 5500 East-

ern Avenue, Cincinnati, manufacturer of corrugated board products, to Rust Engineering Co., Pittsburgh, for two-story addition, 180 x 300 ft., to cost more than \$200,000 with machinery. Devore Co., Toledo, Ohio, is architect and engineer.

Cincinnati Oakland Motor Car Co., 1926 Gilbert Avenue, Cincinnati, local representative for Oakland automobile, is having plans drawn for one and two-story service, repair, assembly and garage building, to cost over \$100,000 with equipment. H. Neilson Jackson, Mercantile Library Building, is architect.

Wessling Brothers Foundry Co., Liberty and McLean Streets, Cincinnati, has acquired tract on Johnson Street, and plans new one-story foundry to cost close to \$110,000 with equipment. Present business will remove to new location.

Louisville Gas & Electric Co., Louisville, has increased stock from \$45,000,000 to \$90,000,000, a portion of proceeds to be used for expansion and improvements. Company has been carrying out new hydroelectric power development at Ohio Falls.

Mead Pulp & Paper Co., Chillicothe, Ohio, is planning an expansion and betterment program at local mill, to include installation of paper-making equipment, coating machine and auxiliary equipment, to cost more than \$175,000. An addition will be built also to branch mill at Kingsport, Tenn.

Meehanite Metal Wheel Co., Chattanooga, Tenn., recently organized by Gus Meehan, head of Meehan Foundry Co., Chattanooga, and associates, with capital of \$25,000, is planning operation of local plant. New company is represented by C. A. Noone, First National Bank Building.

Armstrong Furnace Co., London, Ohio, M. B. Armstrong, president, has plans for new one-story plant at Columbus, Ohio, to cost about \$40,000 with equipment.

Harriman Mfg. Co., Harriman, Tenn., manufacturer of cultivators and other agricultural equipment, has been merged with W. J. Oliver Plow Co., Knoxville, Tenn., manufacturer of kindred products. First noted company name will be retained by consolidated organization. Proposed to discontinue plant at Knoxville during November, removing equipment to Harriman works which will be extended.

L. E. Lowe & Sons Machine Works, Columbus, Ohio, has been removed to 518 East Beck Street, and is in production.

St. Louis

ST. LOUIS, Oct. 1.—P. Jacks Co., 119 North Seventh Street, St. Louis, will soon begin superstructure for one-story tin and metal-working shop, 100 x 126 ft., to cost about \$26,000 with equipment. Edward J. Gieseler, DeMenil Building, is architect.

Pearl Mining Co., Picher, Okla., is planning to rebuild ore mill at its Patty C zinc and lead mining properties, recently destroyed by fire, with loss of over \$75,000 including machinery.

Greenleaf-Moore Cadillac Co., 1201 South Main Street, Tulsa, Okla., local representative for Cadillac automobile, is having plans completed for four-story service, repair and sales building, 100 x 140 ft., to cost approximately \$125,000 with equipment. Noble B. Fleming, Commercial Building, is architect.

Eagle Aircraft Co., Kansas City, Mo., is planning an expansion program, including additional units and installation of equipment. Company is arranging for

sale of 200,000 shares of stock, considerable part of proceeds to be used for work.

Board of City Trustees, Spiro, Okla., is planning extensions and betterments in municipal electric light and power plant to cost \$40,000.

Missouri Pacific Railroad Co., St. Louis, is said to be planning to rebuild engine house with repair facilities at Lincoln, Neb., recently destroyed by fire, with loss of about \$40,000.

City Council, Paris, Ark., is considering extensions and improvements in municipal electric light and power plant, to cost \$50,000 with equipment.

Howokla Oil Co., Allen, Okla., will soon begin work on a new refinery to cost about \$125,000 including equipment.

Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., has asked bids on general contract for four-story automobile service, repair and garage building, 124 x 142 ft., to cost over \$150,000 with equipment. H. G. Freshman is company architect, in charge.

Board of Education, North Little Rock Special School District, Little Rock, Ark., plans installation of manual training equipment in four-story and basement high school to cost \$500,000. George R. Mann, Wanger & King, New Donaghey Building, are architects.

Pittsburgh

PITTSBURGH, Oct. 1.—The Westinghouse Electric & Mfg. Co. has issued its fourth-quarter list for machine tools and supplies; it contains 57 items and includes more machine tools than the third-quarter list. Reports about September business are somewhat mixed, but on the whole indicate that sales and money value exceeded those of August. The Timken Roller Bearing Co., Canton, Ohio, was among the buyers of the past week. In heavy equipment, the placing by the Davison Coke & Iron Co. of the mills for its new cement plant with the Allis-Chalmers Mfg. Co. is outstanding.

The Columbia Steel Corporation, which is building a six-mill tin plate plant at Pittsburg, Cal., has bought automatic doublers, shears, pickling unit and tin house equipment from Aetna-Standard Engineering Co. Mills and drives for this plant are yet to be placed.

Plans have been approved by Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, for addition to steam-operated electric generating plant on Bruno's Island in Ohio River, with initial capacity of 60,000 kw. Work will include new coal tower, with equipment for unloading barges at rate of 200 tons per hr., and coal-crushing plant. Project will cost more than \$6,000,000 with machinery.

Aircraft & Airways of America, Inc., Farmers Bank Building, Pittsburgh, recently organized with capital of \$300,000, will act as representative for Ryan Aircraft Co., San Diego, Cal., for sales and distribution in Pennsylvania, Ohio, New Jersey and New York. Plans are under way for construction of hangar at Rodgers Field, Pittsburgh, with repair facilities. Company is also reported considering establishment of local assembling plant.

Rainbow Light, Inc., manufacturer of luminous tube electric display equipment, a subsidiary of Rainbow Luminous Products, Inc., Long Island City, N. Y., is establishing a branch plant at Pittsburgh. A similar plant will also be established at

Boston, and an expansion program carried out at Detroit plant.

Whitaker Paper Co., 101 Ninth Street, Pittsburgh, has purchased property on Beaver Avenue for new storage and distributing plant, 140 x 540 ft., to cost about \$200,000 with handling and other equipment.

Kesselman & Co., 128 Ann Street, Parkersburg, W. Va., recently formed with capital of \$100,000, will operate a plant to manufacture oil well equipment and supplies. William H. Kesselman, Parkersburg, is head.

Detroit

DETROIT, Oct. 1.—Baker-Perkins Co., Saginaw, Mich., manufacturer of baking machinery, has awarded general contract to James Kerns & Son, Hess Street, for one-story addition to foundry, to cost \$100,000 with equipment.

O. C. Harrington Co., Jackson, Mich., manufacturer of automobile products, has taken over part of former local No. 9 plant of Earl Motors Corporation, totaling about 50,000 sq. ft. floor space, and will remodel for expansion. Another section of same plant has been secured by Watts-Morehouse Co., Jackson, manufacturer of automobile trunks, for increased production.

Stinson Aircraft Corporation, Northville, Mich., has plans for new plant, including parts and assembling divisions, for larger capacity. Company will dispose of stock issue of 23,500 shares, the majority of proceeds to be used for expansion. Edward A. Stinson is president, and Henry E. Hund, vice-president.

Consumers Power Co., Jackson, Mich., is completing plans for power substation at Saginaw, Mich., to cost about \$225,000 with equipment. Company has authorized sale of new stock issue to total \$9,500,000, a part of fund to be used for extensions and improvements, including transmission line construction.

Marmon-Detroit Co., 2927 Woodward Avenue, Detroit, local representative for Marmon automobile, has plans for three-story service, repair and garage building, 100 x 175 ft., to cost more than \$200,000 with equipment.

Board of Education, Owosso, Mich., plans installation of manual training equipment in new two-story high school, for which bids will be asked at once on general contract. William B. Ittner, 911 Locust Street, St. Louis, is architect.

Oldberg Mfg. Co., 2661 East Grand Boulevard, Detroit, manufacturer of automobile mufflers, etc., has awarded general contract to E. A. Moldenhauer, 18442 Muirland Avenue, for one-story addition, to cost about \$30,000 with equipment. Christian W. Brandt, 2111 Woodward Avenue, is architect.

Reo Motor Car Co., Lansing, Mich., has started foundations for new three-story unit, 140 x 700 ft., for manufacture of motor buses, including parts, to cost about \$400,000 with machinery.

Joseph N. Smith Co., 5914 Federal Avenue, Detroit, manufacturer of automobile hardware, has asked bids on general contract for a two-story plant unit, 150 x 800 ft., to cost over \$200,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Chicago & North Western Railway Co., 226 West Jackson Boulevard, Chicago, is said to be planning new engine house, with machine shop and other units, at Iron River, Mich., to cost about \$150,000 with equipment.

Nicholl Chromium Co., Inc., 3704 Mack Avenue, Detroit, has been organized to operate under patents of United Chromium Corporation in chromium plating tools, dies, bearings, etc. Company is doing both job and contract work.

Indiana

INDIANAPOLIS, Oct. 1.—Plans are being considered by Alexandria Metal Products Co., Alexandria, for one-story addition, to cost about \$25,000 with equipment.

Wheeler-Schebler Carburetor Co., Inc., 1302 Barth Avenue, Indianapolis, has asked bids on general contract for three one-story additions, to cost about \$65,000 with equipment. D. A. Bohlen & Son, Majestic Building, are architects.

Board of Education, Sheridan, is said to be planning installation of manual training equipment in new two-story and basement high and grade school to cost \$185,000, for which bids have been asked on general contract. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Showers Brothers Co., Bloomington, manufacturer of kitchen cabinets and other furniture, is reported to be planning one-story addition, to cost more than \$50,000 with equipment.

C. R. Wermuth, 1036 St. Marys Street, Fort Wayne, has plans for a new one-story machine shop, 75 x 108 ft. Pohlmeier & Pohlmeier, Central Building, are architects.

Emge Packing Co., Fort Branch, near Evansville, contemplates installation of conveying equipment and other handling apparatus in connection with an extension and improvement program to cost about \$100,000.

City Council, Muncie, will install electrically-operated pumping machinery and other equipment in a sewage disposal plant to cost \$1,000,000. Pearce, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers.

Gulf States

BIRMINGHAM, Oct. 1.—Officials of Atlas Portland Cement Co., 25 Broadway, New York, have organized a subsidiary, Atlas Portland Cement Co. of Texas, Inc., capitalized at \$2,000,000, with headquarters at Waco, Tex., where 500 acres has been secured for new mill. Plans for initial units will soon be drawn, to cost more than \$1,000,000 with machinery.

Forest E. Gilmore Co., Wright Building, Tulsa, Okla., is said to have plans for new gasoline refinery near Pampa, Gray County, Tex., to cost about \$200,000 with equipment.

Drennen Motor Car Co., Ensley, Ala., has plans for a new service, repair and garage building, 150 x 150 ft., to cost about \$140,000 with equipment.

Cities Service Gas Co., 60 Wall Street, New York, operating natural gas properties, is said to be planning construction of new gas compressor station at Higgins, Tex., to cost about \$100,000 with equipment.

City Council, Bartlett, Tex., is reported planning installation of municipal electric light and power plant, to cost over \$40,000 with equipment.

Farmers' Gin Co., Georgetown, Tex., is planning new cottonseed oil mill near Wharton, Tex., to cost about \$75,000 with

equipment. Machinery will be electrically operated.

Southern Sugar Co., Clewiston, Fla., is completing plans for new mill in Canal Point, Fla., district, with initial output of 2500 tons per day. Project will include power house, machine shop and other buildings, and will cost about \$1,000,000 with equipment. Company is arranging sale of 35,000 shares of stock, no par value, part of fund to be used for new plant. B. G. Dahlberg, head of Celotex Co., 645 North Michigan Avenue, Chicago, is president.

Chevrolet Motor Co., West Grand Boulevard, Detroit, with main plant at Flint, Mich., is said to be planning new factory branch at El Paso, Tex., with repair and service departments, to cost \$110,000 with equipment.

Rubber Products Co. of Alabama, Inc., Muscle Shoals, Ala., has approved plans for a new mill to cost about \$100,000 with equipment.

Board of Education, Waco, Tex., has authorized installation of manual training equipment in additions to senior high school and to junior high school, for which bids will soon be asked on general contract, to cost over \$300,000. T. Brooks Pearson, First State Bank Building, is architect.

Officials of Monolith Portland Cement Co., Bartlett Building, Los Angeles, have plans for new mill near Port Aransas, Tex., to cost over \$1,500,000 with machinery. Company has organized a subsidiary, Monolith Gulf Portland Cement Co., to carry out project.

Board of Education, Petal, Miss., has plans for a one-story vocational school, to cost over \$45,000 with equipment.

Moore-Handley Hardware Co., 25 South Twentieth Street, Tuscaloosa, Ala., has plans for new multi-story storage and distributing plant, to cost over \$40,000 with equipment.

Cleveland

CLEVELAND, Oct. 1.—Machine tool sales increased the past week and inquiry for single machines is good. Business is coming largely from the automotive industry. Dealers' sales during September were in about the same volume as in the previous month. Demand for turret lathes, which fell off early in the month, took a new spurt the past week and September bookings were only slightly below August, which was an exceptionally good month.

Orders for two 30-in. geared head Niles lathes were placed during the week by Toledo Machine & Tool Co., Toledo. Firestone Steel Products Co., Akron, purchased a 3-in. radial drill, 12-in. lathe and a sensitive drilling machine. Akron Rubber Mold & Machine Co., Akron, bought a 6-in. vertical shaper.

Briggs Mfg. Co., Detroit, manufacturer of automobile bodies, has placed contracts for remodeling its Cleveland plant at Taft Avenue and East 131st Street and will again place this plant in operation. It has been shut down for three years.

Wasmer Bolt & Nut Co., Cleveland, has been organized to manufacture standard bolts and nuts and will begin operations about Jan. 1 in a new plant at 13109 Athens Avenue. Company has been incorporated with a capital stock of \$125,000. John C. Wasmer, secretary Cleveland Wrought Products Co., is president; M. J. O'Donnell, formerly president Falls Rubber Co. and O'Donnell Elevator Co.,

is vice-president and treasurer; W. G. Uhler is secretary.

Mullins Mfg. Co., Salem, Ohio, has plans for enlarged capacity to permit a 50 per cent increase in production. An addition will be provided and 10 new double action presses will be installed.

Contract has been let by Cleveland Wire Spring Co., 1281 East Thirty-eighth Street, Cleveland, to Boldt Rapp, 5511 Euclid Avenue, for one-story addition, 120 x 125 ft., to cost about \$80,000. George S. Rider Co., Century Building, is architect and engineer.

Easy-On-Cap Co., Cleveland, subsidiary of Eaton Axle & Spring Co., East 149th Street, has work under way on an addition to cost about \$100,000 with equipment.

Maumee Valley Rubber Co., Maumee, Ohio, has authorized plans for one-story addition to cost about \$25,000, and will install a 180-ton capacity press, trimming machines, boiler equipment, pumps, etc.

Western Reserve Mfg. Co., 3710 East Ninety-third Street, Cleveland, manufacturer of machinery and parts, has filed plans for one-story addition, 35 x 110 ft., to cost about \$45,000 with equipment.

Winston Motor Co., Inc., Twentieth Street and Madison Avenue, Toledo, Ohio, local representative for Graham-Paige automobile, will soon take bids for three-story service, repair and sales building, 55 x 100 ft., to cost about \$100,000 with equipment. Sidney Aftel, 1514 Madison Street, is architect.

Board of Education, Sixth and Rockwell Streets, Cleveland, will soon take bids for one-story vocational foundry, to cost about \$40,000 with equipment.

Alliance Toy & Specialty Co., Alliance, Ohio, has changed name to Alliance Mfg. Co., and has added to its Doo-Klip line a pruner and fertilizer sprayer, and made improvements to grass shears.

Pacific Coast

SAN FRANCISCO, Sept. 27.—Plans are being drawn by Northwestern Pacific Railroad Co., 64 Pine Street, San Francisco, for new one-story car and locomotive repair shop at Tiburon, Cal., to cost about \$45,000 with equipment.

Alloy Steel & Metal Co., 1862 East Fifty-fifth Street, Los Angeles, has filed plans for one-story machine shop, 65 x 84 ft., to cost about \$19,000 with equipment.

Standard Pipe & Supply Co., Los Angeles, is having plans drawn for a one-story storage and distributing plant, 53 x 240 ft., with pipe cutting, threading and other departments. A 200-ft. crane runway will be installed. Unit is estimated to cost over \$90,000 with equipment. Arnold A. Weitzman, Hibernian Building, is architect.

Southern California Edison Co., Los Angeles, has plans for a new equipment storage and distributing plant at Porterville, Cal., to cost about \$40,000 with handling and other equipment.

Great Northern Railway Co., King Street Station, Seattle, is completing plans for a new engine house, machine shop, forge and blacksmith shop and tool shop, 116 x 450 ft., to cost about \$175,000 with equipment.

George L. Barnes, Everett, Wash., has plans for a one-story brass foundry at Centralia, Wash., to cost about \$18,000 with equipment.

American Ice & Cold Storage Co., foot of California Street, Everett, Wash., is

contemplating three-story addition for ice-manufacturing and cold storage units, to cost about \$100,000 with equipment.

Fisher Body Corporation, General Motors Building, Detroit, is said to have plans for new one and two-story plant at Emeryville, Cal., to cost about \$200,000 with equipment.

Public Utilities Commission, Tacoma, Wash., Ira S. Davisson, chairman, is planning early call for bids for second unit of Cushman municipal hydroelectric power development, including water tunnel, dam, generating station and equipment, transmission lines, switching stations, etc., for which appropriation of \$3,850,000 has been authorized by city council.

Canada

TORONTO, Oct. 1.—Demand for machine tools in this market is holding close to the average of the past few weeks; inquiries indicate that business for the fourth quarter will exceed that of the past three months. September sales showed improvement over those in July or August and are expected to compare favorably with any month this year. The majority of manufacturing plants are operating at better than 75 per cent of capacity. Second hand and rebuilt tools are moving more freely.

Gray Ball Bearing Co., 686 St. Clarens Avenue, Toronto, has purchased one and one-half acres at Lansdowne and Royce Avenues and will start work soon on erection of a plant to manufacture automobile parts. Operations are expected to begin before end of year.

John S. Allen, Horning's Mills, Ont., is in market for a pony planer, 16 or 20 in. x 6 in. capacity; also a 28 or 32 in. band saw.

Bids have been called by B. H. & F. Prack, architect, 606 Lister Building, Hamilton, Ont., for a one-story factory, 123 x 146 ft., on Pelham Avenue, Toronto, to cost \$20,000, for W. D. Beath & Sons, Ltd., 394 Symington Avenue, Toronto, manufacturer of electric hoists, barn door tracks, steel drums, etc.

Plans for a four-story factory, 60 x 260 ft., at Toronto, for Willys-Overland, Ltd., are being revised by M. J. Streiffert, engineer, and new tenders will be called.

Hiram Walker Metal Products, Ltd., Kildare Road, Walkerville, Ont., contemplates building three additions to its plant.

F. Brown, 85 Raleigh Street, Chatham, Ont., has been awarded contract for an addition, 60 x 75 ft., to plant of Dowsley Spring & Axle Co., 81 St. George Street.

G. H. Thomas & Sons, Ltd., Dickson Street, Galt, Ont., has been awarded contract for one-story addition, 60 x 98 ft., to plant of Dominion Tack & Nail Co., Ltd., to cost \$20,000. John Evans, Water Street, is architect.

Ferguson Contracting Co., Ltd., Confederation Life Building, Toronto, has been awarded contract for erection of a building at Peterborough, Ont., for Canadian General Electric Co., head office, Toronto. It will be one story, 110 x 428 ft., and will cost \$150,000.

A number of sub-contracts have been awarded for erection of a machine shop at Toronto for Link-Belt, Ltd. Jackson-Lewis Co., Ltd., 1114 Federal Building, is general contractor.

Sub-trades have been let for a \$350,000 plant to be erected at Mount Dennis, Ont., for Firstbrook Boxes, Ltd., 283 King Street East, Toronto. James W. Wickett Co., Ltd., 16 Saulter Street, Toronto, is general contractor.

Canadian Tube & Steel Products, Ltd., 107 Hamilton Street, Ville Emard, Que., has awarded contract for addition to its plant to Reid Brothers, 511 St. Catharine Street West, Montreal.

Dominion Bridge Co. has purchased plant of McGregor-McIntyre Structural Steel, Ltd., Toronto, one of leading structural steel concerns in Canada. Dominion Bridge Co. is building an addition to its old Toronto works and purposes to operate both plants without change.

Western Canada

Canadian Utilities, Ltd., Calgary, Alta., will build a power plant at Nokomis, Sask., and has awarded general contract to R. H. Preiss, Nokomis.

Dominion Electric Co., Shaunavon, Sask., is arranging for erection of an electric light plant at Eastend, Sask.

Town Council, Melville, Sask., contemplates installing new sewage plant, with pumps and other equipment, to cost \$71,000.

Foreign

PLANs are being arranged by Pan-American Petroleum & Transport Co., 120 Broadway, New York, for new oil refinery on Island of Aruba, ex-Danish West Indies, to handle output of crude oil from local properties of its subsidiary, Lago Oil & Transport Co. Project will also include a gasoline refinery with eight cracking units, and 60,000-bbl. capacity skimming plant. Program is estimated to cost about \$10,000,000. Company has begun construction of new refining plant on 60-acre tract on South Elbe River, Harburg, Germany, to cost about \$2,000,000, and expects to complete this unit next spring.

Rhine-Westphalia Electric Power Corporation, Dusseldorf, Germany, known as Rheinisch-Westfälisches Elektrizitätswerk Aktien-Gesellschaft, is disposing of a bond issue of \$20,000,000, in United States, a portion of proceeds to be used for expansion in power plants and transmission systems in Ruhr district.

A company at London, England, operating mining properties at Rhodesia, British South Africa, is planning extensions in plant and installation of mining and operating machinery, with new central power plant, to cost close to \$1,000,000. Information at office of Bureau of Foreign and Domestic Commerce, reference England No. 73207.

Stockholms Superfosfatfabriks Aktiebolag, Stockholm, Sweden, is planning for expansion in its new nitrogen plant at Ljungaværk, to increase output of ammonium sulphate from 4000 to about 8000 tons per annum.

Central Paper Trust of Soviet Russian Government, Petrograd, is planning early purchase of machinery in United States for new Balakhna paper mill on Volga River, to an amount of about \$500,000. G. G. Khramtsoff, chief engineer, and E. A. Kayatz, consulting engineer, have arrived in America for this purpose and will make headquarters at offices of Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Government.

THE IRON AGE

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Profits From Apprentice Training

General Electric Official Reckons Cost of Educating the Individual Is \$3,000 but Expense Is Recovered When He Takes Supervisory Job

AN INTERVIEW WITH JOHN W. UPP

ON a 28-acre plot in West Philadelphia, the General Electric Co. is concentrating all design and manufacture of "switchgear." Switchgear not only includes station switchboards, but air and oil circuit breakers (from the small ones used to guard a single machine to huge outdoor installations to handle thousands of horsepower) and switches and switching stations for every kind of service and capacity. About 4000 men are now employed, a figure which will be considerably augmented when the auxiliary operations now conducted at other points are transferred to the new organization.

A visitor at this plant is struck by the many well-conceived plans for the comfort and health of the employees, and the orderly production of a wide variety of equipment with a minimum of waste motion and delay, much of which is "special" in that only a few will be made. Personnel matters have been given prime consideration. In no department is this feature better exemplified than in the apprentice school.

Here in a wing of one of the main manufacturing units are assembled 50 of the most modern machine tools, hardly two of them alike, yet each a representative of those installed in the main shops and each properly selected to perform one or more items of regular production. An adequate and shipshape tool room is also installed. Along-

side are four well-lighted and comfortable class and drafting rooms, and a couple of offices for the supervisors, teachers and clerical help.

Here machinist apprentices turn out parts requisitioned by the stock room, destined for switchgear under construction. Obviously such extensive and high-grade equipment means one thing—that the management is sincerely interested in apprentice training. And it was therefore found that the manager of the Switchgear Department, John W. Upp, was willing to talk rather freely about the expected returns from this educational effort.

Question: How long has the department been in operation?

Mr. Upp: "As you can see,



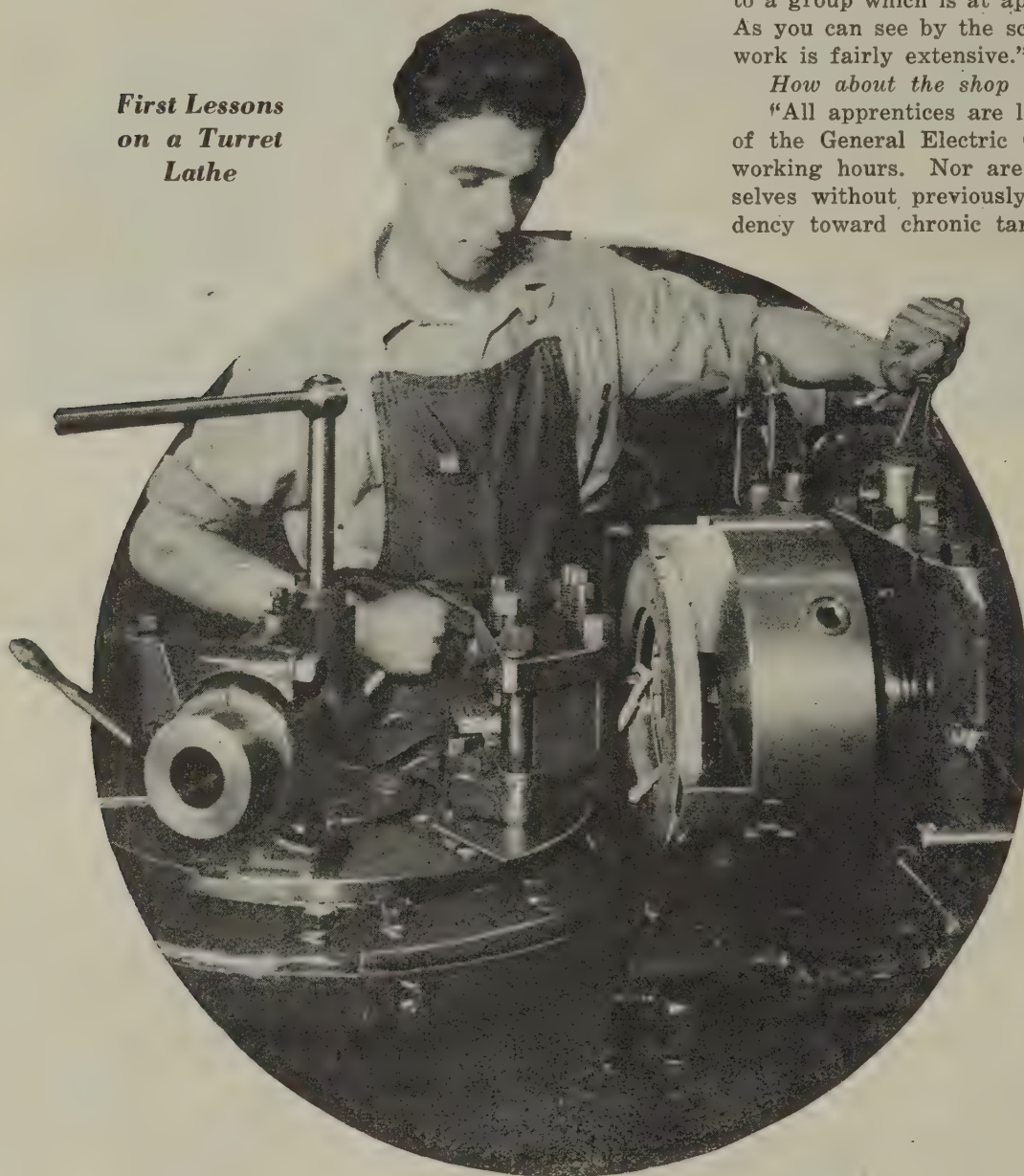
JOHN W. UPP has managed the switchboard department of General Electric Co. for more than 25 years. He was born in Sandusky, Ohio, in 1868 and graduated from Cornell University in 1889 as a mechanical engineer. He is now in charge of all matters pertaining to "switchgear" and manager of the rapidly expanding Philadelphia plant of the General Electric Co.

all our buildings and equipment are relatively new. The apprenticeship system at the Philadelphia works started in August, 1926, with three apprentices. It was recruited steadily until now we have 60 in the machinist course and 20 in the drafting course."

Q. Have you set a limit on the number?

Mr. Upp: "Yes; experience with similar schools in five other plants, dating back nearly 30 years, indicates that we cannot place more than 12 to 15 apprentices among each 100 journeymen without unduly interfering with the regular production."

First Lessons on a Turret Lathe



Q. How do you recruit the students?

"It has been necessary to do more or less advertising among our employees, by word of mouth and through the plant paper. O. H. Ginn, the head of the department, has also visited high schools in and near Philadelphia, explaining the opportunities we offer. Experience in other places shows that before long the apprentice system advertises itself, and an adequate number of desirable candidates continually present themselves.

"Qualifications? A prospective student must first of all convince us that he is serious-minded, and not merely looking for a job. He must pass a physical examination and be acceptable to the employment department. He must have a complete grammar school education. High school graduates are given one year's credit—that is, they complete the course in three years instead of four. The youngster is accepted on probation, as it were, for a couple of

months. If he then appears to have the right stuff in him a regular form of indenture (we call it an "apprentice agreement") is signed by the student, his parent or guardian, and by me representing the General Electric Co."

Q. Is the work scheduled in definite school terms?

Mr. Upp: "Not in the sense that school opens on a certain date and closes for vacation on another. An acceptable student may enter any time there is a vacancy. His work will be adjusted to his individual capacity, and his standing in the various classes determined by the instructors in short order. Since instruction is done to relatively small squads, the new student can readily be attached to a group which is at approximately his educational level. As you can see by the schedule of studies, the class room work is fairly extensive."

How about the shop training?

"All apprentices are looked upon as regular employees of the General Electric Co., and conform to the regular working hours. Nor are they permitted to absent themselves without previously being excused. Usually a tendency toward chronic tardiness is corrected by assigning the delinquent to a few days' 'fatigue duty,' that is, cleaning and janitor work around the apprentice department. With the exception of the class room work, which takes up an hour and a quarter daily, he is working in the shop. The machinist apprentice spends from one to two years at machines in the training department. At first he is helper to an advanced student, but soon he gets on regular production, of course under the watchful eye of a supervisor. After he has mastered the various tools he works a year in the manufacturing departments, and the last year in the tool, die or machine department in which he wishes to specialize. Such work increases his speed, rounds out his experience, and introduces him to the real shop atmosphere."

It seems to me that it would be rather hard on fine machine tools to have them operated by amateurs.

"On the contrary, cost records show that maintenance in the apprentice department is slightly lower than for the same machines in the produc-

tion line. This is probably due to the close supervision given to the students, and also to the much more deliberate pace of the operations. You should also remember that no 'practice' or 'exercise' work is done—all of it is destined for use. For instance, here is a short shaft with three keyways. Width of the keyways have a tolerance of plus or minus 0.0005 in. Angle must be correct to within 1/10 deg. A first year man made 106 of them with only 5 rejects. His speed was a little less than 45 min. each."

It seems peculiar that you are not able to get an ample supply of draftsmen, ready trained, from the young engineers graduating in electrical engineering.

"There is not such a surplus of these as you might imagine. When we get them we find they know a few things about many branches of electricity. What we want for a draftsman, and we find we have to teach him ourselves, is an intelligent man who knows a large number of



things about switchgear—just one important phase of electrical engineering. A high school graduate studying the drafting course first spends six months in the tracing department, learning drawing office routine. Then he spends six months in the apprentice department, becoming acquainted with the machine tools. Then he goes to the welding shop. For a year he progresses through the various assembly departments to become familiar with the different small parts of apparatus. The final period is in the drawing room. By this means we are able to show the student draftsmen the capabilities and the limitations of the various fabricating processes, so they will later avoid designing a part or an assembly which will be unnecessarily difficult or costly to make and erect.”

All this is lovely for the student, but a casual visitor would guess that you are spending a lot of money on each man, with no assurance he will return it to you.

“An actual balance sheet would be difficult to strike, because there are many intangibles which cannot be evaluated. Instinctively I would say that there *must* be money in it. Experience in other G. E. plants proves that apprentice training is the first step in a continuing progress toward sub-foremen, foremen and departmental managers.

In this way the course helps solve one of the very biggest managerial problems—‘Where can I get upstanding foremen?’

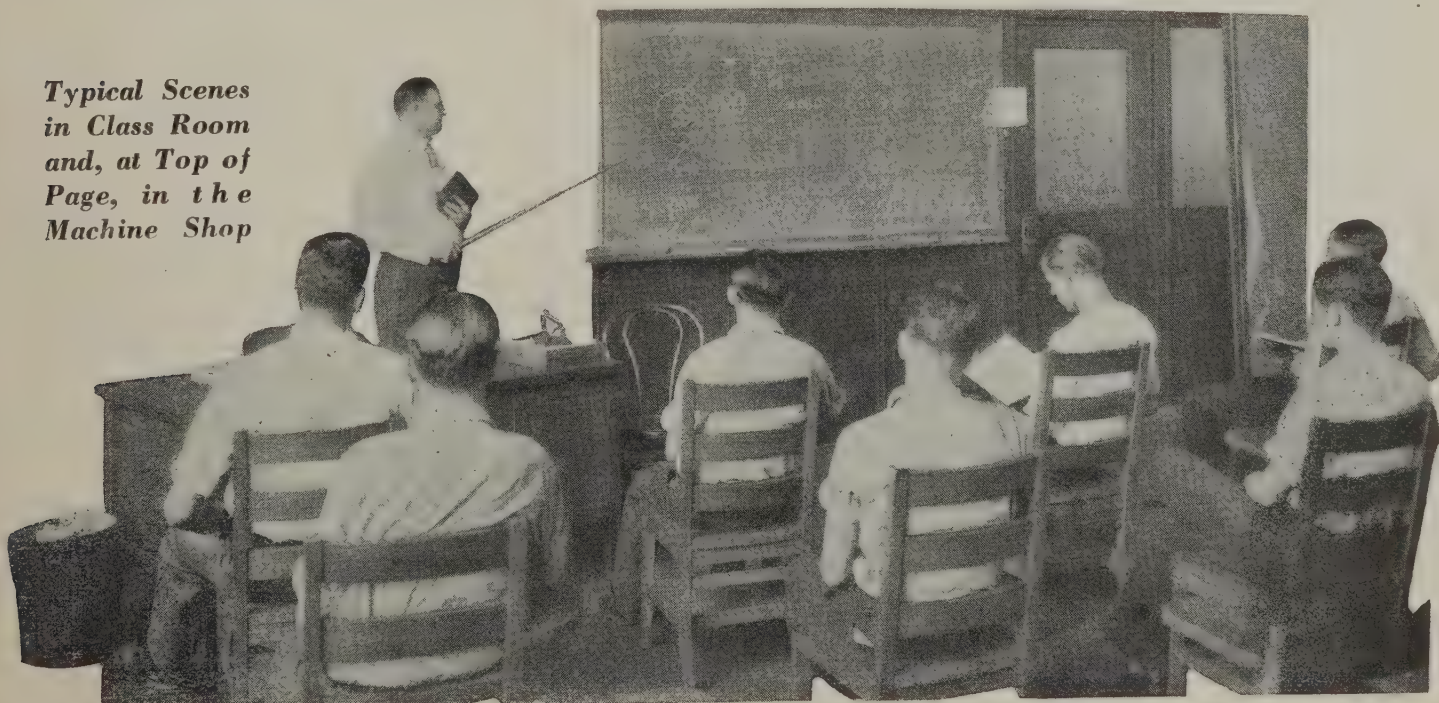
“But let’s make some Yankee guesses on the matter. Take a grade school boy. He enters at 22½c. an hour, and steps up 2½c. every six months, graduating four years later at 40c. For a good record he gets a 2c. an hour bonus, and a \$100 prize on graduation. Now assume that the value on the boy’s production ranges from 10 per cent of his wages up to 75 per cent at graduation (which certainly is conservative) and the balance sheet stands as follows:

	Wages	Value of Production
First year.....	\$556	\$55
Second year.....	673	168
Third year.....	790	395
Fourth year.....	907	672
Total	\$2,926	\$1,290

That makes a net cost of \$1,636, or with 100 per cent overhead \$3,272. Experience shows us that 65 per cent of our graduates become permanent employees, so counting for defections it means that each graduate may cost us as much as \$4,000. So much for the debit side.

“What about the credits? Mostly intangibles. But we

**Typical Scenes
in Class Room
and, at Top of
Page, in the
Machine Shop**



may evaluate the *permanency* of the employee (even if he never rises above a mechanic's grade) by assuming that one permanent employee is equivalent to six turnovers. It must cost at least \$200 to find, hire and get a new man into decent production. That cuts the debit down to \$2,800 immediately. That figure would be wiped out immediately when the man enters the supervisory grades. To my mind, a plant manager would regard himself lucky if he could acquire an adequate number of foremen, each of whose loyalty and capabilities were well known, for \$3,000 apiece!"

Classroom Schedule

For Four-Year Machinist

- 1st and 2nd Term—Arithmetic, algebra, mechanical drawing, English and practical talks.
- 3rd Term—Mensuration, geometry, mechanical drawing, English and practical talks.
- 4th Term—Plane trigonometry, mechanical drawing and industrial history.

- 5th Term—Elements of mechanics, free-hand and mechanical drawing, industrial history.
- 6th Term—Principles of mechanisms and mechanical drawing.
- 7th Term—Strength of materials, tool design and metallurgy.
- 8th Term—Types of prime movers, tool design and metallurgy.
- 9th Term—General physics, tool design and shop economics.

For Three-Year Drafting

- 1st Term—Advanced algebra, mechanical drawing and metallurgy.
- 2nd Term—Plane trigonometry, slide rule, and mechanical drawing.
- 3rd Term—Elementary electricity, descriptive geometry, and shop economics.
- 4th Term—Elementary analysis, tool design and business English.
- 5th Term—Advanced direct current electricity and mechanics.
- 6th Term—Strength of materials and advanced alternating current electricity.
- 7th Term—Thermodynamics and mechanisms.
- 8th Term—Machine and electrical design.

Profits Accrue from Volume at Expense of Margin Per Sale, Says Conference Board

VOLUME, rather than the margin per individual sale, is the road to profits in competitive industry and trade. In fact, narrow profit margins per sales dollar have come to stay, because they are an inevitable characteristic of the trend toward large-scale enterprise and mass production.

This is the conclusion of the National Industrial Conference Board, New York, after analyzing the ratio of profits to sales and investment for more than 4000 large and successful industrial and mercantile corporations. The investigation, which was part of a study undertaken to determine the possibility of shifting the corporation income tax to the consumer, covered the post-war years 1918 to 1925.

Sales at prices closely approximating cost of production, the Conference Board analysis discloses, are the dominant factor in determining commodity prices, forcing producers and merchants to seek profit by volume rather than profit by individual sale. Approximately half the sales of the large and successful corporations selected for analysis annually yielded less than 5 per cent profit in most of the manufacturing industries; in trade, particularly the wholesale trade, more than half of the sales were made at a profit of less than 5 per cent or at a loss. The average amount of sales at low profit rates or at a loss for all corporations is estimated to be even greater.

This condition, however, does not necessarily result in a low return on capital invested, but rather tends to accelerate turnover of capital and thus may result in high returns, the Conference Board points out. Corporations operating at the lowest ratio of profits on sales were found to have ordinarily the highest turnover of capital and often, therefore, are among those enjoying the highest return on capital.

The exact proportionate amount of the total business of all corporations transacted at a loss cannot be determined with the data now available. Almost every corporation, however, makes a portion of its sales at a loss, even though a net profit is realized on the grand total.

Although the corporations whose transactions were studied by the Conference Board include almost all of the large successful corporations in the country, every year during the period considered the total operations of some of them resulted in a loss; on an average corporations operating at a loss handled about 5 per cent of the total sales of all of the companies under scrutiny. When all manufacturing corporations in the country are considered as one group, it is found that those operating at a loss transacted about 13 per cent of the business; trading corporations operating at a loss transacted about 18 per cent of the total business of that class of companies.

High-Temperature Resistance Alloys

RESearch data on high-temperature resistance alloys were presented at the fall meeting of the (British) Institute of Metals in Liverpool, England, Sept. 5 and 6, in a paper, "Laboratory Experiments on High-Temperature Resistance Alloys," by C. J. Smithells, S. V. Williams and J. W. Avery, offered as a communication from the staff of the research laboratories of the General Electric Co., Ltd., Wembley, England. Briefly the authors presented the following results:

A series of nickel-chromium alloys containing from 10 to 60 per cent of chromium, and a few ternary alloys containing tungsten and molybdenum, have been made from specially pure materials melted in hydrogen. They have been subjected, together with some commercial nickel-chromium alloys, to new forms of test for resistance to oxidation and to sag, at high temperatures. For the binary alloys resistance to oxidation increases with increase in chromium content up to 30 per cent. With more than 40

per cent a second phase appears, and resistance to oxidation falls. Ternary alloys containing only 10 per cent of chromium show low resistance, while those containing 20 per cent of chromium show high resistance to oxidation. The composition of the oxides formed on the alloys has been determined by X-ray analysis. For high resistance to oxidation the oxide layer must contain at least 50 per cent of chromic oxide. The composition of the oxide layer is determined by, but is not generally the same as, the composition of the alloy.

For the binary alloys resistance to sag at high temperatures decreases with increase in chromium content. The ternary alloys sag more than the binary alloys having a similar nickel content. Small amounts of impurities have a marked effect in lowering both the resistance to oxidation and to sag. The electrical resistivity of all the alloys has been determined between 20 and 1000 deg. C.



Atomic Hydrogen Welding In Production

Gas-Tight Seams for Refrigerators and
Indicating Instruments—Strong Joints
on Automobile Parts—Repairs to Dies

BY P. C. GREENE*

ATOMIC hydrogen welding utilizes the electric arc with a stream of hydrogen gas. Power is single-phase, 60-cycle alternating current and an arc is maintained between tungsten electrodes. The hydrogen serves a three-fold purpose: first, it prevents electrode oxidation; second, it forms a highly reducing atmosphere over the work, preventing the formation of oxides and nitrides in the weld metal; third, it changes to the atomic state in passing through the arc, and recombines to the molecular state at the surface of the weld metal, thus acting as a powerful heat carrier and generator.

It must be borne in mind that the arc does not touch the work and that the work is not part of the circuit. The weld in reality is made by a flame of atomic hydrogen at approximately 4000 deg. C. This ideal combination of high temperature with reducing atmosphere gives unusually strong ductile welds at a rapid rate, free from oxides and blow holes and with a smooth finished appearance.

The development of this new welding process has been so recent that its field is not yet mapped out. In the factory it is proving a formidable process, not alone on a quality basis, but on cost of operation as well.

Smooth Welds Require Little Finishing

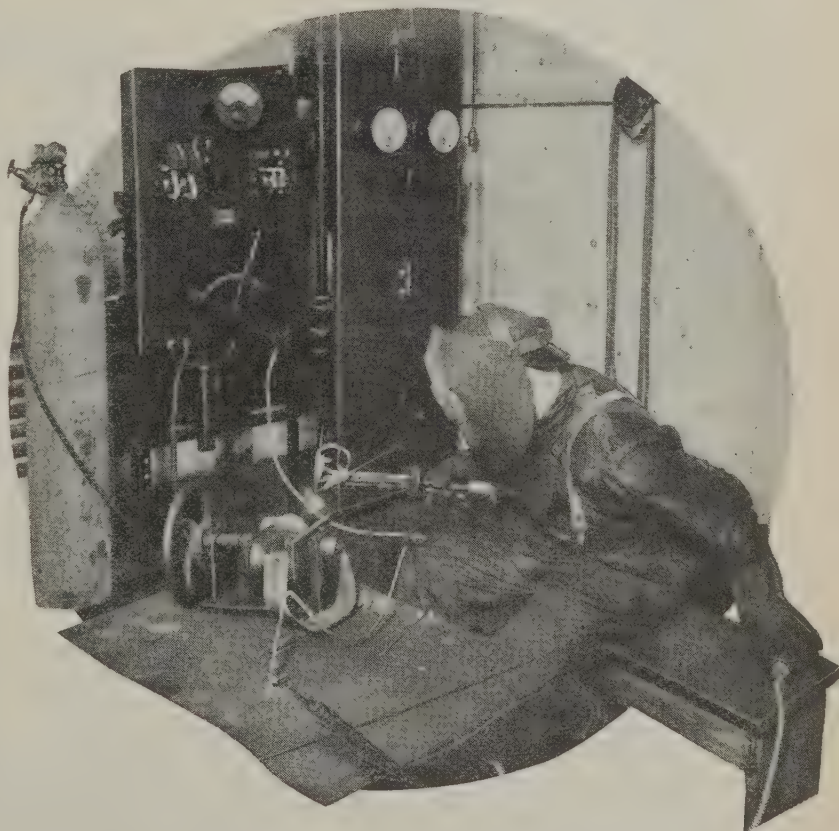
Several interesting applications may be noted. First, perhaps, is the welding of the cover and icing unit of the General Electric refrigerator. The cover is formed of sheet steel and the projections on the under side are folded toward the center, thus requiring a welded joint extending from each corner diagonally toward the center. These welds are made by the atomic hydrogen process, not because of the strength and soundness of the joint produced, but primarily because of its extreme smoothness, requiring a minimum amount of grinding and finishing to produce a level surface. The saving in finishing more than offsets the lower initial cost of metallic electrode arc welding which was originally used.

The icing unit of the refrigerator is a second illustration. This unit is roughly rectangular in form and consists of three sheet-steel shells nested and edge welded at a common seam. The combined thickness of metal is about 7/32 in. and the perimeter about 32½ in. Finest quality welds are made on this work at the rate of 6½ to 7 in. per min., and little if any grinding or finishing is required before vitreous enameling. No imperfections in the enamel finish are caused by these welds.

Another valuable application is building up worn dies

and molds; an hour of welding will often salvage a very expensive unit. Much extra machining and finishing is required, especially on small work, when a process is used that makes it difficult to control closely the amount of metal deposited. In the hands of a skilled operator the atomic hydrogen process gives a smooth surface, with equally good control as to location and amount of the deposit and seldom blisters or scales the adjacent polished surfaces.

As an example, two steel engraver's plates were welded; the original high polish remained unharmed at all points along a 5-in. seam up to within 1/16 in. of the weld where the metal had been in a molten condition. For this reason the Schenectady factory of the General Electric Co. is utilizing this process daily in salvaging dies and molds, and at least one other manufacturer is doing similar work. Stel-

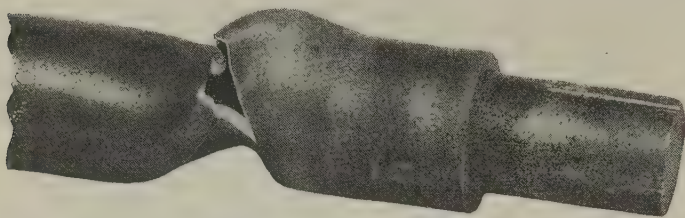


Weld Just Completed in Minor Refrigerator Part Held in Fixture. Gas jet controlled by trigger on handle; electrical current by push button on bench

*Industrial Heating and Welding Engineering Department, General Electric Co., Schenectady, N. Y.

liting of die surfaces has also been done very successfully.

Torque tubes for automobiles have also been made by the new process. This tube is $\frac{1}{8}$ in. wall thickness, 2 in. outside diameter, made of S. A. E. 1035 steel. Into each end is fitted a splined steel shaft with a shoulder flush outside. A flush butt weld is made between this



Medium Steel Tube, $\frac{1}{8}$ In. Wall, Fails in Torsion Before Weld Shows Distress

shoulder and the tube in 40 sec. Under test such tubes fail under torsion without affecting the weld. Because of the speed, appearance and strength, atomic hydrogen welding was adopted in preference to carbon arc welding.

Pipe Systems Welded Under Pressure

A unique application exists in a factory making indicating and recording instruments where quality, neat ap-

pearance and strength are paramount. First, the hollow alloy steel spiral which actuates the indicating needle is welded to one end of a steel capillary tube and the other end to the bulb containing the actuating liquid or gas. The sensitive system is then filled under pressure, and the entrance plugged rapidly by the atomic hydrogen process. In this operation a tight weld must be made, as an infinitesimal leak would throw the instrument out of calibration in a period of time or render it useless. The weld must also be completed before the heat flow from the welding zone is conducted to the liquid in the system, which would cause enough internal pressure to force the liquid out through the molten or cooling weld metal. Other welding processes failed either because of porosity or time consumed. Since pressures in gas-filled instruments may reach 1800 lb. per sq. in., and 3000 lb. per sq. in. in mercury-filled types, it is readily seen that a perfect weld is required.

In this same service, alloy bulbs of nichromes are welded to steel capillary tubes, and nichrome plugs are welded in the bulbs. The smoothness of this high-speed weld on steel bulbs is remarkable—no filing or finishing is required.

Sheet aluminum, searchlight drums and the vacuum-tight welds on mercury arc rectifiers, the fabrication of monel metal tanks and the sheet steel tanks for small oil switches are other applications.

Doctor Hatfield Discusses Corrosion and Acid-Resisting Steels

SPEAKING in Providence, R. I., at a joint meeting of the Providence Engineering Society and the Providence Chapter of the American Society for Steel Treating, on Wednesday evening, Oct. 3, Dr. W. H. Hatfield of Sheffield, England, presented the section of his forthcoming Campbell memorial lecture, dealing with corrosion and acid-resisting steels, giving a summary of the experimental work done in his own and other laboratories.

Doctor Hatfield believes that "ordinary iron is intrinsically rust resisting" and links the passivity of iron caused by immersion in nitric acid, and the film of oxide isolated by Ulick Evans, with resistance caused by the addition of chromium. When chromium is added in sufficient quantity it forms a passive film, protecting the metal.

Stainless steel is stainless because of this passive protective film. While the addition of nickel alone to steel effects no improvement of the metal's resistance to nitric acid, the addition of 14 per cent of chromium to iron makes the metal as resistant to nitric acid as pure nickel. When nickel and chromium are both added to iron, the passive film is of a different character from that produced by chromium alone, and in many cases does actually resist acids.

Although a great deal of data on corrosion-resisting steels are available, it is difficult to answer any specific question of industrial application with a definite yes or no, until the factors of composition, concentration of acids, conditions and temperature have all been considered.

Doctor Hatfield distinguishes three classes of corrosion and acid resisting chromium steels—stainless steels, stainless irons and chromium-nickel or austenitic steels. Of the first two, more attention has been paid in Europe to the stainless steel group, in the United States to the stainless irons. Applications of the stainless alloys have been made in Europe to automobile parts, chemical equipment, ornamental iron, and engineering uses such as dock sluice gates.

On tests of atmospheric corrosion the order of increasing resistance to corrosion is (1) mild steel, (2) chromium steel, (3) chromium-nickel steel; likewise the austenitic and chromium-nickel steel are resistant to steam at high temperatures.

For engineering purposes, where, in addition to non-scaling properties, high tensile strength is required at elevated temperatures, the addition of silicon and tungsten to the chromium-nickel steels has proved effective.

Influence of Manganese in Steel Welding Rods

EXCESS of manganese in welding rods used on high-speed work, where the operator has little opportunity to puddle his metal, is apt to cause blow-holes similar to those caused by carbon. For this reason, and particularly for production welding on thin steel sheets, a rod low in manganese should be used. Considerable information on this subject is given in Bulletin 129 of the Fuzon Welding Corporation, 103rd Street and Torrence Avenue, Chicago. Physical properties of the weld seem to be improved in toughness by increasing manganese up to about 1 per cent. Above that ratio and up to 9 per cent manganese it hardens and makes the steel brittle. For some applications where brittleness is of little consequence the hardness thus produced is desirable.

With rods above 9 per cent in manganese, together with carbon over 1 per cent, the metal is said to be made very soft by quenching from a comparatively high temperature in water. On the other hand, if cooled slowly it is hard, and it hardens easily with cold work. On this account it offers great resistance to wear. All welds made with it are apt to check-crack unless proper rods and technique are used. This metal is non-magnetic and the properties are found most pronounced at between 12 and 14 per cent manganese and 1.25 to 1.50 per cent carbon.

In metallic arc welding, manganese in the welding rod affects its operating characteristics. While carbon speeds up the rate of melting, manganese either does not speed it so much or possibly even slows it. This is believed due to the fact that manganese oxide is not a gas except at extremely high temperatures. Hence, its formation does not produce a violent commotion, as with carbon, in throwing over the molten drops from the electrode end.

Forge Shop of Unusual Flexibility

Arrangement Permits Ease of Materials Handling
and Short Travel for Work—Products
Are of Many Materials

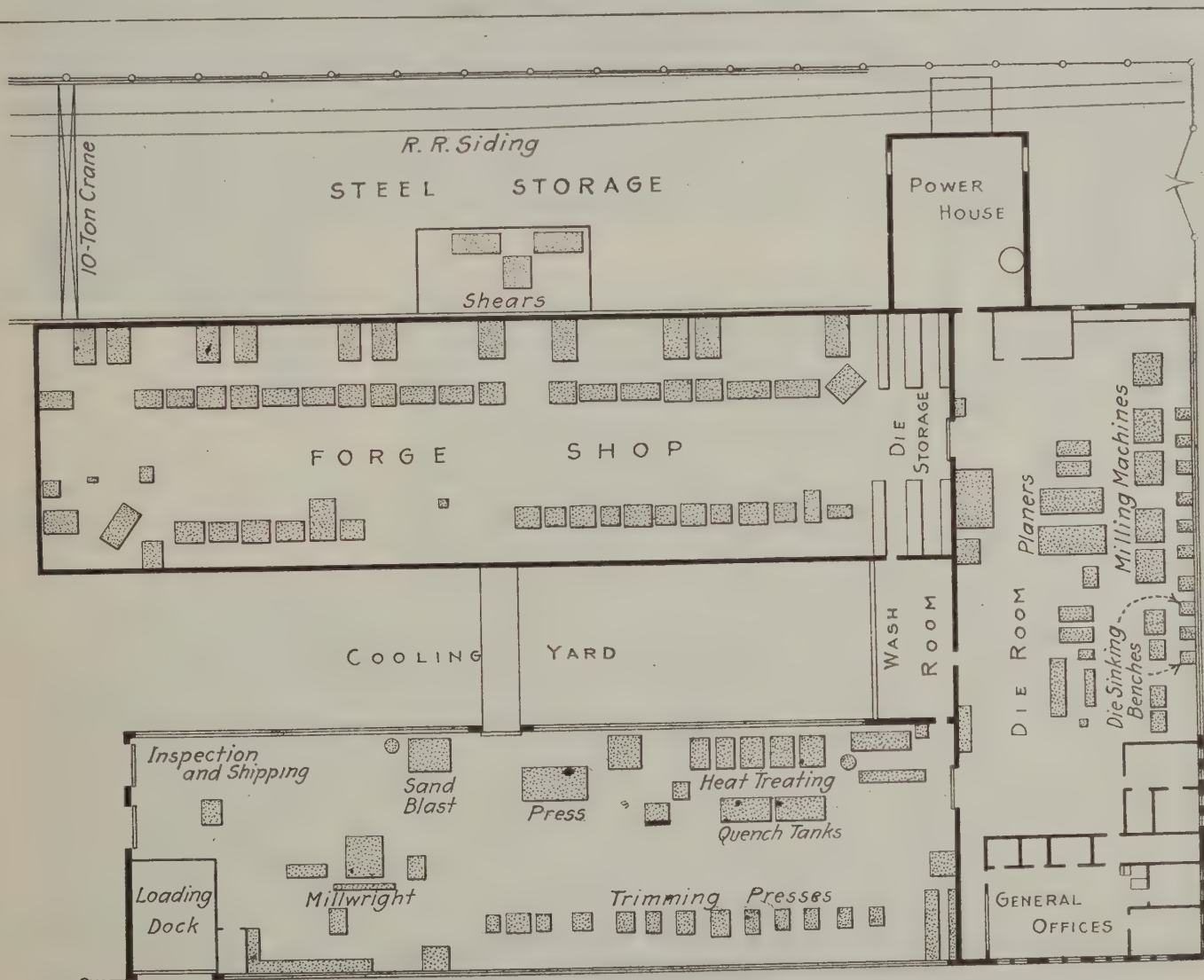
BY FRED L. PRENTISS*

ARRANGED for convenience in material handling, economy in operation and what are regarded as the most modern practices in layout, a new commercial drop forging plant recently was placed in operation by the Steel Improvement & Forge Co., Cleveland. Formerly confining its product largely to automobile forgings, the company has expanded into other fields and its growth necessitated the erection of a plant of larger capacity, which was built on a new site. It is now manufacturing all kinds of industrial forgings, as well as automobile and airplane forgings, and its products include forgings of stainless steel, monel metal and copper and brass.

*Resident editor at Cleveland for THE IRON AGE.

The forge shop and press room occupy parallel buildings, each 60 x 220 ft. Between these is a cooling yard, 40 x 200 ft. The heat-treating, inspection and shipping departments occupy space in the press room. The steel storage yard, 60 x 200 ft., and served by a 10-ton overhead traveling crane, is alongside the forge shop. A railroad siding extends along the outer side of the storage yard. Two electrically driven shears, with a capacity for cutting 4½-in. square 0.50 per cent carbon material, are located in a shear shed at the side of the stock yard, and adjoining the forge shop.

A die room, offices and laboratories are located in a 60 x 160-ft. building connected with the forge and press shops



LAYOUT of the Plant Conduces to Convenience in Handling Materials and Hence to Economy in Operation. The equipment includes 20 hammers and 21 presses

and running across their ends. This arrangement makes both shops accessible to the die department. Forging dies are stored under a balcony at the end of the forge shop and trimming dies in bins at the end of the press room.

Twenty Hammers in the Forge Shop

The forge shop is equipped with 15 board hammers ranging in size from a 6500-lb., four-roll hammer down to a 1200-lb. hammer, and five steam hammers ranging from 3000 to 1500 lb. The hammers are of the Erie, Chambersburg and Billings & Spencer makes. They are arranged in two straight lines down the shop and are grouped to obtain maximum production at a minimum cost. At the side of the 6500-lb. board hammer is a 3000-lb. steam hammer, and other units are so grouped that each steam hammer is alongside a larger board hammer.

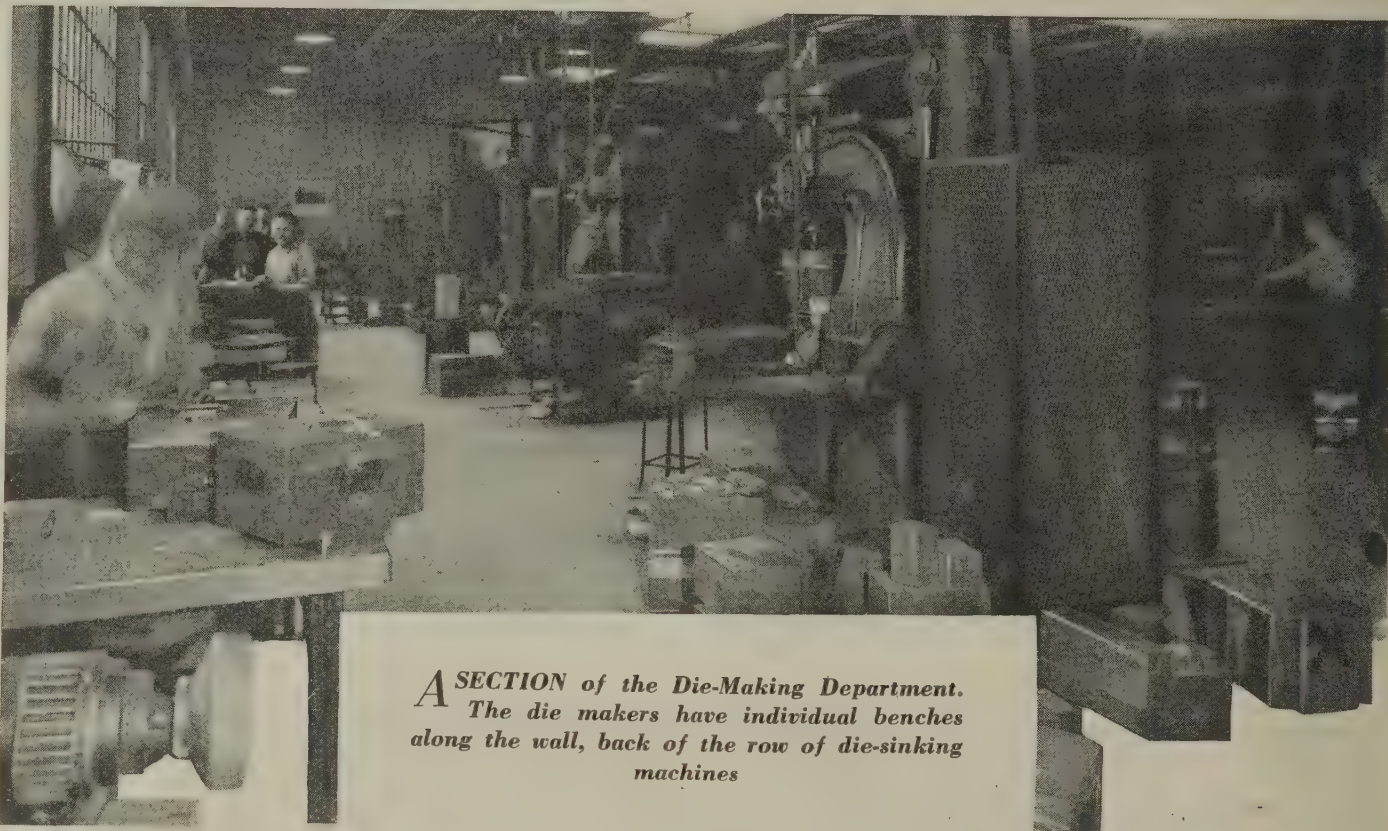
Forgings are first blocked on a steam hammer and then

trolley in the shipping room loads the finished forgings on the trucks.

Leaving the hammers, most of the forgings are put into large metal boxes and go to the press room for trimming and heat treating. The large forgings, however, are usually hot-trimmed at the hammers. One of the presses is used for hot-forming and various special work, this unit being served by a separate furnace. A 1000-lb. steam hammer is located in the press room, to restrike forgings that require that operation after heat treating.

Automatic Control on Forging Furnaces

A feature of the forging furnaces is that some of them are connected with recording pyrometers and have individual automatic control equipment working through Geisinger valves. The control equipment has been placed near the office. Control of the heating furnaces is now being



A SECTION of the Die-Making Department. The die makers have individual benches along the wall, back of the row of die-sinking machines

finished on the adjoining board hammer. The forging furnaces that serve the larger units are back of the hammers, trolleys being provided for handling the work between hammers and furnaces. Furnaces are located also at the side of the smaller hammers, permitting one man to handle the work and minimizing steps.

Press room equipment includes 20 trimming presses of Bliss, Toledo and Cleveland makes and one 600-ton coining press, most of them being arranged in a straight line along one side of the room.

Both the hammers and presses are arranged so that there is ample space around the machines for handling work in process. Room is provided back of the presses for the installation of a conveyor system. Back of each hammer is a metal box 24 x 30 in. x 48 in. high, in which portable tool equipment and dowels for the hammer are kept under lock and key.

Handling of work in process and of dies and tools is done by lift-platform electric trucks. Stock is sheared to proper length, dropping into boxes, which are moved from machine to machine on trucks. These also carry the finished product from the shipping department to the car loading dock over a concrete driveway at the rear of the plant. A

conducted in an experimental way in connection with special forging work. This control equipment is being used with a view of holding the heat control of the furnace to closer limits.

The heating furnaces, oil-fired, which were built from the company's design, are of steel construction, with the top arches made in sections held together with cast iron clamps. Any arch can be removed if it burns out.

There are five natural gas fired heat-treating furnaces of the box type. They are connected with Wilson-Maeulen recording instruments and have indicating control for the operator. Quenching tanks are conveniently located at the floor level in front of the furnaces.

Steam is supplied from a Connelly 300-hp. water-tube boiler in a 37 x 48-ft. powerhouse located at the end of the stock yard. Coal dumped into a hopper at the end of the tracks is elevated into an overhead bin, the hopper and bin having capacity for one carload. The coal is fed by gravity to an automatic stoker supplied by the Combustion Engineering Co.

High-pressure steam is carried to the shop through an 8-in. high-pressure main that is stepped down to 3 in. at the last hammer. The steam pressure at the hammers is



***M**OST of the Presses in the Press Shop Are in a Row on One Side and the Heat Treating Furnaces on the Opposite Side. Liberal floor space is provided for trucking work*

about 125 lb. Exhaust steam from the hammers is carried through a low-pressure line (3 lb. to 5 lb.) and is used to heat the plant and offices, through a vacuum heating system. The plant heating equipment includes three forced-draft heating units supplied by the Skinner Brothers Mfg. Co. The exhaust steam line starts with a diameter of 12 in., but is reduced in size beyond the supply line for the heaters. Each heater has a 5-hp. motor, which operates a blower that circulates the warm air through the rooms. The blowers will be used in the summer for creating a circulation of air through the shops.

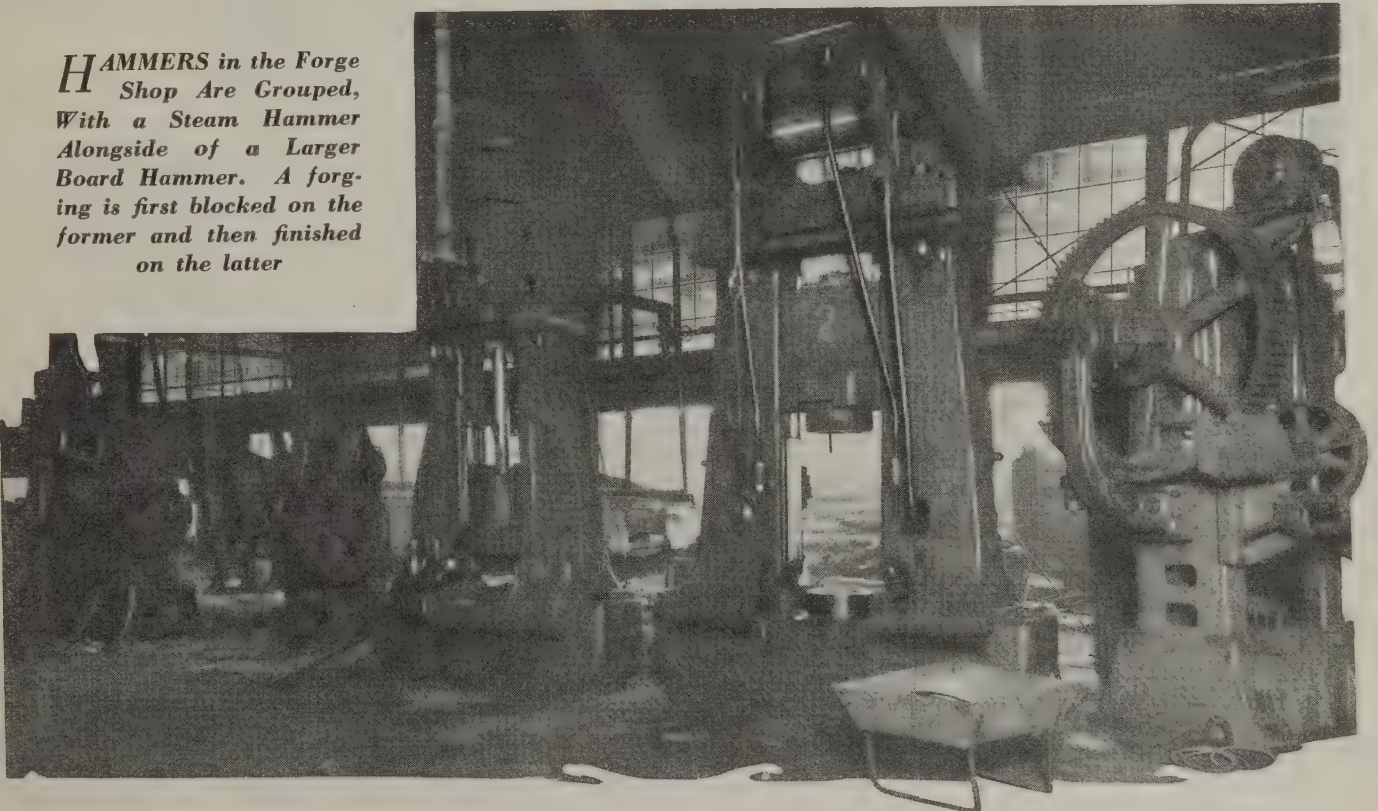
Fuel oil for the heating furnaces is stored in four under-

ground tanks with a combined capacity of 80,000 gal., and is pumped through a loop system of distributing lines by a Tate-Jones Co., Inc., system. The main oil line is 1½-in. pipe and the oil is fed to the burners through ½-in. pipe. One oil heater is located in the pump room and another one half-way through the system. The oil is kept at a temperature of 100 to 150 deg. Fahr. and a pressure of 30 to 35 lb. is maintained on the oil lines.

Much Air Is Used Under Pressure

Low-pressure air for the forge shop furnaces is supplied by two 5400-cu. ft. General Electric motor-driven pressure

***H**AMMERS in the Forge Shop Are Grouped, With a Steam Hammer Alongside of a Larger Board Hammer. A forging is first blocked on the former and then finished on the latter*



blowers, in the gallery at the end of the forge shop. The main switchboard for power and light is in this gallery also. Air is delivered at 1½-lb. pressure through a 20-in. welded steel pipe. Low-pressure air for the press room, including the heat-treating furnaces, is supplied at the same pressure by a 3600-cu. ft. General Electric pressure blower through a 12-in. line. Air at 100 lb. pressure for sand blasting is furnished by an Ingersoll-Rand 62-hp. compressor. This compressor also supplies air for operating the valves on the shears and on some of the newer types of presses that have air-operated clutches, thus eliminating foot treadles. All forgings are cleaned in a Pangborn sand-blast room.

The forge shop is of good height, being 26 ft. to the roof truss and 41 ft. to the peak, providing clearance for the installation of larger hammers than are used at present. The roof and such portions of the sides as are not glass inclosed are covered with Toncan metal. The lower section of the forge shop side walls and portions of the press room side walls have 10 x 20-ft. rolling steel doors, which are kept open in summer to aid in ventilation and trucking.

Mounted on the roof of the forge shop are nineteen 54-in. Swartwout ventilators with a capacity for changing the air every 3½ min. The forge and press shops have concrete floors. All machinery foundations are oversize, so that press machines can be replaced by larger and heavier units. There are light and power and compressed-air lines back of all hammers, permitting the use of portable tools and lights.

The die department is well lighted and each die sinker has an individual bench, the benches being located along the outer wall.

A well equipped chemical and physical metallurgical laboratory is maintained. All steel when received is given a pile number; samples are taken from each heat and analysis is made of the stock and recorded. This follows the work through the process, and affords an identification of the steel from the time it is received until the finished forging is shipped. The record is kept on file so that, long after a forging has gone into service, a check may be made of the analysis of the steel from which it was manufactured.

Corrosion in Metallic Protective Coatings

A STUDY has been made of the corrosion occurring at different kinds of discontinuities in coatings of non-ferrous metals on steel; the work has included sprayed coatings of copper, nickel and aluminum, and, in addition, coatings of zinc and zinc-iron alloy produced by hot-galvanizing, electrodeposition, spraying and sherardizing. Specimens of varying thicknesses of coating were subjected to six different types of corrosion. A report of this study was presented at the fall meeting of the (British) Institute of Metals at Liverpool, England, Sept. 5 and 6, in a paper by Ulick R. Evans of Cambridge, England.

The cracks produced by bending are more dangerous than uniformly distributed pores, says the author. If the coating metal is cathodic to steel, the steel is corroded. Copper under some conditions causes marked acceleration of the corrosion of steel at exposed places, while nickel is less dangerous in this regard. If the coating metal is anodic to

steel, the coating is likely to suffer corrosion, the steel thereby receiving protection; thus steel coated with zinc usually suffers no corrosion even at cracks until the zinc becomes exhausted.

Steel thickly covered with zinc usually fares better than thinly covered steel, notwithstanding the greater tendency to cracking. Old galvanized sheets carried more zinc than the modern material and generally lasted longer. Coatings of aluminum or zinc-iron alloys are themselves less attacked than coatings of free zinc, but for that very reason they afford less sacrificial protection to the underlying steel in certain waters.

Zinc itself is rather rapidly attacked when partially immersed in a chloride solution, but alternate salt-spraying and drying was found to build up a protective film—a fact which explains certain observations made on the behavior of galvanized iron in service.

Chromium Platers Subject to Nosebleed and Ulcerated Sores

COMPARATIVELY mild exposure to fumes arising from chromium plating baths is sufficient to cause nosebleed, ulcerated nasal passages and sores on the hands, according to governmental investigators.* Adequate ventilation and use of rubber gloves is recommended to prevent this industrial hazard.

The bath consists principally of chromic acid, and during the plating process considerable hydrogen and oxygen are liberated, and these carry a spray of chromic acid into the air. It has long been known that in the manufacture of chromic acid and chromates the operators are subject to perforation of the nasal septum and to formation of ulcers or "chrome holes" on exposed parts of the body.

To determine the extent of the hazard and the best means of overcoming it, several commercial plants were visited. It was found by Messrs. Bloomfield and Blum that exposure to very low concentrations of chromic acid—for example, one-sixtieth grain in 350 cu. ft. (which is about the volume of air breathed by a worker in eight hours)—is

sufficient to cause nosebleed and nasal inflammation in a week. Higher concentrations or longer exposures cause extensive attack and even complete perforation of the nasal septum. This is painless, however, and the operator may be entirely unaware of the perforation.

Many of the employees were found to have chromium ulcers on the hands or other exposed parts of the body. No evidence was found of injury to the respiratory tract except in the nose nor of any effect upon the digestive system or the kidneys.

Eliminating the Hazard

While there is a real hazard in chromium plating, it is not critical and can be entirely eliminated by suitable measures. These should include an effective system of ventilation in which the air is drawn horizontally across the plating tanks into a narrow duct in which the air velocity should be about 2000 ft. per min. So far as possible rubber gloves, aprons and shoes should be worn. Frequent applications of vaseline or mentholatum salve to the nose and hands greatly reduce the danger of ulceration. All cuts and abrasions of the skin should receive regular inspection and medical treatment.

*J. J. Bloomfield of the Public Health Service, and W. Blum of the Bureau of Standards, writing in the Sept. 7 issue of *Public Health Reports*, Government Printing Office, Washington.

Local Conveyors Yield Economies

Automatic Pace Setters in Cadillac Plant Reduce Stock in Departments and Allow Space for More Machines

BY FRED L. PRENTISS*

CONVEYOR lines for sub-assemblies and departmental conveyors for handling work in process from machine to machine have recently been installed in the plant of the Cadillac Motor Car Co., Detroit. For the assembly of rear and front axles power-driven conveyors have been provided, and work is moved through several of the manufacturing departments on overhead conveyors, for successive operations.

The extension of conveying equipment is effecting numerous economies in production. The assembly conveyors for axles act as automatic pace setters. They split up operations and permit carrying out progressive assembly to a fuller extent than was possible under old methods. The assembly conveyors have caused to be cast into the discard, in the departments in which they have been used, both the old type of floor stand and the dolly trucks mounted on casters, which took a great deal of floor space and failed to afford a solid mounting for the work during such operations as hammering. One advantage found in the use of the assembly conveyors is that the work during the assembling operations always has a solid support.

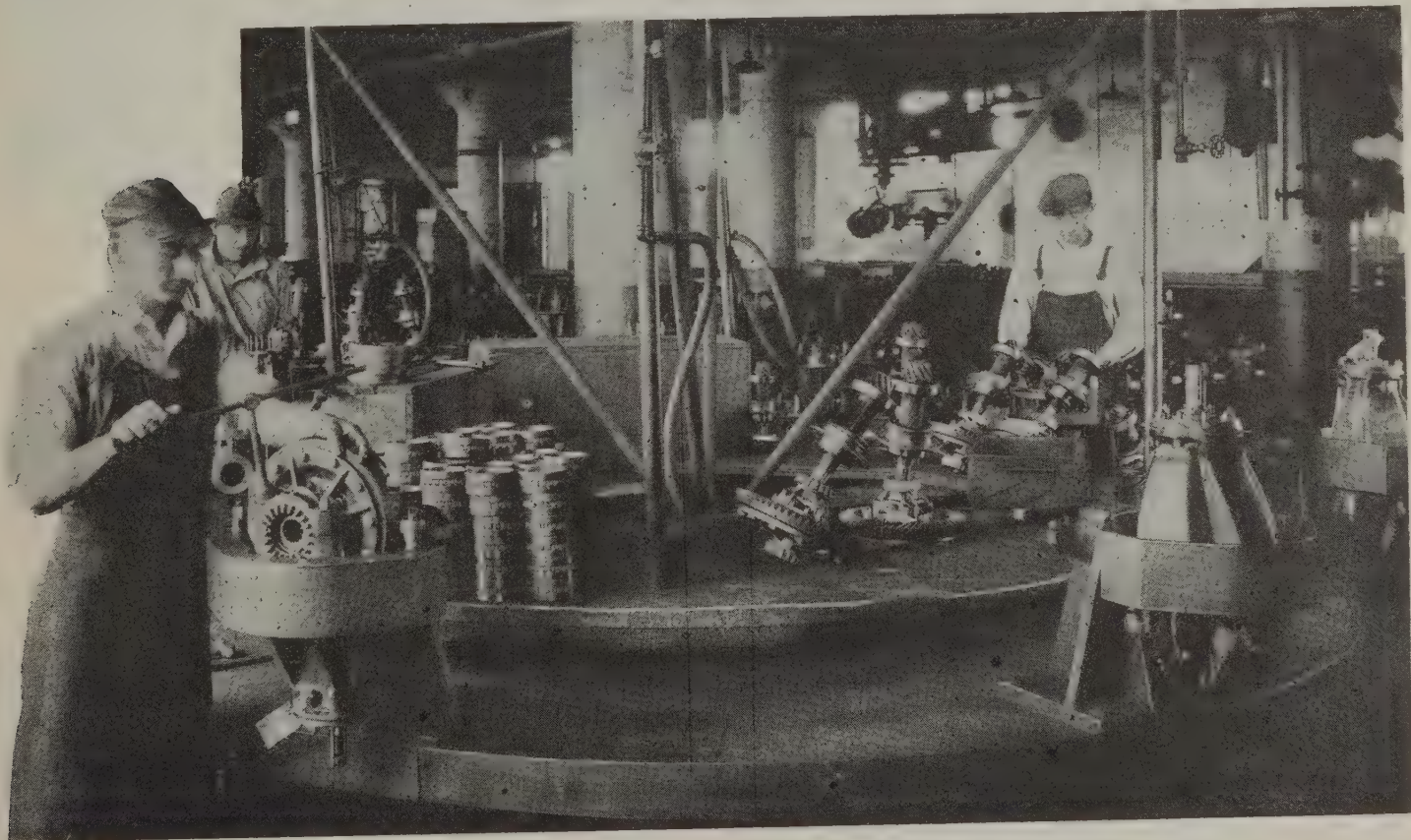
Much floor space is being saved by the departmental conveyors, thus providing room for additional lines of machines. This saving is effected by the elimination of trucks

and the avoidance of the piling of material-in-process at the side of the machines. The department conveyors are also pace setters. With their use material is kept moving. As there is no piling up of stock in process, the amount going through a department at any time is but a small percentage of the quantity formerly piled on the floor. Another economy that is by no means small is effected by having a much smaller amount of stock to keep track of.

Rotating Assembly Table or "Merry-Go-Round"

The rear-axle main-drive gear set is built up on a revolving circular conveyor known as a merry-go-round, 12 ft. in diameter, which moves at a speed of $2\frac{1}{2}$ ft. a minute. This has a moving outer section or assembly table. A circular platform within the circumference of the moving table, and at a slightly higher plane, serves as a stationary table and is provided with racks for holding small parts used in the assembling. The operations on the merry-go-round include assembling the main driving gear and the differential gears in a carrier or housing, all making a gear set. Seven working stations are provided around the merry-go-round for the successive operations. The housing is placed on a trunnion-type fixture. The studs are inserted and then the gear set is assembled in place. Shims are packed in, the nuts are tightened and the unit is inspected.

*Resident editor at Cleveland for THE IRON AGE.



A Revolving Table or Merry-Go-Round Is Provided for Assembling the Rear Axle Main Drive Sets, the Successive Operations Being Performed as the Table Revolves

Then a driver is applied for testing, and the unit is taken from the merry-go-round to an adjoining test booth. Separate merry-go-rounds are provided for Cadillac and LaSalle gear sets. There are similar merry-go-rounds for the transmission assembly.

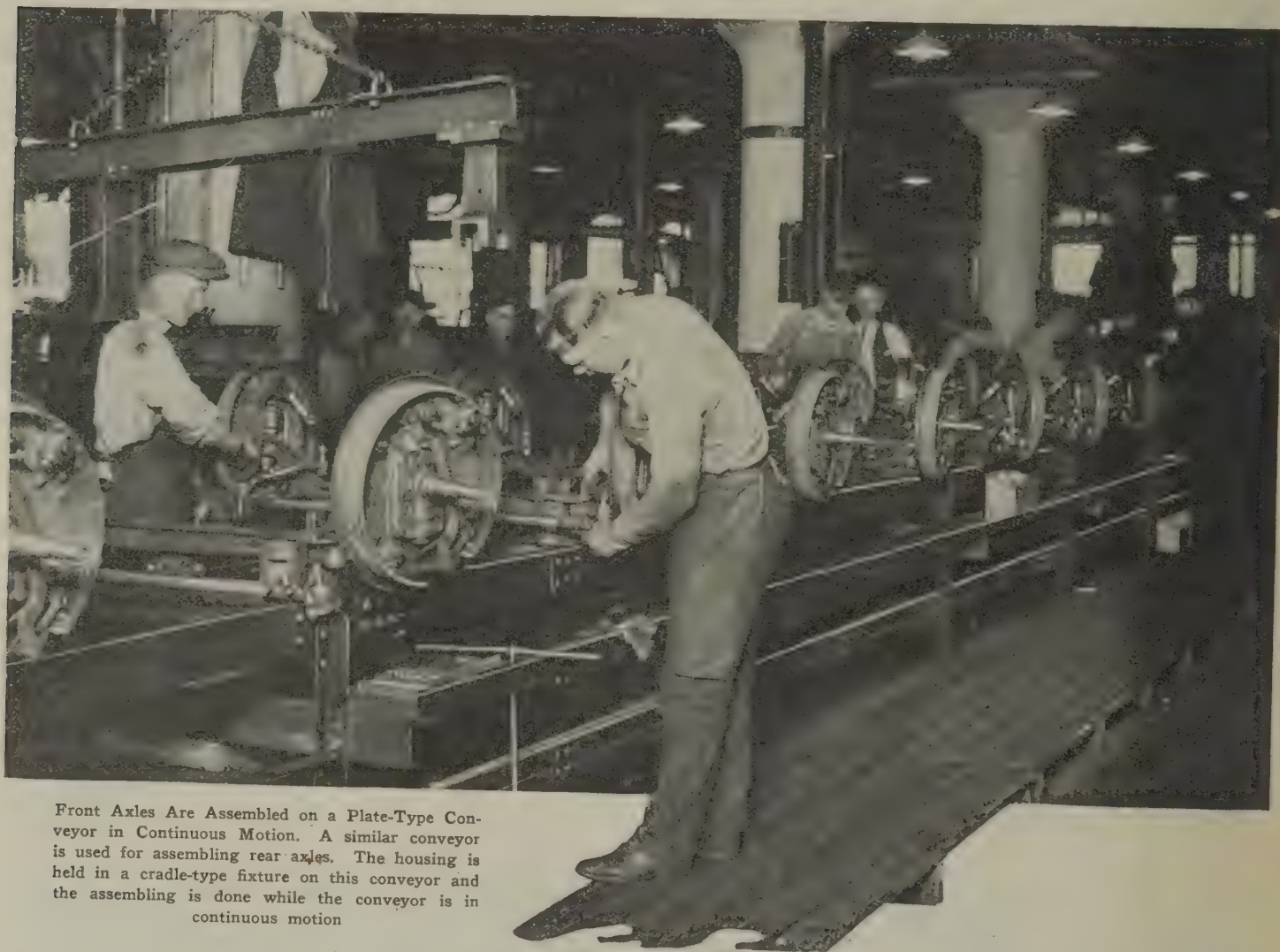
Rear axle units are assembled progressively on a moving plate-type conveyor approximately 50 ft. long, on which are mounted cradle-type fixtures on 6-ft. centers. The rear axle housing is placed on the cradle, the brake mechanism is assembled, the gear set is attached and other parts are added, all operations being done while the conveyor is in continuous motion. Gear sets, after testing, are placed on a sliding rack at the side of the axle assembly conveyor, where they are within easy reach of the men employed on the axle assembly line.

The completed rear axle assembly is discharged from the conveyor to an inclined table. It slides down this to a point

the conveyor through a drying oven 110 ft. long, in which they stay 45 min. at a temperature of 325 deg. Fahr.

The axle conveyor, on leaving the oven, goes down an incline at the side of an inner court, carrying the axles from the third floor to a point near the chassis assembly line on the first floor. Here monorail hoists pick the axles off the conveyor, the front axle being carried directly to the assembly line. The rear axle undergoes one operation before reaching that line—putting on the torque tube.

Front axle steering knuckles are handled from operation to operation on an overhead endless chain conveyor 240 ft. long. There are over 20 machine operations on the knuckles. This conveyor completes a circuit of the department, one line passing over a row of machines and the other between two rows. Its installation, by eliminating old methods of handling work in shop boxes at the side of the machines and moving it from one to another in trucks, has provided



Front Axles Are Assembled on a Plate-Type Conveyor in Continuous Motion. A similar conveyor is used for assembling rear axles. The housing is held in a cradle-type fixture on this conveyor and the assembling is done while the conveyor is in continuous motion

where a carriage operated by an air cylinder delivers it to hooks of a carrier suspended on 8-ft. centers from an overhead endless chain conveyor. Each carrier has two pairs of hooks, one for the rear axle and the other for the front axle, so that a carrier can be used for either axle, although both axles are not placed on the carrier at one time.

Front axles are assembled on a plate conveyor 66 ft. long. The I-beam part of the axle is placed on a fixture, and the axle is built up while the conveyor is moving. The conveyor has variable-speed adjustment through a Reeves drive, the speed being determined by the number of axles to be made in a day. A checking fixture is suspended from a monorail above the conveyor.

Chain Conveyor Carries Axles to Chassis Line

Both front and rear axles, after assembling, are carried on the endless chain conveyor through a paint booth, where they are sprayed with a priming coat. They continue on

space for an additional row of machine tools. The work is suspended from the conveyor on hooks on 2-ft. centers. The only handling by truck in this department is in bringing the rough parts to the first machine.

Another departmental conveyor is in the axle shaft department. Here a conveyor 270 ft. long, similar to that used in the steering knuckle department, runs between the rows of machines and delivers the work for successive operations.

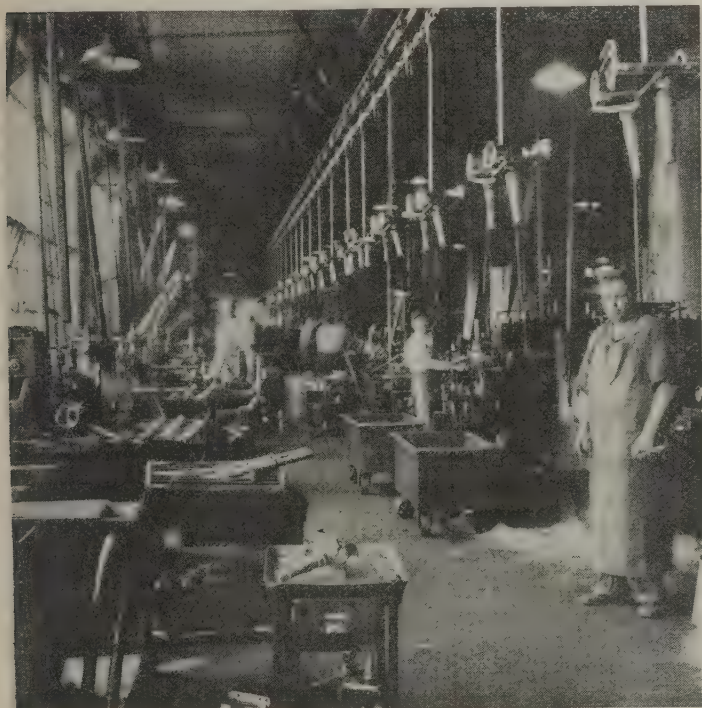
Connecting rods are handled from operation to operation by a two-way roller conveyor in front of the machines and behind the operators. These are stacked on wooden trays, 200 on a tray, and loaded trays can be stacked above each other. At about every 20 ft. in the roller conveyor there is a narrow opening, providing a passageway for the workmen. Formerly the connecting rods were carried from one operation to another on pipe racks. Now pipe racks are used only at the machines during the finishing operations and for

carrying the rods to the point of inspection and to the motor assembly department. When former handling methods were used the floor was badly littered up with work, and it was difficult to keep track of stock.

Making Room for More Machines

Camshafts are handled from operation to operation on an overhead endless chain conveyor 600 ft. long, built in two sections, these being separated near the center on account of a heat-treating operation. Formerly there was space in this department for only three lines of machines, but the conserving of space by the use of the conveyor has provided room for an additional line of machine tools. Formerly there were 3000 to 4000 camshafts on the floor or on trucks going through the various operations in this department. This number has been greatly reduced.

Another overhead conveyor is used for carrying crankshafts over a main traffic aisle, a distance of 300 ft. from



An Overhead Conveyor 240 Ft. Long Has Replaced Shop Boxes for Moving Steering Knuckles from Machine to Machine

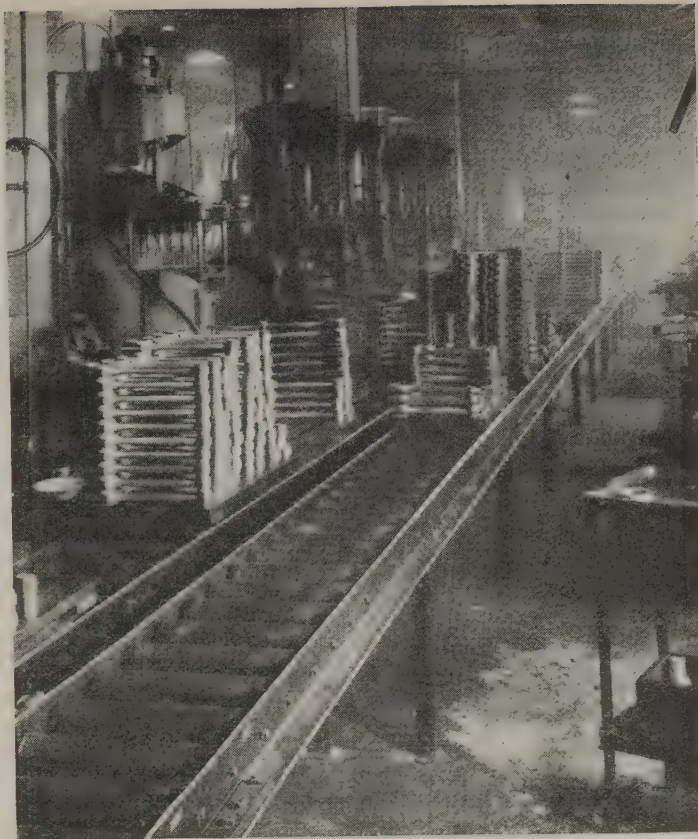
the last rough-grinding operation to the point of the first finishing operation.

Designed by the plant layout division of the Cadillac tool engineering department, the conveyors described were built by Detroit conveyor builders.

Research Aids New England to Cut Manufacturing Costs

Compelled to meet strenuous competition in a prolonged buyer's market, New England manufacturers, deprived of the advantage that they formerly enjoyed through plentiful water-power, are turning in increasing numbers to research as a means of cutting costs and improving products. Machine tool companies, textile weaving organizations, shoe manufacturers, paper mills, small arms makers, paint manufacturers—all are taking advantage of applied research to simplify and standardize products and processes of manufacture, frequently with amazing economies.

A brief history of the accomplishments of 28 New England companies through this method is contained in a booklet, "Use of Research in Standardization and Simplification" published by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., 1 Madison Avenue, New



A Two-Way Roller Conveyor Is Used to Move Trays of Connecting Rods Between Machines. The conveyor takes the place of pipe racks formerly used

York. The brochure contains a part of the compiled data on research in industry gathered during a comprehensive survey of New England industry. It is arranged in four sections, each representative of a particular method of attacking the combined problem of simplifying and standardizing manufacturing processes.



An Endless-Chain Overhead Conveyor 600 Ft. Long Carries Camshafts from One Operation to the Next. Enough space has been saved by the elimination of trucks formerly used in handling work from machine to machine in this department to make room for the installation of a fourth line of machines

"Ruthless Buying" Declared Unsound

George H. Charls, President National Association of Flat-Rolled Steel Manufacturers, Reminds Purchasing Agents That They Have a Part in the Prevention of Uneconomic Conditions

PURCHASING agents should set themselves against "ruthless buying" and the consequent price demoralization from which various branches of the steel industry have suffered. This thought was emphasized by George H. Charls, president National Association of Flat-Rolled Steel Manufacturers, in an address before the National Association of Purchasing Agents at its sixth district convention in Toledo, Ohio, on Oct. 2.

"It may be predicted," said Mr. Charls, "that the time will come when no reputable buyers will be guilty of the irrational policies pursued in some quarters today. The ablest buyers will be those who possess a true understanding of their responsibilities in buying, and in obtaining the best price for their companies they will have the wisdom to know that the lowest price may be the worst price—a menace to the prosperity of industry and a threat to the best interests of their own companies.

"The managing executive, responsible for a corporation's policy, who assumes it is right to bring all pressure to bear upon his purchasing department to secure the lowest price possible in mass buying, is doing business as it was done 3000 years ago. Such a policy is a derelict of the past. There is a new order of things—a modern understanding of economic law—a recognition of the fact that the prosperity of an industry depends upon the prosperity of the whole and that no man can live unto himself alone.

Calls Insistence on Unreasonably Low Prices "Profiteering"

"Any industry which is profiteering at the expense of and to the serious detriment of another primary industry by unscrupulously insisting upon unreasonably low prices will eventually reap what it has sown, in exactly the same manner as the seller who profiteered when conditions were reversed has always suffered his just punishment. The managing executive and the purchasing agent will no longer be excused for not recognizing in advance the economic effects of their acts.

"It has become an accepted principle in industry that stabilization in demand, production, wages and prices is to be preferred always to the wide and wild fluctuations from high peaks to deep valleys.

"It is also being accepted with the same certainty that the unsavory price cutter, with his secret rebates, confidential arrangements and ignorance of economic reactions, is a pernicious influence in any industry, to the buyer, the seller and the public alike—an unsafe, unsound opportunist with nothing to sell but a price. Such a seller does not know that he is overestimating the transient advantage of cut prices, that the secret rebate of today is the published price of tomorrow, that price cuts merely precipitate like cuts by all competitors and bring about a lowering of the net income of the industry without anyone being the gainer. Herein lies one of the reasons why prosperity does not stay with us always.

"Even those who profligately are taking advantage of the steel industry's dilemma must in all fairness commend the patience and fortitude with which it is sacrificing profits to avoid following the example of other industries which

have resorted to a cut in wages, with the natural consequence of reduced purchasing power of their employees. In this respect, at least, the steel industry is proving itself worthy of the leadership accredited to it."

Mr. Charls compared profits of the steel industry, at an average of 5.22 per cent in 1927, with those of the automobile industry, at 28 per cent, and the return for all capital in industry, estimated at 10 per cent. He predicted that the steel industry this year will show the same or a little more than the average return in 1927, notwithstanding increased production.

"The steel industry asks no quarter," he said; "it is not appealing for Government protection or legislation to take care of its surplus. In the last few years it has spent hundreds of millions to reduce the cost of making steel; it has gone the limit to meet the demands upon it. If it has resorted to mergers, it is because in no other way could it assure commensurate return on its invested capital.

Time for Large Buyers to Think

"Certain executives and buyers, often by adroit, inferential misrepresentation and even falsifying, are making futile the efforts of discriminating buyers who are withholding unwarranted pressure. Such buyers, and not the steel industry, will be responsible for the consequences. It is a fair warning that it is time for the mass buyers of steel to stop and think. Obviously, they cannot insist on paying a higher price than they are offered, but they can, in their own interest, recognize that steel is being sold too cheaply and give the steel industry fair opportunity to extricate itself from its serious predicament."

Too-Exacting Specifications Mean Losses

An instance of the loss imposed on the sheet steel industry was cited by Mr. Charls in the exacting specifications of buyers. It has come to the point, he said, that "ordinary quality is rejected, extraordinary quality is questioned, superlative quality is merely acceptable and perfection is demanded.

"While it is praiseworthy of Americans that their demand for progress and improvement in performance and style is insistent and insatiable," he added, "there must be reason in all things and these admirable qualities must not lead to extravagance and loss.

"Only the wonderful ingenuity of the research departments of the steel producers in studying the effect of grain growth and its relation to ductility and tensile strength has made possible the great saving in deep-drawing cost. One does not have to go very far back to a time when such direct deep-drawing operations were inconceivable, and frequent reheating to the detriment of the surface was necessary. Great savings and utilities have been effected by fine qualities of deep-drawing, flat rolled steel, but there are practical limitations which must be recognized. The impractical specification results in unnecessary loss.

"A worth while saving in the cost of flat rolled steel could be made if the purchasing agent, representing the designing engineer and the production and inspection de-

partments of the fabricators, could meet with a committee of flat rolled steel manufacturers to adopt practical and reasonable specifications and standards covering the different grades of flat rolled steel used in their industry.

Buyer Should Know Mill Practice

"The purchasing agent should have very definite knowledge of what constitutes practical mill practice and should use his influence to have his designing and production departments adopt standards and specifications which are reasonable and practical, and he should permit no fanciful

ideas of specifications or designs to impose undue losses and unwarranted hardships upon the producer of steel or in his own factory operation."

Mr. Charls said that the question of gages of flat rolled steel becomes more involved each year. A greater knowledge of gages was urged. Unnecessary confusion would be eliminated by the use of the United States gage, expressing the true decimal thickness of each gage. A movement to concentrate on the actual thickness of steel under the United States gage would be of great benefit to the producer, the fabricator and all other consumers.

Airplane Makers Plan for Mass Production

Uncertainty as to Trends in Design and Need of Standards Are Checks to Rapid Transition from Present Methods

DIFFICULTIES besetting the manufacture of airplanes in quantity, or under mass production conditions, were told at a recent meeting held under the auspices of the American Society of Mechanical Engineers at Wichita, Kan. Among the papers submitted were one by E. E. Porterfield, Jr., American Eagle Aircraft Co., and one by Walter H. Beech, president Travel Air Mfg. Co., Inc., Wichita, Kan.

Must Settle on Type of Motor

Although we have promise of new production motors in adequate quantity, and at prices which will permit their use in the medium and lower priced plane, Mr. Porterfield said we are still struggling with the problems arising with our present motor supply. In the first place, no single new production power plant has proved itself to be outstanding. In fact, no two or three engines have developed what might be called public preference. It has, therefore, been necessary for the manufacturer to diversify production to satisfy a wide range of public demand. The result is reduced production and increased production costs.

The motor situation, he added, is largely duplicated in much of the materials used in plane construction. "The industry has actually grown so fast within the past two years that the sources of material have proved entirely inadequate. The manufacturer, unfortunately, has been entirely dependent upon independent sources for practically his entire list of materials used in plane construction. However, whereas a year or two years ago, the business of supplying airplane materials was incidental to other lines of business, we have today a group of organizations handling airplane supplies exclusively, or specializing in the materials our industry demands.

"We have found it almost impossible to gage public demand," he continued. "Fortunately, so far, we have underestimated it. Fortunately, I say, for such a condition leaves us financially safe for the moment. But it adds to our problem. Public demand is calling upon us early for large scale production. Still, we find ourselves with many of our initial problems unsolved and with our policies consequently undetermined. The industry is still in its formative period, even though we may say that we are approaching a close of that stage."

Design Trend Not Yet Clear

As a result, Mr. Porterfield said, we are facing the problem of constantly increasing production without being sure of the ground over which we must travel. "None of us knows what the trend of public demand may take a year

from now—or even a month hence. We haven't by any means completed our engineering and research work. We are not by any means satisfied with our present product and present methods, satisfactory as they may be. Therefore, no manufacturer cares to invest heavily in machinery and equipment necessary to make large scale production possible. As a result, we are faced with the alternative of forcing production through the continued use of our present methods, namely, through hand work, or small machine tool work, upon materials provided through outside sources."

In concluding he agreed that the continued success of the industry demands the use of efficient machinery for large scale production. Also there must be standardization of product, of methods and of materials. "The manufacturer obviously must cease to experiment with a dozen different types of planes and motors. He cannot hope to continue, as he has in the past, a system which makes practically every ship an individual production problem."

Why 140 Airplane Makers Today

Mr. Beech pointed out that anyone with a few tools, an acetylene tank and blow torch, some steel tubing and an engine on order can start "manufacturing" airplanes. This condition is unfortunate, he argued, because it permits many people to enter the business who are not adequately equipped in experience and financial backing, and accounts in part for the existence of some 140 or more airplane companies in the United States today.

At present there are 15 departments in the Travel Air factory, each in charge of a foreman and a few with sub-foremen. These departments are: Welding, two fuselage assemblies, fuselage paint, wing paint, milling, wing assembly, final assembly, testing, maintenance, transportation, office, engineering, stockroom, first aid and safety.

Procedure in Travel Air Factory

"Let me now for a moment trace the production of a ship through our factory," said Mr. Beech. "At the west end of factory A the fuselage is begun. Tubing is drawn out of the stockroom nearby, cut to the proper lengths on a tubing saw, welded up on jigs, the engine mount built up and bolted on. The fuselage then passes down the line through the fuselage assembly department. The fitting department occupies the side of the building at this point. Here the completed fittings are assembled on the fuselage. The wire department occupies a balcony on one side, and the upholstering department occupies a balcony on the other side. The purpose of these balconies is to concentrate the parts departments near the assembly department,

see that wires, fittings, etc., will not have to be moved more than a few feet before they can be assembled on the ship.

Next the engine is installed in the plane and the cowling and tanks are added at a point opposite the sheet metal department. The fuselage is then covered and passes into the dope room. Dope and paint are sprayed on and the fuselage passes out into the final fuselage assembly department. Here the landing gear, tail surfaces and center section are assembled.

Factory B abuts factory A. Passing to the far end of factory B, we find the mill room. Here lumber is milled to the proper size and shape for wings, turtle backs, and cabin framework on the monoplane. The parts are assembled in the wing assembly department, which joins the mill room. The fittings are added and the wings covered. The wing then passes into paint and dope room No. 2.

The completed wing is moved to the final assembly and rigging department, where it is dropped on the fuselage, which has been moved across the court from factory A. After the ship has been rigged, it is given a final inspection and then test flown.

When More Metal Will Be Used

As to the production methods of the future only a guess can be made. We feel the use of machinery will increase and as a result metal will enter into the construction more and more. Metal wings will be justified as soon as production amounts to a scale which permits the investment in the necessary equipment for their construction. Machined fittings will replace welded fittings, when the quantity of fittings produced is such that the machinery necessary to produce them will pay for itself.

Improved Die Steels for Aluminum Die Casting Industry

ABOUT six years ago it was generally accepted that the question of die steels was the "neck of the bottle" in the aluminum die casting industry, writes Sam Tour in *Mining and Metallurgy* for September. Dies lasted for an average of some twenty thousand castings. Before replacing a die it was customary to make thousands of castings from it which had to be ground all over in order to remove fins left by numerous die cracks. For example, dies for making waffle grids would show cracks after only a few thousand castings and seldom was it possible to make more than 10,000 before replacing the impression block. Other difficulties were warping, and the growing or shrinking of the steel dies during the heat treatment, resulting in mismatch of the two halves.

The industry was then using a chrome vanadium steel. It was the general understanding, gained from such unknown source, that nickel steels were not satisfactory for dies due to the solvent action of aluminum, and that tungsten steels would not withstand the peculiar type of thermal fatigue encountered. About four years ago both of these

general understandings were proved to be false. Several new steels were developed, one containing nickel and the others containing considerable tungsten and chromium.

Larger dies are now being made than ever before. Waffle grid impression blocks give from 50,000 to 100,000 castings before being replaced. Automobile steering wheel spider dies which used to last only for 20,000 castings now last for 70,000 to 100,000. It is only necessary to grind a very small percentage of the aluminum die castings produced.

These new steels are not perfect. They have certain inherent faults such as brittleness, but they are a vast improvement over the old chrome vanadium steel. It is hoped that the present steels will be further improved or that still newer types will be developed that will retain the good qualities of the present steels and will not have their faults. Future progress of the industry however will not be seriously hampered by steels for several years at least. There are other questions in the industry now that are "the neck of the bottle."

Advantages and Limitations of Chrome-Irons for Condenser Tubes

REALIZING that steam superheaters are subjected to more severe working conditions than high-pressure boiler drums, Brown, Bayley's (Sheffield, England) research laboratories are studying the action of tubing under working conditions. Three classes of metal are under observation, a nickel-chromium-iron alloy, a chromium-iron alloy and mild carbon steel.

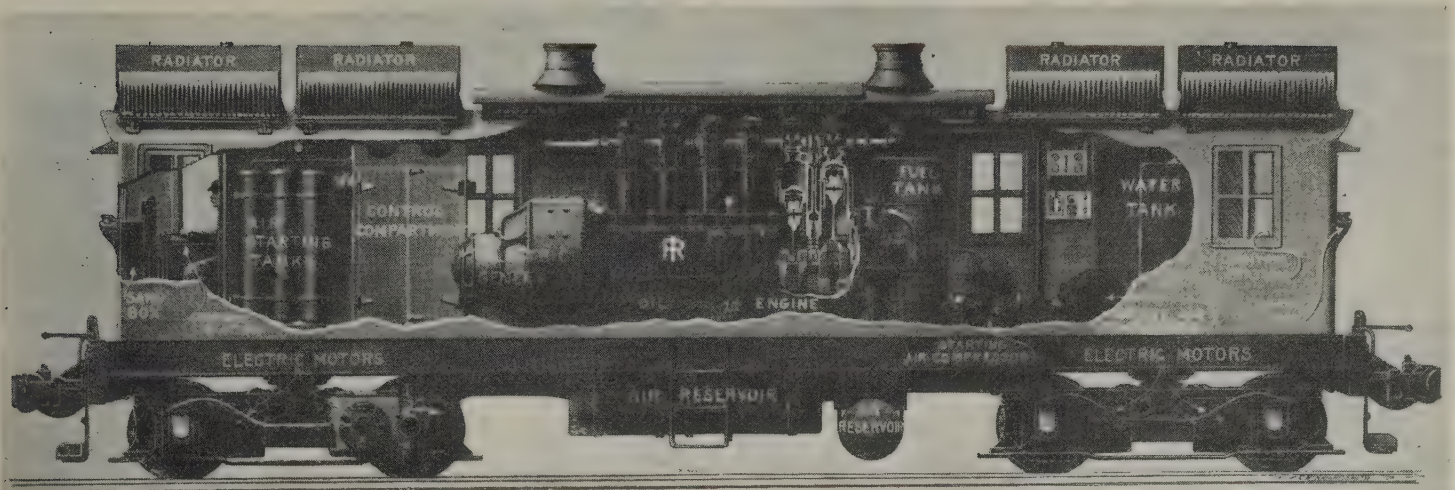
Tests are carried out by passing steam through the tubes, the steam entering at a temperature of about 750 deg. Fahr. and leaving at about 1000 deg., the temperature of the tube being kept at about 1000 deg. Fahr. by passing an electric current through it. Tubes of the alloy irons were found free of attack after several weeks. The result with mild steel, however, was unsatisfactory. The tests proved the immunity of nickel-chrome-iron and straight chromium-iron alloys from oxidation, and assuming such heat-resisting tubes could be manufactured at a reasonable price, it would enable higher steam pressures to be used with safety. Previous experiments had proved similar reactions to hot furnace gases.

Whether tubes of such alloys will stand high internal pressure at high temperature has yet to be proved. Prof. F. C. Lea, speaking before a recent meeting of the British Association for the Advancement of Science, said that experiments dating several years back proved without doubt that a metal which had an ultimate strength of 45,000 lb.

per sq. in. in tension when tested in the usual way at room temperature would break at 12,000 to 14,000 lb. after exposure to a temperature of say 900 deg. Fahr. for several weeks. Special anti-corrosion steels have a much longer life than plain carbon steel at the higher temperatures, but even with them the working temperatures ought to be considerably below 1500 deg. Fahr.

Recent experiments had shown that even some of the best steels for resisting high temperature would, at a temperature of 1500 deg. Fahr., have their strength reduced from, say, 33,000 lb. to 4500 lb. per sq. in. in 53 weeks, and he had estimated that in 1½ years the strength would be reduced to 2200 lb. per sq. in. Therefore, it was apparent that above an undefined temperature between 900 and 1500 deg. Fahr., small changes of temperatures meant very considerable changes in the limiting creep stress.

Methods of test relating to electrical insulating materials have been published by the American Society for Testing Materials in a book of 155 pages illustrated. This has been issued to present under a single cover what the society believes would be important to those interested. The committee active in this work has been engaged for several years in drawing up methods of testing and improving upon those in use. The pamphlet gives what are considered the best methods available.



Steel Plants Using Oil-Electric Engines

Industrial Service Follows Experiments by Railroads for Yard Switching—Savings in Costs

THE comparatively recent development of the oil-electric locomotive is of interest not only because it offers a potentially large field for the use of steel—a factor of no mean importance in view of the small purchases of steam locomotives in the last few years—but because of its adaptability to the needs of large industrial plants, such as those of the steel companies.

Late last year the American Rolling Mill Co. ordered one of 300 hp. capacity for trial at its Ashland, Ky., plant. Since then the company has bought three more of the same size for the Ashland plant, and one of 600 hp. capacity for its Middletown, Ohio, plant. The Donner Steel Co., Buffalo, purchased a 300 hp. engine in April of this year, following with an order for three additional units.

The hourly operating cost of an oil-electric locomotive will vary, it is stated, according to the work as-

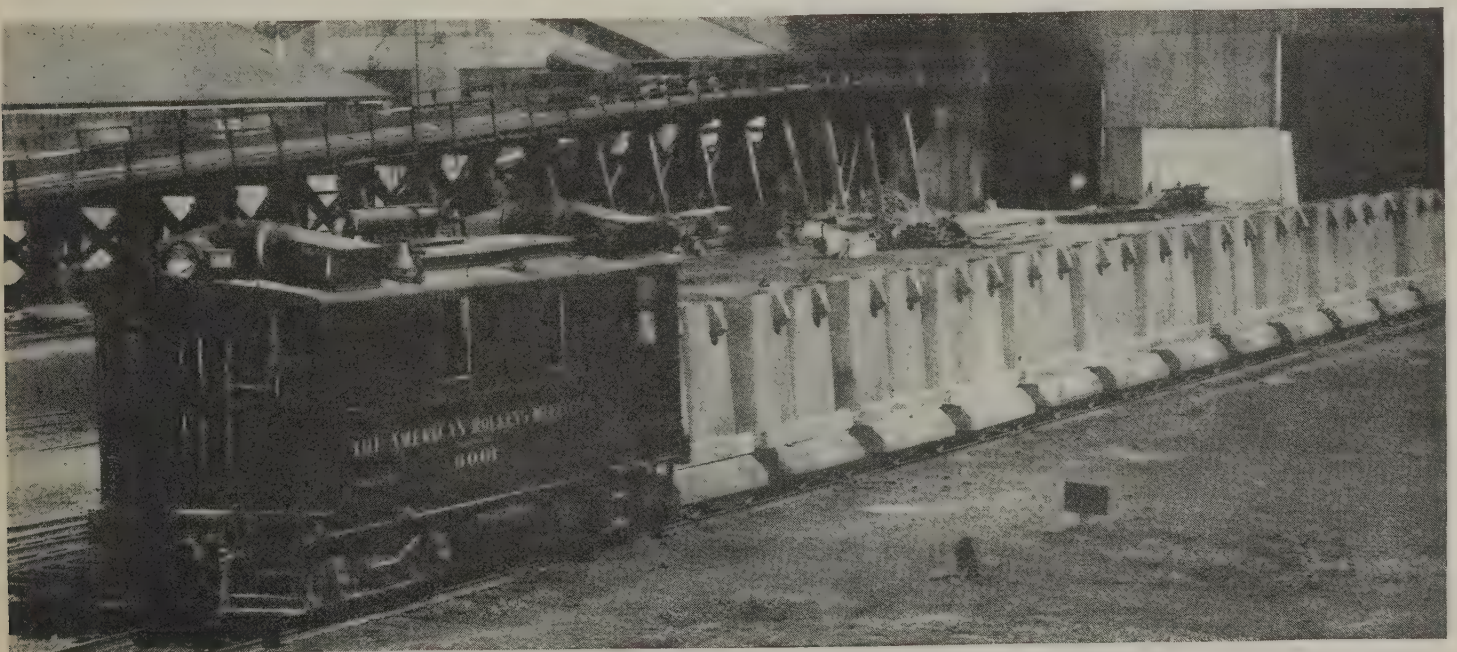
signed. For the 300 hp. engine, it varies from 20c. to 40c. per hr., and for one of 600 hp. from 28c. to 50c. per hr. These costs are contingent upon the prices for fuel and lubricating oils in the localities in which the engines are operating.

The oil-electric engine first demonstrated its possibilities in marine propulsion, but up to the present its application to railroad propulsion has been relatively limited. The automobile has shown the efficiency of the internal combustion engine, while the electric drive in its various applications has been recognized as offering an easily controlled form of power transmission. It has been through a combination of these two principles that the oil-electric engine has been evolved.

Development work was undertaken by three companies acting in cooperation. The General Electric Co., the

American Locomotive Co. and the Ingersoll-Rand Co. supplied the varied types of experience required in electrical engineering, locomotive design and construction of the internal combustion engine. The engine finally developed combines one or more Ingersoll-Rand oil engines direct-connected to a General Electric d.c. generator, which supplies electrical energy to traction motors mounted on the trucks. The oil engine is of the vertical, six cylinder, four cycle, single acting, variable speed type, having direct fuel oil injection. Fuel oil injection is accomplished by means of two spray nozzles in each combustion chamber. To these nozzles oil is delivered under pressure by an injection pump driven from the main shaft. No compressed air is used for fuel injection. Ignition is produced by the heat of compression only.

Other features of the oil engine include a distributor timed to admit oil to the spray nozzles of each cylinder in their proper firing order; a lubricating system entirely enclosed and of the force-feed type, and a closed cooling water system, the water



A 300-Hp. Oil-Electric Engine Hauls Ingot Molds at the Plant of the American Rolling Mill Co., Ashland, Ky.

being circulated by a centrifugal pump driven from the crank shaft.

In operation, the electric control handle is set forward or backward, with the motors in series for speeds below 5 miles per hr. or in parallel for speeds above 5 miles per hr. The position of the throttle lever determines the power delivered by the engine, and the generator and motors transmit the power to the driving wheels, automatically adjusting the proportion of tractive effort and speed to the load on the locomotive, and automatically changing these proportions to suit the varying requirements of acceleration or grade.

While the development of the oil-electric engine to date has been chiefly in connection with its serviceability for low-speed switching service, it is



A 60-Ton Oil-Electric Locomotive in Service at Plant of Donner Steel Co., Buffalo

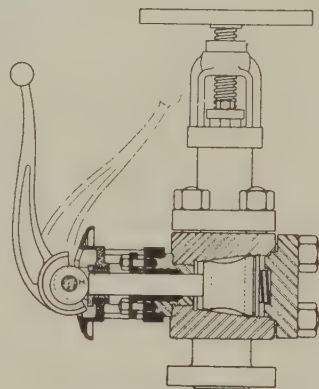
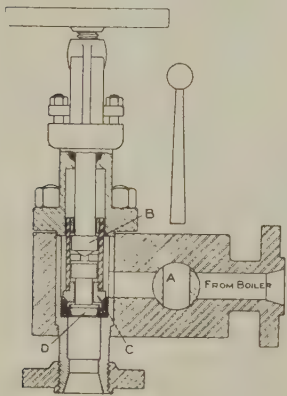
believed to offer future possibilities for main line railroad service. One of 750 hp. capacity has recently been

delivered to the New York Central Railroad for use on its Putnam division in New York State.

Tandem Blow-Off Valves Have One-Piece Body

BOILER inspection laws of most States demand the use of two valves in tandem in the blow-off line from a steam boiler. Ordinarily, two separate valve bodies are used. Generally one of the valves is of a special form designed to avoid or reduce

single, forged-steel body. The valve nearer the boiler is of the rotating gate type, and in ordinary operation is intended to be opened before the main valve is opened and to be closed after the main valve is closed. The gate member is conical and is ordinarily



Two Sections (at Right Angles) Through the Valve Chambers, Both Being Closed. Boiler pressure is held by rotary gate A, by scaling valve C and by check disk D

erosion of the valve disk and seat by the hot water and sludge discharged at high velocity under boiler pressure.

The valve illustrated has been designed by the Cochrane Corporation, Philadelphia, to meet these exacting requirements. There are two main valves in tandem, as required by law, but both valves are combined in a

held to its seat by a seating spring and by the water pressure.

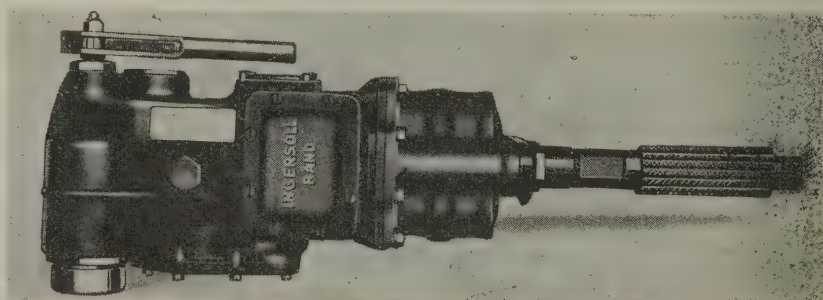
So that it may be turned easily and without scratching of valve or seat, provision is made for lifting it from the seat before it can be turned. The valve member is a one-piece, stainless steel forging, which has been hardened and ground.

New Close-Quarter Drill

A NEW gear-driven close-quarter drill with a two-cylinder double acting air motor has been developed by the Ingersoll-Rand Co., 11 Broadway, New York. It was designed for general drilling, reaming and tapping in close quarters. It weighs 41 lb. and is 9¼ in. long. The length of feed is 2½ in.

Minimum thickness of the machine has been secured by making it flat, the drill being practically the same thickness from spindle to cylinders. It can therefore be readily used in very cramped places. Smooth operation has been secured by arranging

the pistons to act at right angles to, and in a plane with, the spindle; by



Flatness of This Close-Quarter Drill Is a Feature

using a counter-balanced crank and by using special gears for the drive.

Gears are built strong and rugged, their size and strength being increased as the load carried increases, until the final drive on the spindle is through a heavy herringbone gear, which gives a smooth and steady driving action. Anti-friction bearings of the ball or roller type are used throughout.

Three different spindles can be furnished, the standard spindle having a No. 4 Morse taper socket. A threaded spindle 1-11/16 in. in diameter, 12 threads per inch, to take square socket chucks or the Rich chuck, can be had. The third spindle obtainable is a Use-Em-Up spindle which has a No. 4 Use-Em-Up taper.

Sharp Gain in Electric Power Production

Production of electric power by public utility power plants in the United States in August is reported by the Geological Survey at 7485 millions of kilowatt-hours. This compares with 7140 in July and 7010 in June. Water-power furnished a smaller amount in August than in either of the two immediately preceding months, representing about 41 per cent of the total in August, against 43 per cent in July, and more than 44 per cent in June. Correspondingly, the power produced by the consumption of fuels in August was nearly 10 per cent above July and 13 per cent above June.

Foreman Is Key Man in Safety Work

Department Head Is Largely Responsible for Safety Education of Workmen—Mechanical Handling Is Factor in Foundry

THAT the education of every person connected with the foundry to think, act and live safety is the keynote of accident prevention work in that department was emphasized by Nelson H. Kyser, safety engineer, Studebaker Corporation, South Bend, Ind., in an address before the metals section of the National Safety Council assembled in New York last week. This personal education, the speaker pointed out, should begin with cleanliness. "A clean orderly shop," he said, "means careful workmen and greatly reflects the quality of the product. If aisles and passageways are blocked or are strewn with foreign matter, the possibility of spilling a ladle filled with molten metal is greatly increased. If flasks are piled so that they may topple over, the hazard of crushing or badly lacerating a fellow workman is present. Teaching a man or allowing him to develop the proper and safe method of doing a job is also important. The employee should be cautioned against using a rusty skimmer or rod when skimming or stirring molten iron. The pouring of molten metal into moist ladles should also be cautioned against, as also should the watching of a mold up through the risers without the necessary goggles. Proper clothing must also come in for its share of consideration in the correction of unsafe practice in foundries."

The correction of unsafe foundry practice or the elimination of hazards caused by layout, the speaker stated, are just as important as personal education. In his opinion the more mechanical devices that are installed the less will be the possibility of accidents. "In the mechanical handling of raw stock," he said, "magnetic cranes can be brought into use for the pig iron and scrap, while hopper bottoms bins make a safer and easier way to handle the non-metallics. All the ingredients of the charge may be loaded into small cars, weighed and transferred to the charging floor untouched by human hands. This practice will eliminate crushing injuries and also the possibility of disablements caused by the strain of over-lifting.

"After the charge is on the charging floor it should be mechanically dumped into the cupola. This method will avoid hand shoveling of the charge, where a man is apt to slip and fall into the mouth of the cupola. Serious thought should also be given to proper ventilation, as the gases on the charging floor are poisonous, and when ventilation is inadequate res-

pirators should be furnished to the workmen. One of the most important applications of mechanical means is in the pouring of molten metal. If the conveyor system for carrying the molds could be installed universally one of the greatest foundry problems would be solved. If the mold could be placed on conveyors and transferred to a point 25 ft., or not over 50 ft., from the cupola and poured, relatively few men would be brought into the danger zone. The installation of this type of conveyor system would eliminate the inspection of long monorail systems, the danger of slop over would be cut to a minimum and the use of hand ladles would become obsolete.

"The shipping and grinding department should be in a separate room from the rest of the foundry. This room should be well lighted and ventilated and all workmen should wear goggles and hard toed shoes to avoid eye and foot injuries. The various tools should be frequently inspected for their suitability and condition. The use of chisels with mushroom tops is dangerous and should be avoided. The chipping room should be large enough to allow considerable distance between each chipper, as flying chips often cause injuries."

Much Depends Upon Foreman

The key position of the foreman in making safety work successful was stressed by Dominic Samuel, foreman tube galvanizing department, Campbell plant, Youngstown Sheet & Tube Co., Youngstown. He stated that, in eliminating the hazards of his department, he soon found that the attitude of the men was the most serious danger of all. This was gradually corrected by safety meetings, the posting of warning placards, and, most important of all, by individually talking to the men on the job and making certain that they knew how to do their work safely and right.

The responsibility of the foreman was also brought out in a novel manner in a debate between J. A. Voss, director safety and compensation, Central Alloy Steel Corporation, Massillon, Ohio, and Michael P. Grady, president Stark County, Ohio, Foremen's Club. In outlining the procedure for the organization of a safety campaign, Mr. Voss pointed out that the first move is to interest the management; second, the superintendent; third, the foremen, and, fourth, the workmen. The importance of educating the workmen, the responsibility of which depends largely upon the foremen, is evidenced by

accident statistics showing that 25 per cent of accidents are preventable by safeguards and 75 per cent by education. Both men were agreed that one of the best ways of training the workmen to do their work safely is to call them together every two weeks and discuss safety problems.

Mr. Voss stressed the fact that, although the management and the superintendents may be ever so enthusiastic about safety, the foremen must be just as enthusiastic and must constantly plan and scheme to keep every man in their various departments enthusiastic. One way of doing this is by means of the safety committee, the members of which must at all times bear in mind that the prevention of accidents is one of their most important duties. Mr. Grady told of the reluctance of many foremen to place their best workmen on the committee. This attitude, it was explained, can usually be changed by demonstrating to the foremen that safety work is one of the most important factors in maintaining satisfactory uninterrupted production.

Safety as Aid to Department Efficiency

The value of safety work in maintaining the efficiency of a department was the main theme of an address by Philip J. Bowen, foreman annealing department, Michigan Steel Corporation, Detroit. "The first big step in making a safety plan successful," he stated, "is that every foreman know his own men. Knowing the men means that the foreman understands thoroughly their temperaments and characteristics. He should also do his best to gain their confidence by being consistent in his daily practices. He should make a thorough survey of his working equipment at the beginning of each day and see that all working implements are in good safe condition before the men start operations. This will show the employees that the foreman is sincere in his efforts to safeguard their lives and will have a striking effect upon their morale. It is often a good idea to give each man something to do, such as the responsibility for the inspection of some machine, and thus create an individual interest in the safety movement."

The new 6-stand 4-high, roller bearing continuous 13-in. skelp mill, which the National Tube Co. will install at its National Works, McKeesport, Pa., will be furnished by the United Engineering & Foundry Co., Pittsburgh.

Engineers Hold New England Meeting

Airplane Engines, Textile Machinery and Apprentice Training Included in Broad Program

WITH 10 technical sessions devoted to as many different topics, the New England Industries meeting of the American Society of Mechanical Engineers, held at the Hotel Statler, Boston, Oct. 1, 2 and 3, was of broad scope.

The sessions were under the auspices of various divisions of the society, and topics covered included materials handling, management, industrial education and training, machine-shop practice, aeronautics, railroads, and power. There were also meetings of the research and other committees, and outstanding among social events was a banquet and dance held on the evening of Oct. 2. Excursions to the plants of the General Electric Co., West Lynn; Ford Motor Co. assembly plant, Somerville; and the Gillette Safety Razor Co., Boston, were well attended.

Steel Makes Up Half the Weight of Aircraft Engine

Interesting data relating to the arrangement, selection of materials, manufacture, inspection of parts and application of the Wasp and Hornet engines to aircraft were given by A. Willgoos, chief engineer of the Pratt & Whitney Aircraft Co., Hartford, at the aeronautic session. The Wasp and Hornet engines are similar in design, 81 per cent of the parts being the same in both.

In discussing the weights of the various materials used in the Wasp engine the following percentages were given: Aluminum, 33.4 per cent; duralumin, 8.6; copper, brass and bronze, 3.64; rubber, paper, etc., 0.16; and steel and iron, 54.2 per cent.

"It is rather surprising to find that in a unit in which light weight is important, more than half of the weight is made up of steel," said Mr. Willgoos. "Aluminum and its alloys are used as far as possible, but for highly stressed parts there is often no advantage in their use. While aluminum weighs one-third as much as steel, it is not as strong as alloy steel and sections cannot always be increased to offset the reduced strength. For other parts extreme hardness is required and obviously this indicates the use of steel."

Inspection methods were described at length, the thoroughness and care of the inspection work being particularly emphasized.

Other papers at this session were "Air Transportation in Relation to New England," by Sumner Sewall, Colonial Air Transport, New York, and "A Review of Ball and Roller Bearings in Aircraft," by F. W. Mesinger, Norma-Hoffman Bearings Corporation, New York. S. W. Stratton, president of the Massachusetts Institute of Technology, presided.

Some of the methods employed at the Auburn, R. I., plant of the Uni-

versal Winding Co., were outlined by J. F. McEnneny, superintendent of that plant, at the session devoted to machine-shop practice. The high standards of engineering and manufacturing technique in textile machinery building were emphasized, engineering opportunities in this field being said to be equal to those of other branches of the metal working industry.

"Competition in the field of textiles is very keen and mill owners are demanding machinery that will speed up production and minimize the human factor," said Mr. McEnneny. This demand has meant, to many textile machinery builders, changes in design, materials and in manufacturing methods. Mechanism having a large number of small parts that must function and interchange in textile machinery used all over the world call for methods that assure accuracy and interchangeability of those parts.

Several special-purpose high-production machine tools developed by the company were shown by lantern slides, and inspection methods, starting with frequent check up of tools and equipment, were outlined.

Internal Grinder Development Reviewed

"Internal Grinding Development," a paper by Alden M. Drake, chief engineer of the Greenfield Tap & Die Corporation, Greenfield, Mass., described briefly the various machines brought out since hardened pieces began to be used extensively.

At first the pieces were ground in the engine lathe, using a home-made attachment. A bench lathe and a universal grinder with internal grinding attachments were made available later, these being followed by a "cup and cone grinding machine" developed by the Pratt & Whitney Co. The arrangement of this machine, as well as the Heald, Bryant, Landis and other internal grinders, was outlined.

Written discussion was submitted by J. R. Weaver, superintendent of manufacturing equipment, Westinghouse Electric & Mfg. Co., East Pittsburgh. The high speed and close accuracy of the modern internal grinder was commented upon in the general discussion.

"Proper General Management of Industry," a paper by Jerome R. George, vice-president Morgan Construction Co., Worcester, was presented by C. E. Davies, assistant secretary of the society, at a session held under the auspices of the A. S. M. E. management division. "In the end the public will decide whether or not industry is being properly managed," said Mr. George. "Generally speaking and in the long run, a manager of an industrial corporation who does not keep in mind the public relationship of his work will do harm

to the public interest and to industry. On the other hand good management of public affairs will give business reasonable regulation and protect it against unfair attacks by selfish interests from within and without." Thirteen comprehensive aims and rules of general management were set forth in the paper.

The opportunity of the engineer in reducing the cost both of manufacture and distribution was emphasized by W. J. Fortune, assistant vice-president of the National Shawmut Bank of Boston, in a paper on "Progress in New England." The trend toward research in industry and in business was pointed out and in this connection Mr. Fortune said: "To the admitted ability of the New England manufacturer to sell, he is to a greater extent adding essential facts contributed by scientific research. The rule of thumb method is giving place to guidance by essential basic facts."

Apprentice Training at Lynn, Mass., Plant

Description of the apprentice system of the Lynn, Mass., plant of the General Electric Co., by Charles K. Tripp, supervisor of apprentices at that plant, was a feature of the session on education and training for the industries.

Four major courses are offered, machinist work, drafting, pattern making and molding. There are also four special courses, sheet metal working, steam fitting, testing and factory business. All courses are on a four-year basis. Apprentices taking the machinist trade, drafting, electrical testing or factory business courses are required to spend two years in the training room for machinists. After they have completed their term they are given an opportunity to work at the trade for which they show the most talent.

The machine shop is the principal training room and is laid out so that all apprentices start on the same class of work and under the same instructor. As soon as they have learned how to do an operation they are advanced to a different machine where they are required to do work of greater precision. There is no definite schedule of advancement in shop work, the work given an apprentice being determined by his ability and capacity. Most of the instruction is traditional.

The beginner is put at a machine with an apprentice who has learned to do a certain job to the satisfaction of the foremen. The apprentice acts as a teacher to the beginner, who when he has learned to do the work as well as his teacher, acts as an instructor to another boy. The boys are supervised by experienced instructors. Of the 12 shop instructors seven are graduates of the Lynn apprentice course, and five are journeymen machinists who are selected for their production ability, as well as their capacity for teaching. From 15 to 20 apprentices are under the supervision of each instructor.

After the apprentice learns to op-

erate the machines satisfactorily, he is given opportunity to apply his experience to the building of a jig, fixture or machine. All apparatus manufactured in the training room is selected from the different production and tool departments for its educational value rather than for its simplicity. The finished work is given rigid inspection by the general inspection department of the plant. It was stated that the amount of spoiled work is small, less than 2 per cent.

Results of different methods of selecting apprentices at the Scovill Mfg. Co., Waterbury, Conn., were given by W. S. Berry, director of training of that company, in a paper on "Experience in the Selection of Apprentices with the Aid of Tests." The studies described were begun in 1923 and the data given cover a period of four years.

Papers at the materials-handling

session covered the handling of marine shipments of pulpwood and of materials in sugar refining. The mechanical handling of lumber was described at the wood industries meeting, at which a progress report of the society's special research committee on wood-working saws and knives was also presented.

Speakers at the banquet, which was well attended, included Dr. Ira N. Hollis, past president, and Charles L. Newcomb, vice-president of the society. Lieut. S. L. Willets, aeronautical division of the Department of Commerce, spoke on the development of commercial aviation, and Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*, discussed the "Place of Research in the New Competition," with special reference to developments in the field of chemistry. Charles C. Peirce, General Electric Co., Boston, was toastmaster.

Third: To avoid misrepresentation and sharp practice in our purchases and sales, recognizing that permanent business relations can be maintained only on a structure of honesty and fair dealing.

Fourth: To be courteous and considerate to those with whom we deal, to be prompt and businesslike in our appointments, and to carry on negotiations with all reasonable expedition so as to avoid trespassing on the rights of others to the time of buyers and salesmen.

Fifth: To avoid statements tending to injure or discredit a legitimate competitor, and to divulge no information acquired in confidence with the intent of giving or receiving an unfair advantage in a competitive business transaction.

Sixth: To strive for simplification and standardization within the bounds of utility and industrial economy, and to further the development of products and methods which will improve industrial efficiency.

Seventh: To recognize that character is the greatest asset in commerce, and to give it major consideration in the selection of customers and sources of supply.

Eighth: To adjust claims and settle disputes on the basis of facts and fairness, to submit the facts to arbitration if a mutual agreement cannot be reached, to abide by the decision of the arbiters, and to resort to legal measures in commercial disputes only when the preceding courses prove ineffective.

Ninth: To provide or accept no gifts or entertainment in the guise of sales expense, where the intent or effect is to unduly prejudice the recipient in favor of the donor as against legitimate competitors.

Tenth: To give or receive no bribes, in the form of money or otherwise, in any commercial transaction, and to expose commercial bribery wherever encountered for the purpose of maintaining the highest standard of ethics in American industry.

Code for Buyers and Sellers Suggested

Conference Held Under Auspices of Purchasing Agents' Association Declares Mutual Confidence Is Greatest Need

THAT full confidence between buyer and seller is the greatest need of American business today was the expression of business executives at a meeting held recently at the Hotel Commodore, New York. The group consisted of R. W. Babson, Babson's Statistical Organization; L. F. Boffey, editor *Purchasing Agent Magazine*, New York; A. M. Bowman, purchasing agent, Humble Oil & Refining Co., Houston, Tex., and president National Association of Purchasing Agents; L. A. Jones, vice-president and purchasing agent, New York Power & Light Corporation, Albany, N. Y.; W. A. Marshall, president W. A. Marshall & Co.; W. W. Nichols, president Machinery Builders Society; G. A. Renard, secretary-treasurer National Association of Purchasing Agents, New York; R. M. Roosevelt, vice-president Eagle-Picher Lead Co.; A. L. Salt, president Graybar Electric Co., New York, and E. L. Shaner, editor *Iron Trade Review*.

It was the nucleus of a committee appointed at a conference last May of representative manufacturers, sales executives, purchasing agents, and business paper editors which had been called by the National Association of Purchasing Agents to consider the responsibilities of the purchasing agent for the lack of profits by many manufacturers.

In its deliberations, the committee brought out that the much-talked-of effective cooperation can only be based on mutual confidence. Sellers, for example, should be given fair estimates of future consumption needs in order to gage their production as far as possible and thus prevent radical fluctuations within their industry. Buyers, on the other hand, maintained that confidence in the seller's fair-

ness, quality of merchandise, delivery promises, prices, etc., must also be established as a basis for cooperation. Both sides agreed that organization policies were too often entirely concerned with selfish interests and that an industrial code to which both buyers and sellers could subscribe should be made a basis for confidence and cooperation. Such a code, previously prepared by a group of the National Association of Purchasing Agents and indorsed by a number of very large organizations to whom it had been submitted, was unanimously adopted. It is the aim of the committee to secure widespread adoption of the code by representative buying and selling factors throughout the country.

Standards in Buying and Selling

The platform of sales and purchasing methods follows:

Unnecessary sales and purchasing expense is an economic waste, a tax on legitimate industry. Its elimination will assure satisfactory profits to the producer, economy to the consumer, and greater efficiency in commercial relations.

We recognize that the concern which buys must also sell, that buying and selling are companionate functions, that sound commercial transactions must be mutually profitable, and that cooperation between buyer and seller will reduce the cost of purchasing, sales and distribution with consequent benefits to industry as a whole.

In furtherance of these principles, we subscribe to the following standards in our buying and selling.

First: To buy and sell on the basis of value, recognizing that value represents that combination of quality, service and price which assures greatest ultimate economy to the user.

Second: To respect our obligations and neither expressly nor impliedly to promise a performance which we cannot reasonably expect to fulfill.

To Hold International Conference on Bituminous Coal

More than a hundred speakers, representing 12 countries, are tentatively listed to present papers at the second International Conference on Bituminous Coal, to be held under the auspices of the Carnegie Institute of Technology in Pittsburgh, Nov. 19 to 24, according to a preliminary program announced by President Thomas S. Baker. About 60 of the speakers will come from outside the United States.

According to the plans, 10 major subjects are listed for discussion, in addition to addresses of a general nature to be presented by Lord Melchett (Sir Alfred Mond), the British capitalist; Georges Claude, eminent French scientist; Prof. Fritz Hofmann, the German scientist, who makes synthetic rubber from coal; Dr. F. zur Nedden of Germany; F. G. Tryon of the United States Bureau of Mines, and others.

Major subjects to be discussed, it is expected, will include Pulverized Fuel, Gas Production, Liquefaction and Hydrogenation, Fertilizers, Origin, Composition and Classification of Coal, High - Temperature Carbonization, Combustion in Furnaces, Purification and Cleaning, Tars and Oils, and Low-Temperature Processes.

Opposition to Canadian Tariff Changes

Dominion Consumers Appear Before Board to Protest—Steel Companies Seek Protective Duties

OTTAWA, ONT., Oct. 9.—With the submission of the revised brief of the Algoma Steel Corporation of Sault Ste. Marie, Ont., for upward revision of the tariff on pig iron, structural steel, and abolition of prevailing drawbacks on specially treated steel and alloys, before the Tariff Advisory Board on Oct. 2, another case was placed on the agenda of adjourned hearings to be considered during the November sittings of the board.

Particular opposition to the final disposal of the case was voiced by R. E. Musselman, representing the Ford Motor Co. of Canada, who stated that the automobile industry was greatly concerned as to the effects of the proposed tariff revision. He urged that time be given for full study of the application. Others supported Mr. Musselman.

Objection to further adjournment was raised by Norman Guthrie, chief counsel Algoma Steel Corporation. The reference, he pointed out, had originally been placed before the board nearly two years ago and to ask for a delay at this stage "savoured of an attempt to defeat the desires of the applicants to bring the matter before Parliament during the forthcoming session." Mr. Guthrie also took exception to the filing of what he termed eleventh hour opposition briefs. This remark was provoked when John Blain, who spoke on behalf of the Ontario steel producers, announced he had been asked to prepare and file an opposition brief at a later date on behalf of the British Association of Steel Manufacturers.

Particular opposition was voiced against the incorporation of the following proposed clause in the Canadian customs tariff:

Steel in all forms or shapes, by whatever process made, and by whatever name designated, whether cast, hot or cold-rolled, forged, stamped or drawn, containing nickel, cobalt, vanadium, chromium, tungsten, molybdenum, also manganese or silicon when present in the steel in excess of 1 per cent manganese or 0.50 per cent silicon, or any other metallic content used in alloying steel—35 per cent ad valorem and British preference.

The general contention of the opposing interests was that such a provision would seriously limit the source of supply, increase prices and encourage substitution of alloy steel.

Railroads Oppose Restricting Steel Sources

Robert Job, speaking for the railroads, stated that it was essential to have safe, reliable steel for the manufacture of vital parts of locomotives and coaches. To compel the railroads to purchase inferior alloys or steel, would be to endanger the traveling public. He emphasized the importance of leaving the present

sources of tested alloy open to the railroads.

J. Robertson, for the Granby Consolidated Smelting Co., supported Mr. Job. He declared that alloys now imported were the result of years of experimentation and research. He expressed the belief that Canadian producers had not yet proved that a process of treatment superior to that given imported alloys had been evolved.

Referring to the objection that the application threatened the British preferential tariff, Mr. Guthrie declared that the clause in question probably had been hastily drafted and assured the board that his clients were prepared to modify their demands to meet the objection.

The Algoma Steel Corporation asks that the higher rate of duties on structural steel under 35 lb. per yd., and which the Customs Act provides to extend to larger sizes when all sizes up to 120 lb. per yd. are made in Canada, be now applied to all sizes already produced in this country, even though the complete range is not yet manufactured here. Several companies selling structural steel, while not opposing this application, thought there would be a lot of trouble with the customs authorities because each size of beams imported would necessitate finding out whether it were made in Canada before knowing whether it would come in under the low or the high duty. It was also pointed out that orders for structural steel are often placed six months ahead. The prices might be based on the lower tariff, and in the meantime some Canadian firm might start making the particular size, with the result that the higher rate would at once come into effect. Chairman Moore suggested that the representatives of the companies affected get together with the Algoma company

and endeavor to straighten out these difficulties.

Higher Rate on Pig Iron Opposed

The Algoma company's application for higher rates on pig iron brought definite opposition. The company claimed that the rates it was forced to accept for pig iron in face of United States competition gave it no profit at all. The increased duty was asked to give the company a fair profit.

A representative of the Canadian Car & Foundry Co., Montreal, told the board that in the making of cast iron pipe it would be impossible for his firm to pay more for pig iron than at present. If the price was increased, his company would have to close down that section of its operations. The National Iron Corporation, Toronto, and the Dominion Foundries, Ltd., took a similar position. Counsel for the Algoma company thought the situation should be solved by these companies coming before the board for an increased tariff on their products. The chairman suggested that a schedule giving the ultimate effect of the increase asked for would have to be submitted if there was any hope of Parliament giving the relief asked for.

The Algoma Steel Corporation based its claim upon the contention that Canadian iron and steel products are faced with exceptional handicaps in meeting foreign competition. Particular relief is sought to offset importation of pig iron, spring and axle steel for automobiles, alloy and structural steel. It is also urged that certain drawbacks be abolished, while an application is made for the imposition of a duty of 75c. a ton on imported coke. According to the brief, the Canadian iron and steel producers are faced with relatively higher costs of raw material, labor or transportation to consuming markets than foreign competitors.

Opposing the application were leading interests which would be directly affected by higher tariff on the commodities listed.

Philadelphia Scrap Dealers Organize

A group of iron and steel scrap dealers in the Philadelphia district, who met at the Manufacturers' Club, Philadelphia, on Oct. 2, organized a chapter of the Institute of Scrap Iron and Steel and elected John R. Briggs, Henry Potts & Co., chairman. Other officers are: Harry A. Kirshman, Allegheny Iron & Metal Co., vice-chairman; J. B. Partridge, Jr., Allen R. Hoffer Co., secretary, and R. M. Marshall, Marshall Iron & Metal Co., treasurer.

The Philadelphia chapter is the second organized in the past week. One in New York was formed with David Strauss, Continental Iron & Steel Co.,

chairman. A State conference of dealers in Connecticut is scheduled for Oct. 10, at the Bond Hotel, Hartford.

Applications for membership in the Institute of Scrap Iron and Steel, 11 West Forty-second Street, New York, have recently been received from the Allegheny Iron & Metal Co., Bishop & Co., A. Hitner's Sons Co., Allen R. Hoffer Co., Henry Potts & Co., Frank Samuel & Co., Louis J. Gedick, Marshall Iron & Metal Co., E. Perez, West Philadelphia Scrap Iron Co., Oscar H. Tompkins, M. J. Hunt's Sons, Malloy & Schreiner, all of Philadelphia; Mayer Pollock Co., Pottstown, Pa.; H. Sofransky Co., Allentown, Pa.; Valley Iron & Steel Co., Allentown, Pa.; H. Weiner & Co., Pottsville, Pa.; Fechter Steel Co., Allentown, Pa., and E. L. Halstead Co., Norfolk, Va.

Price Cutting Costly in Reinforcing Steel

Margin of Profit Growing Smaller in Industry in Spite of Increased Sales and Better Cooperation with Mills

GRATIFYING progress in securing the better cooperation of mills and in the extension of markets for concrete reinforcing steel was brought out at the semi-annual meeting of the Concrete Reinforcing Steel Institute, held at Shawnee-on-Delaware, Pa., Oct. 1 to 3. At the same time George E. Routh, Jr., Kalman Steel Co., Chicago, president of the institute, called attention, in his semi-annual address, to the deplorable condition of the industry's sales activities which has resulted from price cutting and lack of sincerity between competitors.

"I want to stress the need for serious thought on the part of all members toward this condition," said Mr. Routh. "We have too many detective salesmen seeking cut prices, with the result that the buyer is given every opportunity to put across the idea that he has a cut price although none exists. If a salesman were to approach the buyer with the sole intention of selling his company's materials and service, there would be far less talk and thought of cut prices and we would have a more stable market. Reasonable and proper merchandizing methods dictate that we should determine the cost of our product, to which we should add the proper over-

head expense plus a reasonable profit. Were our business put on this basis and the salesman given to understand that the price he is authorized to sell at has been based on a careful analysis of costs and is the price which he is expected to get, would he not display more salesmanship and spend less time seeking cut prices?

Relations With Mills Improving

Discussing the improved relations with the mills which have been developed during the last six months, Mr. Routh cited the recently adopted policy of the producers of abandoning the custom of cutting bars to length in accordance with the consumers' requirements and shipping only in 40, 50 and 60-ft. lengths. "The cooperation which we have received from the mills during the last three months," he said, "is evidence that they recognize our problems. We should show our appreciation by discontinuing the handling of foreign steel. We owe this to the mills. I might mention in this connection that the amount of foreign reinforcing steel being imported into the United States is apparently decreasing, on account of the difficulty of handling this material. It is not only difficult to secure this material by the time expected, but the quality of the

material is unsatisfactory because of the lack of uniform section."

The speaker stated that one large producer of reinforcing bars has made a financial subscription to the work of the institute. "This," he said, "we feel is an indication that the mills appreciate our efforts toward widening the market for reinforcing steel, and I feel sure that they will do everything they can to cooperate with us in the effort to have fireproof construction replace other types of construction."

Shipments Larger in 1928

Indications of a wider market for reinforcing bars were shown by the composite tonnage reports of the institute. During the first half of 1928 members increased their sales 11.6 per cent over the same period in 1927 and 7 per cent over 1926. Shipments in the first six months this year were 15.5 per cent higher than in the first six months of 1927 and 5.5 per cent higher than in 1926. "In spite of this increased tonnage," Mr. Routh stated, "the margin of profit in our industry has grown smaller, but hope of a better profit is promised through the improvement in the general steel market."

A paper dealing with the increase of this margin of profit by the control of selling costs, which was presented by Walter C. Conger, vice-president Truscon Steel Co., Youngstown, will be printed in abstracted

**WASTE PREVENTION
WEEK
BEGINS OCTOBER 15**

**"Turn the
Waste of Today
into the
Profit of Tomorrow"**

W. F. French
Pres. U. S. Steel Corp.

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Steel Corporation Plants Observe Waste Prevention Week

POSTERS to be displayed in plants and departments of the Carnegie Steel Co. during the week of Oct. 15—to be observed as "Waste Prevention Week,"—were designed by William F. French, public relations department, Carnegie Steel Co., Pittsburgh. Although intended for use by the Carnegie company, several other subsidiaries of the United States Steel Corporation have indicated a desire for a supply of the posters. The setting aside of a week in which to bring vividly to the minds of the employees the desirability of the prevention of waste is one of the outgrowths of the plans developed by the Department of Commerce under the direction of Secretary Hoover for increasing productive efficiency, not only by simplification of styles and types of products, but by elimination of wastefulness.

form in a forthcoming issue of **THE IRON AGE**.

Additional Cost Charges To Be Compiled

At the recommendation of the committee on engineering, selling and cartage costs, it was decided that, beginning Jan. 1, 1929, the Institute will compile monthly reports from members on cartage costs for the entire country with New York and Chicago shown separately; on engineering costs, including estimating, engineering and overhead, and on selling costs inclusive of all related activities both overhead and administrative. In the past the institute has confined its cost studies and reports to warehouse work operations. The additional reports are to relate only to reinforcing bars and spirals and not to accessories. Each member will report under a confidential key designation and the composite reports, while concealing the members' identities, will show the high, low and average costs. It was thought that extremely low quotations would not be made by certain fabricators throughout the country if definite knowledge of costs was obtainable.

Standard for Form Dimensions

At a session devoted to concrete ribbed floor construction, form manufacturers and dealers present asked that a special committee be appointed to work out plans for the setting up of a special department relating to that phase of the industry. The meeting was then turned over to P. H. H. Dunn, division of simplified practice, Department of Commerce, who led the discussion leading to a new recommendation to standardize upon form dimensions. The referendum of the Department of Commerce, which was made following a similar session at the Biloxi, Miss., meeting last year was not approved to an extent which would permit of adoption and the new recommendation will be subject to a similar referendum. The recommendation provides the width of standard forms to be 20 in. or 30 in. with depth of 6, 8, 10, 12 or 14 in. Depth is interpreted to mean the vertical distance from the under side of the concrete slab above the center of the form to the bottom of the concrete joist. Special filler forms, to be used as specials for fillers only, are to be either 10 and 15 in. or 12 and 16 in. in width.

Standardization Progressing

In the report of the committee on grade of steel and standard sizes it was brought out that the campaign for the adoption of the intermediate grade as the single standard for new billet reinforcement was meeting with considerable success and resulting in a saving to members by reduced stock piles and better service. It was stated that nearly all the present mill production of reinforcing bars was in the eleven standard sizes adopted by the industry through the cooperation of the Department of Commerce and

that there was also practically complete adherence to the four standard sizes of spirals.

New Members Added

The Peden Iron & Steel Co., Houston, Tex., and Woodward, Wight &

Co., New Orleans, were elected to membership in the Institute.

Charles M. Gunn, president Gunn, Carle & Co., San Francisco, was elected a director to fill the unexpired term of Edward L. Soule, who has resigned.

Chicago Promises Iron and Steel Meeting Three Technical Sessions and Well Planned Inspection Tours to Nearby Steel Plants

THE second national Iron and Steel Division meeting of the American Society of Mechanical Engineers will be held at the Palmer House, Chicago, Nov. 14 and 15. The Chicago section of the society will act as host. Besides a technical program, one of the biggest iron and steel centers of the country will offer numerous plants for inspection.

On the morning of Nov. 14 two papers are scheduled, one on heat economy in steel mills, and the other on sheet rolling. On Wednesday afternoon, Nov. 14, there will be two papers on cupolas and one on the manufacture of nickel steel plates.

For the dinner, planned for Wednesday evening, one speaker will discuss obsolescence and depreciation. The American Management Association is holding a meeting in Chicago at the same time and will join with the iron and steel engineers in the dinner meeting.

On Thursday morning there will be a session on bearings, metals and lubrication. Thursday afternoon is to

be given over to plant inspection visits. Arrangements have been made to see five of the large iron and steel plants in the vicinity of Chicago, namely: National Tube Co., at Gary; Illinois Steel Co., at Gary; Illinois Steel Co., South Works; Acme Steel Co., and Inland Steel Co., at Indiana Harbor.

The papers are as follows:

Heat Economy Progress in Steel Mills, by F. H. Willcox and Gordon Fox, Freyn Engineering Co.

Modern Methods of Wide Beam Rolling. Sheet Rolling.

Powdered Coal Cupolas, by O. H. Meloche, American Radiator Co.

Hot Blast Cupolas, by F. K. Vial, vice-president and chief engineer, Griffin Wheel Co.

Manufacture of Nickel Steel Plate, by Charles McKnight, Development and Research Department, International Nickel Co., New York.

Lubrication of Steel Mill Equipment, by L. P. Tyler, Vacuum Oil Co., Pittsburgh.

Non-Ferrous Bearing Metals, by M. M. Carl, Buckeye Brass & Mfg. Co., Cleveland, Ohio.

Milwaukee Metal Trades' Apprenticeship Dinner

Apprenticeship activities for the new season in the National Metal Trades Association at Milwaukee got under way on Monday evening, Sept. 24, when 145 executives and officials of metal trade shops attended the annual apprenticeship dinner at the Republican Hotel.

The purpose of the meeting was to create increased interest in apprenticeship through a discussion of its problems. In his opening remarks, Harold S. Falk, chairman, said: "I consider meetings of this kind an extremely important part of our apprenticeship work even in those shops in which the institution is firmly established. Officials of various grades are only too apt to find their attention withdrawn from apprenticeship problems by the every day pressure of work. Meetings of this kind keep the subject in the minds of those of us who are responsible for the success of apprentice training in the shops of our members."

John Goetz, Kempsmith Mfg. Co., and F. J. Roensch, Louis Allis Co., reported the year's activity of the expansion committee, which is responsible for the development of apprenticeship in the district. According to the committee's report, five plants

have put on apprentices for the first time during the last year.

By means of charts, W. J. Fairbairn, secretary Milwaukee branch National Metal Trades Association, pointed out that the number of apprentices in the district had increased from 450 to nearly a thousand during the last six years, that the great majority of apprentice graduates remain at work at the trade which they have learned and that apprenticeship seems to have a favorable effect on labor turnover, since those shops in the district in which apprenticeship is established have a much lower rate of turnover than those in which no apprentices are trained.

The following comprise the general apprenticeship committee of the National Metal Trades Association in Milwaukee: H. S. Falk, Falk Corporation, chairman; R. W. Buettner, Nordberg Mfg. Co.; W. M. Myers, Bucyrus-Erie Co.; Rene von Schleinitz, Harnischfeger Corporation, and William Watson, Allis-Chalmers Mfg. Co.

Vanadium Corporation of America, 120 Broadway, New York, has opened an office at 2245 Oliver Building, Pittsburgh, under direction of J. Alfred Miller, Jr., general manager of sales.

British May Increase Pig Iron Output

Stocks Low and Demand Exceeds Present Supply—French Domestic Requirements May Necessitate Greater Steel Production

(By Cable)

LONDON, ENGLAND, Oct. 8.

DEMAND for Cleveland pig iron is improving so that sales are now exceeding the output and stocks have diminished. Consequently there is consideration given to blowing in additional furnaces.

Hematite demand is also expanding and increased sales for export are placing makers in a better position. Foreign ore continues quiet and no revival in demand is expected this year.

Export demand for finished steel has improved, but actual sales are still difficult to negotiate. It is reported that an agreement has been reached among steel makers for raising foreign credits, but the plan applies only to certain branches of the Sheffield steel trade and not to the heavy steel industry.

Workman, Clark & Co. have received further orders for two 10,000-ton vessels for Andrew Weir and now have 100,000 tons of shipping contracts on hand. The Clyde output in September was 13 vessels of 69,000 tons. Thomas W. Ward has bought

Spencer's Newburn Steel Works, which may be dismantled, as efforts to preserve them have failed.

Tin plate is active with good buying by both domestic and export users, for deliveries up to June. Some mills are rather short of specifications for the last quarter of this year, but most are well booked with tonnage for first quarter and even first half of next year.

Galvanized sheets are quiet. Black sheets continue inactive, but prices for the heavy gages have been advanced because of the higher cost of foreign semi-finished material.

Continental iron and steel trade with British users is increasing and several thousand tons of 3 to 4-in. billets have been sold at prices ranging up to £5 2s. (\$24.79) per ton, f.o.b. Sheet bars have brought £5 3s. (\$25.03) per ton, f.o.b.

Export demand for finished steel is quiet here, but is still reported good from abroad. French production in August was 857,000 tons of pig iron and 793,000 tons of steel ingots and castings. Polish production in 1927 was 617,000 tons of pig iron and 1,246,000 of steel ingots and castings.

changed in the last quarter. The factors that caused advances in prices, however, are still operating. Early this year the proportion of exports to production was about 50 per cent, and today it is very much smaller because of continued demand from domestic consumers. Since early in June export quotations have advanced by more than 10s. (\$2.43) per ton on most products. Since Jan. 1 domestic prices have increased by 100 to 120 fr. (\$3.90 to \$4.68) per ton. The present level of the market is evidently satisfactory to producers, and no reduction of output is contemplated, as it might cause an unsatisfactory reaction. In fact, with deliveries ranging from four to six months on most products, it is believed that a further increase in output may be necessary. The French steel industry is beginning to approach an annual production of 10,000,000 tons, which will still be less than the full capacity possible, as the large plants in Lorraine are using only part of their capacity and some works in the North have not recovered since the war.

Pig Iron.—Production is increasing. The Societe des Acieries de France is blowing in a furnace on hematite at its Isbergues plant and contemplates putting two other furnaces in blast. At the meeting of pig iron producers in Paris, Sept. 20, prices were continued unchanged at 440 fr. (\$17.16) per ton for phosphoric foundry and 565 fr. (\$22.04) per ton, base Ardennes, for foundry hematite. Tonnages of iron placed at the disposal of domestic consumers for October were 36,000

French Prices Stabilizing

Mills Seek to Maintain Present Market—Greater Output Probable as Deliveries Are Extended

PARIS, FRANCE, Sept. 24.—Mills are engaged in an apparently successful effort to stabilize prices, being assisted

by the recent decision of the International Steel Cartel to maintain the production quotas of all members un-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.	to £0 17¾s.	\$4.25	to	\$4.31
Bilbao Rubio ore*.....	1 2	to 1 2½	5.35	to	5.48
Cleveland No. 1 fdy.....	3 8½	to 3 9½	16.64	to	16.89
Cleveland No. 3 fdy.....	3 6		16.04		
Cleveland No. 4 fdy.....	3 5		15.80		
Cleveland No. 4 forge...	3 4½		15.68		
Cleveland basic (nom.)...	3 5		15.80		
East Coast mixed.....	3 10		17.11		
East Coast hematite.....	3 10½		17.23		
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to	40.10
Billets.....	6 2½	to 6 15	29.77	to	32.81
Ferromanganese.....	13 15		66.83		
Ferromanganese (export)	14 0		68.04		
Sheet and tin plate bars, Welsh.....	6 0		29.16		
Tin plate, base box.....	0 18	to 0 18½	4.37	to	4.43
Black sheets, Japanese specifications.....	13 7½		65.00		
C. per Lb.					
Ship plates.....	7 12½	to 8 2½	1.63	to	1.74
Boiler plates.....	9 0	to 10 10	1.92	to	2.25
Tees.....	8 2½	to 8 12½	1.74	to	1.84
Channels.....	7 7½	to 7 17½	1.58	to	1.69
Beams.....	7 2½	to 7 12½	1.53	to	1.63
Round bars, ¾ to 3 in..	7 5	to 7 15	1.55	to	1.66
Steel hoops.....	9 0	to 10 0	1.92	to	2.14
Black sheets, 24 gage...	10 0		2.14		
Galv. sheets, 24 gage...	13 10	to 13 15	2.93	to	2.98
Cold rolled steel strip, 20 gage, nom.....	16 0		3.42		

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium.....	£3 3s.	to £3 5s.	\$15.31	to	\$15.80
France.....	3 3	to 3 5	15.31	to	15.80
Luxemburg.....	3 3	to 3 5	15.31	to	15.80
Basic pig iron (nom.):					
Belgium.....	3 3		15.31		
France.....	3 3		15.31		
Luxemburg.....	3 3		15.31		
Coke.....	0 18		4.37		
Billets:					
Belgium.....	5 2		24.79		
France.....	5 2		24.79		
Merchant bars:					C. per Lb.
Belgium.....	6 7½		1.40		
France.....	6 7½		1.40		
Luxemburg.....	6 7½		1.40		
Joists (beams):					
Belgium.....	5 5		1.14		
France.....	5 5		1.14		
Luxemburg.....	5 5		1.14		
Angles:					
Belgium.....	6 0		1.30		
½-in. plate:					
Belgium (a).....	6 15		1.50		
Germany (a).....	6 15		1.50		
¾-in. ship plate:					
Belgium.....	6 10		1.44		
Luxemburg.....	6 10		1.44		
Sheets, heavy:					
Belgium.....	6 1		1.33		
Germany.....	6 1		1.33		

(a) Nominal.

tons of phosphoric foundry and 35,000 tons of hematite. In October, 1927, the quantities available were 30,000 tons of foundry and 25,000 tons of hematite. The entente of French, Belgian and Luxemburg furnaces has continued its export prices for October.

Semi-Finished Material.—At the September meeting of the Comptoir Siderurgique it was decided to continue the domestic prices on all products, although a rising tendency is evident. Billets remain at 565 fr. (\$22.04) per ton, blooms at 535 fr. (\$20.87), and sheet bars at 600 fr. (\$23.40) per ton.

Finished Material.—Merchant bars are steady at 710 to 720 fr. per ton (1.25c. to 1.27c. per lb.) in the East and at 740 fr. per ton (1.30c. per lb.) in the North of France. The Comptoir Siderurgique at its September meeting decided upon an increase of 25 fr. (98c.) per ton in the price of beams. Angles are scarce, and demand for small sizes of round bars is heavy. The sheet market is active and prices are strong. The situation in the wire-drawing trade is unsatisfactory, as the price of wire rods is proportionately much greater than the prices obtained on wire products. This is the result of an entente of producers in the wire rod field and lack of organization among wire drawers. Recent negotiations of wire-drawing plants failed because of the opposition of one important company. Other makers, however, have agreed that action must be taken to form a purchasing committee, which would buy foreign rods if the domestic price continued too high.

French Automobile Merger Considered

PARIS, FRANCE, Sept. 24.—Manufacturers of automobiles are reported to be considering the formation of a large corporation, similar to the General Motors Corporation in the United States. No definite action is as yet reported, but the suggestion seems to have been favorably received by many companies.

Trend of European Wages Is Upward

HAMBURG, GERMANY, Sept. 22.—Wages in the European steel industry are constantly increasing. The average earnings of steel workers in Germany in 1925 were 0.68 m. (16c.) per hr., but in July of this year they had advanced to 1.08 m. (26c.) per hr. This average includes unskilled as well as skilled labor. On Sept. 20 an increase of 5 per cent was granted in the Saar steel industry, and on Sept. 1 the Czechoslovakian steel mills advanced wages 7.5 per cent. An increase of 2½ per cent in steel workers' wages took place in Belgium on Sept. 10. Luxemburg steel workers received a 3 per cent advance in wages in July.

At present, Luxemburg steel mill

employees are demanding a further increase of 5 per cent in their wages; Austrian workers, a 12 per cent increase; and German steel mill labor, 5 per cent. French workmen are expected to ask shortly for a 7 to 10 per cent increase.

South African Government Buys Steel in Germany

HAMBURG, GERMANY, Sept. 22.—Considerable interest has been aroused in the steel industry here by the announcement that the Government of the Union of South Africa has placed an order with the Deutsche Edelstahlwerke at Bochum for about 1000 tons of spring steel, tool and high-speed steel to the value of about \$260,000. This is said to be the first time the Government of a British dominion has placed an important order in Germany.

German Tube Association Buys Competitor

HAMBURG, GERMANY, Sept. 22.—The German Tube Makers' Association has bought the only non-member in Western Germany, the Rohrenwerk Luxemburger of Düsseldorf, and has closed the plant. This is expected to improve the position of the association in export trade, as the Rohrenwerk Luxemburger was a keen competitor, especially in the Near East. Sales of gas pipe for export have been satisfactory, but the seamless tube market is quiet.

Large Increase in Sheet-Metal Ware Shipments

Shipments of enameled sheet-metal ware in August are reported by the Department of Commerce at 358,811 dozens, valued at \$1,354,316, compared with 277,684 dozens in July, valued at \$1,059,547. August shipments were somewhat higher than those of a year earlier—329,843 dozens valued at \$1,278,013.

For the first eight months the shipments have been 2,770,676 dozens, valued at \$10,405,473, compared with 2,689,631 dozens last year, valued at \$9,505,737. The increase has been wholly in colored goods, the value of which has gone up more than 325 per cent; both white ware and gray ware have declined.

August shipments of galvanized sheet-metal ware are reported at 186,864 dozens, valued at \$746,580; this compares with 169,271 dozens in July, valued at \$677,451, and with 196,439 dozens in August, 1927, valued at \$715,343.

Shipments for the first eight months reached 1,584,508 dozens, valued at \$6,085,745, compared with 1,508,352 dozens last year, valued at \$5,678,957.

French Engineers to Visit American Plants

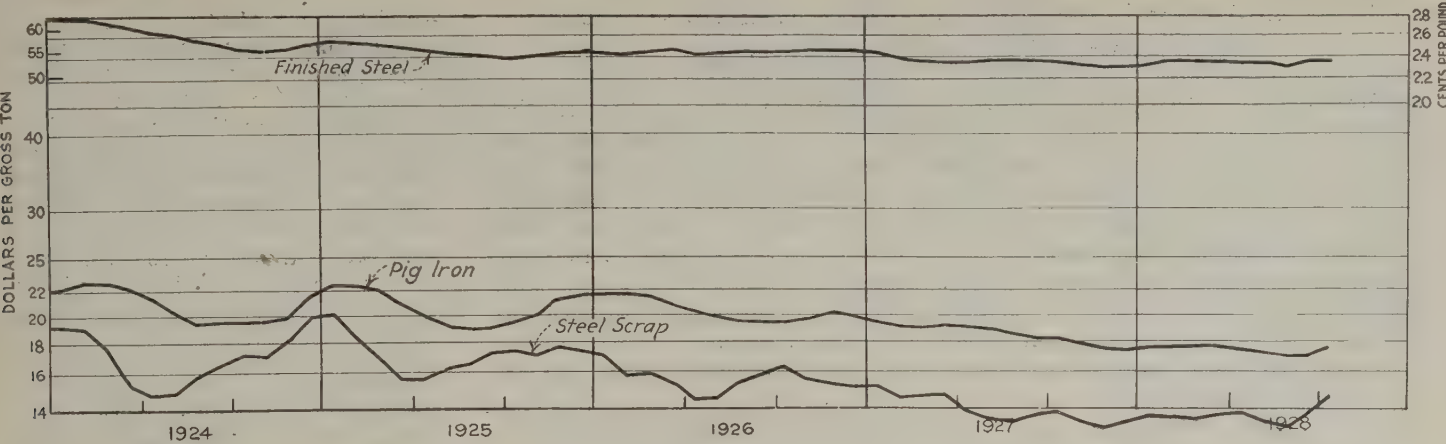
A delegation of French engineers, invited unofficially in the interest of international relationships and to further American exports, is scheduled to arrive in New York, Oct. 22, by the French Line steamer *De Grasse*. The party will also include Belgian and possibly Czechoslovakian engineers. While they will probably include Niagara Falls and Washington in their tour, their chief interest lies in visits to 23 plants in 13 cities. They are expected to leave New York on Nov. 14 by the *Rochambeau*.

The party will be in direct charge of Thomas Cook & Son, travel agents, and generally speaking is not expecting civic or association receptions on any formal scale. The committee on arrangements, of which Dr. Robert Grimshaw, 65 Jesup Place, New York, is chairman, reports that there will be a few special luncheons, including one to be given by the Cutler-Hammer Mfg. Co. and one by the Nordberg Mfg. Co., at Milwaukee. The invitations appear to have been extended only to members of the French Society of Civil Engineers and the equivalent Belgian and Czechoslovakian engineering societies.

Open Pittsburgh Office of Commerce Department

The new Pittsburgh office of the United States Department of Commerce, which, as announced in *THE IRON AGE*, was established Sept. 8, was formally opened Oct. 5 with an inaugural luncheon at the Chamber of Commerce, in the building of which is located the new government office. The honor guests at the luncheon were Senator David A. Reed and Congressman Stephen G. Porter, who assisted the Chamber of Commerce in securing for Pittsburgh this branch office of the Department of Commerce. Addresses were made by them and also by John Matthews, Jr., assistant director of the Bureau of Foreign and Domestic Commerce, who represented the head of that bureau, Dr. Julius Klein, who was prevented from attending by illness. Mr. Matthews explained how Pittsburgh district business men might take advantage of the direct facilities of the new office in finding purchasers for their products in both the domestic and foreign markets. Luther Becker, head of the iron and steel division of the bureau, and Walter S. Rastall, head of the industrial machinery division, were among the speakers. T. P. Gaylord, president of the Chamber of Commerce, introduced William L. Munro, president American Window Glass Machine Co., as toastmaster. Wilson K. Ray is in charge of the new branch.

Scrap Has Risen Sharply in Recent Weeks, Reaching the Highest Level in Two Years. Pig iron has recovered from the lowest point it has touched in almost 13 years and finished steel is still below the prevailing level of the past five years



Scrap Prices Recover in Third Quarter of Year

September Shows Highest Average in Nearly Two Years—Each 1928 Quarter Above the Previous One

AVERAGE prices of heavy melting steel scrap at Chicago, Philadelphia and Pittsburgh have recovered sharply from the weakness of the early summer and now stand at the highest point since October, 1926. The average on May 15 was \$14 a gross ton, which gave way to \$13.08 in early July. From that low point a steady advance brought the average to \$15.42 last week.

In spite of the low level in July, the average for the third quarter, at \$13.88, was the best for the year. It compares with \$13.74 in the second quarter and \$13.69 in the first. In

the third quarter of 1927 the composite was \$13.73 a ton.

Meantime, pig iron has recovered from the lowest level it had reached in more than 12 years. But the differential between THE IRON AGE pig iron composite at the end of September and the scrap average was less than \$3 a ton. This compares with more than \$6 a ton about two years ago.

Finished steel has had only slight fluctuations since early 1927. It declined during the second quarter to 2.341c. a lb. and still further in July, but now has come back to 2.362c. a lb. in the first week of October.

Comparative figures for 33 months, covering steel scrap, pig iron and finished steel, are given in the table. The diagram carries the story of these changing prices over a period of nearly five years.

Fox, traffic manager Highland Iron & Steel Co., Terre Haute; S. S. Shambaugh, traffic manager Continental Steel Corporation, Kokomo; George M. Field, traffic manager Chrysler Corporation, Newcastle, and T. L. Dairy, traffic manager Indiana Steel & Wire Co., Muncie.

Record Quarter in Automobiles

With a production of 460,000 cars and trucks in September indicated by preliminary estimates, the total for the third quarter of the year is brought to about 1,365,500, the largest quarter the automotive industry has ever had, says *Automotive Industries*. Total production in the first nine months is brought to approximately 3,687,000 as against 3,712,984 in the same period of 1926, the record production year. There is little question that output this month will exceed the 349,091 total in October, 1926, and that production in the rest of the year will carry 1928 to a new high record.

Overhead Conveyors in Wire Mill

An overhead system of conveyors will be installed in its wire mill by the Sheffield Steel Co., Kansas City. The equipment will include 10,200 ft. of tramrail, 14 tramrail cranes ranging from 500 lb. to 4000 lb. capacity, 5 cab controlled electric tramrail carriers, 200 hand power carriers, a gantry crane in the cleaning house over a straight row of tubs and a tramrail system in each baker in which the rods will be carried on hairpin hooks. The conveyor equipment will be supplied by the tramrail division of the Cleveland Crane & Engineering Co.

COMPOSITE PRICES ON IRON AND STEEL PRODUCTS			
	(Per Gross Ton) Steel Scrap	Pig Iron	Finished Steel Per Lb.
1925 average...	\$17.12	\$20.58	2.465c.
January, 1926....	16.97	21.79	2.447c.
February	15.50	21.77	2.428c.
March	15.83	21.65	2.433c.
April	15.27	20.96	2.439c.
May	14.35	20.69	2.416c.
June	14.40	20.00	2.420c.
July	15.42	19.51	2.431c.
August	15.88	19.46	2.431c.
September	16.25	19.46	2.439c.
October	15.58	19.69	2.449c.
November	15.25	20.13	2.453c.
December	15.08	19.94	2.453c.
Year's average.	15.48	20.42	2.439c.
January, 1927....	15.17	19.44	2.432c.
February	14.58	19.07	2.378c.
March	14.65	19.03	2.367c.
April	14.71	19.21	2.360c.
May	13.95	19.09	2.360c.
June	13.60	18.92	2.369c.
July	13.48	18.56	2.367c.
August	13.80	18.17	2.367c.
September	13.92	18.03	2.357c.
October	13.48	17.96	2.319c.
November	13.18	17.59	2.299c.
December	13.43	17.55	2.310c.
Year's average.	14.00	18.55	2.357c.
January, 1928....	13.70	17.63	2.318c.
February	13.71	17.73	2.361c.
March	13.65	17.73	2.362c.
April	13.81	17.67	2.359c.
May	13.90	17.45	2.350c.
June	13.52	17.23	2.341c.
July	13.13	17.10	2.325c.
August	13.75	17.11	2.348c.
September	14.75	17.54	2.348c.
Average 9 mo.	13.77	17.46	2.346c.

Indiana Opposes Abolition of Rate Groups

Exceptions to the proposed report of the Interstate Commerce Commission recommending a mileage basis for freight rates on iron and steel products in Official Classification territory will be filed with the commission by the Indiana State Chamber of Commerce as a result of a meeting of the chamber's special iron and steel committee held recently at Indianapolis. The committee declared that the adoption of the proposed mileage basis would abolish the present group system in the State and result in increases to shippers of about 18 per cent.

Members of the committee are H. S. McNeeley, traffic commissioner Indianapolis Chamber of Commerce; H. A. Holopeter, traffic manager Terre Haute Chamber of Commerce; L. R. Martin, traffic manager Oliver Chilled Plow Works, South Bend; John C.

Must Protect Buying Power of Wages

No More Important Task Today, Says Eugene G. Grace—
Employees' Cooperation Essential

AMERICAN industry faces no more important task today than to protect the buying power represented by wages, according to E. G. Grace, president Bethlehem Steel Corporation, in a letter on "Prosperity and High Wages," published in the *Bethlehem Review*, a news bulletin that goes to all Bethlehem employees. Mr. Grace points out that every year through conferences with employees' representatives Bethlehem makes a report to employees on matters of joint interest just as it reports to the stockholders at annual meetings. The conferences this year discussed as a matter of vital concern the necessity of maintaining the wage levels upon which American standards of living are based and the current issue of the *Review* is therefore devoted to some aspects of this important problem.

Mr. Grace says in his letter:

"In the last 10 years a new order has been created in our economic life. It is recognized, first, that high standards of living are based on the greater earning power of labor and, second, that continued prosperity and high wages go hand in hand.

"Progressive industrial management seeks, therefore, to enable employees to earn wages as high as can be paid. Even when profits decline or business falls off efforts are made to economize in other ways than by cutting wages. But management alone is powerless to maintain high wages. They can be paid only so long as economic conditions will permit them to be paid.

"One of the chief factors affecting this ability to pay them is foreign competition. With European wages far below American wages and consequently costs of production lower abroad, European manufacturers can compete on equal terms with the products of higher paid American labor.

"This fact vitally concerns every American worker. Naturally we are all interested in European progress, but economic improvement abroad can be accomplished without sacrificing American wages and living conditions. Foreign standards can be raised without reducing ours.

"Responsibility in part for protecting his wages rests upon the individual both as an employee and as a citizen.

"As a wage earner his responsibility is to help increase production and reduce costs so that his own company can meet competition, sell its products at a profit and thus continue to pay the highest possible wage. Paying men on the basis of individual merit is one way to increase wages and reduce costs.

"As a citizen the employee's responsibility is to take an active, intelligent interest in company and public affairs. We have reached a point in this country today where thousands of employees are also stockholders, with both a payroll and company interest in continued prosperity.

"Certain it is, therefore, that as wage earners, stockholders and citizens our outstanding interest is an economic one. If we are mindful of that fact and act accordingly we shall cooperate with each other to promote

our company's prosperity and see to it that nothing is done to disturb American living standards which have taken us so many years of hard work to establish."

The *Review* points out that steel industry wages generally are higher than wages paid in most of the manufacturing lines. Based on data compiled by the National Industrial Con-

Cooperation in Making Electric Steel Castings

"Competitors Who Have Cooperated to Improve Quality" is the title of a 31-page pamphlet just published by the Electric Steel Founders' Research Group, Chicago, of which R. A. Bull is director. It takes the place of the regular October issue of *Research Group News*, and is to be distributed at the National Metal Exposition in Philadelphia, Oct. 8 to 12, where the group is to display products of its five electric steel casting plants. The pamphlet contains a short history and photographs of the various plants making up the organization and reference matter concerning the products. Specifications, heat-treatment practice and similar data, customarily found in handbooks, are also included.

September Ore Shipments Gain, Year's Total Lower

Iron ore shipments from the Lake Superior region during September amounted to 8,748,286 gross tons, an increase of 1,518,245 tons, or 21 per cent, compared with the 7,230,041 shipped from upper Lake ports in September, 1927. The total for the season to Oct. 1, 41,265,979 tons, de-

ference Board, it is stated that wages in terms of average weekly earnings in the iron and steel industry for June—and this is typical of other monthly comparisons—were higher than the wages paid in any of 20 major industries except two. They were 24 per cent higher than the average of all. The iron and steel industry has a relatively larger number of continuous operations, but in spite of this fact the average weekly working time was only approximately 10 per cent greater in the iron and steel industry than the average weekly working time for all of the industries reported.

Comparisons are also made between American and foreign wages. In this connection the *Review* states:

"Because American workmen produce more and are paid higher wages, the standards of living in the United States are higher than those of any other country. Mass production and labor-saving devices are far ahead of foreign competitors. This means simply that the American employee creates more value by his work than European workers."

clined 1,117,978 tons, or 2.64 per cent, compared with the 42,383,957 tons shipped to Oct. 1, 1927. The table gives the shipments for September and for the season in 1928 and 1927 in gross tons.

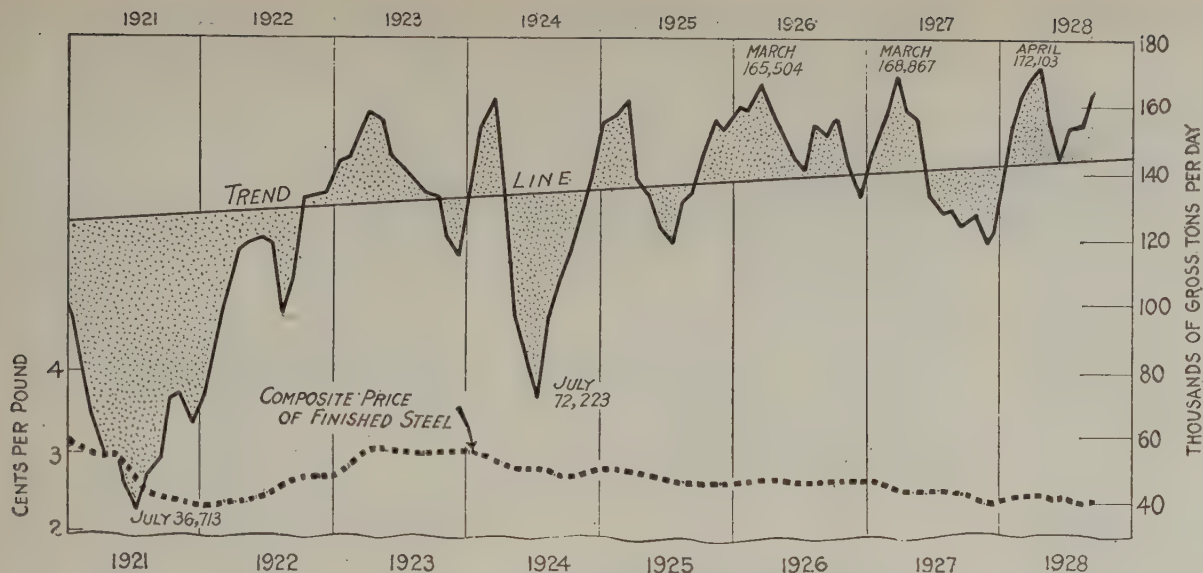
Establishes Manly Medal

To commemorate the work of Charles M. Manly in the fields of automotive and aeronautic engineering and to serve as an inspiration to others, the Society of Automotive Engineers is establishing a Manly memorial medal to be awarded annually for the best paper on aeronautical power plant, part or accessory design, construction or research, presented at a meeting of the society or one of its sections during the year.

An outstanding accomplishment of Mr. Manly, who died last October, was the designing and building, 30 years ago, of a gasoline engine for the flying machine built experimentally by Prof. S. P. Langley, secretary of the Smithsonian Institution. This was a five-cylinder radial engine that weighed only 2.4 lb. per hp. developed, although no builder had previously been able to construct an engine weighing less than 12 lb. per hp. and no builder subsequently equalled Mr. Manly's accomplishment until the 400-hp. Liberty-12 engine was built.

MOVEMENT OF LAKE SUPERIOR ORE

Port	September, 1928	September, 1927	To Oct. 1	
	1928	1927	1928	1927
Escanaba	774,449	818,993	4,077,064	4,591,438
Marquette	590,001	540,707	2,568,355	2,499,362
Ashland	953,912	878,040	4,958,227	5,237,262
Superior	2,547,529	2,070,811	11,779,177	11,972,174
Duluth	2,941,011	2,072,737	13,469,637	13,294,023
Two Harbors	941,384	848,753	4,413,519	4,789,698
Total	8,748,286	7,230,041	41,265,979	42,383,957
Increase	1,518,245	.....	.....	.....
Decrease .....	.....	.....	1,117,978	.....



Exceptionally High Ingot Production Was Recorded in September. On the basis of daily averages, only three previous months have bettered it—March, 1927, and March and April, 1928. Prices were fractionally better than at midyear

Largest September Steel Ingot Production

Output Larger Than in Any Month of Any Second Half, Except August, 1928—Nine-Month Figure a Record

PRODUCTION in September of open-hearth and Bessemer steel ingots in the United States as reported to the American Iron and Steel Institute, was less than 1 per cent under the total for August, in spite of having only 25 nominal working days, against 27. Last year the shrinkage from August was 6½ per cent on a reduction of one day. Not only was the September tonnage the largest ever produced in any September, but it was, with the exception of the preceding month, by far the largest for any month in any second half-year. It is calculated at 4,147,583 gross tons.

On the basis of 25 working days, the output was 165,903 tons a day. This is the highest figure since the record-breaking total of last April. It is 32 per cent above the 125,726 tons of September, 1927, and is the highest daily rate ever reached in a second-half month. Output in August was given as 154,759 tons a day.

For the nine months of the year to date, the calculated production has been 36,930,520 tons. This exceeds by about 1,240,000 tons the previous

high record for the first nine months, which was that of 1926, when 35,689,151 tons was produced. That tonnage included also crucible and electric ingots, which are not covered in the current figures. If we estimate 300,000 tons for that group in the first nine months of 1928, the total production would approach 37,250,000 tons, or more than 1,500,000 tons ahead of the previous record. Compared with last year, when the output in nine months was 33,778,952 tons, this year's production has shown a gain of more than 9.3 per cent.

Open-hearth steel made in 25 days in September was almost equal to that made in 27 days of August. Practically all of the shrinkage of 31,000 tons between the two months was in the Bessemer grade, which dropped 24,421 tons, or 4.3 per cent. Bessemer steel in September formed 13.9 per cent of the total steel reported. In the nine months, Bessemer steel made a gain of 3.9 per cent over 1927, compared with 10.3 per cent for open-hearth steel.

Total ingot production, including crucible and electric steel ingots, was

probably 1000 tons greater daily than the figure given. This would make the daily average for the month about 167,000 tons. Details of the first nine months of 1927 and of 1928 are covered in the table.

To Detect Rail Fissures

Invisible transverse fissures, starting from within the structure of steel rails and working outward, giving no warning until the rail breaks in service, are to be sought by a new electrical device invented by Elmer A. Sperry and announced by the American Railway Association. A small covered car containing the instruments is drawn along the track at 7 or 8 miles an hour. Electric connections provide a magnetic field within which is the rail. The faint impulse is magnified several thousand times when a fissure is met, resulting in sending a squirt of white paint against the rail. The paint marks are danger signals, calling for replacement of the rails so designated.

NINE MONTHS' PRODUCTION OF STEEL INGOTS (GROSS TONS)

Months	1927				1928			
	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927	Open-Hearth	Bessemer	Calculated Monthly Output All Companies	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927	Open-Hearth	Bessemer	Calculated Monthly Output All Companies
January	3,042,133	545,596	3,789,874	26	3,280,247	498,746	3,991,332	26
February	3,043,492	565,226	3,812,046	24	3,308,728	521,366	4,045,304	25
March	3,702,660	590,709	4,535,272	27	3,700,411	567,309	4,507,520	27
April	3,341,750	565,440	4,127,335	26	3,509,637	564,039	4,302,573	25
May	3,273,593	557,785	4,047,251	26	3,397,631	581,949	4,203,190	27
June	2,823,107	486,053	3,495,609	26	3,016,487	527,351	3,742,964	26
July	2,596,349	436,883	3,204,135	25	3,075,247	533,550	3,811,573	25
August	2,806,347	505,596	3,498,549	27	3,386,750	569,436	4,178,481	27
September	2,622,977	471,543	3,268,881	26	3,381,917	545,015	4,147,583	25
9 Months	27,252,408	4,724,886	33,778,952	233	30,057,055	4,908,761	36,930,520	233

Doctor Hatfield Talks on Resistance to Corrosion

At the October meeting of the Hartford, Conn., chapter of the American Society for Steel Treating, held Oct. 2, a large attendance heard Dr. W. H. Hatfield, director of the Brown Firth Research Laboratories at Sheffield, England, and also the Campbell Memorial lecturer at the national convention. He addressed his first American audience at Hartford, his subject being: "Acid, Corrosion and Heat-Resistant Steels." He developed his subject by showing numerous slides, which exhibited a vast amount of experimental work on the effects of corrosion upon different steels.

He held that a thin oxide film only a few molecules thick is responsible for resistance to corrosion. He cited Ulick Evans's clever experiment in separating the iron from the oxide film, leaving the film floating about in solution like the finest gossamer. In another experiment Doctor Hatfield showed that a common mild steel plate, when polished and exposed to the weather but protected by a gauze in front of the polished face, remains bright and uncorroded for many months. He explained this by reasoning that the oxide film on ordinary steel is very liable to mechanical injury. Protection from all particles of dust and dirt insures that no injury to the film takes place and, therefore, no nucleus for corrosion is available. The oxide film on high-chromium and high-chromium-nickel steels is very tenacious and mechanically strong.

Doctor Hatfield showed in a tabular way the results of corrosion tests performed under standard conditions on a series of steels with varying chromium content, on another series of chromium-nickel steels with the nickel content constant, and another series with the nickel varying and chromium

constant. A great advantage in general corrosion properties is gained by adding nickel to chromium steels, the 18 per cent chromium, 8 per cent nickel proving an excellent type for general corrosion-resisting properties.

For any specific case in acid-resistant applications a certain steel can be found to "do the job." Stainless steel for resisting corrosion of superheated steam at 1000 deg. Fahr. is applied in turbine blading and valve parts. A chrome-nickel-silicon steel is useful in applications where a high tensile strength is necessary at an elevated temperature, such as 700 to 800 deg. C. At this temperature, it has the strength of mild steel at room temperature, and the non-scaling properties of this steel are excellent.

Carriers Submit Plan for Interterritorial Rates

A memorandum regarding joint through class rates between Western Trunk Line and Official Classification territories has been submitted to the Interstate Commerce Commission on behalf of carriers operating in those territories, in response to a communication from Commissioner McManamy, requesting the carriers to "advise the commission as to the most practical plan for overhead rates not based on gateway combinations, if finally determined upon, and as to the classification which should govern them. It will be understood," the letter further stated, "that evidence of that nature introduced by the carriers is without prejudice to their position that combinations afford the proper basis."

This memorandum is in no sense a brief and it is confined to an outline of a suggested plan with necessary explanation, but without any argument for or against the plan. It con-

templates joint through class rates between Western and Official Classification territories including points on the Missouri River to be determined by the use of a distance scale. It also suggests that the rates should not be published as distance rates, but that the distance scale be used in determining the rates in much the same manner as proposed by the Western Trunk Line carriers in connection with their basic scale within that territory. It is further recommended that rates resulting from the message outlined in this memorandum shall be the same in both directions. The plan also contends that without relief from the long-and-short-haul provisions of the fourth section any distance basis is immediately defeated and rates result which are lower than those prescribed.

The plan contemplates the application of the Western classification in connection with its adjusted rates, which is in harmony with the suggestions made with respect to interterritorial rates between Western Trunk Line and Southern territories. If this plan should be adopted all rates within this territory and to and from Western Trunk Line territory would be governed by the Western classification.

Eastern Pipe Makers Protest Proposed Rate Changes

WASHINGTON, Oct. 9.—Exceptions to the proposed report of Examiners Howard C. Faul and C. M. Bardwell, in connection with the rate structure on iron and steel products throughout Official Classification territory, were filed last week with the Interstate Commerce Commission by the Eastern Cast Iron Pipe Producers, New York, who asked the commission to dispose of pending cast iron pipe rate cases. It was contended that foundries within the Philadelphia group are being discriminated against and are in need of immediate relief. The protest against the Faul-Bardwell report was based on the fact that it did not treat the cast iron pipe rate situation, and declared that to do so would disrupt "what seems to be a satisfactory competitive adjustment." The protesting interests said that the pipe plant at Scottsdale, Pa., had the benefit of specific commodity rates to 88 points of consumption, that the Birmingham, Ala., district had specific commodity rates to 80 per cent of these destinations and that Philadelphia had such rates to only 15 per cent of the destinations.

The six hot mills of the new tin plate plant of the Columbia Steel Corporation, San Francisco, at Pittsburgh, will be furnished by the United Engineering & Foundry Co., Pittsburgh, Calif.; the six cold mills by the Hyde Park Foundry & Machine Co., Hyde Park, Pa.; the hot mill drives by the Mesta Machine Co., Pittsburgh, and the cold mill drives by the Gears & Forgings, Inc., Pittsburgh.

Coming Meetings

October

American Gear Manufacturers Association. Oct. 11 to 13. Semi-annual meeting, Statler Hotel, Buffalo. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

Society of Industrial Engineers. Oct. 17 to 19. Fifteenth national convention, Hotel Seneca, Rochester, N. Y. George C. Dent, 205 West Wacker Drive, Chicago, secretary.

American Refractories Institute. Oct. 24. Fall meeting, Vanderbilt Hotel, New York. Dorothy A. Texter, 2202 Oliver Building, Pittsburgh, secretary.

American Iron and Steel Institute. Oct. 26. Fall meeting, Commodore Hotel, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

November

Engineers Society of Western Pennsylvania. Nov. 2. All day discussion of welding, William Penn Hotel, Pittsburgh.

American Management Association. Nov. 13 to 15. Fall meeting, Palmer House, Chicago. W. J. Donald, 20 Vesey Street, New York, managing director.

American Institute of Steel Construction. Nov. 13 to 17. Sixth annual meeting, Biloxi, Miss. Charles F. Abbott, 285 Madison Avenue, New York, executive secretary.

American Society of Mechanical Engineers. Nov. 14 and 15. Iron and steel division, Chicago. Thomas Wilson, 7 South Dearborn Street, Chicago, chairman local section.

Second International Conference on Bituminous Coal. Nov. 19 to 24. Carnegie Institute of Technology, Pittsburgh.

Society of Automotive Engineers. Nov. 22 and 23. Production meeting, Book Cadillac Hotel, Detroit. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

This Issue in Brief

Cost records show that maintenance of machines in apprentice department of electrical equipment plant is slightly lower than for same machines in production line. This is probably due to close supervision of students and more deliberate pace of operations.—Page 880.

* * *

Combination of high temperature with reducing atmosphere in atomic hydrogen welding gives unusually strong ductile welds at a rapid rate. The welds are free from oxides and blow holes, and have smooth finished appearance.—Page 883.

* * *

Building contracts in September set high record for that month. Dodge reports for 37 States east of Rocky Mountains show 14 per cent gain over August and 13 per cent increase over September, 1927. Decline of 15 per cent in value of projects contemplated indicates lower construction during remainder of year.—Page 942.

* * *

Margin of profit said to be growing smaller in reinforcing steel industry in spite of increased sales and better relations with mills. Institute president blames diminishing returns on price cutting within industry and lack of sincerity among competitors.—Page 901.

* * *

Success of airplane industry demands use of efficient machinery for large scale production, says aeronautical engineer. There must also be standardization of product, method and materials, and manufacturers must cease to experiment with too many different types of planes and motors.—Page 893.

* * *

Training of apprentices costs General Electric Co. about \$4,000 per man. Permanency of employee, however, cuts cost to about \$2,800 and debit is immediately wiped out if man enters supervisory position.—Page 881.

Purchasing agent should know what constitutes practical mill practice and should insist that designing and production department adopt reasonable standards and specifications, says flat-rolled steel association head. Large savings could be realized if consumers' designing and inspection department heads could meet with steel makers and adopt practical standards and specifications covering flat-rolled steel.—Page 892.

* * *

Mechanical devices lessen possibility of accidents in foundry. Safety engineer holds that mechanical handling of raw stock, the pouring of molten metal by mechanical means and the installation of modern type of conveyor systems would reduce accidents in foundry to minimum.—Page 897.

* * *

Narrow profit margins per sales dollar have come to stay in industry, analysis shows. Sales at prices closely approximating cost of production are dominant factor in determining commodity prices, forcing producers to seek profit by volume rather than by individual sales.—Page 882.

* * *

September steel ingot production was largest ever recorded for that month. Output of 165,903 tons daily was highest since April and exceeded any previous month in second half of year. Nine months' production was greater than any corresponding period in past by 1,240,000 tons.—Page 907.

* * *

Iron and steel make up 54.2 per cent of materials used in well known airplane engine. Aluminum and its alloys are used as far as possible but are not advantageous for highly stressed parts. Aluminum is not as strong as alloy steel and sections cannot always be increased to offset reduced strength. Steel is always used when extreme hardness is needed.—Page 898.

Extension of conveying equipment in Cadillac plant provides for many economies. Assembly conveyors for axles act as automatic pace setters and split up operations to permit carrying out progressive assembly to fuller extent than was possible under old methods. Discarding of old type floor stands and dolly trucks on casters permits solid support for work during assembling operations.—Page 889.

* * *

All steel received at forge plant is given pile number, and samples from each heat are analyzed and recorded. This system follows work through process and affords identification for steel until finished forging is shipped. Record is kept on file providing check long after forging has gone into service.—Page 888.

* * *

Executive who assumes it is right to bring all pressure to bear upon his purchasing department to secure the lowest possible price in mass buying is doing business as it was done 3000 years ago, says association head. Insistence on unreasonably low prices is "profiteering," and industry which does this must suffer in the end.—Page 892.

* * *

Forging furnaces in Cleveland plant are connected with recording pyrometers and have individual automatic control equipment working through Geisinger valves. Control of heating furnaces is being conducted in experimental way in connection with special forging work and control equipment is being used with view to holding heat control of furnace to closer limits.—Page 886.

* * *

Camshafts in automotive plant are handled from operation to operation on overhead endless chain conveyor 600 ft. long. Saving in space has made room for additional line of machine tools, and number of units on floor or on truck going through department has been greatly reduced.—Page 891.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Voluntary Price Maintenance

IN what may be called the voluntary maintenance of prices there has been much favorable experience in the last few years among various classes of manufacturers. We say the experience has been favorable, for it is obvious that indiscriminate price competition would have sent prices of many commodities well below the full cost of production if not below the bare factory cost. Those who speak out concerning inadequate profits are not to be upbraided for complaining, but it would be well if they considered now and then how much worse things might be. There are few manufacturing lines in which demand does not fall quite short of productive capacity.

While there is reason for urging that the anti-trust laws should be amended, that should be done with eyes wide open to the fact that no panacea could be offered by any amendment likely to be adopted. There is the experience of the past as a guide. When the Sherman law was lightly regarded and when there was no Sherman law there were price agreements and in the majority of cases they did not hold for any length of time, if at all. Even when there were forfeits, or contributions to a general fund for periodic distribution, there were evasions. When an arrangement broke up, it was the usual experience that the latter state of the industry was worse than the first.

It is the will to play fair that counts, and when there appeared to be a tight agreement there was the more temptation to attempt evasion. Not so when there is an open market. A price cut nowadays is known almost immediately, and that furnishes its own incentive to each seller to adhere to the known market. In the old days evasions of a definite agreement were much longer lived.

Supreme Court decisions under the present laws permit trade association data of transactions that have been closed, as in the maple flooring case, while data as to prices that are being quoted, as in the linseed oil case, are inadmissible, since they are related to future sales. It is difficult to see how any great hardship is involved in this particular point, for the competent sales organization generally knows just what is being quoted.

Sight is often lost of the fact that the typical self-respecting seller does not wish to undersell his competitors. His normal and natural ambition is to oversell his competitor, just as he wishes to produce better goods and render better service than his competitor. The will to do the constructive thing is what counts. It is fair to ask whether that would not be undermined if sellers were given freedom to enter into price agreements.

There is a wide range of activities in which trade associations may engage, fully and clearly within the law. It may be that the range should be increased or should be still more clearly defined, but anything done in that direction should be by way of increasing the will to play fair and not of providing temptation to do otherwise.

In respect to the improvement of trade associations, a suggestion will not be amiss. Very properly these associations aim to keep within the limitations of the anti-trust laws. There is no doubt that some members at times make inaccurate reports of their sales. In so doing they violate the common law against disseminating false information for the purpose of enhancing or undermining prices, and incidentally they injure the associations to which they belong.

Cheapness at a Price

SEeking volume of business at the expense of prices has been much condemned by leaders in the steel industry and in other quarters, as tending to wipe out profits, if not to produce losses. Yet two independent investigations concur in finding that corporate profits depend not only on an increasing volume of business, but on a declining margin per sale. An analysis of profit ratios to sales and capital investment for 4000 corporations, as made by the National Industrial Conference Board and reviewed elsewhere, confirms the conclusion previously reached by Harry A. Bullis in an inquiry undertaken for the National Association of Cost Accountants and summarized in *THE IRON AGE* of Sept. 20. It showed that the general profit trend for larger corporations is upward and is accompanied by a decreased percentage of profit with respect to selling price.

Narrow profit margins have come to stay, says the Conference Board, because progress in industrial mechanization has produced an irresistible trend toward large-scale enterprise and mass production.

If this be a true picture of what confronts American industry and if all the big business of today is inevitably to become the bigger business of tomorrow, we are headed for a regime in which our boasted individualism may fare hardly. Mass output in demanding mass consumption puts the individual on a new pedestal of importance as a user of products. For him a new era of comfort may be had, but even though he be the gainer in this material way, the question may well be raised whether he will not suffer offsetting losses. The average American finds satisfactions in independence, in steering his own course in the business sea, that are more appealing than a position of nonentity in

an economic order whose chief promise is that he can buy cheaply.

In distribution also the march of the mail order houses and chain stores, and latterly of the scattered branches of the mail order houses, goes on without a halt. We are told that all this is to make for the same efficiency in distribution that as applied to manufacture has displaced thousands of men and forced them to find employment as purveyors of various forms of service. And now the question arises, What employment shall be found for the thousands who must be displaced in distribution lines, in the elimination of the individual wholesaler and the retail merchant, if the promises of new economies there are to be made good?

Enthusiasm for consolidations may be warranted by the cold facts of efficiency, and in certain branches of industry and of distribution further engrossment by large organizations may indeed be inevitable. But some of this cheapening of products and of merchandising may be dearly bought if it means the closing of the door of opportunity against the smaller manufacturer and merchant.

Instalment Buying and the Retailer

NOT so much discussion of easy payment buying has appeared in economic and financial reviews of late as we saw last year, particularly in the weeks following the publication of the Seligman report, which found that no economic danger inhered in widespread buying on the instalment plan. However, the American Bankers' Association gave the subject a place on its convention program at Philadelphia last week and a paper by C. F. Zimmerman of the Pennsylvania Bankers' Association pointedly opposed Professor Seligman's view. Thrift is a familiar preachment of the banker and it was quite to be expected that the author of the Philadelphia paper would sharply contrast families whose income as received is parceled out among instalment sellers with "those who, in addition to their habits of thrift, are learning to make good use of all the facilities of the bank."

But quite aside from the self-interest of a banker's view of the family exchequer, the following comment finds ample confirmation in the experience of tradesmen in many communities:

Despite the fact that one of our leading economists has recently pronounced in favor of the "easy payment plan," most bankers continue to have the feeling that a great deal of instalment buying is an economic evil, and this conviction is based upon a knowledge of the havoc it works in so many families.

The country banker knows so much about the results of mistaken policies in handling the family income, that he is compelled to doubt seriously the wisdom of instalment purchasing so far as it concerns an overwhelming percentage of the people. Possession of attractive, relatively expensive but practically unnecessary articles for a small down payment, has a lure in it that misleads and very seriously entangles those who have only their earnings to depend upon.

As the butcher, the baker, the grocer can testify, the instalment seller is the preferred creditor always, while the local tradesman waits long and anxiously and often in vain. The survey of retail buying now being made

under Federal auspices would do a large service if it could discover how far instalment buying is responsible for the parlous condition of many a local tradesman which it is usual to charge entirely to the incompetency of the retailer himself.

Relative Value of Farm Products

THE latest reports set the volume of the cereal crops this year as follows:

	Bushels
Corn	2,931,000,000
Oats	1,454,000,000
Wheat	901,000,000
Barley	436,000,000
Rye	43,000,000

The value represented is estimated at about \$4,400,000,000, which makes a high figure, often spoken of as created wealth, though more properly it represents a turnover. A large turnover going through one particular channel, whether it be agriculture, building construction, the manufacture of automobiles, or what not, involves further turnover, with broad ramifications. Business in steel and in other lines has already been stimulated by this year's crops.

It is the economic or financial position of the farmer that is so much talked of. The statistics themselves are somewhat confusing and when the politicians take the statistics they are likely to confound the confusion.

One difficulty arises from entirely recasting the most trustworthy of the long-range price series, that of the Bureau of Labor Statistics at Washington. The original series took the ten-year average, 1890-99, as base. The averages for 1913 were 165.8 for farm products and 135.2 for all commodities, showing that the farmer's position had greatly improved. Later a new system was instituted, taking 1913 as base, and thus giving the farmer very decidedly "the edge." For 1926 the figures, based on 1913, were 142.2 for farm products and 151.0 for all commodities, showing the farmer not altogether as well off as in 1913, but much better off than in 1890-99. Now the index numbers are based on 1926, and for last August showed 107.0 in farm products and 98.9 in all commodities.

A reasonably close approximation to the statistical position of the farmer at the present time, relative to 1890-99, may be obtained by taking the continued product of the respective numbers, which gives 252.3 for farm products and 201.9 for all commodities, relative to prices in the ten years 1890-99. Thus the farmer is shown to be 25 per cent better off. We are not trying to maintain that he is better off by 25 per cent or less or more than that amount, but it is clear that if statistics are to be used at all these statistics must be regarded. Indeed, a corresponding computation using the 1926 base, as recently carried back by the Bureau of Labor Statistics to 1913, shows farm products up 30 per cent, instead of 25 per cent, compared with their relationship in the 1890 decade.

Why should prices rise at all? Other things being equal, they should decline as we grow more efficient and can produce things, whether grain, farm implements, automobiles, breakfast food or tooth paste, with less physical and mental effort. Pig iron has declined relatively. Based on 1890-99 as 100 it now stands at about 142 against 202 for commodities in general. Its

relative decline has been 30 per cent against the relative advance of 25 per cent in farm products.

What the individual is interested in is profits, or if not precise profits then how much he can get of the particular things he feels he should have from the revenue the circumstances afford him. The farmer's complaint cannot be based upon the bare statistics, for on the whole, by any broad comparison, they are against him. He may base his contention upon the things which are sometimes referred to as yesterday's luxuries but today's necessities—whether he is getting his share of them—or he can urge that he should receive a larger proportion of what the general public eventually pays for his products. He is not likely to get public sympathy if he asks that the consumer be made to pay more money.

GERMANY continues to make strides in fuel conservation, far outstripping other countries in the briquetting of low-grade coals, as has been the case for many years. Nearly 36,500,000 tons of lignite briquets and 5,000,000 tons of coal briquets was the German output last year, or more than 82 per cent of a world total of about 50,000,000 tons. France was second at 5,000,000 tons and Belgium third at roundly 1,750,000 tons. Before the war Germany also had a long lead in the utilization of lignite, the 1913 output of lignite briquets being about 22,000,000 tons. The briquetting

industry has been relatively unimportant in the United States, though large quantities of fuel suitable for such treatment are available. Last year the American output of briquets was 880,300 tons, as against 995,000 tons in 1926. This latter record was chiefly a product of the anthracite strike, that emergency causing some thousands of consumers to turn to briquets for the first time. There is, however, some growth in their use apart from such interruptions of the regular fuel supply. The first statistical survey, made in 1907, showed a total of but 66,524 tons of briquets. By 1923 there had been nearly a ten-fold increase, or to about 700,000 tons.

INDICATIONS of two months ago that 1928 would make a new high record in steel ingot production are strengthened by the returns for September, given on another page. We have only to exceed by 1 per cent, in October, November and December, the relatively low production in the last three months of 1927. As September was 27 per cent ahead of September, 1927, and as the mills have come into October with excellent backlogs, the prospects are that the output of these three months will have a good margin over last year's final quarter. For the elapsed nine months the gain has been 9.3 per cent over 1927 and 4.25 per cent above 1926, the record year, after allowing for crucible and electric steel ingots, reported monthly in 1926 but not so reported now.

CORRESPONDENCE

Two Authors Comment on a Metallurgical Book Review

To the Editor: I have had my attention called to the review of my recent book entitled "An Introduction to the Metallurgy of Iron and Steel," which appeared on page 1826 of your issue for June 28.

I am naturally pleased with the reviewer's approval of my policy of numerous illustrations. This policy was pursued with intent and has apparently pleased many of the readers of the book also. I fear that the reviewer's examination of the book was rather casual, however, for he states that "seventeen pages are used to describe the acid open-hearth process; three are made to suffice for the basic variety." If he had examined the text more carefully he would have seen that over thirteen out of the seventeen pages which he ascribes to the acid open-hearth process consist largely of illustrations of furnaces which might apply to both processes, the remainder of the thirteen pages being text which also applies to both processes, so that the proportion is more nearly in the ratio of four pages for the acid open-hearth process to three pages for the basic open-hearth. After pointing out in the text and by means of charts the enormous tonnage of basic open-hearth produced as compared with acid I decided to discuss the acid open-hearth process first, partly because it came first historically and partly because of its importance where the highest quality of steel is to be considered. It is also true I think that the acid open-hearth process is much better standardized than the basic and a full discussion of the details of the latter process would take more space than could be devoted to it in a book of this character. I therefore contented myself with describing the chief differences between

the basic open-hearth and the acid open-hearth processes while going into some detail in regard to the acid open-hearth practice.

The reviewer also bemoans the absence of a complete exposition of the theories for the hardening of steel and accuses me of parrying the question by referring the student to Sauveur's work published in 1920 and of being unfair to Jeffries and Archer and their slip interference theory. If he will read my reference more carefully he will notice that I refer not only to Sauveur's 1920 edition but to his 1926 edition which contains a brief description, in Doctor Jeffries' own words, of the Jeffries and Archer theory. Both references were given intentionally, because the earlier theories were more fully discussed in the 1920 edition while the later edition attempts to bring the subject up to date in the customary impartial manner for which Doctor Sauveur is noted. As the reviewer indicates, however, a full discussion of the hardening theories would be very much out of place in an elementary textbook. I believe Doctor Jeffries and Mr. Archer would be the first to resent any charge of unfairness on my part and there is an implied criticism of Doctor Sauveur in the review which it would be difficult to justify.

H. M. BOYLSTON.

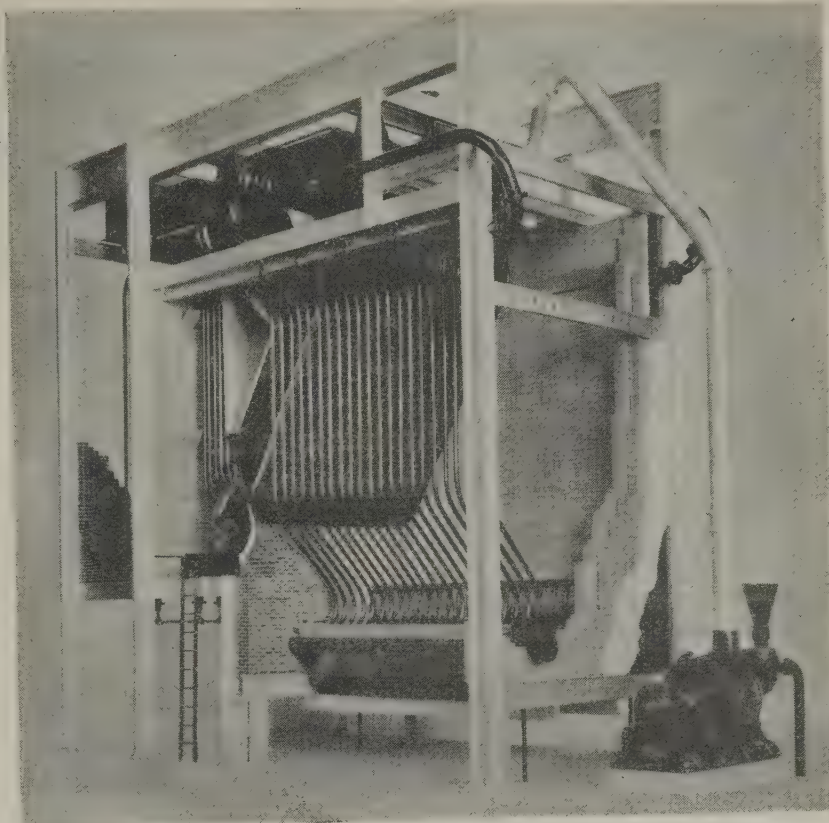
Cleveland, Sept. 20.

To the Editor: It is only today that I note in your issue of June 28 a review of Professor Boylston's book entitled "An Introduction to the Metallurgy of Iron and Steel." I quote as follows from the reviewer's remarks:

"Knowing the author's constant association with Professor Sauveur of Harvard University, and the latter's published views on the hardness of beta iron, the reviewer looked with interest for an exposition of the hardening theory. But alas, the question is neatly parried by referring the interested student to Sauveur's work published in 1920. This hardly seems fair to Professor Boylston's fellow townsmen, Messrs. Jeffries and Archer, who are widely credited with having proposed a very understandable

Model of Water-Cooled Boiler Furnace

AT the request of the Smithsonian Institution, Washington, the Erie City Iron Works, Erie, Pa., has built a model of its Seymour water-cooled furnace for permanent display in the institution. This has been made on a scale of 1 in. to the foot and, as shown in the illustration, has parts cut away enough so that the entire construction can be seen. It is a three-drum boiler with integral economizer and designed to be fired with powdered coal from a unit-type pulverizer



and useful theory of hardening in more recent years."

It is to be inferred from this criticism that if the reader followed the author's advice he would find in my book, "The Metallography and Heat Treatment of Iron and Steel," a description of my personal views on the hardening of steel to the exclusion, or, at least, belittling of the views held by others. This is contrary to facts. He would find that all theories that have survived are as accurately and impartially presented as it was in my power to do. He would find on pages 256 and 257, Jeffries and Archer's theory described in Doctor Jeffries' own words in a statement prepared by him as a reply to my questionnaire. I have made it a rigid rule in my writings designed to instruct students never to emphasize my own views, and I trust that I have not failed in this instance.

In referring the reader to my book, I am sure that Professor Boylston believed, and believed rightly, that in so doing he was referring to an impartial treatment of this important question and not merely to an exposition of my personal views. That is why he did not consider it necessary to deal with the subject at greater length in his own book.

ALBERT SAUVEUR.

Cambridge, Mass., Sept. 10.

Everyone who dislikes to work at a rocking bench or to eat at a jiggling table will be interested in a suggestion contained in the September issue of *Oxy-Acetylene Tips*. Legs of movable work-tables and benches may be made of pipe, the lower ends of which are threaded and fitted with an ordinary sleeve coupling or pipe cap. Such caps may then be screwed up and down to fit irregularities in the flooring, as they chance to occur.

Obscure Cause of Spalled Brick in Oil-Fired Furnaces

Bricks in a furnace or boiler setting fired with fuel oil usually fail by spalling, whereas in a similar one fired with powdered coal they fail by slagging. To discover the reason for this difference in action, the United States Bureau of Mines and the American Society of Mechanical Engineers have cooperated in a study on two large boilers.

The rate of heat liberation in the oil-fired was much higher than in the powdered-coal furnace, but the maximum temperatures of the gases observed were the same, 2800 deg. Fahr. The maximum temperatures measured were somewhat higher in the oil-fired furnace at the positions where the flame impinged on the wall. The temperature gradient plotted for the first 6 in. of the hot side of the furnace wall was no greater in the oil-fired than in the coal-fired furnace.

The rate of change in temperature when the furnaces were banked or fired up was nearly the same. The rate and frequency of change of temperature during steaming were no greater in one than in the other. There is not sufficient evidence to warrant the acceptance of change of temperature as the only cause of the greater spalling in the oil-fired furnace, and differences in some other factors may be expected.

The chemical composition of the ash of the fuels and of the slags from the walls differed materially. It is possible that some such mineral formed in combination of brick and ash from oil fuel is sensitive to thermal shock; or the mineral may have a much different thermal expansion than the brick, and spalling result from the difference in the contraction during cooling.

Schedule of the next instalments of the *Business Analysis and Forecast*, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Oct. 18—Position of Iron and Steel Producers; Nov. 1—Activity in Steel Consuming Industries.

Iron and Steel Markets

Steel Output Still Rising

October Promises to Be Peak Month in Steel Production and Shipments—Buoyancy of Demand Surprising—Scrap and Semi-Finished Steel Higher

WITH steel production rising to what promises to be a new peak, demand shows unexpected buoyancy and the price structure, from primary materials to finished products, continues to strengthen.

In steel ingot output per day, September reached the highest average since the record-breaking rate of April. In total production the month fell less than 1 per cent behind August, which had two more working days. Mill operations are still expanding, now averaging 90 per cent, if not higher, and in view of the large volume of business on mill books, October is expected to be the high month of the year in both output and shipments. That total production for 1928 will establish a new record now seems assured, since the last quarter need only exceed the relatively poor performance of the same period in 1927 by 1 per cent to effect that result.

The continued flow of new business in finished steel is impressive, following last month's heavy specifying against expiring contracts. October orders for bars, sheets, shapes and plates, though in most districts at a lessened rate, are being freely placed at the advanced prices ruling in this quarter. At Chicago, sales were particularly heavy, equaling those of any week this year, not excluding periods when bookings were swelled by large purchases of rails and track supplies.

Meanwhile pressure for deliveries has increased in proportion to the expansion in mill backlogs. In bars and sheets producers are from three to five weeks behind in shipments. A rise in sheet output to 95 per cent of capacity reflects the efforts of mills to satisfy their customers.

The outlook for a sustained rate of steel consumption is reassuring, notwithstanding the large volume of steel now being taken by the trade. The automobile industry is not producing at so rapid a pace as in September, but output for the quarter will probably exceed that for the fourth quarter of 1927 and other recent years. That no slump is in early prospect is indicated by continued efforts of motor car companies to place contracts for sheets and strip steel for the first quarter of 1929.

The farm implement industry, which is completing additions to its plant capacity, is expanding, rather than contracting, its production.

Building work taking structural steel shows no

signs of entering a period of reaction. New projects calling for nearly 82,000 tons of fabricated steel were added to the list of pending inquiries during the week. Awards totaled 33,000 tons.

Tin plate production, at 75 to 80 per cent of capacity, reflects a seasonal decline in business, and jobbing demand for wire products is disappointing, but offsetting tonnage will come from the railroads.

Inquiries for 2300 freight cars have been issued, and orders have been placed for 1500 cars to be built in railroad shops. An Eastern trunk line has closed for 46,000 tons of rails and 14,000 tons of accessories, and the Chesapeake & Ohio has bought 15,000 tons of track supplies to supplement its rail purchase of two weeks ago. The Pennsylvania will open bids Oct. 15 on 160,000 tons of rails with an option on 70 per cent more.

The strength of the price situation is emphasized by the rising trend of primary materials. Heavy steel scrap has advanced another 50c. a ton at Pittsburgh and St. Louis, while prices at Chicago and Cincinnati have gone up 75c. and \$1 a ton, respectively. A leading independent steel company may resort to duplexing to reduce its scrap requirements.

Increasing foundry melt and the expanding raw material needs of steel companies have put pig iron sellers in a strong position. Malleable and Bessemer pig iron in the Valleys have gone up 25c. a ton, and another advance at Chicago is looked for.

Billets, slabs and sheet bars are now commanding \$33 per ton, Pittsburgh or Youngstown, an advance of \$1 over the price that ruled on most third quarter contracts.

To simplify and stabilize quotations on hot-rolled strip steel, which now takes three base prices, makers have announced a new card of extras for width and gage. One base price will apply on all sizes from 1½ in. to 24 in., extras ranging from 5c. per 100 lb. upward. The new prices are 2c., Pittsburgh, and 2.10c., Chicago, but in view of the fact that nearly all buyers are covered for the remainder of the year at 1.90c., Pittsburgh, the effectiveness of the change will date from Jan. 1. Wide strips will take considerably lower net prices under the new extras.

THE IRON AGE composite prices remain unchanged, that for pig iron at \$17.84 a ton and that for finished steel at 2.362c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
No. 2 fdy., Philadelphia.....	\$20.76	\$20.76	\$20.26	\$20.26
No. 2, Valley furnace.....	17.00	17.00	17.00	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	20.94
No. 2, Birmingham.....	16.25	16.25	16.25	17.25
No. 2 foundry, Chicago*.....	18.50	18.50	18.00	19.50
Basic, del'd eastern Pa.....	19.00	19.00	19.00	20.00
Basic, Valley furnace.....	17.00	17.00	16.25	17.00
Valley Bessemer, del'd P'gh... 19.26	19.01	19.01	19.01	19.76
Malleable, Chicago*.....	18.50	18.50	18.00	19.50
Malleable, Valley.....	17.50	17.25	17.25	17.50
Gray forge, Pittsburgh.....	18.26	18.26	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh.....	33.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh.....	33.00	32.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.75

Finished Iron and Steel,	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, New York.....	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.22½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.19½	2.14½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.65	2.90
Sheets, black, No. 24, Chicago				
dist. mill.....	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.40	3.75
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.15
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
Heavy melting steel, P'gh.....	\$17.50	\$17.00	\$16.75	\$15.00
Heavy melting steel, Phila.....	16.00	16.00	15.00	14.00
Heavy melting steel, Chicago..	14.00	13.25	13.00	11.75
Carwheels, Chicago.....	13.75	13.75	13.50	13.50
Carwheels, Philadelphia.....	16.50	16.50	15.50	15.50
No. 1 cast, Pittsburgh.....	15.00	15.00	15.00	14.75
No. 1 cast, Philadelphia.....	17.00	17.00	16.00	16.50
No. 1 cast, Ch'go (net ton)....	15.50	15.00	15.00	14.50
No. 1 RR. wrot, Philadelphia..	15.30	15.50	14.00	15.50
No. 1 RR. wrot, Chicago (net)	12.75	12.00	12.00	10.25

Coke, Connellsville, Per Net Ton at Oven:	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Oct. 9, 1928	Oct. 2, 1928	Sept. 11, 1928	Oct. 10, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	15.25	15.25	14.75	13.25
Electrolytic copper, refinery..	15.00	15.00	14.50	12.95
Zinc, St. Louis.....	6.25	6.25	6.25	6.07½
Zinc, New York.....	6.60	6.60	6.60	6.42½
Lead, St. Louis.....	6.32½	6.32½	6.25	6.00
Lead, New York.....	6.50	6.50	6.40	6.25
Tin (Straits), New York.....	48.50	49.75	47.12½	58.50
Antimony (Asiatic), N. Y.....	11.50	11.50	10.62½	11.50

Pittsburgh

Operations Gain As Ordering of Steel Increases Mill Backlogs—Heavy Melting Steel Sold at \$18

PITTSBURGH, Oct. 9.—Reports are somewhat mixed as to the amount of new business in the first full week of the final quarter of the year, but tonnages entered in most products and on most makers' books were again large. It is probable that no small part of the entries were of orders that had been received in district offices during the closing days of September and did not reach general offices until the past week. But the fact remains that bookings are of sufficient size to necessitate some enlargement of ingot production. With the Youngstown district works running at almost full physical capacity and a similar condition at Johnstown and undiminished operations in Pittsburgh and Wheeling, it is estimated that output for the combined districts is not far from 90 per cent of capacity, or substantially at the peak rate of the early part of the year.

The Carnegie Steel Co. has put on another blast furnace, and the lighting of an additional furnace at the Johnstown, Pa., works of Bethlehem Steel Co., leaves only one idle stack in a group of nine there.

Bar mills are committed for three to four weeks. Sheet mills are sold up for a slightly longer period, and a reflection of the anxiety for deliveries is to be had in the statement that sheet mill operations are at 95 per cent of capacity, or higher. Some stimulation has been given specifications for nails by the fact that some low-priced contracts expire by limita-

tion Oct. 10. The quiet spots are tin plate and welded pipe. Business in railroad track supplies is light, but betterment is expected as the roads place contracts for their 1929 rail needs.

October shows signs of being the biggest month of the year in production and shipments. These results are pretty definitely assured by the vol-

ume of business now on makers' books; the question is whether new business will be in keeping with completed orders.

Makers of semi-finished steel appear to have been successful in securing part of the advances they set out to obtain on tonnage for this quarter.

Sheet makers report little resistance to the higher prices they are asking on fourth quarter tonnages, and there is no evidence that less than 1.90c. is being done in the heavy tonnage products—plates, bars and shapes. The general undertone of the market is one of firmness, but it also is observed that mills are well supplied with orders and not in need of more to sustain economical operating schedules, while consumers are covered on the immediate requirements too fully to have occasion to add greatly to their commitments.

Another advance in heavy melting steel, which has carried it to \$18 at two or possibly three points in this district, or \$4 a ton advance from the low point of early summer, stands out among the primary materials. The recent advance in basic iron appears to have made consumers a little cautious about open inquiry in the fear

of bidding the market up on themselves.

Pig Iron.—Demand for basic iron still is strong, but the steep rise in the price a week ago has led consumers to try private negotiation as a means of securing needed supplies. No sales have come to light since those of a week ago, which embraced one lot of 2000 to 3000 tons at \$16.50, Valley furnace basis, instead of \$16 as then reported, and another of 2200 tons at \$17, Valley furnace. The market as a whole is quiet, with sales of foundry, Bessemer and malleable grades chiefly in carload lots. Basic iron is hard to obtain, as the principal production for market is by steel manufacturers, who, at this juncture, feel they are going to need all they have or will make in the next 30 or 60 days. Demand is for iron for immediate shipment. Malleable and Bessemer iron are more firmly held, and since production for market is confined to a few furnaces, makers are in a position to insist on higher prices. Small sales of these grades have been made at \$17.50, Valley furnace, and that price now appears to be as low as any to be had. The Carnegie Steel Co. has put on a Duquesne furnace and the Bethlehem Steel Co. one of its Cambria group at Johnstown, Pa. The former now has 29 of its 49 furnaces in production and eight of the nine usable furnaces at Johnstown are active.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	17.50
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.50
Low phos., copper free	26.50

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Fourth quarter contract prices of billets, slabs and sheet bars are becoming more clearly defined. Several billet and slab contracts have been made at \$33 per ton, Pittsburgh, for 4 x 4-in. billets and the equivalent area of slabs. This price is a \$1 advance over the third quarter contract price, but it is also \$1 a ton under what several producers

had announced and still are quoting as the fourth quarter price. Strip makers, who take a considerable part of the commercial tonnage of billets and slabs, have been unsuccessful in getting higher prices for this quarter on strips, and therefore it has not been easy to get them interested in semi-finished steel at an advance. Most of them have sizable stocks bought at third quarter prices. Non-integrated sheet and tin plate manufacturers also seem to have been able to place considerable tonnage prior to the advance. Virtually all the makers of sheet bars have named \$33, Pittsburgh, as the final quarter contract price. Base size billets and slabs now are fairly quotable at \$33 to \$34, with the usual extra of \$1 a ton for smaller sizes. Wire rods are firm at \$42, base Pittsburgh, and there is a fairly good movement of them.

Bars, Plates and Shapes.—After the flood of tonnage releases last month, it was commonly expected that business this month would be on a smaller scale, but this has not been the case in the first week of October. New business is reported by one local office to have amounted in the past week to expectations for the entire month, while the tonnage entered by another company was more than 40 per cent in excess of that of the final week in September. It is possible that some business placed in district offices late in September did not reach general offices until the past week. In any event, mills here have a full month's obligation in bars and almost as much specified tonnage in shapes and plates. Promises of delivery on bars still are from four to five weeks. There are no suggestions of less than 1.90c., base, even to large-lot buyers, while a good many contracts have been written at 1.95c. The 2c. price still refers chiefly to very small or otherwise unattractive orders.

Rails and Track Supplies.—The Pennsylvania Railroad standard-section rail inquiry, calling for 160,000 tons plus a 70 per cent option, and for a large tonnage of track supplies, has appeared. The New York Central and Baltimore & Ohio inquiries are looked for soon. Current business in rails and

track supplies is only moderately active.

Wire Products.—Prices are firm, but with no sign of change in prices, buyers are ordering entirely in keeping with real needs. Plain wire is moving well, but this district has lost much of its former business in fence and barbed wire to mills more conveniently located in relation to consuming centers. Nail business is steady, but not active.

Tubular Goods.—Mills making seamless pipe still are well supplied with orders, and demand for that class of pipe still is reported as good. No line pipe business of account having recently been let, producers are beginning to cut into their backlogs. Welded pipe for oil well development and for building and construction work is only moderately active. Shipments of mechanical tubing exceed new buying. Mill operations do not change much, but a letdown seems probable in the last two months of the year unless there are some pipe line orders. Laying of lines is out of the question during the winter and early spring, but orders might develop during the winter.

Sheets.—Makers in this territory see no material slackening either in demand or mill engagement, but, what is probably more important to them, there is no great resistance to fourth quarter prices or the lower cash discount, which became effective Oct. 1. Considerable fourth quarter business in the common finishes has been written at 2.75c., base Pittsburgh, for black; 3.50c., base, for galvanized, and 2c., base, for blue annealed. The effectiveness of these prices is delayed somewhat by the fact that most makers have much tonnage yet to deliver at the lower third quarter prices. A desire to clean up this business, coupled with the continued insistence of buyers for deliveries, is reflected in very high mill operations. The American Sheet & Tin Plate Co. is operating at practically full physical capacity. Sheet making capacity as a whole is engaged at 95 per cent or slightly higher.

Tin Plate.—Business is in its usual

THE IRON AGE Composite Prices

Finished Steel

Oct. 9, 1928, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.348c.
One year ago	2.331c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Oct. 9, 1928, \$17.84 a Gross Ton

One week ago	\$17.84
One month ago	17.46
One year ago	18.09
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.84, Oct. 2;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Philadelphia.....	2.22c. to 2.32c.
Del'd New York.....	2.24c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.75c. to 2.85c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (1½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel.....	0.25	3.00
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Tight (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1/8	45	19½	1/4 to 3/8	+11	+89
1/4 to 3/8	51	25½	3/8	22	2
1/2	56	42½	3/4	28	11
3/4	60	48½	1 to 1½	30	18
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	64	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1/8	41	24½	1/4 to 3/8	+19	+54
1/4 to 3/8	47	30½	3/8	21	17
1/2	53	42½	3/4	28	12
3/4	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 2¾ in.....	37
3 in.....	40
3¼ to 3¾ in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	+18
1¾ to 1½ in.....	+8
2 to 2½ in.....	+2
2½ to 3 in.....	7
3¼ to 4½ in.....	9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb....	5 Fives
12,000 lb. to 21,000 lb....	6 Fives
21,000 lb. and over.....	7 Fives
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1½ to 1½ in.....	55	3¼ to 3½ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	45
2½ to 2¾ in.....	42		

Hot Rolled

2 and 2½ in....	40	3¼ to 3½ in..	56
2½ and 2¾ in..	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in..	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

seasonal reaction, and mill operations are barely maintained at 75 to 80 per cent, with the average probably nearer the lower than the higher figure. General line tin plate is moving well and export business is of fair volume; these outlets are now the principal dependence of the mills.

Cold-Finished Steel Bars and Shafting.—The fourth quarter contract price is well established at 2.20c., base Pittsburgh, but it will be a month before it is reflected in invoice prices, as buyers generally had until the end of September to enter specifications on third quarter contracts. Shipments continue large, but most makers are able to supply demands from single turn operation of their mills.

Hot-Rolled Flats.—The first week of October has been rather light in new business, but makers are heavily supplied with orders and expect a full engagement of productive capacity throughout this month. The common expectation is that this will be a month of heavy production and shipments, but that it will fall short of last month and the month before in specifications and orders. Prices are steady. A new card of extras has been issued naming a base price and extras for all widths and gages of hot-rolled strip.

Cold-Rolled Strips.—Makers are running at a high rate and shipments are heavy, but new business moderated in the first week of the new quarter. Prices are well established at 2.75c., base, as a minimum.

Coke and Coal.—The spot furnace coke market still is very firm, but not quotably higher. More than 1000 bee-hive ovens of the H. C. Frick Coke Co. have been started up in the past fortnight, and a good-sized plant of the Hillman Coal & Coke Co. recently went into operation to take care of the needs of blast furnaces which either were being supplied with by-

product coke or recently were blown in. A local steel company still is making purchases to supplement its own by-product oven production, and this demand is largely responsible for meager supplies of spot coke. The general market still is \$2.75 per net ton at ovens. Spot foundry coke is moving well at unchanged prices. Excessive supplies of slack coal cause very low prices. The general coal market is weak with supplies quite ample for wants. A fair degree of activity and firmness is observed in household coal.

Old Material.—Heavy melting steel scrap has been sold at two points in this district at \$18 and is reported to have sold at that figure at a third. In the past week sales of this grade into consumption have been made from \$17 to \$18. Steel works operations having increased further in the past week, consumption remains high and the market also derives strength from the fact that dealers are paying well to secure tonnages they expect the mills will want. Local dealers were paying \$13 and \$13.50, f.o.b. Detroit, or \$17 to \$17.50 here before the market was fully established at \$17. It is said that this course was necessary, since an order, no matter at what price it is taken, is unprofitable unless the seller has some material

with which to start shipments. Scrap rails have been sold at \$17.50, compressed sheets up to \$17.25 and railroad specialties up to \$19.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$17.50 to \$18.00
Scrap rails	17.00 to 17.50
Compressed sheet steel.....	17.00 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels.....	15.25 to 15.75
Sheet bar crops, ordinary.....	17.50
Heavy breakable cast.....	12.75 to 13.25
No. 2 railroad wrought.....	17.00 to 17.50
Heavy steel axle turnings.....	15.00 to 15.50
Machine shop turnings.....	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers.....	18.50 to 19.00
Railr. coil and leaf springs.....	18.50 to 19.00
Rolled steel wheels.....	18.50 to 19.00
Low phos. billet and bloom ends	20.00 to 20.50
Low phos., mill plates.....	18.50 to 19.00
Low phos., light grade.....	17.50 to 18.00
Low phos., sheet bar crops.....	18.50 to 19.00
Hvy. steel axle turnings.....	15.00 to 15.50
Electric Furnace Grades:	
Low phos. punchings.....	17.50 to 18.00
Hvy. steel axle turnings.....	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 12.75
Short mixed borings and turnings	12.50 to 12.75
Cast iron borings.....	12.50 to 12.75
No. 2 busheling.....	11.25 to 11.75
Rolling Mill Grades:	
Steel car axles.....	18.50 to 19.50
No. 1 railroad wrought.....	12.50 to 13.00
Sheet bar crops.....	18.00 to 18.50
Cupola Grades:	
No. 1 cast.....	15.25 to 15.75
Rails 3 ft. and under.....	17.50 to 18.00

Railroad Equipment

Inquiries for 1300 Refrigerator and 1000 Ore Cars

LARGE inquiries reported during the week included 1000 refrigerator cars for use by the American Refrigerator Transit Co., 1000 ore cars for the Great Northern and 300 refrigerators for the Northern Refrigerator Car Co. Orders placed were largely with company shops and were featured by 1000 box cars and the rebuilding of 983 gondolas by the Pennsylvania and the rebuilding of 500 gondola cars by the Chicago, Burlington & Quincy. Locomotive inquiries included 20 for the Delaware, Lackawanna & Western and 10 for the Denver & Rio Grande Western. Details of the week's business follow;

Missouri Pacific has made inquiry for 1000 refrigerator cars for use by American Refrigerator Transit Co.

Canadian National Railways have ordered five Mountain type locomotives from Canadian Locomotive Co. These are in addition to 55 reported purchased last week.

Donner Steel Co., Buffalo, has ordered three 300-hp. oil-electric locomotives to be built jointly by Ingersoll-Rand Co., General Electric Co. and American Locomotive Co.

Swift & Co. have ordered 300 underframes from Bettendorf Co.

Delaware, Lackawanna & Western is inquiring for 20 4-8-4 type locomotives and two steel dining cars.

Chicago, Burlington & Quincy is rebuilding 500 composite gondola cars at its Galesburg, Ill., shops.

Great Northern is in the market for 1000 ore cars.

Northern Refrigerator Car Co. will buy 300 cars.

Chicago, Rock Island & Pacific is in the market for one 4-8-4 type locomotive.

Denver & Rio Grande Western will purchase 10 4-8-4 locomotives.

Pennsylvania Railroad will build 1000 steel box cars and increase the capacity of 983 gondolas from 50,000 to 70,000 lb. by substituting heavier trucks, at its Altoona, Pa., shops.

Fewer Stokers Sold

Sales of 162 mechanical stokers, with 51,572 hp., were made in August, compared with 193 with 59,859 hp. in July, according to reports received by the Department of Commerce from 11 leading manufacturers. Of the August sales 57 stokers with 7895 hp. were installed under fire-tube boilers and 105 with 43,677 hp. were installed under water-tube boilers. For the eight months ended August, 1022 stokers with 338,031 hp. were sold, against 1025 with 379,380 hp. for the corresponding period of 1927.

For transporting helium gas and other aircraft gases, the General American Tank Car Corporation is constructing a new type of car. It will be used by the aeronautical division of the Navy for shipping helium gas from the Government fields in Texas to Lakehurst, N. J., and to other dirigible ports. The conveyor weighs 200,000 lb., and has a capacity of 220,000 cu. ft. of gas.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.31
Spikes, large.....	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00 to \$34.00
Rerolling, under 4-in. to and including 1 3/4-in.....	34.00 to 35.00
Forging	38.00 to 40.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00 to \$34.00
Smaller than 8 in. x 2 in.....	34.00 to 35.00

Skelp

	Per Lb.
Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron.....	9.25c. to 9.50c.

	Per Gross Ton
Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.25
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines.....	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	70c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	1.00 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00

Bessemer Ferrosilicon

	F.o.b. Jackson County, Ohio, Furnace
	Per Gross Ton
10%	\$30.00
11%	32.00

Silvery Iron

	F.o.b. Jackson County, Ohio, Furnace
	Per Gross Ton
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines.....	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	_____
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base Per 100 Lb.
(1/2-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

	Per Cent Off List
(7/8-In. and Smaller)	
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

	Per Cent Off List
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Heavier Mill Backlogs Add Strength to Steel Market— Specifications and Orders Exceed Current Output

CHICAGO, Oct. 9.—Added to the stability of the local steel market of a week ago is a decided gain in backlogs. With rails not an important factor, sales in the last seven days are fully equal to the best week of the year, not excepting periods of heavy track supply and rail buying. Specifications are unusually large, being well above output, and therefore are forcing deliveries further into the future. Heavier releases reflect not only a greater consuming demand, but also the necessity that users protect their needs against less frequent roll changes and deferred shipments. Fourth quarter contracting is in full swing and there are liberal purchases for nearby needs. Shipments of steel from Chicago mills in the first nine months of this year were 20 per cent heavier than in the corresponding period of last year, and order books are larger than a year ago.

The building industry, though slower than in the summer months, is still active and promises to take a good volume of steel throughout the fall. Several sizable rail inquiries from Western railroads are in the making. Fresh inquiries for 2300 freight cars lend encouragement to car shops. Two Western railroads, the Santa Fe and the Illinois Central, may soon come into the market for freight equipment.

Prices for plates, shapes and bars are steady at 2c. to 2.10c. per lb., Chicago.

The Inland Steel Co. has blown out No. 1 stack for relining. It will be out of service about 60 days. Twenty-three of 36 steel mill furnaces are now in blast in this district.

Pig Iron.—This market is stronger than a week ago. Prices for Northern foundry iron are firm at \$18.50 a ton, base, and the demand for prompt shipments easily keeps pace with current offerings. Rush orders are more numerous than in many years. A Chicago melter will buy 4000 to 5000 tons for delivery in October and November and a user in western Michigan will take 5000 tons for first quarter. More than 1500 tons of charcoal iron has been ordered at \$24 a ton, furnace. A cargo of Lake Erie iron has arrived at Milwaukee. The silvery market is active and prices are strong.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	19.00
Malleable, not over 2.25 sil.....	18.50
High phosphorus.....	18.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free.....	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A 1500-ton cargo of 20 per cent spiegeleisen has been docked at Chicago. This was shipped from England and transferred to a Lake boat at Montreal. The bulk of this tonnage is said to be under contract. Specifications for ferromanganese are heavy.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Of special interest in this market is the fact that definite car inquiries are now before the trade. The American Refrigerator Transit Co. is asking for 1000 cars. This company is a subsidiary of the Missouri Pacific, which is expected to come into the market soon for cars for its own use. The Northern Pacific will take prices on 1000 ore cars and later may buy 500 gondolas. The Northern Refrigerator Car Co. will buy 300 refrigerator cars and the Santa Fe is a step nearer entering the market for freight equipment. Several small and scattered tank inquiries are taking shape on the Pacific Coast. Tank plate business in the mid-Continent fields is quiet. A fabricator in Beaumont, Tex., will use 1200 tons of plates, which will be shipped from Atlantic seaboard mills, for tanks to be erected in the Southwest. Specifications from pipe makers are of moderate size and not in line with recent heavy purchases of gas pipe because difficulties in obtaining franchises are delaying the start of construction programs. Miscellaneous orders for plates are numerous, and many users in the manufacturing trade have placed fourth quarter contracts at prices that range from 2c. per lb. to 2.10c., Chicago. Specifications from railroad shops, where car rebuilding operations are going on, are of fair size. The Burlington will reconstruct 500 composite gondola cars at its Galesburg, Ill., shops.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Forward contracting in soft steel bars has mounted rapidly in the week, and specifications are fully equal to the best week so far this year. Roll changes are much less frequent, and users are finding that mill schedules do not in all cases meet their immediate requirements. Deliveries are from three to six weeks and the range of sizes that can be had in the shorter time is rapidly narrowing. Prices are firm at 2c. to 2.10c. per lb., Chicago. Agricultural implement manufacturers are operating at an unchanged rate. Schedules later in the year will be heavier because plant additions are rapidly being put to use. The iron bar market is moderately active in spot sales, but forward contracting is slow. Prices for

alloy steel bars are steady and shipments are at nearly the capacity of Chicago mills. Spot purchases are more numerous. Schedules of the automobile industry are still heavy. Rail steel bars are firm at 1.95c. per lb., Chicago Heights. Backlogs are heavy, and output continues on a double turn basis. Specifications from bed manufacturers are liberal. Shipments of reinforcing bars are unusually heavy for this time of year.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Bolts, Nuts and Rivets.—Total specifications are not equal to output at 65 per cent of capacity. The margin of production over shipments is being used by makers to build up stocks that have been depleted for some time. The trade expects farm implement manufacturers to take larger quantities before the end of this month.

Structural Material.—Structural awards for the week total more than 8000 tons. Foremost is 4500 tons for a building at Crystal City, Mo., for the Pittsburgh Plate Glass Co. A foundry building at Rockford, Ill., will take 1500 tons and bridges for the Chicago, Burlington & Quincy call for 1200 tons. Earlier reports were to the effect that the Bethlehem Steel Co. would fabricate near Buffalo the 38,500 tons of steel needed for the Mercantile Mart, Chicago. It now develops that the steel is being shipped to Chicago in mill lengths, a move that must be completed before the close of navigation. The work of fabricating this steel will be done in Chicago shops. This contract was taken before final plans had been completed and there may be a sizable overrun in tonnage above the preliminary estimates. Those in close touch with this contract and also the Opera Building in Chicago believe that the extra steel needed will not exceed 5000 tons on each of the two jobs. The Starrett's Building Co. has been awarded the general contract for the 75-story Chicago Tower and Apparel Mart. This structure will make use of air rights, and, according to preliminary estimates, will require 75,000 tons of structural steel and 12,000 tons of reinforcing bars. Several projects in Milwaukee are taking more definite shape. In fact, the outlook in that city is favorable for early action on several sizable structures. Shops to the west of the Mississippi River are in need of orders.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—A railroad operating east from Chicago has closed for 46,000 tons of standard-section rails. About 14,000 tons of accessories will go with this order. The 12,000 to 15,000 tons of track supplies needed by the Chesapeake & Ohio are now said to have been placed in the East. The Pennsylvania is asking for 272,000 tons of rails as a maximum. Last year this railroad ordered 200,000 tons and took an option on 100,000 additional, and exer-

cised the option in part. The Chicago, Milwaukee, St. Paul & Pacific and the Burlington are actively engaged in preparing 1929 rail programs. It is said that the Santa Fe will soon be in the market for about 75,000 tons. Rail mill output remains at 50 per cent of capacity. Production of track accessories has varied little in the last 60 days and is heavier in proportion to rail shipments than is normally expected at this time of the year. Miscellaneous orders for iron tie plates total 300 tons. Inquiries are in the market for 1000 tons.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—Inquiry and awards are active. Two weeks ago this market had all the appearances of having passed into a fall slump. Since that time, however, contracts have been more than heavy enough to support shop operations, and the volume of fresh inquiry is making the near future appear much brighter. Then, too, there is greater activity among architects and engineers, and estimators have more work at hand than in a number of weeks. The total volume of bars sold so far this year, both in Chicago and in the country as a whole, exceeds by a comfortable margin purchases in the first nine months of 1927. But in all directions, as in Chicago, prices are sagging and dealers do not appear to be able to strengthen their position at this time when mills are asking higher prices for fourth quarter contracts. The lightening of bar deliveries by producers is causing some inconvenience at bending shops. New contracts and recent inquiries are given on page 925.

Old Material.—The Chicago scrap market continues to gain strength, and quotations for the most part are higher than a week ago. Users are resisting price advances and therefore have not built stocks. With the high rate of activity, they are forced to

come into the market at frequent intervals. This policy makes for urgent calls for prompt delivery, which is becoming increasingly difficult because many cars that have been used in the scrap trade are being diverted to the coal fields. More than 15,000 tons of heavy melting steel has been purchased by a local steel mill at \$14.50 a gross ton, delivered. Prices paid to railroads are high. The Chicago & North Western received the equivalent of \$14.75 a gross ton, delivered, for heavy melting steel.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.00 to \$14.50
Shoveling steel.....	13.75 to 14.25
Frogs, switches and guards, cut apart, and misc. rails	15.50 to 16.00
Hydraulic compressed sheets	12.50 to 13.00
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels	17.25 to 17.75
Railr'd tires, charg. box size	17.25 to 17.75
Railr'd leaf spring cut apart	17.25 to 17.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	15.75 to 16.25
Coil springs.....	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings.....	13.50 to 14.00
Low phos. punchings.....	15.50 to 16.00
Low phos. plate, 12 in. and under.....	15.50 to 16.00
Blast Furnace Grades:	
Axle turnings.....	11.00 to 11.50
Cast iron borings.....	10.50 to 11.00
Short shoveling turnings..	10.50 to 11.00
Machine shop turnings....	6.75 to 7.25
Rolling Mill Grades:	
Iron rails.....	14.75 to 15.25
Rerolling rails.....	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft..	17.25 to 17.75
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	13.75 to 14.00
Malleable Grades:	
Railroad	15.25 to 15.75
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles.....	25.50 to 26.00
Steel car axles.....	16.25 to 16.75
No. 1 railroad wrought...	12.75 to 13.25
No. 2 railroad wrought...	12.50 to 13.00
No. 1 busheling.....	10.25 to 10.75
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.00 to 13.50
Pipes and flues.....	9.00 to 9.50
Cupola Grades:	
No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast....	13.75 to 14.25
Stove plate	11.50 to 12.00
Grate bars.....	12.25 to 12.75
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—Producers of wire products frankly admit that the fall jobbing trade is a disappointment. Some fair-sized contracts have been placed by distributors, but specifications are not in keeping with what had been expected. Jobbers are finding only a small outlet for nails, this being equally true in the country and in the cities. Nail output is not over 25 per cent of capacity. Woven wire fencing

is moving slowly, not having gained a volume that sellers believed should come with generally good conditions in agricultural districts. A bright spot in this market is the consistent and heavy demand from the manufacturing trade. Contract buyers are well covered for this quarter, and spot buying is of sizable proportions. Prices are steady. Mill stocks are no longer growing and output at 65 per cent of capacity closely represents the actual consumption of wire and wire products.

Cast Iron Pipe.—This market is unusually quiet. Chicago will buy 200 tons of 3-in. to 24-in. fittings. Producers are naming \$36 to \$37, Birmingham, for 6-in. and larger diameter pipe, but tests have not been afforded here.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$43.20; 4-in., \$46.20 to \$47.20; Class A and gas pipe, \$4 extra.

Sheets.—Volume of sales is up and prices are strong. Specifications are liberal. Output is steady at 85 per cent of hot-mill capacity. New purchases now being made are for the most part for delivery in November and December. Releases by road machinery builders are heavier, and agricultural machinery manufacturers are planning larger schedules for early winter manufacture. Movement of sheets out of warehouses is growing slowly. Mill deliveries of all grades range from three to four weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Coke.—Two new batteries, each of 37 coke ovens, have been lighted at the Iroquois furnaces. The daily capacity of these new units is 1100 tons. Shipments of by-product foundry coke are heavy and prices are firm.

Large Airship Hangar to Be Built at Akron

An airship hangar, which, it is stated, will be the largest in the world, will be erected by the Goodyear-Zeppelin Corporation, Akron, Ohio, a subsidiary of the Goodyear Tire & Rubber Co. Two dirigibles for which the Navy Department has awarded the Akron company a contract will be built in this hangar, and it is stated that the plant will also be used for the erection of commercial airships. The hangar will be 1200 ft. long, 360 ft. wide and 200 ft. high, and its cost is estimated at from \$2,000,000 to \$3,000,000. It will be large enough to hold at one time two airships of the size that will be built for the Navy. Equipment will be installed for fabricating the frames for the dirigibles. While the location of the plant has not been definitely announced, a site will probably be selected in Akron.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.15c. to 2.50c.
Reinforc'g bars, rail steel.....	2.00c. to 2.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Plats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List

Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap, or blank..	60
Hot-pressed nuts, hex., tap, or blank..	60
No. 8 black ann'd wire, per 100 lb..	\$3.30
Corn wire nails, base per keg.....	3.10
Cement c'd nails, base per keg.....	3.10

Philadelphia

Pennsylvania Asks for Annual Rail Tonnage—Steel Contracting Fairly Heavy—Basic Iron Inquired For

PHILADELPHIA, Oct. 9.—Bids will be opened Oct. 15 on the rail requirements of the Pennsylvania Railroad for next year, 160,000 tons, with an option on 70 per cent more. In 1927, about 200,000 tons was bought, with an option on 50 per cent additional, but only half of the latter was taken up during the year.

Steel contracting has been larger than in any previous quarter of the year, and most mills report September as among the record months. Sheet mills are well filled and bar mills have in some cases closed rolling schedules to the end of this month. Prices are firm. Last quarter contracts are still being made for bars and plates at a \$2 a ton advance to the consumer, or at 1.90c. to 2c., Pittsburgh, on bars and 2.05c. to 2.15c., Coatesville, on plates.

Pig Iron.—A large consumer of basic, which recently closed on a sizable tonnage for last quarter delivery, is in the market for more iron and will probably buy this week. Sellers are of the opinion that the purchase price will establish an advance in the basic market of about 50c. a ton. Foundry iron is inactive, but prices are firm at \$20, base furnace. Consumers are pressing for prompt shipments on their contracts and interest in first quarter requirements is developing, although no definite inquiries are reported. Low phosphorus demand is fair and the price is unchanged.

Prices per gross ton at Philadelphia:		
East. Pa. No. 2, 1.75 to		
2.25 sil.		\$20.76
East. Pa. No. 2X, 2.25 to		
2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (del'd east. Pa.)	\$19.00 to	19.25
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Stand. low phos. (f.o.b.		
N. Y. State furnace)	22.00 to	23.00
Cop. b'rg low phos. (f.o.b.		
furnace)	23.00 to	23.50
Va. No. 2 plain, 1.75 to		
2.25 sil.		24.54
Va. No. 2X, 2.25 to 2.75 sil.		25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Mills are heavily booked and deliveries have lengthened to two to three weeks on some sizes to five and six weeks on others. Contracts are still being made for this quarter at 1.90c. to 1.95c., Pittsburgh, or 2.22c. to 2.27c., Philadelphia. On small lots 2c., Pittsburgh, or 2.32c., Philadelphia, is usually obtained.

Shapes.—Fabricating shops are well engaged and are quoting on a sizable tonnage of new projects, including 16,000 to 18,000 tons for the Reading Commercial Building at Broad and Callowhill Streets. Low priced contracts on shapes have been fairly well completed, and mills are now asking a minimum of 2.05c., Pencoyd, or 2.11c., Philadelphia, on new business. Contracting has been in fair volume, but not so large as in plates and bars.

Plates.—Contracting has been large, and prices are firm at 2.05c. to 2.15c. per lb., Coatesville, or 2.15c. to 2.25c., delivered Philadelphia. Deliveries on third quarter contracts continue in a few cases. Local shipyards are bidding on a number of shipbuilding contracts, but no awards are reported.

Sheets.—Specifications on mill books are sufficient in some instances to require full operation for eight to nine weeks. Blue annealed sheets are firm at 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., Philadelphia, although some large users claim to be able to buy the continuous mill product at 1.90c. per lb., Pittsburgh. Black sheets are 2.75c., Pittsburgh, or 3.07c., Philadelphia, and galvanized 3.50c., Pittsburgh, or 3.82c., Philadelphia. Contracting for all grades of sheets has been heavy. Most consumers are asking for prompt deliveries.

Warehouse Business.—Effective Oct. 8, jobbers have advanced plates, shapes, bars, hoops and bands \$2 a ton. The quotation on blue annealed sheets has been revised from 3.15c. per lb., base, to 3c., and the quantity differential on plates, shapes, bars, hoops and bands has been applied on orders of one ton or more of a size.

Imports.—In the week ended Oct. 6, 4507 tons of pig iron and 35 tons of ferromanganese arrived at this port from the United Kingdom. Ore imports were 1000 tons of chrome ore from India. Steel arrivals were as follows: From France, 1010 tons of iron skelp, 112 tons of structural shapes, 12 tons of strip steel and 242 tons of steel billets; from Germany, 24 tons of steel scrap and 26 tons of steel sheets; from the United King-

dom, 15 tons of strip steel; from Sweden, 27 tons of steel billets and 31 tons of steel bars, and from Belgium, 12 tons of steel bars and 369 tons of shapes.

Old Material.—A good tonnage of scrap is moving to eastern Pennsylvania consumers, but no new buying of consequence is reported. A broker, as buying agent for a Phoenixville consumer, is paying \$11.50 per ton, delivered, for machine shop turnings. A leading steel company may resort to duplexing operations to save scrap, which the company considers too high at the present level. The list of scrap offered last week by the Pennsylvania Railroad is understood to have brought out a bid of \$17.70 per ton, delivered Vandergrift, Pa., for the heavy melting steel.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$16.00
Scrap T rails	\$15.50 to 16.00
No. 2 heavy melting steel.	13.00 to 13.50
No. 1 railroad wrought.	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 10.50
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50 to 15.00
Shafting	19.00 to 20.00
Steel axles	22.00 to 23.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50 to 17.00
No. 1 cast	17.00 to 17.50
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	15.50 to 16.00

Dover Furnace Remains in Hanna Control

An impression that the Dover furnace, Dover, Ohio, of the Hanna Furnace Co., Cleveland, was under lease to the Shenango Furnace Co., Pittsburgh, is corrected in an announcement just made by the Hanna company, to the effect that the furnace again is in its control. This furnace furnished hot metal to the Penn Mold & Mfg. Co., and when that company was acquired by the Shenango company there were reports that the furnace had been leased as part of the transaction. Early plans called for the operation of the Dover ingot mold plant and a lease of the blast furnace was drawn up, but it was not executed, as the Shenango company soon decided to concentrate the manufacture of molds at its own plant at Filler for Foreign Markets Sharpsville, Pa.

The Hanna Furnace Co. is installing a Steinbart washer at its No. 4 Susquehanna furnace, Buffalo. This is the third installation in this group of furnaces of this type washer, which is built by the Riter-Conley Co., Pittsburgh.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier	2.70c.
Plates, 5/16-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to 5/16-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.00c.
Diam. pat. floor plates—	
1/4-in.	5.30c.
5/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

New York

Pig Iron Market Stronger—Steel Sales Reflect Firmness of Fourth Quarter Prices

NEW YORK, Oct. 8.—The pig iron market has a strong tone. Despite the liberal contracting for this quarter, a good volume of new business, mainly in relatively small lots for early shipment, develops from week to week. Sales in the past seven days totaled nearly 10,000 tons. In some instances slow deliveries against previous orders have resulted in the payment of premiums for prompt material. Barge shipments from Buffalo, however, have increased sharply, and on most current business the ruling price on foundry iron is \$17, base Buffalo. Delivered prices at New Jersey tidewater points have stiffened, evidently reflecting higher barge rates. The present market range is \$20.01 to \$21.25, delivered, for No. 2 plain, which is an advance of 50c. a ton in the minimum price over quotations recently current and an increase of \$1 a ton over the mid-summer low on barge iron. Little interest has yet been shown in first quarter pig iron, and producers, looking for further increases in prices, are not pressing for contracts even at the recently announced advance of 50c. a ton on Buffalo material. Prices on foreign iron are again competitive with those on the domestic product. Dutch No. 1X foundry is still offered at \$21, duty paid, port of entry, although \$21.25 will be asked on first quarter business. An advance of about \$1.25 a ton in ocean freight rates on pig iron from India, effective Jan. 1, will not affect deliveries from that country before March. The largest current inquiry is for 500 tons wanted by the American Locomotive Co. for its Dunkirk, N. Y., plant.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25.....		\$21.91
*Buf. No. 2, del'd east.		
N. J.		20.28
No. 2, del'd east. N. J.		
tidewater	\$20.01 to	21.25
East. Pa. No. 2 fdy., sil.		
1.75 to 2.25.....	20.89 to	22.02
East. Pa. No. 2X fdy., sil.		
2.25 to 2.75.....	21.39 to	22.52
East. Pa. No. 1X fdy., sil.		
2.75 to 3.25.....	21.89 to	23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Considering the heavy specifications received by mills in the latter part of September, the volume of business so far this month, though at a lessened rate, is surprisingly good. This applies particularly to bars, but plates and shapes are also in steady demand. In bars and shapes, mill schedules are well rounded out, with the result that early deliveries are not easy to get unless a buyer happens to catch a current rolling of a size wanted. The price situation for the quarter is now well defined. Large buyers of bars have been covered at 1.90c., Pittsburgh, while the inter-

mediate class of consumers and jobbers are paying 1.95c. The number of contracts at the latter figure is large. Only the smallest buyers are being asked to pay 2c., but single carloads have been sold at this price.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.60c. to 5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger..	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	
	Per Cent
Machine bolts, cut thread:	Off List
¾ x 6 in. and smaller.....	.60
1 x 30 in. and smaller.....	.50 to .50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	.60
¾ x 20 in. and smaller.....	.50 to .50 and 10
Coach screws:	
½ x 6 in. and smaller.....	.60
1 x 16 in. and smaller.....	.50 to .50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discount on Welded Pipe		
Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)		
	Prime	Seconds
Coke, 100 lb. base box....	\$6.45	\$6.20
Charcoal, per Box—		
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)		
IC—20-lb. coating.....	\$10.00 to	\$11.00
IC—30-lb. coating.....	12.00 to	13.00
IC—40-lb. coating.....	13.75 to	14.25

Sheets, Box Annealed—Black, C. R.		
One Pass		
	Per Lb.	
Nos. 18 to 20.....	3.60c. to	3.80c.
No. 22.....	3.75c. to	3.95c.
No. 24.....	3.80c. to	4.00c.
No. 26.....	3.90c. to	4.10c.
No. 28*	4.05c. to	4.25c.
No. 30.....	4.30c. to	4.50c.

Sheets, Galvanized		
	Per Lb.	
No. 14.....	4.15c. to	4.35c.
No. 16.....	4.00c. to	4.20c.
No. 18.....	4.15c. to	4.35c.
No. 20.....	4.30c. to	4.50c.
No. 22.....	4.35c. to	4.55c.
No. 24.....	4.50c. to	4.70c.
No. 26.....	4.75c. to	4.95c.
No. 28*	5.00c. to	5.20c.
No. 30.....	5.40c. to	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

The larger users of plates and shapes have been covered at 2.22½c., New York, for plates and at 2.19½c., New York, for shapes, with \$1 higher for the intermediate class of buyers and \$2 up, or 2.32½c., for small lots. On 150 tons of plates, a buyer had two quotations of 2.22½c. and some at 2.27½c., New York. Structural steel business in New York promises to continue at a brisk rate. The inquiry is out for 26,500 tons for the Kill van Kull bridge connecting Staten Island to New Jersey, and bids will be taken up to Oct. 16 on 6700 tons for another section of the New York subway system. Lettings included 3400 tons for a Y. M. C. A. building and 2800 tons for a Salvation Army building. The Structural Steel Board of Trade of New York reports total bookings by its members in September of 39,000 tons, exclusive of subways and similar work, compared with 43,000 tons in August and 26,000 tons in September, 1927.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.32½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c.

Sheets.—Fourth quarter contracting for sheets has been much more liberal than was expected, in view of the large specifications received by the mills last month. Spot sales and contract coverage have been at 2.75c., Pittsburgh, for black, 3.50c. for galvanized and 2c. for blue annealed in widths under 45 in. and at 2.10c. for widths exceeding 45 in.

Reinforcing Steel.—A considerable tonnage is involved in jobs placed the past week, the largest having been a building for Montgomery Ward & Co. at Albany, N. Y., which took 2000 tons, and foundation work on the Kill van Kull bridge, amounting to 500 tons. The general contract for all four sections of the water tunnel extending under Manhattan from Yonkers to Brooklyn has been let to Patrick McGovern, Inc. The job will take 2850 tons of bars. A terminal warehouse for the Delaware, Lackawanna & Western Railroad Co. at Jersey City will require 2000 tons. Business placed has not yet provided a test for the \$2 advance in prices which was made effective Oct. 1.

Warehouse Business.—Jobbers report increased activity among small consumers, and in a few instances large users are buying material from warehouse, probably because of the extended mill deliveries. Demand for structural steel is good, and orders are increasing in size.

Cast Iron Pipe.—Northern and Southern makers of pressure pipe report a steady flow of small orders ranging from a few tons to a carload, but no sizable business is in the market. Prices continue at \$36 and \$37 base, Birmingham, the quotation of Southern foundries, and \$35.60 to \$36.60 per net ton, delivered New York, quoted by Northern makers.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Connellsville quotations on standard furnace coke range from \$2.85 to \$3 per ton and slight advances on these prices are usually asked when delivery over the remainder of the year is specified. This firmness is not reflected in the foundry coke market, however, and standard foundry continues at \$3.50 to \$3.75 per net ton, Connellsville. Standard brands are unchanged at \$4.85 per net ton, ovens, or \$8.56 per ton, delivered to northern New Jersey, Jersey City and Newark and \$9.44 per ton, to New York and Brooklyn. By-product coke operators are heavily booked with contract tonnage, and deliveries are in some cases delayed. Foundry grade is unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Buying prices show an advance on most grades of scrap. No. 1 heavy melting steel is being bought by brokers at \$15.50 per ton, delivered to a consumer at Coatesville, Pa., and some brokers are paying \$15.75 per ton, delivered Claymont, Del., to fill a \$16 order. The heavy melting steel on the Pennsylvania Railroad list, opened last week, is reported to have brought \$17.85 per gross ton, delivered Steubenville, Ohio, and \$17.70 per ton, Vandergrift, Pa.

Forge fire shows a decided advance in price, with brokers paying \$12 and a few paying \$12.50 per ton, delivered eastern Pennsylvania, to cover a recent \$12.50 per ton order. Yard grade of heavy melting steel is being bought at \$12.50 to \$13 per ton, delivered, shipments going to consumers at Harrisburg, Phoenixville, Pottsville and Conshohocken, Pa.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$11.50 to \$12.00
Heavy melting steel (yard)	8.75 to 9.50
No. 1 hvy. breakable cast.	12.75 to 13.50
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	9.25 to 10.25
Machine shop turnings	7.50 to 8.00
Short shoveling turnings	7.50 to 8.00
Cast borings (blast furn. or steel works)	6.50 to 7.50
Mixed borings and turnings	6.75 to 7.25
Steel car axles	18.00 to 18.50
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.25 to 9.00
No. 1 railroad wrought	11.75 to 12.25
No. 1 yard wrot., long	10.75 to 11.25
Rails for rolling	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
Stove plate (foundry)	9.50 to 10.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	\$16.50 to \$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.)	
cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

quarter. The Cleveland Union Terminals Co. is expected to have an inquiry out shortly for 20,000 tons of structural material for bridge work in connection with new tracks.

Pig Iron.—Foundry and malleable iron has been sold for first quarter shipment from Toledo and Detroit to central and western Ohio and Michigan at the ruling fourth quarter quotations. Cleveland furnaces have not opened their books for that period and are adhering to their quotations of \$17.50 for foundry and malleable iron for outside shipment for the remainder of the year. An \$18 price will probably be named for the first quarter in Indiana, although no sales are reported in that State. Sales by Cleveland interests during the week totaled 32,000 tons, largely in last quarter business. A Muncie, Ind., malleable foundry is inquiring for 6000 tons for the first quarter, a Dayton, Ohio, foundry for 2000 tons of foundry iron and a Hamilton, Ohio, foundry for 1500 tons of foundry iron. The shortage of basic iron continues and the market is firm at \$17. A Canton, Ohio, consumer which inquired for 15,000 tons has taken care of its immediate needs by the purchase of about 4000 tons at \$17, Valley, and another Ohio consumer has bought a small tonnage from a Lake furnace at a price that figures slightly above \$17. An attempt was made to increase the production of basic iron by shipping basic ore to a furnace having only foundry ore, but the plan was abandoned.

Prices per gross ton at Cleveland:

N't'n'n fdy., sil.	1.75 to 2.25	\$18.50
S't'h'n fdy., sil.	1.75 to 2.25	22.25
Malleable		18.50
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace		17.00
Stand. low phos., V'ley fur.	\$26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—Business is coming out in good volume at the new prices, which appear to be firmly maintained at 2.75c., Pittsburgh, for black, 2c. for blue annealed and 3.50c. for galvanized. Little is heard now of an Ohio mill base, which became quite general when the market was weak. Mills are getting a good volume of orders, but consumers see no advantage in placing fourth quarter contracts, and, as a rule, are buying only for their early requirements. Mills are well filled and some are turning away business, particularly in auto body sheets, because they cannot make the desired deliveries. A large tonnage of auto body sheets will be purchased shortly for the new Chevrolet models.

Warehouse Business.—While some price shading is reported on galvanized and black sheets, these are holding fairly well at the recent \$2 a ton advance. Business shows an improvement in that orders, while not more numerous, are for larger tonnages than recently.

Semi-Finished Steel.—Prices appear to have been definitely established at \$33, Pittsburgh and Youngstown, for

Cleveland

Steel Business This Month Exceeding Expectations in View of Recent Heavy Buying

CLEVELAND, Oct. 9.—A good volume of orders for steel bars and structural shapes came out during the week at the new prices. Business exceeded expectations, in view of the heavy volume of specifications on expiring contracts up to the end of September. Plates also are moving fairly well. The fact that no lull developed early this month while shipments on old contracts were being used up indicates that steel is going into production and that consumers are not accumulating stocks. Consumers are accepting the new prices on steel bars, plates and structural material, and most of the buyers have signed fourth quarter contracts.

Most contracts taken by outside mills are at 1.95c., Pittsburgh, for steel bars, plates and shapes. A very few of the larger buyers are allowed the 1.90c. price, but buyers of small miscellaneous lots are paying 2c. The outside mill price on steel bars, when Cleveland is used as a basing point, is 1.95c. to 2.05c., Cleveland. The local steel bar market shows a firmer tone, with 1.90c., Cleveland, the commonly quoted price.

Some of the automobile companies are continuing their efforts to place sheets and strip steel for the first quarter, but mills are declining to go beyond the end of the year. While the automotive industry is not operating at the rate of a month ago, specifications from that industry are good, and it is expected that the output of motor cars during the last quarter will exceed those of the like period in the past few years.

To simplify the price situation and stabilize the market on hot-rolled strip, makers have issued a new card of extras naming one base price for all widths of material and covering strip up to 24-in. While it is expected that this card will be generally adopted, the new extras will not generally apply before January, as most consumers are under contract

for the remainder of the year at the old prices.

Structural inquiry is coming out in fair volume, and fabricators are quoting higher prices than during the last

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'd sheets (No. 10)	3.35c.
No. 9 ann'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

sheet bars, large billets and slabs for the last quarter, and a Cleveland mill announces that it closed during the week with most of its consumers on that basis. This was the open quotation in this market during the last quarter, although some consumers were able to get a \$32 price. Some effort has been made recently to get the price on large billets and slabs up to \$34.

Cold-Finished Steel Bars.—Most consumers have accepted the \$2 a ton advance to 2.25c., Cleveland, for the fourth quarter. There is somewhat of a lull in the demand following heavy specifications against expiring third quarter contracts.

Cold-Rolled Strip.—The demand has increased considerably, due to orders from the automotive industry for material for new models. The market is firm at regular quotations.

Reinforcing Bars.—Business shows a gain, and prices are somewhat better, although irregularities have not disappeared. Awards during the week included two local jobs totaling nearly 1000 tons.

Iron Ore.—The demand for small lots of ore to round out mixtures is more active than usual at this time of the year. One of 40,000 tons and several smaller lots were sold during the week. The market is firm at regular prices.

Fluorspar.—Some of the mills having contracts for minimum and maximum quantities have increased their specifications. There is very little current business, but the market is firm at \$17, mines, for gravel fluor-spar.

Bolts and Nuts.—The demand is slightly less than last month, owing in part at least to some slowing down in orders from the automotive industry. Most buyers have placed fourth quarter contracts at the regular discounts.

Coke.—A moderate amount of activity is reported in foundry coke for prompt shipment. The ruling price for good Connellsville coke is \$4, ovens. Ohio by-product coke is quoted at \$7.75, Painesville.

Hot-Rolled Strip Steel.—A new card of extras on hot-rolled strip was issued by some of the mills Oct. 6, and it is expected that the new extras will be generally adopted. The new card has one base price for all hot-rolled strip from 1½-in. to 24-in. wide, extras being provided to cover all widths and gages. An attempt is being made in this price card to simplify the price structure on hot-rolled strip, to bring about a standard basis of quoting, and to stabilize prices. The market in these respects has been in a demoralized situation for some time. The new base prices are 2c., Pittsburgh, and 2.10c., Chicago, but for the present, at least, mills will quote a \$2 a ton lower price or a 1.90c., Pittsburgh base, except possibly for small lots. Under the new card there is no gage or width of material that carries the base price, the smallest differential being 5c.

per 100 lb. on the heaviest gage wide material. Prices under the new card on most sizes will be higher than present quotations. The most important changes are made on wide sizes. These formerly carried large extras which were entirely out of line, considering the present day costs of rolling the wide material compared with narrow strip. For example, No. 16 gage strip, 15-in. wide, under the old card carried a \$1.15 differential, while under the new card the differential is only 30c. Carbon, quantity and cutting extras are unchanged.

Old Material.—Prices continue to move upward and the market is firm at the new levels. With an active demand for scrap for shipment to the Youngstown and Pittsburgh districts, most of the steel making grades advanced 50c. a ton during the week. Dealers are paying \$16 for No. 1 heavy melting steel and for compressed sheet steel for Youngstown shipment and \$17 for the former for Weirton. No. 1 heavy melting steel has been sold for delivery to a local mill at \$14.25 and the supply is not plentiful at that price. One Cleveland mill would buy scrap at present, but is unwilling to pay the dealers' ask-

ing price of \$15 to \$15.50 for heavy melting steel. It is stated that the only Detroit scrap coming to Cleveland by water at present is some purchased a few months ago, when prices were considerably lower.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.00 to	\$14.50
No. 2 heavy melting steel.	13.25 to	13.50
Compressed sheet steel....	13.50 to	14.00
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	12.25 to	12.75
Machine shop turnings....	9.00 to	9.50
No. 1 railroad wrought....	12.50 to	12.75
No. 2 railroad wrought....	14.00 to	14.50
No. 1 busheling.....	11.50 to	12.00
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops...	16.00 to	16.50
Low phos., billet, bloom and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	10.25 to	10.50
Mixed bor'gs and short turn'gs	10.25 to	10.50
No. 2 busheling.....	10.25 to	10.50
Cupola Grades		
No. 1 cast.....	16.50 to	17.00
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable.....	16.00 to	16.50
Rails for rolling.....	16.25 to	16.50

Reinforcing Steel

Awards of 9400 Tons—2000 Tons for Mail Order Warehouse

AWARDS of reinforcing bars reported to THE IRON AGE in the last week amounted to more than 9400 tons and included 2000 tons for a mail order company warehouse at Albany, N. Y., and 1000 tons for miscellaneous work in Chicago. New projects totaled only 3400 tons, 2000 tons of which will be required for a railroad terminal warehouse at Jersey City. Awards follow:

NEW YORK, 500 tons, foundation work for Kill Van Kull bridge; from Converse Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

BROOKLYN, 300 tons, soap factory for I. Rokeach & Sons, to Jones & Laughlin Steel Corporation.

NEW YORK, 100 tons, Brearley School, Inc., in East Eighty-third Street, to Jones & Laughlin Steel Corporation.

ALBANY, N. Y., 2000 tons, building for Montgomery Ward & Co., to Kalman Steel Co.

AUBURN, N. Y., 300 tons, addition to Auburn Prison, to a Buffalo maker.

LANSING, MICH., 500 tons, Logan Street viaduct, to Capitol Steel Corporation.

AKRON, OHIO, 150 tons, building for Good-year Tire & Rubber Co., to Pattison-Leitch Co.

CLEVELAND, 500 tons, warehouse for Northern Ohio Products Co., to Bourne-Fuller Co.

CLEVELAND, 450 tons, W. S. Tyler Co., to Bourne-Fuller Co.

ALCORN, MISS., 100 tons, administration building and girls' dormitory for Agricultural and Mechanical College, to Laclede Steel Co.

CHICAGO, 100 tons of rail steel bars, apartment building at 2816 East Seventy-sixth Street, to Barton Spiderweb Co., Inc.

CHICAGO, 1000 tons, miscellaneous work placed by William G. McNulty & Brothers, contractors, to unnamed bidders.

CHICAGO, 250 tons of rail steel bars, apartment hotel, to Inland Steel Co.

CHICAGO, 100 tons, placed by Gamm Construction Co. with Concrete Engineering Co.

STATE OF ILLINOIS, 150 tons of rail steel bars, road work, to Calumet Steel Co.

FORT LEWIS, WASH., 550 tons, Government buildings, to Pacific Coast Co.

LOS ANGELES, 225 tons, apartment building at Second and Alexandria Streets, to unnamed interest.

SAN FRANCISCO, 100 tons, warehouse, Third and Brannan Streets, to Gunn, Carle Co.

SAN FRANCISCO, 900 tons, office building, 450 Sutter Street, to Gunn, Carle Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

EASTHAMPTON, MASS., 275 tons, State bridge.

CAMBRIDGE, MASS., 100 tons, engine testing unit for Massachusetts Institute of Technology.

NEW YORK, 2850 tons, tunnel for New York Board of Water Supply; Patrick McGovern, Inc., general contractor.

JERSEY CITY, 2000 tons, terminal warehouse for Delaware, Lackawanna & Western Railroad.

CLEVELAND, 150 tons, addition to Cleveland Clinic.

MINNEAPOLIS, 500 tons, warehouse; Wells Brothers Construction Co., Chicago, general contractors.

SACRAMENTO, CAL., 350 tons, paving in Ventura County; bids Oct. 24.

SEATTLE, 110 tons, hospital, Summit Street; bids being taken.

SEATTLE, 100 tons, Ballard Church; bids being taken.

Pacific Coast

Oil Tanks Awarded Take 1600 Tons of Plates—2100 Tons in Structural Lettings

SAN FRANCISCO, Oct. 6 (*By Air Mail*).—Important developments in the iron and steel markets on the Pacific Coast this week were lacking. Included among the inquiries were 1266 tons of cast iron pipe for Los Angeles and 1284 tons of cast iron or riveted steel pipe for Seattle.

Pig Iron.—Sales and inquiries for foundry pig iron involved relatively unimportant tonnages for prompt shipment. A slight improvement in the rate of operations among jobbing foundries is reported, but most consumers have sufficient stocks on hand to take care of present requirements. Prices remain unchanged.

Prices per gross ton at San Francisco:

*Utah basic.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Included among the awards of reinforcing steel bars this week were 900 tons for an office building and 100 tons for a warehouse in San Francisco, both taken by Gunn, Carle & Co. An unnamed interest was awarded 225 tons for an apartment building on Alexandria Street, Los Angeles. New inquiries include 350 tons for paving work in Ventura County, Cal., and 110 tons for a hospital in Seattle. Little, if any, improvement is noted in out-of-stock prices in the Los Angeles and San Francisco districts, 1.80c., base, continuing general.

Plates.—Featuring the plate market this week was the award made by the General Petroleum Corporation, Los Angeles, to the Western Pipe & Steel Co. for four 134,000-bbl. tanks involving 1600 tons of plates. This company originally put out an inquiry for 14 82,000-bbl. or nine 134,000-bbl. tanks, calling for 2000 tons of material, will be awarded shortly. No action has yet been taken by the Shell Oil Co. on its inquiry for 10 80,000-bbl. tanks, requiring 3100 tons, for its Domingues refinery. Seattle will open bids on Oct. 26 for 231 tons of 24-in. riveted pipe, alternate bids to be taken on cast iron pipe. Bids will be opened next week on 1200 tons for a pipe line at Hood River, Ore.

Warehouse Prices, f.o.b. San Francisco

Base per Lb.	
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.....	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker.....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c'd nails, 100-lb. keg.....	3.40

The East Bay Municipal Utility District, Oakland, Cal., has purchased the property and distributing main system of the East Bay Water Co. and as a result will not go ahead with its own system of mains, bids on which were opened Aug. 17 and which called for 7200 tons of 24 to 44-in. pipe. Prices range from 2.20c. to 2.25c., c.i.f.

Shapes.—Several structural projects were placed during the week, the tonnage being in excess of 2100 tons. The McClintic-Marshall Co. took 650 tons for an office building at Tucson, Ariz., and the Llewellyn Iron Works secured 275 tons for a store at Long Beach, Cal., 200 tons for an office building in Los Angeles and 130 tons for an office building in Glendale, Cal. The Sand Point, Wash., hangar, calling for 400 tons, was placed with the Western Construction Co. The larg-

est new inquiry involves 300 tons for an apartment in Los Angeles. Plain material remains firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe continues light; only three projects are up for figures. The United States Cast Iron Pipe & Foundry Co. took 142 tons of 4 to 14-in. Class B pipe for Oxnard, Cal. S. A. Moceris was awarded the Sixth Avenue, N. W., improvement project at Seattle, calling for 282 tons of 6 to 12-in. Classes B and C pipe. Bids were opened this week on 1266 tons of 8-in. Class 350 pipe for Los Angeles and bids will be opened on Oct. 26 for 1284 tons of 24-in. Class B pipe for Seattle, alternate bids also to be taken on riveted steel pipe. Owing to the fact that the East Bay Municipal Utility District, Oakland, has purchased the property of the East Bay Water Co., the former's inquiry for 22,325 tons of 24 to 44-in. Class C pipe has been withdrawn.

Steel Pipe.—Oil country goods continue to move well in the southern part of the State. Oil well casing particularly is in demand. No large pipe line inquiries are up for figures.

St. Louis

Pig Iron Firm on Moderate Buying—September Steel Sales Very Heavy—Further Advances in Scrap

ST. LOUIS, Oct. 9.—Although sales of pig iron fell off during the week, the total having been about 5000 tons, the melt is steadily increasing. Shipments of the local maker are heavier. There is a firm tone to the market. The Granite City maker sold 4200 tons, including 1500 tons of malleable, to an Illinois jobbing foundry for shipment over the remainder of the year; 400 tons to an Iowa implement maker and 600 tons to a northern Illinois specialty maker, and the remainder in lots of a carload up to 200 tons. A leading Southern interest sold 400 tons. The stove interests report a gain in business, and there also is a heavy increase in the melt of agricultural factors, as well as among steel mills in lines other than those catering to the railroads. Specifications against contracts are heavy and urgent, and shipments of the local maker for September exceeded those for the same month in 1927 and for August.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis..	20.16
Southern No. 2 fdy., deliv'd.....	20.67
Northern malleable, deliv'd.....	20.16
Northern basic, deliv'd.....	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—An advance of 25c. a ton on domestic coke for shipments outside of St. Louis has been made by local by-product interests. Buying of foundry coke is fair.

Finished Iron and Steel.—The Granite City Steel Co. booked a greater tonnage in actual specifications dur-

ing last month than in any September since the war. The last half of the month was especially active and the volume of business so great that the company has found it necessary to extend deliveries on new business. All units are now running full, and from present indications should continue so for the greater part of the fourth quarter. The demand is well diversified, not only as to commodities, but with respect to industries. Prices in St. Louis, the Middle West and in the Southwest appear firm. The Missouri Pacific Railroad is inquiring for 30,000 tons of rails for 1929 requirements. Warehouse business in September was about 10 per cent less than in August, although about the same as in September, 1927. The only award for structural steel for several weeks,

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, $\frac{7}{8}$ -in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

1800 tons for a dairy exhibition building, went to the Stupp Brothers Bridge & Iron Co.

Old Material.—Dealers continue to advance prices of old material in an effort to attract shipments to this market so that they may fill outstanding contracts and prepare for buying by consumers, who continue to hold out against higher prices, but are expected to buy soon. Stocks in the hands of dealers here are light, and they must pay higher prices to get shipments from Texas and Louisiana dealers, who have been finding a more profitable market in Europe, while Oklahoma and Kansas dealers have been getting more for their old material in Colorado. Railroad lists are bringing high prices. Heavy melting steel, heavy shoveling steel, bundled sheets, No. 2 railroad wrought, machine shop turnings, steel rails less than 3 ft., cast iron car wheels and No. 1 railroad cast are 50c. a ton higher, while miscellaneous standard section rails, rails for rolling, No. 1 railroad wrought, and stove plate are 25c. higher. Railroad lists include:

Baltimore & Ohio, 9795 tons; Southern Pacific, 6500 tons; Wabash, 2740 tons; Missouri-Kansas-Texas, 1775 tons; Louisville & Nashville, 125 tons; Ann Arbor, 166 carloads; Frisco, 18 carloads; Chicago & Eastern Illinois, 13 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$12.50 to \$13.00
No. 1 locomotive tires.....	12.50 to 13.00
Heavy shoveling steel.....	12.50 to 13.00
Miscel. stand.-sec. rails including frogs, sw'ches and guards, cut apart..	14.00 to 14.50
Railroad springs.....	15.00 to 15.50
Bundled sheets.....	9.50 to 10.00
No. 2 railroad wrought...	12.50 to 13.00
No. 1 busheling.....	9.00 to 9.50
Cast iron borings.....	8.25 to 8.75
Iron rails.....	13.00 to 13.50
Rails for rolling.....	14.75 to 15.25
Machine shop turnings....	9.00 to 9.50
Steel car axles.....	18.25 to 18.75
Iron car axles.....	26.50 to 27.00
Wrot. iron bars and trans.	19.25 to 19.75
No. 1 railroad wrought...	11.00 to 11.50
Steel rails, less than 3 ft..	15.50 to 16.00
Steel angle bars.....	13.50 to 14.00
Cast iron carwheels.....	13.50 to 14.00
No. 1 machinery cast.....	14.50 to 15.00
Railroad malleable.....	12.50 to 13.00
No. 1 railroad cast.....	14.00 to 14.50
Stove plate.....	12.00 to 12.50
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Boston

Pig Iron Sales Drop—Coke and Scrap Markets Active—Structural Steel Work Lighter

BOSTON, Oct. 9.—Pig iron sales in the past week were not quite 4000 tons and included close to 1000 tons of Indian iron at \$21.25 to \$21.75 a ton, on dock here, duty paid, for the equivalent of No. 2 grade. Although sales have dropped, foundries are specifying freely against old contracts. Prices remain very firm. No new open inquiries of importance are reported. Current buying is very largely for mixture purposes. The New England melt of iron is increasing, although slowly, and furnace representatives are of the opinion there will be a buying movement before the close of October for filling in last quarter and for the first quarter.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91
*Buffalo, sil. 2.25 to 2.75..	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25..	20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	25.71
Va., sil. 2.25 to 2.75.....	26.21
Ala., sil. 1.75 to 2.25.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Cast Iron Pipe.—Massachusetts has awarded 316 tons of 6, 8 and 10-in. pipe for a Waltham, Mass., hospital job to R. D. Wood & Co., Portland, Me., has closed bids on 800 tons of 6 to 12-in. pipe for delivery after Jan. 1, but has made no award. Pittsfield, Mass., has awarded a contract for

laying 600 ft. of 48-in. pipe to the William D. Burns Construction Co. Warwick, R. I., has completed plans for a \$1,250,000 water system and will shortly be in the market for a large tonnage of pipe. Private pipe business is fair. Foundries are well filled up on 4-in. pipe. The market for 6 to 12-in. stock is at least \$1 a ton lower than a fortnight ago, and concessions are still named on large di-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
	Per Cent Off List
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot-pressed nuts	.50 and 5
Cold-punched nuts.....	.50 and 5
Stove bolts.....	.70 and 10

*Including quantity differentials.

mensions. Prices are: 4-in., \$45.10 to \$46.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$40.10 to \$41.10. The usual \$5 differential is asked on Class A and gas pipe.

Shapes and Plates.—The past fortnight was the duller experienced by fabricators this year. Small shops are taking business at low prices. Plate consumers are buying in small amounts. Governor Ralph O. Brewster of Maine intimates that the State will spend \$10,000,000 on bridges during the next year.

Coke.—New England ovens are doing a record-breaking business in domestic coke. One company, in retail sales alone, disposed of about 500 tons a day during the past week. The New England Coal & Coke Co. has lighted another battery of ovens, making a total of 350 now in operation, the full capacity of the plant. Foundry coke users are specifying against contracts freely. The price remains at \$11 a ton, delivered within a \$3.10 freight rate zone. In connection with the sale of \$5,500,000 bonds, the Connecticut Coke Co., New Haven, Conn., announced that part of its product will be sold to industrial consumers. The first cargo of coal ever shipped from Soviet Russia to this country, about 5500 tons, is on its way to Boston. It comes from the Don Basin.

Old Material.—The movement of scrap out of New England continues active. The market for forge flashings, rails for rerolling and steel mill borings is a shade firmer, but no change in prices of other kinds of scrap is noted. Stove plate is in better demand than in months. For Massachusetts consumers, the market is \$10.50 a ton, delivered, and for Connecticut consumption, \$12.50. New England foundries are taking larger quantities of No. 1 machinery cast and textile cast, and stocks in yards have been materially reduced this month. A steamer will load 5000 tons of scrap the last of this month for Danzig. Exporters are buying against this shipment, paying around \$10 a ton for heavy steel and automobile scrap, f.o.b. Boston dock.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$10.75 to \$11.00
Scrap T rails	10.00 to 10.50
Scrap girder rails.....	9.50 to 10.00
No. 1 railroad wrought...	10.50 to 11.00
No. 1 yard wrought.....	8.00 to 8.50
Machine shop turnings....	6.25 to 6.75
Cast iron borings (steel works and rolling mill)..	6.50 to 7.00
Bundled skeleton, long....	8.50 to 9.00
Forge flashings.....	9.00 to 9.50
Blast furnace borings and turnings	6.25 to 6.75
Forge scrap	6.50 to 7.00
Shafting	14.50 to 15.00
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling.....	10.50 to 11.00
Cast iron borings, chemical	9.50 to 10.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast.....	\$14.00 to \$14.50
No. 1 machinery cast.....	15.50 to 16.00
No. 2 machinery cast.....	13.50 to 14.00
Stove plate	10.50 to 12.50
Railroad malleable	15.00 to 15.50

Birmingham

Steel Orders Large But Pig Iron Buying Is Light—Heavy Melting Scrap Up \$1.50 a Ton

BIRMINGHAM, Oct. 9.—Pig iron inquiries are light and involve small tonnages. A large portion of the requirements for the fourth quarter is already on the books. The price of No. 2 foundry iron is firm at \$16.25. The new No. 6 Fairfield furnace of the Tennessee company is now producing basic iron, having been placed in operation on Sept. 27. The No. 5 Ensley furnace of the Tennessee company was blown out on Oct. 2. Otherwise, operations are unchanged. Of the 19 furnaces in blast, 11 are on foundry, six on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—Orders have been running heavy in the past few weeks. Bookings are better than at any time in the past year, and plant operations are correspondingly high. Inquiries continue good in all lines and prices show considerable firmness. Structural steel fabricating business continues to improve. The Ingalls Iron Works Co. has booked an order for 1800 tons for the Rhodes-Haverty Building, Atlanta. The Virginia Bridge & Iron Co. has an order for 3500 tons for the Sterick Building, Memphis, of which 2000 tons will be fabricated at Birmingham and the remainder at Memphis. Several small orders for reinforcing bars have been booked. Sixteen open-hearth furnaces have been active during the past four weeks. On Oct. 6, the Tennessee company shut down one at Ensley and placed one more in operation at Fairfield keeping the total at 12. The Gulf States Steel Co. is working four at Alabama City.

Cast Iron Pipe.—Inquiries are light. The total of new tonnage is not sufficient to change market conditions or plant operations. The United States Cast Iron Pipe Co. has booked 750 tons of 42-in. pipe for Milwaukee. Bidding is under way on 1500 tons of 24 to 30-in. pipe for Honolulu. The Dallas, Tex., tonnage, on which bids were opened three weeks ago, has not been placed. Makers predict quiet conditions for the next two or three weeks. Shipments are at about the same level as for the past month. Quotations remain at \$36 to \$37.

Coke.—The foundry coke market has been quiet during the past two weeks because all important requirements are covered for the last quarter. Shipments are moving in fair volume. No change has been made in the base quotations of \$5 for both spot and foundry.

Old Material.—Demand is growing stronger and sales show a good increase. Heavy melting steel has ad-

vanced \$1.50 a ton and scrap steel rails 50c. No. 1 cast is stronger. Other prices are the same. Shipments are heavy, and dealers' stocks are being reduced. Shortages are reported in a few lines.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	19.00 to 20.00
Iron axles.....	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Detroit

Automobile Production Is Still at a Peak

DETROIT, Oct. 9.—Employment in the Detroit district has indicated a slight slackening of industrial activity in the last two weeks. The labor barometer of the Employers' Association for the past week showed a total of 294,829, a decrease of 2744 from the week previous. The decrease during the week ended Sept. 29 was 3186. In spite of these decreases, however, the totals for last week and the previous week were more than 100,000 ahead of the same periods last year. Employment in the 51 major plants in Toledo for the week ended Sept. 29 totaled 35,869, an increase of 741 over the previous week. The figure of a year ago was 22,617.

Since the introduction on July 28 of its new model, the Buick Motor Car Co. has shipped 64,628. A new weekly production record has been set up with a total of 7600 units. On Friday, Sept. 28, a single hour's production was 150 cars, and on the same day a record was made in the production of 1600 engines. The September shipments of this company totaled 26,800, against 23,871 in the same month a year ago. This shows a slight decrease from the 27,476 shipped in August. Production now is running at about 1370 cars a day.

Shipments of Cadillac and LaSalle cars in September were approximately 5000 units, and it is reported that October and November schedules have been raised to full plant capacity.

The Chevrolet Motor Co. produced 105,616 cars and trucks during September, a 70 per cent increase over the output of September, 1927. The first nine months' output by this company totaled 1,100,723, an increase of 447,969 units over the same period in 1927.

B. E. Hutchinson, vice-president and treasurer of the Chrysler Corporation,

states that production of Plymouth cars will be doubled by Feb. 1, when 1000 units a day of that line will be turned out.

It is estimated that Ford Motor Car Co. shipped 100,000 cars and trucks in September, with daily production running approximately 5000 units a day, exclusive of the Ford Motor Co. of Canada, which is turning out 500 units a day. Thus far, 400,000 units of the new model A have been shipped.

The Graham-Paige Motors Corporation showed a total production for the first nine months of 65,486 units. With a quarterly production of 26,742 units, the third quarter output was more than double that of the first quarter.

The Hupp Motor Car Corporation is still breaking records in monthly production. September showed a total of 6536 cars. In the first nine months of the year 56,992 units were shipped.

A new record was set last month by the Olds Motor Works, with a total of 9301 units, an increase over the August figure, 7892 units, also better than the 7127 units of September a year ago. About 9000 cars are scheduled for October.

Reo production for September totals 3711 units, a decrease from 4823 turned out in August.

Third quarter sales for Willys-Overland were about 75,000 cars, against 39,000 for the same period of 1927.

Blaw - Knox President Denies Merger Reports

Albert C. Lehman, president Blaw-Knox Co., Pittsburgh, has issued a statement denying reports that the company is to be merged with the Universal Pipe & Radiator Co., the Pressed Steel Car Co., and, eventually, with the Baldwin Locomotive Works. Recently I. F. Lehman and George P. Rhodes, directors of the Blaw-Knox Co., were elected directors of the Pressed Steel Car Co., and more recently James D. Rhodes, also a director of the Blaw-Knox Co., was elected president of the Universal Pipe & Radiator Co., while George P. Rhodes and Albert C. Lehman were chosen directors of that company. The merger reports are believed to have grown out of these changes.

The American Telephone & Telegraph Co., New York, in the construction of new long distance telephone facilities during 1928, to cost \$11,042,000, will use 22,282,000 lb. of copper wire in cables, 21,994,000 lb. of copper wire in open wire lines and 39,283,000 lb. of lead and 413,000 lb. of antimony in cable sheaths. The program includes extensions and additions to lines in all parts of the country and to the three transcontinental routes.

Canada

Improvement in Iron and Steel Demand and Production Continues in the Dominion

TORONTO, ONT., Oct. 9.—Practically all manufacturers allied with the iron and steel industry of Canada report general improvement in business. The record crop yield of the Canadian West has had a tendency to bring a stronger demand for agricultural implements. The automotive industry of Canada reports better production than at any time in its history. Mining operations in Ontario, Quebec and Manitoba have helped to stimulate the growing demand for iron and steel. Railroads have been responsible for much of the improvement in mill operations this year.

Robert Dodd, president Lake Superior Corporation, announced that the Algoma Steel Corporation, Sault Ste. Marie, Ont., a subsidiary, will show a profit of \$329,000 on operation account for the quarter ended Sept. 30, against a deficit of \$141,491 in the same period last year.

Pig Iron.—With practically all contract buyers covered to the end of the year, interest in the Canadian pig iron markets centers in the requirements of spot buyers. Both in number and in tonnage, spot sales are increasing. Total weekly sales are between 1500 and 2000 tons. Canadian producers still report strong competition from United States interests in our markets, especially in the Montreal district. While the Port Henry, N. Y., furnace is not shipping as much iron into this district as formerly, imports from that district are keenly felt in the Montreal territory. Agricultural implement makers continue to draw practically all their pig iron from the United States, and, with the increase in their needs, imports are greater than a year ago. Imports of pig iron from Great Britain and the Continent have dropped off and are having little effect on the Canadian market. The price situation is unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—For a Bell Telephone Exchange at Monkland and Hampton Streets, Montreal, 500 tons of structural and 150 tons of reinforcing bars will be required. Thomson & Johnson, architects, Belleville, Ont., are receiving bids for the erection of a hotel at Kingston, Ont., for which about 500 tons of structural steel will be needed; other pending jobs include 400 tons for an addition to the Public Library on College Street, Toronto; 200 tons for a school building on Windermere Avenue, Wal-

kerville, Ont., and 150 tons for addition to the plant of the Wallace Barnes Co., Hamilton, Ont.

Old Material.—With consuming plants running almost at capacity, buyers are entering the market at frequent intervals and their spot orders are invariably for larger tonnages than was the case a month or six weeks ago. With the exception of heavy melting steel, for which dealers are now offering \$9.50 per gross ton at Toronto, and \$2 per ton higher for delivery at Hamilton, Ont., there has been no change in prices. Dealers

believe that higher prices are warranted, but consumers are resisting advances. Export demand is drawing heavily on supplies in the Montreal district.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	15.00	16.00
Stove plate.....	9.00	13.00
Standard carwheels.....	13.00	16.00
Malleable	13.00	13.00
Per Net Ton		
No. 1 machinery cast....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

Buffalo

Pig Iron Firm but Demand Is Lighter—Steel Plants Busy—Scrap Market Strong

BUFFALO, Oct. 9.—The pig iron market is quiet but firm. No large tonnages were bought during the week, but there was steady booking of lots up to 100 tons at current prices. Some sellers are predicting a further advance for first quarter. The largest inquiry is for 500 tons of malleable from a central New York melter. Shipments have been heavy. In the week ended Oct. 6 barge canal pig iron shipments were 3625 tons.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00 to \$18.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50 to 19.50
Malleable, sil. up to 2.25..	17.50 to 18.50
Basic	17.00 to 17.50
Lake Superior charcoal...	27.28

Finished Iron and Steel.—Specifications for all kinds of material have been good, and mill operation is about 90 per cent. A brisk demand for sheets and strips is reported. On strip, quotations are 2.75c. to 2.85c. The local bar and shape market is firm at 2.05c. to 2.10c. A 20-story office building at Niagara Falls, N. Y., will require 1600 to 1800 tons of structural steel, and a school at Newark, N. Y., will require 700 tons. An addition to Auburn Prison, Auburn, N. Y., took 300 tons of reinforcing bars.

Old Material.—The market continues firm and dealers seeking to fill recent orders are having difficulty. Heavy melting steel on a railroad list brought \$16.25, Buffalo. To cover a

recent sizable sale of No. 2 heavy melting steel, dealers are offering \$13.50. They are getting very little material to cover a sale to the same mill of No. 1 steel at \$15.50. It is said that a purchaser of No. 1 steel would now have to pay \$16.50 to \$17. Dealers have offered \$15.25, \$15.50 and \$15.75 for No. 1 steel to cover sales made at \$15.50 to \$16. Some No. 2 steel is going out of this district at \$15.50, delivered Weirton, W. Va., and these shipments are limiting the amount of No. 2 to be picked up in Syracuse, Rochester and Utica districts for local consumption. Some sales of No. 1 machinery cast have been made at \$16 to \$16.25 and grate bars have been sold at \$12.75 to \$13.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$15.50 to \$16.25
No. 2 heavy melting steel.....	14.00
Scrap rails	14.50 to 15.00
Hydraulic comp. sheets....	14.00
Hand bundled sheets.....	11.00 to 11.50
Drop forge flashings.....	13.50 to 14.00
No. 1 busheling	14.50 to 15.25
Hvy. steel axle turnings..	13.00 to 13.50
Machine shop turnings....	7.25 to 7.75
No. 1 railroad wrought....	13.50 to 14.00
Hvy. steel axle turnings..	13.00 to 13.50
Acid Open-Hearth Grades	
Knuckles and couplers....	16.50 to 17.00
Coil and leaf springs.....	16.50 to 17.00
Rolled steel wheels.....	16.50 to 17.00
Low phos. billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Short shov. steel turnings..	12.00 to 12.50
Blast Furnace Grades	
Short shov. steel turnings..	12.00 to 12.50
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings.....	10.00 to 10.50
No. 2 busheling	11.00 to 11.50
Rolling Mill Grades	
Steel car axles.....	18.25 to 18.75
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast.....	15.75 to 16.25
Stove plate	14.00 to 14.50
Locomotive grate bars....	12.25 to 12.75
Steel rails, 3 ft. and under.	17.00 to 17.50
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Cincinnati

Malleable Pig Iron Sales of 6000 Tons—Sheet Mills Busy— Scrap Advances of 25c. to \$1.25 a Ton

CINCINNATI, Oct. 9.—Purchases of malleable iron by district consumers enlivened the pig iron market somewhat the past week. Individual sales of 2500 tons and 2000 tons were reported, while orders for smaller lots brought the total to about 6000 tons. Inquiries, however, are inconsequential, with the exception of 500 tons of foundry iron for an Indiana melter. Prices are being well maintained. Northern Ohio sellers are holding to \$17.50, base furnace, as a minimum quotation and Southern producers are adhering to \$16.25, base Birmingham. Jackson County silvery iron is moving at a fairly good rate.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$18.89 to \$19.89
So. Ohio malleable	20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25 ..	19.94
Ala. fdy., sil. 2.25 to 2.75 ..	20.44
Tenn. fdy., sil. 1.75 to 2.25 ..	19.94
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—Consumers of by-product foundry coke are specifying liberally on current contracts, with the result that shipments this month are running ahead of those in September. A pickup in domestic grades also is noted. A Southern by-product coke maker still is soliciting business in this district at delivered prices which figure back exceptionally low at the ovens. Otherwise prices show stability.

Finished Material.—Specifications for bars, shapes and plates have continued heavy, and prices are steady at 1.95c. to 2c., base Pittsburgh, although it is possible to buy a large tonnage at 1.90c. Structural fabricating shops are busier, but the volume of work ahead is small. The wire goods market is rather quiet, with common wire nails selling at \$2.69 per keg, delivered Cincinnati. This is equivalent to \$2.55 at Ironton, plus a barge rate at 14c. to this city. District sheet mills have had liberal specifications and orders are sustaining production at 100 per cent of capacity.

Backlogs are fairly substantial and insure a continuation of the present high rate of output during the remainder of October. There has been no change in sheet prices. Makers of rail steel reinforcing bars are quoting 1.90c., base Pittsburgh, and claim that they are booking small tonnages at that figure.

Old Material.—Heavy melting steel has advanced \$1 a ton and practically all other items have gone up from 25c. to \$1.25. These sharp increases are accounted for by the fact that dealers, realizing that there is a shortage of steel plant grades, are trying to buy all of the material avail-

able, whereas the holders of scrap are reluctant to sell on the present rising market. Railroad lists closing this week include the Norfolk & Western, 6500 tons; Southern, 7000 tons, and Louisville & Nashville, 12,000 tons. Steel rails make up about 10,000 tons of the total.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.50 to \$14.00
Scrap rails for melting....	13.50 to 14.00
Loose sheet clippings....	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings.....	9.25 to 9.75
Machine shop turnings....	8.75 to 9.25
No. 1 busheling	10.75 to 11.25
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.75 to 14.25
No. 1 locomotive tires....	13.50 to 14.00
No. 2 railroad wrought....	13.50 to 14.00
Short rails.....	13.25 to 13.75
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast.....	17.50 to 18.00
No. 1 railroad cast.....	14.25 to 14.75
Burnt cast.....	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.25 to 10.75
Railroad malleable	13.50 to 14.00
Agricultural malleable....	12.50 to 13.00

Youngstown

Valley Mills Operating at Nearly 90 Per Cent—Producers Have Large Unfilled Tonnages

YOUNGSTOWN, Oct. 9.—Production schedules of iron and steel companies in the Mahoning Valley are nearer a 90 per cent rate this week, as specifications for flat-rolled steels are released with liberality. For example, 49 of the Valley's 53 independent open-hearth furnaces are active, the only idle units being those which are down for relining or temporary repairs. The Republic Iron & Steel Co. is operating all 13 of its open-hearths at Youngstown and eight at Warren; the Youngstown Sheet & Tube Co. has 22 of its 24 furnaces in the Youngstown district in use; the Sharon Steel Hoop Co. is operating all six of its furnaces at Lowellville, Ohio. Of 127 Valley sheet mills, 113 are active, as are 14 of 20 tube mills. Seamless pipe mills are operating two turns per day.

Unfilled tonnage with the independents is sufficient to maintain a high average operating rate through October and into November.

Automobile interests are the heaviest buyers. A number of companies developing new models are seeking prices on sheets and strips for first quarter of 1929.

Steel works interests have withdrawn from the merchant pig iron market because of the heavy requirements for hot metal of their own steel-making plants.

Shipments of the Valley independents for the third quarter were considerably ahead of those for either of the two preceding quarterly periods. Earnings for the period are not likely to be as large as the increase in shipments would indicate. Better results in this respect may be expected from the fourth quarter.

The Youngstown Sheet & Tube Co. expects to operate by Dec. 1 its new

by-product coke plant at the South Chicago blast furnaces. Production of coke at this point will materially cut costs of producing pig iron, it is expected.

It is understood that, with the exception of the Ford Motor Co., all of the principal automobile builders have accepted the new fourth quarter sheet prices and the new discount terms.

Little new buying of scrap has developed, as important consumers still are drawing against purchases made some time ago. Dealers, in covering short sales, are obliged to pay \$16.50 to \$17 for heavy melting steel; \$16 to \$16.50 for compressed sheets and \$12 to \$12.50 for machine shop turnings.

The year's operation of simplified recommendations concerning sheet steel, roofing ternes, eaves trough and conductor pipe and files and rasps will be reviewed at the forthcoming annual convention of the National Hardware Association. The Division of Simplified Practice has sent out questionnaires to those interested, seeking information as to the percentage of production in 1927 represented by existing standard sizes, the degree of adherence to the standards, possible changes and related matters.

The Marquette Iron & Steel Co., St. Louis, has been organized to mine iron and manganese ores and smelt them in its own furnace located near Brandsville, Mo., which has a daily capacity of 200 tons. E. M. McGary is president of the company; J. J. O'Brien, vice-president; M. J. Lynn, general manager, and W. H. Hallerberg, secretary and treasurer.

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

Non-Ferrous Metal Markets

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 9	Oct. 8	Oct. 6	Oct. 5	Oct. 4	Oct. 3
Lake copper, New York.....	15.25	15.25	15.25	15.25	15.25	15.25
Electrolytic copper, N. Y.*.....	15.00	15.00	15.00	15.00	15.00	15.00
Straits tin, spot, N. Y.	48.50	48.75	...	49.00	49.37 1/2	49.62 1/2
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32 1/2	6.32 1/2	6.32 1/2	6.32 1/2	6.32 1/2	6.32 1/2
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price 1/4 c. higher.

Copper Holds Firm Position, Tin Slightly Weaker, Other Metals Unchanged

Copper.—Although domestic consumers have generally covered their requirements through November and in some instances well into December, the demand from foreign buyers continues fairly active. Sales for shipment abroad are running about 2000 tons a day. Some copper for domestic use is still to be bought for December; current sales are largely made up of orders for that delivery, with a sprinkling of fill-in tonnage for requirements nearer by. Very little

copper is available for October and November. Prices remain unchanged at 15.25c. per lb., delivered in the Connecticut valley, for electrolytic and at 15.50c. per lb., c.i.f. European ports, for exported metal, the official price of Copper Exporters, Inc. There is no apparent desire on the part of producers to see prices go higher, and, if an orderly market continues, the present quotations may be expected to remain through the year.

Tin.—The severe manipulation in recent weeks has kept consumers out of the market. Consumers have bought well and presumably are not in need of further supplies at the moment. Demands from the tin plate industry usually slacken at this season because of reduced operation

of the mills, but the needs of the automobile industry, which takes about one-fifth of this country's tin consumption, continue large. From Monday to Thursday of last week about 500 tons changed hands, mostly among dealers. On Friday the market was more active and sales totaled about 400 tons. On Saturday, usually a dull day, transactions added up to 100 tons. On Monday and Tuesday of this week there were moderate sales. Prices have kept within a narrow range. The low point was on Tuesday at 48.50c., while the highest price was 49.62 1/2c., which was paid on Oct. 3. The London market is weaker. Spot standard was quoted on Tuesday at £218 15s., future standard at £216 10s. and spot Straits at £219 5s.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	51.00c. to 52.00c.
Tin, bar.....	53.00c. to 54.00c.
Copper, Lake.....	16.25c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	13.25c. to 13.75c.
Aluminum No. 1 ingots for remelting (guar'd'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, 1/2 and 1/2.....	32.75c. to 33.75c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.00c.
Tin, bar.....	56.00c.
Copper, Lake.....	16.00c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar.....	9.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	58.00c.
Solder, 1/2 and 1/2.....	32.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.50c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	24.62 1/2c.
Copper.....	25.50c.
Brazed Brass Tubes.....	27.75c.
Brass Rods.....	17.50c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products are still quoted at the advances of Sept. 24. Zinc sheets and lead full sheets have not changed since July 30 and May 29, respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.
Seamless Tubes—	
High brass.....	24.62 1/2c.
Copper.....	25.50c.

Rods—	
High brass.....	17.50c.
Naval brass.....	20.25c.
Wire—	
Copper.....	17.25c.
High brass.....	20.25c.
Copper in Rolls.....	23.00c.
Brazed Brass Tubing.....	27.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.00c.	14.50c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bottoms.....	11.00c.	12.25c.
Brass, heavy.....	7.25c.	8.25c.
Brass, light.....	6.25c.	7.25c.
Hvy. machine composition.....	9.75c.	11.00c.
No. 1 yel. brass turnings.....	9.25c.	9.75c.
No. 1 red brass or compos. turnings... ..	9.25c.	10.25c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.625c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Zinc.....	10.00c.
Lead, wide.....	9.75c.
Seamless Tubes—	
Brass.....	26.12 1/2c.
Copper.....	27.00c.
Brass Rods.....	17.50c.
Brazed Brass Tubes.....	27.75c.

The Singapore price on Tuesday was £220 15s.

Lead.—Heavy sales last week have been followed by a quieter market this week. Most of the sales were for October and November, for which consumers are now believed to be pretty well covered. Prices are unchanged at 6.32½c. per lb., St. Louis, and 6.50c., New York.

Zinc.—This market is quiet. There is steady buying, but it is in small lots for nearby requirements. Production of ore in the Joplin district last week increased to 12,000 tons, compared with 10,500 tons in the previous week. Stocks of ore are now estimated at more than 56,000 tons, nearly the high point of the year.

Antimony.—Sales of antimony were made throughout the week at 11.50c., New York, duty paid, for spot shipment and at 11c. for future.

Nickel.—This metal is unchanged in price at 35c. per lb. for ingot, 36c. for shot and 37c. for electrolytic.

Aluminum.—Virgin metal, 98 to 99 per cent, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 9.—Shipments against contracts are heavy. Current purchases of metals are small in total volume. The old metal market is moderately active at unchanged prices.

Prices, per lb., in carload lots: Lake copper, 15.50c.; tin, 50c.; lead, 6.40c.; zinc, 6.35c. in less-than-carload lots; antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Higher Output Features London Tin

Continued increase in production continues to feature the London tin market, but the increase during the latter half of this year will not be at the same rate as during the first half, Trade Commissioner Homes S. Fox, London, informs the Department of Commerce.

At the same time consumption seems to remain high, although over the 12 months ended Aug. 31 supplies evidently increased more than deliveries, compared with the preceding 12 months. During August there was a further small increase in total visible supplies, the figure at the end of the month standing at 18,380 long tons (taking the average of the two leading trade authorities).

Straits shipments of tin for the first eight months of 1928 are reported at 64,030 tons, compared with 51,750 tons during the corresponding period of 1927, representing an increase of 12,280 tons. Supplies of Chinese tin,

however, have fallen off, possibly in anticipation of the erection of the proposed smelter in Hong Kong.

Reports received in London from Tasmania state that a new tin-bearing area has been discovered in the southwestern portion of the island, and that negotiations are also under way for the development of tin fields in the northeastern section. Development of alluvial tin deposits in Bohemia also is indicated by reports that it is proposed to start work shortly on five tin-bearing areas in that district, claimed to have a probable life of 20 years.

River Steel Shipments Effect Large Savings

Pittsburgh district steel manufacturers this year will probably save the difference between water and rail freight charges on at least 1,000,000 tons of their product moving beyond the confines of the Pittsburgh district. Latest figures released by the Pittsburgh office, United States Engineers' Corps, show that in August 124,751 net tons of steel products were moved on the Ohio River. This brings the total Ohio River movement for the eight months ended with August to 769,556 net tons, a monthly average of 96,194 tons, which if maintained to the end of the year would mean a total of 1,154,328 tons.

Ohio River tonnage figures offer a close approximation of the movement of steel products to the more distant destinations and provide a more reliable guide to this movement than is furnished by Allegheny and Monongahela River figures. Only 50 tons of steel products moved on the Allegheny in August, but on the Monongahela, the shipments, as reported by lock keepers, totaled 109,738 tons. These streams join to form the Ohio River at Pittsburgh and naturally carry much of the tonnage that is eventually reported by Ohio River lock keepers. Figures of all three rivers include some interplant movements within the Pittsburgh district. Such movements also mean a saving over what the same movement by railroad would cost.

In August the Ohio River tonnage exceeded the total of the movement on the two other rivers, suggesting that all of the tonnage that originated on the Allegheny and Monongahela rivers found its way into the Ohio. But in July, the Ohio River total was 90,145 tons, while the movement on the Monongahela was 91,834 tons, indicating an interplant tonnage of 1689 tons.

Some idea of the saving that is effected by water-borne steel products to more distant destinations may be gleaned from the fact that the cost on commercial lines of conveying steel from the Pittsburgh district to Memphis, Tenn., a distance of 1200 miles, is approximately \$5 a net ton, that charge, including handling costs at both origin and destination. The rail-

road rate to the same destination is 56c. per 100 lb., or \$11.20 per net ton. The indicated saving to Memphis is \$1.25 per ton. River shipments of steel have helped Pittsburgh district mills in reaching distant markets that for a time were closed to them as a result of high freight rates and the abolishment of Pittsburgh as a sole basing point for steel prices. A barge load of wire products, in a recent tow of finished steel products of the Jones & Laughlin Steel Corporation, to be turned over to the Federal Barge Line at Cairo, Ill., for delivery at Minneapolis, illustrates the point.

Oil Company Buyers to Meet in Tulsa, Okla.

The Oil Company Buyers' Group of the National Association of Purchasing Agents will hold a session in Tulsa, Okla., on Tuesday, Oct. 23. The date selected is during the International Petroleum Exposition, which runs from Oct. 20 to 29. One of the subjects scheduled for discussion by the group is the proper marking of valves and fittings for oil country use, and the possibility of standard specifications for these items. The oil company purchasing agents have given considerable thought to this subject for some time, with the result that it will be discussed quite thoroughly when they meet in formal session.

Emory A. Cook, purchasing agent Twin State Oil Co., Tulsa, is chairman of the group. A. M. Bowman, purchasing agent of the Humble Oil & Refining Co., Houston, Tex., and president National Association of Purchasing Agents, is expected to be present.

Pipe Ball Standardization Recommended

WASHINGTON, Oct. 9.—The size of the mandril core and the curvature of the nose, and the length of the bearing of pipe balls will be recommended as a result of a preliminary conference held here on Thursday of last week under the auspices of the Division of Simplified Practice, Department of Commerce. The conference was attended by pipe ball makers and tube mill representatives. The committee selected to draft the recommendation consists of H. P. Evans, Pettibone Mulliken Co., Chicago; J. S. Morrison, J. S. Morrison Co., Pittsburgh; Albert Pancoast, Union Spring & Mfg. Co., Pittsburgh; J. A. Trainor, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., and a representative of the Damascus Crucible Steel Co. The recommendation is to be resubmitted to all pipe mills of the country for approval. The matter of metal sections and design of core on large size balls is to be taken up as a secondary move and worked out by ball manufacturers themselves later.

Fabricated Structural Steel

New Projects Include 26,500 Tons for New York Bridge and 20,000 Tons for Cleveland Union Terminals Co. Bridge Work

SWELLED by 26,500 tons for a bridge over the Kill Van Kull at New York, 20,000 tons for bridges and road work for the Cleveland Union Station and 18,000 tons for a commercial building at Philadelphia, new fabricated projects reported during the week amounted to 61,500 tons. Other sizable projects were 7500 tons for an airplane hangar at Akron, Ohio, and 6700 tons for an additional section of the New York subways. Awards totaled 33,300 tons, the largest having been 4500 tons in buildings for the Pittsburgh Plate Glass Co. at Crystal City, Mo., and 3400 tons for a Y. M. C. A. in New York. Awards follow:

ANDOVER, MASS., 100 tons, boiler house for Phillips-Andover Academy, to New England Structural Co.
 HARTFORD, CONN., 100 tons, brass foundry addition, to Eastern Bridge & Structural Co.
 STATE OF MAINE, 400 tons, highway bridge, to American Bridge Co.
 HOWLAND, ME., 500 tons, highway bridge, to American Bridge Co.
 NEW YORK, 2800 tons, Salvation Army building on West Fourteenth Street, to unnamed fabricator.
 NEW YORK, 3400 tons, Y. M. C. A. Building on West Sixty-third Street, to unnamed fabricator.
 NEW YORK, 1500 tons, apartment building on Fifth Avenue, to Paterson Bridge Co.
 LAWTON, N. Y., 260 tons, highway bridge, to American Bridge Co.
 LONG ISLAND RAILROAD, 200 tons, bridge at Bay Ridge, Brooklyn, to unnamed fabricator.
 JERSEY CITY, 1500 tons, theater on Journal Square, to unnamed fabricator.
 PHILADELPHIA, 1200 tons, Garden Court apartments, to R. B. Lederle & Co.
 ATLANTIC CITY, N. J., 1250 tons, Chalfonte-Haddon Hall apartments, to Bethlehem Steel Co.
 PENNSYLVANIA RAILROAD, 500 tons, miscellaneous work at Philadelphia, to McClintic-Marshall Co.
 PENNSYLVANIA RAILROAD, 218 tons, bridge at Woodbury, N. J., to Phoenix Bridge Co.
 NEW ORLEANS, tonnage not stated, 7680-ft. span over Biloxi Bay, to International Steel & Iron Co.
 SHREVEPORT, LA., 600 tons, municipal auditorium, to Glassell-Wilson Co.
 MEMPHIS, TENN., 350 tons, two barges for Anderson, Tully Co., to American Bridge Co.
 MEADVILLE, PA., 3700 tons, mill for Viscose Co., to McClintic-Marshall Co.
 TARENTUM, PA., 150 tons, coal trestle, to Guibert Steel Co.
 TRAFFORD, PA., 800 tons, micarta buildings for Westinghouse Electric & Mfg. Co., to Jones & Laughlin Steel Corporation.
 RAPP'S MILL, VA., 175 tons, highway bridge, to American Bridge Co.
 PITTSBURGH, 750 tons, five coal barges for Monessen Coal & Coke Co., to Ritter-Conley Co.
 PITTSBURGH, 118 tons, Ohio River lock gates, to Dravo Contracting Co.
 CINCINNATI, 180 tons, St. Louis Church, to McClintic-Marshall Co.
 CINCINNATI, 100 tons, platform at Central Union Station, to McClintic-Marshall Co.
 ERIE RAILROAD, 250 tons, bridge at Youngstown, Ohio, to American Bridge Co.
 NORFOLK & WESTERN RAILWAY, 2500 tons, bridge at Columbus, Ohio, to Mount Vernon Bridge Co.
 CLEVELAND, 600 tons, building for W. S. Tyler Co., to National Iron & Wire Co.

CHICAGO, BURLINGTON & QUINCY, 1200 tons, bridges, to American Bridge Co.
 LA SALLE, ILL., 900 tons, building for Marquette Cement Mfg. Co., to Mississippi Valley Structural Steel Co.
 CRYSTAL CITY, MO., 4500 tons, buildings for Pittsburgh Plate Glass Co., to McClintic-Marshall Co.
 ST. LOUIS, 1800 tons, dairy building for National Exhibition Co., to Stupp Brothers Bridge & Iron Co.
 PLATTSMOUTH, NEB., 1500 tons, bridge, to Omaha Steel Works.
 TUCSON, ARIZ., 650 tons, office building for Consolidated National Bank, to McClintic-Marshall Co.
 GLENDALE, CAL., 130 tons, Professional Building, to Llewellyn Iron Works.
 LONG BEACH, CAL., 275 tons, store, Fourth and Pine Streets, to Llewellyn Iron Works.
 LOS ANGELES, 130 tons, plant for Byron Jackson Pump Co., East Slauson Avenue, to McClintic-Marshall Co.
 LOS ANGELES, 200 tons, office building, 529 South Broadway, to Llewellyn Iron Works.
 SAND POINT, WASH., 400 tons, Government hangar, to Isaacson Iron Works.
 OLYMPIA, WASH., 120 tons, Coweeman River bridge, to Pacific Car & Foundry Co.
 CHELAN, WASH., 124 tons, Cashmere bridge, to unnamed interest.

SEATTLE, 1100 tons, buildings for Zuerbach Pulp & Paper Co. at Hoquiam and Port Townsend, to Wallace Bridge & Structural Steel Co.
 SEATTLE, 390 tons, crane runway for Pacific Coast Steel Co., to Wallace Bridge & Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 26,500 tons, bridge over Kill Van Kull between Port Richmond, S. I., and Bayonne, N. J.; bids Nov. 5.
 NEW YORK, 6700 tons, subway section 4. route 106 in Bronx; bids Oct. 16.
 NEW YORK, 800 tons, Brearley School in East Eighty-third Street; Turner Construction Co., general contractor.
 BROOKLYN, 2500 tons, addition to St. George Hotel.
 LONG BEACH, N. Y., 400 tons, school.
 BLOOMFIELD, N. J., 150 tons, Chevrolet garage and service station.
 PHILADELPHIA 16,000 to 18,000 tons, Reading commercial building at Broad and Callowhill Streets; general contract pending.
 NIAGARA FALLS, N. Y., 1600 to 1800 tons, Niagara Falls United office building; bids close in two weeks.
 NEWARK, N. Y., 700 tons, school.
 CLEVELAND, 20,000 tons, bridges and road work for Cleveland Union Terminals Co.
 AKRON, OHIO, 7500 tons, hangar for Goodyear-Zeppelin Corporation.
 AKRON, 400 tons, factory building for General Tire & Rubber Co.
 LORAIN, OHIO, 350 tons, State viaduct.
 COLUMBUS, OHIO, 350 tons, municipal police station.
 CINCINNATI, 550 tons, convent for Sisters of Mercy.
 ROCKFORD, ILL., 1500 tons, foundry for International Harvester Co.
 ALABASTER, MICH., 400 tons, building for United States Gypsum Co.
 BLOOMINGTON, ILL., 400 tons, office building.
 PASADENA, CAL., 100 tons, church; bids being taken.
 LOS ANGELES, 300 tons, apartment building, Hillcrest and Franklin Streets; bids being taken.
 SEATTLE, 231 tons, plates for 24-in. riveted pipe line; bids Oct. 26.

Continental Leadership in Iron and Steel Exports

The iron and steel division, Department of Commerce, has compiled a statement of comparative exports of iron and steel products of various producing countries for the pre-war year 1913 and the after-war years 1920-1927, inclusive, which shows that Germany led during both periods through 1926, giving way in 1927 to France and Belgium-Luxemburg. In 1913 exports from Germany aggregated 6,

491,262 gross tons, Great Britain being second with 4,969,225 tons. During the period following the war Germany again reached first place, exporting 5,347,823 tons in 1926. But in 1927 France exported 5,603,000 tons and Belgium-Luxemburg, 4,607,000 tons, while Germany dropped to 4,230,000 tons—less than 1 per cent above Great Britain. The nearest approach to this volume made by the United States was in 1920, with a total of 4,927,800 tons.

The figures, stated in gross tons, follow:

IRON AND STEEL EXPORTS OF FIVE COUNTRIES

	United States	Belgium-Luxemburg	France	Germany	Great Britain
1927.....	2,183,091	4,607,000*	5,603,000*	4,230,000*	4,200,000*
1926.....	2,167,213	3,765,420	4,191,009	5,347,823	2,987,669
1925.....	1,762,572	3,203,915	4,009,127	3,548,773	3,731,366
1924.....	1,805,977	†	†	†	3,851,435
1923.....	2,010,171	†	†	†	†
1922.....	1,985,733	†	†	2,654,676	†
1921.....	2,209,864	†	†	†	†
1920.....	4,927,800	935,287†	883,932	†	3,251,225
1913.....	2,722,618	1,575,479†	629,674	6,491,262	4,969,225

*Excluding scrap; these figures were not included in the statement made by the division.

†Belgium only.

‡Data not given in statement cited.

PERSONAL

N. L. MORTENSON has been appointed chief engineer of the Cutler-Hammer Mfg. Co., Milwaukee, succeeding T. E. BARNUM, who has been made consulting engineer for the company in order to give uninterrupted attention to engineering problems



N. L. MORTENSON

and outside engineering relations. Mr. Mortenson has been associated with the company for 21 years, the last five as assistant to Mr. Barnum. He was born in Denmark and received his formal technical education in that country and Germany. He has contributed numerous articles to the technical press and has been active in the work of the American Institute of Electrical Engineers and of the Association of Iron and Steel Electrical Engineers.

KENNETH B. SPAULDING, formerly sales manager McCrosky Tool Corporation, Meadville, Pa., has been named sales manager of the Wesson Sales Co., Detroit. The company handles sales of Eclipse interchangeable counterbores and John Bath ground thread taps, and has recently been appointed distributor in Detroit and Chicago for Widia cutting metal manufactured by the Krupp works at Essen, Germany.

SPENCER S. SWASEY has been appointed manager of the equipment department of the Walter A. Zelnicker Supply Co., 511 Locust Street, St. Louis. For the last three years he has been head of his own contracting company at Chicago and previously was associated for 12 years with the George D. Whitcomb Co., Rochelle, Ill., maker of industrial locomotives.

FRED M. YOUNG, president Young Radiator Co., Racine, Wis., has been made a captain in the specialist re-

serve, United States Army Air Corps. He served as aeronautical engineer and pilot in the air service during the war and has kept in touch with the work through his contacts with the automotive engineering field.

O. H. WATSON has been placed in charge of an office which has been opened by the Erie Steel Construction Co., Erie, Pa., at 231 Engineering Building, Chicago.

DAVID D. LUPTON, vice-president David Lupton's Sons Co., Philadelphia, and chairman of the company's industrial committee, was recently presented with a gavel by the members of the present and former committees, as an expression of their appreciation of his leadership and guidance since the inception of the committee nine years ago.

HAROLD L. CRULL has been appointed assistant sales manager of the Oilgear Co., Milwaukee.

A. B. ROOT, JR., formerly assistant to the vice-president of the Hunt-Spiller Mfg. Corporation, South Boston, has been made assistant general manager. He is a past-president of the New England Foundrymen's Association and is active in the affairs of the national organization. E. C. FELTON, also formerly assistant to the vice-president, has been made assistant treasurer of the corporation.

HENRY J. LOWDON, formerly sales manager for the Eldridge Buick Co., Seattle, Wash., has been made general manager of Best Lock Co., Seattle.

JOHN A. OARTEL, director of safety Carnegie Steel Co., Pittsburgh, will speak on "Safety—Plus," at the regular monthly meeting of the Pittsburgh Foundrymen's Association in the Norse Room, Fort Pitt Hotel, Monday evening, Oct. 15.

P. R. HAWTHORNE, welding engineer Petroleum Iron Works Co., Sharon, Pa., will be the speaker at the monthly meeting of the Pittsburgh chapter of the American Welding Society at the William Penn Hotel, Pittsburgh, Wednesday evening, Oct. 31. His subject is "The Petroleum Iron Works Fluid Fusion Process of Welding."

H. A. DEFRIES, metallurgist Ludlum Steel Co., Watervliet, N. Y., will speak on "Nitr alloy" at the October meeting of the Indianapolis chapter of the American Society for Steel Treating, to be held at the Chamber of Commerce, Monday evening, Oct. 15.

J. LEONARD REPLOGLE, formerly head of the Replogle Steel Co., Wharton, N. J., and a director in the War-

ren Foundry & Pipe Corporation, its successor, will become a special partner in the New York Stock Exchange firm of Harris, Winthrop & Co. on Nov. 1.

WILLIAM H. WOODIN, JR., son of William H. Woodin, president of the American Car & Foundry Co. and the American Locomotive Co., New York, has been appointed director of research for the first named company, with headquarters at 30 Church Street, New York. He has named A. H. WOBBE, assistant director of research; J. W. STEINMEYER, research engineer, and R. M. ALLEN, research metallurgist. The younger Mr. Woodin acquired important technical training in the Berwick, Pa., plant of



W. H. WOODIN

the Car & Foundry company, where he served as an iron worker and a practical molder in the shops. He later carried on research and practical experiments in metallurgy and has also been active as a microscopist and electrical engineer. In his new capacity he will be prominently engaged in the development of products outside the railroad equipment field to which the company has recently been devoting considerable time.

WALTER G. HILDORF will be placed in charge of all metallurgical work of the Timken Steel & Tube Co., Canton, Ohio, effective Oct. 15. For several years he has been metallurgical engineer of the Reo Motor Car Co., Lansing, Mich.

C. R. VANCE has been appointed sales manager of the Welker Machinery Co., Inc., 650 Beaubien Street, Detroit. The company was known as the E. H. Welker Co. until Oct. 1.

J. F. DRAPER has returned to the Jamison Steel Co., 77 Natoma Street, San Francisco, as manager of the sales department. He started in business with that company's sales department 14 years ago, but six years later became associated with the Pacific Mfg. & Tool Co., Portland, Ore.

WILBUR B. TOPPING, general manager of sales Republic Iron & Steel Co., Youngstown, has resigned, effective Nov. 1, and ALEXANDER E. WALKER, assistant general manager of sales, has been named to succeed him. Mr. Topping has been with the company for 20 years, his first connection having been at the Pioneer blast furnaces in Alabama. In 1910 he was transferred to the general sales office, at that time located at Pittsburgh. When a Philadelphia district office was opened in 1912, Mr. Topping was appointed its manager. His next position was as Cleveland district sales manager and from there he was transferred to the general sales department in Youngstown and appointed assistant general manager of sales. He was made general manager of sales in 1919. Mr. Walker was a salesman in the Chicago office of the LaBelle Iron Works, Steubenville, Ohio, before he joined the Republic company in 1916 as assistant to the late DANIEL GEARY, then assistant general sales manager in charge of pipe sales. He succeeded Mr. Geary in 1919 and later was made assistant manager of sales in charge of pipe and sheets. With the reorganization of the sales personnel of the Republic company, following its absorption of the Trumbull Steel Co. last April, he was appointed assistant general manager of sales.

S. S. ROBINSON, for six years sales manager at Erie, Pa., for Pickands, Mather & Co., Cleveland, has been appointed assistant sales manager for Pickands, Brown & Co., Chicago. He is a graduate of Harvard University, and began his business career in the Cleveland sales department of Pickands, Mather & Co.

To Learn Engineer's Status in Industry

As a part of a plan to ascertain the status of the mechanical engineer in industry, members of the Machine Shop Practice Division of the American Society of Mechanical Engineers are being canvassed by a questionnaire calculated to learn the ages and salaries of men engaged in specific positions in the machine shop field. The questionnaires are to be compiled without signatures and represent an activity of the society to be extended probably to all the professional divisions of the organization. The findings are to be compiled in a general report.

Bituminous coal production in the United States for the week ended Sept. 29 is reported by the Bureau of Mines at 11,059,000 net tons. This is the largest production for several months, and is just 1,000,000 tons higher than in the corresponding week of 1927. Production for the year to date, however, is 40,000,000 tons behind 1927, standing this year at 352,977,000 tons.

American Mining Congress in Washington

Congressional legislation affecting the mining industry, including federal taxation of mines; advanced steps in the mechanization of mines; and improved production and marketing methods for minerals, will be considered by the American Mining Congress at its thirty-first annual convention to be held in Washington Dec. 5 to 8, inclusive, at the Mayflower Hotel. It is expected that the program will include addresses by members of Congress, officials of government bureaus dealing with mining questions and leading metal and coal mining operators from the various producing fields.

Fix Date for Hearings on Scrap Definitions

Following the suggestion of the shippers' subcommittee appointed in April at the instance of the Consolidated Classification Committee to prepare a description of scrap iron and steel, arrangements have been made for three meetings at which shippers and consumers of scrap will have an opportunity to discuss with the classification committee the definition proposed by the subcommittee. This definition was printed in THE IRON AGE of Sept. 6, page 584. The meetings, all scheduled for 10 a. m., are to be held on Oct. 18, in room 404, 143 Liberty Street, New York; on Oct. 24, in room 404, Chicago Union Station, Chicago, and on Oct. 31, in room 1015, 101 Marietta Street, Atlanta, Ga. Later a conference with the railroads in Washington is planned, to which representatives of the Interstate Commerce Commission will be invited to approve the description agreed upon by the classification committee and the shippers' subcommittee.

Classification of Coal

A standard classification for coal is proposed and described in Bulletin No. 180 of the Engineering Experiment Station of the University of Illinois, Urbana. This pamphlet of 62 pages, by Prof. Samuel W. Parr, may be obtained from the university for 35c. Briefly, Professor Parr proposes the progressive grading of solid fuels in 10 groups: Anthracite, semi-anthracite; bituminous A; bituminous B; bituminous C; bituminous D; lignite; peat; cannel and wood.

The limits of volatile matter are governing factors in the first four groups, the percentages running in the first up to 8, then 8 to 12, 12 to 24, and 24 to 50. Bituminous C and D are of higher volatile matter than B, but there is overlapping in the groups. The pamphlet gives a large number of analyses of coals from all over the United States and a number of foreign countries, more than half its volume being occupied by tables.

Obituary

ABRAM JAMES, proprietor of the Pioneer Foundry, LaCrosse, Wis., died Sept. 30 after a brief illness, aged 74 years. He was born in England and came to America in 1869, joining several brothers in the ownership and management of the Pioneer shop, established in 1856 as one of the first foundries in Wisconsin west of Milwaukee.

DANIEL PARDEE SMITH, one of the organizers of the Reed Mfg. Co., Newark, N. Y., died at his home in that city on Oct. 1, aged 85 years. He served as president of the company for many years and prior to his retirement some years ago was active in public utility work in the surrounding district.

GEORGE E. HALL, for 12 years president and general manager of the Boston Woven Hose & Rubber Co., Boston, died suddenly at Osterville, Mass., on Oct. 3. He was born at Brattleboro, Vt., in 1868, and before joining the Boston company in 1907, was associated with the International Paper Co., Watertown, N. Y.

ROBERT LAIDLAW, one of the founders of Laidlaw & Dunn, Cincinnati, now a plant of the Worthington Pump & Machinery Corporation, died Oct. 6 at Brockville, Ont., aged 80 years. He was active in business and civic circles in Cincinnati prior to 1899, when he retired.

More Men Working in Manufacturing Plants

Employment in manufacturing industries increased 1.5 per cent in August, compared with July, and payroll totals increased 3.2 per cent, according to returns to the Bureau of Labor Statistics, Department of Labor. Increased employment was shown in all branches of the iron and steel group except cast iron pipe and machine tools. Iron and steel employment in general rose 1.3 per cent, while the cast iron pipe industry showed a decline of 0.1 per cent and the machine tool industry a drop of 5.4 per cent. Structural iron work employment increased 4.1 per cent, and employment in foundries and machine shops increased 0.5 per cent.

Rates on iron and steel scrap, in carloads, from points in Central Freight Association and Western Trunk Line territories to Kokomo, Ind., were held to be unreasonable and unduly prejudicial to the extent that they exceed 85 per cent of the contemporaneous sixth class rates, in a recent report by William A. Disque, attorney-examiner of the Interstate Commerce Commission. The complainant was the Continental Steel Corporation, whose plant at Kokomo, according to the report, uses between 250,000 and 300,000 tons of scrap annually.

Machinery Markets and News of the Works

Business Still at a High Rate

Machine Tool Orders and Inquiries in First Week of October Show No Letdown

MACHINE tool business in the first week of October showed no letdown from the high rate of September. The automobile and aviation industries continue important factors in maintaining the volume of machinery sales, but orders come from diversified sources. Indications are that the high sales records of July, August and September will be equaled, at least, in October.

Production at machine tool plants, while spotty, is in most cases at nearly full capacity. Night shifts are not uncommon in the effort to meet delivery promises. Unfilled orders have accumulated at some plants so that dif-

ficulties are experienced in making early shipments.

The White Motor Car Co., Cleveland, will buy considerable shop equipment for the manufacture of a new truck model it will put on the market soon. Orders from automobile companies in the past week included one from a Detroit company for six automatic lathes, while a maker of airplane engines ordered four large engine lathes.

Foreign business has been increasing. Cincinnati machine tool builders have received orders for five production lathes for Czechoslovakia and four lathes for Holland.

New York

NEW YORK, Oct. 9.—The week's business in machine tools consisted of a fairly large number of single-machine orders and one order of considerable size for special machinery. September business was good, and compared favorably with that of August, which was a good month. So far this month there has been no apparent let-down either in the number of orders or inquiries, and local sellers are confident that the recent satisfactory market condition will remain through October. Inquiries for heavy tools, including several large lathes, were better in the past week than they have been in some time.

Niles-Bement-Pond Co. has sold a 42-in. x 14 ft. Time-Saver planer. Sales by Pratt & Whitney division of that company included three vertical shapers, five thread milling machines, two jig borers, two profiling machines, two lathes, nine deep-hole drilling machines, rotary surface grinder and a production hand miller.

Plans have been approved by General Petroleum Corporation of California, Inc., 26 Broadway, New York, a subsidiary of Standard Oil Co. of New York, same address, for new refinery at Torrance, Cal., with capacity for handling 30,000-bbl. crude oil per day, and storage and distributing facilities for 134,000 bbl., to cost about \$2,500,000 with equipment.

Montgomery Ward & Co., Chicago Avenue and Larrimore Street, Chicago,

have awarded general contract to Wells Brothers Construction Co., 53 West Jackson Boulevard, Chicago, for a one, three and eight-story storage and distributing plant at Albany, N. Y., to cost about \$1,500,000 with equipment.

Richmond Engine & Machine Works, Inc., 1836 Victory Boulevard, Port Richmond, S. I., William Cairney, president, has purchased part of property of Continental Milling & Warehouse Co. at New Brighton, improved with three-story shop, for establishment of new marine repair works. Present plant will be continued.

American Can Co., 120 Broadway, New York, has engaged Turner Construction Co., 420 Lexington Avenue, to prepare plans for a four-story plant at North Street and Wythe Avenue, Brooklyn, 90 x 200 ft., to cost close to \$200,000 with equipment.

James P. Boyland, 305 East Kingsbridge Road, New York, architect, has plans for a two-story automobile service, repair and garage building, to cost about \$190,000 with equipment.

Rizuto Motor Co., Peekskill, N. Y., is having plans drawn for a one-story service, repair and garage building, to cost about \$100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Aviation Corporation of the Americas, Inc., 100 East Forty-second Street, New York, recently organized to take over and expand Pan-American Airways, Inc., same address, has disposed of block of common stock, totaling about \$3,000,000, and plans expansion, including airport

construction, aircraft manufacture, and other work for establishment of air lines between United States and West Indies, Central and South America. Richard F. Hoyt is chairman of board.

Board of Trustees, Union Free School District No. 1, Altamont, N. Y., is considering installation of manual training equipment in new junior high school at Tupper Lake, to cost about \$300,000. A. Howell Knox, 140 South Dearborn Street, Chicago, is architect.

Klein Iron Works, 65 Broadway, Astoria, L. I., is planning one and two-story addition, 100 x 135 ft., to cost about \$75,000 including equipment.

Sikorsky Aviation Corporation has been formed with capital of 200,000 shares of stock, no par value, to take over Sikorsky Mfg. Co., College Point, L. I., manufacturer of airplanes and parts. New company has disposed of 100,000 shares of stock, portion of fund to be used for increased production. Agreement has been made with Curtiss Flying Service, Inc., Buffalo, for exclusive rights for sale of Sikorsky aircraft for commercial use in United States, and similar contract for export with Curtiss Airplane Export Corporation, also of Buffalo. Igor Sikorsky is one of heads of company.

R. H. Macy & Co., Broadway and Thirty-fourth Street, New York, have awarded general contract to Nieman Irving & Co., Inc., 30 East Forty-second Street, for four-story addition to automobile service, repair and garage building, 100 x 100 ft., to cost more than \$175,000 with equipment.

Office of Constructing Quartermaster, Picatinny Arsenal, Dover, N. J., will receive bids until Nov. 6 for new operating buildings, including group of 21 buildings in melt loading area, three buildings in shop area, 13 buildings in laboratory area and administration building.

Lackawanna Railroad Co., 90 West Street, New York, has acquired 15 acres at Jersey City, N. J., for new group of multi-story storage and distributing buildings, with main unit 162 x 848 ft., including unloading, elevating, conveying and other handling equipment. Project is reported to cost more than \$1,500,000.

System Brake Service, Inc., 54 Sussex Avenue, Newark, has plans for a one-story machine and automobile repair shop, to cost about \$25,000. Simon Cohen, 130 Branford Place, is architect.

Public Service Electric & Gas Co., Public Service Terminal, Newark, is planning construction of two-story substation at 1223-29 Broad Street, to cost close to \$70,000 with equipment; one-story and basement meter and compressor plant at Piscataway, N. J., to cost more than \$35,000 with equipment, and two-story substation on Norfolk Street, Newark, to cost about \$45,000 with equipment.

National Air Transport, Inc., 5930 South Cicero Avenue, Chicago, is reported planning new hangar, with shop and repair facilities, at municipal airport, Newark, to cost over \$50,000 with equipment.

The Crane Market

ONLY a small number of new inquiries for overhead cranes have appeared in the New York district during the past week. Business in the South and West, however, continues active and most of the orders booked recently have been from these territories. An overhead crane builder in Chicago recently received an order from a large public utility company in that city for a 150-ton, 135-ft. span electric crane. Some desirable orders for locomotive cranes are pending, particularly the crawl-tread type. D. C. Serber, Inc., New York, is reported considering the purchase of a locomotive crane and other contractors with subway contracts or bidding for such work are interested in buying. The Island Transport Co., 120 Broadway, New York, is understood to be in the market for two locomotive cranes for export to St. Pierre Miquelon.

In Pittsburgh attention is centered on the requirements of the National Tube Co. for its new skelp mill at McKeesport,

Pa., and those of the American Sheet & Tin Plate Co. in connection with a program of plant betterments recently started at its Vandergrift works, and the cranes that have been pending for the Clairton works of Carnegie Steel Co.

Among recent purchases are:

Viscose Co., Marcus Hook, Pa., 22-ton, 8-wheel, steam locomotive crane from Orton Crane & Shovel Co.

Steel sales Corporation, Chicago, 5-ton, 46-ft. span, overhead electric crane from Whiting Corporation.

Brennan Stone Co., Bridgeport, Conn., 6-ton, 2-motor, overhead crane from H. D. Conkey & Co.

Wisconsin Power & Light Co., Madison, Wis., 10-ton, double girder hand power crane for power station from H. D. Conkey & Co.

St. Louis-San Francisco Railroad Co., St. Louis, 8-ton, hand power crane from H. D. Conkey & Co.

Endicott Forge & Mfg. Co., Endicott, N. Y., 3-ton hand power crane from H. D. Conkey & Co.

Dakota Power Co., Rapid City, S. D., 5-ton, double I-beam hand power crane from H. D. Conkey & Co.

City of Topeka, Kan., four 2-ton underhung push type cranes from H. D. Conkey & Co.

Missouri Pacific Railroad, 20-ton gantry crane for use at Wichita, Kansas, from Whiting Corporation.

Dallas Brass & Copper Co., Chicago, two 3-ton wall bracket jib cranes and one 3-ton underhung electric crane from H. D. Conkey & Co.

Great Lakes Forge Co., Chicago, two 2-ton single I-beam cranes from H. D. Conkey & Co.

Hudson Motor Car Co., Detroit, 1-ton, 17-ft. span, motor driven crane from H. D. Conkey & Co.

Conrad Foundry Co., Montgomery Street, Elizabeth, N. J., gray iron and aluminum castings, has been sold to Ware & Leonard Foundry Co., which will operate plant.

Reiche & Penner, Inc., structural and ornamental iron works, 673-677 Lexington Avenue, Brooklyn, is building a 60 x 100 ft. addition to its plant. Frank Penner is president.

New England

BOSTON, Oct. 8.—New equipment, especially for high production, is more active than appears on the surface. Recent sales include \$40,000 worth of shop equipment to a Hartford manufacturer, and numerous individual tools to Connecticut Valley, Rhode Island and Massachusetts users. The largest buyers and prospective purchasers are those manufacturing automobile and radio parts.

The local used tool market is slow. A Connecticut dealer selling discarded equipment of a General Motors subsidiary is invading Massachusetts, New Hampshire, Vermont and Rhode Island with low prices. Another Connecticut dealer, specializing in gear making and special equipment, is also making broad terms and securing considerable business. A new Worcester shop has just purchased about \$5,000 worth of machine tools, and a Cambridge plant has bought rebuilt milling machines.

Small tools are very active. September was a big month and October is starting off even more encouragingly. The improvement is due to a greater distribution of small tools rather than to an expansion in machine tools.

Vacuum Co., 105 Mystic Avenue, Somerville, Mass., has started work on a \$100,000 addition and alterations.

McClintock & Craig, 458 Bridge Street, Springfield, Mass., have closed bids on a one-story plant, 120 x 140 ft., to be built by Moore Drop Forge Co., Chicopee, Mass.

Henry Perkins Co., Bridgewater, Mass., has under consideration a foundry addition. Details will be announced shortly.

Van Norman Machine Co., 160 Wilbraham Avenue, Springfield, Mass., will build a two-story addition, 23 x 83 ft., and make plant alterations.

No date has been set for bids to close on a one-story machine shop, 40 x 100 ft., to be erected by Everett Avenue Auto Parts Co., 234 Everett Avenue, Chelsea, Mass.

Norton Co., New Bond Street, Worcester, Mass., abrasives and grinding machinery, will start work soon on a one-story, 39 x 78 ft., addition.

William J. Murdock Co., 347 Washington Avenue, Chelsea, Mass., electric specialties, will start work soon on a two-story plant 50 x 95 ft. Eisenberg & Feer, 46 Cornhill, Boston, are architects.

Plans are being arranged by Case Board Co., Andover, Conn., manufacturer of fibreboard products, for rebuilding part of mill destroyed by fire recently, with loss about \$75,000 with equipment. Christopher Case is head.

Russell Mfg. Co., Middletown, Conn., manufacturer of brake lining, etc., has plans for new branch plant at St. Johns, Que., to cost about \$125,000 with equipment.

Blackall, Clapp & Whittemore, 31 West Street, Boston, architects, are completing plans for a one-story automobile service, repair and garage building at Milton, Mass., to cost about \$135,000 with equipment.

George M. MacKenzie, New Haven, Conn., has filed plans for a one-story machine shop, 50 x 150 ft. Leo F. Caproni, 1056 Chapel Street, is architect.

F. C. Hersee Co., 47 Bacon Street, Watertown, Mass., manufacturer of automobile tools, has awarded general contract to L. C. Titus, 50 Lincoln Street, for one-story addition, 50 x 100 ft., with extension, 30 x 45 ft., to cost about \$45,000 with equipment.

United States Oil Co., Providence, R. I., plans rebuilding of portion of four-story plant recently destroyed by fire, with loss about \$40,000 including equipment.

Bush Mfg. Co., Inc., 100 Wellington Street, Hartford, Conn., manufacturer of automobile radiators and parts, has awarded general contract to Industrial Construction Co., 721 Main Street, for a

one-story addition, 50 x 50 ft., to cost about \$25,000 with equipment.

Mason & Parker Mfg. Co., Winchendon, Mass., manufacturer of toys, has taken over a three-story factory at Fiskdale, Mass., for new branch plant.

Strathmore Paper Co., Mittineague, Mass., has awarded general contract to L. S. Wood, 14 Stockbridge Street, Springfield, Mass., for four-story addition to mill at Woronoco, Mass., 50 x 200 ft., to cost about \$150,000 with equipment.

Peerless Unit Ventilation Co., Inc., has removed main office and factory to 719-734 Crescent Avenue, Bridgeport, Conn. New York office remains at 369 Lexington Avenue.

South Atlantic

BALTIMORE, Oct. 8.—Contract has been let by International Harvester Co., Chicago, to J. L. Robinson Construction Co., 522 Park Avenue, Baltimore, for one-story factory branch, storage and service plant, 125 x 250 ft., for motor truck division at Baltimore, to cost about \$125,000 with equipment.

Nardin-Armstrong Co., Bedford, Va., H. E. Armstrong, president, will build new one-story plant, 150 x 350 ft., to manufacture tools, dies, steel stampings and kindred products, to cost about \$70,000 with equipment.

Hampton Smith, 506 McBee Avenue, Greenville, S. C., is at head of project to establish local plant for manufacture of textile machinery and parts. Company will be organized to carry out enterprise.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 16 for motor-driven shaper, two single planers, motor-driven hand jointers, machinists' hammers, sledge hammers, hand saws, axes, augers, and other tools, Panama Schedule 1905; until Oct. 26 for bolt-cutting machine, power band saw, hand saws, vises, reamers, drills, hoists, and other equipment, Panama Schedule 1907.

Officials of Parker Metal Decorating Co., Howard and Ostend Streets, Baltimore, headed by Edwin A. Parker and Harry G. Evitt, have organized Independ-

ent Can Co., with capital of \$1,000,000, to establish local plant to manufacture tin cans. Company will be managed in close affiliation with Parker company.

Board of School Commissioners, Charlotte, N. C., is considering installation of manual training equipment in addition to Alexander Graham Junior High School, to cost over \$200,000, for which bids will be asked on general contract in November. Charles C. Hook, Commercial Bank Building, is architect.

Virginia Public Service Co., Charlottesville, Va., is said to be acquiring property on Big and Little Rivers, Rockbridge County, as site for hydroelectric generating plant, project to cost about \$2,000,000 including transmission lines.

American Oil Co., American Building, Baltimore, has awarded general contract to Bonham Engineering & Construction Co., Bridgeton, N. J., for new storage and distributing plant near Bridgeton, to cost over \$50,000 with equipment. T. J. O'Connell is company engineer.

Savannah River Electric Co., operated by Southeastern Power & Light Co., 120 Broadway, New York, is reported planning construction of hydroelectric generating plant on Savannah River, near Augusta, Ga., with transmission lines to connect with other properties of company. Project will cost over \$10,000,000.

Philadelphia

PHILADELPHIA, Oct. 8.—Plans are being completed by Edgcomb Steel Co., Eleventh and Cambria Streets, Philadelphia, for one-story storage and distributing plant, to cost about \$135,000 with equipment.

Mitchell Specialty Co., Inc., Edmund and Shelmire Streets, Philadelphia, manufacturer of automobile hardware, has awarded general contract to I. A. Stoutenburg, 3438 North Marvins Street, for one-story addition to machine shop, to cost about \$36,000 with equipment.

William L. Charr and Harry Kattelman, Victory Building, Philadelphia, architects, have plans for a four-story automobile service, repair and garage building, 60 x 100 ft., to cost about \$150,000 with equipment.

Atwater Kent Mfg. Co., Wissahickon Avenue and Abbottsford Road, Philadelphia, manufacturer of radio equipment, is having plans drawn for a one-story plant unit, to cost over \$100,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Cramp-Morris Industrials, Inc., Richmond and Norris Streets, Philadelphia, manufacturer of turbine engines and other heavy machinery, has asked bids on general contract for a one-story pipe shop.

Piers and Terminals Division, Merchant Fleet Corporation, Washington, will soon ask bids for 25 steel tackle structures at Tidewater Terminal, Philadelphia, for unloading lumber, etc., each unit to have capacity of about 10 tons, providing for mechanical handling of material.

Philadelphia Air Terminal, Inc., 225 South Fifteenth Street, Philadelphia, C. D. Rottner, in charge, has engaged B. R. Shaw Co., Inc., 810 Olive Street, St. Louis, engineer, to prepare plans for airport on site bounded by Swanson, Fifth and Pattison Streets and Parker Avenue, including hangars, repair shops, oil storage and other buildings, to cost about \$1,000,000.

International Harvester Co., 2905 North Sixteenth Street, Philadelphia, and 606 South Michigan Avenue, Chicago, has purchased property at Erie Avenue and F Street, Philadelphia, comprising two-story factory, two one-story automobile service and garage buildings and one-story shop, for new factory branch and distributing plant for motor truck division.

Board of Education, Trenton, N. J., plans installation of manual training equipment in new two-story senior high school, to cost about \$2,000,000, for which bids will be asked on general contract early in November. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Department of Institutions and Agencies, State Office Building, Trenton, N. J., William J. Ellis, commissioner, is asking bids on general contract until Oct. 16 for a one-story industrial shop unit at Colony for Feeble-Minded, Vineland, to cost \$100,000 with equipment. C. N. Leatham, State Office Building, is architect.

Refrigerator Equipment Co., Wilmington, Del., recently organized, has acquired plants and businesses of Knox Products Co., Fourth and Greenhill Avenues, manufacturer of refrigerators, cold room equipment, refrigerator insulation specialties, etc., and Glacifer Co., Kennett Square, Pa., manufacturer of refrigerator equipment and materials. New company will consolidate organizations, continuing both plants in service. An expansion program is planned. Severn P. Ker, Jr., is president of new company; George B. Scarlett, vice-president, and W. W. White, secretary and treasurer.

Louis Levy, 5941 Pine Street, Philadelphia, and associates have organized Quaker Metal Products Co., with capital of \$20,000, and will operate local plant for manufacture of metal goods. Louis Powell, Fourth and Snyder Streets, is also interested in new company.

Baily Mfg. Co., Beaver Street, North Wales, Pa., manufacturer of automobile bodies, etc., is said to be planning to rebuild part of plant destroyed by fire Sept. 28, with loss reported over \$125,000 with equipment.

Heintz Mfg. Co., Front Street and Olney Avenue, Philadelphia, manufacturer of automobile bodies and parts, is erecting a new building to cost \$300,000 and not \$27,000, as stated in these columns last week.

Pittsburgh

PITTSBURGH, Oct. 8.—Machine tool business is fairly active in this district, although most of the sales are single tools. Inquiry is good. In heavy equipment, interest centers in a 36-in. blooming mill and a structural mill, which the Aluminum Co. of America is planning for its Massena, N. Y., works, for rolling aluminum in shapes for railroad and street cars.

West Pennsylvania Power Co., West Penn Building, Pittsburgh, is planning new one-story equipment storage and distributing plant, 100 x 250 ft., with repair department, shop and garage, at Connellsville, Pa., to cost \$160,000 with equipment.

Whitaker Paper Co., 101 Ninth Street, Pittsburgh, has engaged R. Maurice Trimble, Commonwealth Annex, architect, to prepare plans for storage and distributing plant, 140 x 540 ft., to cost about \$200,000 with equipment.

DuPont Engineering Co., Du Pont Building, Wilmington, Del., has plans for a

new electric power plant at Belle, W. Va., to cost over \$150,000 with equipment.

Zenith Airway Co., Uniontown, Pa., is negotiating for site for new plant at Wellsville, Ohio, and contemplates early removal. Works will cost more than \$50,000 with equipment. Chamber of Commerce, Wellsville, is interested in project.

Marine Mfg. & Supply Co., 35 Water Street, Pittsburgh, manufacturer of barge and other marine equipment, has been reorganized and plans expansion. L. V. Stevens is president; William K. Stamets, vice-president, and Clifford B. Connelly, secretary and treasurer.

Detroit

DETROIT, Oct. 8.—Contract has been let by Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, to Otto Misch Co., 159 East Columbus Street, for one-story addition, 140 x 370 ft., to cost about \$100,000 with equipment.

Grace Construction Co., Fort Wayne, Ind., road contractor, has acquired three-acre tract at Marshall, Mich., for new plant. Initial structures will include one-story machine shop for repair of road machinery, including parts production, and general equipment storage and distributing plant.

Newaygo Portland Cement Co., Newaygo, Mich., is clearing ground at Charlevoix, Mich., for a new cement mill, to cost over \$650,000 with machinery.

Fisher Body Corporation, General Motors Building, Detroit, has asked bids on general contract for new one-story plant, 100 x 750 ft., with steam power plant and office building, to cost more than \$550,000 with equipment.

Kalamazoo Loose Leaf Binder & Equipment Co., Kalamazoo, Mich., has plans for new one-story plant, to cost about \$40,000 with equipment. O. F. Miller, Pratt Building, is architect.

George L. McCarthy, Grand Rapids, Mich., and associates have leased building on Kent Street, Portland, Mich., for aircraft manufacture. Initial output will be devoted to monoplanes, including parts production and assembling. Engine units will be secured from outside sources.

Grand Rapids Store Equipment Co., Monroe Avenue, N. W., Grand Rapids, Mich., manufacturer of show cases, etc., has awarded general contract to Owens-Ames-Kimball Co., Pearl Street, for a one-story and basement addition, 100 x 165 ft., with extension, 40 x 100 ft., to cost about \$70,000 with equipment.

Federal Motor Truck Co., Federal Avenue, Detroit, is arranging for construction of two-story addition, to cost about \$140,000 including equipment.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, will re-equip and re-tool its foundry unit at Saginaw, Mich., and carry out other changes and improvements preparatory to starting production on new models.

A. C. Spark Plug Co., Harriet Avenue, Flint, Mich., is considering one-story addition, 145 x 275 ft., primarily for die-casting and heat-treating service, to cost about \$160,000 with equipment.

American Coil Spring Co., 1455 West Thirty-seventh Street, Chicago, is completing plans for new works at Muskegon, Mich., initial unit to total about 20,000 sq. ft. of floor space, to cost about \$50,000. Present plant will be removed to new location, as well as plant of Monarch

Steel Treating Co., Chicago, recently acquired.

Manufacturers Foundry Co., Holland, Mich., has been organized to make gray iron castings. Plant is in operation and materials and equipment are being purchased.

Buffalo

BUFFALO, Oct. 8.—Plans are being arranged by G. Elias & Brother, 965 Elk Street, Buffalo, for new one- and two-story airplane manufacturing plant at Cheektowaga, near Buffalo, including parts production and assembling, to cost over \$100,000 with equipment.

Precision Die Casting Co., Syracuse, N. Y., has acquired property at Cleveland for new branch plant, to cost about \$100,000, with equipment.

Everlasting Sign Corporation, Fourteenth Street and Buffalo Avenue, Niagara Falls, N. Y., has plans for new two-story plant, to cost about \$25,000 with equipment. J. R. White, 426 Third Street, is architect.

Joseph A. Sanders, 115-17 Lathrop Street, Buffalo, operating a sheet metal-working and roofing plant, has acquired adjoining property and plans addition to double, approximately, present floor space, to cost more than \$30,000 with equipment.

Marine Elevator Co., Childs Street and Buffalo River, Buffalo, has filed plans for a new one-story machine shop.

Utica Structural Steel Corporation, Utica, N. Y., recently organized, will take over Andrews Iron & Steel Co., with local plant. New company proposes addition to mill in East Utica district, early next year. Wilbur F. Helmer is general manager.

City Council, City Hall, Syracuse, N. Y., W. D. Robbins, city manager, has plans for a new municipal airport, including hangar, repair shop and other units.

Milwaukee

MILWAUKEE, Oct. 8.—New business in machine tools continues good and, judging by the scope and character of inquiry, prospects for the future are promising. Locally, the situation is regarded as the best in several years, for, despite heavy buying of equipment for several months, a comparatively large volume remains to be placed. Prospective buyers cover a wide range of industries.

Milwaukee employment increased 692 persons during September, and the Oct. 1 figure of 38,077 in 50 typical plants is 2533 higher than a year ago, and the highest peace-time record.

Nordberg Mfg. Co., Milwaukee, will enlarge its works at Oklahoma Avenue and Chicago Road at an estimated cost of \$500,000, following acquisition of crusher business of Symons Brothers Co., Chicago, for which Nordberg company has been manufacturing two-thirds of its crusher machinery requirements. Nordberg company has negotiated a new issue of \$1,000,000 of 6 per cent serial gold bonds to cover purchase of Symons business and enlargement of its works. Robert E. Friend is president.

Oilgear Co., 661 Park Street, Milwaukee, manufacturer of broaching machines, presses, pumps, feeds and transmissions, is enlarging its works at a cost of \$175,000 by a machine shop addition,

100 x 180 ft., with a second story, 20 x 100 ft., for offices. Worden-Allen Co., Milwaukee, is general contractor.

Highway Trailer Co., Edgerton, Wis., has leased three buildings of former Moline Wagon Co. at Stoughton, Wis., and is installing equipment to manufacture steel and wood bodies for trailers and motor trucks. Space released in main works at Edgerton will be devoted to production of trailers, axles, etc.

Milwaukee Foundry Equipment Co., 473 Idaho Street, Milwaukee, is erecting a new factory, 70 x 130 ft., part two stories, to cost about \$35,000. Albert Pergande is consulting engineer.

National Gauge & Equipment Co., La-Crosse, Wis., subsidiary of MotoMeter Co., Long Island City, N. Y., has broken ground for a two-story extension, 130 x 160 ft., and an addition to power house. A 50,000-gal. steel tank is being installed in connection with automatic sprinkler system. Improvements will cost about \$100,000.

Allis-Chalmers Mfg. Co., Milwaukee, is building a two-story addition, 60 x 115 ft., to administration building of tractor division of main works in West Allis, Milwaukee.

Minneapolis, St. Paul & Sault Ste Marie Railway, Minneapolis, is making surveys for improvements in round house, machine shop, coaling plant, and water tanks at Ashland, Wis. Replacement of considerable equipment is contemplated.

Mads Madsen, National Building, Minneapolis, Minn., is low bidder at \$164,997 for general work of erecting a new vocational training school, 120 x 150 ft., three stories and basement, at Green Bay, Wis. It will cost about \$300,000 complete. Shop equipment purchases probably will not be made until early in 1929. Architects are Foeller, Schober & Berners, Green Bay.

Bids close Oct. 23 with J. W. Purves, secretary Board of Education, Friendship, Wis., for a new two-story high school, 73 x 108 ft., including manual training department. It will cost about \$100,000. Architects are Smith & Brandt, Appleton and Manitowoc, Wis.

Lomira Mfg. Co., Lomira, Wis., manufacture of furniture and hardwood specialties, will build a new plant costing about \$75,000 to replace factory destroyed by fire on Sept. 18.

Chicago

CHICAGO, Oct. 8.—Tendencies in the machine tool trade are not as well defined as a week ago. Miscellaneous orders are more widely scattered and less numerous, but fresh inquiry is more active. Progress is slow on large lists.

The Chicago, Milwaukee, St. Paul & Pacific, is tabulating bids recently taken. Allis-Chalmers Mfg. Co., Milwaukee, is not yet ready to make known its exact needs and the A. O. Smith Corporation has not passed a formal appropriation for its machine tool requirements. An electrical equipment manufacturer in Chicago is making numerous replacements and is reported to have purchased a number of small lathes. A pump manufacturer in Iowa has ordered a 16-in. x 6-ft. lathe and a local builder of radio sets has purchased a 50-ton press. The Santa Fe will take prices on an 18-in. x 1½-in. double-wheel, motor-driven grinder for delivery to California.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a sub-

station, 100 x 160 ft., on Prairie Avenue, to cost \$200,000 with equipment.

Pioneer Publishing Co., 1114 North Boulevard, Oak Park, Ill., will install power equipment in a four-story printing plant to cost more than \$250,000. S. N. Crowen & Associates, 22 West Monroe Street, are architects and engineers.

Iowa Railway & Light Co., Davenport, Iowa, will spend about \$200,000 on improvements in its power plant at Boone, Iowa.

Household Utilities Corporation, Twenty-second Street and Fifty-fourth Avenue, Cicero, Ill., will build an addition, 80 x 400 ft., to cost \$200,000.

Commercial National Bank, Waterloo, Iowa, has been appointed receiver of Litchfield Mfg. Co., Waterloo, maker of agricultural implements. Company will continue operations under receiver.

E. L. Essley Machinery Co., 557 West Washington Boulevard, Chicago, has been appointed district agent for Consolidated Machine Tool Corporation.

Standard Oil Co., 910 South Michigan Avenue, Chicago, has plans for one-story storage and distributing plant at Decatur, Ill., to cost about \$100,000 with equipment. Schlitz & Bailey, 53 West Jackson Boulevard, are architects.

Union Furniture Co., Eighteenth Avenue, Rockford, Ill., has awarded general contract to Holmquist-Peterson Co., Swedish-American Bank Building, for a three-story factory, 80 x 300 ft., to replace one recently destroyed by tornado, to cost over \$100,000 with machinery. Peterson & Johnson, Swedish-American Bank Building, are architects.

J. I. Case Threshing Machine Co., Eighth Street, Des Moines, Iowa, has engaged C. V. Johnson, Commonwealth Building, architect, to prepare plans for a four-story addition, 100 x 130 ft., to cost about \$85,000 with equipment.

Board of Trustees, University of Chicago, 189 West Madison Street, Chicago, will soon take bids for superstructure for new three-story and basement power plant, 100 x 110 ft. It will have initial capacity of 12,000 hp. Philip B. Maher, 157 East Erie Street, is architect.

Chrysler Corporation, East Jefferson Street, Detroit, manufacturer of automobiles, will build a one-story factory branch and distributing plant at Chicago, to cost about \$100,000 with equipment. Mundie & Jensen, 39 South La Salle Street, Chicago, are architects.

Board of Education, Minot, N. D., is considering installation of manual training equipment in three-story junior high school addition to cost over \$200,000, for which bids have been asked on general contract. Bugenhagen & Molander, Union National Bank Annex, are architects and engineers.

Cudahy Packing Co., Union Stock Yards, Chicago, will soon begin superstructure for four-story cold storage and refrigerating plant, 55 x 145 ft., at Sioux City, Iowa, to cost about \$180,000 with machinery.

Lakeside Railway Signal Co., Freeport, Ill., is completing plans for first unit of new plant at South Beloit, Ill., one-story 40 x 300 ft., to cost about \$100,000 with equipment.

Rapid City, Black Hills & Western Railway Co., Rapid City, S. D., has awarded general contract to Kepp Construction Co., local, for new locomotive house and machine shop, to cost about \$30,000 with equipment.

Cleveland

CLEVELAND, Oct. 8.—Machine tool business and inquiry continues good. Buying is well distributed although the automobile parts industry is showing more activity than other fields. The White Motor Car Co., Cleveland, will purchase considerable machinery to manufacture a new truck model which it will bring out shortly. Buying by automobile manufacturers in the Detroit territory has slowed down, but is expected to show more life when motor car builders effect plans to bring out new 1929 models. Turret lathes continue to move well in single orders from widely diversified industries. Buyers as a rule want quick deliveries, but a local manufacturer is unable to make shipments within six or eight weeks.

Union Chain & Mfg. Co., Sandusky, Ohio, maker of elevating, conveying and power transmission machinery, has acquired control of American High Speed Chain Co., Indianapolis, and subject to approval of stockholders, will combine. Indianapolis company manufactures complete line of silent or high speed chains, smaller pitch steel roller chain and sprockets and lines of two companies will supplement each other. With approval of stockholders, machinery and equipment of American company will be removed to Sandusky, a new unit having been provided. J. C. Howe, president, and W. A. McCosh, vice-president of American company, will become part of new organization, officers of which will be Fred Emmons, president and treasurer; J. C. Howe and Walter Hay, vice-presidents, and E. F. Emmons, secretary.

Uniflow Stoker Corporation, Sidney, Ohio, has been organized to manufacture power stokers for 50 to 200-hp. boilers and Turner domestic stokers. It is reorganization of Uniflow Stoker Co., formerly at Piqua, Ohio, which has been recapitalized and removed to new factory at Sidney. Company is in production and also manufactures all parts.

Cleveland Planer Co., 3148 Superior Avenue, Northeast, Cleveland, has purchased good will, patents, drawings, patterns, jigs, fixtures and rights to manufacture and sell Emco W bench power punch press, formerly built by Enterprise Machine Tool Co., Chicago. Cleveland company expects to build presses in quantity to be carried in stock for prompt shipment and will also be in position to furnish repair parts.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, is considering one-story ice-manufacturing plant at Willoughby, Ohio, to cost about \$200,000 with machinery.

General Tire & Rubber Co., Akron, Ohio, is said to be planning an expansion program to increase capacity about 50 per cent, to cost over \$1,000,000.

Fred W. Mettler, Union Mortgage Building, Cleveland, architect, has awarded general contract to Vokes Construction Co., same address, for two-story automobile service, repair and garage building, and bus terminal 120 x 220 ft., to cost about \$160,000 with equipment.

City Council, Zanesville, Ohio, has authorized fund of \$60,000, for establishment of municipal airport, including hangar, with shop and repair facilities, oil storage and other units.

Goodyear Tire & Rubber Co., Akron, Ohio, has awarded general contract to Hunkin-Conkey Construction Co., Hunkin-Conkey Building, Cleveland, for a

five-story addition, 200 x 600 ft., to cost more than \$750,000 with equipment. Portion of structure will be used for storage and distributing. Further expansion is said to be under consideration.

Forest City Walworth Run Foundries Co., 2500 West Twenty-fifth Street, Cleveland, has awarded general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for four-story foundry and distributing unit to replace part of plant lately damaged by fire, to cost over \$70,000 with equipment.

Van Huffel Tube Corporation, Warren, Ohio, manufacturer of steel tubing, has purchased former plant of Sterling Knight Motor Co., Youngstown, for expansion.

Gears & Forgings, Inc., Cleveland, will enlarge its gear making departments by a three-story building, 72 x 72 ft.

Cincinnati

CINCINNATI, Oct. 8.—The first week of October has brought no signs of a let-down in machine tool buying, which has been at about the same rate as in September. While the automobile industry continues the largest source of machine tool business, several builders state that orders have been even more diversified than in recent weeks. Unfilled orders have accumulated to such an extent that many companies are having difficulty in making early deliveries. Production is holding up to high levels and in some cases plants have scheduled extra shifts to speed output.

An automobile maker in the Detroit district has bought six automatic lathes, while a manufacturer of airplane engines has contracted for four large engine lathes. Foreign business has been of somewhat greater proportions in the past few weeks, outstanding transactions including five rapid production lathes for delivery to Czechoslovakia and four lathes for shipment to Holland.

Board of Education, Marietta, Ohio, is said to be planning installation of manual training equipment in addition to high school, to cost about \$130,000. Garber & Woodward, 4 West Seventh Street, Cincinnati, are architects.

Black-Clawson Co., Second and Vine Streets, Hamilton, Ohio, manufacturer of pulp and paper mill machinery, has acquired adjoining property and contemplates expansion.

City Council, Middlesboro, Ky., is said to be planning installation of a municipal electric light and power plant. A city waterworks is also proposed.

Board of Education, Louisville, is reported planning installation of manual training equipment in new three-story and basement high school, to cost \$375,000, for which bids have been asked on general contract. J. M. Colley is architect.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Oct. 17 for couplings and dies, circular 137; for 100 intake wrenches, disks and pointers, circular 138; until Oct. 16 for 12,000 ferrules and electric terminals, circular 139, and 115,000 hose clamps, circular 142.

Lewis Mfg. & Supply Co., Louisville, manufacturer of kitchen equipment, has leased for new plant a factory to be erected at Brook and Bloom Streets, to cost about \$30,000.

Prest-O-Lite Co. and Linde Air Products Co., 30 East Forty-second Street,

New York, affiliated organizations, have awarded general contract to W. W. Wessell, 388 North Front Street, Memphis, Tenn., for new local plants, each one-story 58 x 86 ft., to cost about \$70,000 with equipment.

Stanton Motor Co., Broad and Grant Streets, Columbus, Ohio, has leased a building to be erected on local site, to cost about \$100,000 with equipment, for new service, repair and garage building. Richard, McCarty & Bulford, 584 East Broad Street, are architects.

Indiana

INDIANAPOLIS, Oct. 8.—Cyclone Fence Co., Greensburg, is reported planning one-story addition to cost over \$40,000 with equipment. Headquarters are at Waukegan, Ill.

Hayes Body Corporation, Grand Rapids, Mich., has purchased plant at 1231 West Morris Street, Indianapolis, formerly operated by Murray Body Corporation, Detroit. New owner will continue production and plans output of about 100 bodies daily.

Link-Belt Co., Holmes Avenue and West Michigan Street, Indianapolis, has awarded general contract to Latham & Walters, Empire Life Building, for three-story addition, to cost \$150,000 with equipment. Headquarters are at 910 South Michigan Avenue, Chicago.

City Council, Shelbyville, is considering establishment of municipal airport, with hangars, repair and reconditioning shops, oil storage and other units, to cost over \$50,000.

New Albany Machine Mfg. Co., New Albany, has purchased patents and right to manufacture sheet metal-working machinery, formerly owned by J. M. Robinson Mfg. Co., Cincinnati. Jigs and inventory are now being transferred to New Albany plant, East Tenth and Water Streets.

St. Louis

ST. LOUIS, Oct. 8.—Parks Aircraft, Inc., St. Louis, recently organized by Russell E. Gardner, head of Gardner Motor Co., Main and Rutger Streets, and associates, is planning construction of new works, with parts and assembling divisions, at East St. Louis, Ill., to cost more than \$150,000 with equipment. Harry P. Mammen is president.

Benjamin S. Lang, St. Louis, care of W. S. Frank, Security Building, architect, has plans for three-story and basement automobile service, repair and garage building, 70 x 175 ft., to cost more than \$100,000 with equipment.

Houston Oil Co., Houston, Tex., has plans for a new storage and distributing plant at Herbert, Ark., to cost over \$50,000 with equipment. Company will also improve oil refinery and install additional equipment.

Kansas Power & Light Co., Atchison, Kan., will remodel building at Tenth and Main Streets for a new machine shop and motor bus service and garage unit. A hydraulic lift and other equipment will be installed.

General Tool Co., Enid, Okla., is considering new one-story plant 75 x 135 ft., to cost about \$40,000 with equipment.

Peoples Sugar Co., Moroni, Utah, is reported planning new beet sugar mill near Cozad, Neb., to cost about \$500,000

with machinery. Project includes power house and machine shop.

C. H. Walbert, Penn and Thirty-ninth Streets, Oklahoma City, Okla., and associates are planning construction of new ice-manufacturing plant at Tulsa, Okla., to cost about \$100,000 with equipment.

Meginnis & Schaumburg, Federal Trust Building, Lincoln, Neb., architects, have plans for a three-story automobile service, repair and garage building, 50 x 140 ft., to cost more than \$100,000 with equipment.

Empire Gas & Fuel Co., Bartlesville, Okla., has plans for a pipe line from its properties in Mid-Continent field to a point near Chicago, about 450 miles, and contemplates a new oil refinery at northern terminus, with capacity to handle about 10,000 bbl. of crude oil per day. Project will cost more than \$1,500,000.

Standard Steel Works, North Kansas City, Mo., H. J. Bornstein, head, has plans for one-story storage and distributing plant, 100 x 115 ft., with shop facilities, to cost about \$60,000.

Gulf States

BIRMINGHAM, Oct. 8.—Plans have been filed by Houston Lighting & Power Co., Houston, Tex., for a one-story equipment storage and distributing plant, with automobile service and garage facilities, 168 x 370 ft., to cost about \$250,000.

United States Cast Iron Pipe & Foundry Co., Birmingham, is carrying out an expansion program at North Birmingham, including a new unit for producing pipe 4 to 12 in. diameter, 18 ft. long.

Birmingham Electric Co., Birmingham, is disposing of bond issue of \$3,000,000, part of fund to be used for expansion and betterments.

Central Power & Light Co., Frost Building, San Antonio, Tex., is reported planning new hydroelectric power plant in Maverick County, to cost about \$200,000 with transmission line.

Buick Motor Co., 1420 Young Street, Dallas, Tex., main plant at Flint, Mich., has awarded general contract to Rife Construction Co., Dallas, for three-story factory branch, service and repair building, 95 x 150 ft., to cost about \$130,000 with equipment.

Louisiana Public Utilities Co., Lafayette, La., will rebuild part of generating station at Oakdale, La., destroyed by fire Oct. 1, with loss of about \$120,000 including equipment.

Board of City Commissioners, Palmetto, Fla., will receive bids until Oct. 22 for equipment for electric light and water-works station, including Diesel oil engine with direct-connected alternator and accessories; pumping machinery, switchboard, piping, valves and auxiliary equipment. Main Engineering Co., 112 Baker Street, Daytona Beach, Fla., is engineer.

Stamford Independent School District, Stamford, Tex., has authorized construction of one-story manual training school, 55 x 115 ft., to cost about \$30,000 with equipment. David S. Castle Co., Alexander Building, Abilene, Tex., is engineer.

Great West Pipe Line Co., Big Springs, Tex., recently organized by Reese S. Allen, City National Bank Building, Wichita Falls, Tex., and associates, is arranging for construction of new oil refinery at Big Springs, with pipe line from Chalk Roberts oil field, Howard County, to refinery. Plant of Interstate

Gasoline Co., Iowa Park, Tex., has been acquired by Great West company and part of equipment will be removed to new plant. Project will cost more than \$500,000. Mr. Allen is now operating oil refineries at Amarillo, Tex., and other points.

Board of Education, Montgomery, Ala., contemplates installation of manual training equipment in two-story and basement high school in Capitol Heights section, to cost about \$200,000 with equipment. Frederick Ausfield, Shepherd Building, is architect.

Following completion of first unit of new steam-operated electric power plant at Lake Pauline, near Quanah, Tex., scheduled for this month, West Texas Utilities Co., Abilene, Tex., plans installation of two additional units with capacity of 40,000 hp., making total of 60,000 hp.

Libbey-Owens Co., Toledo, Ohio, has purchased plant of United States Sheet & Window Glass Co., Shreveport, La., and other assets for price of \$6,400,000. New owner is considering extensions and improvements in Shreveport mill and installation of equipment to manufacture laminated glass.

City Council, Denton, Tex., is planning extensions in municipal power plant and additional generating and pumping machinery, to cost about \$30,000. J. P. Greenwood, Allen Building, Dallas, Tex., is engineer.

Canada

TORONTO, Oct. 8.—Machine tool business in this market for the past week was practically on a par with that of recent weeks. Some inquiry is coming out in which lists from a half-dozen to a dozen tools are involved, but the bulk of orders is for single tools. Wood-working tools are in strong demand from lumber plants and wood-working shops.

Chrysler Motor Co., has secured 70 acres at Windsor, Ont., and will start work immediately on erection of buildings to manufacture Chrysler, De Soto, Fargo and Plymouth cars and trucks. Plant will cost \$1,500,000 and is expected to be completed in January.

Canadian Steel Corporation, Ltd., Ojibway, Ont., is installing equipment to manufacture electrically welded wire mesh for concrete reinforcing. It is also installing equipment to manufacture wire fence and fence posts.

G. G. McKeough, 329 Wellington Street West, Chatham, Ont., is completing arrangements for erection of a new machine shop.

Arthur Jackson Machine Tool Co., Toronto, has moved into its new and larger offices and warehouse at 9 Front Street, East.

Pyramid Paper Products, Ltd., East Angus, Que., is having plans prepared by J. W. Gregoire, 86 Wellington Street North, Sherbrooke, Que., for a factory to cost \$40,000. It will be one story, 40 x 280 ft.

Bids are being received (no closing date set) by S. McPhie, architect, Sun Life Building, Hamilton, Ont., for a \$25,000 addition to plant of Wallace Barnes Co., Ltd., 274 Sherman Avenue, West, Hamilton, Ont., manufacturer of flat, coil, phosphor bronze, and steel wire springs, etc. It will be two stories and basement, 60 x 120 ft.

National Steel Car Corporation, Ltd., Kenilworth Avenue, Hamilton, Ont., will

start work immediately on addition to cost \$25,000.

Sangamo Electric Co., of Canada, Ltd., 183 George Street, Toronto, is having plans prepared by Chapman & Oxley, Northern Ontario Building, for two-story addition, 40 x 110 ft.

Bids will be called this month for four-story addition, 150 x 400 ft., to plant of Hinde & Dauch Paper Co. of Canada, Ltd., 45 Hanna Avenue, Toronto. R. Cook is engineer.

Godson Contracting Co., Ltd., 203 Richmond Street, West, Toronto, will start work soon on erection of a one-story machine shop, 34 x 125 ft.

Gray Ball Bearing Co., 686 St. Clarens Avenue, Toronto, has let general contract to Wells & Gray, Ltd., Confederation Life Building, for one-story plant to cost \$25,000.

City Council, Charlottetown, P. E. I., contemplates construction and installation of electric light and power plant.

Western Canada

Victoria Cold Storage & Terminal Co., Victoria, B. C., has awarded contract to Luney Brothers, Sayward Building, Victoria, B. C., for a five-story cold storage plant, 110 x 120 ft., at Ogden Point to cost \$400,000.

Bids are being received by chairman of Committee on Public Utilities, Winnipeg, until Nov. 19 for delivery at Slave Falls, Man., of equipment and supplies to be used in power development plant under construction, including two 10,000-kva., generators and two 450 kva. generators with accessories and spare parts; also erection of five spillway gates, four sluice gates, and stop logs, etc. Plans and specifications with Winnipeg Hydro Electric Commission, 55 Princess Street, Winnipeg.

Pacific Coast

SAN FRANCISCO, Oct. 4.—Plans are under way by Emsco Aero Engine Co., Los Angeles, E. M. Smith, president, for new plant on eight-acre tract at South Gate, near Los Angeles, to cost about \$200,000 with equipment.

Fibreboard Products, Inc., Antioch, Cal., has awarded general contract to Barrett & Hilp, 918 Harrison Street, San Francisco, for new one-story and basement mill, to cost over \$80,000 with equipment. Laland Rosener, 233 Sansome Street, San Francisco, is engineer.

In connection with expansion program at its motion picture studios, Fox Film Corporation, Los Angeles, plans installation of power equipment and electrical machinery to cost more than \$1,500,000. Entire program will include group of 25 buildings at Westwood to cost about \$8,000,000.

Board of Education, Los Angeles, has authorized construction of a one-story vocational shop unit with new high school group on Santa Barbara Avenue, to cost \$350,000. Architectural Division, 1445 South San Pedro Street, is preparing plans.

Premier Bed & Spring Co., 5700 Third Street, San Francisco, has filed plans for one-story addition to plant, to cost over \$50,000 with equipment.

Wenatchee-Beebe Orchard Co., Clarks-ton, Wash., is planning construction of new cold storage and refrigerating plant to cost about \$70,000 with equipment.

American Can Co., 120 Broadway, New York, and Hunter-Dulin Building, San Francisco, is said to be planning new works at Pittsburg, Cal., for manufacture

of tin cans and other containers, to cost more than \$175,000 with equipment.

Ventura Union High School District, Ventura, Cal., plans construction of one-story vocational shop with new junior high school group, for which bonds for \$400,000 have been approved. Austin & Ashley, Chamber of Commerce Building, Los Angeles, are architects.

Board of Education, Inglewood, Cal., plans construction of one-story vocational shop with new high school group on Rosecrans Avenue to cost about \$400,000. T. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Century Electric Co., St. Louis, has removed its Spokane, Wash., office to 709 Hutton Building, Sprague and Washington Streets.

Jamison Steel Co., Los Angeles, will be located in its new warehouse at 1320 Santa Fe Avenue on Nov. 1.

Jones & Laughlin Steel Corporation, Pittsburgh, has closed its branch office in Smith Building, Seattle, which was in charge of Jesse K. Barker, general sales manager.

Foreign

CONTRACT has been let by Segura & Jugar Hydroelectric Development Co., Madrid, Spain, to Fox Brothers International Corporation, 33 Rector Street, New York, for five hydroelectric power plants, each with capacity of 20,000 kw., on Segura and Jugar Rivers, southeastern Spain, with transmission lines for service in mining districts in vicinity. About 40 per cent of output will be used later by Spanish Government for electrification of railroads in that territory. Project is reported to cost about \$2,000,000.

Increase in Petroleum Output

Production of crude petroleum in the United States in August was 77,829,000 bbl., a gain of about 3 per cent over July, when the total was 75,426,000 bbl. There was a falling off, however, in the aggregate production of the first eight months, which amounted this year to 588,548,000 bbl., compared with 598,242,000 bbl. last year.

New September Record in Building Contracts

Construction contracts in September in the 37 States east of the Rocky Mountains are reported by F. W. Dodge Corporation at \$587,674,000. This is the largest figure ever recorded in September. It is 13 per cent ahead of September, 1927, and 14 per cent ahead of August, 1928. It brought the total amount for the first nine months to \$5,132,944,000, an increase of 7 per cent over the first nine months of 1927.

Residential construction still holds the first position in volume, at \$202,807,000, or 35 per cent of the total. This percentage has been dropping from 40 or more, earlier in the year. Public works and utilities accounted

Plans are said to be under way for organization of a company to develop low grade manganese properties near Santiago de Cuba, headed by Howard Trumbo, American resident at Havana, Cuba, inventor of process for transforming such material into commercial concentrates; A. E. Smith, comptroller Electric Bond & Share Co., 2 Rector Street, New York; J. D. Lannon, vice-president American Radiator Corporation, 40 West Fortieth Street, New York; Martin O'Mara, president Brockway Motor Truck Co., Cortland, N. Y., and others. It is purposed to construct plant with milling capacity of about 1000 tons per day, to cost over \$750,000 with machinery.

An automobile company at Sao Paulo, Brazil, has purchased property south of city, as site for an automobile plant, including parts manufacture and assembling. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Brazil No. 288445.

Compania Hispano Americano de Electricidad, known as "Chade," Buenos Aires, Argentina, is arranging for early sale of capital stock in United States, representing portion of recent increase in capital of 60,000,000 pesetas (about \$11,580,000), fund to be used in part for expansion in power plants and system. Company has work under way on new central generating plant with capacity of 85,000 kw., including additional transmission lines and power substations. Arturo Dunzelmann is manager.

A municipality in State of Sao Paulo, Brazil, is asking bids until Nov. 30 for pumping, power and other equipment for municipal waterworks and sewage systems. Information at office of Industrial Machinery Division, Department of Commerce, Washington, reference Brazil No. 287887.

for \$119,014,000, industrial buildings for \$114,780,000, commercial buildings for \$60,068,000, educational buildings for \$38,800,000 and hospitals and institutions for \$23,846,000.

Lower construction during the remainder of the year is indicated by a drop of 15 per cent in the value of projects contemplated but not yet let. The total, at \$522,656,000, is also 17 per cent less than in September, 1927.

Motor Truck Output May Break 1925 Record

Predicting the continuance during the remaining months of 1928 of the high motor truck production which has marked the first eight months, A. J. Brosseau, chairman motor truck committee National Automobile Chamber of Commerce, foresees the possibility of 1928 equaling, if not surpassing, the record year of 1925.

"The National Automobile Chamber of Commerce figure of 66,795 trucks produced in the United States and Canada in August sets a new high mark for the production of trucks in any month since the beginning of the industry," Mr. Brosseau said. "The previous high mark of 61,185 was set in September, 1925. This high production continues the movement which began in May and which character-

ized the early summer months of this year.

"The accelerated production in mid-year has resulted in a total of 377,954 trucks produced to Sept. 1, compared with 358,234 during the same period last year and 346,528 produced during the first eight months of 1925, the truck industry's record year. In 1925 a total of 531,628 trucks were produced, due chiefly to a well sustained production toward the end of the year. Production was also continued at a good level toward the end of 1926, when a total of 529,920 trucks were produced. The rather marked reduction in the output of trucks during the last quarter of 1927 carried the total for that year below the half million mark for the first time since 1924."

Slight Increase in Shipments of Railroad Locomotives

Shipments of locomotives in September totaled 41, compared with 34 in August, which was the lowest number for many years. The September total was less than one-third that of September, 1927, when 127 units were shipped. Twenty-eight of the 41 are steam locomotives for domestic use and two are electric units on domestic order. The remaining 11 are steam engines for export.

During the first nine months shipments totaled 435, against 838 in the corresponding period of 1927. Steam and electric units for domestic use this year numbered 285 and 87 respectively, against 573 and 116 last year. Steam and electric units for export numbered 61 and 2 this year, against 136 and 13 last year.

Slight Increase in Industrial Coal Stocks

Stocks of anthracite and bituminous coal in the United States in the hands of industries on Sept. 1 are estimated by the National Association of Purchasing Agents at 40,090,000 tons, a gain of 1½ per cent from the 39,415,000 tons Aug. 1. This is the first upturn of the curve since last October. The average stocks are estimated as equivalent to 37 days' supply at current consumption rates, an increase of one day during the month. Steel mills are estimated to have 33 days' supply, railroads 33 days' supply, by-product coke plants 23 days, electric utilities and coal gas plants 55 days and other industries 36 days.

Industrial consumption during August is given as 33,890,000 tons, a gain of 1 per cent over July and the highest figure since last May. Production in August was 48,598,000 tons, a gain of 16 per cent over July, and the highest figure since last March.

The Technology Club, Syracuse, N. Y., will celebrate the twenty-fifth anniversary of its founding with an all-day program, Oct. 15, ending with a banquet in the evening.

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Gates and Risers for Good Castings

How Their Proper Arrangement Avoids Many Troubles—Methods of Skimming Slag and Filling Mold

BY PAUL R. RAMP*

GATES and risers are to a mold what food is to our bodies. Proper food means a good, healthy body free from aches and pains and a smooth skin with no imperfections on the surface. Proper gates and risers mean good castings free from blow holes, sand, slag and shrink cavities, with a smooth, clean surface. It is true that we can produce a defective casting even though we have the gates and risers properly made; but it is also true that we can have our bodies in perfect health and break a limb or lose an eye. A healthy body or a properly gated mold represents 75 per cent of the battle won. For this reason I believe too much cannot be said about gates and risers and their influence on the quality of the casting produced.

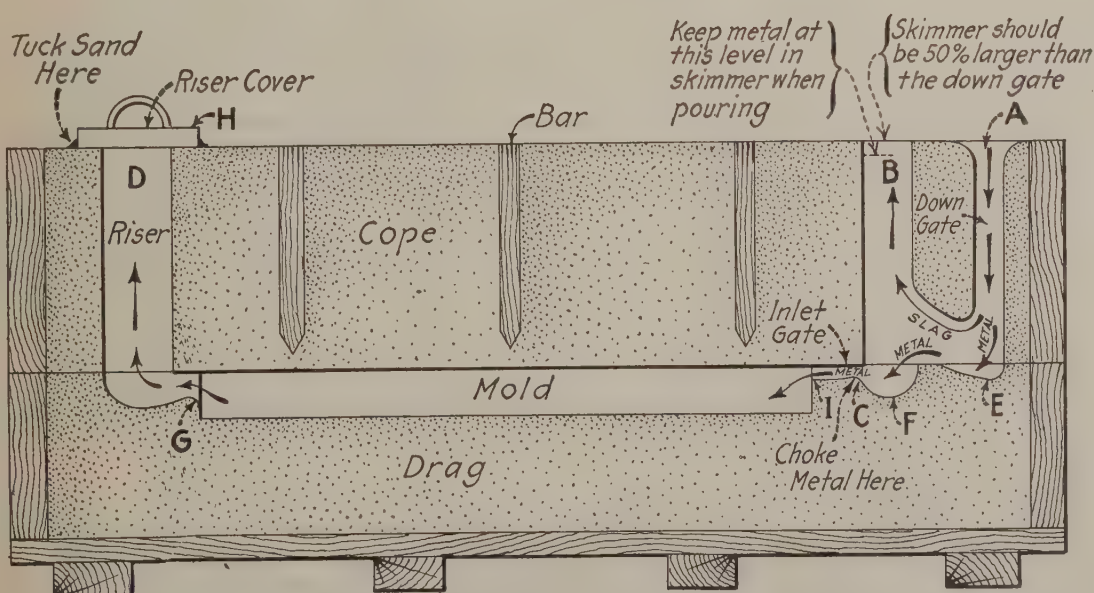
A foundry engineer, when designing molding equipment for quantity production of castings, considers first where and how he is going to gate the mold; where he is going to

place the risers or feeding heads (riser is often called feeding head). After he has settled this question he is ready to consider other details, such as parting the mold, holding the cores in place and carrying off the gas. He decides upon the gates and risers first, because they are the most important.

In the job shop where the work varies from day to day the molder must make his own gates and risers, and decide where they are to be placed and the kind he must use. Consequently it is very important that he should have a thorough knowledge of the subject. It is the author's intention to give as much information as possible that will help him decide on his plan of gating and feeding the many different molds that he makes.

All of the metal entering the mold must pass through the gate; consequently the gate must receive the same attention that is given the mold. The sand must be as well mixed; the escape of the gas must be provided for. As there is more danger of a gate cutting than of a mold cutting, the gate must be surrounded with the same facing sand that is rammed around the pattern. Just as much care

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SECTION of Mold for a Face Plate, Showing Method of Gating and Character of Riser to Produce Best Results. The way the slag is skimmed off, by a combination of a choking effect at C and provision for its reception at B, is particularly effective

must be used in ramming around the gate as in ramming around the pattern.

To prevent any impurities from entering the mold with the metal, the pouring gate must be kept full during the pouring process. As this cannot be done if the gates are too large, it is good practice to choke the flow somewhere between the ladle and the mold.

These are things that the molder must always have in mind in making his gates and risers.

Gating a Face-Plate Mold for an Iron Casting

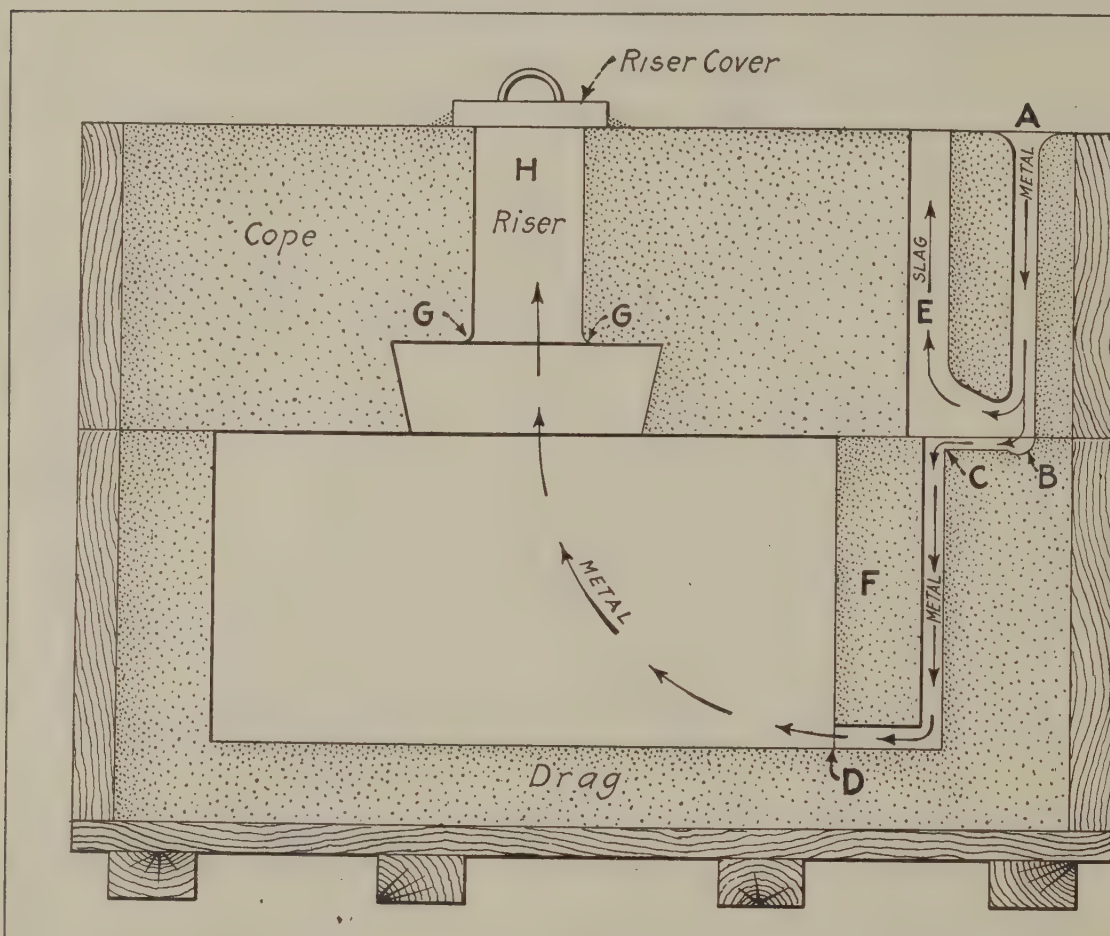
A CROSS-SECTION of a mold for a face plate is shown in the first illustration. This casting must be very clean and free from dirt or slag. A single skim gate is used on this mold; if it is properly made, and the gates are kept full during the pouring, a clean casting will be produced.

Hot metal is poured from the ladle through the pouring gate at A. The first metal must be poured very quickly,

the same time it must be remembered that if the small gate, or channel, that extends from the choke to the mold is too long, there is danger of the metal in this channel chilling, thus closing the inlet gate entirely.

The surface of the basin at E must be soft enough to prevent the metal from cutting into it. The same applies to the basin F directly under the skimmer. Also, the gate surface between these two points must be soft, because the metal flowing over this area will cut if the surface is hard, and produce more dirt than can be carried off by the skimmer.

A side riser, D, is used on this mold, with a fillet at G where the riser is connected with the mold. This fillet is provided to prevent the riser from breaking into the casting when it is removed. The riser cover H should be made of cast iron heavy enough to fit snugly over the riser. The function of the riser cover is to prevent air from rushing from the mold through the riser.



GATES and Risers for a Mold Used in Making a Hammer Die Block: This shows the same method for getting rid of the slag as in the illustration on the preceding page. The riser, however, here rises above the center of the casting, instead of being led off at one end

so as to choke the stream of metal at C. When the progress of the metal is retarded at C, the level rises in the skimmer toward B. All the metal that follows must be poured fast enough to keep the skimmer at B full. When the metal is running into the mold in this manner, the slag and other impurities automatically rise to the top, while the heavier metal flows beneath it into the mold.

Care must be used in preparing the choke gate at C. It must be sufficiently large to allow the metal to flow fast enough to run the mold and avoid cold-shuts, and it must be small enough to produce a head of metal in the skimmer at B. The choke point shown at C must be abrupt and not tapered. A tapered gate produces a nozzle effect on the stream of iron and, with a nozzle-shaped gate, dirt or slag may be forced into the mold, regardless of the skimmer.

At the point where the metal enters the mold, indicated by I, a small quantity of impurity may be stopped, but there is always danger of dirt being forced into the mold if it gets as far as I. For this reason it is safer to choke a gate as far away from where it enters the mold as possible. At

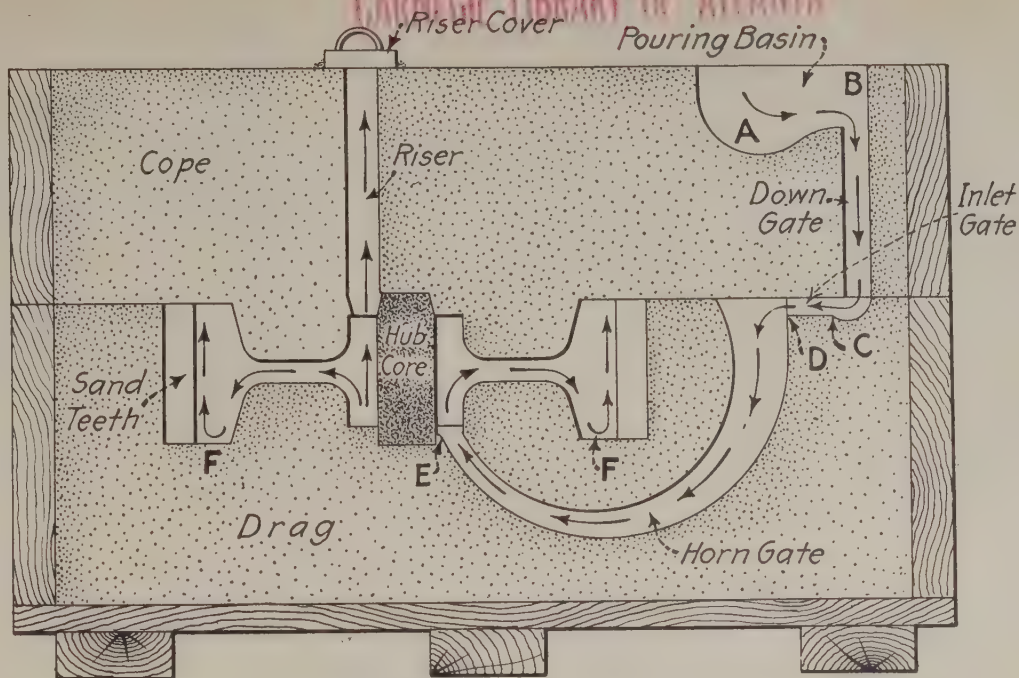
A current of air is produced by the metal forcing the air out of the mold as it fills; it often blows off corners and projections in the mold and produces a dirty casting. With the riser cover properly sealed, the air in the mold is compressed and acts as a support to the cope, or top mold surface, until the metal reaches it. Without this air support, it is not unusual for the upper surface of a mold, directly over the riser metal, to blister and drop off into the mold and produce a dirty casting. This blister is commonly called a "burn down."

After a riser cover is placed in position on the mold, sand should be tucked around the outer edge to seal the joint between the top of the mold and the riser cover, to guard further against the escape of air.

Bottom Pouring Gate

CROSS-SECTION of a die block mold is shown in the second illustration. This die block, a heavy piece of iron, must be free from slag and sand holes and shrink cavities when casting. The pouring gate shown at A, working in

HORN Gate for a Gear Mold, Used to Avoid Damage to the Molded Teeth. Here the pouring basin is large enough to take care of slag. The riser leads from the heavy hub section. Metal from the gate flows outward in all directions from the hub



conjunction with skimmer *E* and the choke shown at *C*, will, if the metal is properly poured, produce a casting free from slag.

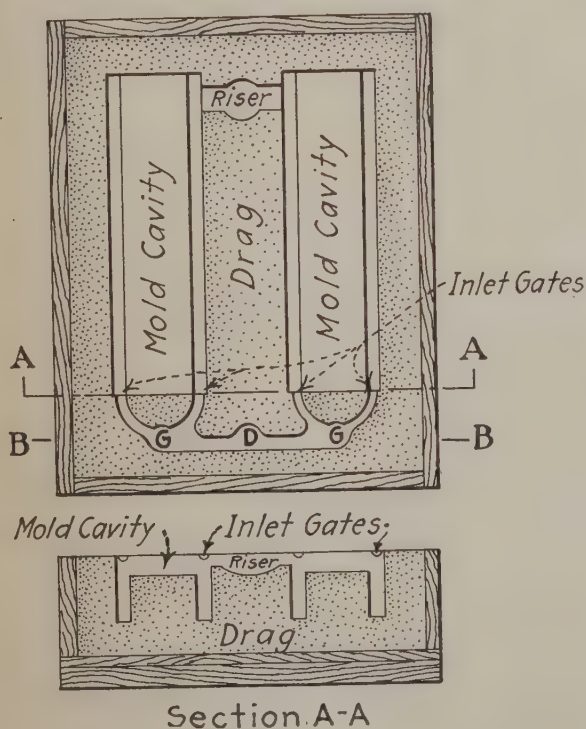
The bottom pouring gate leads the metal from *C* to the mold, which it enters at *D*. This mold is gated at the bottom because the fall of the metal to the joint of the mold, at the bottom, would be so great that the hot iron would be likely to cut into the surface of the bottom and produce sand holes in the casting.

In this case the single skim gate and choke at the joint prevent slag holes, and the bottom pouring gate prevents sand holes. The skim gate at the joint would not insure a clean casting without the bottom pouring gate, because the

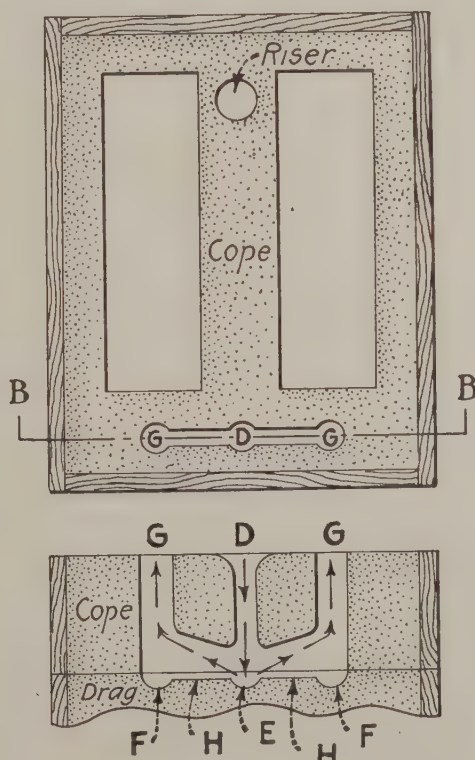
falling metal would cut the mold and produce sand holes. The bottom pouring gate, without the skim gate on the joint, would not insure a clean casting, because there would be danger of slag entering the mold. This is why a mold of this kind should be poured with the skim gate and bottom pouring gate combined.

Metal enters the gate at *A* and drops on the soft basin at *B*. The stream is choked at *C*, causing the slag to rise in the skimmer *E*, after which the metal proceeds to the mold through the bottom pouring gate. The usual care must be used in making the basin *B* and the channel to *C* soft enough to prevent cutting.

The space between the bottom pouring gate and the



Section A-A



Section B-B

DDOUBLE Skim Gate for Mold for Two Driving Box Shoes for Locomotive. Slag skimmers at *G, G*, and four inlet gates, feature this mold. A single riser serves both castings

mold proper, indicated by *F*, must be supported by rods to prevent its collapse before the mold is filled. This same space must be well vented, to prevent a scab or cut on the surface of the mold opposite the gate. This will occur if gas is confined between the bottom pouring gate and the mold.

The riser is covered to hold the air pressure against the upper surface of the mold and thus prevent a burn-down. Fillets are provided where the riser connects with the mold at *GG*, to prevent the riser from taking a piece out of the casting when it is broken off. This plan of gating should be applied to all molds for heavy, chunky castings, where the metal must fall some distance on the surface of the mold.

Horn Gates

THE third sketch is a cross-section of a mold for a spur gear. In pouring a mold of this kind, the metal must enter at a point where it will not damage the teeth that

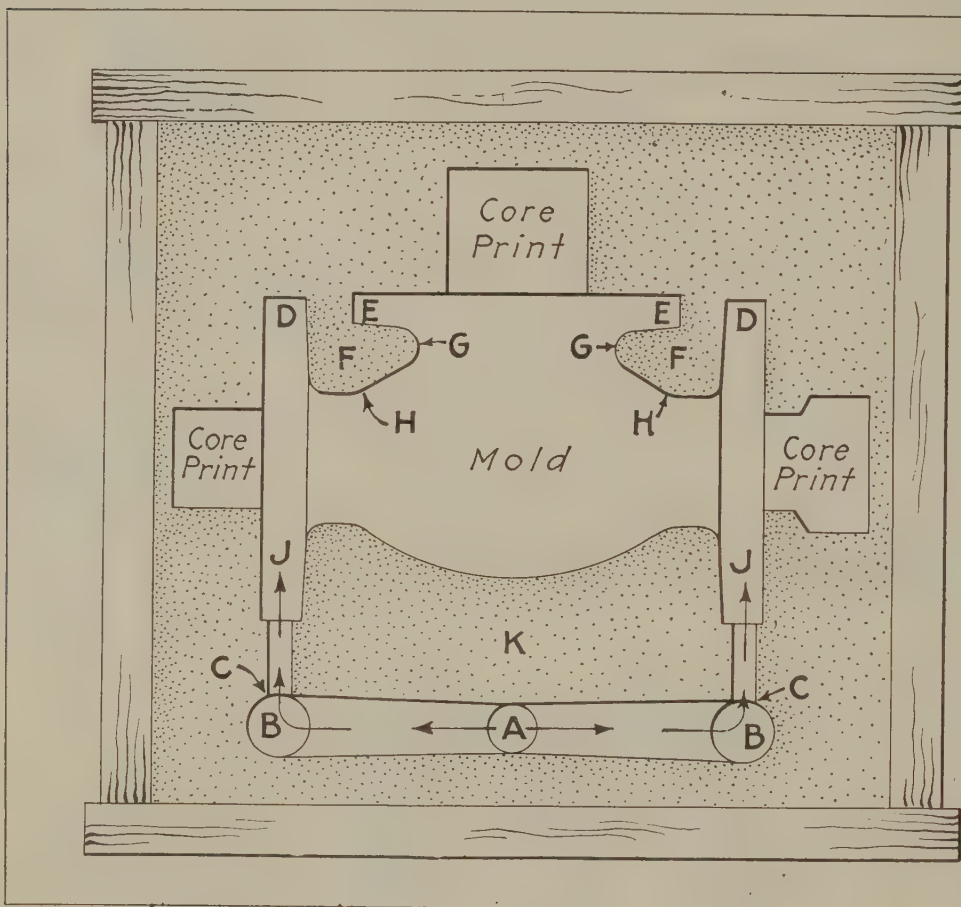
flows through the horn gate, under one section of the mold and into the bottom of the hub at *E*. From there it rises and flows over the web surface gently to the point indicated by *FF*.

After the mold is filled, the metal rises to the top of the cope through the riser. A riser cover should be used in a mold of this character, as the current of air produced by the metal entering the mold is likely, otherwise, to blow down the delicate columns of sand that produce the gear teeth.

The horn gate must not be too close to the bottom of the mold it is passing under. In such a case there would be danger of the gate's breaking into the mold directly above it, or confined gas causing a cut or a blow in the bottom surface of the mold.

Mold for Locomotive Driving Box Shoes

FOUR cross-sections of a mold for locomotive driving box shoes are shown in the fourth illustration. In this



GLOBE Valve Mold with Three Cores. This is a horizontal section through the mold, the metal being poured in at *A* and slag skimmed off at *B*. Especial care of surfaces at *G* and *H* is required in this type of casting

are formed in the sand. To pour it directly into the hub from a pouring basin would be dangerous, because the metal would splash and strike some of the delicate sand teeth. The best and safest plan is the use of a horn gate as shown here.

Hot metal enters the pouring basin at *A*. The bottom of this basin must be soft enough to prevent the metal from cutting, and a little lower than the point where the metal leaves the basin and enters the down-gate *B*. This is done to provide a cushion of metal in the bottom of the pouring basin for all the metal that follows to fall on. If this cushion of metal were not provided, the bottom of the basin would be cut away by the action of the metal before many pounds had flowed through the basin, and a quantity of the sand cut away in this manner would find its way through the down-gate to the mold.

The metal proceeds through the down-gate to the inlet gate, which connects with the horn gate and is choked at the point indicated by *C*. It is also choked at the point *D*, where the inlet gate connects with the horn gate. The metal

case two castings are made in one flask and a double skimming gate is used. These castings are machined on all sides and must be free from sand or slag. The double skimming gate is necessary to take care of the impurities properly.

Section *B-B* shows how the metal enters the gates. It is poured in at *D* and falls to basin *E*, from which it flows to *F-F* and rises in the two skimmers *G-G*. The plan of the cope is shown above section *B-B*.

Section *A-A* shows the four inlet gates, which are very small, to choke the metal. In the plan above section *A-A* the location of the two skimmers *G* and the pouring gate *D* can be seen, and the inlet gates also. These inlet gates are located so that the metal will drop to the bottom of the flanges and fill these flanges first, to prevent the surface at the flanges from being cut by the metal. When metal flows over a bare surface it is likely to scab and create a dirty casting. The plan should always be to have metal falling upon metal as early as possible in the pouring operation.

The inlet gates should be small enough to choke the

metal as it passes *G*, shown at left, and cause the skimmer to fill immediately. The riser is shown in the cross-section *A-A* and in the plans. Further to insure a clean casting, the riser must be covered during the pouring operation.

This plan of gating with the double skimmer and the proper size inlet gates will produce a clean casting, provided the facing is correctly mixed and the mold is clean before it is poured. The skimmer at *G-G* must always be at least 50 per cent larger than the pouring gate *D*. This makes it easier for the impurities to rise to the surface of the skimmer.

A single skim gate, as was shown in the first illustration, would not be practical when molding two of these castings in one flask, as one of the castings would be located too far from the single skimmer and there would be danger of dirt being collected between the skimmer and the casting. In all cases it is advisable to have the skimmer reasonably close to the mold.

Drag Section of a Globe Valve Mold

THE drag section of a globe valve mold shows how the double skimmer should be used in gating this type of mold. Metal entering the pouring gate *A* flows, as indicated by the arrows, to the two skimmers *B-B*. Here the metal is choked at *C*, where it enters the inlet gates and flows into the mold at *J-J*. This plan is the best method for gating globe valves; it not only insures a casting free from slag but also free from sand holes. The casting will be free from slag because the method of gating with the double skim gate will make it impossible for the slag to enter the

mold. If the skimmers are kept full during the pouring process the casting will be free from sand holes, because the metal dropping into the flanges from the side of the mold indicated will not cut or damage the surface of the mold.

The mistake made by many molders who have worked at the business for years is to gate castings of this character at the points of the mold indicated by *D* or *E*. This is done to enable them to use a smaller flask. But it is false economy, as a number of castings rejected on account of sand holes caused by the gates being located at these points will increase the cost more than the use of a larger size flask. The reason the gates that enter the mold at *D* or *E* produce dirty castings is that the sand pockets marked *F* are completely surrounded by the metal and the gates prevent free escape for the gas from these pockets. A frequent result is that the surface of these pockets, at *G-G* and *H-H*, scab and cut, and the loose sand that cuts off from them is found later on the surface of the casting.

In making a double skim gate for a globe valve, care must be taken not to have the space too small between the pouring gate and the edge of the mold proper. If this point is not given consideration, there is always danger that the pouring gate will break into the mold at the point indicated by *K*. Another danger of having the pouring gate too close to the mold, even though the gate does not break in, is that, when it is too close, it is difficult for the gas to escape, and there is a possibility of a scab on the mold, directly opposite the pouring gate.

(To be continued)

Where Our Finished Steel Exports Go

United States Ships Less Than Certain Other Countries;
Distribution Is World-Wide

POINTING out that while the United States ranks first in steel production of the world, but is fifth in the volume of steel exports, Luther Becker, chief of the Iron and Steel Division, Department of Commerce, sketched the distribution of American steel in addressing a group session at the formal opening early in October of the department's new district office in Pittsburgh. As a steel exporting nation, Mr. Becker said, the United States is surpassed by France, Germany, Great Britain and Belgium-Luxemburg, in the order named. Of these France, the greatest distributor of steel today, sold 2,300,000 tons in foreign markets in the first half of this year, Germany and Great Britain each but 150,000 tons less, and Belgium-Luxemburg slightly less than 2,000,000 tons. The United States trade over this period, it was stated, totaled 1,350,000 tons, with export sales increasing.

"These figures do not present quite the true picture of this relationship, however, for whereas virtually all of the exports of the United States go to non-European areas, a good part, if not the bulk of the sales, of those countries which exceed the United States are among themselves. Belgium supplies sheet bars to Great Britain and receives finished black and galvanized sheets in return, and so on. Further, these figures do not reveal the tremendous pressure which extensive excess capacity brings to bear on the European steel maker, and which make export sales of his steel a vital necessity. It is not exaggerating to say that France must export between 40 and 60 per cent of her output to utilize her present capacity effectively and economically, Germany and Great Britain from 20 to 35 per cent, and Belgium-Luxemburg from 60 to 75 per cent."

After stating the production of steel of the various pro-

ducing countries, Mr. Becker declared that, with one exception, tin plate is the principal steel product exported from the United States, this trade in 1927 having totaled 254,000 tons. Although we are the largest producer in the world of tin plate, it was pointed out, our exports of this product are exceeded by those of Great Britain. Being without such colonial markets as Great Britain enjoys in India, Australia and South Africa, the United States sells tin plate in virtually every country of the world.

"American rails found almost as wide employment in foreign lands, the 178,000 tons exported last year having been laid down at points as widely separated as Belgium and Mozambique and Canada and Uruguay," said Mr. Becker. "American rails grooved for street railway use carry the street cars of Spain, light rails climb the slopes of the Chilean Andes, linking mines with seaports, and heavy rails have gone into Manchuria, aiding in the development and industrialization in progress there under Japanese direction.

"Black and galvanized sheets are two other leading items of our export trade, export sales of each having aggregated approximately 150,000 tons last year. Galvanized sheets, however, find wider range than black steel sheets, the markets for the latter being frequently those in which galvanizing plants are already set up. American galvanized sheets were imported, during 1927, into Iceland and, although not braving the blasts from Greenland's icy mountains, they did feel the torrid heat of India's coral strand. They sheltered blacks in the Congo and Liberia, yellow men of China and Mongolia, brown men of Malaya and the East Indies, as well as whites throughout Europe, America and South Africa."

Gear Manufacturing Methods Discussed at Buffalo Meeting

LARGE attendance and active participation in a program of broad scope marked the fall meeting of the American Gear Manufacturers Association, held at the Hotel Statler, Buffalo, Oct. 11, 12, and 13. Problems met in the production of high-speed gearing were reviewed, and data on new facilities for finishing and testing gears reflected further advance in gear manufacturing methods. There was also a paper on the advantages of arc welding as a manufacturing tool.

Although no recommended practices were presented for adoption by the association, progress reports were made by several of the standardization committees, as noted below.

A joint session with the machine-shop practice division of the American Society of Mechanical Engineers was a departure. The success of this arrangement was indicated by expressions favoring the same arrangement for future meetings in large cities.

Visits were made to the plants of the Farrel-

Birmingham Co. and the Lumen Bearing Co., Buffalo. Members of the association were guests at a luncheon Oct. 12, given by A. A. Gloetzner, president of the Covert Gear & Mfg. Co., Lockport, N. Y.

E. J. Frost, past-president of the association, who recently disposed of his interest in the Frost Gear & Forge Co., Jackson, Mich., which required him to resign as a member of the executive committee of the A. G. M. A., was elected to honorary membership in the association. A. A. Henninger and D. A. Searle were admitted as executive representative and associate representative, respectively, of the New Process Gear Co., Syracuse, N. Y.

A. F. Cooke, vice-president Gears & Forgings, Inc., Pittsburgh, presided at the regular sessions and E. W. Miller, chief engineer, Fellows Gear Shaper Co., was chairman of the A. G. M. A.-A. S. M. E. joint session.

The next meeting of the association will be held in Cleveland during May, 1929.

Gives Comprehensive Data On High-Speed Turbine Gearing

INTERESTING data relating to reduction gearing of helical-tooth type were given in a paper on "High-Speed Turbine Gearing" by Ira Short, marine engineer, South Philadelphia Works, Westinghouse Electric & Mfg. Co., at the session held jointly with the shop practice division of the American Society of Mechanical Engineers. The paper dealt with the reduction gears furnished by the Westinghouse company, which since 1909 has built more than 3000 geared units ranging from 5 to 32,500 hp. and totaling well above 2,500,000 hp.

Action of the teeth of the gears was discussed and data relating to wear presented. Two distinct types of wear were said to occur at the meshing faces of the gear teeth, one being a regular change in the shape of the tooth profile, and the other the formation of a number of cavities or pits on the tooth face. From a photographic study of the first type it was to be seen that the wear varies considerably over the profile and is greater below the pitch line than above. There is considerable wear at the tips of the gear teeth but very little at the pitch line. In several installations it has been found that the metal flowed because of the combined rolling and sliding action until the thickness of the gear teeth at the pitch line, after being in operation for some time, was actually greater than when the gear was originally put into service. It is believed that the metal flowing from the tips of the gear teeth has maintained the pitch line very close to the original thickness.

The second type of wear, the formation of pits or cavities on the meshing faces, has been explained in a number of ways, but, according to Mr. Short, fatigue of the metal seems to be the best explanation. "The conditions are such at the point of contact between two meshing teeth that it is difficult to form an exact idea of the actual stresses set up. The stresses have been investigated by photoelastic methods, and it appears that a maximum shear stress occurs a short distance below the surface and travels along with the point of contact. Should there be any slight imperfection in its path or some irregularity on the meshing surfaces, the stress will be considerably increased and by repeated application will cause a crack and finally a pit.

"Pitting is considered to be in the nature of a corrective agency as metal is removed from the high spots, allowing the surrounding areas to carry their share of the load. It is found that pitting generally starts on a new machine shortly after it is put in service, and gradually decreases and finally stops completely after a few months."

A section of the paper was devoted to methods of lubricating the gear teeth and another to noise and its elimination. Noise from a gear is traceable to reproduction in the gear of errors in the hobbing machine, variable deflection of gear teeth with phases of tooth contact, and vibration transmitted from the connected machine. The arrangement of the hobbing machines used by the Westinghouse company for its high-speed gears was described and illustrated, special mention being made of the methods employed to assure accuracy of the master worm wheel. All parts of the hobber are checked periodically. The lead screw, also checked regularly, must not show an error exceeding 0.0005 in. per ft. in length.

The origin of noise emitted from a gear is traced by means of an instrument consisting of a portable cylinder and piston connected to ear pieces. The method of using this instrument was described by Mr. Short as follows: "The piston is moved in the cylinder until the air column in the latter is in resonance with the sound from the machine, when the sound will be heard distinctly. In using this 'resonator' the length of the air column is first made very short and gradually increased in length until the maximum sound is heard, when the length of the air column is noted. The piston is then moved further until the same note is again heard, and the length of air column is noted. The distance between these two points is then exactly one-half wave length of the sound. Knowing the velocity of sound to be about 792,000 in. per min. under average conditions and by noting the speed of the machine at the time of checking the sound wave, the sound waves per revolution can be determined from the formula—

Waves per rev. = $\frac{\text{Velocity of sound, inches per minute}}{\text{R.p.m. of machine} \times \text{wave length in inches}}$

"Knowing the waves per revolution, the source of the sound can generally be traced. A hobbing-machine error

will generally show up as the same number of sound waves per revolution as there are teeth in the master wormwheel.

"On all gears a note will be heard corresponding to one sound wave per tooth on the wheel. This note can be reduced to a minimum by using the 'even contact' design, which insures a constant deflection of the teeth."

Several typical gears were illustrated by lantern slides and a model of a double-reduction marine gear for transmitting 3000 s.h.p. on two pinions with a reduction of 3340-585-90 r.p.m. was shown.

Gear Teeth Finished by Shaving Process

THE Pratt & Whitney gear-shaving process, invented by James H. Barnes, Dayton, Ohio, was described by H. D. Tanner, manager of the gear division of the Pratt & Whitney Co., Hartford, at the A.G.M.A.-A.S.M.E. joint session.

In this process the teeth of unhardened gears are finished in an automatic machine, designed for the purpose, to conform to the theoretically correct involute curve, a small amount of material being shaved from the tooth faces and flanks of the gears.

After explaining the underlying principles of the process, Mr. Tanner said: "It now becomes apparent that the process is one of zero-degree generation and that the active profiles of the gear teeth are generated by rolling the gear in mesh with a zero-degree rack. The active profiles of this rack are the top edges of its teeth, which coincide with the cutting edges of the tools. The remainder of the profile of the rack does not come in contact with the

gear. We are then required to make tools with straight cutting edges slightly longer than the face of the gear to be cut and to place the tools in the shaving machine with their edges lying in a plane tangent to the base cylinder of the gear. If the edges are parallel to the center line of the gear, a spur gear will be produced. If they are parallel to each other but at an angle to the center line of the gear, a helical gear will be produced."

A large cam, with two opposed involutes and two cam rolls are used in the machine and two cutting tools are employed. The component parts, including the master involute cam, which is the only precision form used in the machine, were described in detail. The milling and grinding of the involute profiles of the master cams was also outlined. Operation of the machine was shown by means of moving pictures.

Discusses Methods of Checking Gear Quality

INSTRUMENTS of both "elemental" and "integrating" type, for maintaining the quality of gearing, were reviewed by Russell M. Coldwell, Fellows Gear Shaper Co., in a paper on "Predetermining Gear Quality."

As the term implies, instruments of the first class are for checking the elemental characteristics of gears. The integrating measuring instruments "combine the elemental errors so that the effect of the combination of errors may be predetermined." Of the latter class a machine designated as the Red Liner, which records errors in gears by means of a pen on a constantly moving chart, was described in detail.

Gear Lapping Facilitated by Manufactured Abrasives

CARE in selecting lapping media, whether the lapping is done for smoothing or fault correcting, was emphasized by H. J. Willis, research engineer, Carborundum Co., Niagara Falls, N. Y., in a paper on "The Manufactured Abrasive In Gear Lapping."

No one abrasive is suitable for more than a few types of gears, said Mr. Willis. Hardened gears having a sliding action require a hard sharp grain, which if used on soft gears having a rolling action would prove disastrous. Gears having both rolling and sliding action require a still different abrasive.

Natural abrasives were said to vary widely in purity, which seriously affects the quality of work they do. Generally speaking, nearly all of them are suitable for polishing only. Ground glass, it was stated, is not suitable for hard gears and is too splintery for soft. It is generally of poor grading and varies in quality. Because of its resistance to crushing, it is harmful to bearings.

Manufactured abrasives discussed were made of crystalline alumina and carbide of silicon. Some grades of the former are suitable for soft gears having sliding action, but are too soft for hard gears, especially of the rolling type. It is uniform in quality and grading. Carbide of silicon is suitable for hard gears of any class; but is too sharp for soft gears. It is made both green and black, the latter being best for gear work.

Abrasive Selected for Softest Gears In Train

In all cases the abrasives must be selected for the softest gears in a pair or train. "It is not sufficient, either, merely to select the kind of grain of the common gradings that are available," said Mr. Willis. "Research in gear lapping, particularly of spiral bevels, has demonstrated that a closely graded grain that will cut fast enough for commercial lapping is too harsh and will leave deep grain marks. Consequently, packing with a well selected grit is required to combine good finish with speed." To meet this situation, the Carborundum company has developed a carbide of silicon grain, designated as the RAA, for use on spiral bevel and hypoid gears. It is particularly adapted for lapping where considerable metal is to be removed.

The usual practice in lapping these gears is to make up a batch of grain and oil and use it until it is exhausted or the grain is broken down. To offset the constant change

in lapping action as the grain breaks down, fresh grains and oil are added daily. This perpetual mix idea was advocated strongly.

It was stated that too little attention is given to the selection of the vehicle for carrying the grain. Some of the defects of oils, soaps and greases, when used with abrasives as lapping media, were discussed, and specifications of the ideal vehicle given.

"Heavy oils and greases will suspend the grain fairly well," said Mr. Willis, "but are messy, hard to clean and generally retard the cutting. Thin oils work faster but will not suspend the abrasive unless the proportion of grain to oil is excessive. Grain must not be present in the vehicle much in excess of 25 per cent, in order to allow spaces for the removal of metal and to permit the free and individual abrasive action of each grit. But grain in this proportion in any kind of oil will not be stabilized, because it will generally form in pockets. Many complaints on quality of grain can be traced directly to these pockets and to the variables in oils and grain proportions."

A "finishing compound" that is said to be free from the variables mentioned has been developed by the Carborundum company and is available for each of 10 major lapping operations, with several grades of fineness for each. Particularly pleasing progress was said to have been made in gear lapping, the time for finishing straight worms having been cut 62 per cent in lapping, and soft spur gears and helicals, 68 per cent. For spiral bevels the development is too recent to make definite statements.

Lapped gears should be cleaned off thoroughly regardless of what abrasive is used, said Mr. Willis. He maintains that there are neither natural nor manufactured abrasives that will crush down to a degree of fineness that it will be harmless to gears and bearings. Researches by the company were said to have produced a grain in a compound that is suitable for the running in of plain bronze or babbitt bearings without impregnating the bearings.

Advocates Arc Welded Steel Construction

THE importance of arc welding in making possible the application of steel, with substantial economies, where cast iron has usually been employed, was emphasized by J. F. Lincoln, vice-president and general manager of the

Lincoln Electric Co., Cleveland, in an address on "The Effect of Arc Welding on Manufacturing."

Motors, arc welding machinery and other products of the company in which welded steel parts are used in place of castings were shown by lantern slides. Redesign of

many of these parts to permit the use of welded steel was begun several years ago, and it was stated that, in general, there has been a reduction of at least 50 per cent in the cost of these parts. An abstract of Mr. Lincoln's address will be given in a forthcoming issue of THE IRON AGE.

Gear Standardization Work Going Forward

REPORTS submitted by the several subcommittees of the general standardization committee, which is headed by B. F. Waterman, engineer, Brown & Sharpe Mfg. Co., Providence, and vice-president of the association, indicate definite progress. No recommended practices were offered for adoption, but it is expected that several of the projects will be ready for presentation at the next meeting. Round table gatherings of the subcommittees were held, as heretofore, for the purpose of formulating plans for work over the next six months. The status of some of the standards work is given in part below.

Working on Alloy Steel Specifications for Gears

AN analysis of 54 replies to a questionnaire relating to alloy steel specifications for gears, sent to the association's membership, was presented by Chester B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, Canada, chairman of the metallurgical committee.

Alloy steels which, according to the replies to the questionnaire, should be retained, include S. A. E. No. 2315, 3½ per cent nickel, case hardening; No. 3115, low-chrome nickel, case hardening; No. 3215, medium-chrome, medium-nickel, case hardening; No. 3312, high-chrome, high-nickel, case hardening; No. 3340, high-chrome, high-nickel, in the hardening and tempering grade; and No. 6120, chrome-vanadium case hardening steel. S. A. E. No. 2350, 3½ per cent nickel, hardening and tempering steel is also retained but No. 2345 is dropped, because the No. 2350, with suitable draw back, will meet the requirements.

No. 3145, low-chrome, low-nickel, in the hardening and tempering grade, was the subject of a special question and is still before the committee. This is not an S. A. E. steel. S. A. E. 3245, medium-chrome, medium-nickel steel in hardening and tempering grade, is indorsed by a large majority. However, a number of replies advocated a change to No. 3250, and it was pointed out by Mr. Hamilton that there is evidently a strong feeling in this direction among S. A. E. users of this steel. S. A. E. 6150 chrome-vanadium steel, hardening and tempering grade, will be retained and 6145 dropped, because the former, with suitable draw back will meet all requirements. S. A. E. 2512, a 5 per cent nickel case hardening steel, will be added, 98 per cent of those replying to the questionnaire being in favor of it.

It is expected that the committee will not include the new high-manganese case hardening steels in the A. G. M. A. list of standard specifications.

Spur Gear Tables Compiled

TABLES for quickly finding the diameters and necessary dimensions of metallic pinions for various horsepower to be transmitted at various speeds were presented by the spur gear committee, the chairman of which is J. L. Williamson, Fellows Gear Shaper Co., Springfield, Vt. The tables, prepared by L. F. Burnham, Westinghouse Electric & Mfg. Co., East Pittsburgh, are prefaced by a statement of maximum tooth stress and other specific values adopted, the formulas upon which the tables were computed being also given.

The large amount of work done in preparing these tables received favorable comment. B. F. Waterman, engineer, Brown & Sharpe Mfg. Co., Providence, said that the method used was of high value. The possible effect of wear data

being obtained on the Lewis machine at the Massachusetts Institute of Technology was brought up and in this connection Mr. Waterman pointed out that the Lewis formula usually provides satisfactory resistance to wear and that, at any rate, the tables could be supplemented by others based on wear factors established by the data from the tests on the Lewis machine. So far as strength is concerned, it seemed generally conceded that the tables are a good guide.

The tooth form committee, which is headed by H. J. Eberhardt, secretary, Newark Gear Cutting Machine Co., Newark, N. J., reported progress on several items of its program. A table of chordal dimensions for all types of gears is being prepared. Relating to modification of hobs for tip relief purposes, it was stated that the committee cannot at present recommend a fixed amount. "The main difficulty," it was stated, "lies in the geometrical fact that the amount of relief generated varies for each diameter, and therefore gears may have too much of the tooth involute removed and the meshing pinions very little." It was indicated that the present trend was toward less tip relief than formerly, which is in line with improvements in the art of gear cutting and mounting.

Helical and Worm Gear Nomenclature Being Prepared

DEFINITION of backlash as "the shortest distance between non-driving surfaces of adjacent teeth in mating gears" was accepted by the association, at the suggestion of the nomenclature committee, the chairman of which is D. T. Hamilton, Fellows Gear Shaper Co.

Standard nomenclature for helical gears is being prepared and the committee expects to have material ready for the next meeting. Preparation of a standard worm gear nomenclature is also in progress, this work being in conjunction with the worm gear committee, the new chairman of which is W. H. Himes, Westinghouse Electric & Mfg. Co.

Keystock sizes and materials are on the program of the keyway committee, of which R. B. Zerfey, engineer, Tool Steel Gear & Pinion Co., Cincinnati, is chairman. It is planned to formally recommend the use of the low carbon keystock now available for industrial gears. For heavy duty work it was suggested that 40-50-point carbon steel might be recommended, but the consensus of opinion was that only one key material should be standardized; for special cases keystock of special material could be selected.

Tables of dimensions of special keys, such as Barth, Kennedy and Woodruff, will be printed in A. G. M. A. data sheet form by the association's library committee.

The sprocket committee is working along the same lines as the sectional committee on chains and sprockets, of which the A. G. M. A. is one of the sponsors, said G. M. Bartlett, professor of machine design, Purdue University, Lafayette, Ind., chairman of the committee.

Three meetings have been held during the past year by the subcommittee on roller chains and one meeting by the A. G. M. A. sprocket committee. Discontinuance of the present "narrow," "medium" and "light" series of roller chains, and designation of the present "heavy" series as standard has been under consideration. A new series, to be known as the extra heavy, with pitches from ¾ to 2½ in., and inside plate thickness 1/32 in. greater, up to and including the 2-in. pitch, and 1/16 in. greater for the 2½-in. pitch, has been added. A standard light weight machinery chain of ½-in. pitch, ¼ in. wide and with 0.306-in. diameter rollers has also been added. The ¾-in. pitch stan-

dard roller chain has been changed to a rollerless chain with 0.200-in. diameter bushings, 0.141-in. pins and 3/16-in. width.

Specification of standard tolerances for side plates, pins and bushings, to permit interchangeability of the links of various makes of chain, is an important item of the committee's work. Certain dimensions of offset links have also been standardized, permitting interchangeability. Other work of the subcommittee includes modification of the chamfering curve on the sides of the sprocket teeth to improve the action of the chain link in passing over the teeth, especially under conditions of misalignment.

Formulas for the average working loads and horsepower have been worked out to aid in the selection of chain and also formulas for the maximum r.p.m. of sprockets, to aid in the design of chain drives. The discontinuance of the formula for breaking strength is being recommended by the sectional committee.

No definite steps have been taken by the non-metallic gearing committee. T. C. Roantree, Westinghouse Electric

& Mfg. Co., East Pittsburgh, chairman, in presenting a progress report, indicated that the committee intended to introduce a contact duration factor "C" in the horsepower formula for non-metallic gears. The need for such a factor is indicated by the gear tests on the Lewis machine at the Massachusetts Institute of Technology, but changes will not be made until the tests are completed.

A blueprint showing the variation of the working stress with the pitch line velocity of gears of steel, cast iron and phenolic material, making use of the new formula for

150
velocity increment loads, $(\frac{\quad}{200V} + 0.25)$, has been prepared.

This blueprint, which will be issued in A. G. M. A. data sheet form, as supplementary data, shows that gears of phenolic materials are equal in strength to cast iron gears at 1800 ft. per min. and to forged steel gears at 4800 ft. per min.

Institute Visits Spain's Iron Mines

British Organization Meets at Bilbao—Technical Papers Featured by Description of Mining in Vizcaya—Corrosion Also Important Topic

THE autumn meeting of the Iron and Steel Institute (British) in Bilbao, Spain, was more notable because of the opportunities it gave for an inspection of iron mines and steel plants of that country than for technical papers and discussions. Little time was left for the latter, but several papers were presented. Summaries of them are given below. On another page of this issue is an account of the other features of the excursion made by the institute members to Bilbao, repeating a visit to that city made 32 years ago.

Iron Mining in Vizcaya

Main interest centered on the paper of José Balzola of Bilbao, who described iron ore mining in Vizcaya. This paper went over a good deal of the ground covered by the late William Gill, then resident manager of the Orconera Iron Ore Co., on the occasion of the institute's previous visit to Bilbao in 1896, and brought up to date the information then given.

The author estimated that the present workings of the district show a content of some 65 million tons of ore, 40 per cent of which is probably spathic, with a reserve of some 40 million tons, and a further 60 million tons in un-bored parts of the district. The future is dependent on the spathic ore (having a density of 2.8 to 3). The conditions under which the ore has to be extracted, compared with rubio, necessitate a larger consumption of explosives, but this is compensated for by the fact that the faces are much cleaner and the general conditions favor systematic mechanization. On the other hand, 40 per cent more crude spathic ore has to be extracted than the amount of calcined ore obtained, but this also has its compensation in the higher iron content.

Comparing the behavior of first class rubio (having a density of from 2 to 2.5) and first class spathic in the furnace, the author noted that the latter shows higher loss in the flue and its higher sulphur content calls for a more basic slag. Even taking into consideration these disadvantages, a calculation of the comparative furnace changes seems to indicate that the calcined spathic could be 20 per cent higher than that of rubio. That is not the case today, but it is expected that as time goes on prices will be stabilized and that the relation of the price of calcined to the rubio price may reach this percentage. In this compari-

son the calcined spathic has been assumed to have no further treatment and to be used alone. In practice this is not feasible, but the ore sinters very well, and if submitted to this treatment it could be used as the principal ore. If, for instance, 40 per cent of it were submitted to sintering, the sulphur content could be reduced to, say, 0.28 per cent. The surcharge of 2 pesetas per ton incurred by this treatment is balanced by the reduction in sulphur content and of flue losses.

The production of rubio has been steadily decreasing since 1899; the mines are becoming steadily poorer in this class of ore, and very few have maintained their reserves intact. In the production of rubio, labor costs amount to 40 per cent of the total, but this item could be reduced by mechanical methods of loading and improving transport in big mines. Spathic mines can be mechanized under better conditions than rubio, as the ore is clean, almost free from waste, and the majority of mines have considerable quantities of this ore.

Some interesting facts were given by the author regarding the conditions of iron ore mining in Spain. Under the law of the country, the state grants a concession of mining rights to any person who applies for it, without the necessity of consulting the owner of the surface or proving the existence of the mineral. The minimum unit of surface area for which mining rights can be granted is 4 pertenencias (a pertenencia is a rectangle of 100 m. square, i.e., 1 hectare), and the royalty to be paid, which varies according to the class of minerals to be mined, is 6 pesetas per pertenencia for iron ore.

The concession of a mine only becomes void through non-payment of the surface royalty, and the mine itself may be left unexploited as long as the concessionaire desires. Due to the insignificance of the royalty paid and to the exploitation of the mine not being enforced within a fixed number of years, many mines containing large quantities of minerals are left unworked. As a general rule the mines are not worked by the owners, but are leased at a certain royalty per ton on a minimum output per annum. The lessee on his part usually employs a contractor who extracts the mineral and puts it into storage.

The royalty paid by the lessee to the owner varies according to the class of mineral. It oscillates between 0.50 peseta

(in very old contracts) and 6 pesetas in some; the average is about 2 pesetas per ton.

Contracts are usually of two classes. In big companies like the Orconera, Franco-Belga, and Parcocha to a certain extent, the principal installations, lines, compressors, locomotives, inclines, etc., are the property of the company and are worked under their administration. The contractor has a contract for one year, placing the output near the main-line railroad and into stock, all charges in connection with raising the ore, loading, and unloading being on his account. In this type of contract a fixed sum is usually paid for each product extracted, be it mineral or overburden.

Usually contracts are given at a fixed price per ton of rubio, spathic, or washed ore placed in stock or loaded into railroad cars. In this case the contractor is liable for all risks. He buys the machinery, and erects inclines, tracks, etc. The price varies from 8 pesetas to 10 pesetas per ton for rubio and 10 pesetas to 12 pesetas for calcined spathic. The lessee pays all charges for transport and general administration, royalties to the owners, etc. For every workman employed in the mines the law enforces the payment of 12 centimos (about 1¼d.) per day toward the workmen's pension fund, and the payments for accidents are about 4 per cent of the daily wage.

Transverse Test for Cast Iron

J. G. Pearce, director British Cast Iron Research Association, suggested that the true criterion of transverse strength is the modulus of rupture determined for the actual bar section, measured at the point of fracture. By concentration on the new standard cylindrical transverse bar test, and by casting bars of varied sizes and compositions, it becomes possible to chart relations between size and strength and between composition and strength. The author showed that the transverse rupture modulus increases continuously as the test bar diameter diminishes until the point is reached at which the metal ceases to be gray. The size-strength curve is a useful index to the behavior of cast iron in thick sections, and the composition-strength curve deduced from a series of these promises to be of considerable assistance both to the designer of cast-iron structures and to the founder who has to realize the designer's ideas. The transverse strength is closely related to tensile and compressive strengths, but this relationship is only shown if the transverse strength is expressed as rupture modulus, based on the area at fracture.

Corrosion of Iron and Steel

In their paper on the phenomena of corrosion of iron and steel, A. Herrero and M. de Zubiria of Bilbao studied the problem of corrosion due to atmospheric agency alone. They referred to the serious depletion of our fuel reserves resulting from failure to attack this evil at its source. On this point the authors assumed a world's annual production of 100,000,000 tons and an average life of iron and steel products of 30 years. With a consumption of four to five tons of coal or its equivalent per ton of steel, from the getting of the ore to the finished product, the loss is obvious. The problem is acute in Spain, where atmospheric conditions appear singularly productive of corrosion, but emphasis was laid on the point that raising the price of ordinary commercial steels above that at which they must of necessity be sold would not provide an economic solution of the question. The causes producing corrosion were described as of two distinct types: (1) those which are independent of the object which suffers corrosion, and (2) those which are a function of the physical or chemical properties of the object. In the first category faulty design was mentioned as an important cause of corrosion. The miscalculation of certain principal parts of a steel structure has resulted in the material being stressed in parts beyond its

elastic limit. Under such conditions the parts so stressed are highly liable to corrode even though the remainder may remain normal, and thus the stability of the entire structure may be impaired.

It has also happened in the case of a structure perfectly designed from the point of view of resistance to the mechanical stresses that rain water may accumulate in hollow spots and remain a long time without draining off, and if such spots are not easily accessible it may not be easy to keep them properly painted or remove any coating of rust which may have formed on the steel structure. All such cases show the importance of the study of corrosion from the point of view of safety, and how the rusting of a small and insignificant part may lead to the destruction of the whole structure.

Concerning the general atmospheric conditions, it is evident that a moist air and persistent exposure to rain with strong aeration are agents which particularly favor corrosion, since both the electrolyte and influence of oxygen then come into action. If to these conditions be added that of proximity to the sea, bringing with it air laden with sodium chloride, which increases the conductivity of the electrolyte and consequently accelerates the corrosion, it will be readily understood that the metallurgical works of Vizcaya are unfortunately exposed to a combination of all the circumstances most apt to produce intensive corrosion due to external causes.

With regard to the internal causes which stimulate corrosion the authors advocated proper heat treatment and mechanical treatment, the elimination of impurities and avoidance of segregations, as the principal objects to aim at to obtain improvement.

Mechanical Properties of Carbon Steels

Joaquin Orlando of Madrid described experiments to determine the influence of pearlitization below the A_1 point on the mechanical properties of carbon steels. On tempering quenched steel a finely granular pearlite is obtained which gives to the steel both a tensile strength and an impact resistance greater than that given by laminar pearlite in annealed steel. For low carbon steels a temperature of 500 deg. C. appears to be the best. For higher percentages of carbon the temperature of 580 deg. C. has yielded good results.

Steel Bath Conditions

J. H. Whiteley of Consett discussed some of the observations by which a smelter is guided in judging the condition of a bath of steel, and described an investigation which he has carried out. Although much further work is needed, the results so far indicate that the examination of quenched pellets can yield additional information on bath conditions.

Cold-Drawn Heat-Treated Steel Wire

An examination of the properties of cold-drawn chromium-vanadium steel wire described by S. H. Rees of the research department at Woolwich shows that conclusions previously arrived at in connection with carbon steel wire are applicable when suitable modifications of the quantitative data have been made. Thus, complete restoration of elasticity at atmospheric temperature requires treatment at 300 deg. C. instead of 200 deg. C., and other changes which occur on low temperature heat treatment are comparable in extent when the chromium-vanadium wire has been heated at a temperature about 100 deg. C. higher than that applied to the carbon steel wire. In its behavior under stress at raised temperatures, the superiority of cold-drawn chromium-vanadium steel treated for 1 hr. at 400 deg. C. over the most suitably treated cold-drawn carbon steel wire (1 hr. at 300 deg. C.), and over the same steels hardened and tempered, is considerable.

Steel Treathers Meet in Philadelphia

Large Conclave of Metallurgists Discusses Progress in Stainless Iron, Tool and Alloy Steels, and Heat Treatment

—British Metallurgist's Lecture a Feature

MEETING in the city and hall where it held its second annual convention and exhibition in 1920, the American Society for Steel Treating last week, Oct. 8 to 12, celebrated its tenth annual gathering at Philadelphia. Those who were present at both conventions could not fail to be impressed with the remarkable strides which have been made in heat treatment both technically and in equipment as reflected in the exhibits.

Augmented by simultaneous conventions of the Institute of Metals and of the American Welding Society, National Metal Week again brought together groups of men whose interests interlace in varying degrees in the fields of pure science, practical metallurgy and work-a-day shop procedure.

A feature of the week was the Campbell memorial lecture by Dr. W. H. Hatfield, noted British metallurgist, which was listened to by about 550, a record for such gatherings.

The National Metal Exposition, while not so large as those of 1927 in Detroit and of 1926 in Chicago, was a marked success. Its compactness and attractiveness were commented upon, and exhibitors generally were optimistic as to the results and concede it one of the best in years.

Offering nearly 40 papers at 10 sessions the technical program was up to a high standard. Only a few of the important ones can be reviewed here. They all illustrated the progress being made in various fields of heat treatment.

Wide Interest in Stainless Irons

IT is evident that there is keen interest in the stainless irons and steels. One largely attended session was devoted entirely to these alloys. Four papers covered several developments, new steels and new applications were introduced to the assemblage and the meeting was one of the most instructive of the week.

The four papers were: "A New Development in Corrosion-Resisting Steel," by Frank R. Palmer, Carpenter Steel Co., Reading, Pa.; "Stainless Iron and Its Application to the Manufacture and Transportation of Nitric Acid," by Dr. Walter M. Mitchell, Central Alloy Steel Corporation, Massillon, Ohio; "Chromium-Copper Steels As Possible Corrosion-Resisting Ferrous Alloys," by Dr. B. D. Saklatwalla and A. W. Demmler, Vanadium Corporation of America, Bridgeville, Pa., and "An Investigation of the Physical Properties of Certain Chromium-Aluminum Steels," by Frank B. Lounsberry and Walter R. Breeler, Atlas Steel Corporation, Dunkirk, N. Y.

Zirconium Sulphide Solves a Machining Problem

A novel application of zirconium sulphide was announced as solving a difficult problem. In the machining and grinding of some of the high-chromium steels, trouble has been experienced, said Mr. Palmer, in his paper; the chips often adhere to the cutting tool, with similar difficulties in grinding. A solution of the problem is claimed to have been found.

Taking as a basis the known effect of fairly high percentages of sulphur and phosphorus on the machinability of certain steels, it was ascertained that the presence of 0.40 per cent of zirconium sulphide in the chromium alloys had the same effect on the machinability and the grinding properties as 0.30 per cent sulphur. The alloy steels, however, are easily worked with the presence of the zirconium sulphide, whereas they can not be with a high-sulphur content. Thus by introducing the sulphide of zirconium, the machining and grinding properties of rustless iron are greatly improved.

The author also announced that the presence of this

sulphide does not impair the resistance to corrosion nor to scaling at high temperatures and that the alloys can be forged or rolled under 2100 deg. Fahr. The sulphide does, however, decrease ductility and lowers the Izod value. Microscopically it does not dissolve in the ferrite, but is distributed as nuclei.

In the discussion it was brought out that stainless irons containing the zirconium sulphide can easily be cold drawn, but that its application to stainless steels had not yet been fully worked out, though it seems to have the same effect. An answer to questions as to how this sulphide is introduced was not forthcoming.

Dr. W. H. Hatfield of Sheffield, England, the Howe memorial lecturer this year, testified that some workers in England experienced the difficulties in machining and grinding referred to by Mr. Palmer, while others did not; that the alloys were not difficult to handle in their properly heat-treated condition. He made a plea for standardized corrosion tests as between British and American workers in this field so that there could be a common basis for judging results.

Rustless Iron in Nitric Acid Plants

One company is using, or has under contract, 1200 tons of stainless iron involving an investment of \$1,500,000 for equipment to make nitric acid by the fixation of nitrogen process, said Dr. Mitchell, in introducing his paper. Stainless irons have been found particularly resistant to nitric acid and the author discussed the requirement for the construction of equipment for the manufacture and transportation of the acid. He also critically examined the existing specifications for stainless iron for this purpose, dealing especially with plates, rivets, tubing, castings, tank cars, shipping drums, etc.

Making Cheaper Rustless Steels

In an attempt to develop a cheaper alloy than the regular stainless iron, Dr. Saklatwalla and Mr. Demmler, in their paper, offer a chromium-copper steel. They say a

low chromium (0.50 to 3.00 per cent) steel containing about 0.50 per cent copper is capable of being produced in open-hearth furnaces at a low cost. They point to it as occupying a position between the stainless irons and the plain

copper-bearing steels or ingot irons and as having superior rust-resisting properties, capable of being made at the cost of ordinary open-hearth steel plus the expense of the chromium and copper.

A Session Devoted to Steel Making

WHEN the session on steel melting was made a regular part of the program three years ago, it was the general impression that it was to be of a practical educational nature for the immediate benefit of steel treaters. This policy has been consistently carried out until this year. It is doubtful that anything is to be gained under the conditions suggested by the presentation of papers of the character of some of those last week. Two of the four papers at the session were of such a highly technical and mathematical nature as to be beyond the comprehension of all but a few specialists present. Commendable and excellent as these were, they belonged to an entirely different group or society meeting.

Steel Best Suited to Large Ingots

That acid open-hearth heats are best suited to the manufacture of larger ingots for heavy forgings was advanced by H. P. Rassbach, Midvale Steel Co., Philadelphia, in a paper, "Manufacture of Open-Hearth Steel for Forging Ingots." When ingots up to 400,000 and 500,000 lb. are to be made, there is less uncertainty regarding the success of transverse tension tests if acid steel is used. This grade is less complicated, said the author, than basic open-hearth and better results are obtained.

Mr. Rassbach described in some detail the practice of the Midvale company in making and pouring these large ingots of various sizes and shapes from 50 to 70-ton oil-fired furnaces.

How Silicon Deoxidizes Steel

Another chapter in the excellent work which Dr. C. H. Herty, Jr., and his associates at the Bureau of Mines Station at Pittsburgh are doing was embodied in a paper, "Deoxidation of Steel with Silicon," which he, with his coauthor, G. R. Fitterer, presented last week. Much of the paper had a theoretical basis and so had its discussion. The writing of the paper resulted from an investigation as to how silicon

deoxidizes steel and how far it goes under certain conditions.

The mechanism of the deoxidation with silicon is, first, the formation of silica by the reversible equation: $\text{Si} + 2 \text{FeO} = \text{SiO}_2 + 2 \text{Fe}$, and, second, a fluxing of more oxide of iron by the silica, forming a ferrous silicate inclusion. Complete deoxidation of steel is impossible unless the oxide formed is absolutely infusible and insoluble at steel-making temperatures. It may also be concluded, say the authors, that silicates high in iron or manganese will be more readily eliminated from the bath than high-silica particles, due to their lower melting point, with consequent increased rate of coalescence.

Commenting on this and other papers, Dr. W. H. Hatfield, Sheffield, England, paid a tribute to Dr. Herty by declaring that his investigations are being eagerly watched in England, particularly by the steel ingot committee of the Iron and Steel Institute, of which committee Dr. Hatfield is chairman. He offered the opinion that if steel is properly refined, its oxygen content will be very low and it will be free from inclusions; and to achieve that the electric furnace is best adapted.

Two other papers presented at this session were "The Equation of the Carbon-Time Curve in Open-Hearth Refining and Prediction of Carbon Drop," by Alexander L. Feild, Union Carbide & Carbon Corporation, New York, and "A Melting Record of Three Acid Open-Hearth Heats," by W. E. Griffiths, research metallurgist Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., and C. E. Meissner, development engineer Chrome Steel Works, Carteret, N. J. Mr. Feild's paper contains a general survey of the physico-chemical relations obtaining during basic open-hearth refining and discusses the significance of the general differential equation involving the various factors. The other paper presents a complete log of three acid-open hearth heats so as to show the effect of adding silicon in the ladle rather than in the furnace.

Hardening Steel With Nitrogen

A SERIES of papers on aluminum steels and the nitride case-hardening process caused much discussion at one session. It is plain to see that the characteristics of the hardened surface and the economics of the process are being given much consideration by metallurgists and production men.

Raymond H. Hobrock of the Engineering Experiment Station, Purdue University, Lafayette, Ind., in a paper, "Surface Hardening of Special Steels with Ammonia Gas Under Pressure," finds that it is possible to reduce the nitriding time by one-half by conducting the operation at a pressure of 600 mm. of mercury above the atmosphere. In order to get a scleroscope hardness of 90 on the very surface, 30 hr. is required, regardless of the pressure. But increasing the pressure drives the case deeper (as shown in Fig. 8) and also produces uniform hardness of about 75 scleroscope for a considerable depth just under the skin. Theoretical considerations indicate that the latter represents the optimum hardness attainable by aluminum nitride; the extra skin hardness is thought to be due to some iron nitride existing there. It is also concluded that hardest surfaces of shallow depth may be made in high-aluminum

steel, but that if penetration is also desired, the amount of aluminum in solid solution must be closely controlled.

Many persons in the audience criticized Mr. Hobrock's use of the scleroscope for hardness measurements. G. M.

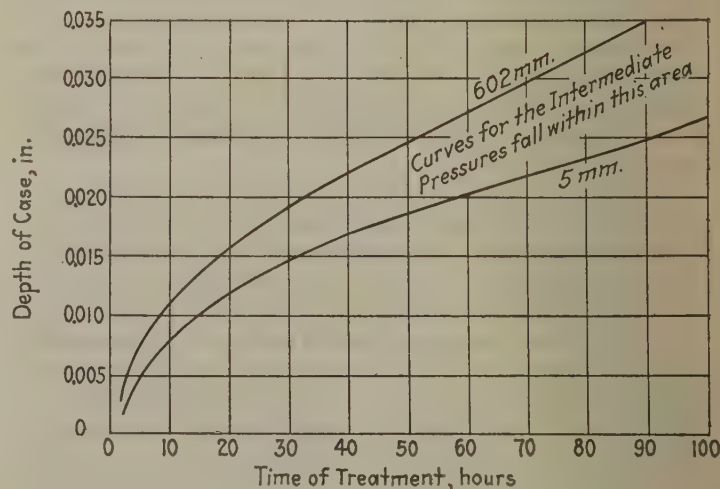


Fig. 8—Relation Between Case Depth and Time

Authors of Technical Papers Read at Philadelphia



F. R. PALMER



W. M. MITCHELL



C. H. HERTY, JR.



A. B. KINZEL



S. L. HOYT

Eaton, Molybdenum Corporation of America, believes that the Vickers diamond indenter (*THE IRON AGE*, March 1, 1928) is the best instrument for this purpose. It also can separate tough surfaces, which in practice withstand wear excellently, from unsatisfactory brittle cases. The impressions in steels of the former class are surrounded by ridges of plastically deformed metal, appearing much like the depressions made when testing mild steel, whereas brittle surfaces of no greater hardness will flake badly at the edge of the indentation.

Methods of test for nitrided surfaces, in the opinion of several speakers, should be correlated with wear resisting ability, since the parts so treated are ordinarily used in such service. Consequently a wear testing machine is badly needed. It was suggested that this might use the principle of drawing a soft iron wire across the hardened surface, it being well known that this is one of the most severe cutting actions occurring in manufacturing operations. That nitrided cases actually do resist wear is vividly shown by Guillet's experiment of running two aircraft engines for 100 hr. on a test block. One had nitrided piston rings and

cylinder bores. The other was of regular construction. The former was consuming oil at the same rate at the end as at the beginning, while the latter's oil consumption rate tripled.

Crystalline structure of the untreated steel is also an important factor in the success of nitriding. V. T. Malcolm, Chapman Valve Mfg. Co., Indian Orchard, Mass., said that the nitrided cases now being used by them on gear teeth are giving much superior service. The improvement is understood to come from better control and understanding of the process. This led to the inquiry as to whether aluminum oxide in the steel is not a controlling factor, but Prof. V. O. Homerberg, Massachusetts Institute of Technology, Cambridge, Mass., said that very few inclusions are visible under the microscope, and that impact strengths are satisfactory; consequently he concludes that the aluminum exists as metal. He emphasized that at least 30 per cent of the ammonia in the reaction chamber must be disassociated in order to prevent decarburization of the surface by the free hydrogen; in his opinion, lower carbon surfaces usually are brittle and unsatisfactory in service.

Two Methods of Heat Treating High-Speed Steel

HHEATING high-speed steel in a molten salt, or in molten lead, to a temperature of 2400 deg. Fahr. was shown to be feasible, in two papers read at one session. One of these, "A New Method for Heat Treating High-Speed Steel," was by Horace C. Knerr, 538 Washington Lane, Germantown, Philadelphia, who is consulting metallurgical engineer to Ajax Electrothermic Corporation, Summerill Tubing Co., and others. The other was read by Wilbur C. Searle, who is associated with the Leland-Gifford Co., Worcester, Mass. It was entitled "Heating High-Speed Steel to 2400 Deg. Fahr. in Molten Lead."

Heat Treating High-Speed Steel

FEATURES of the method described include electrical heating, close temperature control, which may be made automatic, the use of a salt bath which does not give off fumes or attack the tools, prolonged container life, absence of furnace deterioration, comfortable working conditions, low heating cost per pound of steel, and the ability to employ full hardening temperatures (in the neighborhood of 2400 deg. Fahr.) without injury to finished surfaces or cutting edges of high-speed steel tools.

Heating the container for a salt bath required to operate at temperatures of about 2400 deg. Fahr. for continuous periods has heretofore involved serious difficulties, including:

- (a) Attack of the container by the salt bath, or by decomposition products of the bath.
- (b) Attack of the container by products of combustion, or by the furnace atmosphere, when electric heat was used.
- (c) Rapid deterioration of furnace parts and lining, including the resistors when electrically heated.
- (d) Low fuel efficiency, owing to high sensible heat in the escaping products of combustion when burning gas or oil.
- (e) Difficulty of securing accurate temperature control.
- (f) Unpleasant working conditions, due to fumes, gases and heat, etc.

A new liquid bath has been developed which shows excellent characteristics at temperatures as high as 2450 deg. Fahr. The mixture is rather viscous just above its melting point, but at temperatures above 2250 deg. Fahr. it is sufficiently fluid to permit strong convection currents to be set up, which assure temperature uniformity within the container. Even at the highest temperatures (2450

deg.), a film of molten salt adheres to the piece of steel when removed, protecting its surface from the atmosphere during transfer to the quenching medium.

When uncontaminated from outside sources, the molten salt is neutral to steel, neither visibly attacking its surface nor causing serious carburization or decarburization. There are no fumes and its cost is moderate. Patent considerations prevent disclosing the composition at this time.

What Has Been Done in Service

Finished tools of various types have been heat treated at 2350 to 2400 deg. Fahr. without any mark upon the surface other than a slight discoloration. Sharp cutting edges were practically unaffected and retained file hardness. No pitting, scale or other surface defects occurred when the treatment was properly carried out. There was no warping, provided, of course, internal strains had been removed from the tools before treatment. These tools were quenched in oil and tempered either in a salt bath or an electric muffle furnace at 1100 deg. Fahr. for from 1 to 4 hr. Rockwell hardness of 62 to 65 C was obtained on the surface after tempering.

Drills, thread cutters, files, file cutting chisels and lathe tools treated by this method have been tested in service. Results compared favorably with tools treated in the open furnace and ground, and were superior to tools treated in salt baths at the customary lower temperatures.

Heating High-Speed Steel in Molten Lead

THIS paper describes the apparatus and method of heating high-speed steel to 2300 to 2400 deg. Fahr. in molten lead. Photomicrographs show the structure obtained in specimens at 2200, 2300 and 2400 deg. The method has been used for a number of years by at least two concerns in Worcester.

Work being hardened includes small and large pieces; any pieces that will go into the crucible can be hardened. Flat cutters, circular formed cutters, reamers, etc., are all hardened successfully by this method. It is possible to harden part of a flat cutter and have part not hard; also the cutting portion of a reamer can be hardened and the shank left soft.

How This Method Is Applied

Preheating is done usually in an electric oven furnace equipped with an automatic control. The control is set for 1600 deg. Fahr. A gas furnace is used for heating the lead, which is contained in a graphite crucible. Ordinary city gas, 530 B.t.u., is used. The time to bring the bath up to 2300 to 2350 deg. is 2½ to 3 hr. About 900 cu. ft. of gas is used, and about 200 cu. ft. an hour thereafter.

Pieces taken from the preheating furnace one at a time in a pair of tongs are held in the molten lead for a definite number of seconds, depending on the size of the piece. The ends of the tongs are just above the lead surface. The piece is removed at the end of the immersion period and dropped into a basket in the quenching oil. At the end of the heat the pieces are removed from the quench, washed in hot washing compound and placed in the electric furnace for tempering at 1050 to 1100 deg. Fahr.

Other Methods of Attaining High Temperature

In presenting his paper, Mr. Knerr prefaced his remarks with the statement that, through THE IRON AGE, he had learned that about 15,000 tons of high-speed steel is produced, sold and used annually in the United States.

Prof. W. Trinks, who presided at this meeting, read a communication stating that a method somewhat similar to that proposed by Mr. Knerr had been used elsewhere, in which two special salts were utilized, the second one being solvent in the first and used in quenching and drawing the material at 1100 deg. Fahr. The writer stated that he had been able to heat the first salt to 2250 deg. in 18 min. while using 19 kw. of electric power.

Another speaker told of another method for achieving the same result. He uses electric heat with close temperature control, the salt bath, and gets away from fumes and other troubles experienced from the use of combustible fuels. This method was developed in 1920 by A. E. Bellis, his salt being used in oil and gas furnaces. The electric furnace has now superseded the others, but for certain reasons the composition of the bath could not be given.

This salt is fluid enough above 1800 deg. Fahr. to assure a setting up of convection currents and thus produce circulation. Even when the temperature is as high as 2500 deg., a certain protective coating of the salt adheres to the steel when removed, and keeps it from oxidizing while being transferred to the quenching medium.

This method makes use of a heavy electrode. As there is no direct heating of the pot itself, the pot has an almost indefinite life. The early electrodes used for this process wore away rapidly, but a new type has been developed which gives evidence of being able to last indefinitely. The pot used is 8 in. in diameter and in many cases the liquid depth is about 11 in. There is a very thick heat insulation surrounding the whole apparatus. This was shown in two lantern slides, one of which showed a single pot, while the other showed three pots, all in the same surrounding insulating medium. Over 90 per cent of the total electric input was developed as actual heat in the electrode.

High-Chromium Additions in Making Steels

ADDITIONS of considerable chromium to high-carbon steels for dies and kindred uses were described in one paper read at the meeting. The steels here discussed had from 1.38 to 2.38 per cent of carbon and from 12.01 to 16.95 per cent of chromium. Another paper took up the addition of chromium to silicon-manganese steels as an aid to obtaining high physical properties in oil-quenching, which, for various reasons, is preferred in manufacturing practice to quenching in water. Abstracts of these two papers, and of the discussion which they elicited, follow.

Silicon-Manganese Steels With Chromium Additions

EXPERIMENTS in developing a type of steel not now used, for automotive and other similar use, were described by A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. His paper, "Silicon-

Manganese Steels with Chromium Additions, for Engineering Applications," is briefly abstracted below:

For silicon-carbon steels the practical working carbon limits have been found to be about 0.20 to 0.40 per cent. Manganese, however, may vary with the silicon. Two 1-in. round specimens of the same analysis, each with 1 per cent silicon, were quenched from the same temperature, the one in water, the other in oil. Their resultant physical properties were as follows:

	Quenched in Oil	Quenched in Water
Yield point (a)	89,000	122,000
Ultimate strength (a)	115,000	135,000
Elongation, per cent.....	20	20
Reduction of area, per cent.....	54	58

(a) Pounds to the square inch.

This superiority in the water-quenched material appears to be typical of this type of steel. An effort was made to

produce a steel which would, on oil quenching, provide qualities equivalent to those here shown for water quenching. Such a steel was made with 1 per cent chromium, 1 per cent manganese, 1 per cent silicon and 0.30 per cent carbon, which gave about the same results, whether quenched in oil or in water. Three samples of this steel, A, B and C, gave results as follows, compared with other steels:

	Yield Point (a)	Ultimate Strength (a)	Elongation, Per Cent	Reduction of Area, Per Cent
A	136,000	151,000	18	50
B	175,000	201,000	10	42
C	151,000	167,000	12	48
D	128,000	152,000	12	52
E	125,000	150,000	15	57
F	142,000	167,000	20	53

(a) Pounds to the square inch; D, S.A.E. No. 2330, 3½ per cent nickel; E, S.A.E. No. 3130, chrome-nickel; F, S.A.E. No. 6145.

From these comparative data it is seen that the steel now proposed for use in automotive and kindred parts is of the same order of excellent utility as those now in general use for such purposes, and is superior in some qualities, notably strength. Plain manganese steels, however, without the silicon addition, fall short of such properties. This work was carried out at first on 6-lb. ingots. Later the studies were made on heats from a 300-lb. electric furnace.

It follows that a medium carbon (around 0.35 per cent) silico-manganese steel is available whose physical properties make it suitable for use in engineering work and it is susceptible to easy heat treatment. Its properties are on the same order as those of the best alloy steels, heat treated.

Probably the best result from Mr. Kinzel's paper, in the opinion of Allen L. Davis, Scovill Mfg. Co., Bristol, Conn., lies in his introducing to users the product with which he has been experimenting. It is not a new steel, for such analyses were made 15 years ago. But it has not become known, and it may well be added to the list of steels at command of the engineer.

High-Carbon High-Chromium Steels

CERTAIN physical characteristics of high-carbon, high-chromium steels were discussed in a paper by James P. Gill, chief metallurgist Vanadium Alloys Steel Co., Latrobe,

Pa. The author compares the properties of six steels of the high-carbon, high-chromium class, which, during recent years, have become so popular as die steels. The comparison covers the critical points, hardening and tempering curves, microstructure and physical properties. A short discussion of the constitution of steels of this class is included; also a brief historical outline of the development of steels of this type.

Suitable for Many Tools

Such qualities as high resistance to wear, nondeformation on hardening and ability to harden in oil or air, adapt this steel to a wide variety of tools and dies. Possible applications are almost unlimited; a few of the uses for which it is especially suited are as follows: blanking dies, drawing dies, coining dies, forming dies, thread rolling dies, trimming dies, shear blades, punches, lathe centers, gages, bushings, certain types of cold-heading dies, rolls for cold forming, seaming rolls, wear plates, brick mold liners, cutting tools for brass and bronze, guides, mandrels, etc.

In the table is given the chemical composition of the six steels studied:

CHEMICAL COMPOSITION OF STEELS STUDIED
Per Cent

Steel	C	Si	Mn	S	P	Cr	V	Co	Ni	Mo
A	2.38	0.42	0.71	0.010	0.030	12.48	0.00	0.00	0.24	0.00
B	2.12	0.24	0.31	0.020	0.021	13.20	0.81	0.00	0.12	0.00
C	1.38	0.35	0.26	0.006	0.015	12.20	0.00	3.45	0.00	0.54
D	2.17	0.19	0.46	0.009	0.015	13.43	0.00	0.00	0.51	0.00
E	1.60	0.09	0.30	0.011	0.026	16.95	0.00	0.00	0.31	0.00
H	2.19	0.24	0.39	0.012	0.018	12.01	0.72	0.66	0.00	0.00

Difficulty in machining material of this character was stressed by H. J. Keshian, metallurgist Chase Companies, Waterbury, Conn., in discussing Mr. Gill's paper. The machining properties are even more difficult than with high-speed steel. The same difficulty is experienced when it is attempted to grind this material. As a result, special types of grinding wheels are necessary in handling it.

It was found experimentally that lowering of the carbon to 1 or 1½ per cent does not assist much in this problem of machining or grinding. Taking up this phase of the subject, Mr. Gill reported having found that, when such material is at a Brinell hardness of 196, it machines appreciably easier than at 250. All chromium steels have the property of machining in a "gummy" manner. That is, there is a piling up of material on the cutting edge of the tool, thus interfering with its free action.

Various Important Topics Covered by Single Papers

WHILE some of the sessions were so developed as to cover mainly some major topic, with a number of papers on different phases of that topic, there were other sessions at which the papers had little or no relation to each other. A group of such papers, read at several sessions, has been abstracted in the following pages.

On Oxygen Dissolved in Steel

ILLUSTRATING his paper with a number of lantern slides, Marcus A. Grossmann, metallurgical engineer Central Alloy Steel Corporation, Canton, Ohio, discussed the subject of "Oxygen Dissolved in Steel, and Its Influence on the Structure." An abstract of his paper follows:

It is shown that in regular pack carburizing (box carburizing), steel absorbs not only carbon but also oxygen, which diffuses into the steel. This was determined by analyzing strictly comparable samples for oxygen, one sample before carburizing and the comparative sample after carburizing. The oxygen determinations were made by the vacuum fusion method, in a graphite crucible.

The amount of soluble oxygen present in steel appears to affect the microstructure. (The soluble oxygen diffuses readily, and is considered here apart from precipitated oxides and nonmetallic inclusions.) A high oxygen content seemingly favors solubility of cementite in alpha iron, and as a result of this solubility it affords opportunity for cementite to diffuse. This theory, advanced by P. D. Merica in a consideration of these data, is supported by all evidence which is at present available.

In certain steels, cementite may occur not as pearlite but as massive cementite associated with grains of ferrite. The separation of pearlite into massive cementite and ferrite appears to be due to diffusion.

Cementite diffusion (and hence agglomeration) seemingly accounts for the phenomenon of "split cementite" in the structures observed in a McQuaid-Ehn test, and also for the structure of "boundary cementite" in low-carbon steels. These structures are characteristic of high-oxygen material. McQuaid-Ehn phenomena should be examined in

the light of original oxygen in the steel plus oxygen absorbed in carburizing.

Solubility of cementite in alpha iron can be indicated on the iron-carbon diagram. Since some steels exhibit

Fig. 11 (Left)—Iron-Carbon Diagram Indicating Some Solubility of Cementite in Alpha Iron

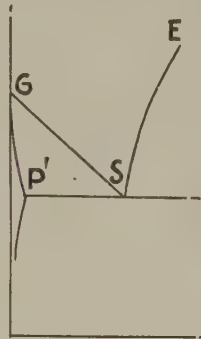
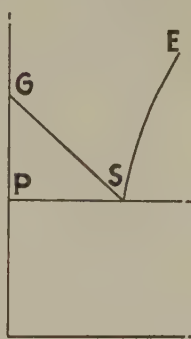


Fig. 12—"Ordinary" Iron-Carbon Diagram. Cementite Insoluble in Alpha Iron



cementite diffusion while others do not, it is suggested that different iron-carbon diagrams can be drawn for different steels, varying the diagram to accord with the cementite solubility and hence with the diffusion power. Oxygen contents must apparently be considered, and in carburized steels it is the oxygen content after carburizing that is significant.

If the solubility of cementite in alpha iron varies for different steels, these variations can be indicated by changes in the iron-carbon diagrams which represent those different steels.

In discussing this paper one speaker reported having tried to check the results obtained, without finding any definite effect from the treatment. In one case—that of ingot iron—he found an actual decrease, from 0.049 per cent to 0.037 per cent of oxygen, after carburizing the specimen for 36 hr.

Dr. H. W. Gillett, United States Bureau of Standards, made particular reference to the iron-carbon diagram as the "foundation stone of all our knowledge of heat treatment." In a study extended over 10 years or more the bureau has collected a mass of data. He pointed out that in deoxidized material, especially that of about $\frac{1}{4}$ per cent Mn, the P point comes nearer to the left of the diagram than when in the presence of dissolved iron oxide.

Electric Furnaces for Heat Treating

DEVELOPMENT of electric furnaces was briefly reviewed and their advantages for heat treating was pointed out in a paper, "Progress Made in the Use of Electric Furnaces for Heat Treating." The author, Albert N. Otis, is associated with the industrial heating and welding engineering department, General Electric Co., Schenectady, N. Y. The object of the paper was to show the present status of electric furnaces, the extent of their use for heat treating, and some new types which have been developed recently.

Rapid increase in the use of electric furnaces is shown by a list of the principal installations, describing briefly some of the individual furnaces and their operation. Photographs are shown to illustrate the various types. Reference is made to specific applications, including furnaces for annealing tool steel bars and rods, and elevator furnaces for annealing sheet steel for electrical machines, the latter without the use of boxes. Large savings are shown by this method.

Among new developments, electric furnaces for forging are referred to, also continuous furnaces for the new process of copper brazing, and for annealing in atmospheres of protecting gas.

Greater Production at Lower Cost

There is no doubt that the development of electric heating has been a valuable contribution to the manufac-

turing industries. They are an aid in improving quality, reducing cost, providing better working conditions and enabling output per man to be increased. This art is relatively new, and appears to have vast possibilities for the future.

In response to several questions from the floor, Mr. Otis stated that the annealing boxes ordinarily used in heat-treating in electric furnaces are made customarily of steel plates. The Ludlum Steel Co., however, has been using alloy steel boxes for the past three years without losing any boxes, and an examination of them shows that they probably have many more years of usefulness ahead.

In comparing costs of electric heat treating against heat-treating using oil as fuel, the unit prices were $1\frac{1}{4}$ c. for each kw-hr. in the electric furnace and $5\frac{1}{4}$ c. a gallon for oil.

Steel Failures in Aircraft

THIS paper discusses failures in steel aircraft parts which have been investigated by the metallurgical laboratory at Wright Field. The author, F. T. Sisco, is chief of the metallurgical laboratory, Air Corps, Wright Field, Dayton, Ohio. The methods used in the investigation of these failures are described briefly, followed by a classification of the various failures in respect to their origin.

Included in this classification is an account, illustrated by typical and representative cases, of: (1) failures due to faulty manufacturing methods and not caused by defective material; (2) failures due to internal defects, such as non-metallic inclusions; (3) failures due to seams and other surface defects; (4) miscellaneous failures due to defective steel, including large grain size, segregation and banding; (5) failures due to faulty or wrong heat treatment; and (6) failures due to welding.

Failures of material on aircraft in service are comparatively rare; probably 90 per cent of them occur during test. From the large number of failures investigated in the past five years, it has been possible to classify them, to form rather well defined opinions concerning their causes, and to make recommendations to reduce their number.

Some Causes of Metal Failure

It has been established without doubt that a concentration of stress occurs at sharp corners, keyways, screw threads, toolmarks, gear teeth and the like and leads to early fatigue failure. There has been some question as to whether non-metallic inclusions accelerate failure by fatigue. The results brought out by Lucas in his study of the path of fatigue failure, and by Styre in his discussion of Lucas' paper, show conclusively that fatigue cracks frequently have their origin in clusters of slag particles.

Several engine builders were troubled by an excessive number of valve spring failures. These springs were made out of a chromium-vanadium spring wire by experienced spring makers. The stresses on a valve spring can be estimated with a fair degree of accuracy. In one engine this stress varied from about 30,000 to 50,000 lb. to the sq. in. So far as is known the torsional endurance limit for spring tempered chromium-vanadium steel has not been determined, but past experience has set 30,000 to 50,000 lb. as a safe working stress for these springs.

When an excessive number of failures developed, the springs were increased in size so that the stress range was decreased to about 20,000 to 35,000 lb. to the sq. in. Even with this greater margin of safety the number of failures did not diminish noticeably.

Investigation disclosed that the steel in the springs was not of high quality. The detection of slag inclusions and other defects led to the conclusion that the failures were due to defective steel. After a search for a source of supply of high-grade steel, high-carbon piano wire was used for valve springs. With the introduction of these springs the stress range was increased to 35,000 to 50,000 lb. to the sq. in. and

the springs were placed in service. Failures of these springs are almost unknown.

Fatigue Failures Caused by Overloading

Practically all crankshaft failures are due to fatigue; most of them have their origin either in a fillet or in an oil hole. There is little doubt that the direct cause of failure is a highly concentrated stress at the point where failure starts. That this failure is due to overloading is probable. There is no direct evidence that hairline cracks, small seams or other defects cause the failure, but there is considerable basis for the assumption that they contribute materially.

The art of welding, especially of thin tubular products, has progressed to the point where it is practically 100 per cent perfect. The perfection attained is so high that at

now overcome these failures practically completely, by re-designing end fittings which attach the stream-line wire to the structure.

Tungsten Carbide—A New Tool Material

DEVELOPMENT of a material for use as the cutting edge of tools subjected to hard service and heavy duty was reported by Samuel L. Hoyt of the research laboratories of the General Electric Co., Schenectady, N. Y. Tools of this material, which has been much studied in Germany, were shown in operation at the Exposition. An abstract of Mr. Hoyt's paper follows:

Use of tungsten carbide as a tool material is described. In tool form it has a Brinell number of over 2000, with half the strength of high-speed steel, and it is capable of

Metallurgists Who Presented Papers at Philadelphia



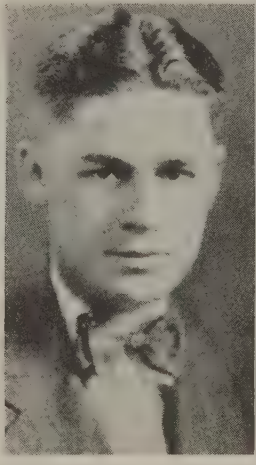
C. E. MEISSNER



O. W. BOSTON



A. N. OTIS



R. H. HOBROCK



W. E. GRIFFITHS

present the welded fuselage is standard in airplane construction. Other applications of welding in airplane and engine construction are numerous and well known. Failures due to improper welding in the construction of the airplane are exceedingly rare. When they do occur they are almost always due to the welder, and seldom if ever have their origin in the materials or the process.

Improved Steels Have Benefited Others

There are already in existence sufficient types of steels to meet practically all needs which come up in engineering practice, according to Commander William Nelson, United States Navy, in his discussion of Mr. Sisco's paper. The effort should now be put forth to reduce the costs of manufacture of some of these steels and to increase their uniformity and reliability. Hazards in the use of aircraft are certainly high enough now, without introducing further hazards from the use of defective material. The aircraft industry, young and undeveloped as it is, has already caused improvements in materials which are becoming of increasing benefit to other industries.

Attention was called by T. W. Downs to the fallacy of introducing too great a hardness by heat treatment for the particular type of steel used. This has gone in many instances far beyond what the steel is made for, and has resulted in failures; for that reason.

In closing the discussion, Mr. Sisco referred particularly to the question of failures in stream-line wire, brought up in a question from the floor. He stated that these failures have come almost wholly in a series of epidemics, with a large number of failures at a time, followed by study of the causes and correction. The Army aircraft service has

scratching sapphire. Tests on machining quenched high-speed steel, glass, hard porcelain, Hadfield's manganese steel and abrasive compounds are described. On cast iron and steel the carbide tools are shown to be greatly superior to high-speed steel and capable of sustaining cutting at speeds which are several times that commonly used.

Experience gained in production by the General Electric Co. shows that these new tools rapidly attain great industrial importance and that they are indispensable in many lines of work. A number of these applications are described to show the type of performance which has been obtained. In general, the paper gives an account of what is claimed to be the first marked improvement in cutting tools since the introduction of high-speed steel by Taylor and White.

What the Material Will Do

A sample specimen ground to an edge of about 90 deg. is capable of cutting a rather deep, narrow groove in an alundum wheel without suffering much loss itself; whereas ordinary tool materials are worn away by the wheel. This behavior on the alundum wheel gives a good idea of the hardness of the material.

Quenched and tempered high-speed steel has a modulus of rupture in a transverse or cross-bending test of around 425,000 lb. to the sq. in. Similar tests have been run on tungsten carbide tool material at the laboratory, using a section ¼ in. square with supports 1½ in. apart. The German material is found to run around 225,000 lb., while our material runs around 250,000 to 275,000 lb. to the sq. in. We have not found it feasible to get a figure for the carbide without cobalt to compare with these figures. It is not likely that a good figure could be obtained, but we may

safely say that the pure carbide would come under 50,000 lb. Our experience indicates that such a material would be very weak.

These figures show that tungsten carbide has had its strength increased by the addition of cobalt to somewhat over half that of high-speed steel. Viewed in one light, this is to be considered as a substantial achievement, but this strength must also be regarded as a factor which places a definite limitation on the use of tungsten carbide in commercial practice.

Toughness an Important Quality

Another important property of a material of this type may be called "toughness"—the ability to stand up under stresses or impacts imposed on relatively small areas. A

Institute of Metals Lecturer



A SCHOLARLY review of the status of chromium and its alloys was delivered by Dr. F. M. Becket, at the dinner of the Institute of Metals. Dr. Becket has latterly devoted himself very largely to research in this field.

weak or fragile material would chip and flake off, but a tough one would stand stresses of this type without injury. This material possesses its share of toughness, since it withstands severe blows of a soft peen delivered on the edge of a bar. The blows are delivered in such a way that the edge would crumble if it were weak. A supporting block of copper shows marked indentations as a result of the blows on the material.

Inasmuch as the break comes abruptly when the bar does break, the material may be called brittle, in that sense. The fracture is of the curved type, while a weaker, or less "tough," material would break straight across.

Durability Between Tool Dressings

We compared tungsten carbide tools with a special alloy cutting tool which had given the best performance on this operation. Three tools were used on this job on two different heads, finishing three faces on the part. The tools of the special alloy required redressing after every 150 parts machined, on the average, when the tools became dull enough to require sharpening. Carbide tools were substituted under the same operating conditions, and finished 11,000 parts before they became dull enough to be redressed.

In the "low-tensile" field the durability of the tungsten carbide tools has been found to be of the order of 25 to 75 times that of high-speed tools. The difference is so great that the simplest kind of a test demonstrates the superiority of the carbide tool. Here the tool pressure is always light, the cuts are small, and the cutting speeds are high. Resistance to either wear or "burning" is the chief requirement of the tool.

One test log is a chromium-nickel steel with a Brinell hardness number of over 250. With a cut of $\frac{3}{8}$ in. and feed of $\frac{1}{8}$ in., good high-speed tools fail at 35 ft. a minute

in about 6 to 8 min. We run the carbide tools with the same cut and feed, but at 70 ft. a minute, and stop the test at 10 min. The tools show only slight wear at that point.

Discussing the paper on "carbology," a representative of the Vanadium Alloys Steel Co., Latrobe, Pa., pointed out that an important element in considering materials of this sort is their atomic concentration, or the specific gravity divided by the atomic weight. For the diamond this is about 0.293, and figures were read for several other materials. For a tungsten carbide it would be 0.160 for WC and 0.127 for W₂C, both of which are much lower than for the diamond.

Service Annealing of Sling and Crane Chains

METHODS of overcoming failures of chain in service were discussed by W. J. Merten, metallurgical engineer with the Westinghouse Electric & Mfg. Co., East Pittsburgh, in a paper, "Service Annealing of Sling and Crane Chains." This paper discusses the inconsistent results in ductility and strength ordinarily obtained when chains are annealed at temperatures unsuited for links that have been severely deformed and cold-worked in service. The author recommends a uniform recrystallization at temperatures considerably above the transformation range, to render the chain entirely safe for further service, without resorting to a reduction of the safety load and basing the calculation of permissible stresses on the average cross sectional dimensions only.

Analysis of the results of experimental and general evidence indicates that the factors involved in a complete reconditioning of a worn chain by reannealing are:

1. The degree of refinement of grain structure from the original heat treatment of forge welded chain.
2. The degree of plastic deformation or cold work during service.
3. The degree of temperature above the A_{c3} point and rapidity of cooling from this temperature.
4. The duration of the heating at and above critical temperatures.

Suggested heat treating practice for chains:

Heat treatment after forging—heat uniformly to above the finish forging temperature (1900 deg. Fahr.). Hold for 1 hr. for each inch of cross section of largest part of chain (ring or hook). Then cool in air to black heat (700 to 800 deg. Fahr.). Reheat uniformly to just above the A_{c3} point, hold for 1 hr., then cool in air to approximately 1000 deg., then slowly to room temperature.

For Service Annealing—Heat chain uniformly to above the A_{c3} temperature for complete recrystallization. Hold for at least 1 hr. at temperature and cool in air to a black heat, then slowly to room temperature. The first part of this practice is not in general use and has been given little attention. But its observance contributes probably more to the life and performance of a chain than even the selection of the most suitable material.

To Avoid Wastage of Link Surfaces

While it is true that annealing of chain above the A_{c3} point will correct cold work and eliminate any possibility of gross crystallization, no test or proof is offered that low annealing temperatures will not give the same desirable practical result—that of freeing chain from brittleness—according to C. G. Lutts, metallurgist Boston Navy Yard, in his discussion of Mr. Merten's paper. The practice of low-temperature annealing of chains has been in effect for some years and the results generally have been satisfactory.

One very practical objection against long soakings above the A_{c3} point is that, at such high temperatures, the metal of the chains oxidizes and wastes away rapidly. Frequent treatments at these temperatures are known to shorten seriously the life of chains, because of the rapid decrease in "wire" diameters and the excessive softening of the metal. The choice is between the costly and very severe high-temperature treatment and the possibility that gross crystalli-

zation, if developed with low-temperature annealing, may be found weakening.

As is well known, the severity of cold work determines the beginning of recrystallization and the temperature at which gross crystallization sets in. But the temperature range of 1200 to 1500 deg. Fahr. is one successfully used today for periodic annealing of chains, and instances of gross crystallization are not reported.

It is questioned if the erratic failure of chain may perhaps reasonably be explained on the basis of internal stresses, plus a lack of ductility in the work-hardened surface, plus the added stress, possibly of only a normal working load, which combined exceed the strength of the metal. Does the delicate balance between these internal stresses and the ready susceptibility to intensification or relief explain this erratic failure? It is submitted that a successful attack on the problem of chain failures, and of corrective heat treatments, has to be led with a study of internal stresses and better understanding of them.

Navy Practice with Anchor Chain

Stating that the United States Navy has experimented with anchor chains of wrought iron and also of high-carbon cast steel, Lt. Comdr. H. N. Wallin, Construction Corps, United States Navy, Bureau of Construction and Repair, Washington, continued the discussion of Mr. Merten's paper. The author's views as to cold working of chain in service, with consequent local embrittlement and eventual chain failure, have been substantiated by Navy experience. Often wrought iron chain links of 2¾-in. wire have fractured under small loads, or in some cases when merely dropped upon a concrete floor from a height of 15 or 20 ft.

Usually cold working is accompanied by a reduction in the mean diameter of the chain links, due to the plastic

deformation described. The Navy makes a practice of condemning such chain, so far as anchor use is concerned, when this reduction, whether due to cold working or to abrasion, reaches 10 per cent of the original diameter of the links.

It has been found in Navy practice that relieving of stresses by periodic annealing has greatly reduced the failures of anchor chains. While the combined heat treatment and annealing of chains as proposed would be beneficial, it must be emphasized that neither heat treatment nor annealing is a panacea. Neither one will reconstruct or restore chain which has been excessively deformed by stresses beyond the elastic limit.

It has been determined that high temperatures are required to relieve the strains induced in wrought iron chain by the process of manufacture. For a high grade, double refined iron, the temperature of 1760 deg. Fahr. was found to give the best results. The chain is held at that temperature for about 10 min. and then is cooled in the air. The use of lower temperatures resulted in weaker and less substantial chain, while higher temperatures gave no additional improvement in strength or other qualities.

In the periodic reannealing of wrought iron chain, the United States Navy has found best results were obtained by heating the chain to 1290 or 1300 deg. Fahr., holding it there for 3 hr., and then cooling it in the air or in the furnace. The German Navy, however, reports the belief that heating to 1110 to 1200 deg. Fahr. and holding for 6 hr. gives the best results; while higher temperatures are said to cause considerable wastage of metal from scaling.

Cast steel anchor chain, as used by the United States Navy for the last eight or ten years, is high in both carbon and manganese. The best heat treatment has been found to include heating to 1650 deg. Fahr., quenching in water for one minute, drawing to 1100 deg. and holding there for

News and Sidelights of National Metal Week

A SPECIAL train from Chicago brought about 90 Chicago, Detroit and other steel treaters, gathered in part on the way. By way of diversion a political poll was taken during the trip which revealed about 90 per cent in favor of the Republican nominee.

THE executive secretary, C. E. Hoyt, and the technical secretary, R. E. Kennedy, of the American Foundrymen's Association were interested visitors.

THE Philadelphia Chamber of Commerce tendered a luncheon the first day of the convention at the Benjamin Franklin Hotel in honor of the officers of the various technical societies. The affair was enlivened by a welcoming address by the mayor of Philadelphia, Harry A. Mackey.

TWO foreign steel men, F. C. A. H. Lantsberry and C. L. Bailey, with their wives, were among the visitors. Mr. Lantsberry is an official of William Jessop & Sons Co., Ltd., Sheffield, England, and has attended several steel treaters' annual gatherings. He presented a paper at the Boston convention. Mr. Bailey is from Toronto, and is the manager of the Canadian branch of the same British steel company. He succeeded his father who was the active head for many years.

ALSO present from Great Britain was Charles Wardlow, the present head of S. & C. Wardlow, of Sheffield. He was in the company of his New York

representatives, the Hoyt brothers, and, coming chiefly for the Metal Show, set sail for England on Oct. 13 after barely a week in this country.

IT was interesting as well as profitable to listen to Dr. W. H. Hatfield enter into the technical discussions. He has a happy manner of getting across critical comments, favorable and otherwise.

IF it had been made to order, the weather for the activities of National Metal Week could not have been better. There were five days of sunshine and warmth which made the long distance between the hotels and the Commercial Museum of small consequence. And the excellent taxicab arrangements minimized transportation difficulties.

THE Campbell Memorial lecturer this year, Dr. W. H. Hatfield, must have been gratified at the reception he received. An attendance of about 550 established a record for such a meeting. It tendered him a warm greeting before and after the lecture. Each one of those present was presented with a printed copy of the complete lecture only parts of which were touched on in his one-hour address.

PLANT visitations were, of course, a feature of daily occurrence. The Naval Aircraft Factory, Leeds & Northrup Co., Riehle Brothers Testing Machine Co., Brown Instrument Co., and Victor Talking Machine Co., were among the man-attracting magnets.

A NOTHER prominent British metallurgist will soon visit American co-workers. Ulick R. Evans, Cambridge University, Cambridge, England, is to be the Institute of Metals lecturer in February, 1929.

ANNOUNCEMENT was made in the week that the (British) Institute of Metals will probably visit the corresponding American society in the fall of 1932.

BOTH the president of the American Institute of Mining and Metallurgical Engineers, George Otis Smith, and the secretary, H. Foster Bain, were present during the week. Both spoke at the regular dinner of the Institute of Metals Division.

TWO committees of the American Society for Testing Materials held a meeting in the week—A2 on cast iron and B2 on non-ferrous metals. There was a large attendance at both.

ENOUGH foundrymen were present by chance and by arrangement so that the cast iron committee of the American Foundrymen's Association held a long and profitable session.

TOTAL attendance for the week is reported as 64,870, slightly exceeding that at Detroit last year.

THERE were 2714 members of the A. S. S. T. present during the week, which is slightly in excess of 50 per cent of the total membership.

2 hr. It is not present Navy practice to reanneal this chain periodically, as the stresses in service are well below the elastic limit of the material.

Cast Steel Chain Lightly Loaded

In adopting cast steel chain, definite sizes were selected as substitutes for the same sizes of wrought iron chain. As the cast steel in chain has a tensile strength of 100,000 lb. per sq. in., compared with only 50,000 lb., in the wrought iron, it is believed that the greater strength of the cast steel chain can safely be placed at 60 per cent above the wrought iron, after allowing for all possible variables in the manufacture of the cast steel chain. No failures have occurred during the period of use of this chain on board naval vessels.

More chain trouble after annealing than before was reported by Fred G. Frisbie, metallurgist Duquesne Steel Foundry Co., Pittsburgh. The wrought iron links apparently lose their rigidity after being heated to 1400 deg. Fahr. This causes them to elongate and results in subsequent inequality in the lengths of chains, which customarily are used in sets of two, four or eight. As the chains must be of equal length to carry loads in a horizontal plane, this situation necessitates considerable blacksmith work in bringing the chains back to uniformity of length.

Wear, Overload and Embrittlement

Only two different phenomena are to be considered in this connection, according to A. V. deForest. These are the effect of wear and overload in producing deformation of the chain, and embrittlement occurring without any appreciable change in the appearance or dimensions of the chain. Gough and Murphy of the National Physical Lab-

oratory in Great Britain say that this brittleness is due to a skin effect, caused by surface hardening resulting from small impacts. The deleterious effect of this action is undoubtedly the major cause of the production of brittleness in wrought iron chains.

Evidence available indicates that, as a result of inter-link action, hammering on the ground, rattling through hawse pipes, battering on chain wheels, cleaning by rumbling machine (in certain cases), the material of the surface of the link—in some instances to a very small depth only—becomes locally hardened to such an extent that its ductility is practically exhausted. The link surface then consists of a thin and highly brittle case covering a core possessing the ductile properties of the best chain iron.

Skin Cracks Extend Through Link

When such a link section is subjected to bending stresses—particularly those caused by shock conditions—the hardened skin strains elastically and then cracks. This crack is of such a type that very great stress concentration occurs at its root. When the crack reaches the underlying ductile metal the latter cannot exert its proper ductility, because of the prevailing conditions of local constraint. Hence, the crack continues its course through the section of the link and produces a fracture which has an entirely brittle appearance.

In closing the discussion on the paper, the author expressed the belief that it is the annealing practice generally, rather than deterioration of the chain material, which gives such trouble as is experienced. It must be remembered always that chains are subjected to compound stresses which cannot well be evaluated in advance. These are much more severe than the straight stresses for which they are figured.

Application of Science to the Steel Industry

TAKING the above as a text, Dr. W. H. Hatfield, director of the Brown-Firth Research Laboratories, Sheffield, England, first outlined the problems now awaiting solution, and then proceeded to indicate the way in which science has aided metallurgists in producing the various special steels now available. His paper—which constitutes the Edward De Mille Campbell Memorial Lecture for 1928—occupies 154 pages of the Society's *Transactions*, and obviously must be consulted in the original for the wealth of data on alloy steels which it contains.

At the outset, Dr. Hatfield calls attention to the fact that "pure" science supplies the knowledge of natural laws. It requires long and painstaking research without any thought of immediate financial reward. Yet recent history is so full of instances where great industrial advances have resulted from thorough understanding of these fundamental laws that the speaker advanced the proposition that Governments should encourage such independent investigations by every reasonable means.

No less admirable is the type of mind that can apply abstract physical laws to the improvement of everyday manufacturing or living conditions. It bridges the gap between pure and applied science. But the diversity of knowledge has become so great as to be beyond the comprehension of one educated mind; consequently, really efficient organizations for industrial research (i. e., for the application of science to industry) must contain several specialists with individual laboratories. While it has frequently been said that the scientific man should endeavor to understand the human element in industry, Dr. Hatfield suggested that it is even more necessary "that industry generally should learn to know, to appreciate and to make the best use of the scientist."

Coming to more specific problems, the lecturer cited

the progress made in getting sound ingots. (He is chairman of the British Iron and Steel Institute's Committee on heterogeneity of steel ingots, which presented voluminous reports in 1926 and 1928.) Whereas carbon steel ingots of medium size used to be bottom-cast, small end up, in a closed mold—a method which caused much secondary piping down the axis of the ingot—the present British practice for high-class metal has become standardized upon big-end up, top poured with refractory-lined sink heads. While a marked degree of improvement has resulted from such a change, there is still so much unknown about the physical properties of molten and just solid steel, and about the chemical reactions between metallic and non-metallic ele-

Campbell Memorial Lecturer for 1928



FOR many years Dr. W. H. Hatfield has been associated with the Brown-Firth Research Laboratories, Sheffield, England. His scientific and metallurgical education was received at Sheffield University, where he obtained his doctor's degree. He is a member of the council of the Iron and Steel Institute and of several other societies. His work on stainless and special alloy steels is well known, as are also his contributions to technical societies and periodicals. He is the author of "Cast Iron in the Light of Recent Research," which has had wide circulation in the United States.

Officers Nominated for 1929

President: *Dr. Zay Jeffries, research director Aluminum Co. of America, Cleveland.*
Vice-President: *R. G. Guthrie, metallurgist Peoples Gas, Light & Coke Co., Chicago.*
Secretary: *W. H. Eisenman, who has held the office since the Society was organized.*
Directors for two years: *A. H. D'Arcambal, Pratt & Whitney Co., Hartford, Conn.,*
and F. T. Sisco, Wright Field, Dayton, Ohio.



ZAY JEFFRIES



R. G. GUTHRIE



W. H. EISENMAN



A. H. D'ARCAMBAL



F. T. SISCO

ments at those high temperatures, that further progress by the method of trial and error is bound to be slow.

Dr. Hatfield also selected from his long prepared dissertation the subject of strength at high temperature as being worthy of special mention. It is known that steels will frequently show permanent set after carrying a load for a long time at high temperature. The lecturer believes that as long as a metal remains a crystalline aggregate there will be a range of stress wherein it acts in an elastic manner. This range becomes very small as the melting point is reached, and to determine it for various elevated temperatures requires careful work with equipment of high precision. Table I shows the limiting creep stresses ("the stress above which there is a steady continuous creep of a measurable rate") as determined by the National Physical Laboratory. The same authority states that adding

carbon up to 0.50 per cent is incapable of raising the limiting creep stress above 11,200 lb. per sq. in. at 500 deg. C.

Table I.—Limiting Creep Stress for Low-Carbon Boiler Tubes

Temperature	0.10 Per Cent Carbon	0.17 per Cent Carbon
400 deg. C.		30,000 lb. per sq. in.
450 deg. C.		19,000 lb. per sq. in.
500 deg. C.	7,840 lb. per sq. in.	10,750 lb. per sq. in.
550 deg. C.	2,910 lb. per sq. in.	5,380 lb. per sq. in.
600 deg. C.	1,340 lb. per sq. in.	2,690 lb. per sq. in.

For rapid determinations which have been found useful by designers of equipment, the Brown-Firth Laboratories have devised a test for "time-yield." This arbitrary value is found by discovering the stress at the given temperature which causes a permanent set of 0.5 per cent on the gage length (measured to an accuracy of 0.01 per cent of the gage length) within 24 hr., and no further increase for the next 48 hr.

Important Events of the Week

AT the annual meeting of the society the usual reports of the president, the secretary and the treasurer revealed the excellent condition of the organization. Announcement of the report of the nominating committee for officers in 1929, of which W. E. Reeder, General Electric Co., Schenectady, N. Y., was chairman, was formally accepted. The nominees are mentioned on another page.

The annual banquet at the Hotel Benjamin Franklin was the usual success. An excellent address by E. P. Warner, assistant secretary of the United States Navy for Aviation, was the feature. Douglass Mulloch, the well known poet of Chicago, enlivened the evening with one of his usual able and humorous speeches.

Other important events of the convention are briefly reported in the following:

Howe Medal Conferred on Two Authors

Each year, by recommendation of a special committee and by a vote of the board of directors, a medal—the Henry M. Howe medal—is conferred on the author or authors of

the most meritorious paper printed in the *Transactions* during the previous year ended with July. This year at the annual banquet President Hughes bestowed the medal (two in this case) on Prof. O. E. Harder and R. L. Dowdell, University of Minnesota, Minneapolis, for their paper, "The Decomposition of Austenite," published serially February to July, 1927.

Past President's Medal

A new custom recently inaugurated is the bestowal of the past president's medal, always upon the man who was president the preceding year. The last recipient, R. M. Bird, presented the medal this year at the banquet to J. Fletcher Harper, president during 1927.

Philadelphia Chapter Receives President's Bell

It is customary for the president of the national society to present each year the president's bell to some chapter which has distinguished itself during the year. President Hughes called upon Dr. R. H. Patch, chairman of the Phila-

delphia chapter, to accept the bell, largely in recognition of the heat treatment courses which that chapter has been and is conducting in cooperation with Temple University.

Next Year's Convention in Cleveland

The 1929 convention and exposition will be held in Cleveland, the exact date to be announced later. An annex has been completed for the large auditorium and ample facilities for a large exhibit will be available.

Institute of Metals Dinner

THE "dinner meeting," which only a few years ago was attended by few except the active officers of the division, has grown into the most important social event of the Institute of Metals convention. This year the guests included George Otis Smith and H. Foster Bain, president and secretary of the American Institute of Mining and Metallurgical Engineers, and fifty or more ladies, wives and friends of the members. W. M. Corse, secretary of the division, announced that the British Institute of Metals had accepted an invitation for a joint meeting in America, and it will be held probably in 1932. Dr. Ulick R. Evans of Cambridge University will deliver the annual Institute of Metals lecture in New York early in 1929. Sam Tour, chairman of the meetings and papers committee, has arranged for a series of papers on new aspects of the corrosion problem for that same occasion.

Frederick M. Becket, vice-president Electro Metallurgical Corporation, New York, delivered a formal address on the history and present position of chromium and chromium alloys. He has been investigating these alloys and production methods for chromium and ferrochromium for 25 years, almost to a day of the address. One interesting side-

Howe Medallists for 1928



O. E. HARDER



R. L. DOWDELL

light on stainless iron was divulged by his laboratory records, showing that he prepared a number of these low-carbon high-chromium alloys and exposed them to furnace atmospheres at high temperatures in order to determine their heat resistance properties. Since not a single piece remained to exhibit its peculiar resistance to tarnish at room temperature, the announcement of stainless iron was delayed by several years. Doctor Becket's paper, which is of such a nature that it cannot well be abstracted, will appear later in print.

Widening Application of Products and Equipment Emphasized in Exhibits

ADVANCES in the development of special and alloy steels and demonstration of a wide variety of improvements in the technique of both electric and oxy-acetylene welding were features of the National Metal Exposition held the past week at the Philadelphia Commercial Museum. Although many steel companies were not able to show radical departures from the standpoint of either method or finished products, they were all able to prove important progress in the commercial application of high-grade alloy steels and to show that the steel industry has been able to meet the demand of an exacting industrial structure for specialized products upon a reasonable commercial basis.

But the finished steel products would never have been possible had it not been for the continued evolution in the design and operation of furnaces and heat-treating appliances, of testing and control equipment and of the highly accurate and dependable metal working tools, many of which were in operation in the exhibition hall. Thus the exposition might be termed a complete cross section of the development, manufacture and utilization of steels and alloys during the past year.

The progress and diversification of

heat treating was emphasized in a popular exhibit of one company contrasting the hut of the alchemist of the middle ages with the modern research laboratory. The advantages of different modern methods were ably demonstrated. Electric heat applications of a new and unusual nature were shown by a number of companies, and it would seem that the electric industry is actively seeking outlets for its products in many new fields. Keen interest was displayed in gas furnaces, also, and the many fine examples of units of both the gas and electricity utilizing types indicated that there is ample room in the heat treating industry for a wide application of both forms of heat energy. But in this line of equipment, as in many others, the visitor was not so impressed by departures in design or operation as by the diversity of application which is taking place. The American Gas Association, to illustrate, presented exhibits of its various members and a completely outfitted metallurgical laboratory, the latter covering the efforts of this group to concentrate its activity on individual problems.

New Cutting Tool Introduced

Demonstration of Carboloy, a new cutting tool developed in the research

laboratory of the General Electric Co., attracted considerable interest. It was shown cutting cast iron at a rate of 140 to 160 ft. per min. and occasionally even higher. It is an alloy of tungsten, carbon and cobalt and is a product of the hydrogen furnace. The exhibit included many examples of materials cut with Carboloy and comparisons with the work of high-speed tool steels. Its most economic application is said to be on jobs involving low tensile materials. The development and application of Carboloy was dealt with in a paper at one of the technical sessions and is discussed elsewhere in this issue.

Castings in Group Exhibits

The success of manufacturers producing kindred products to join together in an effort to improve quality was illustrated in the exhibits of the Electric Steel Founders' Research Group, the Steel Castings Development Bureau and the Gray Iron Institute, Inc. These exhibits were confined almost entirely to commercial castings produced for the trade and emphasized general utility work rather than exceptional or difficult applications. Of particular interest in the steel castings group were a turbine diaphragm showing the insertion of the metal blades in the mold as-

sembly, a number of locomotive superheater return bends tested to 6000 lb. per sq. in. and a hardening tray the holes in which had been cast rather than bored. The gray iron exhibit contained a number of castings of interest both from the standpoint of use and manufacture and the electric steel group attracted interest for similar reasons. A visit to any of these exhibits provided convincing evidence of the efforts of the industries represented to secure a wider market for their products by diversity of application.

Testing and Control Apparatus

Testing and control apparatus had an important place at the exhibition, and as usual a number of instruments were shown for the first time. The tendency toward greater precision was emphasized and automatic control features which have been developed recently attracted considerable attention. "Some of the more important innovations were described in the pre-convention issue of *THE IRON AGE*, Sept. 27, and others have been dealt with in more detail in previous issues.

An opportunity to note the recent advances in the welding industry was offered in the American Welding Society's exhibits of welded products as well as by the operating displays of many companies manufacturing welding apparatus and equipment. The booth of the society contained a wide assortment of welded products, including automobile bodies, metal furniture, ornamental iron products, structural steel sections and many others. In another booth part of a welded airplane fuselage was shown. Another interesting welding application was offered in a gas refrigerating unit requiring more than 50 welds and which had been tested to 900 lb. per sq. in.

More than half the exhibits of welding equipment included operating units which drew constant attention. The wide assortment of products offered little opportunity of discerning any particular trend, but it was indicated that the welding industry is making rapid strides in all departments and is quickly achieving the economies in operation which industry demands. Safety features were em-

phasized. A number of companies displayed examples of welding as applied to non-ferrous metals with a number of applications in operation.

May Drop Odd Sizes in Welded Chain

WASHINGTON, Oct. 16.—Manufacturers representing more than 85 per cent of the production of welded chain have unanimously agreed upon a simplification program providing for the elimination of several hundred odd sizes from their list of standard numbers. The Division of Simplified Practice, Department of Commerce, has been requested to call a general conference of manufacturers, distributors and users of welded chain at which the manufacturers' recommendation will be presented for adoption.

Structural Fabricators Take Up Business Problems

A new program for the fabricated steel industry is to be taken under consideration by the American Institute of Steel Construction at its annual convention to be held at Biloxi, Miss., Nov. 13 to 17. During the past four years attention has been concentrated largely upon technical problems and engineering standards. The new program will embrace problems of buying and selling, out of which it is expected to evolve a code of ethics or trade practices.

To introduce the subject in its broad scope, the institute has scheduled three addresses at its annual convention. The buyer's attitude as related to the present competitive conditions among sellers will be discussed by L. F. Boffey, editor of *Purchasing Agent*; and the character of

salesmanship essential to meet present-day economic conditions will be discussed by C. K. Woodbridge, president Kelvinator Corporation, Detroit, and past-president International Advertising Association. Following these, Abram F. Myers of the Federal Trade Commission will address the convention on the powers and duties of trade associations. These three addresses will constitute a symposium on the business problems of the industry.

Puts Pickling Compound on the Market

A new pickling compound, a product of the E. I. duPont de Nemours & Co., will be marketed by the Research Manufacturing Co., Oak Lane Station, Philadelphia. It is stated that it not only removes the scale or oxide, but it stops when it has removed the scale. As a consequence, it conserves the acid content and minimizes the loss of the steel itself. In other words, it is said to contain within itself an inhibitor, preventing over-pickling or pitting of the steel.

Buffalo Forge Celebrates Fiftieth Anniversary

The fiftieth anniversary of the Buffalo Forge Co. was celebrated at the annual three day sales convention of the Buffalo Forge Co., Buffalo Steam Pump Co., and the Canadian Blower & Forge Co., Ltd., held at Buffalo.

Representatives of over forty branch offices of these associated companies were present. The Canadian plants sent salesmen from Kitchener, Toronto, Winnipeg, Montreal and Vancouver. Both the South American and Porto Rican offices had one representative.

THIS plane, owned and operated by E. J. Henke, president American Electric Fusion Corporation, Chicago, was used by him to reach the Metal Exhibition at Philadelphia last week



Business Analysis and Forecast

Steel Industry Has Much Activity Ahead

Demands of Consuming Industries Show Little Let-up—Railroad Orders Not Improving but Construction Remains High

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

WHEN allowance is made for the usual seasonal ups and downs, and for a small factor of long-time normal growth, we find that steel production increased a little in September and was 19 per cent above "normal." This represents almost exactly the same annual rate of production as existed in April and again in July. The unfilled orders of the Steel Corporation showed about the usual seasonal increase in September, and the rate of gain in the adjusted figure was only the same as that which occurred in the preceding month. From this, it may be inferred that new orders have been coming in at a rate that is only a trifle ahead of shipments. The average price of finished steel for the month was about 2.351c., which compares with 2.348c. in August.

Pig iron production, as adjusted, showed a slightly downward trend in September and was only about 8½ per cent above our estimate of normal, against 9.6 per cent above in August. The price of pig iron advanced considerably, the average for the month being \$17.60, which compares with an August average of \$17.11.

The following conclusions seem justified as to the future trend of prices

in the industry: (1) Steel production is too ample to allow much more than continued firmness at the present level of prices. With production 19 per cent above normal, and forward buying no larger than it is, the situation is little better than one of equilibrium. (It is unusually dependent upon the automobile industry.) (2) Pig iron production, however, is relatively low and pig iron prices are cheap. Further advances in pig iron prices seem to be a reasonable expectation during the next two or three months. (3) The situation as to steel scrap is decidedly different from that in pig iron. Scrap is dear. It is too high in comparison with pig iron prices. It seems probable that the scrap markets are very near their peak and that considerable declines will occur before the end of the year.

Steel Activity Exceptionally High

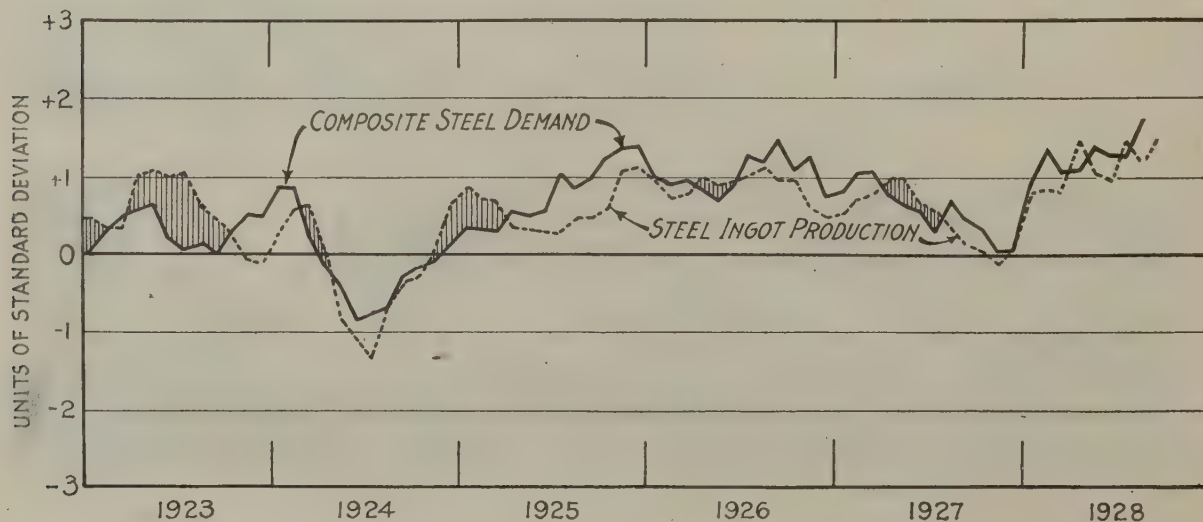
OUR composite steel demand line rose in August and reached a new high point for recent years. This means that average activity in the chief iron and steel consuming industries is high, and continues amply to justify the present high rate of

steel production. The steel output, considering the season, also increased in September, but it is clearly in line with the requirements of the country.

The rise in the composite demand line reflects an increase in activity that was quite general among the various factors included in this index, such as automobile production, railroad transportation, manufacturing, mining and exports. Farm purchasing power was well maintained. Machine tool orders showed a large increase. Only the building industries indicated a decline.

The future promises a sustained high level during the winter months. About the only item that is practically certain to decline is building. The situation here is already reflected in the market for nails, pipe, etc. Residential and other building operations covered by municipal permits will continue to decline. However, a large volume of construction of public works and roads seems assured.

Probably railroad buying will be disappointing, also, as we find that freight traffic in September failed to show the usual seasonal gain, though some allowance must be made for the fact that September this year had only 25 working days. The outlook in



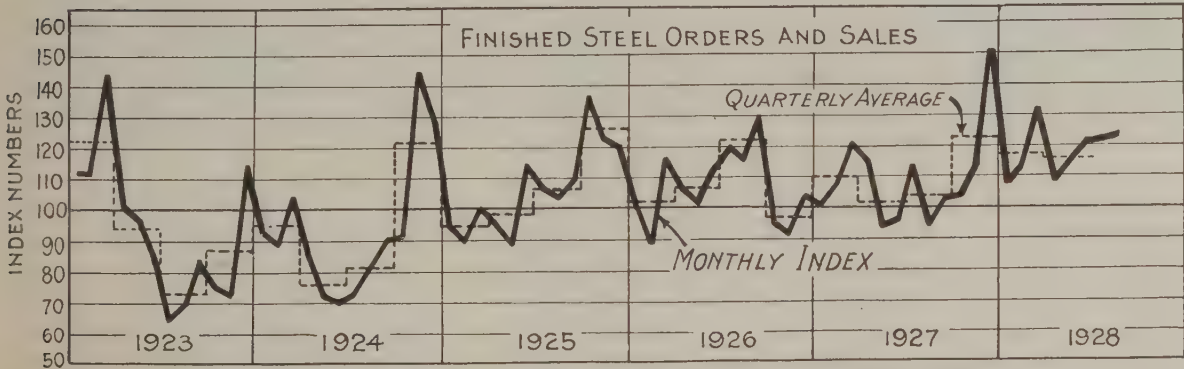
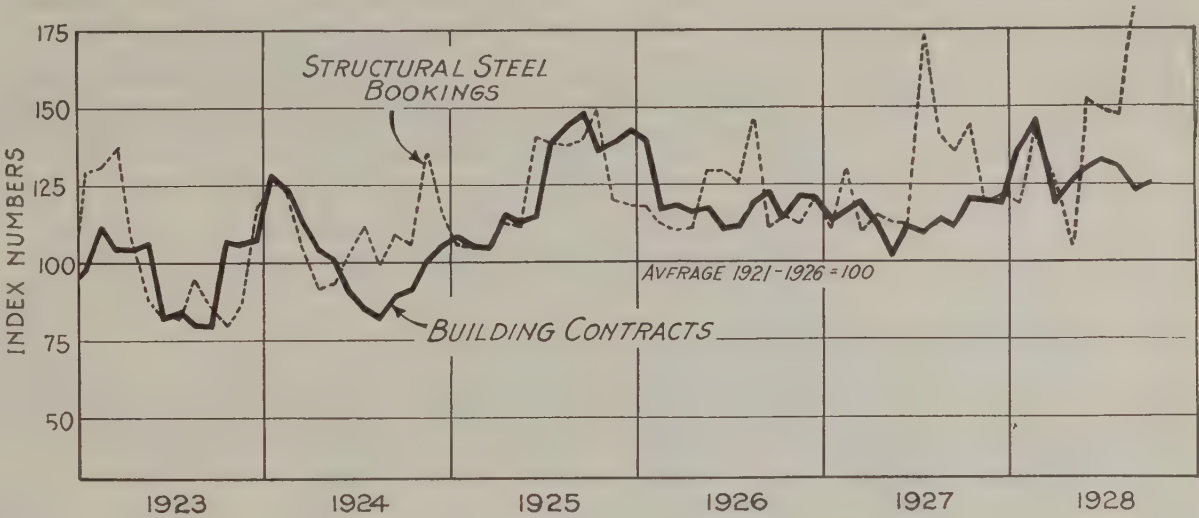
Steel Production Remains in Close Agreement with the Level of Composite Demand. This latter is higher than at any season in recent years

the oil industry is also somewhat less favorable than it was a month ago, production of both crude oil and refined products being a little in excess of demand and declines having been forced recently in refinery prices for gasoline. The situation here is complicated by the fact that increased drilling, while it would bring a demand for some kinds of steel, would injure the oil industry as a whole,

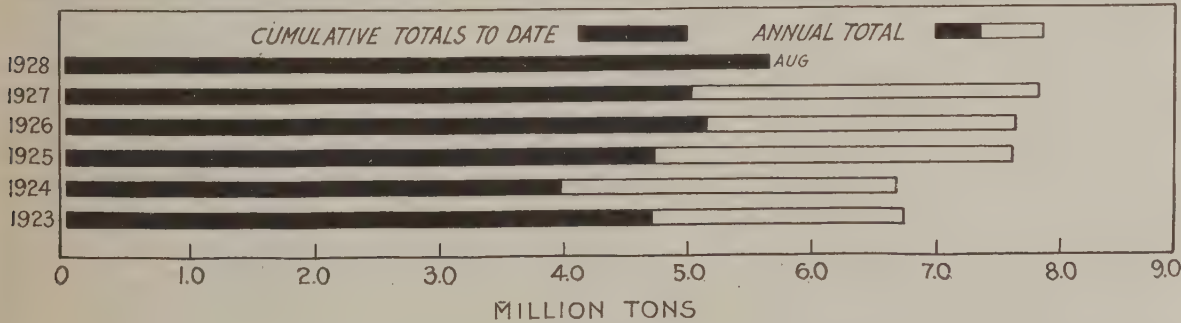
and that would ultimately be unfavorable to the interests of the steel industry. On the other hand, the boom continues in the automobile industry. General manufacturing is much more active than normally and promises to continue at a high rate for several months. The machine tool orders barometer gives a very favorable reading. The general business outlook

indicates a sustained activity and approximate stability near present levels through the winter. One might conclude that the demand for bars will be sustained at about present levels; that the plate demand will continue dull, improvement in some directions offsetting declines in others; that sheet requirements will be sustained at their present high levels; that structural steel, wire and

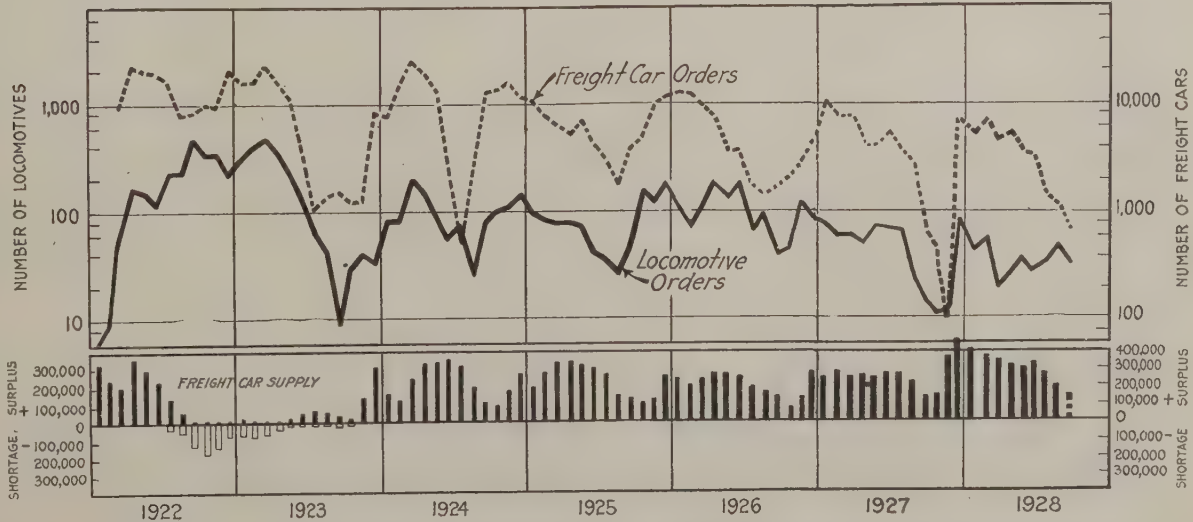
Building Contracts Have Remained High, But the Strength of Structural Steel Bookings Indicates Considerable Activity in Engineering Projects Other Than Buildings



Buying of Finished Steel Was Higher in August Than in That Month in Any Previous Year Shown. The cumulative total is much the greatest for any year on the diagram



Locomotive and Railroad Car Orders Continue Discouragingly Low. And the surplus of cars is still so large that there is no indication of immediate need for heavy purchases



pipe demands will decline. However, requirements for heavy structural steel should continue large for the remainder of the year.

Sales Highest for Any August

ORDERs and sales figures covering some of the chief items of finished steel made a further gain in August. This is notable as being the first August increase in our sales index since 1924. The latest figure is the highest for the month that we find on record. It brings the total for the first eight months of 1928 to a level much in excess of any similar period, and in all probability assures a new yearly record. It is possible, however, that the third quarter total may not quite equal the third quarter of 1926.

There was a large seasonal decrease in the sales of sheets, in spite of high automobile activity, but the bookings of structural steel, plates and steel castings all gained in August. Sales of steel castings are holding better than usual at this season, and the August increase was the first that has occurred in that month since 1923. Sales of plates showed about the usual seasonal gain.

Greatest Structural Steel Orders on Record

AS to structural steel, it is important to note the building situation. This can be understood only by beginning with the money market. Here we find money rates tight and, in spite of a little easing in October and November, they are likely to continue much above the levels of the last few years. As a result, issues of long-term mortgage bonds for building purposes have declined sharply. Building permits slumped badly in September and were about 10 per cent under a year ago. Contemplated new construction was also smaller, and very low. In fact, the foregoing items are near to the low point reached in 1924. But construction contracts, actually awarded, declined less than usual in September and were about 11 per cent above a year ago. This apparently was due to heavy construction of roads and public works, which items are not covered by permits.

The continued volume of large construction contracts, some of which are not influenced by current business considerations, means large requirements of steel for several months ahead. But the declines in bond issues and in building plans indicate the coming of a reduced volume of awards and ulti-

mately of a lower level of building operation.

Bookings of structural steel usually decrease in August, but this year they gained, rising from 296,300 tons in July to 356,300 tons. Our adjusted index is the highest on record. Nevertheless, it may be noted that the curve of structural steel bookings has acted this year somewhat as it did in 1926, and it is so far above the curve of building contracts that it does not seem that it can continue at present levels very long. Weekly trade reports, however, indicate that the September volume was running at about an average of 36,000 tons a week, in comparison with less than 34,000 tons a week in August.

Locomotive and Car Orders Low

SOME hopes have recently been expressed that the buying of railroad equipment will improve, and better inquiries are actually reported, particularly in the Middle West. The

cold statistics, however, give little evidence of actual gains. As shown in the chart, the trend of freight car orders is still downward and locomotive orders continue close to the lowest levels on record. According to *Railway Age*, domestic orders for steam locomotives amounted to only eight in September, and there is not the slightest indication of improvement, as the total unfilled orders for all locomotives continue near the record low point.

Freight car orders, at 1236, showed a seasonal gain from 767 in August, and were nearly double the orders of a year ago. If any improvement is occurring, it is in this branch of equipment. Surplus cars, though above the level of recent years, have shown a larger than usual reduction since July. But there is still a good surplus, considering the season, and railroad freight traffic has shown little tendency to expand. The gross revenues of the railroads in August were actually lower than a year ago, and this indicates that continued economy will be necessary.

Ohio Employment Gains Steadily This Year

Industrial employment in Ohio has shown an increase every month since the low point of last January, attaining in September the highest level since October, 1926, says the current bulletin of the Bureau of Business Research of Ohio State University. The index for September stood at 111, with an average month of 1923 taken as 100. In the iron and steel industries, the September employment index of 101 was 2 per cent greater than in August and 12 per cent greater than in September, 1927. However, employment during the first nine months of 1928 was 1 per cent less than in the same period of 1927. The number of wage earners in the machinery group decreased 1 per cent from August, but was 3 per cent greater than in September, 1927.

Warwick Furnace Property Brings About \$200,000

At public auction on Oct. 9, 10 and 11, the real estate and equipment of the Warwick Iron & Steel Co., Pottstown, Pa., realized a total of about \$200,000. The equipment was sold for slightly less than \$100,000. This included two blast furnaces with stoves, blowing engines and boilers, a machine shop, blacksmith shop, power house and foundry equipment, several

ore cars, four industrial locomotives, three locomotive cranes, about 10 miles of 90-lb. rails, a 300-ft. span revolving crane and a quantity of scrap.

The Warwick company was incorporated in Pennsylvania June 9, 1899, as a successor to the Warwick Iron Co. The authorized capital stock of the Warwick company is \$1,500,000 in shares, with a par value \$10 each, so that the amount received from the sale of equipment and properties, after deduction of costs, is believed to be sufficient to pay slightly more than 10c. on the dollar.

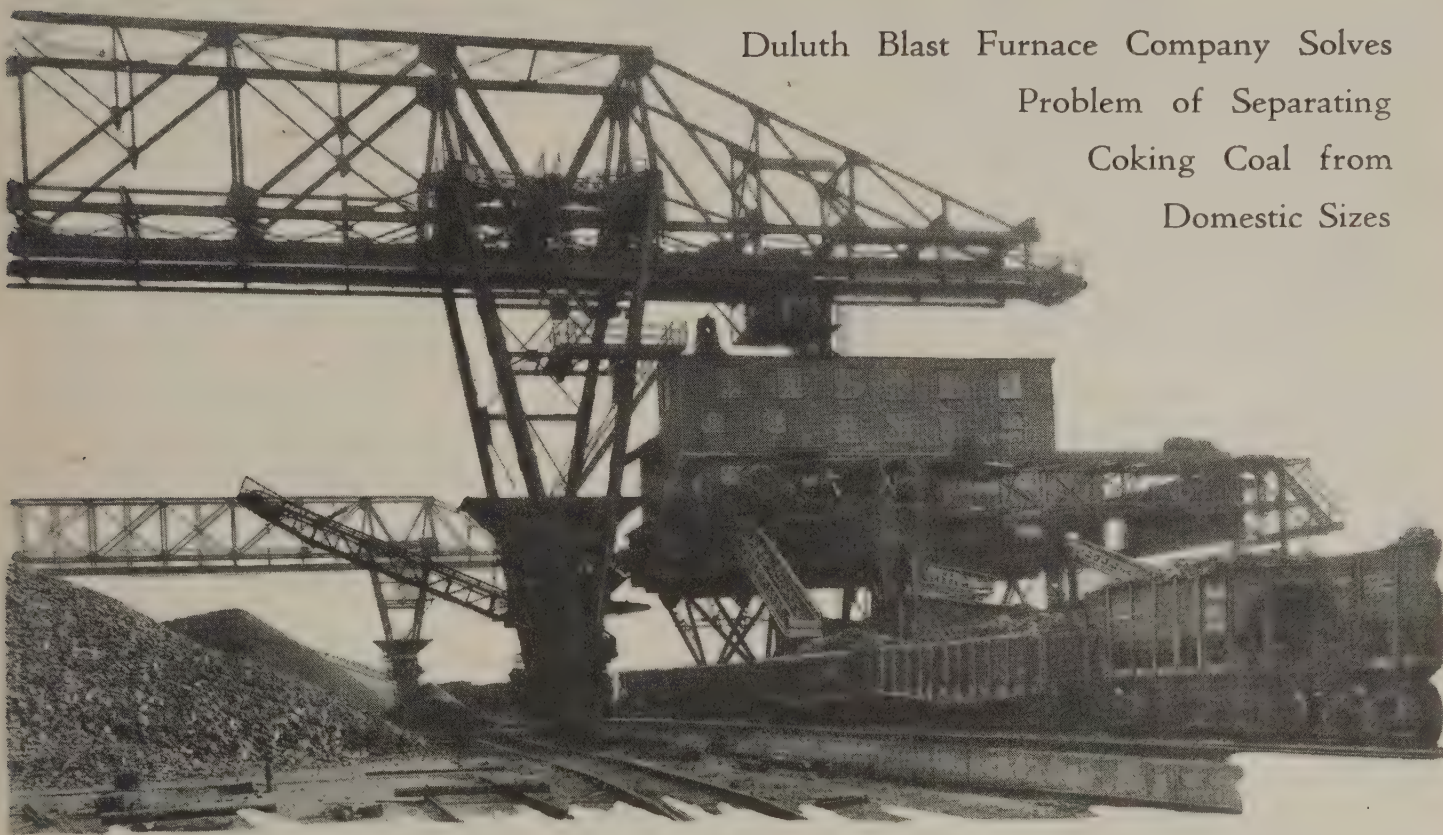
Russian Commission to Buy Farm Machinery Here

Armed with authority for the purchase of large supplies of tractors, agricultural implements and factory machinery, an official economic mission from Soviet Russia arrived in New York on the *Mauretania* last Friday. A report recently submitted to the Economic Council by the Central Metal Department stated that it will be necessary within the next few years to supply the rural population of Russia with 115,000 farm tractors and well over 500,000 tractor plows, drills, bores and other kindred equipment. It is expected that a large part of this material will be purchased from American companies.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Nov. 1—Activity in Steel Consuming Industries; Nov. 15—Position of Iron and Steel Producers.

Tipple on Wheels Prepares Coal at Dock

Duluth Blast Furnace Company Solves
Problem of Separating
Coking Coal from
Domestic Sizes



A COAL tipple on wheels has been installed on a new coal dock of the Zenith Furnace Co., Duluth, Minn. This traveling plant gives the equivalent of mine preparation of coal, according to a description of N. L. Davis, Link-Belt Co., Chicago, thereby solving the problem of separating coal needed for making blast furnace coke from fuel supplied to domestic consumers.

The coal is delivered to the dock by boat as mine-run and is delivered to separate piles by two electrically operated bridge tramways of the man-trolley type, having a span of 375 ft., and equipped with 10-ton buckets for free digging and a cleanup bucket with 24-ft. spread.

The tipple, which can travel on its own tracks the full length of the dock, can be fed by either of the bridges. An apparent obstacle to the construction of a traveling tipple was the cost of concrete foundations and tracks. This was overcome by designing a flexible tipple structure and rock ballasting the tracks. Wheel loads were reduced to comply with American Railway Association specifications and reasonable limits were allowed for track variations in grade and gage.

The traveling plant prepares domestic sizes and loads them, singly or in mixtures, into box or open-top cars without the aid of chutes. The greatest drop from the time the coal leaves the screens until it is loaded is not more than 8 in. and its greatest ve-

locity is 150 ft. a minute, except in loading box cars, when the speed is limited by that of a box car loader belt. Coal may be loaded simultaneously into cars on four tracks.

Coal is prepared at the rate of 500 tons an hour. If the percentage of slack or smaller sizes in the run-of-pile coal is excessive, the feed to the screens can be increased to maintain full loading capacity in the prepared sizes. The surplus of the smaller sizes is automatically returned to dock storage on a dock return conveyor with which each bridge is equipped. Conversely, if slack is deficient, the feed can be reduced, to prevent overloading the screens. Lump, egg, stove and nut coals are prepared, and any combination of these sizes, or mixtures,

may be loaded, the remaining coal returning direct to dock storage.

The plant has two hoppers, one of 50 tons capacity for stove and nut coal, which serves the stove and nut screens, and one of 70 tons capacity, for slack, which discharges through a motor-operated gate and spout to cars beneath. Both hoppers may be emptied to dock storage in 20 min.

The slack coal requirements of the coke ovens are 800 tons daily. The slack is obtained from three or four kinds of coal, which must not be mixed in handling. During the light shipping season, one or all of the domestic sizes remaining after the slack is removed from the run-of-pile coal must be returned to the storage piles from which they came.

Production of Portland Cement Near Peak

Production of Portland cement is reported by the United States Bureau of Mines to have been 17,856,000 bbl. in September—the largest September production ever reached and the third highest for any month. The figure was exceeded only by August, 1928, with 18,730,000 bbl., and August, 1927, with 18,315,000 bbl. In September, 1927, the total was 17,505,000 bbl.

Production for the third quarter of this year (54,031,000 bbl.) was the greatest for any quarter yet reached. This compares with 53,228,000 bbl. in

the third quarter of last year, and with 48,217,000 bbl. in the second quarter of 1928. For the first nine months production has made a new record, at 131,036,000 bbl., displacing the previous January-September record of 128,286,000 bbl., made last year.

Shipments have been above production ever since the end of April. The amount shipped in September was 20,462,000 bbl., compared with 21,970,000 bbl. in August. The only other earlier month surpassing September in shipments was August, 1927, when a total of 21,411,000 bbl. went out. In September, 1927, shipments were 19,828,000 bbl.

Fabricated Structural Steel

Awards of 34,500 Tons Include Many Small Tonnages— New Projects Call for 13,300 Tons

ALTHOUGH awards in the past week amounted to about 34,500 tons, only a few were in excess of 1000 tons. The largest was 6000 tons for a plant at Asheville, N. C. Another sizable award was 3500 tons for a building in Memphis, Tenn. New inquiries total 13,300 tons, of which 5000 tons is for a section of the New York subway. Awards follow:

NEW YORK, 3400 tons, Y. M. C. A. building in West Sixty-third Street, to Harris Structural Steel Co.; reported last week to unnamed fabricator.

NEW YORK, 2800 tons, Salvation Army Building in West Fourteenth Street, to Hedden Iron Construction Co.; reported last week to unnamed fabricator.

BROOKLYN, 200 tons, building for Brooklyn Ash Removal Co., to Shoemaker Bridge Co.

WILDWOOD, N. J., 400 tons, pier, to unnamed Philadelphia fabricator.

STATE OF NEW JERSEY, 250 tons, highway bridges, to American Bridge Co.

PHILADELPHIA, 1500 tons, addition to Lewis building, to Shoemaker Bridge Co.

PENNSYLVANIA RAILROAD, 3500 tons, 17 small bridges, to American Bridge Co. and unnamed fabricators.

COATESVILLE, PA., 130 tons, girders for Lukens Steel Co., to Massillon Bridge & Structural Co.

PITTSBURGH, 200 tons, ore bridge and river unloading equipment for Davison Coke & Iron Co., to Dravo Contracting Co.

ALBUQUERQUE, PA., 180 tons, addition to Harding High School, to Jones & Laughlin Steel Corporation.

ATLANTA, GA., 1200 tons, Rhodes-Haverty Building, to Ingalls Iron Works.

TAMPA, FLA., 200 tons, airplane hangar and passenger station, to Ingalls Iron Works.

RUSSELLVILLE, ALA., 300 tons, mine improvements for Woodward Iron Co., to Virginia Bridge & Iron Co.

ZAPATA, TEX., 150 tons, International Bridge over Rio Grande River, to Orange Car & Steel Co.

SHREVEPORT, LA., 610 tons, municipal memorial auditorium, to Orange Car & Steel Co.

ASHEVILLE, N. C., 6000 tons, American Enka Corporation plant, to Virginia Bridge & Iron Co.

MEMPHIS, TENN., 3500 tons, Sterick Building, to Virginia Bridge & Iron Co.

NEWARK, N. Y., 500 tons, State Teachers' College, to R. S. McMannus Steel Construction Co.

PLYMOUTH, MICH., 1445 tons, factory building for Chrysler Corporation, to Whitehead & Kales Co.

SAGINAW, MICH., 300 tons, Adams-Saginaw Building; relet by Flint Structural Steel Co., to Massillon Bridge & Structural Co.

STATE OF MICHIGAN, 100 tons, highway bridges, to Massillon Bridge & Structural Co.

DETROIT, 950 tons, craneway No. 37 and Clayton-Lambert Building for Fisher Body Corporation, to Massillon Bridge & Structural Co.

DETROIT, 150 tons, building for Wood Hydraulic Hoist & Body Co., to Massillon Bridge & Structural Co.

AKRON, OHIO, 800 tons, building for General Tire & Rubber Co., to American Bridge Co.

NEWARK, OHIO, 120 tons, building for Pennsylvania Railroad, to Pittsburgh-Des Moines Steel Co.

MADISON, IND., 300 tons, caissons and coffer dam for bridge, to St. Louis Structural Steel Co.

CHICAGO, 1000 tons, addition to Chicago Club, to A. Bolter's Sons, local.

DU QUOIN, ILL., 300 tons, coal tippie for United Electric Coal Co., to St. Louis Structural Steel Co.

APPLETON, WIS., 500 tons, bridge for Chicago & North Western, to Wisconsin Bridge Co.

MILWAUKEE, 100 tons, addition for Oilgear Co., to Worden-Allen Co.

DAVENPORT, IOWA, 550 tons, bridge for Rock Island Railroad, to American Bridge Co.

HERMAN, MO., 1800 tons, bridge, to Kansas City Structural Steel Co.

CHELAN, WASH., 124 tons, Cashmere bridge, to Pittsburgh-Des Moines Steel Co.

SEATTLE, 100 tons, West Seattle school, to Isaacson Iron Works.

SEATTLE, tonnage unstated, coal pulverizing plant for Pacific Coast Cement Co., to Hofius Steel & Equipment Co.

PORT ANGELES, WASH., 125 tons, addition to Washington Pulp & Paper Co. plant, to Isaacson Iron Works.

BAYWOOD, CAL., 170 tons, apartment building, to Judson-Pacific Co.

SAN FRANCISCO, 2000 tons, power plant

for Great Western Power Co., to Dyer Brothers.

PITTSBURGH, CAL., 2500 tons, tin plate mill for Columbia Steel Corporation, to McClintic-Marshall Co.

PITTSBURGH, CAL., 450 tons; open-hearth furnace, 300 tons and machine shop, 150 tons for Columbia Steel Corporation, to Dyer Brothers.

LOS ANGELES, 2000 tons plates, five 134,000 bbl. tanks for General Petroleum Corporation, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 5000 tons, subway section 6, route 109; bids Oct. 26.

NEW YORK, 2000 tons, 15 barges for New York Central Lines, Dravo Contracting Co. and Atlantic Ellis Co., low bidders.

BROOKLYN, 5000 tons, addition to St. George Hotel; Schroeder & Koppell, Inc., general contractor; reported last week as 2500 tons.

BALTIMORE, 500 tons, Y. M. C. A. building.

STATE OF TENNESSEE, 1300 tons, two highway bridges for State Highway Commission.

MOBILE, ALA., 450 tons, shops for Louisville & Nashville Railroad.

TALLEDEGA, ALA., 750 tons, factory for Bemis Bag Co.

WOLF POINT, MONT., 700 tons, bridge across Missouri River.

OAKLAND, CAL., 170 tons, Jackson Creek spillway for East Bay Municipal Utility District; general contract to Ward Engineering Co.

PORTLAND, ORE., 243 tons, Gardiner bridge over Yellowstone River in Montana; Illinois Steel Bridge Co., low bidder.

Distributors Protest New Sheet Discounts

ATLANTIC CITY, N. J., Oct. 16.—Re-affirming a resolution adopted at a meeting held in Pittsburgh in September, members of the Metal Branch, National Hardware Association, at a meeting here today, again urged producers of sheet steel to reconsider their new policy of reducing the discount on sheets from 2 per cent for cash in 10 days to 0.5 per cent for cash in 30 days. The new discount terms were adopted by all the principal makers of sheets as effective Oct. 1.

The resolution adopted at Pittsburgh, which was printed in part in THE IRON AGE of Sept. 13, page 640, urged the mills to consider the old discount not as an allowance of interest charges, but as a premium for prompt payment of bills. It was suggested at the meeting here today that, with the present small discount allowed by the mills, distributors would be inclined to allow payment of sheet bills to run as long as possible, paying first the statements allowing a larger discount.

Will Not Pass Increased Charges to Customers

Considerable discussion arose at the meeting as to the advisability of passing along the increased charges of the distributors by reducing their discount to jobbers, sheet metal workers and other customers to a corresponding

figure. An informal ballot revealed that 43 of the distributors represented will maintain the old 2 per cent discount to their customers while four have adopted the new terms introduced by the mills for their trade. It was brought out that one warehouse has sought to offset the reduced profit in sheets occasioned by the lessened discount by advancing the price \$2 a ton.

Nearly all the distributors present stated that they could not afford to lower the discount to jobbers at present because they would not be able to stand the increase in accounts receivable which would be almost certain to follow. It was brought out that about half the average distributor's customers had been trained to take advantage of the 2 per cent discount, and that its withdrawal or sharp reduction would take many of these customers out of the prompt payment class.

An organization has recently been set up in Czechoslovakia for the production and sale of steel houses, according to a report received from Consul General Arthur C. Frost, Prague. The company has acquired some foreign patents and plans to sell and erect these houses throughout Czechoslovakia. It is proposed to use only Czechoslovak products in the manufacture of the steel houses so far as it is practicable to do so.

This Issue in Brief

Suggests medium-carbon silico-manganese steel as a substitute for some of the best alloy steels. The silico-manganese steel is cheaper, is easily heat-treated, and compares favorably in physical properties with the alloy steels.—Page 957.

* * *

Fatigue failures frequently occur at sharp corners, keyways, screw threads and tool marks where there is a concentration of stress. Fatigue cracks also originate in clusters of slag particles.—Page 958.

* * *

New tool material cuts cast iron at a rate of 140 to 160 ft. a minute. Tungsten carbide bonded with cobalt ("Carboloy") will scratch sapphire and cut a groove in an alundum wheel. It is claimed to be much superior to high-speed steel, and capable of sustained cutting at speeds several times those commonly used.—Pages 959 and 972.

* * *

Chips will not adhere to cutting tool in machining high-chromium steels, if the steel contains zirconium sulphide, metallurgist declares. Sulphide does not reduce resistance to corrosion, but it does lessen ductility.—Page 953.

* * *

Cuts in half hardening time by conducting nitriding operation at a pressure of 600 mm. of mercury above the atmosphere. Thirty hours are required to get a scleroscope hardness of 90, regardless of pressure. Higher pressures give a deeper case.—Page 954.

* * *

To render sling and crane chains entirely safe for further service, without reducing safety load, they should be heated to a temperature considerably above the transformation range, says metallurgist. But at such high temperatures the metal oxidizes and wastes away rapidly, says another.—Page 960.

Traces gear noises by means of an instrument consisting of a portable cylinder and piston connected to ear-pieces. In device used by Westinghouse the piston is moved in the cylinder until the air column in the latter is in resonance with the sound from the machine.—Page 948.

* * *

If gates on molds are too large, the pouring gate cannot be kept filled during pouring. This permits impurities to enter the mold. Accordingly, it is wise to choke the flow somewhere between the ladle and the mold.—Page 944.

* * *

Suggests how a low-cost rustless steel may be made. A low-chromium steel, containing about 0.50 per cent copper, can be made in open-hearth furnaces, says metallurgist. It would occupy a position between stainless iron and plain copper-bearing steels or ingot iron.—Page 954.

* * *

Water-quenching of silicon steels produces superior physical qualities. If the steel is alloyed with 1 per cent chromium, about the same results are obtained from oil-quenching as from water-quenching.—Page 957.

* * *

Hardens high-speed steel tools in salt bath at 2400 deg. Fahr. without injury to the tools or furnace. New process is claimed to be fumeless and low in cost.—Page 956.

* * *

Alloy steel spring failures found to be due to slag inclusions. Engine builders have eliminated spring failures by using springs of high-carbon piano-wire steel.—Page 958.

In lapping gears the abrasive should be selected for the softest gear in the pair or train. Otherwise the soft gear will be harmed. No one abrasive is suitable for more than a few types of gears, says abrasive manufacturer.—Page 949.

* * *

True criterion of the transverse strength of cast iron is the modulus of rupture determined for the actual bar section, measured at the point of rupture, says British expert. By concentrating on standard bar test, relations between size and strength, and composition and strength, may be determined.—Page 952.

* * *

Warns against hardening steel too much for the particular type of steel used. If the hardness exceeds what the steel is made for, failure in service may result, metallurgist declares.—Page 959.

* * *

Doctor Haney looks for higher pig iron prices and lower scrap prices. "Further advances in pig iron prices seem to be a reasonable expectation during the next two or three months," says forecaster. "It seems probable that the scrap markets are near their peak and that considerable declines will occur before the end of the year."—Page 966.

* * *

United States is a more important factor in steel export market than statistics indicate. Though our steel exports are exceeded by those of four European countries, a great part of their business is among themselves, while virtually all of our steel exports go to non-European areas.—Page 947.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Cutting Harder and Faster

PROBABLY the most important feature of Metal Week in Philadelphia was the disclosure of a new tool substance and its demonstration at the Commercial Museum. Rumors of a super-hard material used abroad for drawing dies had been coming over for several years. Returning visitors from the Krupp plant had reported seeing some super high-speed steels in action; it was said that these materials were made of metallic carbides cemented together with less brittle materials. American metallurgists turned their attention to these possibilities. Yet all the time, in the words of H. J. French of the Bureau of Standards, the machine tool users were like beggars looking into a restaurant window—a most desirable material was dangled before their eyes with no possibility of getting any.

Now comes Dr. Samuel L. Hoyt of the General Electric research laboratory, and describes a substance to be marketed under the name of carboloy, which, in view of his modest presentation of facts, constitutes the greatest single advance in the art of cutting metals since the announcement of the Taylor-White method of heat treating tool steels. One important distinction needs to be made. The high-speed steel was an important advance over the carbon tool and the air-hardening tool because it cut mild steel six or eight times as fast. But it is not essentially a hard substance, nor did it prove to be useful on material which could not satisfactorily be cut at a slower rate by the old tools.

This recently invented combination of tungsten carbide and cobalt is intrinsically hard—three times as hard as the old tools—and not only appears to be able to stand against steel satisfactorily at largely increased speeds, but also can cut tough or abrasive materials (like aluminum bronze, manganese steel castings, chilled iron, bakelite and carbon products) which hitherto have worn down the cutting edge of the best tools in short order. In fact, we are informed that the General Electric Co. is using many of the new tools in production on insulating materials, not previously machinable.

It is interesting to remember the chemical relationships of our tools. Carbon tools owe their hardness to their content of iron carbide; the cementing material is the soft iron, ferrite (but according to Jeffries and Archer's theory, hardened because of its excessively fine grain after quenching). After 1870 it became generally known that tungsten and chromium combined with high-carbon steel slowed down the softening reactions, so a drastic quenching would be unnecessary. Tungsten, chromium and iron carbides thus combined to make a steel which was hard after slow cooling. So-called Mushet steels were used

on hard castings, although they satisfactorily run on steel twice as fast as the carbon tools.

The third era in tool steels dates from 1900 when Taylor and White disclosed the fact that, if these air-hardening tungsten-chromium steels were cooled from a sweating temperature and given a high draw, they would retain their hardness up to a red heat. Consequently another doubling of machine speeds was possible because friction from the chip which would temper the older tools had no effect on the newer high-speed steels.

A fourth doubling in cutting speed came a few years later when the optimum composition in tungsten, chromium, carbon and vanadium was worked out—a problem which Dr. J. A. Mathews did much to clarify. In all this half century of advance, it can be seen that the revolution in machine shop practice was primarily due to the hardening and stabilizing effect of tungsten, chromium and iron carbides in the complex tool steel. More recently the addition of cobalt in amounts up to 15 per cent has been found to increase the cutting speed of some tools even further and to give a more durable cutting edge at a red heat.

Meanwhile Haynes had discovered stellite, a family of alloys essentially of tungsten, chromium and cobalt, intrinsically hard and requiring no heat treatment. This soon established itself for machining hard cast iron ("semi-steel") and for rough turning medium steels. The new German die alloys, described in *THE IRON AGE* of Aug. 16, seem to be of this general class. But this swing to hard metals seems to be a passing phase. The new tool material described by Doctor Hoyt again comes back to a hard carbide of tungsten with softer cobalt metal as a binder. Tungsten, chromium, cobalt—metals and carbides—are the leading actors in this metallurgical pageant.

About all that can be said at this date, is that the new tool materials open up a wide vista of possibilities. That they will meet some impediments (such as cost, brittleness and competitive exploitations) cannot be doubted. It is too much to expect that they will render obsolete all our present practice; but that they will have a profound influence on numerous aspects of machine shop operation cannot be doubted.

Winning the Fight on Corrosion

NONE who heard the papers on stainless iron at the steel treaters' meeting in Philadelphia last week, or listened to the summary of the advances in chromium steels and irons given by Dr. F. M. Becket at the Institute of Metals dinner, could fail to appreciate that excellent progress has been made. Many grades of rustless iron and of the higher chromium alloys have been perfected and are in use in a widening range of industries.

One company has been producing nitric acid on a large scale by the fixation of atmospheric nitrogen since it was found that rustless iron was adaptable to the process. About 1200 tons of the alloy at a cost of nearly \$1,500,000 is now employed or on order for this purpose. Ultimate independence of the Chilean nitrate fields thus becomes a possibility. In the oil industry these alloys have revolutionized processes and made possible larger yields of gasoline for the automotive industry. Here the demand for non-oxidizing, strong metal that shall maintain these properties under high temperatures seems to have been met.

The battle against corrosion has been long and hard fought. For years theories of its operation have been controverted and many methods of combatting it have had and are still having their day. Meanwhile, steel replacement on a large scale, prodigal as that waste has been, still holds the preponderance in the economic argument, so costly is any metal that can guarantee immunity. Yet all signs indicate steady progress on the commercial as well as the metallurgical side of the problem.

Lessons from the Scrap Rise

THE rise in steel scrap prices in the last few months suggests that the mills return to the carrying of stocks—a policy from which they departed only recently. Heavy melting steel scrap has advanced \$4 a ton in the Pittsburgh district, \$3 in eastern Pennsylvania and about \$2 at Chicago. Such an advance was quite unexpected and has attracted much attention. It may be argued that at the new levels scrap has merely approached its “intrinsic” value, relative to pig iron; but if so it was previously much too low. The point is that in an era of relatively steady commodity prices all around such swings seem out of keeping.

The mechanism of the scrap market has changed altogether in recent years from that of pre-war time. Then there were two classes of swings, a seasonal swing with the low falling commonly about the middle of the year, and a swing in keeping with the longer term swings in steel activity and finished steel prices. It will no doubt be recalled that steel prices used to indulge in general and marked swings.

Under the old conditions the dealers took care of the matter of supplies. Having in mind what seemed to be the normal seasonal swing, and being able more or less to foresee the longer term swings, they accumulated yard stocks after prices had had some considerable fall, feeding them out after there had been some substantial advance. Freights were lower then, and a total swing of \$4 a ton in the market was sufficient to give the dealers a good trading basis. Some of the swings were greater than that, but they were not out of line, as finished steel prices also had their swings.

It is quite clear that the outcome of scrap, from original sources, does not fluctuate with the varying needs of the steel mills, either in point of time or point of volume; hence the need of a reservoir or receiver somewhere. When the mills are increasing their operating rate they need particularly large quantities of outside scrap, since it takes time for their supplies of works scrap to increase. Later on, as the increased steel production comes to be used, the supply of industrial scrap increases. When the rate of steel produc-

tion is decreasing the mills still have their works scrap and require correspondingly less from outside, while industrial scrap continues to pour into the situation.

In short, the natural outcome of scrap varies at exactly the wrong time. Its swings are always too late for mill convenience. Dealers are unable to operate along the line of accumulating scrap at one time and feeding it out at another, as they used to do. For one thing, freights and cost of handling are much higher. For another thing, mills are so particular about their costs that they would hesitate to pay advanced prices when dealers' yard stocks were visible, and finally there is keen and relentless competition between dealers. Many dealers have disappeared in the last few years, having lost all they had or all they cared to lose.

It would seem clear that when the dealers are unable to carry stocks the mills should do so, and naturally there should be more resort to duplexing, a process not so much in vogue recently, while it used to be a great aid in smoothing things out. Thus in 1914 only 3.7 per cent of the total ingot production came from duplexing while in 1916 the proportion was 8.3 per cent. Then again in 1920 the proportion was 8.0 per cent and in 1921 it was only 4.4 per cent, while the actual tonnage of duplex ingots was only one-fourth that of 1920.

Self-Interest in the Public Interest

“AMERICAN industry faces no more important task today than that of protecting the buying power represented by wages.” This expression by Eugene G. Grace, president of the Bethlehem Steel Corporation, is the accepted opinion of most industrial executives today. But when we compare it with the view that prevailed less than a generation ago, such recognition of the dependence of prosperity upon high buying power of wage earners is seen as a virtual revolution in economic thought.

Not so many years back there was agitation against “predatory wealth” and “special interests” on the ground that the building up of large fortunes was at the expense of the public and against the general welfare. This unrest had some basis in the unenlightened selfishness of certain of the earlier leaders in industry. The millennium has not come in, but a marked change has taken place in the common conception of self interest. Management no longer looks upon high prices and low wages as the twin prerequisites of profits. The consumer no longer fears extortion at the hands of industry. Nor does labor now believe that its bargaining power is its sole guaranty of a fair wage. And little is now heard of an essential and irrepressible conflict between employer and employee or between producer and consumer.

Mechanization of industry is yielding economies that cannot be converted into profits without a large volume of business, and volume is impossible unless buying power is high and widely diffused. Protection of the buying power of wages is of general concern. Management must find still more ways of increasing efficiency; labor must whole-heartedly support these innovations. That view is now widely held and will doubtless find its way in time to the less progressive branches of industry where old antagonisms and old issues persist. The partnership of employer and employee on the one hand, and of producer and consumer on the other, is

based on realities; in fact, it conditions the continuance of national prosperity.

More Work, Less Fuel

PRELIMINARY estimates of this year's production of coal, petroleum and natural gas indicate a decrease from last year of 4 or 5 per cent, when the fuels are brought together on a heat unit basis. Yet there is no doubt that more work is being done this year than last. Even in a single year we seem to have made distinct progress in getting more results from our fuels.

From the viewpoint of the fuel producing industries the trend has been very unsatisfactory. The forecast here made involves estimates of changes in production from 1927 to 1928 as follows: Bituminous coal, 6 per cent decrease; anthracite, 9 per cent decrease; petroleum, an even break or a slight increase; natural gas, about 7 per cent increase.

Of course, the coal industry does not complain of its poor production, for it is always feeling that production runs too heavy. What it does complain of is the poor demand. The oil industry on the other hand has to submit to its production, which it considers altogether too high. When it comes to natural gas there is another situation. Little complaint is made of production or demand. Natural gas has been awaiting a

greater outlet through the construction of pipe lines, the Pan Handle field of Texas and the Monroe field of Louisiana having much gas held back awaiting lines to markets, some of which are now being built. Our estimate of 7 per cent increase in natural gas production is merely a projection of the rate of increase in the two preceding years. There are no current reports on gas production as in the case of both coal and petroleum. Next year promises a large increase in natural gas which, as indicated, is largely a matter of ability to reach markets.

Both petroleum and natural gas this year attain new high percentages of the total fuel production, when figured on a heat unit basis, through the influence of a decrease in coal and, in the case of natural gas, an increase in its production. On a heat unit basis the fuels run this year approximately as follows: Bituminous coal, 63 per cent; anthracite, 9 per cent; petroleum, 21 per cent; natural gas, 7 per cent.

In later years we are quite likely to see the natural gas percentage increase, for a long life is promised for the fields. In petroleum the talk is of relatively early exhaustion, but we have now had that talk for so many years that many will doubt. Economies in the use of fuel promise to continue, as best practice of one time extends to the average while itself improving. Over a period of years coal production is likely to have little if any increase.

To Legalize Resale Price Contracts

Advocates of Kelly-Capper Bill Hold That It Will Aid
Smaller Manufacturers and Independent Dealers
and Still Preserve Competition

WASHINGTON, Oct. 16.—Again an effort will be made at the forthcoming session of Congress to pass a bill legalizing the maintenance of resale prices. Representative Kelly of Pennsylvania and Senator Capper of Kansas, authors of an identical measure now pending and known as the Kelly-Capper price standardization bill, say that it will be passed at the next session. On the other hand the general view is that, as with similar proposed legislation in the past decade, it will be defeated.

Price Stabilization the Aim

Proponents of the bill point out that extensive hearings on the subject, as well as public discussion, have dispelled the once popular idea that it entails price fixing and instead have shown that it means price stabilization, elimination of price cutting, and protection against inferior products. On these grounds it is argued that such a law would be to the advantage of the manufacturer, distributor and consumer. Its supporters point to the fact that a favorable report on the Kelly-Capper bill was made to the House Committee on Interstate and Foreign Commerce by a subcommittee of that body at the last session of Congress. They also expect that the inquiry now being made on the subject by the Federal Trade Commission will disclose a favorable attitude on resale price maintenance. The commission will make its report to Congress early in December.

Opponents of the bill contend as heretofore that it affords opportunity for manufacturers and distributors to gain advantages at the expense of consumers and therefore that it is not in the public interest.

The legislation covers only trade-marked or branded ar-

ticles, or so-called standard merchandise. In making its favorable report, the subcommittee of the House Committee on Interstate and Foreign Commerce presented an amendment to the bill which permits disposal of stock without regard to agreed prices, when the owner discontinues dealing in such commodities as are covered by the bill, and gives like exemption to dealers when disposing, toward the end of a season, of a surplus stock of goods especially adapted to that season.

Competition Not Eliminated

It is argued for the bill that the public would not suffer by any undue increase in price, because the measure specifically provides that any contract between maker and seller must relate only to an article which is in fair and open competition with commodities of the same general class produced by others. The point is also made that it is now generally accepted that a large volume of sales at a small profit is better than a small volume at a large profit and that if any producer of trade-marked articles unduly increases his price his competitors are sure to invade his market with lower prices.

In these days of mail orders and chain stores, it is urged, it is certain that these aggregations, in case they do not get fair prices from manufacturers of standard articles, will have the desired articles specially made for them and will sell them at much lower prices. Testimony is said to show that local dealers suffer destructive competition from these chain stores and other large distributors with great capital, who, it is alleged, offer standard goods of nationally advertised brands at prices which represent cost, or in some

cases less than cost. They are said to do this for the purpose of attracting customers, making up their loss on a standard article by greater profits on staple goods on which there are no standard or advertised prices. Such a practice, it is contended, not only works to the detriment of a local dealer but also interferes with, if it does not destroy, the business of the manufacturer of such standard articles in the particular town affected. Such methods force the independent dealer to take these goods out of stock, leaving their sale to chain stores which, it is claimed, can dictate to the manufacturer the price at which they will purchase his goods.

Tendency to Gradual Price Reduction

Makers of standard trade-marked goods, it is pointed out, have to rely primarily on quality for a large and continuous demand on the part of the public, but with unfair competition there is a strong pressure on the manufacturer to make his goods for a price and not primarily for quality. On the other hand, it is contended, if the dealers in standard trade-marked articles buy them under proper resale price agreements the quantities of these articles handled in

the aggregate would be so increased, both because of public demand and because the dealers will be anxious to handle them at a fair profit, that the quantity production will of itself cause a gradual reduction in cost and also in price.

The further point is made that large manufacturers are now able to maintain fair control of retail prices, while smaller manufacturers have not the resources to protect themselves against destructive practices.

Representative Lea, in a dissenting report, said that he was reluctant to interfere with the right of a buyer of property to dispose of it on any terms satisfactory to himself. He considered that the public is not interested in merely protecting profits or permitting an arrangement that arbitrarily fixes profits. Competition without misrepresentation, on a close margin, is not against public interest. Representative Lea said he could not join in the majority report unless the protection of a contract was so limited as to confine it either to costs or a moderate percentage above the purchase price of the dealer, which he fixed at 10 or 20 per cent. Such a margin, he held, would prevent sales below cost and not be open to the criticism of fostering unreasonable profits.

CORRESPONDENCE

The Chance of the Small Manufacturer

To the Editor: As a long-time reader of THE IRON AGE from cover to cover, I was much impressed by your editorial "Cheapness at a Price," appearing in your Oct. 11 issue. The facts summarized there merit the serious attention of the small manufacturer, but I do not believe he need become pessimistic in view of this editorial.

Whether we wish it or not, larger and larger corporations with their obvious economies have come to stay and if the smaller manufacturer seeks to compete with them on their own ground he is doomed to failure. The advantages, however, of the larger corporation hold only within certain bounds, and the determination of those limits is one of the serious problems of the small manufacturer. Once outside the bounds wherein lie larger purchasing power, greater mass production, greater resources for wide distribution, and the advantages of superior technical leadership, the small manufacturer can meet the large corporation at even or perhaps better terms. Once outside of those limits, the advantages of the small manufacturer are far too numerous to detail here, but that they exist is proved by the large percentage of the country's business that is still done by the smaller firm.

One particular advantage is in the specialty field. Mass production plus mass distribution requires a standardization of products which makes it very costly for the large corporation to make and sell non-standard or specialty material. Some specialties are so limited that it is hardly worth while to go into them. On the other hand, many specialties are destined to great growth; in fact, it might be said that the specialty of today becomes a standard product tomorrow. The small manufacturer exploiting such a specialty and growing with it will become the large manufacturer of tomorrow.

It seems odd, perhaps, for us to think of steel as a specialty; and yet, when the Bessemer was first introduced iron was the standard mass product and the pitiful output of the first Bessemer was a specialty which it was conceded might have some future in the manufacture of steel rails; but as for general use—well, that was another matter. And now look at the beast. It has grown to the point at which not only has steel manufacture become a standard mass

production, but many steel specialties have grown to the standard status. We can all remember that but a few decades have passed since these specialties were born—the automobile, the radio, the talking machine, the airplane, the skeleton steel building.

The smaller manufacturer can stay in business by developing a specialty, preferably one protected by patent or other method of whole or part monopoly. If he picks the right specialty now, there is nothing to prevent his becoming a large operator later on.

CROSBY FIELD.

Brooklyn, N. Y., Oct. 15.

Rapid Corrosion Tests for Coated Steel

Investigation by the Bureau of Standards, Department of Commerce, indicates that, in the case of zinc-coated steel, the bureau's simulated atmospheric corrosion tests produce an effect that more closely resembles corrosion in service than the spray test.

Since it is important to develop a test that will give some indication of the probable life of the product, the bureau has made a thorough study of the two test procedures now in use. The simulated atmospheric corrosion test employs a moist gaseous mixture of sulphur dioxide, carbon dioxide and air, while the spray test uses normal solutions of sodium chloride or ammonium chloride. The time required for breaking down the zinc coating was considerably less with the first test than with the second, and the coating was broken down in a more consistent manner.

No attempt was made to interpret the experimental results in terms of service life under the many atmospheric conditions that are found in different climates. Any satisfactory attempt at such an evaluation must await the results of long-time field tests on zinc-coated products, conducted under typical conditions obtaining at different locations. A complete account of this work is given in Research Paper No. 10 of the Bureau of Standards.

The "Blaster's Handbook," issued by the Explosives Department of the E. I. du Pont de Nemours & Co., Wilmington, Del., has been revised. New matter includes a description of the character and uses of pellet powder, a relatively new type of explosive in the United States for use in coal mines. Sections are devoted to ore mining, coal mining and tunneling revised as to new practices.

Iron and Steel Markets

Prices Show Further Strength

Heavy Rolled Products \$1 to \$2 a Ton Higher on Prompt
Tonnages—Advances in Scrap, Coke and Pig Iron—
Demand for Automobile Steel Dips

FOLLOWING the heavy bookings of recent weeks, new business in steel is at a reduced rate, but the upward movement of prices has not yet run its course.

Further evidences of strength in finished steel, in some instances attributable to extended deliveries, are matched by additional advances in scrap and pig iron and a slight rise in blast furnace coke.

Steel production holds at close to 90 per cent of ingot capacity, and little, if any, recession from that rate is looked for this month. With mill backlogs large and consumer commitments of like proportions, the decline in new orders is not surprising. The view is still held that the rush of business in September was partly due to the advanced prices named for fourth quarter and that consumers' reserve stocks have been built up to some extent.

On the other hand, pressure for deliveries is still insistent, and the leading producer of sheets is operating several plants an extra turn each week to speed up shipments.

Not a few consumers who failed to anticipate their needs are embarrassed by the heavy commitments of the mills on some products. Their pressure for prompt material, although usually in small tonnages, has resulted in a further strengthening of prices on the heavy rolled products. Bars, and in less degree plates and shapes, are commanding \$1 to \$2 a ton more than the prices at which fourth quarter contracts were closed.

An advance of \$2 a ton on cold-rolled strips to 2.85c. a lb., Cleveland or Pittsburgh, is being widely adopted. Order books are reported to be the largest in over three years.

Pressure on the mills is not uniformly strong throughout the country. A decline in specifications at Chicago is ascribed largely to slackening operations in the automobile industry. Chicago steel output is still at a rate exceeding 85 per cent, and mill operations in other producing centers dependent on motor car steel have not yet been affected. A number of automobile manufacturers will shut down two or three weeks in November for inventories, and their steel requirements upon resuming operations will depend on the motor car demand at that time. Purchases by the Chevrolet company, which will start production on new models next month, are expected to offset the decline in orders from other plants.

Steel production has been reduced in the Birmingham district, where five open-hearth furnaces were put out following the shutting down of the Ensley rail mill.

This action is of temporary significance, marking the completion of 1928 orders. The rail buying movement for 1929 has been under way for several weeks. Following closely the purchase of 46,622 tons by the Erie a week ago, the Santa Fe has distributed orders for 119,637 tons. In addition, the Reading will divide 30,000 tons between a Pittsburgh and an Eastern mill. New inquiries include 190,000 tons for the New York Central and 30,000 tons for the Texas & Pacific.

Farm implement plants are taking steel at an undiminished rate, and shipments to them so far this year have been the largest in history.

Unfilled orders of pipe mills are being slowly reduced. While demands from the oil and gas industry have declined, a projected natural gas line from Ventura, Cal., to San Francisco will call for 50,000 tons of steel.

Basic pig iron in eastern Pennsylvania has advanced 75c. a ton on purchases of 5000 tons. An inquiry in that district for 20,000 tons of basic iron is from a steel producer that bought 25,000 tons 30 days ago. Prices are also stronger in foundry grades in the Central West, where Lake furnaces have booked some first quarter business. A Valley producer of low phosphorus has announced an advance of 50c. a ton to \$27, furnace.

Heavy melting steel scrap has advanced another 25c. a ton at Pittsburgh and St. Louis and \$1 a ton at Detroit.

Spot furnace coke, under the influence of orders from blast furnaces supplementing contracts, has advanced 10c. to \$2.85 a ton, Connellsville.

The new card of extras on hot-rolled strip recently announced by an Ohio mill has been adopted by a number of producers, although others may decide to quote two base prices instead of only one.

Tin plate prices for the first half of 1929 will probably be announced in the next 30 days. A cut in the cash discount from 2 per cent to 1/2 per cent is also expected.

In Europe a changing situation is indicated. A diminishing steel demand, exports included, now is reported, accompanied by some price recessions.

Both of THE IRON AGE composite prices remain unchanged. That for pig iron, at \$17.84 a ton, is exactly the same as a year ago. The finished steel composite, at 2.362c. a lb., compares with 2.307c. twelve months ago.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
No. 2 foundry, Philadelphia...	\$20.76	\$20.76	\$20.76	\$19.76
No. 2, Valley furnace.....	17.00	17.00	17.00	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	20.94
No. 2, Birmingham.....	16.25	16.25	16.25	17.25
No. 2 foundry, Chicago*.....	18.50	18.50	18.50	18.50
Basic, del'd eastern Pa.....	19.75	19.00	19.00	20.00
Basic, Valley furnace.....	17.00	17.00	16.25	17.00
Valley Bessemer, del'd P'gh..	19.26	19.26	19.01	19.76
Malleable, Chicago*.....	18.50	18.50	18.50	18.50
Malleable, Valley.....	17.50	17.50	17.25	17.50
Gray forge, Pittsburgh.....	18.26	18.26	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
O.-h. rails, heavy, at mill....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess, billets, Pittsburgh.....	33.00	33.00	32.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	32.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.75

Finished Iron and Steel,	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, New York.....	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.22½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.19½	2.14½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.65	2.90
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.75	2.75	3.00
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.40	3.75
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.85
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.15
Sheets, blue, 9 & 10, Chicago.				
dist. mill.....	2.10	2.10	2.10	2.30
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago dist.				
mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
Heavy melting steel, P'gh....	\$17.75	\$17.50	\$16.75	\$14.50
Heavy melting steel, Phila....	16.00	16.00	15.50	14.00
Heavy melting steel, Ch'go....	14.00	14.00	13.00	11.50
Carwheels, Chicago.....	13.75	13.75	13.50	13.50
Carwheels, Philadelphia.....	16.50	16.50	16.00	15.50
No. 1 cast, Pittsburgh.....	15.50	15.00	15.00	14.75
No. 1 cast, Philadelphia.....	17.00	17.00	16.50	16.50
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.00	14.00
No. 1 RR. wrot, Phila.....	15.50	15.50	15.00	15.50
No. 1 RR. wrot, Ch'go (net)..	12.75	12.75	12.00	10.00

Coke, Connellsville, Per Net Ton at Ovens:	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
Furnace coke, prompt.....	\$2.85	\$2.75	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Oct. 16, 1928	Oct. 9, 1928	Sept. 18, 1928	Oct. 18, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	15.25	15.25	15.00	13.25
Electrolytic copper, refinery..	15.00	15.00	14.75	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	6.05
Zinc, New York.....	6.60	6.60	6.60	6.40
Lead, St. Louis.....	6.32½	6.32½	6.32½	6.05
Lead, New York.....	6.50	6.50	6.50	6.25
Tin (Straits), New York.....	48.50	48.50	48.00	58.62½
Antimony (Asiatic), N. Y.....	11.00	11.50	10.87½	11.25

Pittsburgh

Steel Orders Lighter, But Continued High Production Is Assured Through October at Least

PITTSBURGH, Oct. 16.—Steel plant engagement in this and nearby districts still is averaging 90 per cent of capacity. There is no indication of a recession this month from that rate. While the amount of business entered on mill books in the past week has been less than in the first week of October, this appears to be largely in line with expectations after the heavy flood of orders and specifications in the latter part of last month.

Aside from wire, tin plate and pipe mills, there are commitments sufficient to provide full occupation of rolling capacity for the month. Lighter new purchases, however, suggest that the mills will cut extensively into order books at the present rate of activity. Whether a 90 per cent production of ingots can be maintained beyond this month will depend on the volume of business a few weeks hence.

Rail tonnage is reaching the mills in good volume, but against that are definite signs of some letdown in automobile production. There is sustained demand for steel for building and construction and for agricultural implements. The demands of the oil and gas industry are smaller than they were recently, and, except for seamless pipe and line pipe, orders from that source have not been as large as usual at any time this year.

Of interest in connection with speculation as to the continuance of present steel works operations, is the way scrap dealers are combing the field for ideas upon which to plot their course. As much as \$18 has been paid by consumers for heavy melting steel scrap; there is no admission that more has been paid, but at one point, at least, in this district a dealer is bidding \$18.25 for that grade. Higher prices are predicted in the event that

steel ingot production holds at its present gait for another 30 days. Makers of pig iron also expect to get higher prices on the same premise, it being figured that there will be purchases of scrap by all steel makers if the demand for finished steel holds up and of pig iron by some ordinarily self-contained units.

Close observers of market conditions, however, are looking for some letdown before another month passes, and it is interesting in that connection that a steel company which recently considered putting on another blast furnace finally decided against doing so.

Steel prices are holding steadily. On new business a tendency to seek what is regarded as the top of the market is rather common. Several mills want 2c., base, on new business in bars. Some makers of cold-rolled strips ask 2.85c., base Pittsburgh, on fresh business. The market under present conditions, with makers well supplied with tonnage and consumers well protected on probable requirements, is free from either pressure for business on the part of producers or pressure on prices by consumers.

Pig Iron.—The market still is firm, but, so far as open transactions go, it is very quiet. Private negotiations are understood to be in progress for a considerable tonnage of basic iron, most of which is for delivery in the first quarter of 1929. The American Steel Foundries is in the market for 3000 to 5000 tons of this grade for its Alliance, Ohio, works. A sale of 2500 tons of basic is noted at \$17, f.o.b. a Pittsburgh district furnace. Valley furnaces which have basic iron for sale want \$17, furnace, for it. A company which recently had requirements of a pressing character appears to have picked up a sufficient supply to tide it over the emergency. Foundry iron is moving well on old orders, but new business does not amount to much. An effort to stiffen the price of this grade 50c. a ton to \$17.50, Valley furnace, has not made much progress. A few moderate-sized lots of Bessemer and malleable iron are being sold. The Valley producer of low phosphorus iron has gone to \$27, furnace, for that grade. Otherwise, Valley prices are unchanged.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	17.50
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.50
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Fluorspar.—It is reported that some makers have advanced their prices to \$18, f.o.b. mines, for gravel spar analyzing 85 per cent calcium fluoride and not over 5 per cent silica. The most recent sale in this district was of 500 tons at \$17, mines. Consumption has risen in keeping with steel works operations and it is said that accumulations at the mines have been pretty well cleaned up. In the meantime, there has been no increase in production on account of the fact that recent prices have been unprofitable.

Semi-Finished Steel.—The market has settled to a basis of \$36, Pittsburgh or Youngstown, for sheet bars and base billets and slabs, with an extra of \$1 a ton for billets and slabs

less than 4 x 4 in. in area. Most non-integrated sheet, tin plate and strip makers have signed fourth quarter contracts at these prices, which, in the case of billets and slabs, are \$1 a ton less than makers set out to obtain. Finishing mills, for the most part, are working on steel bought at third quarter prices. Wire rods are firm at \$42, base Pittsburgh and Cleveland, and are moving steadily.

Bars, Plates and Shapes.—Makers generally find the past week to have been productive of smaller entries on their books than the first week of the month, but the first week included a good deal of third quarter tonnage, specifications for which did not reach mills until after the end of that quarter. Business still is regarded as good, considering the flood of orders and specifications during the latter part of last month, and all mills are booked to the end of the month and some beyond, notably on bars. The market is very firm, and makers are inclined to view 1.90c., base, at which large consumers were covered for this quarter, a matter of history; they are quoting \$1 to \$2 a ton more on current inquiries.

Rails and Track Supplies.—The Carnegie Steel Co. has been awarded 40,000 tons of the 76,000 tons of standard-section rails placed by the Erie and Reading railroads. Distribution of the Pennsylvania and New York Central rail requirements is expected shortly. Some good-sized orders for track accessories are in the offing, but current orders are light. Prices are unchanged.

Wire Products.—Business is fairly good on the whole, but provides no tax on productive capacity. The chief satisfaction of manufacturers is that prices are holding well.

Tubular Goods.—A gas line of 240 miles of 18-in. or 20-in. pipe to run from southern California to San Francisco is the most promising piece of business in this class now before makers. Old orders are slowly playing out. Business still is fairly active in seamless oil country pipe, but only moderately good in butt welded and lap welded pipe. Highest rate of en-

gagement among pipe mills is in seamless pipe-making capacity. In tubing, the best demand still comes from motor car builders.

Sheets.—Business on makers' books still is sufficient to sustain almost full mill operations. There are relatively few idle mills. At several plants of the American Sheet & Tin Plate Co. an extra turn each week is found necessary to make the shipments that consumers are demanding. The common finishes of sheets are firm at the prices asked for this quarter, but some buyers are said to have quotations lower than 3.50c., base, on galvanized sheets. Mills appear to be holding rigidly to the lower cash discount for cash, which became effective Oct. 1.

Tin Plate.—Demand for tin plate for packers' cans has been satisfied for this season, and mill operations are chiefly sustained by general line tin plate requirements and a fair amount of export business. There has been no rolling against early 1929 packers' can requirements. Prices for the first half of next year will probably be announced in the next 30 days, and with that announcement is expected some word as to the cash discount. It is believed that it will be cut from 2 per cent to one half of 1 per cent, effective from Jan. 1.

Cold-Finished Steel Bars and Shafting.—Reports of some letdown in the productive activities of the motor car industry are not reflected in the shipments of cold-finished steel bars, but specifications for material to be used in cars to be built in late November and early December are in lessened volume. Current shipments, for the most part, carry the third quarter contract price. On fourth quarter contracts, 2.20c., base, has been well established.

Hot-Rolled Flats.—Makers in this district still are being pressed for deliveries on orders for strips, and a full operation of mill capacity is necessary to accommodate the demand. Local producers have done nothing yet in connection with the new card of extras.

THE IRON AGE Composite Prices

Finished Steel

Oct. 16, 1928, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.348c.
One year ago	2.307c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.566c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Oct. 16, 1928, \$17.84 a Gross Ton

One week ago	\$17.84
One month ago	17.63
One year ago	17.84
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$17.84, Oct. 2;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base Per Lb.

F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.24c. to 2.34c.
Del'd Cleveland	1.92½c. to 2.05c.
F.o.b. Cleveland	1.90c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.15c. to 2.25c.
F.o.b. Coatesville	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Bethlehem	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

Narrower than 3 in., P'gh.....	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh.....	1.85c. to 2.00c.
6 in. and wider, P'gh.....	*1.75c. to 1.90c.
Narrower than 3 in., Chicago.....	2.30c.
From 3 to 6 in., Chicago.....	2.20c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle	\$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland.)

Base Per Keg

Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (¼% Nickel)	\$0.25	\$3.00
2100 (1½% Nickel)	0.55	3.30
2300 (3½% Nickel)	1.50	4.25
2500 (5% Nickel)	2.25	5.00
3100 Nickel Chromium	0.55	3.30
3200 Nickel Chromium	1.35	4.10
3300 Nickel Chromium	3.80	6.55
3400 Nickel Chromium	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100 Chromium Spring Steel	0.20	2.95
6100 Chromium Vanadium Bars	1.20	3.95
6100 Chromium Vanadium Spring Steel	0.95	3.70
9250 Silicon Manganese Spring Steel (flats)	0.25	3.00
Rounds	0.50	3.25
Chromium Nickel Vanadium	1.50	4.25
Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars	2.75
Track bolts, to steam railroads....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1½	45	19½	1¼ to ¾..	+11	+39
1¼ to ¾..	51	25½	¾	22	2
1¼	56	42½	¾	28	11
¾	60	48½	1 to 1½..	30	13
1 to 3....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6..	59	47½	2½	26	11
7 and 8..	56	43½	3 to 6....	28	13
9 and 10..	64	42½	7 to 12..	26	11
11 and 12.	53	40½			

Butt Weld, extra strong, plain ends

1½	41	24½	1¼ to ¾..	+19	+54
1¼ to ¾..	47	30½	¾	21	17
1¼	53	42½	¾	28	12
¾	58	47½	1 to 1½..	30	14
1 to 1½..	60	49½			
2 to 3....	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4..	57	46½	2½ to 4..	29	15
4½ to 6..	56	45½	4½ to 6..	28	14
7 to 8....	52	39½	7 to 8....	21	7
9 and 10..	45	32½	9 to 12..	16	2
11 and 12.	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2¼ in....	27
2½ to 3 in....	37
3 in.	40
3¼ to 3½ in....	42½
4 to 4½ in....	46
5 to 6 in....	40
1½ in.	+18
1¾ to 1½ in....	+8
2 to 2¼ in....	2
2½ to 3 in....	7
3¼ to 4½ in....	9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb..	4 Fives
5000 lb. to 12,000 lb....	5 Fives
12,000 lb. to 21,000 lb....	6 Fives
21,000 lb. and over	7 Fives
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	43
1¼ to 1½ in....	55	3¼ to 3½ in....	50
1¾ in.	39	4 in.	53
2 to 2¼ in....	34	4½, 5 and 6 in..	45
2½ to 3 in....	42		

Hot Rolled

2 and 2¼ in....	40	3¼ to 3½ in..	56
2½ and 2¾ in..	48	4 in.	59
3 in.	54	4½, 5 and 6 in..	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads) ..	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.

Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes ..	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more	
bundles	3.70c.
Galv. sheets (No. 24), 25 or more	
bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to	
10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per	
square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	
60 per cent off list	
Machine bolts, 100 count,	
60 per cent off list	
Carriage bolts, 100 count,	
60 per cent off list	
Nuts, all styles, 100 count,	
60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base	
per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100	
lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Cold-Rolled Strips.—Recession in automobile production finds no reflection in the insistence of consumers for shipments on their orders. Prices are firm, and, while much tonnage is on makers' books at 2.75c., base Pittsburgh, there is a disposition to quote 2.85c. on new inquiries.

Coke and Coal.—Spot furnace coke is 10c. to 15c. a ton higher as a result of numerous small purchases by furnaces which require supplies in addition to those coming to them on contracts. Lately, it has not been necessary for producers to go under \$2.85 per net ton at ovens to make sales, and some business has been done at a higher price. Spot foundry coke is in good demand and slightly firmer. Warm weather for the time of year has reduced the demand for coal slightly; most of the demand is for prepared sizes for Lake shipment or household use and the supply of

slack, consequently, is so heavy that accumulations are avoided only by sales at very low prices.

Old Material.—The situation in the steel works grades is one of marked firmness. Steel works operations remain high and that means a heavy consumption of scrap and much pressure upon the dealers to deliver on contracts. Mills have gone as high as \$18 for heavy melting steel, and dealers are finding it difficult to pick up tonnages to apply on orders at less than \$17.50. A very strong market in compressed sheets and the railroad specialties exists, partly in sympathy with heavy melting grade. Demand for the specialties is good from the steel foundries.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	\$17.50 to \$18.00
Scrap rails	17.00 to 17.50
Compressed sheet steel	17.00 to 17.50
Bundled sheets, sides and	
ends	15.50 to 16.00
Cast iron carwheels	15.25 to 15.75
Sheet bar crops, ordinary ..	17.50 to 18.00
Heavy breakable cast	13.50 to 14.00
No. 2 railroad wrought	17.50 to 18.00
Heavy steel axle turnings ..	15.00 to 15.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers ..	18.50 to 19.00
Railr. coil and leaf springs ..	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet and bloom	
ends	20.00 to 20.50
Low phos., mill plates	18.50 to 19.00
Low phos., light grade	17.50 to 18.00
Low phos., sheet bar crops ..	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turn-	
ings	12.50 to 12.75
Short mixed borings and	
turnings	12.50 to 12.75
Cast iron borings	12.50 to 12.75
No. 2 busheling	11.25 to 11.75
Rolling Mill Grades:	
Steel car axles	19.00 to 20.00
No. 1 railroad wrought	13.00 to 13.50
Sheet bar crops	18.00 to 18.50
Cupola Grades:	
No. 1 cast	15.50 to 16.00
Rails 3 ft. and under	18.00 to 18.50

Warehouse Business.—Black and galvanized sheets are quoted higher out of local warehouses. In a large measure, this change is a reflection of the reduction in the cash discount by the mills. Higher mill prices on bars, plates and shapes have not disturbed regular warehouse prices, which were subject to some shading when mill prices were lower. Warehouse business is reported fairly active.

Japan to Get Iron Ore From Australia

WASHINGTON, Oct. 16.—Recently an agreement was entered into by a Japanese organization with a West Australian syndicate for the purchase of iron ore from Yampi Sound, Western Australia, says a report received by the Department of Commerce from Trade Commissioner E. C. Squire, Sydney. Investigations, it is stated, have proved that there are rich deposits of iron ore of good commercial value at Yampi Sound and that they will be developed by a West Australian syndicate, which has obtained British finance. Experts have been sent out to Western Australia by the Asana group of industrial concerns in Japan, and it is added that this organization will enter into a contract to take 150,000 tons of iron ore the first year, 300,000 tons the second year and from 500,000 to 1,000,000 tons thereafter, according to the output. It is understood that the agreement is for 12½ years. The Asana group, it is reported, will spend \$10,000,000 in Japan to enable it to treat the Yampi ore.

The Aetna-Standard Engineering Co., Youngstown, has moved to new and larger quarters in the Home Savings & Loan Building, Phelps Street, Youngstown, in which it occupies two full floors. Offices are on the ninth floor and the drafting rooms on the eighth floor.

STEAM piping no less than 7 ft. in diameter has been made at the South Philadelphia works of the Westinghouse Electric & Mfg. Co. It is composed of sections of rolled steel ¾ in. thick which were joined by arc-welding. It is to be installed in a large steam turbine generator unit in an Eastern power plant and is designed to carry 1,600,000 lb. of steam per hr. at 40 lb. absolute pressure.



Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and over.....	*\$33.00
Rerolling, under 4-in. to and including 1¾-in.	34.00
Forging	38.00

Sheet Bars

Per Gross Ton

Open-hearth or Bessemer	\$33.00
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*Cleveland mill base on large billets, slabs and sheet bars is \$33.

Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

Per Lb.

Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

Per Gross Ton

*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	

Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25

Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
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Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.
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Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.85 to \$2.90
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens.	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines.....	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to \$1.00

Ferromanganese

Per Gross Ton

Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$33.00
Domestic, 16 to 19%	32.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$83.50 to \$88.50
75%	130.00 to 140.00

Per Gross Ton Furnace

10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton

10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton

6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium, fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00
No. 2 lump, Illinois and Kentucky mines.....	\$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

Per 1000 f.o.b. Works

First Quality	Second Quality
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

Per Net Ton

Standard size	\$45.00
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Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2½
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base Per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(¾-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Specifications Lighter, Partly Because of Lessened Needs of Automotive Industry—Ingot Output at 85 Per Cent

CHICAGO, Oct. 16.—Specifications for finished steel products, though still holding at the current rate of shipments and assuring ingot output at a shade better than 85 per cent of capacity, are measurably lighter than a week ago. The downturn in demand is partly due to the slackening pace of the automotive industry. Frame makers have passed the peak of fall production and other parts makers have slowed down in like proportion. Sales, not counting rails, are in fair volume following several weeks of heavy forward buying. Most current purchases are for nearby requirements.

Chicago mills will roll 25,000 tons of standard-section rails for the Santa Fe and they expect to book about 30 per cent of the 190,000 tons to be bought by the New York Central. Recent rail contracts, based on 1929 requirements, have not been scheduled at the mills, but output remains unusually high for this time of the year, being supported by the remainder of old obligations and rather liberal miscellaneous new business for nearby delivery.

Railroad contracting for finished steel is moving forward steadily, one Western road having placed 12,000 to 15,000 tons for shipment in this quarter. The Southern Pacific has ordered 25 dining cars. The Great Northern has purchased 500 underframes and the Chicago & Northwestern and the Texas & Pacific will buy caboose car underframes.

With forward contracting well out of the way, Chicago producers are turning their attention to obtaining higher prices for plates, shapes and bars. One seller has named 2.10c. per lb. as the price on current business. Others are recognizing a spread of 2c. to 2.10c., depending on the size and character of orders.

Pig Iron.—Prices for Northern iron are firm at \$18.50 a ton. All furnaces in the immediate Chicago territory are lighted and shipments still overbalance output. Deliveries to foundries that cater to the automobile trade are lighter, but malleable producers appear to be little affected by the changed pace of motor car builders. A few large first quarter sales have been made. Sellers are showing more interest in soliciting 1929 business. Prices for silvery are stronger than in many months, and sales are being made subject to confirmation at the furnaces. The Southern iron market is quiet. Scattered lots of charcoal iron have been purchased at \$24 a ton, furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus.....	18.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—An inquiry for 7000 tons of plates for oil tank construction in the Southwest is before local mills. The railroad equipment market is quiet except for an order for 500 un-

derframes placed by the Great Northern. Current purchases of plates and releases against contracts are keeping local plate mills engaged at about 85 per cent of capacity. Prices, depending on tonnage, range from 2c. to 2.10c. Chicago.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Ferroalloys.—In specifications, this market remains active. Spiegeleisen in the 19 to 21 per cent grade has reached a firm basis at \$33 a ton, Hazard, Pa. Inquiry for ferromanganese is quiet, but quotations are steady at \$105, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Structural Material.—Structural projects are marking time and shop backlogs are growing lighter. Bids were submitted Oct. 15 on 1500 tons for the Rock Island, Ill., plant of the International Harvester Co. Several Western railroads have closed for their fourth quarter requirements of plates, shapes and bars. From all indications, most local fabricators will continue buying only for specific jobs, though several shops have closed small contracts for miscellaneous steel needed for orders expected in the coming months. Prevailing prices are 2c. to 2.10c., Chicago, depending on the tonnage.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Bars.—Current specifications for soft steel bars are lighter, but mill order books are well filled and mills continue at a high rate of output. Deliveries range from four to six weeks. Automobile parts plants are slowing down. Manufacturers of farm implements, especially tractors, are looking forward with a great deal of confidence and are taking steel at an unchanged rate. Shipments in 1928 from local steel mills to this class of users are the largest in history. It is again heard here that Ford will manufacture tractors. Prices for soft steel bars are steady at 2c. to 2.10c. per lb., Chicago. Mills are taking a firm stand for 2.10c. on all miscellaneous busi-

ness, while 2c. will rule on large tonnages. The iron bar market is without feature. Output of alloy steel bars has dropped to 80 per cent, following lighter releases by the automobile trade. Nail orders are characterized by diversity rather than by size. Prices are steady. Deliveries of rail steel bars are not better on the average than four weeks. Releases against contracts are heavy and spot purchases are in fair volume. Prices are firm at 1.95c. per lb., Chicago Heights. The fence post business is far below producers' expectations.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Rails and Track Supplies.—Of foremost interest are the purchase of 115,000 tons of standard-section rails by the Santa Fe and the inquiry of the New York Central for 190,000 tons. About 90,000 tons of the Santa Fe order went to the Colorado mill and 25,000 tons was divided between the Inland Steel Co. and the Illinois Steel Co. Nearly 30,000 tons of track accessories will be needed by the Santa Fe for laying these rails. The Erie purchase, mentioned a week ago, was distributed as follows: 24,471 tons to the Carnegie Steel Co., 11,151 tons to the Illinois Steel Co., 7500 to the Bethlehem Steel Co., and 3500 tons to the Inland Steel Co. Of 13,000 tons of track supplies ordered by the Chesapeake & Ohio, about 3000 tons will be made by Chicago mills. Miscellaneous orders of accessories in the week total 3000 tons. Several users have ordered small tonnages of light rails. Rail mill output remains steady on releases against 1927-28 contracts and small current purchases. The iron tie plate market is quiet, and prices are steady at \$43 a ton.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Interest is revived in this market by several sizable inquiries by local contractors for pipe that is to be laid before winter weather comes. James B. Clow & Sons are low bidders on 200 tons of 3-in. to 24-in. fittings for Chicago. Milwaukee closed bids Oct. 16 on 100 tons of 8-in. Class C pipe. Prices have been advanced to \$35 to \$37 a ton, Birmingham, for diameters 6 in. and larger.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43.20 to \$45.20; 4-in., \$47.20 to \$49.20; Class A and gas pipe, \$4 extra.

Reinforcing Bars.—Activity in this market centers more around bidding and estimating fresh projects than in signing contracts. There is a noticeable pickup in construction of apartments of moderate size, also greater activity among promoters of apartment hotels. The Powhatan Hotel, requiring 500 tons, is up for figures. Among industrial projects of note is

1200 tons for a plant addition for the Western Electric Co. Incoming business is in smaller tonnage than shipments, with the result that shop backlogs are smaller and the current rate of output is assured for only three or four weeks. Competition is keen; prices, regardless of size or kind of bar used, are unsteady. Higher asking prices by mills have had no effect in strengthening reinforcing bar quotations. New contracts and fresh inquiry are given on page 994.

Bolts, Nuts and Rivets.—Lighter requirements by automobile manufacturers are being felt by producers of bolts, nuts and rivets. Output is in excess of shipments and the margin is being put in stock. Prices are firm on all products excepting large rivets.

Billets.—This market is quiet. Prices for rerolling billets, 4 in. and larger, are steady at \$33 a ton.

Wire Rods.—Shipments are in fair volume, and spot business at \$43 per ton is moderately active.

Cold-Rolled Strip.—Some producers of this commodity are considering an early advance of \$2 a ton. Order books are the largest in over three years, and shipments, with mills operating practically at capacity, are gradually becoming more deferred. Chicago delivered prices range from 3.05c. to 3.15c. per lb. The advance talked of would bring the upper limit of the range to 3.25c. The freight rate from Cleveland to Chicago is 30c. per 100 lb.

Sheets.—A realignment has taken place in sheet prices. Chicago delivered quotations on blue annealed have definitely settled to 2.15c. per lb. Black sheets are being sold at 2.90c., while galvanized sheets bring 3.65c. Contracting for fourth quarter is near an end. Following several weeks in which specifications were heavy, there is now less interest in releases, but deliveries have not improved beyond three to five weeks. Third quarter

contracts have been specified in full, but hot mills have not yet completed these orders. Makers of light tanks are less busy, but sheet users in the stove and barrel industries are operating at a high rate. An improvement is noted in shipments to jobbers. Agricultural machinery manufacturers continue to take large quantities.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Wire Products.—Demand from practically all sources is lighter, but producers are holding to a 65 per cent rate of output, with the result that stocks are slowly accumulating at mills. Specifications from the automobile trade are fewer, but still average fully 40 per cent heavier than at this time a year ago. Many consumers are buying at close range and pressing for deliveries. Buyers who are obligated for the final quarter have well-arranged shipping schedules, so that with lighter specifications there is not a great change in the rate of deliveries. The jobbing trade continues to lag; most sellers, taking into account the lateness of the season, have little hope that conditions in this trade will be bettered this fall. Orders from the South are consistent but not large, but heavier shipments are being made to the Northwest. Demand for nails is running behind that of the early fall months of 1927.

Old Material.—Prices for most grades of scrap are strong and consumers' interest remains high. Consumption is heavy and pressure for delivery is severe. In specialties, spot cars are eagerly sought and car tracing is giving considerable trouble to dealers. For the most part, consumers still resist prices by making purchases in small lots for immediate use. Producers of scrap are being pressed to make shipments, with the result that the average carload is lighter than at the turn of the month. Supplies available at car shops are small and sales by automobile car manufacturers are measurably lighter. Cars coming on track from railroads are fewer in number. These factors are believed by some to be indicators of a sustained market over the next four to six weeks. However, higher prices at points of consumption are inducing country dealers to release stocks. Several weeks ago this market was tight on short rails, but shipments from as far as St. Paul have relieved the situation. It is evident, too, that local yard dealers are willing at present price levels to liquidate holdings gathered when prices were low. There is little reason to doubt that the supply is still in excess of demand, but the margin is close and the variation from week to week makes the market difficult to gage. In many instances dealers are being forced to pay prices equal to the figures written in contracts. The Santa Fe has obtained

\$14.90 a gross ton, delivered, on 1000 tons of heavy melting steel. Direct bidding on railroad lists by consumers is more common.

*Prices deliv'd Chicago district consumers:
Per Gross Ton*

Basic Open-Hearth Grades:
Heavy melting steel.....\$14.00 to \$14.50
Shoveling steel 14.00 to 14.50
Frogs, switches and guards,
cut apart, and misc. rails 15.50 to 16.00
Hydral. compressed sheets 12.25 to 12.75
Drop forge flashings..... 9.50 to 10.00
Forg'd, cast and r'l'd steel
carwheels 17.25 to 17.75
Rail'r'd tires, charg. box
size 17.25 to 17.75
Rail'r'd leaf spring cut
apart 17.25 to 17.75

Acid Open-Hearth Grades:
Steel couplers and knuckles 15.75 to 16.25
Coil springs..... 18.25 to 18.75

Electric Furnace Grades:
Axle turnings..... 13.50 to 14.00
Low phos. punchings..... 15.50 to 16.00
Low phos. plate, 12 in.
and under..... 15.50 to 16.00

Blast Furnace Grades:
Axle turnings..... 11.00 to 11.50
Cast iron borings..... 10.50 to 11.00
Short shoveling turnings.. 10.50 to 11.00
Machine shop turnings.... 6.75 to 7.25

Rolling Mill Grades:
Iron rails..... 14.75 to 15.25
Rerolling rails 16.50 to 17.00

Cupola Grades:
Steel rails less than 3 ft.. 17.25 to 17.75
Angle bars, steel..... 16.50 to 17.00
Cast iron carwheels..... 13.75 to 14.00

Malleable Grades:
Railroad 15.25 to 15.75
Agricultural 12.50 to 13.00

Miscellaneous:
*Relaying rails, 56 to 60 lb. 23.00 to 25.00
*Relaying rails, 65 lb. and
heav. 26.00 to 31.00

Per Net Ton

Rolling Mill Grades:
Iron angles and splice bars 14.50 to 15.00
Iron arch bars and trans-
oms 20.50 to 21.00
Iron car axles..... 25.50 to 26.00
Steel car axles..... 16.25 to 16.75
No. 1 railroad wrought... 12.75 to 13.25
No. 2 railroad wrought... 12.50 to 13.00
No. 1 busheling 11.00 to 11.50
No. 2 busheling 6.00 to 6.50
Locomotive tires, smooth.. 13.00 to 13.50
Pipes and flues..... 9.00 to 9.50

Cupola Grades:
No. 1 machinery cast..... 15.50 to 16.00
No. 1 railroad cast..... 14.50 to 15.00
No. 1 agricultural cast.... 13.75 to 14.25
Stove plate 11.50 to 12.00
Grate bars..... 12.25 to 12.75
Brake shoes 11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes..... 3.10c.
Soft steel bars..... 3.00c.
Reinforc'g bars, billet steel. 2.15c. to 2.50c.
Reinforc'g bars, rail steel.. 2.00c. to 2.50c.
Cold-fin. steel bars and shafting—
Rounds and hexagons..... 3.60c.
Flats and squares..... 4.10c.
Bands 3.65c.
Hoops 4.15c.
Black sheets (No. 24)..... 3.80c.
Galv. sheets (No. 24)..... 4.65c.
Blue ann'l'd sheets (No. 10)..... 3.35c.
Spikes, stand. railroad..... 3.55c.
Track bolts..... 4.55c.
Rivets, structural..... 3.60c.
Rivets, boiler 3.60c.

Per Cent Off List

Machine bolts..... 60
Carriage bolts..... 60
Coach or lag screws..... 60
Hot-pressed nuts, sq., tap. or blank... 60
Hot-pressed nuts, hex., tap. or blank.. 60
No. 8 black ann'l'd wire, per 100 lb.. \$3.30
Com. wire nails, base per keg..... 3.10
Cement c't'd nails, base per keg..... 3.10

Windows built of inflammable material are never a protection against fire is a conclusion reached by the National Fire Protection Association, which recently issued a survey of the Fall River conflagration of Feb. 2. "The failure of wired glass windows because of the use of ordinary frames presents an interesting lesson as to the importance of metal frames for wired glass windows," states the association. The frames must be so designed that the glass will positively remain in place even when the expansion caused by the heat of the fire may have bowed out the glass and seriously distorted the frame."

Philadelphia

Eastern Pennsylvania Mills Operating at High Rate—Basic Pig Iron Sold at an Advance

PHILADELPHIA, Oct. 16.—Operating rates of eastern Pennsylvania mills range from about 85 per cent to 93 per cent. Most steel consumers are covered by contracts for the fourth quarter, so that new buying is limited to small orders. Specifications against contracts, however, are heavy, and plate and sheet mills have four to five weeks' work ahead. Producers of shapes are not in so satisfactory a position as other mills, but have a fair volume of business on their books. A steel company has announced an advance on foundry pig iron to \$20.50 per ton, furnace, and other producers are asking \$20.50 on carload lots. Two small tonnages of basic have been closed at an advance in price from the previous basic sale, and a sizable order is still pending from an eastern Pennsylvania plate mill. Prices of iron and steel scrap are strong, with a slight upward tendency, but new contracts on scrap are in most cases for small tonnages.

Pig Iron.—An eastern Pennsylvania plate producer, which bought 25,000 tons of basic pig iron about 30 days ago, has come into the market again for 20,000 tons. Two smaller users of basic in this district have closed on 2500 to 5000 tons at \$19.75 per ton, delivered, an advance from the previous purchase price. A steel company producer has advanced its quotation to \$20.50 per ton for foundry iron, and this is the usual asking price of other furnaces on the smaller lots. Although sellers are apparently willing to make contracts for first quarter at \$20.50, base, none of the eastern Pennsylvania furnaces is seeking business at this price, and consumers have shown only moderate interest in deliveries beyond the first of the year. Low phosphorus iron is quiet, but prices are firm on both the copper bearing and copper free grades. The Virginia producer of iron has booked an order for 10,000 tons from a Virginia pipe foundry. The Virginia market is firm at \$20, base furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.76 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 21.76
East. Pa. No. 1X.	21.76 to 22.26
Basic (del'd east. Pa.)	19.75
Gray forge.	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Domestic producers report a continuance of heavy requisitions for ferromanganese. The price is firm and unchanged at \$105 per ton, seaboard, for both the domestic and foreign product.

Bars.—Mills are booked with business for several weeks, many of the contracts for this quarter being at 1.95c. per lb., Pittsburgh, or 2.27c., Philadelphia. Some large buyers, who have been receiving third quarter deliveries on low-priced contracts, are now under contract at 1.90c., Pittsburgh, or 2.22c., Philadelphia. On miscellaneous new business mills re-

port 2c., Pittsburgh, or 2.32c., Philadelphia, as firm.

Shapes.—Quotations f.o.b. nearest mill to the consumer are becoming quite common with mills in this district, so that, while the market continues firm at 2.05c. per lb., base, quotations are made f.o.b. Pencoyd, Pottsville, Bethlehem and occasionally Phoenixville. Structural mills are not so well off as to tonnage as other steel producers, but report a fair amount of business on their books and a steady flow of specifications against contracts.

Plates.—Operations in this district are at about 90 per cent of capacity. Deliveries are becoming more extended. Shipments are going forward on contracts at 2.05c., Coatesville, or 2.15c., Philadelphia. On new business, 2.10c., Coatesville, or 2.20c., Philadelphia, is reported still quoted on desirable orders, but on small lots the quotation is 2.15c., Coatesville, or 2.25c., Philadelphia.

Sheets.—Black and galvanized sheets continue firm at 2.75c., Pittsburgh, or 3.07c., Philadelphia, on black and 3.50c., Pittsburgh, or 3.82c., Philadelphia, on galvanized. Blue annealed sheets are firm at 2.10c., base Pittsburgh, on widths greater than 45

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, $\frac{1}{4}$ -in. and heavier	2.70c.
Plates, $\frac{3}{8}$ -in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished $1\frac{1}{2}$ x $1\frac{1}{2}$ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to $\frac{3}{8}$ -in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.00c.
Diam. pat. floor plates— $\frac{1}{4}$ -in.	5.30c.
$\frac{3}{8}$ -in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

in., but on the narrower sheets, continuous mills are still willing to quote 1.90c. to 1.95c., Pittsburgh, so that 2c., base, for blue annealed in these competitive widths is not so firm as the base price on wide sheets. Mills are fully engaged for the next four to six weeks.

Warehouse Business.—Jobbers report a steady flow of orders, particularly in galvanized sheets. Prices and quantity differentials are firmly maintained.

Imports.—In the week ended Oct. 13, iron ore arrivals at this port consisted of 5802 tons from Algeria. Of 1282 tons of manganese ore received, 1250 tons was from British India and 32 tons from Germany. Pig iron receipts were 500 tons from British India. Steel imports consisted of 402 tons of structural shapes and 6 tons of steel bars from Belgium, 506 tons of steel skelp from France and 23 tons of steel scrap from the United Kingdom.

Old Material.—All grades of iron and steel scrap are firm, partly a reflection of the strong market in western Pennsylvania. Recent contracts made by consumers in this district have been small, but at the present level of prices. Machine shop turnings are being bought by a broker-buying agent for a Phoenixville consumer at \$11.50 per ton, and another broker is paying \$12 per ton, delivered in eastern Pennsylvania. Stove plate is firm at \$13 per ton, delivered. Forge fire, bought at \$13 per ton by a consumer at Reading, Pa., is understood to have been of a high quality, for which the buyer was willing to pay a slight premium.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$16.00
Scrap T ralls.	\$15.50 to 16.00
No. 2 heavy melting steel.	13.00 to 13.50
No. 1 railroad wrought.	15.50 to 16.00
Bundled sheets (for steel works)	11.50 to 12.00
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars.	13.00 to 13.50
Stove plate (for steel works)	13.00
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles.	17.00 to 17.50
Rolled steel wheels.	17.00 to 17.50
No. 1 blast f'nace scrap.	10.00 to 10.50
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50 to 15.00
Shafting	19.00 to 20.00
Steel axles	22.00 to 23.00
No. 1 forge fire.	12.00 to 13.00
Cast iron carwheels.	16.50 to 17.00
No. 1 cast.	17.00 to 17.50
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling.	15.50 to 16.00

September shipments of electric industrial trucks and tractors are reported by the Department of Commerce at 118 units, of which five were for export. This is the highest total since April, when 136 units were shipped. It compares with 96 in August. A year ago there were only 79.

New York

Steel Prices Stiffen on Current Small Orders—New York Central to Buy 190,000 Tons of Rails

NEW YORK, Oct. 16.—The pig iron market is passing through a lull such as frequently follows a period of active contracting. Sales for the week were made up of relatively small lots and totaled only about 7000 tons. New inquiries are mainly for fill-in tonnages for early delivery, and it is unlikely that demand will again be active until consumers are ready to cover their first quarter requirements. Among current inquiries is one from the General Electric Co. for 1200 tons for its Elmira, N. Y., plant and 500 tons each for its Pittsfield and Lynn, Mass., works. Except for this inquiry and one for 1200 tons for delivery in this district, pending business includes no outstanding tonnages. Sales of foundry iron by New York State and New England furnaces continue at \$17, base Buffalo, or the equivalent. Pressure for shipments is unabated, and there is every indication that foundry melt is holding its own, if not gaining.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$21.91
*Buf. No. 2, del'd east.		20.28
N. J.		
No. 2, del'd east. N. J.		
tidewater	\$20.01 to	21.25
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Following the large orders and specifications for the heavy tonnage products in the latter part of September and the first week of October, there has been a decided letdown in the past week. This is not a surprising development, as consumers are covered for a month or longer, and it is not to be expected that orders in volume will be forthcoming until present commitments are nearing exhaustion. Mill representatives are in a happy frame of mind, not only because of the relatively full engagement of the mills, but because of the minimum of opposition among buyers to the higher prices now being asked. Some consumers, whose buying habits have tended toward last-minute ordering with requests for prompt shipment, now find that they must await mill convenience. Small orders for urgent needs are in most cases taking the top prices. Large buyers have been covered at 2.22½c., New York for plate; 2.19½c., New York, for shapes, and 1.90c., Pittsburgh, for bars, but these prices are now being rarely quoted, and current sales are more frequently at \$1 or \$2 a ton higher. A promise of quick delivery is more potent in getting some orders than price. Mill operations in the East are at a high rate. The

Bethlehem Steel Co. is running its plants at about 90 per cent, and Eastern plate mills have the best operation in many months. In addition to 3000 tons of reinforcing bars, a warehouse to be built in New Jersey for the Delaware, Lackawanna & Western

Warehouse Prices, f.o.b. New York

	Base per Lb.	Per Cent Off List
Plates and structural shapes.....	3.30c.	
Soft steel bars, small shapes.....	3.25c.	
Iron bars.....	3.24c.	
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—		
Rounds and hexagons.....	3.50c.	
Flats and squares.....	4.00c.	
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.	
Hoops.....	4.50c.	
Bands.....	4.00c.	
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.	
Long terme sheets (No. 24).....	5.60c. to 5.80c.	
Standard tool steel.....	12.00c.	
Wire, black annealed.....	4.50c.	
Wire, galv. annealed.....	5.15c.	
Tire steel, 1½ x ½ in. and larger.....	3.30c.	
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.	
Open-hearth spring steel, bases.....	4.50c. to 7.00c.	
Machine bolts, cut thread:		
¾ x 6 in. and smaller.....	50 to 50 and 10	
1 x 30 in. and smaller.....	50 to 50 and 10	
Carriage bolts, cut thread:		
½ x 6 in. and smaller.....	50 to 50 and 10	
¾ x 20 in. and smaller.....	50 to 50 and 10	
Coach screws:		
½ x 6 in. and smaller.....	50 to 50 and 10	
1 x 16 in. and smaller.....	50 to 50 and 10	
Boiler Tubes—	Per 100 Ft.	
Lap welded, 2-in.....	\$17.33	
Seamless steel, 2-in.....	20.24	
Charcoal iron, 2-in.....	25.00	
Charcoal iron, 4-in.....	67.00	

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
LXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20.....	3.60c. to 3.80c.	
No. 22.....	3.75c. to 3.95c.	
No. 24.....	3.80c. to 4.00c.	
No. 26.....	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.....	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c. to 4.35c.
No. 16.....	4.00c. to 4.20c.
No. 18.....	4.15c. to 4.35c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.35c. to 4.55c.
No. 24.....	4.50c. to 4.70c.
No. 26.....	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30.....	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Railroad will take 1000 to 3000 tons of sheet steel piling. The New York Central Railroad has issued its annual inquiry for rails, calling for 190,000 tons.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.32½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c.

Warehouse Business.—October has been a better month for business than September, and some jobbers expect it will be the best month of the year. Demand for structural material continues good. Individual orders are increasing in tonnage. Black and galvanized sheet prices are firmer than for some time. Galvanized sheet orders are numerous.

Coke.—More ovens are being lighted in the Connellsville district, but prices of the standard furnace grade are stronger, ranging from \$2.95 to \$3.05 per ton, Connellsville. Some of this firmness is reflected in the market on foundry coke, which ranges from \$3.50 to \$3.75 per net ton, Connellsville. Standard brands are unchanged at \$4.85 per net ton, ovens, or \$8.56 per net ton delivered to northern New Jersey, Jersey City and Newark and \$9.44 per ton to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Cast Iron Pipe.—Southern makers are quoting prices considerably higher than the bids of Northern foundries. On a recent opening in the New York territory, tenders are reported to have been on a basis of \$32.50 per net ton, f.o.b. Florence, N. J., and \$33 per ton, f.o.b. Burlington, N. J. Among current inquiries is one for 14,000 tons of 6 to 30-in. water pipe for Warwick, R. I. Herkimer, N. Y., is taking bids on 1300 tons of water pipe.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Sheets.—Many sheet buyers who did not cover their fourth quarter requirements in full, now confronted with a mill situation which makes early deliveries almost impossible, are placing orders for shipment at mill convenience, which generally means four to six weeks. Prices are firm on all grades. The week's purchases have disclosed little or no objection to 2.75c., Pittsburgh, on black, 3.50c. on galvanized and 2c. on blue annealed narrower than 45 in.

Reinforcing Bars.—Several fair-sized jobs have been placed in the last week at the new scale of prices, and the market seems to be quite firm. Interest is centered in the terminal warehouse for the Delaware, Lackawanna & Western Railroad at Jersey City, which will require about 3000 tons of bars, and in the water tunnel for the New York Board of Water Supply, calling for 2850 tons. Both of these jobs will likely be placed soon. The Pittsburgh mill price for 40, 50 and 60-ft. lengths is 2c. per lb., and out of Pittsburgh mill warehouse

distributers are quoting 2.25c., or 2.59c., on cars at New York. New York warehouse prices are unchanged, ranging from 2.80c. to 3.24c. per lb., all delivered at job.

Old Material.—Although no further purchases of No. 1 heavy melting steel are reported by eastern Pennsylvania mills, brokers are paying as much as \$15.75 per ton, delivered to Claymont, Del., and Coatesville, Pa., and \$15 per ton is quoted for delivery to Bethlehem, Pa. Some brokers are offering \$12.50 per ton, New York, for No. 1 heavy melting steel for shipment to western Pennsylvania. Machine shop turnings are being purchased at \$11.50 and \$11.75 per ton, delivered Phoenixville, Pa., and at \$12 per ton, delivered Conshohocken, Pa. Other grades of scrap are substantially unchanged, but the undertone of strength continues.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$12.00 to \$12.50
Heavy melting steel (yard)	8.75 to 9.50
No. 1 hvy. breakable cast.	12.75 to 13.50
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	9.25 to 10.25
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	8.00 to 8.50
Cast borings (blast furn. or steel works)	6.50 to 7.50
Mixed borings and turnings	6.75 to 7.25
Steel car axles	18.00 to 18.50
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought	11.75 to 12.25
No. 1 yard wrot., long	10.75 to 11.25
Rails for rolling	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
Stove plate (foundry)	9.50 to 10.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	\$17.00 to \$18.00
No. 1 hvy. cast (columns, bldg. materials, etc.) cupola size	15.00 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	14.50 to 15.50

British Steel Output Gains in September

LONDON, ENGLAND, Oct. 15 (*By Cable*).—Pig iron output in September was 503,900 gross tons, and production of steel ingots and castings was 718,600 tons.

A comparison of the September output with that of the eight preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly	855,000	638,600
1920—Av. monthly	669,500	755,600
1922—Av. monthly	408,500	490,100
1923—Av. monthly	620,000	706,800
1924—Av. monthly	609,900	685,100
1925—Av. monthly	519,700	616,400
1926—Av. monthly	203,500	296,700
1927—Av. monthly	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700
1928—June	563,700	709,500
1928—July	537,800	666,900
1928—August	519,000	648,300
1928—September	503,900	718,600

The September pig iron output was the smallest thus far this year, while steel production was the fourth largest.

Cleveland

Bookings of Finished Steel Fall Off But Volume is Still Good, Particularly From Automotive Industry

CLEVELAND, Oct. 16.—While bookings of finished steel continued good the past week, the volume with some mills was not as heavy as during the first week of the month. Steel bars are in very good demand, particularly from the automotive industry, and structural shapes are moving well. Plates are lagging somewhat, not being as active as a few weeks ago. Most orders are small and consumers want quick delivery. Many consumers of the heavy rolled products have made fourth quarter contracts.

No marked decrease in the demand for steel from the automotive industry is noticeable, but a falling off in orders is expected during the remainder of the month, as some of the automobile manufacturers will shut down for inventories for two or three weeks about Nov. 1. Their output, on resuming operations, doubtless will depend on the demand for motor cars at that time. The Chevrolet Motor Car Co., which is completing work on its old models, will start production on its new models next month, and its new demands for steel will at least partly offset a slowing down in orders from other automobile plants.

The automotive industry is looking ahead to 1929 and predicting that this year's record in output of cars will be broken next year.

Structural inquiry is fairly plentiful, particularly for small lots, and the smaller fabricators are said to be busier than they have been for some time. A dam over the Mississippi River at Hastings, Neb., will require 3000 tons of steel, mostly in reinforcing bars and piling.

Prices are well maintained at 1.95c., Pittsburgh, for steel bars, plates and structural material on the bulk of current business. Outside bar mills, using a Cleveland base, quote steel bars at 1.95c. to 2.05c., Cleveland, while Cleveland mills generally quote 1.90c., Cleveland.

Pig Iron.—The demand for iron in shipments on contracts continues heavy. Stock piles of some furnaces have been almost wiped out and producers are not as prompt as they were in making deliveries. Shipments by some furnaces so far this month have exceeded those during the same period in September. The automotive industry is taking iron at the recent volume, and there has been an increase in shipping orders from other consumers. The market is still fairly active. First quarter inquiry so far has been rather moderate, and, while some of the Lake furnaces have made sales of foundry and malleable iron for that delivery, furnaces located in Cleveland have not yet opened their books. One Lake furnace interest, which took some first quarter business in western

Ohio at \$18, has advanced its price 50c. a ton to \$18.50 for that territory and for Indiana shipment. For delivery in central Ohio, where there is more competition, \$18 is being quoted for the first quarter. However, the first quarter price situation will not be definitely cleared up in some sections until Cleveland and Valley furnaces open their books for that delivery. For Michigan delivery, the first quarter price is well established on several sales at \$18.50, which has been the ruling quotation for a few weeks. A Muncie, Ind., consumer which inquired for 6000 tons of malleable iron for the first quarter, has postponed buying. The Valley foundry iron market shows a firmer tone, with sizable sales at \$17.50. Cleveland interests sold 26,000 tons during the week, about one-third of which was for the first quarter. Inquiry for low phosphorus iron has become more active. While one 200-ton lot brought \$27, a 50c. a ton lower price has not disappeared.

Prices per gross ton, at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$18.50
S'th'n fdy., sil.	1.75 to 2.25	22.25
Malleable		18.50
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace		17.00
Stand. low phos., V'ley fur.	\$26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—A few small-lot sales are still being made for fill-in purposes. The dock balance at Lake Erie ports Oct. 1 was 6,100,456 tons, compared with 6,768,735 tons on the same date a year ago. Receipts at Lake Erie ports during September were 5,826,530 tons and for the season 27,341,510 tons, compared with 29,792,366 tons during the same period last year. Shipments from Lake Erie ports during September were 3,884,346 tons and for the season 19,480,038 tons, compared with 21,556,077 tons during the same period last year. Shipments to other than Lake Erie ports show a gain compared with last year. These, including shipments to interior furnaces from South Chicago, were 12,320,763 tons, against 11,304,643 tons during the same period last year.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.35c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Strip Steel.—Mills are still getting a good volume of orders against contracts for hot-rolled strip, but there is very little new business. While several producers have announced that they will adopt the new card of extras, some have not yet got out their printed cards and it will take some time for consumers to familiarize themselves with the price changes. These will not become generally effective until the first quarter, as larger consumers are covered for the remainder of the year. Cold-rolled strip is fairly active. The market is firm at 2.75c., Cleveland, for good lots, some small-lot business being taken at 2.85c.

Semi-Finished Steel.—A Cleveland mill has taken a large volume of business for the fourth quarter at \$33, Cleveland, Youngstown and Pittsburgh, for sheet bars, large billets and slabs, with a \$1 a ton higher price for under 4-in. billets. There is already talk of higher prices for the first quarter. Forging billets range from \$38 to \$39, Ohio mill. Specifications for sheet bars, billets and slabs are heavy.

Sheets.—Orders are still plentiful, apparently equal to production, so that there is no change in the delivery situation. Few mills can make shipments within four weeks, and deliveries are further extended on automobile body sheets. These and black sheets in the common finishes are in better demand than other grades. Most of the mills are holding firmly to regular prices and are meeting little price resistance. However, on attractive business a few cases of price shading of from \$1 to \$2 a ton are reported on black sheets, and a buyer of 1300 tons of blue annealed sheets was able to obtain a concession. An inquiry for 400 tons of galvanized sheets failed to reveal weakness on that grade. Cleveland stamping plants have taken orders for running boards for the new models of Chevrolet cars, which it is estimated will require 5000 tons of sheets for a three months' production. These sheets have not yet been purchased.

Reinforcing Bars.—While several fair-sized jobs are still pending, inquiry for steel for building work has fallen off. However, the demand for steel for road work is very active. Warehouse prices are better maintained than recently, holding rather closely to 2.25c., Pittsburgh.

Warehouse Business.—Sales show a gain over last month's, doubtless due partly to some slowing down in mill deliveries. Galvanized sheets are quite active. Prices are well maintained.

Coke.—By-product coke for domestic use is fairly active. This is quoted at \$4.50, Valley, for egg size, and \$5, Cleveland, for egg and \$4.85 for nut for outside shipment. The price differential between Valley and Cleveland producers equalizes the freight rate to some important consuming points. For Cleveland delivery, egg

coke is quoted at \$6, delivered. Foundry coke is quiet and unchanged at \$4, Connellsville, for good brands and \$7.75, Painesville, for Ohio by-product coke.

Old Material.—The market continues very firm and prices have advanced further on several grades. Dealers are paying \$14.25 for No. 1 heavy melting steel for delivery to one Cleveland mill and \$15 to \$15.25 for shipment to another, which requires higher grade material. For Youngstown shipment, the price dealers are paying has advanced to \$16.50 for No. 1 heavy melting steel. For compressed sheet steel, they are paying \$16 to \$16.50 for the same delivery. Machine shop turnings and blast furnace scrap have advanced 25c. a ton. On the latter, \$10.50 has become the ruling price, although sales are reported at \$10.75. Mills still appear to be well supplied with scrap, as they are getting shipments at a fair rate and they are showing no interest in new orders.

Prices per gross ton delivered consumers' yards:

Basic-Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.00 to	\$14.50
No. 2 heavy melting steel.	13.25 to	13.50
Compressed sheet steel....	13.50 to	14.00
Light bundled sheet stamp'gs	11.50 to	11.75
Drop forge flashings.....	12.25 to	12.75
Machine shop turnings....	9.25 to	9.75
No. 1 railroad wrought....	12.75 to	13.00
No. 2 railroad wrought....	14.50 to	15.00
No. 1 busheling.....	13.00 to	13.25
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops....	16.00 to	16.50
Low phos., billet, bloom and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	10.50 to	10.75
Mixed bor'gs and short turn'gs	10.50 to	10.75
No. 2 busheling.....	10.50 to	10.75
Cupola Grades		
No. 1 cast.....	16.50 to	17.00
Railroad grate bars.....	11.00 to	12.00
Stove plate.....	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable.....	16.00 to	16.50
Rails for rolling.....	16.25 to	16.50

Lower Production of Track Work

Shipments of track work for T-rail track of 60 lb. and heavier are reported for September by the American Iron and Steel Institute at 10,767 net tons. This is the lowest figure since last January. It compares with 11,040 tons in August and with 10,999 tons a year ago. For the third quarter, shipments aggregated 33,583 tons. This is, with one exception, the lowest quarter's shipments in several years. It compares with 41,368 tons in the second quarter of this year, with 37,603 tons in the third quarter of last year, and with 45,997 tons in the third quarter of 1926. Shipments in the first nine months were 110,712 tons, compared with 131,872 tons in the same period last year and 154,663 tons in 1926.

Steel Corporation's Orders Increase in September

Another increase in the unfilled orders of the United States Steel Corporation was recorded in September. The total on Sept. 30 was 3,698,368 tons, compared with 3,624,043 tons on Aug. 31—an increase of 74,325 tons. In August the increase was 53,116 tons, while in July there was a decrease of 66,082 tons. A year ago, on Sept. 30, the unfilled orders were 3,148,113 tons, or 550,255 tons less than this year. The table gives the reported figures for the last 12 months.

		1928	1927
Jan.	31.....	4,275,947	3,800,177
Feb.	28.....	4,398,189	3,597,119
Mar.	31.....	4,335,206	3,553,140
April	30.....	3,872,133	3,456,132
May	31.....	3,416,822	3,050,941
June	30.....	3,637,009	3,053,246
July	31.....	3,570,927	3,142,014
Aug.	31.....	3,624,043	3,196,037
Sept.	30.....	3,698,368	3,148,113
Oct.	31.....	.....	3,341,040
Nov.	30.....	.....	3,454,444
Dec.	31.....	.....	3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Reduction in Output of Foundry Supplies

Establishments engaged primarily in the manufacture of foundry supplies reported products valued at \$11,635,060 in 1927, a decrease of 8.6 per cent as compared with \$12,723,120 for 1925, the preceding census year, according to the Bureau of the Census, Washington. In addition, foundry supplies are made to some extent by establishments classified in other industries. The value of such products made outside of the industry proper in 1925 was \$1,080,801. The corresponding value for 1927 has not yet been ascertained.

Establishments classified in this industry are those engaged in the manufacture of foundry facings, molding sand, cement for castings, core oils and compounds, chaplets, wax, flux, "parting" composition, flasks, riddles or sieves, pipe blacking and plumbago. Facings and supplies made by foundries for their own use are not, as a rule, reported separately.

Sustained demand for cars and trucks, according to *Automotive Industries*, is continuing factory operations at a rate far in excess of the usual fourth-quarter level and only slightly lower than in the record breaking third-quarter just closed. There are as yet no signs of any extensive stocking of new cars by dealers and several factories are weeks behind in meeting dealer demand. Two important manufacturers' plans for European sales in 1929 indicate greatly increased demand for American cars.

Pacific Coast

Gas Line to Take 50,000 Tons of Pipe—Oil Tanks Call for 2000 Tons of Plates

SAN FRANCISCO, Oct. 13 (*By Air Mail*).—Developments in the Pacific Coast iron and steel markets this week include the award of five additional 134,000 bbl. tanks requiring 2000 tons of plates, by the General Petroleum Corporation, Los Angeles, to McClintic-Marshall Co., and the announcement that a new company has been organized to construct a natural gas pipe line from Ventura to San Francisco. For this project, about 50,000 tons of line pipe will be used.

Building operations on the Pacific Coast are steady. September permits for the five principal cities were as follows: Los Angeles, \$8,505,327; San Francisco, \$2,422,080; Oakland, \$1,777,005; Seattle, \$1,474,210; Portland, \$1,281,216. Permits issued in Los Angeles in September of this year were less than the total for the same month last year.

Pig Iron.—Demand for foundry pig iron has not increased appreciably during the past month. During the past 10 days about 1400 tons of Indian iron arrived on the Coast. The next large shipment is due Nov. 28. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—The only large award of reinforcing steel bars this week went to the Pacific Coast Steel Co.—575 tons for three buildings at Fort Lewis, Wash., for the United States Army. The largest pending project calls for 1800 tons for the Life Science Building at the University of California at Berkeley. New business includes 675 tons for a warehouse for Sears, Roebuck & Co. in San Francisco, 164 tons for a drainage project at Los Angeles and 129 tons for a highway extension in Orange County, Cal. Out-of-stock prices in Los Angeles and San Francisco continue weak, and 1.80c., base, is general.

Plates.—The General Petroleum Corporation, Los Angeles, has placed five additional 134,000 bbl. storage tanks with the Riter-Conley Co., through the McClintic-Marshall Co. About 2000 tons of plates will be re-

quired. The Shell Oil Co. has taken no action on its inquiry for 10 80,000 bbl. tanks, calling for 3100 tons, for its Domingues plant. Bids were opened this week on 1200 tons for a pipe line at Hood River, Ore. No new inquiries of importance have come up for figures. Prices continue to range from 2.20c. to 2.25c., c.i.f., with a strengthening tendency.

Shapes.—Structural shape awards this week exceeded 5500 tons. Those outstanding were 2500 tons for a tin plate mill for the Columbia Steel Corporation at Pittsburg, Cal., placed with McClintic-Marshall Co., 2000 tons for a power house for the Great Western Power Co., San Francisco, booked by Dyer Brothers, and 170 tons for an apartment at Baywood, Cal., obtained by the Judson-Pacific Co. Bids were opened this week on 243 tons for a bridge over the Yellowstone River at Gardiner, Mont. The Illinois Steel Bridge Co. was low bidder. Pending business exceeds

10,000 tons. Plain material continues firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—Demand for cast iron pipe has fallen off, though a fair-sized tonnage was placed this week. Los Angeles placed 844 tons of 8-in. Class 350 pipe with R. D. Wood & Co. through Jones-Lyman Co. and 422 tons of the same size with the Pacific States Cast Iron Pipe Co. A number of small street improvement projects in San Diego, Cal., calling for more than 225 tons, were placed this week with various interests. Only two important projects are now up for figures; these are 1284 tons of 24-in. Class B or riveted steel pipe for Seattle and 164 tons of 2 to 12-in. Class B pipe for Phoenix, Ariz.

Steel Pipe.—The Pacific Gas & Electric Co., the Southern California Gas Co. and the Pacific Lighting Co. have announced the formation of the Northern California Gas Co., with capital stock of \$5,000,000, to construct a pipe line of 210 miles from Ventura to San Jose, Cal., to transport natural gas to the bay districts. This project will require about 50,000 tons of 12 to 22-in. pipe. It is understood that the construction of the line will be begun in the near future.

St. Louis

Steel Orders Still Good Despite Recent Heavy Ordering—Pig Iron Firm—Scrap Again Advances

ST. LOUIS, Oct. 16.—Most melters in the St. Louis district are covered on their pig iron requirements for the remainder of the year, with the result that sales, which fell off this week, probably will continue to show recessions until makers open their books for the first quarter of next year. Some inquiry is being made for next quarter iron, but furnaces are not making prices for that shipment. The market is firm, and there is some talk of another advance of at least 50c. a ton. The melt in the district is heavy, and calls for iron are urgent. The stove interests are enjoying an unusually good shipping season, and foundries catering to agricultural lines are doing a heavy business. Mills specializing in railroad material report quiet business. The St. Louis Gas & Coke Corporation sold 3700 tons, including 500 tons to an implement maker, 300 tons each to two stove foundries, 300 tons to a specialty maker, 200 tons to an Illinois implement maker, and the remainder in lots of a carload up to 150 tons.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis..	20.16
Southern No. 2 fdy., deliv'd.....	20.67
Northern malleable, deliv'd.....	20.16
Northern basic, deliv'd.....	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—The Texas & Pacific Railway, which is in the market for 30,000 tons of rails for its 1929 requirements, and not the Missouri Pacific, as stated in these columns last week, is expected to place the business early next week. None of the railroads centering in St. Louis has indicated its requirements for next year. Steel specifications continue to reach the Granite City Steel Co. in satisfactory volume, despite the fact that during the latter part of September nearly all buyers availed themselves of third quarter contracts then existing, specifying

Warehouse Prices, f.o.b. St. Louis

Base per Lb.

Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, 3/8-in. and over.....	3.15c.
Small channels, under 3/8-in.....	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.....	3.75c.
Spring steel, 1/4-in. and thicker....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, 1/2-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100-lb. keg.....	3.40

heavily against them. The demand for all classes of sheets has resulted in a large backlog and extended deliveries. If plate inquiries now pending develop into orders, a very fair tonnage will soon be on mill books. Business with structural fabricators is light.

Old Material.—Prices for old material are higher because dealers, to fill contracts, have been forced to pay more in competition with other territories. In some cases, dealers are filling contracts at losses. Mills are still holding out against the advancing market. Most of them are fairly well supplied with stocks of old material. Heavy melting steel, heavy shoveling steel, railroad springs, No. 2 railroad wrought, No. 1 busheling, cast iron borings, rails for rolling are up 25c. a ton, while iron car axles are 50c. higher, and wrought iron bars and transoms and railroad malleable are \$1 a ton up. Railroad lists include: Louisville & Nashville, 12,500 tons; Chesapeake & Ohio, 7606 tons; Atchison, Topeka & Santa Fe, 6240

tons; Southern, 6710 tons; Pennsylvania, 2136 tons; Frisco, 1000 tons; Texas & Pacific, 595 tons; Kansas City Southern, 435 tons; Nickel Plate, 39 carloads; Pullman Co. (St. Louis), 8 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel.....	\$12.75 to	\$13.25
No. 1 locomotive tires....	12.50 to	13.00
Heavy shoveling steel.....	12.75 to	13.25
Miscel. stand.-sec. rails including frogs, sw'ches and guards, cut apart...	14.00 to	14.50
Railroad springs.....	15.25 to	15.75
Bundled sheets.....	9.50 to	10.00
No. 2 railroad wrought...	12.75 to	13.25
No. 1 busheling.....	9.25 to	9.75
Cast iron borings.....	8.50 to	9.00
Iron rails.....	13.00 to	13.50
Rails for rolling.....	15.00 to	15.50
Machine shop turnings....	9.00 to	9.50
Steel car axles.....	18.25 to	18.75
Iron car axles.....	27.00 to	27.50
Wrot. iron bars and trans.	20.25 to	20.75
No. 1 railroad wrought...	11.00 to	11.50
Steel rails, less than 3 ft..	15.50 to	16.00
Steel angle bars.....	13.50 to	14.00
Cast iron carwheels.....	13.50 to	14.00
No. 1 machinery cast....	14.50 to	15.00
Railroad malleable.....	13.50 to	14.50
No. 1 railroad cast.....	14.00 to	14.50
Stove plate.....	12.00 to	12.50
Agricult. malleable.....	11.50 to	12.00
Relay. rails, 60 lb. and under.....	20.50 to	23.50
Relay. rails, 70 lb. and over.....	26.50 to	29.00

Youngstown

Valley Mills Operating at Close to Full Capacity—Shipments Exceed Volume of New Business

YOUNGSTOWN, Oct. 16.—Not since the recovery from the 1921 depression has the steel industry in the Mahoning and Shenango Valleys enjoyed such activity as in the first half of this month. While new business, as distinct from specifications and releases on old orders, generally is lighter than in the first half of September, it is running much larger than most steel company sales managers had expected, in view of the extraordinarily heavy flow of specifying, ordering and contracting in September. It was believed that this month's business might suffer by reason of the September rush of tonnage.

With the exception of tin plate and welded standard and oil country pipe, mill schedules are filled to the end of the month at least, and in sheets and bars well into November, while ingot production remains at full physical capacity. At the Ohio works of the Carnegie Steel Co. only one or two open-hearth furnaces, of a group of 15, are idle. The Sharon Steel Hoop Co. at Lowellville has all six of its open-hearth furnaces in production. There is full operation of furnaces at both the local and Warren plants of the Republic Iron & Steel Co., and all but four of the 24 open-hearth furnaces of the Youngstown Sheet & Tube Co. are producing. Of the 26 steel works blast furnaces, 19 are active.

Plant engagement of this sort makes for optimism, but it is somewhat restrained, in that there is doubt whether the present gait can be maintained through the remainder of the

year. It is recognized that, while new business is relatively good, it is not equaling production and shipments and that inroads are being made upon the order books. There is no disposition to overlook the fact that September's rush of business was partly accountable to the higher prices named for fourth quarter business. In the desire of buyers to escape the advances, there was probably a little more ordering than actual requirements suggested. Reserve stocks of consumers have been built up to some extent.

Birmingham

Tennessee Company Takes Off Five Open-Hearth Furnaces—Steel Demand Fairly Good

BIRMINGHAM, Oct. 16.—Pig iron sales the past week have been in small to moderate lots for nearby delivery. Buying is largely by quiet negotiation, and very few good-sized open inquiries are coming into the market. The volume of iron under contract for the last quarter is larger than it was at the early part of any other quarter in the past year. Shipments the first two weeks of this month have been slightly less than the weekly average for September, yet they have been about equal to production. On Oct. 7 the Tennessee company changed its Nos. 1, 2, 3 and 4 furnaces at Ensley from basic to foundry iron. The No. 2 Bessemer furnace of this company was banked on the same date. Eighteen furnaces are now in blast, of which 15

Prices present a firm front. Makers of sheets now are uniformly quoting black at 2.75c., base, galvanized at 3.50c., base, blue annealed at 2c., base, and automobile body sheets at 4c., base. Concessions are encountered in galvanized and black sheets, but blue annealed and body sheets are firmly held by all producers. Makers believe they should get more money for body sheets because of the quality exactations of the automobile body producers. They are actually getting some net advance by insisting upon consumers taking stock that is in accordance with specifications and by refusing to accept rejections based on some of the reasons advanced by consumers. Strip makers here are considering a new single base price and a new card of extras, although it is generally realized that not much business can take the new schedule until the first quarter of 1929, as so many consumers now are under contract for this quarter.

The pig iron market shows firmness. Producers quote No. 2 foundry at \$17, furnace, basic at the same price, Bessemer at \$17.50 to \$18 and malleable at \$17.50, but only small sales are being made.

A tight situation exists here in steel works grades of scrap, as dealers sold more than they had or have since been able to buy in the face of the pronounced strength in the Pittsburgh district. The local market is regarded as \$16.50 to \$17 for heavy melting steel, \$16 to \$16.50 for compressed sheets and \$12 to \$12.50 for machine shop turnings, the three grades most commonly used here. With the Pittsburgh market fully \$1 a ton higher on the first two grades and a difference of only about 40c. between the freight on Western shipments to this market and Pittsburgh, there is the possibility of Western scrap going past Youngstown. Local mill buying would probably advance prices, but local melters have so far succeeded in avoiding purchases supplementary to those of mid-summer.

are on foundry, two on basic and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic.....	16.25

Finished Steel.—Orders for the first half of the present month were better than in the first two weeks of September. With the exception of steel rails, bookings in the past four weeks have been better than for the corresponding period in the past several seasons. The market is firm. Owing to the closing down of the Ensley rail mill of the Tennessee company on Oct. 7, its open-hearth operations have been reduced by the shutting down of five furnaces there.

Seven are active at Fairfield and the Gulf States Steel Co. is working four at Alabama City. Operations of other plants in the district are at a high rate. The fabricated structural steel market is slightly more active. Pending tonnage has been increased by the announcement that bids will be opened next month for 15 bridges in Alabama. The Virginia Bridge & Iron Co. has booked 6000 tons for the new plant of the American Enka Corporation, Asheville, N. C., about half of which will be fabricated at Birmingham and the remainder at Roanoke, Va. Reinforcing steel bookings are fair. The Connors Steel Co. has an order for 315 tons for a warehouse at New Orleans.

Cast Iron Pipe.—A light volume of small orders characterizes the market. No sizable tonnages have been placed in several weeks. Present inquiries are light. Makers continue to maintain quotations of \$36 to \$37 on 6-in. and larger sizes. Shipments are equal to current production.

Coke.—Foundry coke sales are fairly satisfactory in view of the extent to which the trade is covered by contracts. Demand for domestic coke sizes is increasing rapidly. Specifications against foundry coke contracts are active. Quotations are unchanged from the \$5 base for both spot and contract coke.

Old Material.—Demand is stronger than a week ago. Sales are holding up well. No changes have been made in prices since the slight readjustment reported last week. Firmness is noted. Dealers' stocks are the lowest in several months.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	19.00 to 20.00
Iron axles.....	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Canada

Steel Business Continues at Satisfactory Level—Large Rail Orders Expected—Scrap Active

TORONTO, ONT., Oct. 16.—New business continues at a satisfactory level. The Canadian National and Canadian Pacific railroads have announced extensive rail laying programs for next year requiring large tonnages of rails. The rail mills at Sydney, N. S., and Sault Ste. Marie, Ont., are still in operation, orders on hand being sufficient for a month, by which time it is expected that new Canadian orders will be forthcoming. Mills report good business in other departments.

Pig Iron.—Business in this market is steady, but no outstanding purchases are reported. As many buyers are covered to the end of the year, contract placing is practically at a standstill, although two or three such orders were taken for lots under 500 tons. The demand for merchant iron for prompt delivery is active; orders for one and two car lots are numerous. About 1000 tons was closed the past week for spot delivery. Shipments are large. The iron melt is higher than a year ago. Pig iron prices are firm in both Toronto and Montreal markets.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Canadian fabricators report a steady flow of new orders, which, together with orders

on their books, assure capacity operations for some time to come. Large tonnages are in prospect for bridge and building projects. The Hamilton Bridge Co. estimates production for this year for its Hamilton plant at 32,000 tons. The Sarnia Bridge Co., Sarnia, Ont., has closed a number of orders during the past few weeks, and it is expected that it will receive a portion of the steel contract for the new bridge across the St. Clair River

between Sarnia and Port Huron, Mich. Recent orders include: 500 tons of steel to the Canadian Vickers, Ltd., Maisonneuve, Que., for an office building at Craig and Cote Streets, Montreal; 400 tons to the Canadian Bridge Co., Walkerville, Ont., for Canadian Pacific bridge on Sandwich Street, Windsor; 200 tons to the Hamilton Bridge Co. for factory for National Hosiery Co. and 100 tons for N. Slater factory at Hamilton, Ont.; 100 tons reinforcing bars to Steel Co. of Canada, Ltd., for National Hosiery Mills, Hamilton; 200 tons structural steel to Dominion Bridge Co., Ottawa, for hotel at Brockville, Ont.

Old Material.—A strong spot demand continues. Movement of scrap on contracts is large. Heavy melting steel and machinery cast were the most active grades during the week, large orders coming from Toronto and Hamilton consumers. Toronto dealers offer \$9.50 per gross ton for heavy melting steel, but despite this higher price the supply is not greatly in excess of demand; machinery cast is being purchased by local dealers at \$15 per net ton. Montreal dealers now report a strong demand for scrap, with improvement in export business.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast.....	16.00	16.00
Stove plate.....	13.00	13.00
Standard carwheels.....	16.00	16.00
Malleable	13.00	13.00
	Per Net Ton	
	Toronto	Montreal
No. 1 machinery cast.....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

Buffalo

Steel Plants Continue High-Rate Operations—Scrap Market More Active and Prices Advance

BUFFALO, Oct. 16.—Pig iron inquiry has been very light, but the prices recently established are holding. While some talk of higher prices is heard, producers realize that current quotations must be tested on tonnage before there is a further increase. This week's inquiries include one for 100 tons of malleable and one for 200 tons of high manganese iron from this district and two 500-ton inquiries for foundry iron from down State melters. Full differentials are being obtained on foundry iron in carload lots. Consumers are showing little interest in first quarter iron. Eleven furnaces are in blast. The Tonawanda Iron Corporation stack is scheduled to resume about the middle of November. Shipments of pig iron on the New York State barge canal

for the week ended last Saturday were about 900 tons. Total canal shipments for the season are about 70,000 to 75,000 tons.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00 to \$18.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50 to 19.50
Malleable, sil. up to 2.25.....	17.50 to 18.50
Basic	17.00 to 17.50
Lake Superior charcoal...	27.28

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

Finished Iron and Steel.—District mills are operating at a high rate. The Lackawanna plant of the Bethlehem Steel Corporation has 22 open-hearths active and most of its finishing mills are on double turn; the Donner Steel Co. has eight open-hearths in operation, and the Seneca Iron & Steel Co. is operating at about 92 per cent on sheets. Bars and shapes are in good demand. Prices on these products are 2.05c. to 2.10c., Buffalo. Sheet prices are well stabilized at 2.75c. for black and 4c. for automobile body grade. The galvanized price is steady at 3.55c. Sheet prices are sentimentally stronger than a week ago. Sheet deliveries are being extended. The R. S. McMannus Steel Construction Co. will fabricate 500 tons of structural for a new State normal school at Newark, N. Y.

Old Material.—The market is more active. Some scattered sales of heavy melting steel, strictly No. 1 grade, at \$16.50, are reported. Opinion is that if a mill entered the market for a tonnage of this material, it would have to pay \$16.50 to \$17. There is a scarcity of scrap here owing to heavier shipments to the Pittsburgh and Youngstown districts. A good deal of machine shop turnings and hydraulic compressed sheets is going into Pittsburgh and Youngstown. A few small lots of stove plate have been sold at

\$15 and some No. 1 machinery cast at \$16 to \$16.50. A number of short sales of stove plate are reported, dealers paying \$14.75 to cover. Scrap rails are a little stronger at \$15 to \$15.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$15.50 to \$16.50
No. 2 heavy melting steel.	14.00
Scrap rails	14.50 to 15.00
Hydraulic comp. sheets	14.00
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	13.50 to 14.00
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	13.50 to 14.00
Hvy. steel axle turnings	13.00 to 13.50
Acid Open-Hearth Grades	
Knuckles and couplers	16.50 to 17.00
Coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phos. billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Short shov. steel turnings	11.50 to 12.00
Blast Furnace Grades	
Short shov. steel turnings	11.50 to 12.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	10.00 to 10.50
No. 2 busheling	11.00 to 11.50
Rolling Mill Grades	
Steel car axles	18.25 to 18.75
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 16.50
Stove plate	14.00 to 15.00
Locomotive grate bars	12.25 to 12.75
Steel rails, 3 ft. and under	17.00 to 17.50
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

of 6-in. pipe, bids on which will be opened Oct. 17. Private business continues in excellent volume. There is a firmer price situation.

Coke.—With the additional coke produced by a battery of ovens started up first of last week, producers in this territory have been able to catch up with the demand. Calls for coke, however, continue in good volume. There has been no falling off in demand from foundries, indicating a fairly good improvement in melt by New England foundries, which have prospects of another month, at least, of excellent business.

Old Material.—Heavy melting steel was in brisk demand through the past week. Sellers continue to hold back materials to some extent, evidently expecting still higher prices. Stocks are low. Shipments of pipe have been larger than in some time. No. 1 steel was firmer at \$11.25 to \$11.75, while No. 2 steel was sold at \$9.75 to \$10.25. Most of the tonnage leaving here went to Pittsburgh.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$11.25 to \$11.75
Scrap T rails	10.00 to 10.50
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.00 to 8.50
Machine shop turnings	6.25 to 6.75
Cast iron borings (steel works and rolling mill)	6.50 to 7.00
Bundled skeleton, long	8.50 to 9.00
Forge flashings	9.00 to 9.50
Blast furnace borings and turnings	6.25 to 6.75
Forge scrap	6.50 to 7.00
Shafting	14.50 to 15.00
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling	10.50 to 11.00
Cast iron borings, chemical	9.50 to 10.00
<i>Prices per gross ton deliv'd consumers' yards:</i>	
Textile cast	\$14.00 to \$14.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	13.50 to 14.00
Stove plate	10.50 to 12.50
Railroad malleable	15.00 to 15.50

Boston

Scrap Market Continues Strong—Coke Demand Indicates Improvement in Melt—Pig Iron Firm

BOSTON, Oct. 16.—About 3000 tons of pig iron was disposed of in the New England market the past week, prices showing firmness on all transactions. The Mystic Iron Works sold about half of the total, while the remainder went to Buffalo furnaces. Several small tonnages of Indian iron also were sold. Prospects are brighter, based on the fact that machine shops are showing general activity and the stove makers are now in the midst of their heaviest producing season. New England foundries are increasing their melt.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	\$21.91
*Buffalo, sil. 2.25 to 2.75	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25	20.78
†Buffalo, sil. 2.25 to 2.75	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25	25.71
Va., sil. 2.25 to 2.75	26.21
Ala., sil. 1.75 to 2.25	23.16 to 25.02
Ala., sil. 2.25 to 2.75	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.
*All rail rate. †Rail and water rate.

Cast Iron Pipe.—What promises to be the largest pipe contract awarded by a New England municipality in years is the proposed installation of a new water system at Warwick, R. I.

The project will call for 14,000 tons of 6 to 30-in. pipe. Bids will be opened on Oct. 19. The only other municipal inquiry in the district is for 100 tons

Warehouse Prices, f.o.b. Boston

Base per Lb.	
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot-pressed nuts	.50 and 5
Cold-punched nuts	.50 and 5
Stove bolts	.70 and 10

*Including quantity differentials.

Steel Scrap Up \$1 a Ton at Detroit

DETROIT, Oct. 16.—Further advances have been registered in the Detroit scrap market during the past two weeks, heavy melting steel showing an advance of \$1 per ton and blast furnace material is up 50c. per ton. Several large sales have been negotiated recently.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	10.00 to 10.50
Sheet clippings	8.00 to 8.50
Flashings	10.50 to 11.00

The Mary furnace, Sharon Steel Hoop Co., Lowellville, Ohio, is being equipped with a Steinbart washer.

Cincinnati

Steel Orders Satisfactory Though at Less Than September Rate—8000 Tons of Pig Iron Sold

CINCINNATI, Oct. 16.—Pig iron purchases the past week totaled approximately 8000 tons, most of which was for fourth quarter delivery. The largest individual order was for 2000 tons of foundry iron. An Evansville, Ind., melter took 500 tons of Northern and a like amount of Southern iron. Two Michigan users of Jackson County silvery iron each took 300 tons. Sales of iron on open inquiries have been small, recent major tonnages having been placed by means of private negotiation. Pending business is light. The price situation is favorable to producers, who are holding firmly to current schedules. The volume of unfilled orders at district furnaces makes unlikely any deviation from present quotations in the near future. Conditions at Ironton have not changed. One furnace interest there has no iron to offer and the other merchant producer has only small lots of various grades.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$18.89 to \$19.89
So. Ohio malleable	20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.94
Ala. fdy., sil. 2.25 to 2.75	20.44
Tenn. fdy., sil. 1.75 to 2.25	19.94
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—Demand for by-product foundry coke has been fairly well sustained, although a prominent maker reports a slackening volume of specifications and orders. Shipments this month, however, will at least parallel those of September, and, in the case of several producers, will exceed last month's good record. Prices are showing strength. Indications are that by-product foundry coke will remain at \$7 per net ton, f.o.b. ovens, or \$9.14 delivered Cincinnati, during November, while domestic grades probably will be advanced 50c. a ton Nov. 1. A local dealer will supply 15,000 tons of beehive foundry coke to a district consumer during the next 12 months. A Chicago company is negotiating for

12,000 tons of furnace coke for its Nashville, Tenn., plant.

Finished Material.—Although bookings have not attained the level reached in September, district sheet mills are well satisfied with the volume of orders and specifications in the first half of October. Incoming business fell slightly short of production, but the accumulation of unfilled tonnage from the previous month insures the maintenance of operations at full capacity until at least Nov. 1. The well-rounded demand from all consuming lines has been especially gratifying to producers. Several of the largest automobile makers in the Detroit district have yet to place their requirements for new models, and, though sales to the public may fall off considerably, the necessity of manufacturing a substantial supply of cars for dealers assures the purchase of considerable automobile body sheet stock in the next 30 days. Prices are firm at 2.75c. to 2.85c., base Pittsburgh, for black, 2c. for blue annealed, 3.60c. to 3.70c. for galvanized and 4c. for automobile body sheets. Orders for cold-rolled strip steel have been of fair proportions. An important maker has today announced that its minimum price, effective immediately, is 2.85c., base Pittsburgh or Cleve-

land. Specifications of bars, shapes and plates have fallen off somewhat, but mills are having difficulty in making prompt deliveries. The wire goods market is quiet. Common wire nails are bringing \$2.69 per keg, delivered in Cincinnati.

Old Material.—The scrap market remains turbulent, and dealers are making every effort to acquire certain grades of material of which there is a shortage. Railroads received high prices for many of the items offered last week and a fair amount of this tonnage was bought by local dealers. District steel plants apparently are not buying for forward delivery, but nevertheless are accepting shipments on current contracts at a normal rate. That they will make purchases in the near future is the opinion in this market. Meanwhile, the entire schedule is strong at the prices quoted below.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	\$13.50 to \$14.00
Scrap rails for melting	 13.50 to 14.00
Loose sheet clippings	 9.50 to 10.00
Bundled sheets	 10.25 to 10.75
Cast iron borings	 9.25 to 9.75
Machine shop turnings	 8.75 to 9.25
No. 1 busheling	 10.75 to 11.25
No. 2 busheling	 6.50 to 7.00
Rails for rolling	 13.75 to 14.25
No. 1 locomotive tires	 13.50 to 14.00
No. 2 railroad wrought	 13.50 to 14.00
Short rails	 18.25 to 18.75
Cast iron carwheels	 12.50 to 13.00
No. 1 machinery cast	 17.50 to 18.00
No. 1 railroad cast	 14.25 to 14.75
Burnt cast	 10.50 to 11.00
Stove plate	 10.50 to 11.00
Brake shoes	 10.25 to 10.75
Railroad malleable	 13.50 to 14.00
Agricultural malleable	 12.50 to 13.00

Black & Decker Buys Motor Works

Black & Decker Co., Towson, Md., has purchased the plant of the Domestic Electric Co., Cleveland manufacturer of fractional horse power motors. The plant of the Van Dorn Electric Tool Co., Cleveland, was purchased a few months ago by the Black & Decker Co. and with the acquisition of the Domestic plant it was stated that the Maryland company becomes a self-contained unit, making all parts used in the manufacture of electric drills, hammers and other tools in its line of products. Carl A. Duffner, president Domestic Electric Co. since its organization 15 years ago, will remain as the head of that company as will also Alfred N. Kellogg, treasurer, and Milton H. Spielman, vice-president.

Timken Acquires Wooster Tube Plant

The Timken Steel & Tube Co., subsidiary of the Timken Roller Bearing Co., Canton, Ohio, has purchased for \$200,000 from John C. Schultz, receiver, the Weldless Tube Co., Wooster, Ohio. This plant was built in 1922 and is equipped with a piercing mill, an automatic rolling mill and 10 stands of reducing rolls, together with heating, swaging and annealing fur-

naces and a pickling and treating department for boiler tubes. It has a rated annual capacity of 18,000 tons and the product includes locomotive and marine boiler tubes and cold-drawn seamless tubing in sizes from ½ in. to 3¼ in. in diameter. With the plant the purchaser secures 100 acres of land. The Canton company expects to place the Wooster plant in operation shortly.

Open Meeting to Consider Steel Making Problems

A discussion of important problems in steel making has been organized for Friday, Oct. 19, by the metallurgical advisory board to Carnegie Institute of Technology and United States Bureau of Mines. As has been noted frequently in the past, these organizations are conducting an extended research into the fundamentals of steel making. Meetings held on Oct. 19 will be open to all interested listeners, and will be held in the auditorium, Bureau of Mines Station, Pittsburgh. In addition to the problems of slag formation and reaction with steel, other items for consideration will include case carburizing, X-ray investigations, and iron-manganese alloys. After an informal dinner at Pittsburgh Athletic Association, Dr. W. H. Hatfield, director of research, Brown-Firth Research Laboratories, Sheffield, England, will speak.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforce. bars	3.15c.
Rail steel reinforce. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.95
Cement c'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Non-Ferrous Metal Markets

Copper Inactive But Firm, Tin Sales Moderate, Lead and Zinc Quiet and Unchanged

Copper.—Columbus Day, Oct. 12, was a generally observed holiday in this and other non-ferrous markets, and, followed by a Saturday, activity slowed down. Buying by domestic consumers is spasmodic and, where large tonnages are involved, December is the usual delivery period. A few consumers still need a little October and November metal which they seem able to obtain. Foreign sales have been larger than domestic, with November-December generally involved,

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY					
	Oct. 16	Oct. 15	Oct. 13	Oct. 11	Oct. 10
Lake copper, New York.....	15.25	15.25	15.25	15.25	15.25
Electrolytic copper, N. Y.*.....	15.00	15.00	15.00	15.00	15.00
Straits tin, spot, N. Y.	48.50	48.50	48.25	48.25	48.62½
Lead, New York.....	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32½	6.32½	6.32½	6.32½	6.32½
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

though some October metal is still being bought. September statistics were quite favorable to sellers with a loss in stocks of about 3000 tons of copper in the refined and blister condition and with shipments to domestic consumers about 88,700 tons, the largest on record. Foreign shipments were about 51,300 tons, making the month's total about 140,000 tons, compared with 143,600 tons in August. Stocks of refined copper on Oct. 1 were about 51,000 tons, the lowest in many years. Prices are unchanged, with electrolytic copper selling at 15.25c., delivered in the Connecticut Valley, and with the foreign quotation at 15.50c., c.i.f., usual European ports. Lake copper is moderately active and

stocks are very low, with quotations unchanged at 15.25c. to 15.50c., delivered.

Tin.—Sales for the week ended Saturday, Oct. 13, were about 650 tons, with the market very dull. Consumers are largely absent from the market, indicating that they have ample supplies. On Monday, only about 100 tons changed hands and on Tuesday also the market was dull. Spot Straits tin on Tuesday was quoted at 48.50c., New York. Sales in London Tuesday of only 10 tons of spot and 90 tons of futures are said to have been the smallest on record. Quotations were as follows: Spot standard, £220; future standard, £218, and spot Straits, £220 10s. Arrivals

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.50c. to 51.50c.
Tin, bars.....	52.50c. to 53.50c.
Copper, Lake.....	16.25c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.25c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.50c.
Tin, bar.....	55.50c.
Copper, Lake.....	16.00c.
Copper, electrolytic.....	16.00c.
Copper, casting.....	15.75c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar.....	9.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	58.00c.
Solder, ½ and ½.....	32.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.50c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	24.62½c.
Copper.....	25.50c.
Brazed Brass Tubes.....	27.75c.
Brass Rods.....	17.50c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged, and zinc sheets and lead full sheets are quoted at 9.75c. per lb., base, and 10c. to 10.25c., respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	19.75c.
Copper, hot rolled.....	24.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.
Seamless Tubes—	
High brass.....	24.62½c.
Copper.....	25.50c.

Rods—	
High brass.....	17.50c.
Naval brass.....	20.25c.

Wire—	
Copper.....	17.25c.
High brass.....	20.25c.
Copper in Rolls.....	23.00c.
Brazed Brass Tubing.....	27.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	
.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.00c.	14.50c.
Copper, hvy. and wire.....	12.50c.	13.50c.
Copper, light and bot-toms.....	11.25c.	12.25c.
Brass, heavy.....	7.25c.	8.25c.
Brass, light.....	6.25c.	7.25c.
Hvy. machine composition.....	10.00c.	11.25c.
No. 1 yel. brass turn-ings.....	9.25c.	9.75c.
No. 1 red brass or compos. turnings....	9.25c.	10.25c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.625c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....	19.75c.	
Copper, hot rolled.....	24.00c.	
Copper, cold rolled, 14 oz. and heavier.....	26.25c.	
Zinc.....	10.00c.	
Lead, wide.....	9.75c.	
Seamless Tubes—		
Brass.....	26.12½c.	
Copper.....	27.00c.	
Brass Rods.....	17.50c.	
Brazed Brass Tubes.....	27.75c.	

thus far this month have been 1990 tons, with 8635 tons reported afloat.

Lead.—Only moderate activity is reported, consumers purchasing October-November metal. The leading interest continues to quote 6.50c., New York, as its contract price, and the prevailing quotation in the West is 6.32½c., with a little metal available from one or two sources at 6.30c., St. Louis.

Zinc. — Statistics for September showed an increase in stocks of refined metal of about 3000 tons, but this is offset by a large decrease in the number of refiners operating on Oct. 1. Quotations for prime Western are firm and unchanged at 6.25c., East St. Louis, or 6.60c., New York. Demands from consumers, however, are not heavy, although buying by galvanizers may develop in the near future. It is believed by some that their stocks are low.

Antimony.—The market is a little easier with Chinese metal for spot delivery available at 11c. to 11.25c.,

New York, duty paid, with futures holding at 10.75c.

Nickel.—Quotations are unchanged at 35c. per lb. for ingot, 36c. for shot and 37c. for electrolytic nickel in wholesale lots.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 16.—Sales are more active but the bulk of business is for early delivery. Prices are steady except in tin and antimony. The old metal market is moderately active.

Prices, per lb., in carload lots: Lake copper, 15.50c.; tin, 49.75c.; lead, 6.40c.; zinc, 6.35c. in less-than-carload lots; antimony, 12.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Chicago Hotel Takes 1000 Tons of Bars

AWARDS of about 5200 tons of bars included 1000 tons for a Chicago hotel and 500 tons for subway construction in New York. Among inquiries totaling 3600 tons are 1200 tons for a building in Chicago for the Western Electric Co. and 500 tons for the Powhatan Hotel, Chicago. Awards follow:

NEW YORK, 500 tons, subway work; 300 tons from Carroll Co., general contractor, and 200 tons from Clementi Contracting Co., to Concrete Steel Co.

NEW YORK, 160 tons, building on Broad Street for Lee, Higginson & Co., to Carroll-McCreary Co., Inc.

NEW YORK, 120 tons, miscellaneous work in Mott Haven yards of New York, New Haven & Hartford Railroad, to Concrete Steel Co.

BROOKLYN, 110 tons, building for St. John's Law School, to Carroll-McCreary Co., Inc.

BROOKLYN, 100 tons, public school No. 96, to Tidewater Structural Materials Corporation.

HASTINGS-ON-HUDSON, 130 tons, factory building for American Brass Co., to Fireproof Products Co.

NEW CITY, N. Y., 100 tons, Rockland County Court House, to Fireproof Products Co.

HORNELL, N. Y., 100 tons, sewage treatment work, to a Buffalo maker.

NEWARK, N. J., 130 tons, Essex County Girls' Vocational School, to Tidewater Structural Materials Corporation.

HENDERSONVILLE, N. C., 150 tons, hotel, to Connors Steel Co.

LOUISVILLE, KY., 350 tons, recreation building, to Laclede Steel Co.

NEW ORLEANS, 315 tons, Atlantic & Pacific Tea Co. warehouse, to Connors Steel Co.

COLUMBUS, OHIO, 500 tons, grade crossing for Norfolk & Western Railroad, to Truscon Steel Co.

CHICAGO, 100 tons of rail steel bars, garage at Lamon and Madison Streets, to Calumet Steel Co.

CHICAGO, 1000 tons, hotel on Walton Place, to an unnamed bidder.

CHICAGO, 300 tons, building for Patterson Estate, to Jones & Laughlin Steel Corporation.

CHICAGO, 500 tons, warehouse for John Sexton & Co., to American System of Reinforcing.

CHICAGO, 100 tons of rail steel bars, apartment building at Sixty-seventh and Jeffery Streets, to Olney J. Dean & Co.

CHICAGO, 200 tons of rail steel bars, hotel at 617 West Madison Street, to Olney J. Dean & Co.

SPRINGFIELD, ILL., 300 tons of rail steel bars, State highway work, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 185 tons, Evander Childs High School; John T. Brady & Co., general contractors.

NEW YORK, 110 tons, warehouse on East Thirty-sixth Street for New York Steam Corporation; Turner Construction Co., general contractor.

NEW YORK, tonnage being estimated, laboratory on Bank Street for Bell Telephone Laboratories, Inc.; Turner Construction Co., general contractor.

BROOKLYN, 400 tons, building for Brooklyn Ash Removal Co., Inc.; United Fireproofing Co., general contractor.

JERSEY CITY, 3000 tons, terminal warehouse for Delaware, Lackawanna & Western Railroad Co.; reported last week as requiring 2000 tons.

CLEVELAND, 100 tons, Cleveland Union Terminals Co.

CHICAGO, 500 tons, Powhatan Hotel.

CHICAGO, 1200 tons, building for Western Electric Co.

CHICAGO, 900 tons, six public schools.

OAKLAND, CAL., 248 tons, south spillway for East Bay Municipal Utility District; general contract to Ward Engineering Co.

OAKLAND, 100 tons, Pardee Reservoir, East Bay Municipal Utility District;

general contract to Ward Engineering Co.

SAN FRANCISCO, 675 tons, Sears-Roebuck Co. warehouse; bids being taken.

BERKELEY, CAL., 1800 tons, science building for University of California; general contract to Dinwiddie Construction Co.

SANTA CRUZ, CAL., 225 tons, hotel; general contract to Carl Swenson.

SACRAMENTO, CAL., 129 tons, highway work in Orange County; bids Oct. 30.

Railroad Equipment

Great Northern Orders 500 Steel Underframes

Orders for 500 steel underframes, for the Great Northern, and 25 dining cars, for the Southern Pacific, are the more important items of a quiet week in railroad equipment. Details follow:

Great Northern has ordered 500 steel underframes from Pressed Steel Car Co. and will build steel box car bodies in its own shops. This road has also made formal inquiry for 1000 ore cars and will soon ask for bids on 500 general service gondola cars. Preliminary announcement of these inquiries was made in THE IRON AGE of Aug. 9.

Canadian National is inquiring for 300 flat cars. This is in addition to its inquiry for 1500 box and 30 tank cars reported recently. This road is also expected to come into market for five buffet parlor, five mail and express and 10 sleeping cars in addition to 25 coaches, 15 sleeping and two combination baggage and smoking cars now under negotiation.

Maine Central has ordered four box cars from Standard Steel Car Co.

Youngstown Sheet & Tube Co. has ordered 200 mine cars from Enterprise Wheel & Car Corporation.

Southern Pacific has ordered 25 dining cars from Pullman Car & Mfg. Corporation.

Texas & Pacific will take preliminary figures on 75 caboose car underframes.

Chicago & North Western is in the market for 100 caboose car underframes.

Production of bituminous coal in the week ended Oct. 6 is reported by the United States Bureau of Mines at 11,028,000 net tons. This is about the same output as in the preceding week, which was the highest in several months. It brings production for the calendar year to 364,002,000 tons, compared with 403,157,000 tons in the corresponding portion of 1927 and 414,634,000 tons in 1926.

Orders received by the General Electric Co., for the three months ended Sept. 30, amounted to \$90,328,666, compared with \$77,420,263, for the corresponding quarter of 1927, an increase of 17 per cent. For the nine months ended Sep. 30, orders received amounted to \$260,686,463, compared with \$233,076,091, for the first nine months of last year.

PERSONAL

ALEXANDER E. WALKER, new general manager of sales for the Republic Iron & Steel Co., Youngstown, was graduated from the engineering department, University of Michigan, in 1910. He joined the Riter-Conley Co. just after completion of his college course and for almost a year was en-



A. E. WALKER

gaged in fabricated steel erection work. In 1911 he left that company to go with the La Belle Iron Works, Steubenville, Ohio, and after a brief connection with the general sales department of that company, was transferred to the Chicago district sales office. On Feb. 1, 1916, he joined the Republic company, as assistant manager of pipe sales and in 1919 was made assistant general manager of sales in charge of pipe and sheets. When the Republic sales department personnel was recast following the absorption of Trumbull Steel Co. early this year, he was made assistant general manager of sales with supervision over all products of the company.

GEORGE B. WHITWELL is president and treasurer, FRANK GOULD, vice-president and director of sales, and JOHN H. WHITWELL, secretary, of the McCaffrey File Corporation, which has been formed to take over the business and assets of the McCaffrey File Co., Fifth and Berks Streets, Philadelphia. Mr. Gould was associated for 30 years with Henry Disston & Sons, Inc., Philadelphia, and for five years with George H. Bishop & Co., Columbus, Ohio.

DR. ROBERT J. ANDERSON, vice-president Fairmont Mfg. Co., Fairmont, W. Va., arrived in New York Oct. 5, after an extended trip through Europe. He visited a number of the principal aluminum plants abroad and made a study of the foreign aluminum situation.

JOHN W. McMAHON has been appointed superintendent of the cold strip department at the Warren, Ohio, works, Republic Iron & Steel Co., succeeding H. A. FISHER, who resigned recently. Before going to Warren, Mr. McMahon was associated for 25 years with the Superior Steel Corporation, Carnegie, Pa., having served for 10 years as superintendent of the cold rolling department.

C. R. ELLICOTT, formerly superintendent Lehigh mills and furnaces, Bethlehem, Pa., plant, Bethlehem Steel Co., has been appointed assistant general manager of the Bethlehem company's Cambria plant, Johnstown, Pa. He succeeds F. A. SCAMMELL, who has resigned.

MAXIMILIAN N. BODENBACH, formerly chief engineer Electro-Mechanical Engineering Co., Milwaukee, has established offices at 502 Commerce Building, Milwaukee, for the practice of engineering advisory to manufacturers, inventors and architects on electrical problems.

A. C. DENISON has been elected president of the Fulton Foundry & Machine Co., Cleveland, succeeding A. E. GIBSON, who has resigned to become works manager of the Wellman-Seaver-Morgan Co., Cleveland. Mr. Denison was formerly connected with the Fulton foundry but for the past six years has been manager of the Euclid Foundry Co., Euclid, Ohio.

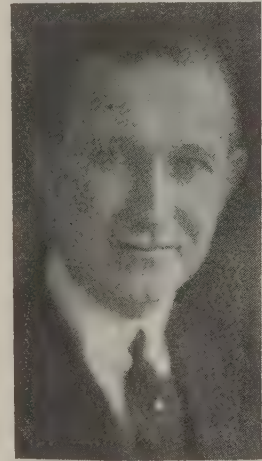
JOSEPH W. IVY, for 15 years manager of the Kansas City office of the American Cast Iron Pipe Co., Birmingham, has resigned to become Western sales manager for the National Cast Iron Pipe Co., with headquarters in the Land Bank Building, Kansas City. Control of the National company was recently obtained by James B. Clow & Sons, Chicago.

CHARLES RAMSDEN has been appointed general manager of the Pacific Coast Engineering Co., Oakland, Cal. He was chief engineer of the Western Pipe & Steel Co. from 1909 to 1919, when he resigned to become president of the Steel Tank & Pipe Co., Berkeley, Cal.

GEORGE KELMAN has joined the engineering and sales organization of the Welded Products Co., Birmingham. He has had 12 years' experience in steel tank and plate work, having been previously connected with the Petroleum Iron Works, Sharon, Pa.; the International Petroleum Co., Tampico, Mexico; the Gulf Refining Co., Port Arthur, Tex., and the Birmingham Tank Co., Birmingham.

HUGH MORROW, president Sloss-Sheffield Steel & Iron Co., Birmingham, has been made a director of the Central of Georgia Railway Co.

WILBUR B. TOPPING, whose resignation as general manager of sales Republic Iron & Steel Co., Youngstown, was mentioned in THE IRON AGE last week, has been appointed general manager of Western sales for the Bethlehem Steel Co., with headquarters at Pittsburgh. He has been active in the steel industry for 21 years. He attended Lehigh University for two years and then transferred to the University of Pennsylvania, from which he was graduated in 1907. He then went into the operating department of the Tennessee Coal, Iron & Railroad Co., Birmingham, serving for two years in various capacities, in which he acquired a thorough knowledge of the manufacture of iron and steel. He was transferred in 1909 to the Pioneer furnaces of the



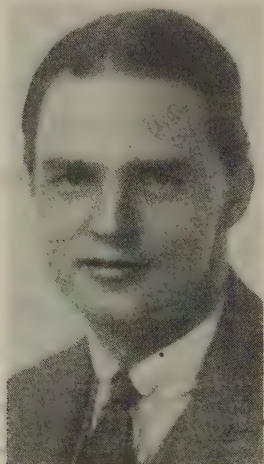
W. B. TOPPING

Republic company at Thomas, Ala., and a little later to the Youngstown mills. In 1911, he went into the sales department of the company in the general offices, then located in Pittsburgh, and in 1912 was sent to the company's New York sales offices. That year he opened and was first manager of the Philadelphia district sales office, holding this position until 1914, when he was appointed Cleveland district sales manager, with the offices at Detroit and Buffalo under his jurisdiction. Later that year he was promoted to assistant general manager of sales, with headquarters in Youngstown and in 1919 was advanced to the position he recently relinquished.

EUGENE J. MANN, formerly with the Independent Foundry Co., Portland, Ore., has purchased the Vancouver Iron & Steel Co., Vancouver, Canada, of which concern he is now president and treasurer. He is secretary of the board of the Oregon Manufacturers' Association, and was formerly president of the United Metal Trades.

CALVIN R. MCGAHEY has been appointed to the sales engineering force of the Hill Clutch Machine & Foundry Co., Cleveland. He has specialized in the handling of power transmission equipment in the Southern section of the country, which territory he will cover for the Hill company, the territory comprising Virginia, Tennessee, North and South Carolina, Georgia, Alabama, Florida, Mississippi and Louisiana.

CHARLES WARDLOW, head of S. & C. Wardlow, Sheffield, England, otherwise known as the Portobello Steel Works, makers of crucible steel



CHARLES WARDLOW

and rustless iron, particularly sheets for cutlery and saws and steel for files, made a hurried visit to the United States, chiefly to visit the exposition at Philadelphia last week of the American Society for Steel Treating. He reports expanding sales, including business with the United States and on the Continent, and a

Swelling of Coal During Rapid Coking

It is common knowledge that the semi-bituminous coals give trouble from sticking of the coke in the retort or even after carbonizing. This is probably because the cokes do not shrink appreciably during the latter stages of carbonization, as do those from coals higher in volatile matter. Abnormal swelling during coke formation would cause sticking, but this is not observed with semi-bituminous coals when coked at normal rates.

Experiments at the United States Bureau of Mines' Pittsburgh experiment station have shown, however, that even semi-bituminous coals can be made to swell when coked at extremely rapid rates, as in the crucible coking test. If the temperature is raised to 900 deg. C. in 1 min. a strongly swollen button will result, whereas with the higher volatile coals swelling is not so pronounced. Re-

generally improved outlook with no labor troubles in England in prospect. He sailed for England on Oct. 13 after being barely a week in America. He was accompanied at Philadelphia by Sears and King Hoyt and V. A. Greene, all of the Edgar Allen Steel Co. and A. Milne & Co., New York, who represent the Wardlow company in the United States.

L. P. ROSS, who has been at the Newcastle, New South Wales, plant of the Broken Hill Proprietary Co., Ltd., as consulting engineer for nearly two years, returned to New York this week. His work at Newcastle was chiefly the modernizing of the Broken Hill Company's blast furnaces. For several years previous to 1926 Mr. Ross was vice-president in charge of operations of the Replogle Steel Co. at Wharton, N. J.

R. J. WORKING has been appointed district sales manager for the Cincinnati district, with headquarters at 1320 Union Trust Building, that city, for the Central Alloy Steel Corporation. For some years he has been associated with the corporation's sales department at the general offices at Massillon, Ohio. He succeeds J. O. DEARTH, who has resigned.

ARTHUR G. EATON, recently elected vice-president and director of sales of the Aluminum Industries, Inc., Cincinnati, is in charge of general sales offices opened by the corporation in the Fisher Building, Detroit. For 15 years Mr. Eaton was connected with Dodge Brothers, Inc., the last four as director of the purchasing department. Heretofore Aluminum Industries has been represented in Detroit by B. J. PLUMLEY, engineer, serving in a technical capacity. Mr. Plumley will be associated with Mr. Eaton.

sults of the crucible test should not be taken as indicative of the ease with which coke made from it can be pushed out of the oven, since, although they do show abnormal swelling with coals which stick in the retort, the sticking is due rather to failure to shrink than to swelling during coke formation.

Rubber Binders Developed for Foundry Cores

A foundry core sand binder, using rubber as its basis, has been developed by the United States Bureau of Standards, Washington.

The outstanding advantages of the binder, according to the *Technical News Bulletin* of the Bureau, are:

The cores crush readily, falling to loose sand of their own accord, so that the core sand may be poured from the casting instead of having to be dug out.

The cores have greater strength

than green sand cores and extend the range of jobs to which a readily crushed core may be applied.

The cores are not oven baked; they are merely air-dried.

The cores are of high permeability and show remarkable freedom from blowing.

The rubber core binder consists, essentially, of a solution of unvulcanized rubber in gasoline. The amount and type of rubber binder used in making cores depend upon the type of core sand, the size of the core and the metal to be cast around it. A core strength equivalent to that of green sand cores or baked oil sand cores can be attained by the use of the rubber binders. The new binders have proved to be successful in producing sand cores for castings of lead, tin, zinc, brass, phos-bronze, bronze, aluminum, iron and steel.

The rubber types of binders are discussed in considerable detail in Letter Circular No. 252, "Rubber Binders for Foundry Cores," which is now ready for distribution.

New Otis Steel Furnace

The Otis Steel Co., Cleveland, shortly will begin the erection of another open-hearth furnace, the third to be built this year. With the completion of this furnace the company will have a fully rounded out steel plant with eight open-hearth furnaces at its Riverside plant, which together with five furnaces at its Lakeside plant will give it an annual capacity of 840,000 tons of steel ingots or sufficient to supply all the semi-finished steel required for its finishing mills.

Obituary

SILAS M. HAIGHT, for several months research engineer Sweet's Steel Co., Williamsport, Pa., was killed Sept. 30 in an automobile accident near Liverpool, Pa. He was a graduate of Lafayette College, Easton, Pa., and before going with the Sweet's company, had been associated with the Highway Products Mfg. Co., Elmira, N. Y.

EDWARD H. SWINDELL, treasurer of William Swindell & Brothers, Pittsburgh, builders of steel works and glass plant furnaces, died at his home in that city, Oct. 11. Mr. Swindell was 61 years old and had been identified with this company, of which his father was one of the founders in 1853, during his entire business life. He was also president of the American Dressler Tunnel Kilns, Inc., and of the New Castle Refractories Co. He was a member of the American Iron and Steel Institute.

Gas manufactured in the East St. Louis and Granite City, Ill., plants of the Illinois Power & Light Corporation, will be piped to Staunton, Mount Olive and Carlinville, Ill., by the way of Edwardsville, a distance of more than 50 miles.

Spain Making Industrial Progress

Visit of Iron and Steel Institute of Great Britain Gives
Evidences of New Stabilization—Two American
Steel Men in Group Received by Queen

BILBAO, SPAIN, Sept. 27.—After an interval of 32 years, the British Iron and Steel Institute came again to Bilbao for its second autumn meeting. Four members who participated in the earlier visit were present, among them Past-president F. W. Harbord, who, in 1896, presented a paper in conjunction with T. Twyman on "The Presence of Fixed Nitrogen in Steel." Another of the "veterans" was H. Spence Thomas, a prominent South Wales tin plate maker, who enlivened a long and tedious rail journey with pleasant reminiscences of the 1896 meeting.

In the hospitality extended to the hundred members who made the journey, the Spanish meeting compared very favorably with meetings held in other countries, and those who remember the institute's visit to Sweden two years ago know that no greater compliment could be paid to the Spanish hosts than by making this comparison. The main party left London on Sept. 21, which gave a whole day in the beautiful seaside resort of San Sebastian, the capital of the province of Guipuzcoa. Here, a delegation from the institute, headed by President Benjamin Talbot, was received by the Queen of Spain and by the Queen Mother. Two American members were chosen to join this delegation—C. S. Robinson and Mrs. and Miss Robinson of Youngstown, and R. H. Irons and Mrs. Irons of Harrisburg, Pa. The members were also received by the Provincial Government of Guipuzcoa and the municipality of San Sebastian, and a happy day spent in delightful surroundings was appropriately concluded with a dinner and dance given by the provincial and municipal authorities, and the works of the Province of Guipuzcoa. Monday was devoted to a tour by motor from San Sebastian to Bilbao, and en route the party visited the car works at Besain and an exhibition of art metal work at Eibar.

Spain Making Industrial Progress

The arrival in Bilbao was marked by the same cordiality, and here it was possible to notice the steady development that has been going on in the country during recent years. The present regime in Spain has an excellent record of achievement, and under its control order and prosperity now reign where there were confusion and waste. Spanish finances have been set in order; revenue now exceeds expenditure, and the country has money for investment. Rail-

roads, highways, harbors, canals, and the rivers are being developed. Labor has been organized on a cooperative plan, and there is machinery for preserving peace in industry.

The hub around which revolves the system of government-controlled industry and trade is the National Economic Council, created in 1924. Each trade and industry has its council, whose representatives sit on the National Industrial Council. This body can refuse permission for the establishment of a new industry, or even in some cases grant entrance permits for machinery free of duty. It controls the customs tariff and valuations and dictates its policy to the ministerial departments.

Ore and Steel Output Increasing

It has often been stated that the iron mines in Vizcaya were nearing exhaustion, but today this condition seems little, if any, nearer than in 1896. The output during that year amounted to 5½ million tons, and in 1913 it jumped to 9½ million tons, but it declined to 3¼ million tons in 1926 to advance again to just under 5 million tons in 1927. Pig iron output, which in 1896 amounted to 297,000 tons, advanced during 1927 to 612,000 tons, and iron and steel output rose from 100,000 tons in 1896 to 600,000 tons in 1927. There are 93 shipping companies in Spain with a total capital of 400 million pesetas in shares and 221 million pesetas in debentures. The gross steam tonnage in 1896 was 485,441 tons; in April, 1928, it was 1,127,037 tons. The electrical development in the country will, when completed, give an output exceeding 2500 million kilowatts, which is equivalent to 2500 million tons of coal. The total wealth of Spain is estimated at 220,000 million pesetas; mining accounting for 7000 million, industrial production 48,000 million and railroads for 5000 million pesetas.

Civic Authorities Welcome Visitors

The opening meeting of the conference, held on Sept. 25, at the Alfonso XIII High School, was attended by high civic authorities, and was addressed by the president of the Bilbao reception committee, Count de Zubiria, director of the Altos Hornos Co. of Vizcaya, and Senor D. Alfonso de Churrua, assistant manager of the Altos Hornos Co. In extending a cordial welcome to the visitors, they spoke of the high industrial development in Spain.

The president of the institute, Ben-

jamin Talbot, in thanking the hosts, mentioned that the excellent quality of the steel made in Spain during the Middle Ages was attested by the fact that in Shakespeare's day the word "bilbo" meant rapier. Mr. Talbot pointed out that the beginning of systematic exploitation of Spanish ores coincided approximately with the rise of the Bessemer process. It was in that period that Bessemer steel rails were introduced. Owing to the great railroad developments, the demand for Bessemer steel rails increased so rapidly that, unless an ample supply of the very pure ores of the Bilbao district had been obtainable, it would have been impossible to keep pace with the demand. Notwithstanding the approaching exhaustion of some of the better mines, the prosperity of Bilbao had not declined, and there had sprung up a number of new prosperous manufacturing industries, for the maintenance and conduct of which the local conditions were well adapted.

Visits to Steel Works

The remainder of the meeting was devoted to a reading of a selection of papers, after which there was a reception at the Town Hall by the Lord Mayor of Bilbao, followed by a luncheon party at the Bilbaina Club, with the mining companies of Vizcaya as hosts. In the afternoon the members were conveyed by launch to the steel works of the Altos Hornos Co. at Sestao, then by special train to the Baracaldo works of the same company, which is near the Geldarmes mining area, from which it draws a portion of its ore and limestone.

The Baracaldo works was founded in 1854. It is equipped with five batteries of coke ovens of the Solvay and Carves types, with a production of 80 tons per 24 hr. for each battery. There is a group of four blast-furnaces, each furnace giving an output of 250 tons of metal per day, which is converted by the Bessemer process. Three basic open-hearth furnaces are nearing completion. The electrically driven cogging mill has rolls of 2.750 x 1.941 mm., and can treat ingots of from two to five tons, rolling them into slabs down to 300 x 300 mm. The reversible mill has four stands, on which, in addition to the flats, beams up to 700 mm., rails up to 50 kilos, and angles from 150 x 100 mm. can be rolled. Power is obtained from steam generators using waste gases from the blast furnaces and the coke ovens.

The Altos Hornos Co. has devoted

considerable attention to welfare work among its employees, providing schools for children, a savings bank, hospitals and a pension fund for the widows and orphans of employees.

Iron Mines Are Inspected

On Wednesday, Sept. 26, the iron mines of the Orconera, the Franco-Belga and Dico & Setares were visited. The principal features of these mines were described in Mr. Balzola's paper and it is unnecessary to refer to them again except to point out the wide expansion of mechanical conveying. The party then returned to Bilbao, when the afternoon was devoted to the further reading of papers. In the evening the members were entertained at a dinner and dance at Las Arenas by the Metallurgical Works of Vizcaya.

The concluding day of the conference was spent in visiting works in the neighborhood of Bilbao. One party visited the Basconia works which, beginning in 1893 with the manufacture of tin plate, has since added structural iron and steel work departments and sheet and plate mills. At the Echevarria works, the visitors saw the manufacture of high-speed tool steels and alloy steels as well as horseshoe nails and iron and steel wire. Babcock & Wilcox own a large works at Galindo for the manufacture of water tube boilers, railroad material, weldless steel tubes (hot and cold drawn), and construction material. The Construction Naval works which was visited is confined to shipbuilding, the construction of steam turbines and Diesel engines. Large forgings and castings for naval and armament purposes are constructed at the Reinosa works, which was not open to inspection. According to information supplied by Count de Zubiria, the foundry at Reinosa is equipped with three open-hearth and five electric furnaces, the first for the production of mild steel and the latter for nickel and chrome-nickel steels. In the forge shop are two Davy presses of 1000 and 3000 tons as well as reheating furnaces with capacity for 30 tons of ingots. In the rolling plant there is a 21-in. reversible mill constructed for rounds and squares, while two new sheet mills are being built.

Tour Extended to Madrid

At the conclusion of the Bilbao meeting, a tour was made further south in Spain. The party spent a week-end in Madrid, some of the members going on to the famous Sagunto works owned by Sota & Aznar, Ltd. The plant here was designed by Frank C. Roberts & Co. of Philadelphia, and the three mills in operation are capable of giving an annual output of 300,000 tons. Another party visited the ancient city of Toledo with its notable and artistic monuments bearing silent witness to the national greatness and power in centuries gone by. Here the party visited the Arms Factory. At Cordoba, still bearing traces of the

Roman and Arab occupations, a visit was paid to the copper works of the Compañia Electromecánica de Cordoba.

On the whole, the Spanish visit of the Iron and Steel Institute was as enjoyable as it was interesting. The impression brought back by the visitor to Spain is that of a nation determined to attain a leading position among producing countries, and, after satisfying its own requirements, to seek outlets in the markets of the world. Spain is steadily progressing along this path.

New Plan for Program of Blast Furnace Meeting

At the fall meeting of the Eastern States Blast Furnace and Coke Oven Association, to be held at the Shannopin Country Club, Ben Avon, Pa., Oct. 26, there will be a single round table discussion of coke oven and blast furnace topics. At other recent meetings of the association, separate gatherings have considered each division of its activities. The new arrangement is intended to permit wider interchange of ideas between those responsible for blast furnace operation and those in charge of coke plants than has been possible when separate sessions were devoted to blast furnaces and coke plants.

The program provides for luncheon at the club at noon, to be followed by the joint round table discussion, at which A. E. Maccoun, superintendent of blast furnaces Edgar Thomson works, Carnegie Steel Co., Braddock, will preside. Subjects listed for discussion are:

Comparison of practice and efficiency of the modern large blast furnace with the smaller furnace.

Discussion on distribution.

Coke made from high volatile coals versus coal made from a mixture of high volatile coals.

Furnace losses.

Improvements in blast furnace refractories.

Power, efficiency, and available surplus.

The relation between size of large bell and stock line diameter and its bearing on flue dust losses.

Recent improvements if any in blast furnace and coke oven refractories.

Following the dinner in the evening there will be a discussion of stream pollution, with special reference to coke plant wastes, to be participated in by W. L. Stevenson, chief engineer Pennsylvania State Department of Health; F. H. Waring, chief engineer Ohio State Department of Health; E. S. Tisdale, director division of sanitary engineering West Virginia State Department of Health, and F. W. Sperr, Jr., Koppers Co., Pittsburgh, and chairman phenol committee of the association.

Harry Saxer, assistant general superintendent Aliquippa works Jones & Laughlin Steel Corporation, is chairman of the committee of arrangements for the meeting, the other members of which are Douglas E. Price, Koppers Co., Pittsburgh; R. H.

Schaller, Jones & Laughlin Steel Corporation, Aliquippa, Pa., and H. M. Crossett, Bethlehem Steel Co., Johnstown, Pa.

Carnegie, Pa., Scrap Rate May Be Reduced

WASHINGTON, Oct. 16.—Rates on iron and steel scrap from Carnegie, Pa., to Weirton, W. Va., and Steubenville, Ohio, will be reduced to \$1.13 from \$1.39 per gross ton and to 76c. from a former rate of \$1.39 from Weirton and Steubenville to Carnegie if the Interstate Commerce Commission approves a report made public last Wednesday. The report, prepared by Examiner W. R. Brennan, based on a complaint by Charles Dreifus & Co. and other scrap dealers in Pittsburgh against the Pennsylvania Railroad. The 76c. rate from Weirton and Steubenville to Carnegie, the examiner held, was applicable from Jan. 15, 1927, and Sept. 1, 1927 respectively. The railroad contended that the 76c. rate did not apply on scrap but that it applied only on various kinds of billets and slabs in its tariff. The \$1.39 rate is the billet rate from Carnegie to Weirton and Steubenville, while the rate of \$1.13 is the pig iron rate from Carnegie to the latter two points. Award of reparation to the complainants was recommended by the examiner.

Studies Hand-to-Mouth Buying Practices

WASHINGTON, Oct. 16.—The Institute of Economics has completed the first draft in connection with a scientific study it has made on "Iron and Steel in Relation to the Tariff." The draft is now being revised by the council of the institute.

It will be three months or more before the institute completes its study on "hand-to-mouth buying" which is designed to check up on the reported widespread change in purchasing methods during the past 10 years. Purchasing agents are being asked how far ahead their companies have been in the habit of placing orders for two of the more important commodities purchased in 1914, 1918, 1922, 1924, 1926 and 1928; what proportion the approximate average inventory for those years has been of the year's needs; whether there has been any important change in inventories carried in proportion to annual requirements; whether there has been any definite improvement in purchasing technique during the past five years; whether buying is more frequent and in smaller quantities, and, if so, why. Iron and steel share prominently in the study, inquiries being sent out to 120 or 125 purchasing agents to ascertain size of orders placed, how far they are placed in advance of use as compared with previous periods, etc. Prices, unfilled tonnages, and other information also are being compiled.

Continental Prices Decline Slightly

Some Mills Grant Concessions—Export Rebates Spread in Europe—
Welsh-German Tin Plate Agreement Possible

(By Cable)

LONDON, ENGLAND, Oct. 15.

CLEVELAND pig iron makers have lost 15,000 tons of foundry iron for Scotland to Midland furnaces, at about 2s. (49c.) less than their agreed price. Export demand is poor and in general the domestic market is inactive, but prices are being maintained as output is held at an agreed maximum. Increased demand would necessitate blowing in additional furnaces.

Hematite iron is steadier and consumers show more interest in buying, so that some sales have been effected for first quarter delivery. Gjers, Mills & Co. are to resume operation of their Ayrshire works, with two furnaces in blast, in January. Foreign ore is quiet, with prices unchanged.

Finished steel is quiet in the ordinary merchant export trade, but moderate tonnages of steel are involved in Indian Government railroad contracts. Rolling mills buying their semi-finished steel in the open market have strengthened quotations because of the higher cost of their raw materials. Heavy plate mills need tonnage to maintain steady operation.

Tin plate is quieter and mills calling for next year delivery are accepting 18s. 3d. (\$4.43) per base box, f.o.b. works port. The current rate of output is down to 80 per cent of capacity, but mills are well booked for forward delivery, and some have sold half their production to next June.

Galvanized sheets are active in most markets, except India, and mills generally are well engaged to the end of November. There is some Japanese demand for light-gage black sheets, which is being filled by merchants with contracts, most mills being too well filled to ship before the end of the year.

September exports of pig iron were 30,000 tons of which the United States received 9600 tons. Total exports of iron and steel were 295,000 tons. Imports also decreased with the total September arrivals of all kinds, 185,000 tons.

The Continental situation is uncertain as some makers are reported more inclined to grant concessions and prices generally have receded slightly from the recent peak. The German Semi-Finished Steel Syndicate is a keen seller. Overseas demand for finished steel has diminished.

wages of 15 pf. (3.57c.) an hour. The Ingot Steel Syndicate has announced that no advance in prices will be made because of the impending 11 per cent increase in railroad freight rates, but states at the same time that prices will be marked up immediately if wages go up.

To determine the extent that prices have risen since January it is necessary to place sales of steel in three classifications, export, domestic and sales to exporting manufacturers receiving rebates. In the first six months of the year about 50 per cent of the production of steel was delivered to domestic users, about 33 per cent was sold for export and about 17 per cent went to exporting manufacturers. On the basis of prices obtained from the three classes of consumers, the average sales price increased 15 m. (\$3.57) per ton for bars, 7.50 m. (\$1.78) per ton for structural shapes, 9.50 m. (\$2.26) per ton for heavy sheets and 13 m. (\$3.09) per ton for medium gages of sheets.

Following the recent increase in export prices of steel, rebates of the Ingot Steel Syndicate for October have been reduced, as follows:

	October Rebate per Ton	September Rebate per Ton
Marks	Marks	
Ingots	14 \$3.33	17 \$4.05
Billets	15 3.57	19 4.52
Slabs	14 3.33	20 4.76
Light rails	37 8.80	40 9.52
Structural shapes	32 7.62	34.50 8.21
Bands	30 7.14	35 8.33
Bars	17 4.05	22.50 5.36
Heavy sheets....	24 5.71	28 6.66

The pig iron market is quiet and prices show a tendency toward weak-

German Sales Prices Show Increase

Labor Demands 15 Per Cent Advance in Wages—Steel
Production Still Large

BERLIN, GERMANY, Sept. 27.—The Metal Workers' Labor Union claims that producers have reaped large

profits from their advances of domestic and export prices in January and May and is demanding an increase in

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s. to £0 17¾s.	\$4.25 to \$4.31
Bilbao Rubio ore.....	1 2 to 1 2½	5.35 to 5.48
Cleveland No. 1 fdy.....	3 8½ to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy.....	3 6	16.04
Cleveland No. 4 fdy.....	3 5	15.80
Cleveland No. 4 forge...	3 4½	15.68
Cleveland basic (nom.)...	3 5	15.80
East Coast mixed.....	3 10	17.11
East Coast hematite....	3 10½	17.23
Rails, 60 lb. and up.....	7 15 to 8 5	37.66 to 40.10
Billets	6 2½ to 6 15	29.77 to 32.81
Ferromanganese	13 15	66.83
Ferromanganese (export)	14 0	68.04
Sheet and tin plate bars, Welsh	6 0	29.16
Tin plate, base box.....	0 18 to 0 18½	4.37 to 4.43
Black sheets, Japanese specifications	13 7½	65.00
Ship plates	7 12½ to 8 2½	1.63 to 1.74
Boiler plates	9 0 to 10 10	1.92 to 2.25
Tees	8 2½ to 8 12½	1.74 to 1.84
Channels	7 7½ to 7 17½	1.58 to 1.69
Beams	7 2½ to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 5 to 7 15	1.55 to 1.66
Steel hoops.....	9 0 to 10 0	1.92 to 2.14
Black sheets, 24 gage....	10 0	2.14
Galv. sheets, 24 gage....	13 10 to 13 15	2.93 to 2.98
Cold rolled steel strip, 20 gage, nom.....	16 0	3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):					
Belgium	£3 3s. to £3 5s.	\$15.31 to \$15.80			
France	3 3 to 3 5	15.31 to 15.80			
Luxemburg	3 3 to 3 5	15.31 to 15.80			
Basic pig iron (nom.):					
Belgium	3 3	15.31			
France	3 3	15.31			
Luxemburg	3 3	15.31			
Coke	0 18	4.37			
Billets:					
Belgium	5 1	24.54			
France	5 1	24.54			
Merchant bars:					
Belgium	6 3½	1.36			
France	6 3½	1.36			
Luxemburg	6 3½	1.36			
Joists (beams):					
Belgium	5 4	1.14			
France	5 4	1.14			
Luxemburg	5 4	1.14			
Angles:					
Belgium	6 0	1.30			
½-in. plate:					
Belgium (a).....	6 14	1.48			
Germany (a).....	6 14	1.48			
¾-in. ship plate:					
Belgium	6 9	1.42			
Luxemburg	6 9	1.42			
Sheets, heavy:					
Belgium	6 1	1.33			
Germany	6 1	1.33			

(a) Nominal.

ness. Exports of pig iron in the first half of this year were only 13 per cent of the total sales of the Pig Iron Syndicate, compared with 16 per cent in the first half of 1927 and 31 per cent in the same period of 1926.

Expectation of a rise in the steel prices has brought out considerable buying, and mills are in most cases booked for six to eight weeks in advance. The proportion of foreign to domestic steel orders is increasing. The decline in steel output from the high rate of 1927, when production exceeded 1926 by 4,000,000 tons, has been extremely small. The average output per working day in the first eight months of this year was 51,500 metric tons, compared with 52,900 tons in the same months of 1927. In rolled products, the average output per working day this year has been 40,800 tons compared with 41,700 tons in 1927.

At the recent meeting of the European Rail Makers' Association prices were advanced 2s. 6d. (61c.) per ton. Renewal of the association agreement, which expires March 31, 1929, will be discussed in December. The medium and heavy sheet association agreement has been renewed until Dec. 31, and the present base price on sheets of 165 m. (\$39.27) per ton, f.o.b. Essen, has been retained. Efforts are being made to replace the present loose agreement of sheet producers with a syndicate, and it is understood that the 18 mills have agreed to quota participation. Of a total output of 207,435 metric tons of sheets, the following quotas are suggested as a basis for the syndicate: Mitteldeutsche

Stahlwerke, 54,850 tons; Vereinigte Stahlwerke, 29,041 tons; Heinrichshuette 21,252 tons, and Gutehoffnungshuette 19,452 tons.

At the recent meeting of the International Tube Cartel, members were unable to reach an agreement on an increase in tube prices. Great Britain is not expected to join the cartel until the British Government has established a tariff on tubes. At present the chief members are Germany, with a quota of about 60 per cent, France and Belgium, with 26 per cent, and Czechoslovakia, with 11 per cent.

Stockholders of the Mannesmann Tube Corporation have voted to increase the capital stock by 25,000,000 m. (\$5,950,000) to 165,000,000 m. (\$39,270,000). The new capital is to be used to develop the company's works at Huckingen, on the Rhine River, between Düsseldorf and Duisburg. It is planned to produce more raw material, needed by the tube mills; pig iron output will be expanded to about 600,000 tons annually.

Exports of machinery have gained. German manufacturers are making rapid progress in sales of machinery to Eastern Europe. Domestic demand for agricultural implements is expected to be large this year, as crops have been good, the yield of cereals being estimated at 10 to 11 per cent greater than in 1927. Exports of agricultural machinery to Russia, however, have declined considerably. Russian purchases of textile machinery and machine tools are about 12 times those of 1925, and of miscellaneous machinery, about five times.

being put on the ways is small and heavy plate mills continue in need of orders.

The agreement recently reached between the United States and Welsh tin plate makers for the regulation of sales to certain export markets has provoked some criticism, although the plan as a whole has been received favorably by the Welsh trade. It is reported that similar negotiations are pending between Wales and Germany, but at present no definite information is available. The tin plate trade is in a sound condition, and Welsh makers are assured of steady operations for some months.

Shortage of Fuel and Ore Limits Japan's Future in Steel

WASHINGTON, Oct. 11.—Difficulty in obtaining satisfactory coke at a reasonable price is the outstanding problem of the Japanese iron and steel industry, according to J. H. Ehlers, assistant commercial attaché, in a bulletin issued by the Department of Commerce. Japan has an abundance of coal, but not of a type producing good coke. With blast furnace coke at more than 15 yen (\$6.87) per ton, it is difficult to see, Mr. Ehlers states, how pig iron can be economically produced, unless great savings are effected in labor or other costs.

The iron mines of Japan proper produce but a small proportion of the total ore consumption of the country. In 1927, Japan, Chosen and South Manchuria produced 1,212,000 tons of ore, of which only 159,000 tons came from mines in Japan. The production of South Manchuria was half the total although its ores are of much lower iron content than the others.

Besides imports of ore from Japanese controlled territory, large quantities are brought in each year from the Yangtze Valley in Central China and from the Malay States. The mines in both these areas are controlled by Japanese interests. Little ore, according to Mr. Ehlers, is imported from sources not controlled by Japanese capital. The thoroughness with which sources of supply from Asiatic ore properties have been built up is shown by the growth of iron ore imports, which have nearly quadrupled in the past 16 years. The Japanese have increased the production in all the areas which they control and have been able to insure an increasing supply, despite fluctuations in the flow from certain individual sources.

While sufficient for its iron and steel industry as it now exists, Japan's ore reserves are insignificant when compared with those of the large iron and steel producing countries of the world. Reserves in Japan proper and Chosen amount to about 100,000,000 tons, while South Manchuria has about 750,000,000 tons. These figures compare with 10,000,000,000 tons of high-grade ore in the United States, about 8,000,000,000 tons in France and 1,000,000,000 tons in Germany.

Tariff Protection Nearer in Britain

Mills Rolling Foreign Steel Would Be Affected—Welsh Tin Plate Makers May Negotiate with Germany

LONDON, ENGLAND, Sept. 29.—Interest in the iron and steel trade is now centered in the possible introduction of "safeguarding" by the Government. It has been known for some time past that the Premier was being pressed by certain Conservative members to apply this measure to the iron and steel trade, but it was thought that he would refuse. At the Conservative conference at Yarmouth this week, however, Mr. Baldwin announced that no industry would be prevented from applying for protection, which means that the case for safeguarding will be considerably strengthened. The value of such a measure seems to be an open question. It is regarded as certain that one of the largest industries of the country, rolling mills using foreign semi-finished steel, would be seriously affected, and the trade in galvanized sheets would be jeopardized. Meanwhile, although fall business should be developing, there is no indication of any substantial improvement in iron and steel orders.

A factor that is likely to have an important bearing on market conditions is the continued firmness of Continental markets, which has sharply restricted imports of steel into this country to a large extent. But it is export business that is required, and because of the lack of it, makers' order books are far from well filled. Pig iron producers in the Cleveland district are moderately busy and are able to dispose fully of their restricted output, but in other districts there are still substantial stocks. A few sales for export are recorded, but the demand is not strong and competition is keen. Continental pig iron is no longer coming into this country for consumption here, as the price is not competitive, and it is reported from the Continent that the domestic demand there is fully able to absorb output.

In the finished steel market, British consumers of construction and engineering material are supplying mills with a fair volume of work, but the tonnage of new shipbuilding that is

Foreign Steel Deliveries Extended

Mills Ask Several Months' Delay—Exporters Foresee Lower Delivered Price on Tin Plate from New California Mill

NEW YORK, Oct. 16.—Importers of European steel are still offering small lots of certain sizes of shapes, most of which they purchased some time ago at prices below the present Continental market. Recent quotations by European mills have ranged from 1.75c. to 1.85c. per lb., base, on shapes and from 1.95c. to 2c. per lb., base, on plain steel bars of ordinary Thomas grade. In addition, deliveries are becoming more extended and some foreign mills are unwilling to accept new business except for delivery at their convenience, which might mean several months' delay.

Export trade continues small, particularly with the Far East, most current inquiries being for small lots of tin plate and certain specialties. Demand for second-hand plates from China has declined considerably in recent weeks, and the explanation of Chinese importers is the cessation of

hostilities. When warfare was active, such plates were used for street barricades, and were placed against windows and even the walls of rooms to make them bullet-proof. In some small communities, according to the importers, a single building would be barricaded with plates to afford protection to the women and children.

The new tin plate plant that the Columbia Steel Corporation plans to erect at Pittsburg, Cal., has aroused interest among exporters to the Far East. In addition to affording earlier delivery of tin plate to Japanese and Chinese merchants and consumers, the plant will have lower ocean freight rates, which may reduce the delivered price by 15c. to 20c. per base box. The ocean freight rate to Japan from Atlantic ports is \$8 per gross ton or about 36c. per 100 lb., compared with a rate from San Francisco of \$4 per net ton, or 20c. per 100 lb.

Large Increase in Fluorspar Imports

Foreign Product Sold in United States in 1927 Equal to 64 Per Cent of Domestic Shipments

WASHINGTON, Oct. 16.—In a pamphlet just issued by the Bureau of Mines, it is pointed out that salient features of the fluorspar industry in 1927 were the decrease in domestic shipments; the pronounced increase in imports from Germany and the equally pronounced decrease in imports from the United Kingdom; the large stocks of fluorspar at consumers' plants on Dec. 31, especially the stocks of 85,000 net tons that accumulated at basic open-hearth steel plants; and the increase in producers' stock piles, which were the largest ever accumulated.

Shipments of fluorspar to steel plants by domestic producers in 1927 were 12 per cent less than in 1926 and there were also decreases of 27 and 21 per cent, respectively, in the shipments of fluorspar for use in foundries and glass plants. Exports in 1927 were the smallest since 1921. In 1927, shipments of fluorspar from domestic mines aggregated 112,546 net tons, valued at \$2,034,728 or a decrease of 13 per cent in both quantity and value as compared with 1926. The general average value per ton f.o.b. mines or shipping points for all grades in 1927 was \$18.08, which is 12c. lower than the average in 1926. Of the total shipments last year, 97,036 tons was gravel fluorspar, valued at \$1,599,310 or \$16.48 per ton at the mines, comparing with 112,092 tons, valued at \$1,868,854, or \$16.67 per ton in 1926.

Of the 1927 output of gravel spar, Kentucky mines supplied 50,533 tons, valued at \$839,933, or \$16.62 per ton,

as against 38,970 tons, valued at \$656,863, or \$16.86 per ton, produced in Illinois mines. Colorado produced 5971 tons and New Mexico 1562 tons. Steel plants in 1927 received 93,196 tons or 82.81 per cent of the production, the average value being \$16.35 per ton at the mines, against 105,614 tons or 82.09 per cent of the 1926 output, with an average value of \$16.51 per ton. Exports in 1927 amounted to only 385 tons, compared with 2132 tons in 1926.

Imports of fluorspar in 1927 amounted to 71,515 tons, valued at \$595,185, and were the second largest ever recorded, having been exceeded only in 1926, when imports were 75,671 tons, valued at \$747,237. The value assigned to the foreign fluorspar in 1927 averaged \$8.32. The cost to consumers in the United States includes, in addition to the duty of \$5 per net ton, loading charges at the docks, the ocean freight charges, and other charges, besides the freight charges from docks to manufacturers' plants. The imports were equivalent to 64 per cent of the total shipments of domestic fluorspar in 1927 compared with 59 per cent in 1926. It is estimated that steel plants consumed 62,115 tons of imported ore in 1927.

According to reports of importers of 44,185 tons of imported fluorspar sold to steel manufacturers in 1927, the selling price of this quantity at tidewater, duty paid, ranged from \$15.71 to \$17.81 and averaged about \$16.47 per ton. The United Kingdom, which has been the chief source of imported fluorspar, supplied only 26

per cent of the total imported in 1927, the imports of 18,449 tons representing a decrease of 37 per cent from 1926. Germany was the chief source of fluorspar imports last year, supplying 31,829 tons or 45 per cent of the total, against 36 per cent of the 1926 total.

In 1927, 138,000 tons of fluorspar was consumed in basic open-hearth furnaces, and at the end of the year these furnaces had stocks aggregating 85,000 tons, the largest on record. In 1926, they consumed 142,000 tons and at the end of the year had 70,000 tons in stock. The average quantity of fluorspar used by individual plants per ton of basic open-hearth steel, the report said, varies widely, usually ranging from 1 to 35 lb. In general, the average is stated to be between 7 and 8 lb.

Fluorspar Duty Report Is Referred to Departments

WASHINGTON, Oct. 16.—It was stated at the White House last Friday that the fluorspar report sent to the President by the Tariff Commission will be sent to the Department of Commerce and then to the Treasury Department before action is taken on it by the President. This is the usual procedure of such reports. The Tariff Commission is said to have recommended that the existing duty of \$5 per net ton be increased 50 per cent to \$7.50, though the report cannot be verified. The increased duty was asked by domestic producers of fluorspar, while the application was opposed by Eastern steel makers, particularly the Bethlehem Steel Co.

Australian Steel Works to Build Coke Plant

WASHINGTON, Oct. 16.—Development and expansion of the Newcastle steel works of the Broken Hill Proprietary Co. will entail an initial cost of £1,000,000 and for the present will be confined to the erection of a by-product coke plant, according to a report received from Trade Commissioner E. C. Squire, Sydney. The equipment is to be of the Coppee type. It is understood that the Coppee company proposes to use the largest possible proportion of Australian material and workmen in the construction of the plant, importing from England only those special materials and skilled technicians not obtainable locally. In some quarters the proposed expansion is taken to indicate the inauguration of a plan to meet competition expected from the newly organized Australian Iron & Steel, Ltd., which is engaged in building steel works at Port Kembla, and also expected from a new German company, which is reported to be preparing to set up a plant at Cessnock, New South Wales, for the production of coal products.

Export Rebates Gain in Favor

German System of Supplying Cheaper Steel to Manufacturers Who Sell Products Abroad May Be Adopted by Other Countries

HAMBURG, GERMANY, Sept. 30.—The success that has attended the German plan of paying rebates on steel bought by manufacturers in Germany who export their products is evidently influencing other European producing countries to adopt similar measures. Application of such a system appears to be desirable for any country with a tariff on steel. Success of the rebate plan in Germany is measured by its advocates in the constantly rising exports of manufactured metal products, such as machinery, bolts, nuts, rivets, wire and general hardware. The non-ferrous metal industry in Germany has adopted a similar plan, and in other lines, such as artificial silk, glass and pottery, steps are being taken to establish rebates on the raw materials entering exported products.

As France, Belgium, the Saar, Austria, Poland and Czechoslovakia have steel tariff schedules, it is considered probable that rebate plans will eventually be introduced in all these producing countries. Austria has already applied a system of rebates patterned after the German plan, and Czechoslovakian mills are expected to reach an agreement with exporting consumers before the end of the year. In France, the Comité des Forges is negotiating with the French steel consumers to the same end, and Belgian manufacturers of bolts, rivets, wire

and machinery are urging the introduction of such a system.

Advocates of a rebate plan point out that a high domestic steel market is a distinct disadvantage to the manufacturer for export, who must meet the competition of foreign makers of the same product who buy exported steel at considerably lower prices. The example of a German manufacturer of bolts at Hagen and a Dutch competitor at Helmond is cited. Both bolt makers may buy their raw material from a mill at Hagen. In the case of the Dutch producer the price is £6 2s. 6d. (\$29.77) per metric ton, to which is added 8 m. (\$1.90) per ton for bolt quality. The German maker would pay 150 m. (\$35.70) per ton, or \$4.03 per ton more than his competitor were it not for the rebate. A British maker of wire or wire nails may buy German wire rods at £6 (\$29.16) per ton, while the German manufacturer buying from the same plant, without the rebate, would pay 159 m. (\$37.84) per ton. It is claimed that in producing countries where no rebates are paid to exporting manufacturers the producer for export finds it necessary to buy abroad, as he receives a return of the greater part of the duty when the manufactured article is exported. This is to the disadvantage of the producers of that country as well as the consumers.

Direct Process Plant Under Construction in Germany

Construction of an experimental plant in Germany by the Friedrich Krupp A. G. and the Vereinigte Stahlwerke A. G., for the purpose of testing the "Norsk-Staal" method of making sponge iron and steel direct from ore (THE IRON AGE, Oct. 4, page 835), has been started, according to a report to the Department of Commerce from the trade commissioner in Berlin. The two corporations cooperating in this experimental work are understood to have been working independently on various processes for some time and finally decided to develop the "Norsk-Staal" method, by which steel is produced at low temperatures with gas. In this process, the iron does not become fluid and the finished product is of a spongy consistency.

It is said that the consumption of gas is not excessive, as it is used repeatedly for reducing the ore. Although a large quantity of electric current is required in converting the sponge iron into steel, it is believed that this can be produced at low cost by using by-product gas.

The annual production at the experimental plant will be about 20,000

tons, and it is said to be the first large experimental venture of the kind in Germany. Other methods, such as that used by the Hoesch Iron & Steel Co., have been employed on a much smaller scale.

German Cities Contract for Steel Dwellings

HAMBURG, GERMANY, Sept. 30.—Rapid progress is being made in steel house construction. Contracts for from 30 to 100 steel dwellings have been awarded by the cities of Munich, Frankfurt, Breslau, Oppeln and Berlin. At present, orders for single houses for individuals cannot be accepted, as output falls considerably short of demand.

Russian Iron and Steel Output Greater Than Year Ago

Russian industrial output in July decreased 9.3 per cent from June, according to preliminary returns of the Supreme Economic Council of the U. S. S. R. Compared with July of last year, however, industrial production showed an increase of 27.1 per cent. In the first 10 months of the

fiscal year, gross industrial output increased 22.2 per cent, compared with the same period of the previous year.

Production of pig iron in July was 268,700 tons, compared with 245,200 tons in July, 1927; steel ingot output was 310,500 tons compared with 284,300 tons, and production of rolled metals was 232,300 tons, compared with 189,100 tons.

New German Company to Sell Ship Steel

HAMBURG, GERMANY, Sept. 30.—A ship steel sales office has been established by the United Steel Works, Düsseldorf, in conjunction with other producers. Both export and domestic business will be handled by the new office, operating as the Schiffbaustahl Verkaufsgemeinschaft G.m.b.H. It is understood that the company may establish some foreign offices.

Turkey Now a Market for Typewriters

HAMBURG, GERMANY, Sept. 30.—Legislation in Turkey compelling the use of Latin letters instead of Arabic has resulted in a considerable demand for typewriters. German and British manufacturers have sent a large number of typewriters to the Government and to schools for free use to introduce their products.

Scrap Dealers Organize in New England

A Southern New England chapter of the Institute of Scrap Iron and Steel, the headquarters of which are at 11 West Forty-second Street, New York, was organized at a meeting of dealers in Hartford, Conn., Oct. 10. Officers elected were Harry S. Blumenthal, Swissman & Blumenthal, Hartford, president; Nathan Katz, Jacob A. Katz & Sons, Hartford, first vice-president; Robert Erlich, Moses Erlich Iron & Metal Co., Springfield, Mass., second vice-president; Harris Botwinick, Harris Iron & Metal Co., New Haven, treasurer; H. Kasden, H. Kasden & Son, New Haven; J. A. Marson, J. A. Marson, Inc., Bridgeport, Conn., and Barney Carlson, Springfield, Mass., members of the executive committee.

This is the third chapter of the institute organized recently, others being the New York and Philadelphia chapters. A dinner meeting of dealers in the Baltimore district is scheduled for Oct. 16 at the Southern Hotel, Baltimore, and a meeting, Oct. 23, at the Berkshire Hotel, Reading, Pa., is expected to be attended by dealers in Reading, Allentown, Bethlehem, Coatesville, Easton, Harrisburg, Lancaster, Lebanon, Pottstown, Pottsville, and York, Pa. Iron and steel scrap dealers of Trenton, N. J., will meet at the Stacy-Trent Hotel, Oct. 17, to consider organization of a local chapter.

Machinery Markets and News of the Works

Machine Tool Orders Large

Tractor Manufacturers and Automobile Companies Buy—
Norfolk & Western Wants Nearly 60 Tools

HEAVY purchasing by tractor manufacturers in the Middle West, considerable business from automobile companies and a generally sustained and diversified demand for single tools were features of machine tool buying during the week. An inquiry from the Norfolk & Western for nearly 60 machines gave new interest to the railroad branch of the market, which has been unusually dull throughout the year.

The Allis-Chalmers Mfg. Co. placed large orders for tools for its Springfield, Ill., tractor plant and the International Harvester Co. bought heavily for its works at Rock Island, Ill.

Much of the business in the Cincinnati, Cleveland and Detroit districts is coming from automobile manufacturers, especially from those putting out new models. Some companies in the Cincinnati district report that fully half of their orders in the week were from the automotive industry. The Olds Motor Works, Lansing, Mich., ordered 10 multiple and double spindle drilling machines. The Mullins Mfg. Co., Salem, Ohio, bought about \$125,000 worth of presses.

The list of the Norfolk & Western consists of a miscellaneous lot of shop equipment. Other roads are inquiring sparingly.

Pending orders for machine tools

are of substantial volume, and indicate that large purchases of shop equipment will continue during the next 30 days at least. Production schedules are taxing the capacity of many machine tools plants. Large unfilled orders make it impossible, in some instances, for tool builders to promise early deliveries.

The National Machine Tool Builders' Association, in its report for September, says that the machine tool orders index continues its upward trend. For the nine months of this year, each month's orders have been above 200 on the association's scale (the figure 100 representing the average shipments for 1922, 1923 and 1924). The base figure of 265 for September was the highest month since March, 1920, which registered 322.3.

"All important factors," says the association, "point to good business for the rest of the year. The metal-working industries have been studying costs and have been making enough money to buy modern equipment to replace old equipment of less efficiency."

Despite the excellence of the general situation, the association sounds a note of caution in saying that "a well known characteristic of machine tool demand is to have some pretty sharp peaks followed by sharp drops."

New York

NEW YORK, Oct. 16.—Machine-tool trade in the Eastern territory continues steady and in fairly good volume but without important feature. Some sellers report business as somewhat quieter, but on the whole there is no complaint.

Niles-Bement-Pond Co. has sold a 62-in. boring mill, a floor boring machine, four Boye & Emmes lathes, Blount speed lathe, United States pedestal grinder, two

Grand Rapids grinders, Niles-Acme 36-in. shaper, and Morris 4-ft. radial drill; Pratt & Whitney division sold two automatic lathes, an engine lathe, two vertical surface grinders, two vertical shapers, eight multiple spindle drills and a jig borer.

Plans are being drawn by Manhattan Refrigerating Co., 521 West Street, New York, for addition to cost about \$100,000 with machinery. Gunvald Aus Co., 244 Madison Avenue, is engineer. T. A. Adams is head.

Dock Department, Pier A, North River, New York, Michael Cosgrove, dock com-

missioner, is planning an appropriation of \$2,750,000 for municipal airport on Barren Island, to be known as Floyd Bennett Field, including \$198,000 for hangars at land plane base; \$66,000 for hangar at seaplane base; terminal buildings at seaplane base, \$20,000; machine tools, \$15,000; wire fencing, \$35,000; water supply system, \$25,000; radio equipment, \$50,000, and electric light and power equipment, \$58,000.

Sinclair Refining Co., 45 Nassau Street, New York, has awarded general contract to Fisher Williams Corporation, 103 Park Avenue, for one-story oil storage and distributing plant at Brooklyn, to cost about \$70,000 with equipment.

Interborough News Co., 244 West Forty-second Street, New York, is having plans drawn for a six-story automobile service, repair and garage building for company motor trucks and cars, to cost about \$180,000 with equipment. Russell G. Cory, 30 Church Street, is architect and engineer.

Charles H. Wilson, 383 Concord Avenue, New York, manufacturer of pyrometers, instrument parts, etc., has filed plans for an addition to four-story factory, including improvements in present structure, to cost about \$35,000.

Pelham Manor School Board, Pelham Manor, N. Y., is said to be planning installation of manual training equipment in three-story addition to high school to cost about \$500,000. Hart & Shape, 247 Park Avenue, New York, is architect.

Frank J. Ricker, 1328 Broadway, New York, architect, has plans for a two-story automobile service, repair and garage building, to cost about \$155,000 with equipment.

Moth Aircraft Corporation, New York, care of J. A. Ritchie & Co., 52 Wall Street, New York, bankers, recently formed under Delaware laws, plans operation of plant in this vicinity for manufacture of D. H. Moth type of airplanes, including parts and assembling, controlled by De Havilland & Co., London, England, with which exclusive contract has been made for production and sale of such aircraft in United States. Company is arranging for early stock offering to provide financing for operations. Minton M. Warren is head.

I. Rokeach & Son, Inc., 345 Hewes Street, Brooklyn, manufacturer of soaps, etc., has filed plans for four-story unit, 90 x 200 ft., to cost over \$125,000 with equipment. C. G. Preis is company engineer.

Liberty Auto Radiator Co., Jersey City, N. J., care of Flagg & Stades, 665 Newark Avenue, architects, has plans for a new two-story unit, to cost \$30,000 with equipment.

Smith Tool & Mfg. Co., 120 Christie Street, Newark, N. J., has plans for a new one-story plant, 90 x 100 ft., to cost about \$25,000 with equipment.

J. D. Lugosch, 714 Bergenline Avenue, Union City, N. J., architect, has plans for a one-story automobile service, repair and garage building, 155 x 200 ft., at Pater-

The Crane Market

INQUIRIES for overhead and locomotive cranes continue to accumulate, but prospective buyers are slow to place orders. In overhead cranes there is a fair volume of inquiry for hand power equipment and electric cranes of small capacity. Chicago, Rock Island & Pacific will buy two 15-ton overhead electric cranes with auxiliary hoods for delivery at Burr Oak, Ill. Issue of the list of overhead equipment for the new 207th Street yards of the Transit Commission,

New York, is not expected until early next year. The list of locomotive cranes and steam shovels inquired for by Dwight P. Robinson & Co., New York, for use in Argentina, has been awarded to two large builders, one in Ohio and the other in Wisconsin.

Among recent purchases are:

Dwight P. Robinson & Co., New York, seven 10-ton crawl-tread cranes and four 5-ton truck cranes from a Wisconsin builder and two steam shovels from the

Bucyrus-Erie Co., all for shipment to a contract at Buenos Aires, Argentina.

Panama Canal Commission, Washington, 30-ton steam-driven locomotive crane for use at Panama Canal, from Brown-Ing Crane Co.

Algoma Power Co. of Canada, 45-ton overhead electric crane from Northern Engineering Works.

Power Corporation of New York, Watertown, N. Y., 30-ton, one-motor crane from Northern Engineering Works.

son, N. J., to cost about \$140,000 with equipment.

Public Service Electric & Gas Co., Public Service Terminal Building, Newark, N. J., has plans for a two-story equipment storage and distributing plant, 140 x 180 ft., with shop facilities, at Jersey City, N. J., to cost over \$200,000 with equipment.

Lackawanna Railroad Co., 90 West Street, New York, is asking bids until Oct. 30 for one and eight-story storage and distributing building, 343 x 410 ft., at Jersey City, N. J., forming first unit of new terminal project, to cost over \$1,500,000 including mechanical handling and other equipment. G. J. Ray is company engineer.

Brooklyn Ash Removal Co., Inc., office of Department of Street Cleaning, Municipal Building, New York, is asking bids until Oct. 29 for furnaces, air-preheaters, flues and other equipment for three incinerator plants, each with burning capacity of 500 tons per 24 hr., at Brooklyn. Plans and specifications at office noted. Erle L. Collins is chief engineer.

Koeppen Metal Products, Inc., formerly at Union City, N. J., is now located in new plant at Carlstadt, N. J., and may be addressed at P. O. Box 37.

New York Steam Corporation, New York, has let contract for nine-story warehouse, 46 x 100 ft., foot of East Thirty-sixth Street, New York, to Turner Construction Co., 420 Lexington Avenue, New York. G. Denison is engineer.

Bell Telephone Laboratories, Inc., New York, has let contract for new three-story laboratory in Bank Street, 50 x 120 ft., to Turner Construction Co., 420 Lexington Avenue, New York. Voorhees, Melin & Walker are architects.

Accurate Fireproof Door Corporation, 425 Barretto Street, New York, has been organized to manufacture fireproof doors, window sash and other fireproof products. Operations will begin about Oct. 22.

New England

BOSTON, Oct. 15.—Contract has been let by United States Rubber Co., 1790 Broadway, New York, to Berlin Construction Co., Berlin, Conn., for one-story addition to plant at Naugatuck, Conn., to cost about \$32,000.

Municipal Light and Power Department, Hudson, Mass., will make extensions and improvements in electric light and power plant, including addition and installation of new equipment, to cost more than \$40,000. L. D. Wood is manager.

Enterprise Mfg. Co., Cambridge, Mass., manufacturer of hot water boilers, copper vessels and other coppersmithing, has

arranged for removal of plant on First Street to one of former factory buildings of Blake & Knowles Pump Co., at Third and Binney Streets, for increased production.

Brockton Gas Light Co., Main Street, Brockton, Mass., has asked bids on general contract for one-story automobile service and mechanical repair shop, 125 x 125 ft., to cost over \$75,000 with equipment. C. H. Tenney Co., 200 Devonshire Street, Boston, is engineer.

Panco Rubber Co., Chelsea, Mass., has awarded general contract to Idell Melnick, Chelsea, for one-story addition to press department, 48 x 100 ft., to cost over \$35,000 with equipment. Schein & Levine, 20 Pemberton Square, Chelsea, are architects.

Texas Co., 31 St. James Street, Boston, is planning two-story addition, 40 x 145 ft., to oil storage and distributing plant at Chelsea, to cost about \$75,000 with equipment. Headquarters are at 17 Battery Place, New York.

New Britain Iron & Construction Co., New Britain, Conn., ornamental and other iron products, has removed its plant from 189 Hartford Avenue to 1283 East Street, where increased production will be carried out.

Kepes & Sattan Co., Parsons Street, Wallingford, Conn., has been organized to manufacture wood handles for screw drivers and similar tools. Factory has been acquired and equipment installed. Company is in market for shavings and dust collector.

Pittsburgh

PITTSBURGH, Oct. 15.—While machine-tool business is not so active as many might wish, there is little real cause for complaint either as to sales or inquiries. Some good business is expected from the Westinghouse Electric & Mfg. Co. which has not yet begun to buy extensively on its fourth quarter list. Another prospect is the Aluminum Co. of America, in connection with expansions at Massena, N. Y., and New Kensington, Pa., while the Pittsburgh Plate Glass Co. is a probable buyer for its new plant at Crystal City, Mo.

Wheel foundry of Pressed Steel Car Co., McKees Rocks, Pa., which has lately been idle, was destroyed by fire Oct. 9. Considerable machinery was lost. H. P. Hoffstot is vice-president and C. W. Wrenshall, general manager.

Property, 48 x 460 ft., for expansion, has been acquired by Pittsburgh Foundry & Machine Co., foot of Thirty-sixth Street, Pittsburgh.

Ovens, power equipment, conveying and

other machinery will be installed in new two-story and basement baking plant to be built by Fishels Co., 233 Fifth Avenue, Pittsburgh, 100 x 240 ft., to cost over \$250,000. Richard Irvin & Co., Vandergrift Building, are architects.

Oil Well Supply Co., 215 Water Street, Pittsburgh, has leased building totaling about 10,000 sq. ft. floor space, for extensions in storage and distributing plant.

Board of Education, Lewistown, Pa., is said to be planning installation of manual training equipment in two-story junior high school to cost \$150,000, for which bids have been asked on general contract. Hersh & Shollar, Commerce Building, Altoona, Pa., are architects.

West Virginia Water Service Co., Bluefield, W. Va., plans extensions and improvements in plant and system, including construction of dam at Ada, W. Va., and installation of pumping and other equipment, to cost over \$150,000.

South Atlantic

BALTIMORE, Oct. 15.—Independent Can Co., Baltimore, care of Edwin A. Parker, head of Parker Metal Decorating Co., Howard and Ostend Streets, recently formed by Mr. Parker and associates with capital of \$1,000,000, is said to be planning construction of new works, to cost more than \$200,000 with equipment.

Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, manufacturer of metal bottle caps, bottle-capping machinery and parts, has asked bids on general contract for one and two-story addition, 150 x 600 ft., to cost over \$175,000 with equipment. L. R. White, Hearst Tower Building, is architect.

Storms Aviation Co., Spartanburg, S. C., recently formed by N. E. Storms, Spartanburg, and associates, will operate an airplane and parts manufacturing works near municipal airport, where buildings have been secured, including machine shop and hangar.

Gulf Refining Co., Sydenham and Locust Streets, Philadelphia, is said to be planning construction of new oil storage and distributing plant at Siler City, N. C., to cost about \$40,000 with equipment.

Perel's Fixture Exchange, 241 Harrison Street, Baltimore, store and office fixtures and equipment, has awarded general contract to Abraham Goodman, 2000 Whittier Avenue, for a three-story addition, 54 x 65 ft., to cost about \$35,000. John Freund, 1307 St. Paul Street, is architect.

Board of Education, Easton, Md., is said to be planning installation of manual training department in new high school to cost more than \$200,000, for which bids are being asked on general contract until Oct. 23. Henry P. Hopkins, 347 North Charles Street, Baltimore, is architect.

Following merger of John H. Heald Co., Lower Basin, Lynchburg, Va., manufacturer of extracts, etc., and Mead Paper Board Corporation, Dayton, Ohio, last-noted company is reported planning a new paper mill near Lynchburg, to cost over \$200,000 with equipment.

Covington Machine Co., Covington, Va., E. H. Archer, manager, is planning installation of equipment to manufacture expanded metal lath.

Delco Light Co., Dayton, Ohio, a subsidiary of General Motors Corporation, manufacturer of isolated electric lighting plants, is planning new factory branch and distributing plant at Charlotte, N. C., to cost over \$50,000 with equipment.

Chesapeake & Ohio Railroad Co., Richmond, Va., has completed plans for new engine house, machine shop, blacksmith and forge shop, pipe shop and other units, at Huntington, W. Va., to cost more than \$2,000,000 with equipment.

Philadelphia

PHILADELPHIA, Oct. 15.—Davies Battery & Electric Co., 2016 South Bancroft Street, Philadelphia, has purchased two-story building at 2021-27 South Chadwick Street, 52 x 88 ft., for expansion.

Huck-Gerhardt Co., Inc., Luzerne and G Streets, Philadelphia, is having plans revised for two-story addition to millwork plant, to cost about \$40,000 with equipment. Clarence E. Wunder, 1520 Locust Street, is architect.

Atwater Kent Mfg. Co., Wissahickon Avenue and Abbotsford Road, Philadelphia, manufacturer of radio equipment, has taken title to seven acres adjoining plant, and will expand building program, announced in these columns last week, to include one-story units, to cost more than \$900,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Central Airport, Inc., Philadelphia, recently organized by C. Townsend Ludington, president Ludington Philadelphia Flying Service, Inc., Island Road and Tinicum Avenue, and associates, has acquired 145 acres at Camden, N. J., and plans construction of airport, including hangars, machine and repair shops and other units. Company is disposing of stock issue to total \$550,000, a considerable portion of fund to be used for airport construction.

Officials of American Brown-Boveri Electric Corporation, 420 Lexington Avenue, New York, have organized a subsidiary, New York Shipbuilding Co., to take over and operate this branch of its properties at Camden, N. J. Parent company will continue to occupy portion of plant, as heretofore, for manufacture of heavy electrical machinery. Both branches of business will be developed for increased output. C. L. Bardo is president of subsidiary organization.

Quality Alloy Casting Co., Easton, Pa., has been organized by T. A. Mellon, 205 First National Bank Building, and associates, to operate plant for manufacture of aluminum, brass, bronze and other metal castings, as well as for production of hardware specialties. J. Clem Kline, R. F. D. No. 3, Easton, is interested in new company.

Delaware School Foundation, duPont Building, Wilmington, Del., is said to be planning installation of manual training equipment in new two-story high school at Newcastle to cost more than \$350,000,

for which plans are being drawn by Guilbert & Bételle, 20 Branford Place, Newark, N. J., architects.

Hazlebrook Coal Co., Mount Carmel, Pa., is said to be planning construction of new electrically-operated coal breaker at its Mid-Valley colliery, near Mount Carmel, to cost more than \$500,000 with machinery.

William Costello Co., Inc., 2536 North Third Street, Philadelphia, has been formed to continue business of former William Costello Co. in manufacture, repair and sales of machinery, machine tools and other equipment. Business is confined largely to biscuit and cake-making machinery.

Glasgow Iron Co., formerly in Harrison Building, Philadelphia, has removed office to Pottstown, Pa.

Harrisburg Foundry & Machine Co., Inc., Harrisburg, Pa., has been formed to succeed Harrisburg Foundry & Machine Works, recently in receivership. New company will continue manufacture of gray iron castings, Harrisburg dual clearance unafow engine, Harrisburg single valve and Corliss valve engines. C. W. Lynch, who operated company prior to 1920, will be president.

Carpenter Steel Co., Reading, Pa., plans rebuilding plant, including 9-in. and 10-in. rolling mills, wire mill and other units, partly destroyed by fire Oct. 6.

Buffalo

BUFFALO, Oct. 15.—Contract has been let by National Grinding Wheel Co., 2984 Main Street, Buffalo, to L. A. Harding, 1335 Main Street, for new plant at North Tonawanda, N. Y., to cost more than \$50,000 with equipment.

Eisler Mfg. Co., 15 Eisler Terrace, Rochester, N. Y., manufacturer of special tools, has changed its name to Yawman Metal Products, and has increased capital to provide for expansion.

Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, is said to be arranging call for bids for initial units of plant on property recently acquired at Tonawanda, N. Y., consisting of four one-story units, 200 x 1500 ft., 200 x 200 ft., 60 x 200 ft., and 60 x 100 ft., to cost about \$750,000 with equipment.

New York Central Railroad Co., Buffalo, and 466 Lexington Avenue, New York, has plans for new one and two-story car repair shop at East Buffalo yards, to cost over \$65,000 with equipment.

George F. Johnson, head of Endicott-Johnson Corporation, Binghamton, N. Y., manufacturer of shoes, and associates are organizing a local company to be affiliated with Colonial Airways Corporation, 270 Madison Avenue, New York, which is planning establishment of air line between New York and Buffalo. New company plans construction of airport to serve Binghamton, Johnson City, Endicott and vicinity, with hangars, repair and reconditioning shops and other mechanical units, to cost over \$100,000.

Department of Correction, Albany, N. Y., has authorized construction of new mechanical shop building at Auburn State Prison, Auburn, N. Y., to cost about \$225,000 with equipment.

William G. and Frank D. Menihan, 171 Cedar Street, Corning, N. Y., and associates have organized Corning Saw & Supply Co., with capital of \$50,000, to establish and operate local plant for manufacture of saws, files and other cutting tools. Hugh V. O'Brien, 262 West

Second Street, is also interested in company.

Excavation work on three-story addition, 90 x 500 ft., to plant of Ritter Dental Mfg. Co., West Avenue, Rochester, N. Y., has been begun. Building will be used to house business of Electro Dental Mfg. Co., Philadelphia, purchased by Ritter company early in year and which will be removed to Rochester.

Chicago

CHICAGO, Oct. 15.—Heavy purchases by tractor manufacturers have made the past week one of the most active so far this fall. Allis-Chalmers Mfg. Co. has placed orders for its Springfield, Ill., tractor plant and the International Harvester Co. is closing a large list for its Rock Island works. An appropriation for machine tools has been made by A. O. Smith Corporation, Milwaukee, and it is probable that revised bids will be taken on a list sent out several weeks ago. Machine-tool manufacturers west of Chicago are in the market for miscellaneous equipment.

The Chicago, Milwaukee, St. Paul & Pacific is asking for prices on a 24-in. Gould & Eberhardt shaper, a 2 x 24-in. turret lathe and an 18-in. x 12-ft. selective-head engine lathe. The Chicago Board of Education will buy a 30-in. band saw for the Medill High School.

Norfolk & Western Railroad has issued the following list:

- One No. 6 Brown & Sharpe automatic screw machine, motor driven.
- One 20-in. x 8-ft. motor-driven engine lathe with taper attachment.
- One 48-in. carwheel borer, motor driven.
- One crankpin turning machine.
- One core oven, 8 ft. 6 in. wide, 17 ft. 6 in. deep, 11 ft. 6 in. high.
- Two 20-in. vertical drills, motor driven.
- One Foley saw filing machine.
- One 24 x 6-in. heavy-gear cutting machine, motor driven.
- One internal grinding machine for holes 1 1/2 to 5-in. diameter x 3 to 8 in. deep.
- Eight 8 x 30-in. plain external grinding machines.
- One model D Walker grinding machine.
- One locomotive flue grinder.
- Five 18 x 3-in. motor-driven double floor grinders.
- Five 2 1/2 x 12-in. motor-driven double floor grinders.
- Two 1 x 6-in. motor-driven double floor grinders.
- One 1 x 6-in. motor-driven floor buffer grinder.
- Two 1-ton electric hoists.
- Two 2-ton electric hoists, 20-ft. lift.
- One Rockwell hardness tester.
- One 16 x 8-ft. tool-room lathe, motor-driven.
- Two No. 1-A Warner & Swasey turret lathes.
- One No. 3-A Warner & Swasey turret lathe.
- One heavy-duty axle lathe.
- Two gap axle lathes.
- One 42-in. carwheel turning lathe.
- One 36 x 36-in. x 16-ft. three-head, planer-type milling machine.
- One 24 x 6-in. single surface planer.
- One Tabor hinged roll-over core machine.
- One nibbling machine, motor driven, 24-in. throat.
- One 36-in. heavy-duty open-side planer.
- One Peerless portable hydraulic pinion puller.
- One locomotive-flue roller.
- One motor-driven heavy-duty hack saw.
- One No. 470 Fay & Egan motor-driven scroll saw.
- One 36-in. heavy-duty shaper.
- One 48-in. tinnings' foot-power squaring shear.
- One 12-in. Universal head slotter, head to swivel 15 deg.

Pressed Steel Car Co., 13600 Brainard Street, Chicago, will build a one-story boiler house, 72 x 80 ft.

Chicago, Rock Island & Pacific is building a new car shop, 75 x 500 ft., at Burr Oak, Ill.

A new assembly and storage plant, 220 x 240 ft., and a research and experimental building, 36 x 80 ft., both one story, are under way at plant of Wood Brothers Thresher Co., Des Moines, Iowa, and will represent an investment of \$60,000.

International Harvester Co., 606 South Michigan Avenue, Chicago, has asked bids on general contract for one-story foundry, 160 x 320 ft., and two-story motor truck unit, 90 x 520 ft., at Rock Island, Ill., to cost more than \$600,000 with equipment. W. D. Price is superintendent of construction.

City Council, City Hall, Minneapolis, Minn., has awarded general contract to Standard Construction Co., Plymouth Building, for one-story machine shop and equipment storage and distributing building to cost \$40,000. A. M. Larson, City Hall, is architect.

National Airways Corporation, care of Jameson & Harreson, Peoria Life Building, Peoria, Ill., architects, has plans for new aircraft manufacturing plant at Peoria, where site has been secured on Mount Hawley Road.

Public Service Co. of Colorado, Denver, Colo., will build a new one-story steam-operated electric power plant at Alamosa, Colo., to cost about \$45,000 with equipment. Work will be carried out in connection with expansion program in Alamosa district to cost about \$125,000.

Gulf States

BIRMINGHAM, Oct. 15.—Rome Electric Range Co., Huntsville, Ala., has awarded general contract to George A. Rodgers, Huntsville, for initial unit of new plant, one-story, 50 x 250 ft., including foundry and machine shop.

Bemis Brothers Bag Co., 601 South Fourth Street, St. Louis, has approved plans for power house, 49 x 50 ft., at proposed new mill at Talladega, Ala., with machine shop and other units, project to cost more than \$2,000,000. J. E. Sirrine & Co., Greenville, S. C., are architects and engineers.

Board of Commissioners, City Hall, Mobile, Ala., is asking bids until Oct. 26 for equipment for municipal pumping stations, including four motor and gasoline engine driven horizontal centrifugal pumping units, each with capacity of 5200 gal. per min., with auxiliary equipment. Wright Smith is city engineer.

Weatherford, Mineral Springs & Northwestern Railway Co., Weatherford, Tex., will rebuild part of engine house, tool and equipment shops at Weatherford, recently destroyed by fire.

Ford Motor Co., Detroit, is having plans drawn for a new one-story factory branch, service and repair building, 125 x 170 ft., at Meridian, Miss., to cost about \$60,000 with equipment. P. J. Krouse, M. & W. Building, Meridian, is architect.

Richardson Refining Co., Big Spring, Tex., is erecting new oil refinery with initial capacity of 5000 bbl. per day, to cost about \$750,000 with equipment.

Ouachita Iron Works, Inc., Monroe, La., is planning construction of new foundry,

machine, forge and welding shops, and other units, to cost more than \$60,000 with equipment.

Republic Portland Cement Co., San Antonio, Tex., an interest of Smith Brothers Properties, Inc., 121 Villita Street, will proceed with construction of new cement mill units at Longhorn, near San Antonio. A housing development for employees is included. Project will cost more than \$300,000. Terrell Bartlett Engineers, Inc., Calcasieu Building, is engineer.

Houston Lighting & Power Co., Houston, Tex., has awarded general contract to Don Hall, Cotton Exchange Building, for three-story and basement equipment storage and distributing plant, 100 x 150 ft., including repair department and garage, to cost \$250,000 with equipment. Robert J. Cummings, Bankers' Mortgage Building, is consulting engineer.

Houston Gulf Gas Co., San Antonio, Tex., is planning construction of new natural gas pipe line from Jennings gas field, Zapata County, to Monterey, Mexico, about 140 miles, to cost more than \$650,000 with compressor stations and other equipment.

Texarkana & Fort Smith Railway Co., Texarkana, Tex., operated by Kansas City Southern Railway Co., Kansas City, Mo., is completing plans for new locomotive shops at Dowling, near Port Arthur, Tex., where home site will be developed for employees, to cost more than \$300,000 with equipment.

D. S. Mair Machinery Co., Houston, Tex., has been appointed agent in Texas for Whiting Corporation, Harvey, Ill., to handle Whiting and Swenson lines.

Indiana

INDIANAPOLIS, Oct. 15.—Wheeler-Schebler Carburetor Co., Inc., 1302 Barth Avenue, Indianapolis, has awarded general contract to Schlegel & Roehm, 602 Lexington Avenue, for three one-story plant units, to cost about \$65,000 with equipment. D. A. Bohlen & Son, Majestic Building, are architects.

Delco-Remy Corporation, Anderson, manufacturer of automobile starting and lighting equipment, has approved plans for one-story addition to plant at Dayton, Ohio, 75 x 120 ft., to cost about \$50,000 with equipment. A 15-ton traveling crane will be installed.

Auburn Automobile Co., Auburn, Ind., has plans by Austin Co., Cleveland, for one-story plant unit at Connersville, 80 x 100 ft., to cost about \$80,000 with equipment.

Wayne Pump Co., Fort Wayne, Ind., manufacturer of self-measuring gasoline pumps, tanks, air compressors, etc., has acquired Boyle-Dayton Co., Los Angeles, manufacturer of kindred equipment, and will operate as a Pacific Coast division, changing name to Wayne-Dayton Co. Los Angeles plant will be continued for present line, as well as for assembling of Wayne type pumps for coast distribution, expansion will be carried out.

General Motors Corporation, Detroit, is having plans drawn for a two-story service, repair and parts plant at Indianapolis, to cost about \$150,000, for one of its manufacturing divisions not yet announced. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Cleveland

CLEVELAND, Oct. 15.—Machine tool business continues good in single orders which are coming largely from plants affiliated with the automotive industry. Some forging and stamping companies are adding to their tool room equipment. Buyers usually want quick shipments, but a number of manufacturers are slow on deliveries. Not a great deal of business is coming at present from the automotive industry in the Michigan territory, although the Olds Motor Works, Lansing, during the week purchased ten multiple and double-spindle drilling machines.

Other orders during the week included a 6-in. vertical shaper purchased by Defiance Pressed Steel Co., Defiance, Ohio, and two double-spindle drilling machines bought by Cleveland Tractor Co., Cleveland. Presses continue in good demand. Mullins Mfg. Co., Salem, Ohio, bought two toggle and four double-crank presses the past week. This order amounted to approximately \$125,000. These machines comprise a first unit to be purchased for equipping an extension to be erected by the Mullins company. It is understood that four additional similar units will be required.

Western Stamping & Mfg. Co., which has had its headquarters in St. Paul, Minn., has acquired a plant with 30,000 sq. ft. of floor space on Settlement Road, Parma, a Cleveland suburb, and will move its general offices to Cleveland. This company for some time has been operating a branch factory at 2798 East Eighty-third Street, Cleveland. It conducts a general sheet metal stamping business and also manufactures automobile license plates and highway signs. T. R. Willwerheid is president, and B. A. Preus general sales manager.

Precision Castings Co., Syracuse, N. Y., has purchased a site on Berea Road, near West 117th Street, Cleveland, and will erect a plant to manufacture die castings.

Wasmer Bolt & Nut Co., Cleveland, recently incorporated, will establish its plant in Bramley Storage & Power building, Athens Avenue.

Stebbens & Rich Brass Mfg. Co., Cleveland, recently organized, will establish plant at 6723 Denison Avenue, to manufacture plumbing supplies.

Cleveland Metal Hose Co., has been incorporated and is erecting a plant at 3710 East Ninety-third Street, to manufacture metal hose. Edward S. Pierce is president and general manager.

Fisher Machine Co., Toledo, Ohio, maker of production machines and tools, formerly at 607 Jefferson Street, is now operating in its new plant at 2109 Canton Avenue.

Gifford Metal Specialties Co., Inc., Toledo, has acquired Lober Radiator & Mfg. Co., 126-134 Eleventh Street, and is operating at that location, specializing in stamping, metal spinning and sample work. A. C. Gifford is president and general manager.

Lorain Automatic Icer Co., Lorain, Ohio, has been organized to manufacture automatic refrigerators. Factory at Lorain has been leased where compressors for unit will be made. Refrigerators and other parts will be purchased and assembly work done at factory. H. E. Hageman, secretary Lorain Telephone Co., is president.

Contract has been let by Lyons Machine Co., 5601 Tillman Avenue, Cleveland, to D. Gilchrist Co., Berea, Ohio,

for one-story addition to machine shop, 50 x 50 ft., to cost about \$30,000. W. G. Caldwell, Ontario and St. Clair Avenues, is architect.

Citizens Necessities Co., Toledo, Ohio, George C. Shepard, vice-president and general manager, is planning construction of two ice-manufacturing plants to cost more than \$400,000 with machinery.

Seiberling Rubber Co., Akron, Ohio, manufacturer of automobile tires and tubes, is planning an expansion and improvement program to cost more than \$400,000.

Cleveland Cutter & Reamer Co., 7406 Madison Avenue, Cleveland, plans one-story addition, 39 x 80 ft., to cost about \$35,000 with equipment.

Willys-Overland Co., Toledo, has awarded general contract to H. J. Speiker & Co., Elm and Utica Streets, for one-story addition to plant on Central Avenue, to cost about \$100,000 with equipment.

Board of Education, Maple Heights, Ohio, contemplates installation of manual training equipment in new high school to cost \$225,000, for which plans will be drawn by A. M. Allen Co., 7016 Euclid Avenue, Cleveland, architect and engineer.

Cincinnati

CINCINNATI, Oct. 15.—That machine-tool sales in the first half of October were sustained at the high level which prevailed in September is the report of local builders. Much of the business is coming from automobile manufacturers, especially from those putting out new models. In some cases orders from the Detroit district are as high as 50 to 60 per cent of current bookings, although the average for the entire market probably would be somewhat less.

Tractor makers have bought small quantities of tools for expanding output, and airplane companies still are a buying factor of consequence. Pending orders are of substantial volume and give promise of a continuation of heavy purchases during at least the next 30 days. Meanwhile, production schedules are taxing the capacity of certain local machine-tool plants, the unfilled orders of which are large.

Cincinnati Car Co., Cincinnati, manufacturer of street cars and industrial locomotives, and Versare Corporation, Albany, N. Y., maker of buses, trackless trolleys and trucks, are to be merged and production centered at Cincinnati. Plans have been approved by boards of directors and await ratification by stockholders.

Ohio Steel Foundry Co., Lagonda Avenue and Gothic Street, Springfield, Ohio, is considering three-story plant unit, 60 x 150 ft., to cost more than \$50,000.

City Council, City Hall, Cincinnati, C. O. Sherrill, city manager, has plans for development of Luken municipal airport in East End section, including hangars, repair and reconditioning shops, and other units, to cost \$375,000. Kruckemeyer & Strong, St. Paul Building, are architects.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Oct. 29 for tow target windlasses and tow target windlass parts, circular 132.

Tennessee Enamel Mfg. Co., Cleveland, Tenn., recently organized by W. B. Evans, Sterling Court, Nashville, Tenn., and as-

sociates, has awarded general contract to W. L. Hailey & Co., 314 Forty-second Avenue North, Nashville, for initial unit of new plant, 200 x 200 ft., on 7-acre tract, to manufacture metal enameled products, to cost more than \$80,000 with equipment.

Board of Water Commissioners, 105-7 North Second Street, Memphis, Tenn., is asking bids until Nov. 7 for a steam turbine reduction gear-driven centrifugal pumping unit and condensing auxiliaries, with capacity of 15-million gal. per day; and one secondary hydraulic-driven pumping unit, with capacity of 1-million gal. per day. James Sheahan is general superintendent.

R. J. Smith Co., Somerset, Ky., plans installation of electrically-operated cold storage plant, to cost about \$40,000 with equipment.

Board of Education, Owensboro, Ky., plans construction of manual training shop for colored students at Western School, and has authorized fund of \$150,000 for this and other school expansion.

Atlantic Ice & Coal Co., Atlanta, Ga., is planning new ice-manufacturing plant at Knoxville, Tenn., to cost about \$180,000 with machinery.

Milwaukee

MILWAUKEE, Oct. 15.—The first half of the month has witnessed further developments in business of machine-tool builders, and dealers also have been greatly encouraged by the volume of transactions. Machine-tool plants as a rule, are operating at capacity, with some working overtime and night shifts in an effort to make specified deliveries.

Belle City Malleable Iron Co., Racine, Wis., which is completing an addition, 77 x 96 ft., has placed contracts with Nelson & Co., local builders, for a power plant addition, 50 x 81 ft., two stories. Engineers are A. A. Wickland & Co., 205 West Wacker Drive, Chicago. C. S. Anderson is secretary-treasurer and general manager.

Badger Foundry Co., Holborn and DeKoven Avenues, Racine, Wis., is starting work on a core-room addition, 70 ft. square, and is inquiring for core-oven equipment.

Vollrath Co., Sheboygan, Wis., manufacturer of enameled utensils and ware, has plans by Richard Philipp, architect, 405 Broadway, Milwaukee, for a one-story addition, 150 x 160 ft., for manufacturing, storage and warehousing. Contracts will be let about Oct. 20.

Gillette Rubber Co., 799 Wisconsin Avenue, Eau Claire, Wis., has placed general contract with Hoeppner-Bartlett Co., local, for a one-story addition, 128 x 200 ft., with foundations for three additional stories. Present work will cost about \$50,000, exclusive of equipment.

Standard Oil Co. of Indiana plans an investment of over \$75,000 in warehouse, tank storage and garage building at Wisconsin Rapids, Wis. Plans are being made by R. N. Allen, company engineer, 910 South Michigan Avenue, Chicago.

Wisconsin Creameries, Inc., 342 Sixth Street, Milwaukee, will spend \$200,000 in construction and equipment of a three-story refrigerator house and distributing plant, 105 x 152 ft. M. Tullgren & Sons Co., 20 Prospect Avenue, are architects.

Detroit

DETROIT, Oct. 15.—Bean Spray Pump Co., Lansing, Mich., is planning one-story addition, to cost about \$40,000 with equipment. J. N. Churchill, Lansing, is architect.

Joseph N. Smith Co., 5914 Federal Avenue, Detroit, manufacturer of automobile hardware, has awarded general contract to Wood Co., Ford Building, for two-story addition, 150 x 800 ft., to cost about \$200,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Motor Wheel Corporation, Lansing, is reported planning one-story addition, 200 x 220 ft., for wire wheel division, to cost more than \$175,000 with equipment. Another unit will be built for hub production.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Owen-Ames-Kimball Co., Grand Rapids, Mich., for four-story factory branch and distributing plant at Grand Rapids, to cost about \$115,000 with equipment.

Board of Supervisors of Wayne County, Court House, Detroit, has authorized purchase of property at Goddard and Middle Belt Highways for new County airport, and has provided for fund of \$2,000,000 for establishment, including hangars, repair and reconditioning shops and other units.

Department of Public Works, City Hall, Detroit, is asking bids until Nov. 14 for equipment for new Connors Creek pumping plant, to cost \$1,250,000 with machinery. B. A. Fellows, City Hall, is city engineer.

Nichols & Shepard Co., Marshall Street, Battle Creek, Mich., manufacturer of agricultural implements, is planning one-story addition, 100 x 400 ft., with smaller unit, 90 x 100 ft., to cost more than \$225,000 including equipment.

Heney Motor Corporation, Freeport, Ill., has purchased plant and business of Weatherproof Body Corporation, Corunna, Mich., and will continue operations as a division of its business. E. C. Morine, heretofore president and general manager of Weatherproof company, will continue with purchasing company, acting as manager of Corunna plant.

Crane Co., 836 South Michigan Avenue, Chicago, is completing plans for one-story factory branch and distributing plant at Detroit, including pipe shop, to cost more than \$100,000 with equipment. Weston & Ellington, Stroh Building, are architects.

Wilcox-Rich Corporation, 6-240 General Motors Building, Detroit, has been formed as consolidation of Rich Products Corporation and Wilcox Products Corporation to manufacture automobile valves, tappets and piston rings. Plant formerly maintained at Detroit by Wilcox corporation is being removed to Marshall, Mich., and some additional machinery is being purchased at Battle Creek and Saginaw, Mich., plants. C. H. L. Flinterman, formerly president of both corporations, is president of consolidated organization. He was previously vice-president and general manager Detroit Pressed Steel Co. and prior to that vice-president Midland Steel Products Co.

Michigan Steel Tube Products Co., Buffalo Street, Detroit, will make extensions and improvements to cost \$300,000. Plans include added manufacturing equipment and extensions to manufacturing building and steel storage buildings. When completed company will have monthly capacity of 5,500,000 ft. of electrically welded steel tubing.

St. Louis

ST. LOUIS, Oct. 15.—Contract has been let by Brass & Copper Sales Co., 1712-14 Chestnut Street, St. Louis, to A. H. Haeseler Building & Contracting Co., Wainwright Building, for a two-story and basement storage and distributing plant, 50 x 130 ft., to cost about \$65,000 with equipment. Klipstein & Rathman, Security Trust Building, are architects.

General Auto & Body Co., 1115 South C Street, Fort Smith, Ark., is planning installation of equipment for repair and reconditioning of automobile bodies, fenders, motor truck and bus bodies, etc. J. E. Finney is in charge.

Evans-Wallower Lead Co., 118 East Fourth Street, Joplin, Mo., is arranging for a preferred stock issue of \$1,125,000, proceeds to be used primarily for erection of new electrolytic zinc plant at East St. Louis, Ill.

Kroger Grocery & Baking Co., 3801 Vista Avenue, St. Louis, has plans for one-story motor truck repair and reconditioning shop, with garage unit, 107 x 360 ft., to cost more than \$100,000 with equipment. Emil H. Nieman, 3816 Shaw Avenue, is architect.

Independent Oil & Gas Co., Tulsa, Okla., has work under way on pipe line to refinery at Okmulgee, Okla., and will increase capacity of refinery from 5000 to 10,000 bbl. per day. Plans are under consideration for installation of pipe line from Okmulgee to point in Greenwood County, Kan., to connect with present line running to Kansas City refining plant.

Home Fertilizer Co., Little Rock, Ark., is planning new plant at Texarkana, Ark., to cost about \$50,000 with equipment. Martin E. Williams is general manager.

Board of Education, Genoa, Neb., is said to be planning installation of manual training shop in two-story high and grade school to cost about \$120,000, for which plans are being drawn by G. Grabe, 304 East Sixth Street, Fremont, Neb., architect.

Pacific Coast

SAN FRANCISCO, Oct. 11.—Imperial Irrigation District, El Centro, Cal., will arrange bond issue of \$1,700,000 for construction of three hydroelectric power plants, utilizing water of valley canals; also bond issue of \$1,800,000 for extensions and improvements in drainage system, pumping system, etc. M. J. Dowd is chief engineer.

Board of Education, Phoenix, Ariz., plans installation of manual training equipment in new high school to cost more than \$400,000, for which bids have been asked on general contract. Lescher & Mahoney, Phoenix, are architects.

Crane Co., San Francisco, and 836 South Michigan Avenue, Chicago, has plans for new one-story factory branch and distributing plant at Emeryville, Cal., to cost close to \$75,000 with equipment.

Union Oil Co., Mills Building, San Francisco, has awarded general contract to William C. Keating, Central Bank Building, Oakland, for new storage and distributing plant at Emeryville, Cal., to cost about \$100,000 with equipment. Engineering department of company is in charge.

Sethman Generator Co., Denver, Colo., manufacturer of electric generating apparatus, is said to be planning construction of new plant at Santa Ana, Cal., and will later remove entire plant to that location, where production will be con-

centrated. Project will cost about \$100,000.

Board of City Trustees, Alturas, Cal., is considering installation of a municipal electric light and power plant to cost about \$150,000, including power lines.

Puget Sound Power & Light Co., Seattle, has authorized construction of first unit of new steam-operated electric power plant on Lake Washington, near Renton, with capacity of 35,000 kw., to cost about \$5,000,000 with transmission lines. Later additional units of like size will be constructed, to develop total output of 210,000 kw.

National Paper Products Co., Church Street, Stockton, Cal., will soon begin superstructure for new two-story plant, to cost about \$90,000 with machinery. General contract has been let to Barrett & Hilp, 918 Harrison Street, San Francisco. Leland Rosener, 233 Sansome Street, San Francisco, is engineer.

Ontario and Chaffey Union High School District, Ontario, Cal., is having plans drawn for an addition to mechanical arts building, to cost about \$35,000 with equipment. An industrial high school unit is also planned. Allison & Allison, Hibernian Building, Los Angeles, are architects.

Canada

TORONTO, Oct. 15. — Machine-tool sales, while mostly in units of one or two, total a good volume. A few small lists have recently appeared and others for complete new plant equipment are in preparation. The automotive industry is showing more interest in the market and some extensive buying is expected for new works. A good demand for equipment is coming from pulp and paper mills, power development, mining and wood-working plants. Second-hand tools are also moving well.

Dominion Alloy Steel Corporation, Sarnia, Ont., is arranging for installation of equipment to double present capacity.

Canadian Goodrich Co., Kitchener, Ont., will erect an addition to its plant to cost \$250,000, which will provide 35 per cent increase in production.

Factory at Dundas, Ont., owned by Jones Brothers Co., Ltd., manufacturer of show cases, office furniture, etc., was damaged by fire Oct. 12, with a loss of \$30,000. It will be rebuilt and new equipment installed.

Anglin-Norcross, Ltd., Temple Building, Toronto, general contractor, has awarded a number of sub-trades for \$150,000 addition to plant of Flint Paint & Varnish Co., Ltd., Perth Avenue. Construction work will be started immediately.

Church Ross Co., Ltd., 698 St. Catharine Street West, Montreal, has let sub-trades for \$235,000 addition to plant of American Can Co., 2065 Jeanne d'Arc Street.

Northern Rubber Co., Metcalfe Street, Guelph, is asking bids for erection of factory to cost \$50,000. James, Proctor & Redfern, Ltd., Excelsior Life Building, Toronto, are engineers. It will be two stories and basement, 60 x 120 ft.

A. H. Coplan, 7 Elemor Avenue, Ottawa, Ont., will build an addition to iron and steel foundry at Hull, Que., to cost \$250,000.

N. Slater Co., Sydney Street, Hamilton, Ont., manufacturer of hardware specialties, etc., will build a two-story addition, 100 x 160 ft., to cost \$25,000. Mitchell

& Riddell, 46 Head Street, have general contract.

B. Greening Wire Co., Ltd., 55 Queen Street North, Hamilton, Ont., has let contract to Stuart Brothers, 15 Hyde Park Avenue, for one-story addition.

Foreign

PLANS are under way by Soviet Russian Government for purchases of agricultural implements, tractors, and kindred equipment. S. S. Loboff, vice-president of Supreme Economic Council of Government, accompanied by other members of Council, has arrived in United States primarily for this purpose and will make headquarters at offices of Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Government. Another delegation headed by W. Korobovkin, president of Embanef, one of three large oil producing organizations in Soviet Russia, has also arrived in United States to purchase oil refining equipment and other oil field apparatus, including storage and distributing equipment, and also will make headquarters at Amtorg Trading Corporation offices.

Electric Bond & Share Co., 2 Rector Street, New York, has purchased electric properties in Chile and Mexico of Whitehall Electric Investments, Ltd., London, to be operated by American & Foreign Power Co., a subsidiary of purchasing company. Acquisitions include companies in Santiago and Valparaiso, Chile; Tampico, Puebla and Vera Cruz, Mexico. Sale involves about \$50,000,000. New owner plans expansion and improvements.

Commonwealth Department of Works and Railways, Chelford House, Flinders Lane, Melbourne, Australia, is planning construction of new railroad in Western Australia, known as the Ejanding, and is expected to ask bids for equipment and supplies at once. Project will cost about \$2,000,000.

Gronberg & Co., Dickursby, near Helsingfors, Finland, have approved plans for a new plant for production of carbon dioxide, white lead and kindred products, to cost more than \$400,000. Company is operating with capital of 3,600,000 Finnish marks.

Graham-Paige Motors Corporation, Detroit, has acquired property at Johannisthal, Germany, with building totaling about 57,000 sq. ft. for establishment of new assembling plant.

New Trade Publications

Kinite Dies and Tools.—Kinite Corporation, Milwaukee. Booklet No. 11 describes this patented alloy steel which may be cast in intricate shapes, forged if necessary, and machined. It is said to heat-treat and air-harden with negligible distortion and to resist heavy pressures without change in dimension.

Gasoline Locomotives.—Mid-West Locomotive Works, Hamilton, Ohio. Booklet of 24 pages describing gear-driven gasoline locomotives in four sizes, from 4 to 10 tons. Specifications for the 10-ton unit show four speeds up to 13½ miles an hour. Illustrations show both details and installation views.

Dry Coke Quencher.—Dry Quenching Equipment Corporation, 200 Madison Avenue, New York. Folder DQ-3 of six pages illustrates and describes the Sulzer dry quenching equipment for coke. The unit shown has a capacity of 15 tons in 24 hr. It uses the heat to produce steam.

THE IRON AGE

New York, October 25, 1928

ESTABLISHED 1855

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Profits by Close Material Control

Timing Deliveries to Meet Production Schedules, Based on Sales Forecasts, Permits Stutz Company to Turn Over Stock 15 Times Yearly

BY L. A. BARON*

MAINTENANCE of a minimum inventory to secure maximum turnover is the basic principle of the plan for controlling materials which has enabled the Stutz Motor Car Co. of America, Inc., to turn over its stock 15 times annually in the past two years. This is done by timing deliveries of purchased goods to meet current production schedules established as a result of frequent forecasts of sales. In fact, stock has been so controlled that the physical inventory as compared with the book inventory has shown a shrinkage of less than $\frac{1}{2}$ of 1 per cent in value. An account of the factors entering into these accomplishments involves an explanation of the system for regulating stocks.

About 5 per cent of the parts going into direct material costs of the Stutz automobile are fashioned from raw materials in our plant, the remaining 95 per cent coming to

*Comptroller, Stutz Motor Car Co. of America, Inc., Indianapolis.

us as rough, semi-finished or finished parts. Regardless of the state in which material is received it is considered "productive material" from the standpoint of accounting, and therefore no distinction is made on our books. In fact, the designation "productive material" is used for all direct material costs up to the time that shipments are transferred to "cost of sales."

Every piece entering into the Stutz car is either designed or specified by the engineering department. The individual pieces or parts are given both name and number, by which they are identified thereafter. When a new part is designed, a blueprint giving the necessary specifications is furnished the purchasing department for use in ordering the part or the material from which it is to be manufactured. A copy of the blueprint and an "experimental material release notice," Fig. 1, is sent to all other departments concerned. This notice states whether the part is to be manufactured in the plant or is to be purchased and speci-

Incoming Materials Are Promptly Inspected Either In the Receiving Room or On the Assembly Floors. The inspection of valve springs and timing chains is shown



fies the name and number of the part, the material and other details. If the design proves satisfactory in experimental work, the part is approved by the chief engineer and is released for production on a form designated as an "engineering release," Fig. 2. It then is written into the "bill of materials," the form of which may be noted from Fig. 3, and becomes a part of our product thereafter. Changes in the design of parts in production are covered by the "engineering change" notice, Fig. 4, and such changes are written into the bill of materials. Incidentally, the bill of materials is an important requisite, being used constantly by the purchasing department, foremen, inspectors, stock chasers, cost accountants and others.

Material Contracts Based on Sales Forecasts

Near the end of the year the management and the sales department together forecast the probable sales volume for

the following year. When this information is released, the purchasing department solicits bids and places contracts for the estimated requirements for the 12 months. The contracts, which cover not only probable production needs, but also spoilage and service requirements, generally do not designate specific quantities of material.

Production materials are ordered from vendors on the purchase order, shown in Fig. 5. This order is made up from a purchase requisition which specifies the shipping date, and gives a complete description of the part, packing instructions, price and terms. A special order form is used for service stores, and another for factory supplies and expense items.

Before the purchase order is released to the vendor, study of the processing time must be made for each part. By process time is meant the vendor's time, plus transpor-

EXPERIMENTAL
MATERIAL RELEASE NOTICE

Please make purchase the following for Series

Part Number

Part Name

Quantity Wanted

Material

Remarks:

Where Used

Quantity Used

Signed

Date

Copies to:
Management
Purchasing Dept.
Accounting Dept.

FORM 12B

STUTZ MOTOR CAR CO. OF AMERICA, INC.
INDIANAPOLIS

FORM 79 5M 6-28

ENGINEERING RELEASE

PART NAME

PART No.

COPIES TO

LATEST REVISED DATE OF DRAWING

PATTERN OR DIE NO.

AFFECTS MODELS

SUPERCEDES

HAS PART BEEN USED IN PREVIOUS PRODUCTION?

REMARKS

WHEN IS PART TO GO INTO PRODUCTION?

SIGNED

DATE

STUTZ MOTOR CAR CO. OF AMERICA, INC.
INDIANAPOLIS

FORM 123 10M 3-28

ENGINEERING CHANGE

PART NAME

PART No.

COPIES TO

LATEST REVISED DATE OF DRAWING

LAST CHANGE LETTER

PATTERN OR DIE NO.

AFFECTS MODELS

SUPERSEDED BY

DETAILS AND REASON FOR CHANGE

WHEN IS CHANGE EFFECTIVE?

DISPOSITION OF STOCK

ROUGH

FINISHED

ASSEMBLIES

SERVICE

IS PATTERN OR DIE TO BE CHANGED?

IS INTERCHANGEABILITY AFFECTED?

SIGNED

REQUESTED BY

DATE

19

Fig. 1 (upper left)—Experimental Release Notice Issued by Engineering Department
Fig. 2 (upper right)—The Engineering Release Notifies All Departments That the New Part Is to Be Put into Production
Fig. 4 (lower right)—Changes In Parts In Production Are Made on the Engineering Change Notice

SERIES BB

STUTZ MOTOR CAR CO. OF AMERICA INC. 131" W.B. CHASSIS -									
GENERAL DIVISION 131" W.B. Chassis			SUB DIVISION COOLING SYSTEM		No. V		REMARKS Purchase		SHEET No. 261-2
CAR No. To INCL.			GROUP Radiator and Connections		No. 1		APP'D BY		DATE 6-15-28
LINE No.	STUTZ PART No.	DWG SIZE	NAME OF PART		MATERIAL	NO. REQD.	GENERAL REMARKS		MAKERS PART No.
1	24884	B	Radiator Cap		Red Brass - N. P.	1			
2	21468	A	Radiator Cap Gasket		Lead	1	Radiator Cap to Filler Neck		
3									
4	20584	B	Radiator Cap Ornament		Bright Chrom. Plated Finish Die Casting	1			
5	21056	A	Plain Washer - 41/64 I.D.x 1-9/32 O.D.x 1/32 Thick		Brass or Zinc	1	Radiator Cap Ornament to Cap		
6	20837	A	Washer - 5/8 I. D.x 1-1/4 O.D.x 1/32 Thick		Rubberised Fabric	2	Radiator Cap Ornament to Cap		
7	20888	A	Hex. Nut - 5/8-20 Special Crown		Brass	1	Radiator Cap Ornament to Cap		
8									
9									
10									
11									
12	20871	A	Starting Crank Cap		Sheet Alum. Alloy Polished or Steel Stamp.- N.P.	1	Snaps into Radiator Shell		
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
GEN. DIV. BILL OF MAT. FOR SERIES 131" WHEEL BASE CHASSIS - AFTER APPROX. 2500 SERIES BB CARS						THIS SHEET SUPERSEDES SHEET DATED THIS SHEET IS SUPERSEDED BY SHEET DATED			

Fig. 3—Bill of Materials. Upon completion of experimental work, the new part, if approved by the chief engineer, is released for production. At the same time, all necessary data are written into the bill of materials

tation time, plus our time. Thus, when the purchasing department contracts for the purchase of a part, it obtains the vendor's process and shipping time. Moreover, when the engineering department releases a part for production, the material supervisor informs the purchasing department as to the factory process time, which varies from 48 hr. on local pick-up items to 90 days on such parts as bodies and crankshafts. When production is being maintained on schedule, bodies and crankshafts for cars coming off the assembly line today should have been received not less than 20 days previously.

Five copies are made of the purchase order, one of which is sent to the vendor, one to the cost department and one to the receiving department, while two are retained by the purchasing department.

Materials and Supplies Controlled by Material Supervisor

As soon as material enters the plant it passes under the control of the material supervisor, who has charge of all "productive material" and factory supplies within the plant. The receiving room, interior trucking, stock chasers' material records and many other activities are under his supervision. About 90 per cent of the parts received are unpacked and counted in the receiving room, the remaining 10 per cent, constituting bulky materials such as cushion springs, fenders, bodies and frames, being delivered directly to the first station along the production line.

The receiving department makes out the report shown in Fig. 6 for every lot of material delivered to the plant. Six copies are prepared. The first is attached to the vendor's invoice and forwarded to the accounting department, while the second is used by the purchasing department to complete its record of the purchase order. The third is re-

tained in the receiving department, and the fourth is sent to the material supervisor to complete the material record. The fifth and sixth are sent with the material to the receiving inspection room, the former being kept by the inspection department and the latter going to the point on the assembly line where the material is to be used.

Incoming Material Inspected

All materials are inspected in the receiving inspection room or on the assembly floors as rapidly as delivered. While in the process of inspection the materials are temporarily out of the jurisdiction of the material supervisor and are under control of the chief inspector, who is responsible directly to the president of the company.

Parts that do not pass the receiving inspection are covered by the "defective material receiving inspection report," shown in Fig. 7, which, in addition to a complete description of the material, records the vendor's name, purchase order number and the reasons for rejection. In case the supplier has failed to comply with our specifications, the report is stamped "return to vendor for replacement." A similar report is used for parts having defects that are found later in the course of production and for which the vendor is responsible. The only difference between the two reports is that the latter states the department in which the material was found and how far it had progressed along the line toward completion.

Both reports are filled out in triplicate, one copy being sent to the material supervisor for his records, the second to the purchasing department for use in making replacement purchase requisitions and in preparing shipping instructions for the return to vendor; and the third is retained by the inspection department. The purchasing department makes out a shipping order, and the vendor is

As a further means of controlling material, one person in each department is designated to watch the stock. He may be a member of the stock department or an assistant foreman. On every part a minimum quantity is set to comply with production schedules and when the supply approaches the minimum, a report is made to the material supervisor. The reports, made by each department, are compiled each morning into a "dangerous shortage report." This shortage list is checked against unfilled purchase orders and steps are taken to expedite deliveries or to place orders to cover the shortage.

When the material supervisor checks his records against the "dangerous shortage report" he ascertains the reason for the shortage. If the shortage cannot be reconciled with the stock records, he issues an "unaccountable loss" report, or "productive material loss" report, Fig. 8, in duplicate and corrects his records to conform to the actual count. One copy of this report, which shows the quantity lost and the department responsible, is sent to the purchasing department

for a "shortage purchase order" and the other is forwarded to the cost department for charges against the department responsible and credit to inventory.

How the Inventory Is Maintained

An inventory of cars in process and of finished cars is kept both by the sales order department and the material supervisor. While we try to build the cars to predetermined production schedules, in reality our operations are usually governed by the number of bodies received. The inventory is maintained in the following manner. When a sales order is received, the order department checks over the inventory to ascertain what cars are in process and what are completed, ready for shipment. If no cars are available, a sales shipping order is made out and a copy dispatched to the material supervisor. As soon as a suitable body is received, the order is released for production. When bodies arrive for which there is no shipping order, the material super-

FORM NO. 184

STUTZ MOTOR CAR CO. OF AMERICA, INC.

DEFECTIVE MATERIAL—IN PROCESS

DEPARTMENT RESPONSIBLE

DATE

ORIGINAL—MATERIAL CONTROL DEPT

PART No.

PART NAME

QUANTITY

LAST ORDER No.

THIS SPACE FOR MATERIAL CONTROL DEPT.

FROM DEPT.

DESIGNATE REPAIRABLE? YES OR NO

DEF. MTL. TAG No.

SHIP'S ORDER No.

DATE SHIPPED

NATURE OF DEFECT AND REPAIRS NECESSARY:

SHIPPED VIA

FORM NO. 185

STUTZ MOTOR CAR CO. OF AMERICA, INC.

DEFECTIVE MATERIAL—RECEIVING INSPECTION

VENDOR RESPONSIBLE

ORIGINAL—MATERIAL CONTROL DEPT.

DATE

PART NAME

PART No.

VENDOR

REC'D FROM

ON REC. REPT. No.

P. O. No.

QUANTITY RECEIVED

QUANTITY REJECTED

DESIGNATE REPAIRABLE? YES OR NO

NATURE OF DEFECTS AND REPAIRS NECESSARY

THIS SPACE FOR MATERIAL CONTROL DEPT.

SHIP'S ORDER No.

DATE SHIPPED

SHIPPED VIA

P. O. No.

COST

PER

WEIGHT

VENDOR

CHARGE REPAIRS TO

ESTIMATED COST OF REPAIRS

DEF. MTL. TAG No.

INSPECTOR

Form 325

Stutz Motor Car Co. of America, Inc.

PRODUCTIVE MATERIAL LOSS REPORT

ORIGINAL

Date

Part Name or Description

Part No.

Total Quantity on Hand as of Inventory Date

Total Received since Inventory

Total Debit

Requirements on Shippers since Inv.

Scrap Losses Reported

Service Withdrawals

Total Credit

Net Pieces to Account for

Actual Count on Hand Today

Quantity Short

Cost Department is authorized to charge the value of the above shortage as an expense against Dept. No.

Supervisor of Materials

Supervisor of materials will report all losses of Productive Materials on this form. Duplicate will be forwarded to the Cost Dept.

Fig. 7 (lower right)—The Defective Material Vendor Responsible Report Is Issued for All Parts that Fail to Pass Receiving Inspection. A similar report is made for parts found defective in production and for which the vendor is responsible

The report at the upper left is used for accounting for and replacing damaged parts for which the production departments are responsible

Fig. 8 (lower left)—Productive Material Loss Report Used by the Material Supervisor

visor notifies the sales order department which issues a stock order.

The sales order department and the material supervisor keep records of the bodies received and in process, the records being divided into the various body types. Data given include the paint and trim specifications for each body in process, which is necessary to comply with our sales policy of "no two cars alike," the date that the body passed through the paint and trim department, when it was mounted on the chassis, when the car assembly was completed, when the car passed the final test, the date of shipment and the shipping order number. This record, which is completed daily, is the only inventory of finished products which we carry; it enables the management to tell when any sales order can be filled. Incidentally, for accounting and cost purposes, all cars are in process until they leave the plant for delivery to customers.

Control and purchase of materials for service stores and of factory supplies are handled in the same manner as for productive materials. Service stores is charged with the value of all purchases for its account and is credited with the cost of service parts sales, while supply stores is charged with the value of supply purchases and is credited through the medium of all requisitions covering withdrawals.

It is always necessary for service stores to draw on production for current productive items, such cases being accounted for by means of requisitions whereby productive material stores is properly credited and service stores debited. The material supervisor keeps his material records up to date from these requisitions before they are passed to the cost department for costing and for transfer of charges.

Material Records Compiled from Receiving and Other Reports

The material supervisor compiles his material records from the "receiving reports" covering receipt of goods, "defective material reports" for vendor defects and departmental spoilage, "unaccountable loss reports" for other losses and pilferage, and requisitions for withdrawals by the

service department. To ascertain the amount of any given part on hand at any time he figures as follows: Quantity at last physical inventory, plus receipts, and minus returns, the result being the net total debit; scrap, plus service withdrawals, plus requirements on cars produced, gives the total credit; net debit, minus total credit, gives the quantity on hand.

All goods entering the plant are covered by a receiving report, a copy of which is matched by the vendor's invoice and is forwarded to the accounting department. The matching of the receiving reports and the vendor's invoice is done by the purchasing department after it has checked invoices for price, terms and quantity. Every purchase order shows to what account the purchase is to be charged, this information also being written into the receiving report in the receiving department, which obtains the information from its copy of the purchase order. When the accounting department gets the invoices with the receiving reports, it analyzes the purchases on cards. These tabulated data make up the "contra account" for the accounts payable journal.

Car Sales Analyzed Monthly

Analysis of productive material is made in detail and shows the part number, quantity, price of each and the total amount. This information is posted in the material cost records, which are made up in the form of a ledger with separate sheets for each part shown in the bill of materials. Each sheet carries all of the information given in the bill of materials for each part, such as the usage per type of car and the place where the part is used on the car. These parts vary in price from 0.0001 cents for many small items, to \$1,800 for custom built bodies.

Each month the cost department analyzes car sales, separating the cars into different groups. The material cost of each group shipped is compiled, using data contained in the bill of materials and in the material cost records. The total cost is computed by adding up the material costs of the groups. Cost of car sales is then debited and productive material inventory credited.

Aging of Cold-Drawn Metals

In the experimental work described by Dr. L. B. Pfeil, University College, Swansea, in a paper read before the (British) Iron and Steel Institute at the meeting in September at Bilbao, Spain, the tensile test was employed as a measure of the capacity of the metal to undergo age-hardening after cold-drawing, and it is shown that the phenomenon is chiefly due to the presence of carbon. Carbon-free iron is not subject to aging, but iron containing as little as 0.0025 per cent of carbon shows well-developed aging. Iron containing ferrous oxide also exhibits the phenomenon. It is suggested that both carbon and iron oxide are soluble to a small extent in ferrite at ordinary temperatures, but that the solubility is less in distorted crystals, with the result that hardening and strengthening of the duralumin type occurs after cold-working.

Standard Skid Platforms

In order to further the method of shipping goods to ultimate destination on skid platforms, the Division of Simplified Practice of the Bureau of Standards has recommended that the clearance heights be fixed at 8 or 12 in. and the minimum clearance between supports be 29 in. It is estimated that \$700,000 is expended annually in loading and unloading goods which can be shipped on skid plat-

forms, and of this cost approximately one-half would be saved by so doing. This practice facilitates handling all along the line of movement from factory to consumer. Goods thus prepared for shipment are loaded into cars, unloaded onto trucks, and finally moved into the customer's stock rooms without breaking bulk, with a minimum of physical effort, and with a great saving in time.

Short Drop Lessens Segregation in Blast Furnace Burden

To study the changes taking place in porosity of the blast furnace burden, and by that means to get more light on the chemical reactions of iron smelting, the Minneapolis station of the United States Bureau of Mines has been experimenting with scale models one and three feet in diameter. Similar tests have checked quantitatively. Results to date show that, with an equivalent big bell clearance of 2 ft., greater proportions of ore to coke are deposited around the periphery. Coke is also found to have a smaller angle of repose than ore, while larger pieces of ore tend to roll to the center of the furnace. Size segregation may be reduced by depositing material on the stock line as rapidly as possible. This may be accomplished by increasing the bell drop and the angle of the bell, and by decreasing the distance from the stock line to bottom of the bell.

Mass Production of Bolts and Nuts

Manufacture of 3000 Standard Sizes and Types, in Addition to Special Requirements, Calls for Varied and Ingenious Methods and Machines

BY GEORGE A. RICHARDSON*

MODERN demands for mass production, whenever possible and economical, have resulted in the development of distinctive and ingenious methods and equipment for large-scale manufacture of bolts, nuts and related products at the Lebanon, Pa., plant of the Bethlehem Steel Co., where 3000 sizes and types of bolts and nuts are regularly made and carried in stock, not including the much larger variety called for on special specifications.

Plant production sheets show that a minimum of eight and a maximum of 16 to 20 distinct operations are involved in completing a single item, the number depending on the type and degree of finish called for. Each operation requires the use of special machines of various sizes, ranges and capacities.

There are two standards for the manufacture of nuts in common use in this country:

1. *The Shop or Manufacturer's Standard.* Nuts conforming to this are those placed on bolts regularly carried in stock and sold off the shelf. These are sometimes known as bin nuts, a later name which comes from the fact that the nuts are carried in stock in bins. When nuts alone are ordered the United States Standard is usually furnished.

*Bethlehem Steel Co., Bethlehem, Pa.

2. *United States Standard.* Nuts conforming to this standard are slightly larger in dimensions than Shop Standard nuts. Ultimately, both of these standards will be done away with in favor of one sponsored by the Government and various societies. In fact, the movement to effect this simplification is making rapid headway, and shortly the Shop or Manufacturers' Standard will be a thing of the past. Owing to conditions that have to be met, it will take longer to discard the United States Standard entirely.

Nuts are also made hot or cold. In general, all nuts $\frac{1}{2}$ in. and smaller in size are made cold, while those $\frac{5}{8}$ in. and larger are made hot. The exception to this is in the case of $\frac{1}{2}$ in. United States Standard nuts, which may be either hot or cold.

United States Standard nuts are made in different styles and types as follows:

1. Hot pressed, blank and tapped.
2. Cold punched (c. and t.), chamfered and trimmed, blank and tapped.
3. Cold punched (c.p.c. and t.), semi-finished.
4. Bethlehem treated nuts, United States dimensions, specially treated.
5. Standard unit lock nut, United States dimensions, made in same types as above.



Each Hot Nut Machine Is Provided with a Heating Furnace

In addition, Bethlehem makes certain special nuts, including the following:

1. *Ideal Recessed Nut.* This is distinctly a track bolt nut and usually made to special dimensions. It is thicker and of special shape.

2. *Tail Nuts.* Used chiefly on heel bolts on plowshares, etc. So called because of a projecting tail which enables the farmer to turn them up tight by hitting with a stone or hammer.

Bolts are also made to conform to the two standards, although about 1 per cent is made with the United States head in either square or hexagon. Here, too, a movement is on foot to eliminate the two old in favor of the new American standard. Both cold and hot processes are used, the size limit being practically the same as for nuts. In other words, bolts $\frac{1}{2}$ in. diameter x 6 in. long and smaller are made cold. The larger sizes are made hot. All types of bolts are made, including square and hexagon head, carriage, plow, etc.

The problems of a bolt and nut manufacturing plant are complicated by the infinite variety of sizes and types. A further source of complication lies in the big variations in the quantities called for. This condition has a very important bearing on the types of equipment that can be advantageously used and divides the products into two more groupings.

On the one hand are certain products ordered or used in large quantities. In cases of this kind the manufacturer has an

opportunity to utilize the very latest types of automatic machines designed for large-scale mass production.

On the other hand, a large proportion of the products are either of a special nature, or ordered in quantities which do not justify the expense of designing and installing special machinery. In this case, equipment of the more ordinary types must be used, and instead of the highly ingenious automatic machines, semi-automatic and even hand-operated machines are the most economical. This explains why mass production has not been so much employed in some departments as in others.

Both Wrought Iron and Steel Used

Wrought iron and steel are both used in making the finished products. The wrought iron is made direct from pig iron in the puddling department of the Lebanon plant. It is used for the manufacture of boiler staybolts, engine



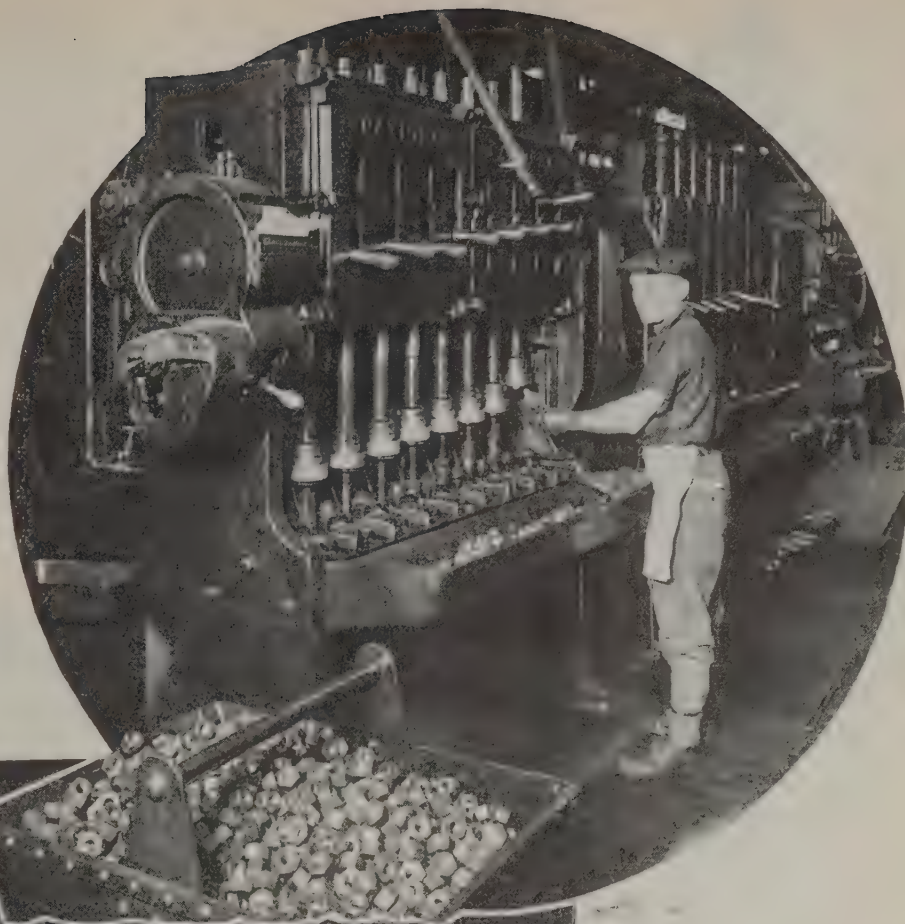
An Electrically Operated Skip Hoist Dumps the Nuts on a Riddler, Shown in Upper Picture, Which by a Jig Motion Separates the Scrap from the Nuts. Tumbling to knock off scale and sharp corners is the next operation. Lower picture shows tumbling machines and inspectors separating bad from good nuts

bolts, etc., and is handled separately. All steel materials are brought in in the form of billets, coils, flats, rounds and wire from other units of the Bethlehem organization.

Commercial bolts, nuts and related products are made from steel, the form of which depends to a large extent on the size of the finished product. In other words, for the larger bolts and nuts which are made hot, bar stock is used, whereas the smaller sizes are made cold from coils of cold-drawn sections or wire.

Large quantities of bar stock in standard sections are used, and a new 10-in. bar mill has recently been put into operation to insure a uniform source of supply. At present, more than 70 per cent of the total requirements of the plant are rolled on this mill. Odd lots and special sizes are rolled on the older type hand mills.

The 10-in. mill is located in a separate building, together with auxiliary equipment. It is of the looping type, assuring the latest and best practice. The general procedure at



Semi-automatic Tappers, Shown Above, Are Used to Tap the Larger Sizes of Nuts, While Smaller Sizes Are Tapped on Automatic Machines. The operations of the cold nut machines (below) follow a sequence similar to that of the hot nut department

this mill is as follows: Steel standard billets 4 in. x 4 in. x 30 ft. long, made in other Bethlehem plants and stocked in a special billet yard, are transferred by crane and charged by electric machine into the upper end of a gas-fired, 72-ton capacity, continuous heating furnace. The billets are gradually moved from the upper end of the furnace to the discharge point, and, as they travel, are brought up to the proper rolling temperature, in 2 to 4 hr., the time depending upon the size of the finished bars. Small sizes takes longer to roll, and more heating time is required. A mechanically-operated pusher pushes the heated billets out of the furnace on to a roller conveyor and thence to the first stand of rolls in the 16-in. continuous mill. Interposed in the conveyor are shears which cut up the billets into mill lengths.

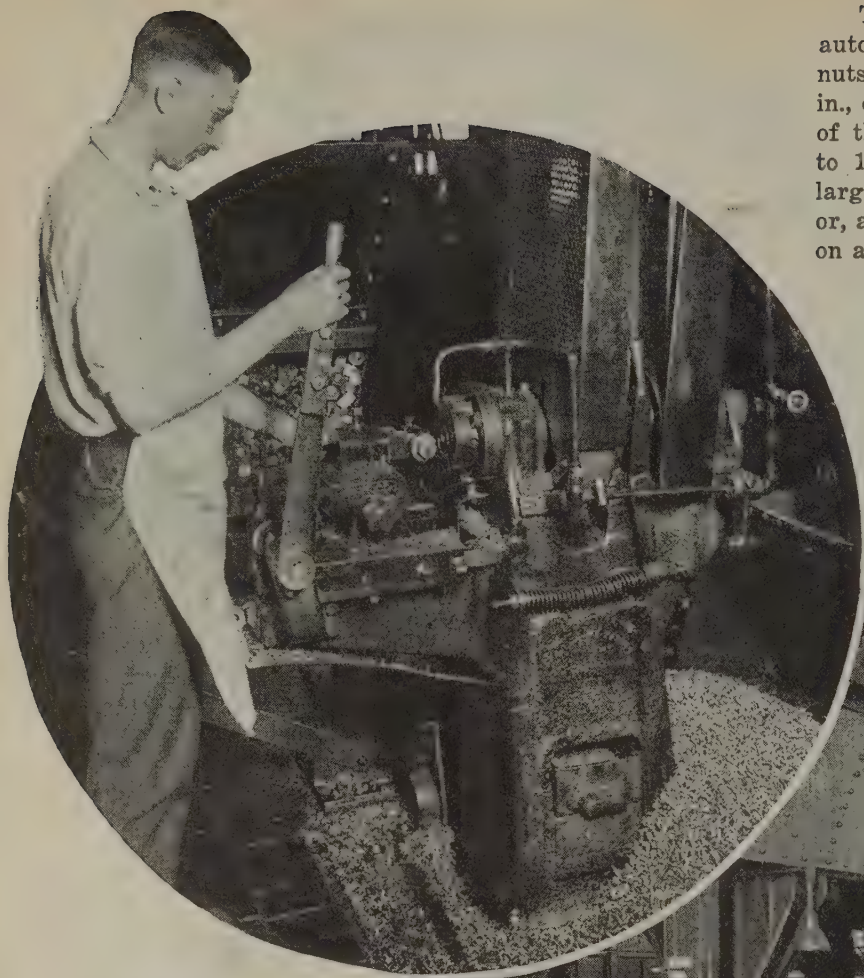
The rolling equipment consists of a six-stand 16-in. continuous mill, two 14-in. pony roughing stands, two 12-in. strand rolls and two 10-in. strand rolls. Either or both sets

of strand rolls are used, according to the finished size of bar.

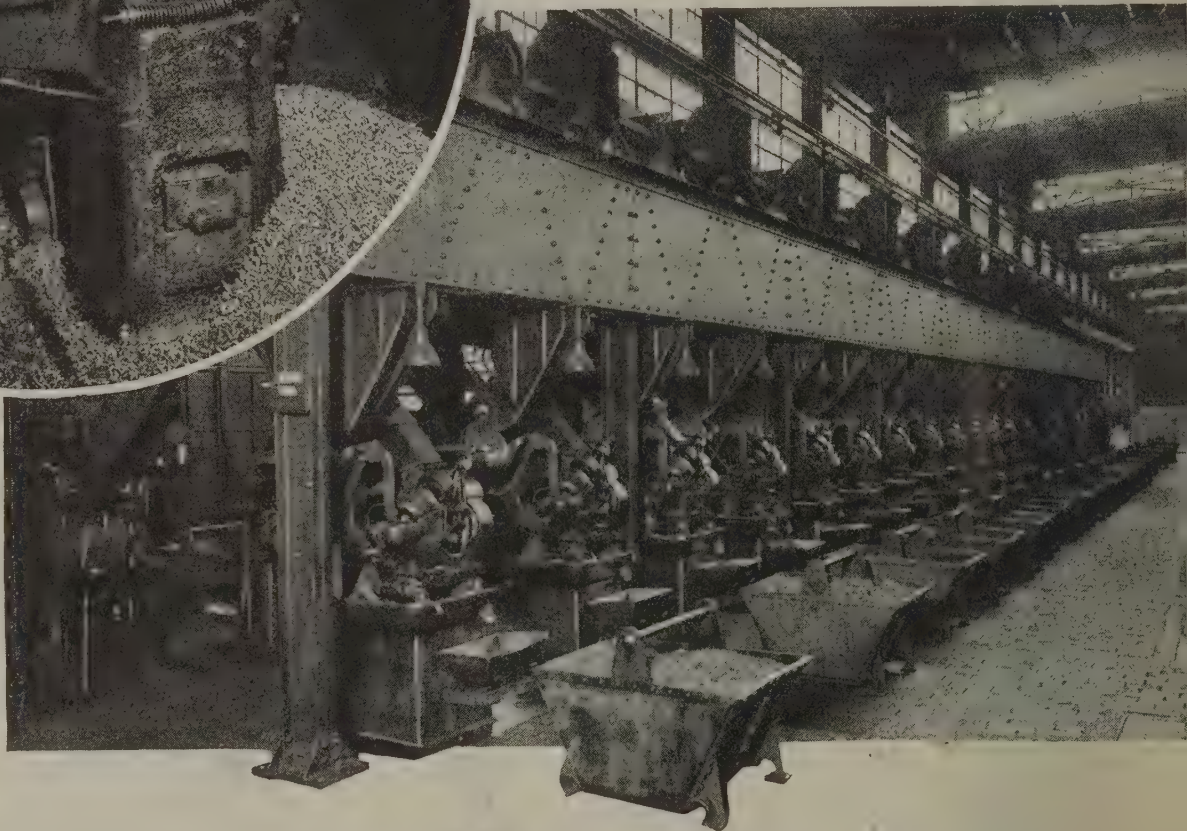
Bars Cut and Inspected for Size

On leaving the finishing rolls, the bars pass to the hot bed and on the way are cut by automatic rotary flying shears into 150-ft. lengths. Squares, rounds and flats are rolled on this mill, the range of sizes for squares and rounds being $31/64$ in. to $1\frac{1}{4}$ in. diameter. For flats, the size limits are $1\frac{1}{64}$ in. to $2\frac{1}{2}$ in. wide x $\frac{5}{8}$ to $1\frac{1}{2}$ in. thick.

On the hot bed, the bars are inspected for size. As they cool, they are moved over from one side to the other by an arrangement of rockers. There they drop on to a conveyor, which carries them to a set of hand-controlled shears, where they are cut up into 30-ft. lengths. These are inspected, bundled and the bundles tagged with metal tags, showing the size, heat number and other information. The bundles are then transferred to a large storage building immediate-



Facing Practice with New Hand Fed Machines (Above) Is to Run the Nuts on to a Threaded Mandrel, Thus Obtaining an Accurate Face Which Sets Level. Nuts $\frac{7}{8}$ in. and smaller are tapped on automatic machines (below), while larger sizes are taken care of on hand fed or semi-automatic machines



The hot nut shop is equipped with both hand fed and automatic machines, and has a capacity of 150,000 lb. of nuts per 10-hr. day. Square or hexagon nuts, $\frac{5}{8}$ in. to $3\frac{1}{2}$ in., can be made on the hand fed machines. The size range of the automatic machines is not so great, extending only to $1\frac{3}{8}$ in. square or hexagon, in either standard. Sizes larger than $3\frac{1}{2}$ in. are made either on forging machines, or, as is the modern practice to a limited extent, from bars on a lathe.

Each hot nut machine is provided with a heating furnace. Pulverized coal, reduced to proper fineness in a central plant, is used as a fuel, and gives very satisfactory results, because close control of the feed is readily obtained. An overhead screw feed brings the coal to hoppers located over each furnace and from here it is fed with the aid of two screws and an air blast. In one or two cases the coal is sucked out of the hopper by vacuum.

ly adjacent and kept until needed for use in the factory department.

Operations for Finishing the Products

This brief description of the rolling facilities and sources of supply of materials brings us to the operations involved in the manufacture of the finished product. With the exception of track bolts, rivets, screw spikes, and certain types of bolts, all preliminary operations are performed in units comprising parts of the older division of the plant. The most important preliminary operation is that of forming the material, i.e., bolt stock is cut to length and headed, blanks for nuts cut and punched, etc. All finishing operations are performed in the finishing department to which the semi-finished products are transferred.

The five departments in the old division of the plant which do the actual working up of the material are: Hot nut department, cold nut department, hot bolt department, cold bolt department and No. 3 threading department.

Hot Nut Shop Makes 150,000 Lb. Per Day

As already mentioned, all nuts from $\frac{5}{8}$ in. upward are made hot. In addition, United States nuts in the $\frac{1}{2}$ -in. size may be made hot.

In making nuts, flat bar stock is used, the length running from 8 to 9 ft. in the case of a hand fed or center feed type machine. To give some idea of the size of bars required two typical examples are mentioned below:

For bolts $\frac{3}{8}$ in. diameter, the United States size of the nuts will be $11/16$ in. x $\frac{3}{8}$ in. x $5/16$ in. thick, calling for a flat $21/32$ in. x $25/64$ in. Normally, bin nuts or Manufacturers' Standard would be supplied on bolts of this size, and in that case the dimensions would be somewhat smaller.

For a $3\frac{1}{2}$ -in. diameter bolt, a United States nut would always be furnished, the dimensions being $5\frac{3}{8}$ in. x $3\frac{1}{2}$ x $3\frac{3}{32}$ in. thick, for which a flat 5 in. x $3\frac{15}{16}$ in. is the proper size.

These examples represent the standard practice for square and hexagon nuts.

Bars of the proper size are placed in the heating furnace and about three feet of one end brought to forging temperature. After this amount is worked up the bar is replaced in the furnace and another section is heated. As a result of this practice, it is customary to start charging at one side of the furnace and continue until there is a full charge, 40 to 45 bars, across the entire front. When the first bar has come up to temperature it is removed and the practice from then on is to "cut across"; in other words,

as soon as one bar has been cut at the end it goes back to its same position in the furnace for reheating. In this way the nut maker goes back and forth until it is time to start all over again with a new charge.

Making Rough Blank Requires Four Operations

Four operations are required in the machine to form a rough blank, these being in sequence as follows:

1. As end of heated bar is placed in machine a piece of the proper length is cut off and shoved in the die. The die is stationary and fastened in the die block. The moving parts are the punch, piercer and crowner.
2. The piece is pierced and crowned.
3. The crowner comes forward still further and ejects the nut.
4. A "picker" comes down, knocks the blank nut off the crowner, and on to a flight conveyor, which carries it to a container holding about 3000 lb. When full, the container is transferred by electric truck to temporary storage and weighed.

In the majority of machines, the scrap in the shape of trimmings and punchings goes into the containers with the blanks and is separated later as described below. A few of the machines, however, used for square nuts only, from $\frac{3}{8}$ in. to $\frac{5}{8}$ in., separate the scrap at the machine and not only eliminate the necessity of riddling but finish the blanks in such a manner that burring is not required.

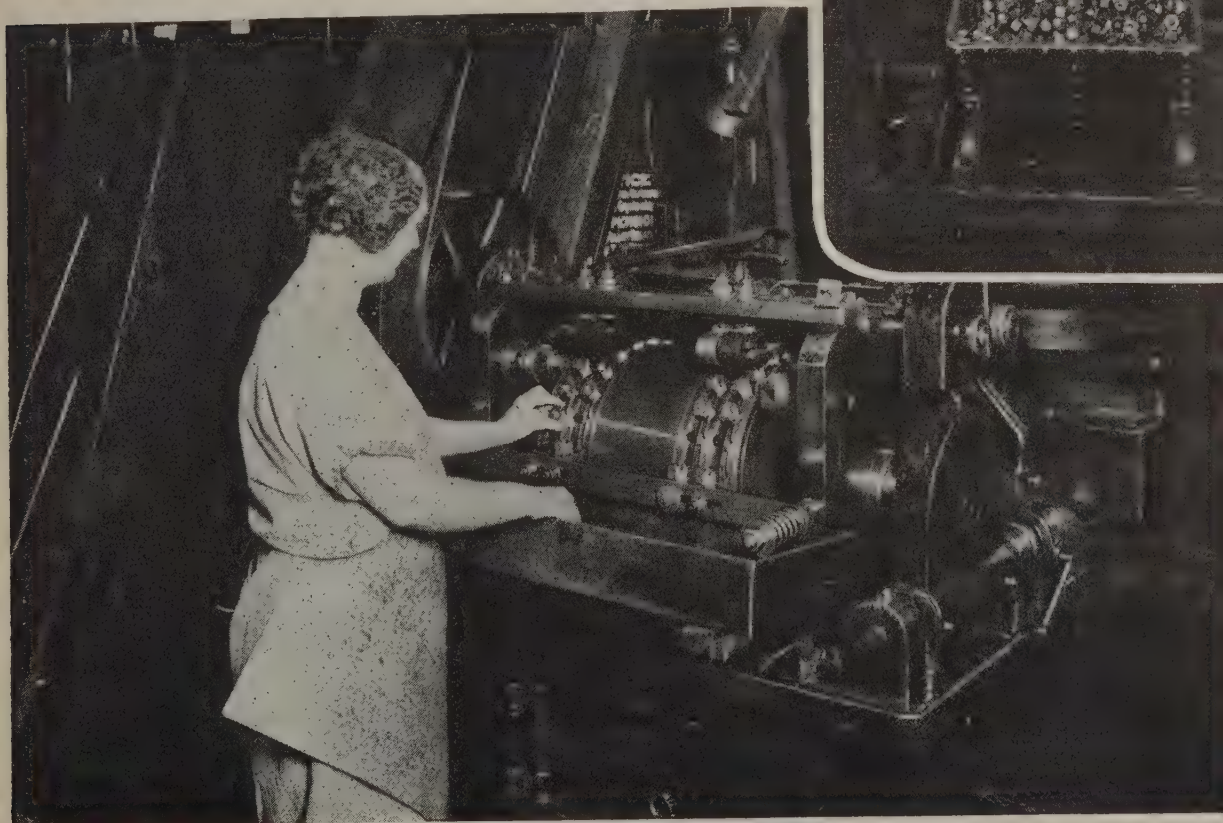
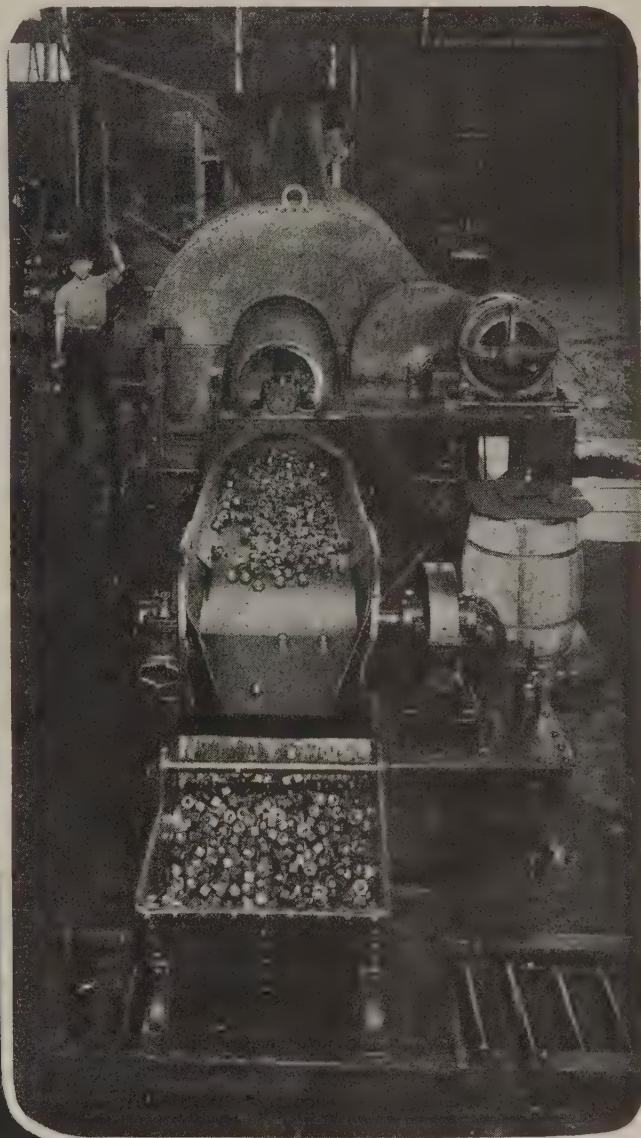
Storage battery trucks carry the containers in temporary storage to an electrically operated skip hoist, into which the contents are dumped, lifted, and poured down on to the screen of the riddler. This is a machine of the jig type, the screen being rapidly moved back and forth. The scrap drops through the screen into a small car and is ultimately disposed of for remelting purposes. The blank nuts slide down into another container and are ready for the next operation, known as "burring."

The burr formed at the point of punching must be removed by machine. Semi-automatic, two-spindle burring machines, which burr two nuts at one time, are used. The blank nuts are set by hand in dies or jigs, mounted on a flat revolving turret. As this turret rotates, it stops at points so located that two blanks come under the two spindles, each provided with three high-speed steel cutters. These descend and cut the burr off. At the same time, the

two nuts burred in the previous operation are brought over openings through which punches push them so that they drop into a container. The two operations of trimming off the burr and pushing the nuts out of the dies are performed simultaneously, while a fresh supply of nuts is being placed in the empty jigs; hence, there is very little wasted time. The consideration of safety has not been overlooked and a treadle release brings the machine to a stop in case of necessity.

Scale Knocked Off by Tumbling

Tumbling to knock off scale and sharp corners is the next operation. The nuts are carried to the tumblers, long motor-driven cylinders, in containers holding about 1400 lb.



All nuts, with the Exception of Track Bolt Nuts, Are Cleaned in a Hot Chemical Solution Which Cuts the Oil. The upper picture shows the "washing" machine. A machine for castelling nuts (below) consists of a revolving drum containing four grooves in which jigs or chucks are mounted

each. After tumbling, the nuts pass directly out at the far end on to a sorting table, where there is a thorough inspection and sorting. There has already been a partial inspection at the burring machines, where operators throw out any half nuts. Inspectors spread out the nuts, turn them over and eliminate those with cracks, unclear burring, poorly formed blanks, and any other imperfections. These men become very expert.

The nuts are again dumped into containers and transferred to the loading station, thence in turn they are delivered to the finishing department.

A few automatic hot nut machines are in use, and for these 30-ft. bars are furnished. The latter are transferred from the storage building on racks, the sides of which drop, forming a table for the approach of the bars to the oil-fired furnaces. The bars are fed into the furnaces by hand and pushed out into the pinch rolls of the hot-nut machines.

With the exception of the automatic features, the operation of these machines is similar to that of the hand fed machines. There is one slight change in practice. In the case of the hand fed machines, the bars are rotated at each cutting-off position to offset the bending action at the die. This rotation is not necessary in the automatic machines, because their greater bearing surface offsets the bending action.

A few production figures help to visualize the amount of work that can be done. One hundred 1-in. hexagon nuts weigh 56.14 lb. About 6000 lb. of these can be made in a day's run on a hand fed machine and the capacity is increased to about 8000 lb. in the case of square nuts. The scrap loss is necessarily quite large, as it includes the punchings as well as the portions trimmed off. For hexagon nuts, the average amount of material scrapped is 50 per cent. This is lowered to about 32 per cent in the case of square nuts.

Operations in the Cold Nut Department

The number of operations involved in producing blanks in the cold nut department is considerably reduced by reason of the fact that when they leave the machine they are ready for transfer direct to the finishing department without riddling, burring, etc.

The stock comes in coils in usual weights of 200, 250 or 275 lb. each. Bin nuts from 3/16 in. up to and including 5/8 in. square and all United States sizes, including 9/16 in. hexagon and square, can be made on these machines, which produce from 60 to 80 nuts per min. per machine, according to the size.

The operations of the cold nut machines follow a sequence similar to that of the hot machines. The stock entering the machine is cut off, formed with a forming punch and punched, after which the blanks go to the finishing dies. Tumbling, sorting and inspecting follow and the nuts are then ready for transfer to the finishing department.

The finishing department, where all the various finishing operations on bolts and nuts are performed, is an interesting section of the Lebanon plant. Here, in addition to the more commonplace types of machines, are automatic machines designed for mass production on a large scale. This department is housed in half of a large steel and brick building, which is about 375 ft. wide by 1150 ft. long. The other half is used as a warehouse.

The exact point at which material enters the finishing departments depends upon the amount and kind of finishing specified. Nuts classified as "rough" go direct to the tapping department, tapping being the only operation before inspection and washing. Semi-finished, on the other hand, require a number of additional operations and enter at the west end of the building. Semi-finished nuts are chamfered and trimmed and faced on the bottom. Finished nuts are made from cold-drawn steel on an automatic lathe.

The general order of work in the case of semi-finished nuts runs somewhat as follows: Flatten, chamfer, trim,

tap, face, castellate if required, wash and inspect. (Both semi-finished and finished nuts may be castellated.)

The various operations and machines are grouped in bays, of which there are three. All nuts are finished in the north bay; large bolts in the middle bay, and all 1/2 in. and smaller bolts are handled in the south bay.

The more important operations in their logical sequence without regard to individual specifications are as follows:

Flattening.—Although a commonly used term, "pressing" really better describes this first operation, which is for the purpose of obtaining a more uniform thickness and making the nuts more level. It is a preliminary operation for chamfering and is done in semi-automatic, hand fed presses.

Chamfering.—Chamfering is the operation of beveling the corners of the nuts. Equipment of the general description mentioned above is used, modifications being made according to the nature of the work involved.

Trimming.—The number of trimming operations depends on: (a) The size of the nut; 1 1/8 to 1 3/4-in. nuts are trimmed five times; 1/2 to 3/8-in. are trimmed three times; (b) the quality of the stock and the tolerance allowed for irregularities.

Inspection.—A thorough inspection is made here for both surface and general imperfections. This is only one of numerous inspections. There is an inspection at each individual operation.

Tapping.—One of the most interesting parts of the nut section of the finishing department is the division where tapping is done. Nuts 7/8 in. and smaller are tapped on automatic machines, while the larger sizes are taken care of on hand fed or semi-automatic machines. The semi-automatic tapping machines, depending upon the individual design, are fed by hand, either directly to the tap, or into a slot leading to the tap. The taps are automatically raised and lowered and as they come down tap the nuts which have been pushed into position. These nuts remain on the taps until the taps are filled. The taps, which fill in rotation, are lifted out, one at a time, while the machine is operating and the nuts are stripped off by hand. The taps are then reset in the machines. One group of 39 automatic machines is used for the smaller nuts; these machines are capable of tapping from 1,000,000 to 1,500,000 per day. Operations are as follows:

The nuts to be tapped are delivered in containers holding from 1000 to 2000 lb. each. These are dumped by crane into stock bins at the top of the machine. The nuts feed down from these bins by gravity into an open hopper. A circular disk, in the periphery of which are small lugs, rotates in the hopper. The lugs lift or pick up the nuts and push them into a narrow chute or track, down which they slide, one at a time, to a pusher or finger which, moving in and out, pushes the nuts on to the tap.

The tap used is bent, and thus differs from the ordinary. It is mounted in a revolving head and rotates with the head. The nuts, either square or hexagon, instead of being removed after tapping from the tap end, pass off over the shank and drop down into the inspection pan.

Inspectors watch for imperfect tapping. When there is evidence of this, the machine is stopped and steps taken to correct the cause of the trouble. Small pans are used so that if a defect develops only a few nuts instead of several thousand need to be sorted.

With machines of this character 19 1/4-in. nuts and 21 5/8-in. nuts are tapped per min. The greater tapping speed of the larger nut is due to its coarser thread.

In some cases, nuts, after tapping, go direct to nearby sorting benches, where they are inspected and sorted. Other operations may follow, first, however, as indicated below:

Facing.—Facing, when required, is done on special machines. In the facing operation, the cutter puts on a washer effect. The older practice of facing was simply to chuck nuts and run the cutter over them, with the result that a

good bearing surface was seldom obtained. Facing practice with new hand fed machines is to run the nuts on to a threaded mandrel, thus obtaining an accurate face which sets level. Nuts from $\frac{3}{4}$ in. to 2 in. can be handled on these machines and the facing made to an accuracy of 0.002 in.

Castellating.—Nuts are castellated to meet A. S. M. E. specifications. The new machines used are comparatively simple but effective in their operation. A rotating drum contains four grooves in which jigs or chucks of the size and shape necessary are mounted. The nuts are placed in these and as the drum rotates pass under milling cutters located at the top of the machine, which cut one slot at a time. As the drum continues to rotate, the nuts drop out and are set in position again for the cutting of the second groove. Any nut from $\frac{1}{4}$ in. to 2 in. may be handled on this equipment.

Washing.—All nuts, with the exception of track bolt nuts, are cleaned in a hot chemical solution which cuts the oil. A very slight film of oil remains to protect the nuts against rust. Nuts to be washed are dumped into the hopper of the washing machine, and from there drop into a drum which holds the cleaning solution. This is equipped

with steam pipes for keeping it at the proper temperature. The nuts are agitated in the solution and pass on to a rotating screen which allows the surplus liquid to drain off. A short belt conveyor on which they dry by their own heat carries them to a container.

Belt Inspection.—After washing, all cold-punched nuts are sorted, receiving a 100 per cent inspection. This so-called "belt inspection" is something that the plant people consider especially worth while, and is a very thorough job. The nuts travel on belts passing before a number of inspectors. After inspection the nuts go in containers to the warehouse. Special nuts go direct to packing and shipping floors.

The procedure described covers the operations involved in finishing the different kinds of the regular sizes of nuts. Large nuts, particularly special ones, are finished in the machine shop.

A division of the finishing department is given over to facilities for doing special cold forming jobs. These include punching machines, presses, shears, etc.

(In a subsequent article, the finishing of bolts will be described.)

Advocates Arc Welded Steel Construction

ARC welding for steel construction was discussed at the meeting of the American Gear Manufacturers Association, Buffalo, Oct. 11, 12 and 13, by J. F. Lincoln, vice-president and general manager Lincoln Electric Co., Cleveland. What he had to say was in part as follows:

"Structural steel," said Mr. Lincoln, "has a tensile strength of approximately 60,000 lb. per sq. in.; the strength of cast iron is but little more than one-fifth of this. Structural steel has a modulus of elasticity of 30,000,000; cast iron a modulus of elasticity of 12,000,000. In general, a factor of safety twice as great is used for cast iron as for steel.

"The price per pound of structural steel is no more than one-third that of iron castings. Translating this, if a structure is to be made the efficiency of which depends upon tensile strength, the material cost, if made from structural steel, will be no greater than one-fifteenth of what it would be if made from cast iron. If the factor of safety were to be taken into consideration, the ratio instead of being 15 to 1 would be 30 to 1. If the structure depends for its success on its stiffness, as in bases, bridges, etc., the ratio would be $7\frac{1}{2}$ to 1 without the factor of safety, and 15 to 1 with it.

"It is evident, therefore, that the ratio between the material cost of the same structure, when made from structural steel or cast iron, is great enough to permit a great deal of welding to be done on the steel structure and still make a very considerable saving over a cast structure."

Motors, arc welding machinery and other products of the company in which welded steel parts are used in place of castings, were shown by lantern slides. Redesign of many of these parts to permit the use of welded steel, was begun several years ago, and it was stated that, in general, there has been a reduction of at least 50 per cent in the cost of the structures.

Mental inertia, fear of change in appearance and the lack of information by committees and technical bodies were discussed in connection with the failure to use the arc welding process in many possible applications.

Sees Wide Use of Welded Steel In Next 10 Years

Within the next 10 years, 85 per cent of the castings being made today will be replaced by welded steel parts, said Mr. Lincoln.

"The profound result of this on industry can be well imagined," he said. "Inventories of castings will be replaced with inventories of structural steel taking about one-fourth the space and at one-tenth the cost. Pattern storage and pattern development, which heretofore has

been a very large item in manufacturing cost, will be eliminated. Breakage and scrap, heretofore an appreciable item, will be done away with because any part which is wrongly machined will be welded up and re-machined. Steel does not break in handling as does cast iron. Hence another great waste will be eliminated.

"Changes in design which heretofore have been difficult will be greatly simplified, and instead of the same model being manufactured without change over a long period of time, changes will be made continually because of the ease, and because of the entire elimination of pattern equipment. Deliveries of special machines will be greatly shortened and the weight of all machinery will be materially decreased.

"This change is not going to be a revolution, it will be an evolution. It does not mean that your present organization must be replaced; it does mean that your designers and your plant officials must become welding-minded so that they will see a structure not as an accumulation of castings and rivets, but as a structure built up by joined pieces of steel, making a much better structure at a much lower cost."

Use of welded steel in the manufacture of shears, punches, iron workers, fans and bases, was outlined by C. A. Booth, the Buffalo Forge Co. Gears of welded steel plate have been made experimentally. Those made so far have been noisy, but they are being redesigned and it is expected that the noise will be eliminated.

Rockwell Hardness Tester Compared with Others

British comments on the value of the Rockwell hardness testing apparatus were presented before the (British) Institute of Metals at its autumn meeting in Liverpool, England, Sept. 5 and 6. In a paper, "The Rockwell Hardness Test," by J. E. Malam, Birmingham, England, the author described work carried out to furnish data for conversion between (1) Rockwell and Brinell and (2) Rockwell and scleroscope numbers for 95:5, and 70:30 copper and 63:37 copper-zinc and 80:20 cupro-nickel alloys.

An examination of these data led to the conclusion that the Rockwell ball test in its present form yields so-called "hardness numbers" which must be considered as quantitatively misleading. Similarly it was found that unscientific results are obtained owing to the arbitrary numbering of the scleroscope scale. It was suggested that a representative committee be set up in order to consider the whole subject of hardness testing.

Selling to Maintain Prosperity Margin

Control of Distribution Costs Requires Better Understanding Among Competitors to Curb Professional Buying

BY W. C. CONGER*

FOR any study of sales application, Control of Selling Costs should be divided into four divisions: first, creation of demand; second, establishment of outlets; third, influencing of markets, and fourth, maintenance of sales spirit. Direct returns are possible from capital expended within the second division, while returns for capital invested to bring about results within the first and last two divisions are more indirect.

Creation of Demand

Advertising and personal contact of promotional representatives are the prime means of creating demand. Both efforts should be used in connection with specialty products. For commodity products, constructive advertising alone proves to be sufficient.

Advertising is selling on a mass basis. Its aim is the education of every possible prospect on the product and creating in him the desire for it. Mass selling is more economically done by advertising than by salesmen. There it, however, no more fertile field for the waste of hard earned margins than in the blanket acceptance of an ad-

vertising program, or the execution of a set program without due regard to changes in market conditions.

In the specialty field advertising can best be considered as an introduction for salesmen. It is educational work performed for the purpose of conserving salesmen's time in making explanations, and for the purpose of breaking down sales resistance. Advertising of specialties can be materially supported by the use of promotional sales representatives, making personal presentations and soliciting local assistance. This type of work is performed by an individual or squad of individuals and should never be undertaken unless it is obvious that it will pay to establish some type of local "follow through."

Properly planned advertising in the building field costs between 1 per cent and 3 per cent of the gross volume of business developed; promotion representation generally costs between 3 and 5 per cent of the gross returns, and it is not unlikely that, in cases of extremely scattered contact, it may cost as high as 10 per cent. Unless a substantial percentage of working margin can be made, traceable directly to these returns, a venture is not advocated.

Branch Manager Responsible for Expenses of His Office

BRANCH representation and distribution through dealers are the two main methods of establishing outlets. Expenses of branch offices are controlled best by taking advantage of basic influences. The manager should be made responsible for all expense items. His quota should be a direct ratio of his expense rather than sales expectancy. His bonus should be at a fair rate, never starting above the figure at which the office is producing a return to the company. It should be relatively easy for the manager to earn a bonus for special effort, and that bonus should be paid to him as promptly as possible.

All branch offices should operate on a budget system with expenses sub-divided as follows: Local advertising, automobile maintenance, commissions payable, engineering, insurance, dues and subscriptions, office supplies and postage, rent, light and heat, salaries, taxes, telephone and telegraph, traveling and special expenses. All items with the exception of postage, telephone, telegraph and traveling should be subject to home office approval prior to commitment. Even home office approval must be influenced by policy in preference to circumstances, because circumstances are so liable to control policy.

Local advertising is an item which implies advertising in local media and is not covered in the company's general advertising program. It is local because it identifies the local branch office only and is not beneficial to any other

sales unit outside its territory. The expenses not budgeted must be controlled by the home office management.

Automobiles Provide Frequent Contacts

Automobile maintenance is important because it must be remembered that today's prosperity is due mostly to the frequent contact, with a greater number of sales opportunities made possible, by automobile transportation. Men cannot keep pace with the times without facilities of rapid transit. Sales volume is always in direct ratio with sales contact. It is true under some circumstances it does not pay to maintain extended contact, but it is difficult to single out such circumstances without jeopardizing positive leads for sales. Men drawing \$300 and over per month should arrange for their own automobiles. The company should not be asked to make any consideration for their going and coming from work, but should pay them for the extent to which they use this investment for strictly company business, remembering that depreciation on a car is only slightly increased by the additional business mileage and so should practically all be absorbed in his competitive wage. Of the three possible methods of granting allowances, the monthly allowance, with the recognition for special items, seems most practical and free from misuse. This allowance should be established in accordance with the average mileage expected from the men, with allowance, usually at the end of a year's service, for reconditioning. Young salesmen covering commodity fields, and spending most of their time contacting prospects, should probably

*Vice-president Truscon Steel Co., Youngstown. From an address before Concrete Reinforcing Steel Institute, Shawnee-on-Delaware, Pa., Oct. 2.

have automobiles furnished them by the employing company.

If an organization is operating on the branch office plan it cannot afford additional sales expense in the form of commissions. Contact is all the commission man has to sell and it should be the policy of branch house sales organizations to establish their own contacts and pay excessive rates for outside contact only as special circumstances warrant.

Dealer Distribution for Commodity Products

Dealer distribution is more naturally used in forming a sales organization for commodity products. Dealers are already locally established and successful with certain lines. The direct expense to them of adding a few more commodity products for sale to their regular customers would not add proportionately greater sales costs.

Dealers are not promotional organizations; they are service organizations and when dealers are used for servicing the company must shoulder the responsibility of creation of demand and training of personnel together with market influence and sales spirit.

Dealers usually prefer buying their products outright, keeping the margin derived from resale to themselves. It is not, however, as simple as it sounds because market influence is a national as well as local responsibility and always falls upon the manufacturer as a sales expense. The

dealer will demand lower costs whenever national market influence lowers his resale market and will object, through his weapon of competitive buying, to having his costs raised in the event the manufacturers' investment in market influence proves satisfactory.

Dealer sales organizations are not subject to the definite control of branch office systems, because all items of local expense previously mentioned obviously fall under the jurisdiction of a local independent authority.

Sales Costs Must Be Kept Low

It is as essential that sales costs do not materially exceed competitor's sales costs as it is that production costs do not exceed his. Too rapid contact development increases sales expense out of all proportion. The fact that a certain product is successfully marketed by one organization does not mean that the field is a fertile one from which any group can derive profits. Too many times a house branching into a new line allows its determination to overtake its business judgment and allows inexperienced management to excuse poor returns on the theory of "buying a market."

Administrative expense is subject to top-heaviness both in the form of non-producing employees and non-essential records and accounts. Records kept should have the benefit of constant review of executives and such as are not absolutely essential must be eliminated before they reach the state of expense without return.

Influencing Markets Requires Cooperation of Leaders

MARKETS can best be influenced by constant personal contact between the leaders of those markets. The marketing problems of any two industries or of the same industry within any two cities are not identical. Before any real progress can be made toward market influence it is necessary to have the leaders in each industry and the local leaders within every district personally acquainted. It is essential that they meet in conference often and discuss openly their opinions, handicaps, and progress. Market influence or market control is possible only when those few executives who control the sales policies of the sources of supply sincerely want it. The surest way to invite price competition is to refuse to understand someone who has a right or who is willing to put investment and sales effort back of a market.

There is no necessity for collusion or market frame-ups. There is a necessity for the smaller man realizing that business expansion can be brought about only by exercising the one fundamental of business—service; that any expansion gained by him through cutting the market is ill-gotten and deceptive, and no matter what his gain, it would have been greater had he placed the same brain power back of constructive distribution and secured what share of any locality's business rightfully belonged to him through the character of his market service, at a market level that insured the prosperity margin to all.

Contact and understanding between competitors both locally and nationally is essential in properly sizing up the buyer's arguments. Buying today is being more scientifically handled than selling. In justice to the purchasing agent, however, buying which increases previous quantities by several hundred per cent, and asks for the saving occasioned by the increased quantity to be put into quality, is by no means condemned.

A few months ago the purchasing agent of a large automobile company placed an order for 1500 tons of sheets with a steel company. It was followed a few days later by an order of 3000 tons at a reduced price and with the insistence that the 1500 tons previously placed should be lowered to that price or the entire amount would be given to

a competitor. The president of this automobile company was called into the transaction and the entire volume was placed at the market, because he could realize the danger of such scientific purchasing lowering the margin on steel to a point where wages might be reduced and the demand for automobiles curtailed.

The purchasing agents of our large industrial units today have a greater influence upon the national prosperity than any other group of operators. It behooves sales managers whose responsibility it is to create demand and include the prosperity margin to offset this professional attempt to eliminate it. Buyers are not to blame. Purchasing agents are what sales executives have made them.

Competitive Understanding Necessary

Can sales organizations afford to allow professional buyers to continue to deceive their representatives, and in turn allow representatives, realizing too late that they have been deceived, to concoct additional circumstances to clear themselves and sell the orders at cost? Is it not better for sales executives to spend sufficient time together to understand each other and to realize that there may be divergent opinions of true values. If they cannot secure true value for goods, if contact on service is not sufficient to give recognition at true value, then they should refuse to furnish those goods at less than true value.

Everything in competitive understanding works back to the executives in charge of the sources of supply supporting and appreciating each other and of their refusing to ship goods below cost. Special blanket contracts to large customers, or any manner of protected coverages within any industry should not exist. They only make it necessary for the competitor to reserve the privilege of meeting price competition as he finds it. Such an open privilege exercised on the part of any competitor is sufficient to destroy any market.

The real cause for price cuts is not the mere existence of excess capacity, but the blind grasping for volume to use that capacity. In reality, it matters not whether excess

capacity be 5 per cent or 40 per cent. Grasping for business to fill it is destructive.

Executive Review of Contracts

Supplementing the general market influence, every company should have a field check and a home office check on every contract, and both should be exercised before the company is legally bound to the contract. Our company has recently established a system of executive review of every contract. Each individual contract is analyzed from the standpoint of gross margin over platform cost. Different gross margins are possible within different branches of the company, but we have at our finger tips what the gross margin in every community should be, and when they vary, we find out why. Our margin this year, influenced considerably during these months by the tremendous demand, is likewise influenced by our insistence upon our men that we will not accept business which does not carry its proper gross margin.

Every man is penalized $7\frac{1}{2}$ per cent in sales credit for every 1 per cent in which that gross margin on every contract is lower than that correct level. He is thereby made a part of securing correct margins and if he cuts a contract 5 per cent, he is penalized $37\frac{1}{2}$ per cent of his sales credit, and his bonuses as previously stated are all paid upon the amount of contest credit which he secures over his quota as established by a ratio to his expense. No salesman in any line of specialty business should be allowed to operate without such basic influence supporting correct prices.

A representative's competitive conduct should never require further time and thought in covering up his action. It is far better that he sacrifice business to his competitor than to conduct himself in a manner requiring subterfuge. He should realize that his customers are happiest when they are all paying the same price for their materials. Competitors are all human in their understanding and readily detect unfair methods used against them, with the result of loss of confidence toward future fair dealings.

Many sales policies include the fallacy that the customer is always right. In national markets, however, it is more important to be right with competitors than with cus-

tomers. There are always relatively few competitors who could, if they would apply themselves to the task, influence every industry to prosperity. They cannot be expected to accept excuses in each other's conduct toward common customers and so errors should be corrected to the understanding of these competitors. What does it mean to reduce sales expense by 1 per cent through rigid economy, while on the other hand, through lack of confidence among a few, legitimate profit is cut 50 per cent? This loss in profit is actually an added sales expense.

Pooling of Interests Reduces Costs

Certain industries have reduced their sales costs and increased their competitive understanding through the establishment of quantity survey institutes or estimating bureaus. Such bureaus eliminate duplication of effort, reduce unit costs of estimating and create additional confidence because the estimate held by each competitor is identical. It is a practical method of eliminating cheating or buying by confidential quotations or deliberate omissions.

In some industries honest cooperation might lead to consolidation of facilities within given territories. A lesson might be had from the German industries, which function through what is known as a "community of interest." The firm better equipped to handle an individual operation is allotted that work. There is no need to maintain warehouses and bending facilities within the territories which can afford only one plant. What difference whether reinforcing bars are cut in one yard or another? It is wasteful to have several yards adjoining one another, all working half-time on orders accepted at cost, because of the existence of the other yards. Why not have a product made where it can be made more economically? It would be better for a company to supply another with what it can produce more economically, permitting each firm to sell in its territory free from stiff competition, rather than be subject to excessive and overlapping sales expense.

A "community of interest" within an American specialty industry could extend further than the warehouse facilities. It could extend to having details made by a central bureau. Such seems entirely possible in our vision of the future.

Sales Spirit Depends upon Attitude of Executives

A SALESMAN'S spirit is best maintained by his superior's interest and appreciation of his success. Eliminate too severe criticism, but never go without allowing him to realize that his shortcomings are understood. Every man needs help, not only from his superior, but from his colleague. Convince your personnel that he climbs highest who helps the other most. The moment you find any of your regulations pitting one man against another, charge yourself double before you allow sales energy to be wasted between your own men in conflict.

If two men have worked on a contract over-extend yourself to credit them with it. Your money cost will be repaid many times by the increase in your salesmen's spirit. Industrial management depends more upon management of men than of machines.

Men develop best under strain. They must have problems and they must meet them with the understanding that work is the cornerstone of real happiness. Many times this strain may be of such a character as to cause your men temporarily to misunderstand. Many men stake their jobs upon a single act or decision. They should be corrected every time they approach the breaking point.

Recognition of Services Important

Recognition can be accomplished by individual quota, prize contests, personal letters and visits from executives,

salary increases and promotion in the form of added responsibilities. Prize contests are splendid individual and group incentives. They can be staged between organizations or different communities with the sales opportunities equalized by means of quota and with prizes given to individuals or those teams, departments or offices who within any given period of time, days, weeks, months, or quarters, excel in sales success over their opponents.

Chief executives should personally correspond with the men on the firing line to have their minds influenced by the state of mind of the one who is most vitally in touch with the company's problems. Periodical visits also prevent the local sales manager's viewpoint from being distorted by his closeness to the problems and the broad company's viewpoint can be understood only by personal contact with the leading spirit. It is impossible for any chief executive to visit any local manager without that manager confessing that he has gained new viewpoints.

Company prestige should be maintained at all costs. Men should not be allowed to influence customers from a personal relationship but rather because personally they represent the best organization and the best products. It is a tremendous handicap for a salesman to have a customer feel that he is dealing with him in spite of his dislike for his company.

More Welding on Steel Structures

Welding Society Hears About Four Buildings, One a 12-Story Hotel—Fabrication Shops Avoid Handling Large Pieces

STRUCTURAL steel welding, both in the fabrication shop and for field erection, was the principal topic of discussion at the general meeting of the American Welding Society, held in Philadelphia, Oct. 9 to 12. A digest of the matter presented on this topic is given in the notes below. An interesting talk and motion picture showing the manufacture of steel automobile bodies was also presented. Mr. Meadowcroft's remarks on this topic, describing many new labor-saving devices and machines, will be abstracted in a later issue.

Space prevents a lengthy account of two other topics considered. A paper entitled "Standard Line of D.C. Machines Fabricated by Arc Welding," by R. S. Marthens, C. C. Brinton and F. T. Hague, showed how the Westinghouse Electric & Mfg. Co. has been able to standardize details on its line of medium sized machines, and has

thereby effected many collateral economies in inventory, machine shop and foundry work, and at the same time improved the operating characteristics of the motors.

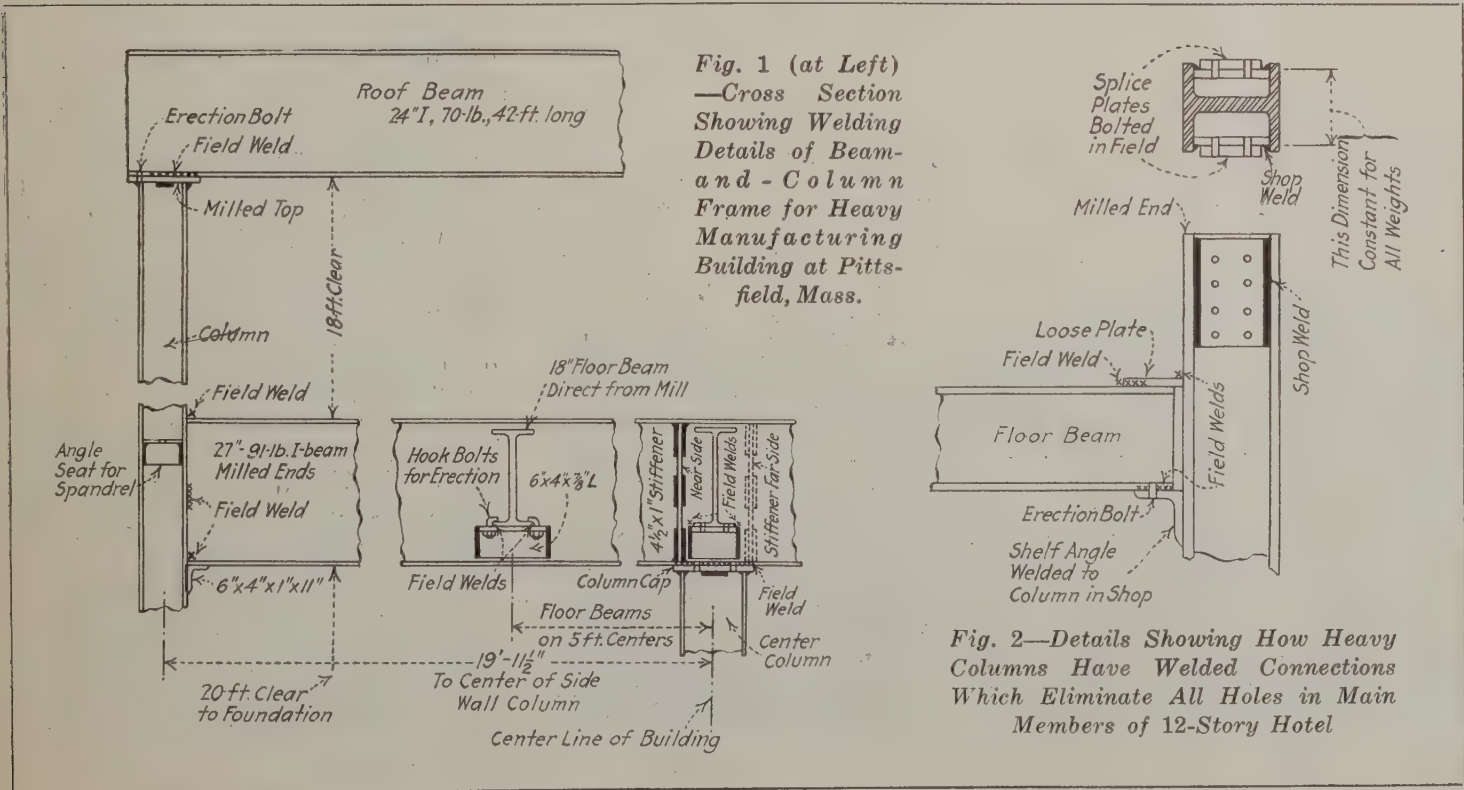
Two lengthy papers describe the research work undertaken by the San Francisco section. A number of tension test pieces were made under commercial conditions, using both the gas and electric processes. These were then pulled while heated in Prof. Charles Moser's laboratory at Leland Stanford University. Most of the specimens broke in the fire box plate (ultimate strength at room temperature about 67,000 lb. per sq. in.) rather than in the weld metal. Results for the welded joints, therefore, closely paralleled those for the unwelded check specimens: ultimate strength as determined by loading at normal rates increased with temperature to a maximum at about 575 deg. Fahr., above which the values dropped rapidly.

Fabrication of Two Buildings for Heavy Manufacturing

IN a paper entitled "Present Status of Welding Steel Buildings by Electricity," Frank P. McKibben, consulting engineer General Electric Co., noted that a recently compiled list of welded structures included 43 buildings, eight bridges, 28 ships and pontoons, and 11 gas holders. On account of these successful applications he is of the opinion that it will now be comparatively easy for building codes to recognize this new method of construction, espe-

cially as many of the important ones are under revision, to permit the change from 16,000 to the 18,000-lb. unit stress basis sponsored by the American Institute of Steel Construction.

He also presented details of two new welded buildings recently erected by the General Electric Co. One of them, a 42 x 66-ft. extension at Bridgeport, Conn., contains four welded trusses placed on tall steel columns. As in the



building at West Philadelphia (described in *THE IRON AGE* for March 22), considerable saving in weight was effected by eliminating all gusset plates. The Bridgeport trusses were made with T-section chords (a 14-in. beam split down the center of the web), with the angle-iron diagonals edge-welded directly against the stem of the T. At the peak of the roof, the top chord was welded on top flange only; the stem is spliced by welding along each side of the leg of the angles which constitute the central vertical member of the truss.

A two-story beam and column building, 42 x 280 ft. in area, erected at Pittsfield, Mass., was so designed that the floor beams were shipped directly to the site from the mill, thus saving shop handling on a considerable percentage of the total weight. Erection details were also arranged so that nearly all welding was done in the "down" position and no "overhead" welds required. Fig. 1 shows the principal features to be that the floor girders have milled ends, thus allowing them to be welded to the column face, making a rigid transverse bent and fixing the ends. This permitted considerable economy in steel, provides for all wind stresses, and lines up the building precisely during the erection stages.

In both these buildings a unit shearing stress of 3000 lb. per linear inch was used for $\frac{3}{8}$ -in. triangular fillet welds.

Welded Frame for Hotel

Discussing this paper, J. H. Edwards, chief engineer American Bridge Co., said that experience has now been accumulated on nearly all varieties of building frames. Heavy manufacturing buildings with trussed roofs, long columns, traveling and jib cranes and beam-and-column buildings as high as five stories have been successfully erected. He then proceeded to describe the 12-story Homestead Hotel, just completed at Hot Springs, Ark. His company had accepted the contract at \$8 a ton more than a riveted design would cost; welding was required in order to avoid disturbance in inhabited portions of adjoining hotels. Actual costs were somewhat in excess of the contract price. Two welders had no difficulty in keeping up with the erection gang.

Details for this tall tier building were worked out so

as to avoid handling heavy pieces in the shop. Where erection holes were required, it was usually possible to put these holes in a light detail, and then weld the detail in place. Column splices, for instance, were plates made to fit snugly within the outstanding legs of the H columns, and welded in proper place, as shown in Fig. 2. Splice plates were then fitted to the outside to make the joint with machined bolts. Beam seats were also fitted between flanges in a similar manner. Such splices and beam seats were placed a uniform distance apart on each column, irrespective of section. This enabled the beams framing into them to be of uniform length and punching. Use of a loose top plate to fix the floor beams at the end is also indicated in Fig. 2. A peaked roof was erected by carpentering methods, i.e., the rafters were hoisted to place, cut to length, and fillet welded to the wall trusses and hip rafters. No blueprint details of this roof were prepared.

Full sized details as described above were tested at the Bureau of Standards. A column splice sheared through the bolt holes at a load of 340,000 lb. Loaded as a beam, a spliced column broke through the welds at 548,000 lb. Beam seat angles ranging from 4 by 4 to $3\frac{1}{2}$ by 8 in., welded between column flanges, bent down like a stirrup before the welds tore loose. A series of test pieces designed to break a $\frac{3}{8}$ -in. weld in shear gave the following ultimate strengths: Average, 13,400 lb. per linear in. (Maximum, 15,400; minimum, 11,300.)

Marshall Williams, assistant general operating manager American Bridge Co., Pittsburgh, said that experience in fabricating several sizable buildings had convinced him that, while welding is frequently quite advantageous to structural fabrication, it is by no means a universal tool. Among the advantages he cited light truss construction, where it eliminates many plates and minor details. Heavy building columns, after the ends have been milled, may have all details welded on them, thus avoiding further handling. Among the disadvantages are the number of expert welding supervisors required, and the slow rate at which the process operates. Both these increase overhead charges, the latter principally by decreasing the output capacity of the plants. Further experience with the process, it was pointed out, would correct the two difficulties mentioned.

The Personal Element in Welding

G. A. CALDWELL, general superintendent Mississippi Valley Structural Steel Co., Melrose Park, Ill., commented on the spread in values for unit tests, quoted by Mr. Edwards. The range from 11,300 to 15,400 amounts to 36 per cent (figured on the low value). Until more uniform work could be guaranteed he felt that one of two things would occur—either the low value would be adopted by designing engineers, thus penalizing the good workman, or else risks of poor workmanship must be encountered. Certain tests convinced him that it would be relatively easy to grade welders according to their ability, and to keep the poorer ones on less important details. Thus he had tested four welders on three different occasions, some weeks apart; the same ranking was attained in each examination. In comparing the work of another group, each man having made six test pieces, it was found that the work of any one man did not vary more than 10 per cent in strength, but the best weld of the best welder was 35 per cent better than the poorest joint made by the worst. Professor McKibben, answering an inquiry, said that the uniformly higher results of tests now being published, in comparison with those made a few years back, are due to the use of higher current densities. It is well known that the research com-

mittee on structural steel of the American Bureau of Welding is completing an exhaustive series of tests on joints made by both gas and electric processes.

F. T. Llewellyn, president of the society, was doubtful whether a high degree of uniformity could ever be expected from all the workmen in a shop, since it is never attained in any manual operation. He doubted whether the uniformity in riveted joints is any higher than that of welded joints. He also pointed out that there has been more research expended on welding in the past five years than has been put on all other methods of fastening since the beginning. It would be surprising if some mildly conflicting results were not produced. From an erector's standpoint, he asked that some attention be given to field inspection. An open hole advertised itself to a casual glance; but on welded connections the beads must be counted, measured and gaged. Tools for this are lacking.

F. M. Farmer, past president of the society, said that an adequate supply of welders is badly needed. He cited a \$6,000,000 project under way this winter at a Boardwalk hotel in Atlantic City. A frame building is to be replaced with a 13-story structure, a garage is to be built, and a

power house enlarged. Noisy riveting is prohibited, but the hotel building must be completed early next spring. Not being confident of obtaining sufficient personnel, the con-

tractor decided to weld only the power house extension. The hotel frame is to be bolted throughout, and the garage to be made of reinforced concrete.

Erection of Buildings by Welding

A PAPER of the above title was presented by J. C. Lincoln, president Lincoln Electric Co., Cleveland, based largely on experience gained on a four-story business block designed by the Austin Co. As an evidence that design must be made especially for welding, this building departs from the now standard practice of running the columns straight up from foundation to roof, framing the floor beams into them, and goes back to the old fashioned "mill building" construction, where the columns are a single story high, and the main floor beams are continuous from end to end. Special stiffeners are required to transmit the loads from the stories above down through the beam to the column beneath. While this system is all right for low buildings, some structural engineers present doubted whether it would be suitable for tall, narrow buildings which have to resist heavy wind stresses.

Mr. Lincoln said that worth-while economies would not result if the building were designed as if for riveting, and then welding substituted. The shop and erection costs would then be of the same order. Notable savings in steel result, however, if each column is proportioned to the load it is to carry, rather than going two or three stories over-size, if the floor beams are made continuous and fixed at the ends, and if the main girders are reinforced at the center of the span by cover plates and at the supports by web stiffeners. He sketched many devices used for erection

purposes: in general they consist of shelf angles or clips welded to the adjoining members, each with two holes for preliminary bolting. After plumbing the building, all such joints would be properly fixed by welding. Variations in mill lengths of beams cause no trouble if slotted holes are punched in the clips welded to them. The following points must be considered to profit most by structural welding:

1. Design joints to eliminate overhead welding, and minimize vertical welding.
2. Do no more welding than is necessary to carry stresses.
3. Utilize continuous beams of non-uniform cross section.
4. Use "stepped" columns.
5. Bolt up the erection, as at present.
6. Avoid open holes in heavy pieces.
7. Ship as much steel as possible direct to the job.
8. Use large electrodes and large currents.
9. Scarf nothing thinner than ½ in.
10. Use only tested welders.
11. Inspect all joints carefully.

As to costs, Mr. Lincoln said that field welding on this building cost \$2,500. A reliable estimator predicts that this would drop to \$800 by the time the fifth such building were erected.

Floods Fenced Out with Steel

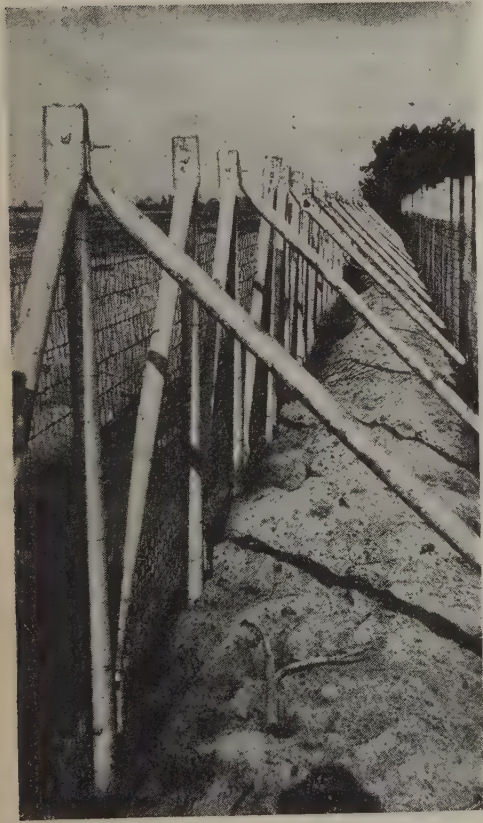
TO protect a half-mile stretch of road against encroachment by the Santa Ana River channel, the California Highway Commission has constructed a novel revetment. Steel pipe is used to replace timber piles, experience having shown that the latter rots below the ground level and fails at critical floods.

As shown in the illustrations, the bank protection consists of a double row of posts, placed 6 ft. on centers. The vertical members are 3-in. pipe, heavily galvanized, approximately 20 ft. long, driven 14 ft. into the ground. Braces are made of the same material, flattened and bolted at the ends, as indicated.

Along the row of posts on the river side there was placed two 58-in. widths of Ellwood fencing, lapped 20 in. at the ground line, where the wear will be the greatest. The upper width of fencing came to within 18 in. of the top of the posts and extended 4 in. below the ground surface, while the lower width of fencing extended 42 in. below the ground surface.

One 58-in. width of the same fencing was fastened along the back row of posts and extended 10 in. below the ground surface with 4 ft. above the surface.

When all fences were in place, the 6-ft. space between the two parallel lines of fence was filled with brush and rock to weight it down.



Urges Study of Business Trends

Need for Considering Changing Conditions, to Avoid Nullifying Production Economies, Pointed Out at Meeting of Industrial Engineers

THE industrial engineer must expand his horizon beyond shop walls and observe the broader currents of business, if he is to anticipate changes that might otherwise offset savings wrought in production, according to Ray M. Hudson, assistant director of the Bureau of Standards, Department of Commerce, who addressed the fifteenth annual convention of the Society of Industrial Engineers, held at the Chamber of Commerce, Rochester, N. Y., Oct. 17, 18 and 19.

"Campaigning for Lower Costs" was the general subject of the convention, which was held in cooperation with the Industrial Management Council of the Rochester Chamber of Commerce and the Rochester Engineering Society. Mr. Hudson's address, delivered at the opening session, was on "Management's Opportunities for Cost Reduction."

"The costs of the changes forced on a business by the new competition, hand-to-mouth buying, market shifts, the migration of industry, research and invention may have absorbed to a greater extent than we realize the economies and savings wrought in production," said Mr. Hudson.

"The question is: 'Could these changes have been foreseen and if so, could they have been handled so as to avoid this absorption of profits?'"

"My answer is 'Yes,' for I am sure the industrial engineer is capable of sensing the approach of new conditions and problems in industry and of preparing to meet them efficiently and economically. But to attain this preparedness, he must first expand his horizon beyond the shop walls and perfect his observation of the broader currents of business. He can do this through review, interpretation and use of the statistics of business. To ignore these indicators of trends is to be caught napping. . . . Why spend months or years perfecting some part of shop management technique if the whole program is 'washed out' by failure to observe important market changes or shifts in the buying habits of your customers?"

Must Reckon With Certain Recent Developments

The contribution to lower costs made by planning and scheduling, labor saving machinery, progressive assembling, and other "primary tools of good management" was emphasized. "There is, however," he said, "a large area of American industry into which these fundamentals have not penetrated, and there is still great opportunity for management to cut costs and assure profits through their wider application."

"Nevertheless, in our zeal to spread their use and to perfect the technique of their application, we must take care that we do not overlook or underestimate the importance of certain recent developments, developments which in their cumulative aspect are altering the very structure of that great organism we call American business. We need to reckon with these newer developments, and learn how to guide, control and apply them to the end that they also may contribute lower costs."

One of the problems discussed was the competition between entire industries as distinguished from that between member plants of a single industry. On this Mr. Hudson said: "The effects on business of the new competition are not easily counted. Nevertheless the pressure it has ex-

erted on old established businesses is evidenced by the struggles some of them are making to hold their places in the line. Products, processes and machinery are being revamped; intensive sales and advertising campaigns are being conducted. Installment selling, liberal credit and financing terms are offered the consumer. But it is not at all certain that these will perpetuate the business offering them and assure a steady or consistent profit. It is still necessary to determine whether some of these endeavors are merely temporary expedients or whether they are permanent features of the new order of business.

"Therefore one of the immediate problems of the industrial engineer is to determine the effects of the new competition on the business with which he is connected. Another of his newer problems is the correct evaluation of the measures or means employed in meeting that competition."

Hand-to-Mouth Buying Affects Production Economies

Hand-to-mouth buying and the small order problem, the next to be taken up, were said to have brought a host of problems in their train. "The conditions giving rise to these developments, the probability of their duration as well as the ways and means to cope with them are also of interest to the industrial engineer. For example, how can he show a profit if short runs on small quantities, frequent changes of machine set-ups, etc., absorb the economies he makes through time study?"

"Along the selling side of the business are these questions: What market shifts are occurring in this field? Is the future of the business in the domestic or in the foreign market? What is a market anyway? Is our common conception of a market, as a vast reservoir to be filled, correct? A market originates in human wants. Therefore markets are people, not places. People move about; they take their habits with them. Sometimes they stay in the same place but change their habits. May we not therefore regard human wants as the prime source of business, and that the market they reflect is not a reservoir, but a 'spring' that flows steadily, year in and year out. Nature provides the spring, man's job is to guard it against diversion, stoppage and contamination, especially if he expects to drink 'long and heartily' therefrom."

Migration of industry was pointed out as another development of recent years. "Studies show definite movements in many lines of industry," said Mr. Hudson. "In some lines, plants are moved closer to the source of raw materials; others closer to their markets; still others are moving to more favorable power sources, climatic conditions, etc. What underlies these movements? Are they undertaken solely because of present costs? Do these shifts, as and when made, assure lower costs and better profits? The answer to this question concerns the industrial engineer."

Research a Source of Larger Profits

Research—commercial, technical and scientific—was emphasized as a frequently neglected source of lower costs and larger profits. In this connection Mr. Hudson said: "There is scarcely any phase of business which cannot be strengthened by research."

"Analysis of markets, and back of them, the study of human wants, gives new conceptions of what to make and where to sell it. Studies of the rate of consumption, the potential buying power of the public, indicate whether or not the public can absorb more of your output. Analysis of present uses of your product, the study of fields of its possible application serve either to increase sales or to establish the point of diminishing returns.

"When to change the style, or redesign the product is not a matter of chance. 'Coming events cast shadows before.' Profitable management requires anticipation of, and insurance against, sudden shifts in the public taste or fancy.

Large Opportunities in Reducing Distribution Costs

"Management's opportunity for cost reduction through research along the distribution side of business is tremendous. Studies of present channels of distribution, the methods employed in each, the actual routes over which goods move, the ways in which goods are packed and shipped, the types of containers used, machinery and equipment for handling goods in transit—every one of these can be studied with profit. To assume we have reached the peak of refinement of simplification in any one of these features is absurd. The greatest opportunities for cost reduction are in distribution. There is no question about that, for practically nothing has been done in this direction, when compared to the great concentration of effort toward reducing production costs. We could well afford to let present production costs alone for the next five years and focus all our energies on whipping this distribution problem.

"Savings made in that end of the business are just as valuable a contribution to a satisfactory annual net profit as those made in production; and they ought to be easier to make."

In a New Era of Business

"Many of our industries seem to suffer from overfondness for 'things as they are,'" said Mr. Hudson, in the concluding paragraphs of his paper. "At least there is a reluctance to 'change,' not entirely accounted for by opposition to the costs of making it. More of us need to look away from the 'good old days and their good old ways,' and take a longer look ahead. If we would be progressive we must watch new developments in both science and business, and be ready to adapt or apply them to our daily operations.

"We are in a new era of business, one in which scientific investigation, application and control are playing a most important part. Rule-of-thumb and empirical methods must give way to the new order. Profits are no longer the difference between selling price and cost. Instead they are the difference between new ideas and old ones, new methods and out-of-date ones, new equipment and obsolete."

Profits from Waste

A MENTAL attitude that abhors waste is the first requirement for waste reduction, said Virgil M. Palmer, engineer of industrial economy, Eastman Kodak Co., Rochester, in a paper presented at a session under the auspices of the manufacturing section of the society's waste elimination committee.

The paper was confined to waste of the materials of industry. This waste, it was pointed out, can be subdivided into three classes, according to its origin. 1. Waste occasioned through low yield or inefficient use of consumable tools, accessories and supplies, 2, waste due to failure to use the by-products from production operations, and 3, waste occasioned by obsolescence of plant, equipment and product. The first class of waste, it was said, should be reduced at its source; it should never be allowed to exist. Many industries have yield figures showing what is considered efficient use of material, and it is fairly easy to calculate actual yield figures in the manufacture of product.

Waste of the second class was emphasized as presenting

perhaps the most difficult, but the greatest, opportunities for profit. Among waste by-products which have been utilized, Mr. Palmer cited blast furnace slag, which, he pointed out, now forms half the volume of 150,000,000 barrels of cement giving, at \$2 per barrel, a gross return of \$150,000,000 per year.

The third class, occasioned by obsolescence of plant, equipment or product, was said many times to be justifiable. It is waste created through discarding the old for the new. It is the price paid for progress and is justified by the benefits attained.

American Scrap Industry Has Large Annual Turnover

"The result of all this is that there is a constantly increasing volume of material to be salvaged and reclaimed," said Mr. Palmer. "According to the magazine *Thrift*, the American scrap industry has attained a place in big business, with an annual turnover of \$1,000,000,000."

Reference was made to the research of the Buffalo chapter of the S. I. E. on "Profits from Waste," particularly the profits derived from its sale and reclamation. One of the objects of this investigation is to find and list some basic principles and common practices for salvage and reclamation work.

Of the 106 companies replying to the questionnaires 61 are rated at over a million, 12 were rated between one-half and one million, and 33 at less than half a million.

Large Companies Have Organized Salvage Departments

It was found that 47 of the 61 largest firms have an organized salvage department; 42 of these departments are operated as a subdivision of other departments, and five are self-contained and in charge of major officials. About half the firms rated between one-half and one million have salvage departments, but only 12 of the 31 smallest companies have such departments. This does not mean that the benefits of salvage are overlooked, said Mr. Palmer, but rather that the prevention of waste at the source is emphasized by many companies; and frequently in the smaller concerns prevention of waste at the source and salvage and reclamation are supervised directly by some major official without having a separate department.

Production superintendents are responsible for salvage in 17 plants; in 17 other plants this work is supervised by a salvage foreman.

In 60 plants, material to be salvaged is collected at a central point for checking, assorting and disposal. In 15 other plants this work is done in the department in which the waste originated. Unnecessary sorting is eliminated in many plants by having separate containers for each kind of waste, and by having the waste put directly into these containers where it is produced.

Replies to a question relating to the value of salvage work were read by Mr. Palmer, one of them being: "Would not attempt to function without it. Acts as a check on all departments and brings to the attention of supervisors all excessive or abusive use of materials."

"Dividend Requirements from Waste Elimination," by C. E. Knoepfel, managing director, Waste Eliminators, Inc., Boston, was another paper at this session.

Working on Time Study Standardization

PROGRESS made by the time study engineering standardization committee of the Society of Industrial Engineers was outlined by the committee secretary, W. B. Lincoln, Jr., A. J. Nystrom & Co., Chicago, at a dinner meeting, held during the society's fifteenth annual convention.

A comprehensive time study engineering bibliography has been compiled. The principal forms and makes of time study watches have been tabulated and recommendations prepared covering the types considered best suited for average use. Specifications for time study boards and other tools of the time study engineer have been developed,

as well as standard time study forms, instruction cards, etc., for use in a variety of industries. A treatise on "Preliminary Survey" has also been completed.

This committee was organized March 18, 1927, for the purpose of: "Formulating a standard time study procedure suitable for general adoption and which would agree in most respects with the best of the many diverse opinions and practices now prevalent in this profession, stressing particularly the necessity for correct standards of task measurement." T. R. Hough, Wilson & Co., Chicago, is chairman.

The standardization work is carried on by five subcommittees, one of which deals with bibliography and terminology, another with production measuring equipment and forms, and a third with time study procedure. The fourth subcommittee, on research, compiles data relating to feeds and speeds, inspection, working conditions, etc.; the fifth, designated as the subcommittee on review, passes on the work of the other subcommittees.

Papers presented at meetings held this year under the committee's auspices in Chicago and Milwaukee have been published in booklet form by the society.

"Time Study—Its Place in the Campaign for Lower Costs," a paper by T. R. Hough, chairman of the standardization committee, was also received with interest at this meeting.

A large collection of time study and related forms, showing wide diversity of practice and the need for standardization in various industries, was on exhibition during the three days of the convention.

Program of Wide Scope

OTHER sessions of the convention were devoted to the elimination of unnecessary fatigue, office management, sales, industrial management education and plant maintenance. Papers at the latter session, the chairman of which was Perry A. Fellows, city engineer, Detroit, were: "Applying Scientific Management Principles to Plant Main-

tenance Work," by R. R. Reese, plant engineer, Packard Motor Car Co., Detroit, and "The Status of Maintenance Organization," by V. S. Karabasz, assistant professor of industry, Wharton School, University of Pennsylvania. Speakers at the opening session included James E. Gleason, president of the Gleason Works and chairman of the Industrial Management Council of the Rochester Chamber of Commerce, and Dr. H. S. Person, managing director of the Taylor Society, New York.

Afternoons were devoted to plant visits, the plants of the North East Electric Co., Gleason Works, Bausch & Lomb Optical Co., Stromberg Carlson Telephone Mfg. Co., Bastian Brothers Co., Eastman Kodak Co., Taylor Instrument Co., and the General Railway Signal Co. being among those open for inspection.

Social features included the banquet, speakers at which were Dr. W. F. Rittman, president of the society, and Dr. E. J. Cattell, Philadelphia. Robert M. Searle, president of the Rochester Gas & Electric Corporation, was toastmaster. Demonstration of the Televox, popularly named the "mechanical man" at the last session of the convention, attracted large attendance.

Doctor Rittman Reelected President

At a meeting of the board of directors, Dr. W. F. Rittman, Carnegie Institute of Technology, Pittsburgh, was reelected president of the society. Eugene A. Rummmler, engineer, Chicago, continues as treasurer, and George C. Dent, 1815 Engineering Building, Chicago, as executive secretary. New vice-presidents at large are John Calder, Springfield, Mass., and C. H. Gullion, Swift & Co., Chicago. Albion N. Doe, industrial engineer, New York, was named vice-president in charge of promotion. Perry A. Fellows, Detroit, continues as vice-president in charge of research.

A Rochester chapter of the S. I. E. has been organized, with Virgil M. Palmer, engineer of industrial economy, Eastman Kodak Co., president.

Precise Linear Measurements Discussed

Manual and Automatic Methods Surveyed in Two Papers Before Engineers

TWO speakers took up different phases of the subject of precise linear measurements in manufacturing at a meeting held in the Engineering Societies Building, New York, Oct. 17, under the auspices of the Museum of Peaceful Arts and the Machine Shop Division of the American Society of Mechanical Engineers. Dr. George K. Burgess, director of the Bureau of Standards, Washington, presided.

In his introductory remarks, Dr. Burgess referred to the successive advances in measuring practice, from those involving only geometry to those in which electricity was a feature, and later to optical devices, in the most recent form of which measurement by means of light waves has been effected. Standards of measurement are limited both by the constancy of the material of which the standard is made—a metallurgical problem—and by temperature. Means have been developed for introducing correction of temperature variation or eliminating its effects.

International standards are somewhat hampered by lack of uniformity with regard to the temperature accepted as a basis. In the United States this is 68 deg. Fahr., equivalent to 20 deg. C. In Germany it is 20 deg. C. In England it is 62 deg. Fahr. In France many measurements have been made at 0 deg. C., although 20 deg. is in use, also. Following a recent international meeting, for the purpose

of establishing uniformity in this particular, it is hoped that a universal standard will be adopted. Dr. Burgess expressed the belief that this would be at 20 deg. C., which agrees with present American and German practice.

Development of Linear Measuring

Manual measuring devices were discussed in the first paper of the evening, which was that of Prof. James A. Hall, Brown University, Providence, R. I. Regarding linear measurements, the paper referred to the methods in use a century or more ago as giving way to the greater precision of steel rules graduated on dividing machines, which became generally available about the middle of the nineteenth century. For certain purposes these scales were replaced with plugs or gages, rings, etc., by Sir Joseph Whitworth in England. The first vernier caliper was developed by Joseph R. Brown in 1851 and the micrometer caliper by the same man, then associated with Lucien Sharpe as Brown & Sharpe, in 1867. It did not come on the market for general use, however, until 1877.

Angular measurements were served for a long time by a plain protractor, which later had vernier attachments added. The most recent development is the sine bar.

Snap gages were in use 60 years ago. They were followed much more recently by the go-no-go gages, which

have played such a great part in modern mass production.

Gage blocks of great precision developed by C. E. Johansson in Sweden were brought by him to the United States in 1907, and have become an important part of the production of the Pratt & Whitney Co., Hartford, Conn. A set of 81 of these blocks will give dimensions from 1 to 2 in. in steps of 0.001 in. and from 2 to 12 in. in steps of 0.010 in. Comparators designed for checking up on interchangeable work, etc., were first produced about 1878, and have reached a high degree of precision and usefulness. It is easy to change the setting for new dimensions, and the machine does not depend so largely upon delicacy of the operator's touch as in some other instances.

Inaccuracies of precise measurements may result from temperature changes or from a deformation of the measuring devices due to minute pressures. The speaker said that a 10-deg. difference in temperature on a length of 4 in. induces a length change of 0.00025 in. in steel.

Automatic and Optical Measurements

A second paper, devoted to the development of automatic measuring devices and the use of optical methods, was read by Prof. Earle Buckingham of the Massachusetts Institute of Technology, Cambridge. He defined the primary purpose of such instruments as being to prevent mistakes, because at high productive speed a mistake will pile up the scrap heap very rapidly. Automatic measuring instruments are those which do not depend upon the delicacy of the feel of the individual operator. They may be divided into three classes:

- 1.—Substitutes for hand measuring instruments.
- 2.—Special devices or fixtures built into an automatic machine to measure specific products.
- 3.—Sizing devices built into the machine to control the size of the product.

Describing briefly a considerable number of these devices or machines, both for use of the productive operator and for inspection, the speaker referred to inspection of measurements as a vital production process. Consequently, equipment for this purpose is deserving of the highest quality in precision. The stresses induced in such equipment are very small and must be so, and the power required to operate it is inconsequential.

Over-Emphasis on Precision

Several speakers contributed to the discussion of the paper. In particular Eric Oberg, editor of *Machinery*, New York, expressed the view that we have altogether too much demand for super-accuracy. Devices developed during the last 20 years have, of course, made possible many things not previously attainable, but the trouble is, some

people wish to have everything go to these extremely precise dimensions. The speaker expressed the opinion that there is as much waste or unnecessary expense in our manufacturing procedure, as a result of attempts to attain accuracy beyond all reasonable needs, as from carelessness resulting in work which really is unduly inaccurate for the purpose for which it is intended. He estimated at 20 per cent the shop cost of manufacturing which could be saved by the use of common sense in determining the degree of accuracy really required by the case at hand.

Specific examples were cited to give point to the general statements. Slitting cutters were ordered which were to be exact within 0.00001 in. The quotation was \$100 each. Complaint at this price resulted in a conference, at which it was found that an accuracy of 0.0001 in. would fulfill all needs, and the cutters were made for \$4 each. A ring gage was demanded with an accuracy to 0.00005 in. The quotation was \$2,500 and the manufacturer was not sure that he could make a profit on it at that figure. He knew, however, that his measuring instruments were more precise than those of the prospective buyer, and that the latter could not detect deviation within the magnitude demanded. Again a conference, caused by the high price, resulted in a change in the precision demanded to 0.00025 in. and the gage, made on the cost-plus basis, was billed at \$315. In a third case a lead screw was asked for, to be accurate to 0.0001 in. and the quotation was more than \$10,000. It developed that the screw and nut were to be furnished by the same manufacturer, and that so long as the one fitted the other accurately, the measure of precision of either was somewhat immaterial. When this view was brought to the attention of the purchaser, revised specifications resulted in production of the screw for \$315.

Exhibit of Precision Devices

Following the meeting those present adjourned to the Museum of the Peaceful Arts, at 24 West Fortieth Street, to see an exhibit made by various manufacturers and which is to be in the museum for about 30 days. An effort is being made to extend this period to cover the meeting of the American Society of Mechanical Engineers, early in December. Among the exhibits were those of the Pratt & Whitney Co., Brown & Sharpe Mfg. Co., Bausch & Lomb Optical Co., John Bath & Co., Jones & Lamson Machine Co. and the United States Bureau of Standards. In addition to block, ring, snap and other gages, there were shown a number of the high-precision machines developed in recent years, including the sine bar for measuring angles, the comparator and a number of optical instruments. The interferometer, one of the optical type, was shown by photograph.

Organization Formed for Establishing Commercial Standards

ABOUT a year ago, the Commercial Standards Unit was created by the Division of Simplified Practice, United States Bureau of Standards, to aid those industrial and commercial groups desiring to establish standards of grade and quality for their products or their purchases, or to secure relief in instances where the current variety in grades, qualities, and specifications is a burden on the producer, and a handicap to the purchaser.

The Commercial Standards Unit does not intend to write specifications but will cooperate on request with any industry in finding among existing standards and specifications those which will satisfactorily meet the commercial needs of that industry. In the event such a standard is not to be found, the Unit will assist the industry to develop one.

A "commercial standard" has been defined as a standard

for a commodity which industry wants, that is, one which the manufacturers want to produce, which the distributors want to stock, and which the consumers want to buy.

The Commercial Standards Unit functions only at the direct request of the industry concerned. Its procedure follows that of the Division of Simplified Practice, except that 65 per cent of the industry, by volume of annual production, must accept the commercial standard in writing before it is published by the Department of Commerce. Provision is made for regular revision of the standard in order that it may be kept constantly compatible with progress in the art.

Among the projects now actively considered are commercial standards for malleable iron unions, brass pipe nipples and enameled sanitary ware.

Scrap Exports Reach Large Volume

More Going to Japan Than Canada—Southern Ports the Largest Shippers—Character of Material Exported— Situation in Other Countries

WASHINGTON, Oct. 23.—The unprecedented export movement of iron and steel scrap from the United States has created unusual interest among both domestic dealers and consumers. Ordinarily shipments of old material to world markets are so small that they have no effect on the market but, whether a mere coincidence or directly related, it has been observed that domestic prices of scrap have been rising with the growing exports.

Except for an occasional dip, exports of scrap have been increasing since March, 1927, when they were only 15,416 gross tons. In August of the present year they established a record with a total of 70,538 tons. For eight months ended August, 1927, scrap exports aggregated 145,700 tons, while for the corresponding period of this year they increased to 364,776 tons and for the 20 months, January, 1927, to August, 1928, inclusive, the formidable figure of 603,985 tons was reached.

Reasons Assigned for Large Exports

Several reasons are assigned for the rise in exports of scrap. Among them are:

The disturbed situation in China, reducing shipments from that country of iron ore and pig iron.

Shutting down of iron ore mines in Sweden as the result of recent strikes.

Restrictions in Sweden against exports of scrap.

Similar restrictions in France.

Completing the recovery of scrap material from the battlefields of Europe.

Diminishing supplies of scrap in Japan.

The unsettled situation in China together with its reduced domestic supplies of scrap have been important factors in forcing Japan to reach out for new sources of old material. Japan usually draws on China for iron ore and pig iron and to some extent on Sweden and India. Some of these sources are now entirely or almost completely cut off, with no indication that they will be available again soon. Sweden for some time has prohibited the exportation of scrap and only recently extended this proclamation until March, 1929.

France has in effect a limited prohibition against the exportation of scrap, whose shipments to Italy are restricted to a basis of trade in iron and steel with Italy. The result has been that Italy likewise has had to search for new sources of supply. The clearing of the battlefields of Europe of scrap is understood to be almost at an end and to have been a factor in forcing France to reduce exports of scrap. Germany has become a larger importer of scrap. Poland and Danzig also have been affected by export prohibitions and other causes which have reduced the supplies of scrap obtained from the usual sources. China has suffered from internal conditions and, while not a large user of old material, has been compelled to go outside for supplies.

Japan, Italy, Poland, Germany and China together took 254,835 tons, or a little more than 72 per cent of the scrap exports of 364,776 tons during the first eight months of 1928. For the corresponding period of last year scrap

exports to these five countries were 84,447 tons, or approximately 57 per cent of the total of 145,700 tons exported.

Japan Taking More Than Canada

The other large consuming buyer of American scrap is Canada, generally the leading user. But during the first eight months of the present year exports of scrap to that country, 101,987 tons, were about 6000 tons less than the 107,853 tons exported to Japan, which took first rank during that period. During the eight months ended with August of 1927, Canada took 56,885 tons while Japan took only 40,936 tons. From a point of percentage increase the most notable movement of sizable tonnages were to Poland and Danzig, which during the first eight months of the current year took 53,585 tons and it is assumed that this material was consumed in Poland. It is thought unlikely that it would have moved so far east and been transshipped to Germany. During the eight months ended with August of last year, scrap exports from the United States to Poland and Danzig were only 10,300 tons.

Mexico and the United Kingdom have figured to a smaller extent than the other countries named in receiving scrap from the United States and shipments to the Netherlands have fallen to a negligible quantity, as shown in one of the tables.

Taking the nine countries dealt with, exports of scrap from the United States during the first eight months of 1928 aggregated 362,290 tons, leaving only 2486 tons shipped to other countries. For the corresponding period of 1927 these nine countries took 144,519 tons out of the total exports of 145,700, other countries taking the remainder of 1181 tons.

Government records do not disclose the grades of scrap sharing in the export movement but, except for China, the leading countries of consumption are producers of steel in bulk quantities and from this fact it is indicated that the major portion of the old material exported is heavy melting steel. China uses scrap largely for the making of knives, forks, razor blades, wire shorts and for plate cutting purposes.

Most Scrap Goes from Southern Ports

Southern ports are the source of the largest shipments of scrap. Galveston led during the first eight months of 1928, clearances aggregating 75,296 tons for the nine principal consuming countries. For the corresponding period of last year shipments to these countries from Galveston amounted to 32,427 tons. Michigan was the next most important source of scrap shipments during the first eight months of the present year. This is accounted for by the fact that the bulk of scrap exports to Canada are cleared through Michigan. The total exports through that district to Sept. 1, this year, were 73,418 tons, of which 73,307 tons went to Canada. During the eight months ended August, 1927, exports from the Michigan district were 38,799 tons, of which Canada took 38,745 tons. Exports from Florida during the first eight months of 1928 totaled 32,566 tons, of

which 13,682 tons went to Japan, the second largest American port of shipment for that country, Galveston being first with 47,346 tons. During the eight months ended August, 1927, exports of scrap from Florida amounted to only 5520 tons.

Massachusetts ranked fourth as the source of exports during the eight months of 1928, supplying 32,127 tons, of which 24,078 tons went to Poland and Danzig. Exports

United States Exports of Iron and Steel Scrap by Principal Countries of Consumption—Gross Tons			
	Eight Months Ended August		Calendar Year 1927
	1928	1927	1927
Canada	101,987	56,885	92,514
Japan	107,853	40,936	71,087
Italy	68,539	28,158	30,185
Poland and Danzig ..	53,585	10,300	14,858
Germany	18,843	2,216	9,367
China	6,015	2,937	4,067
Mexico	3,884	1,218	2,983
United Kingdom....	1,518	1,854	3,163
Netherlands	66	15	9,402
Total	362,290	144,519	237,626
All others.....	2,486	1,181	1,583
Grand total.....	364,776	145,700	239,209

from New Orleans during the eight months of the current year totaled 23,173 tons, of which 20,563 tons went to Italy. Of the 18,428 tons shipped from Maryland during the first eight months of 1928, Germany took 9171 tons, other tonnages going to Poland and Danzig, 5679 tons; to China, 1937 tons, and to Japan, 1641 tons. Sabine, Tex., shipped 13,565 tons during the first eight months of the present year, 9894 tons going to Italy and 3640 tons to Poland and Danzig. Virginia shipments during the first eight months of 1928 aggregated 12,549 tons, of which 6761 tons went to Poland and Danzig and 5699 tons to Japan. Much of the scrap from the South is said to consist of railroad material as well as steel salvaged from old buildings which have been and are being razed.

The Situation in Poland

In connection with the situation in Poland the ore extracted in that country is of low iron content and in 1927 is said to have averaged only 31 per cent, as against imported ore which averaged between 43 and 58 per cent. The practice of the Polish industry is to mix the domestic and foreign ores, but the quality of the pig iron is understood to have been unsatisfactory.

Output of iron ore in Poland, however, has increased. It rose to 538,706 tons in 1927 and 282,459 tons during the first five months of the current year, according to the Iron and Steel Division, Department of Commerce, which based its figures on reports from Consul Charles Heisler and Assistant Trade Commissioner Gilbert Redfern, Warsaw. In 1926 production of iron ore in Poland was 316,073 tons.

Imports of iron ore into Poland also have been increasing, amounting to 94,593 tons during the first quarter of 1928 and 585,172 tons in 1927, as against 273,387 tons in 1926. Similarly, the imports of scrap have risen during these years and for the first half of the current year aggre-

United States Ports Shipping Scrap Material to Nine Chief Consuming Countries—Gross Tons			
Ports	Eight Months Ended August		Calendar Year 1927
	1928	1927	1927
Galveston	75,296	32,427	45,789
Michigan	73,418	38,799	62,879
Florida	32,566	5,520	7,280
Massachusetts	32,127	6,313	8,445
New Orleans	23,173	212	295
Maryland	18,428	3,250	15,458
Sabine, Texas.....	13,565	15,769	19,754
Virginia	12,549	6,197	10,791
Buffalo	10,575	10,850	18,306
Washington	10,487	4,420	7,682
Oregon	8,548	3,034	4,240
Vermont	5,356	1,887	9,175
San Antonio.....	5,170	664	2,216
Georgia	4,937	...	...
St. Lawrence.....	4,073	305	685
North Carolina....	3,923	...	...
Mobile	2,782	1	1
Rhode Island.....	2,621	...	...
Los Angeles	2,035	4,355	5,185
Porto Rico.....	1,965	...	...
New York	1,698	1,500	2,690
Hawaii	1,565	2,063	2,925

gated 250,037 tons and 471,582 tons in 1927, as compared with 162,903 tons in 1926.

The future of the scrap trade is problematical, as the German-Polish convention of June 15, 1922, the terms of which provided that Germany should furnish Poland with 235,000 tons of scrap annually for five years, terminated in June, 1927, and since that date the sales of German scrap in Poland have practically ceased. In consequence where imports formerly moved overland from Germany to the Polish steel works in Upper Silesia, the bulk of imported scrap now moves through the free city of Danzig with a long and costly haul before it can be delivered to the Silesian furnaces.

Directors and Officers of Youngstown Sheet & Tube Co.
at Indiana Harbor Plant



Front row; Left to right. All of these men are Directors: Richard Garlick, Harry Coulby, A. E. Adams, H. G. Dalton, President J. A. Campbell, John Tod, T. J. Bray, Assistant President Frank Purnell and J. W. Ford.
Middle Row: J. M. Faris, assistant to vice-president; L. A. Manchester, general counsel; W. C. Reilly, vice-president; W. E. Watson, vice-president; W. B. Gillies, district manager at Chicago; C. S. Robinson, vice-president; W. E. Meub, secretary and treasurer, and W. J. Morris, vice-president.
Last Row: C. J. Ohlson, consulting engineer; A. R. Finch, general superintendent, Chicago plant; Henrik Ovesen, chief engineer; and E. S. Stillman, assistant district manager, Chicago plant.

Makes Die Castings for High Outputs

AN improved type of Lester die-casting machine has been built for its makers, the P. & R. Tool Co., Inc., Worcester, Mass., by the Reed-Prentice Corporation of that city. The machine is designed for high production of die castings, with a capacity up to 250 shots per hour, producing casting from a fraction of an ounce up to 5 lb. in aluminum and in corresponding weights in other metals. To accomplish this the machine is semi-automatic in its operation. It

of the machines at maximum production.

The operation of the machine is simple, by means of two lever handles shown at the front, one, at the left, horizontal, the other vertical. The movement of the horizontal handle brings into action the die-closing mechanism. Simultaneously, the tapered gooseneck nozzle is forced forward into its similarly tapered seat at the aperture in the adjacent die.

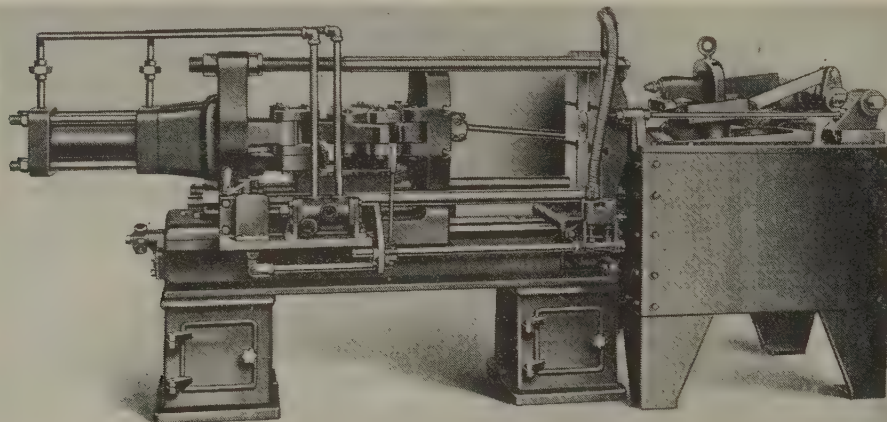
The vertical lever controls the air,

easily enter the narrow slots and grooves of the forming tools. The blades are 0.030 in. thick and permit measurements to be taken in slots or grooves up to 7/32 in. deep. By the use of this micrometer, the diameter of forming tools can be accurately measured and the depth of forms and grooves determined. It is available in sizes for measuring from 1 to 4½ in. by thousandths of an inch.

Chamfering Machine for Gear Teeth

FOR chamfering and rounding teeth of gears to promote easy engagement or meshing, as in the case of transmission gears in automobiles, the City Machine & Tool Works, 1517 East Third Street, Dayton, Ohio, has brought out a new Peerless tooth chamfering machine, motor-driven, with motor installed in the base.

The standard machine, such as that here shown, will accept gears up to 10 in. in diameter, although the capacity can be increased materially, it is emphasized, by slight alterations in manufacture. Operation time is put



By the Lever at the Left the Dies and Metal Connection Are Set and by the Lever at the Right Metal Is Forced by Air into the Dies

is furnished in four sizes, that shown being the smallest.

A chief change in the design from previous models lies in the mechanism which provides the automatic filling of the gooseneck which dips the molten metal from the furnace and delivers it under high air pressure into the dies. The die-closing toggle mechanism is hydraulically operated by oil and with a delivery of 3000 cu. in. of oil per minute will develop 15 cycles with a low consumption of power. The builders state that a 10-hp. motor will easily operate three

which forces the hot metal from the gooseneck into the dies to form the casting. The gooseneck is not connected with the high-pressure line when the dies are open, thus to eliminate danger or accident from this source.

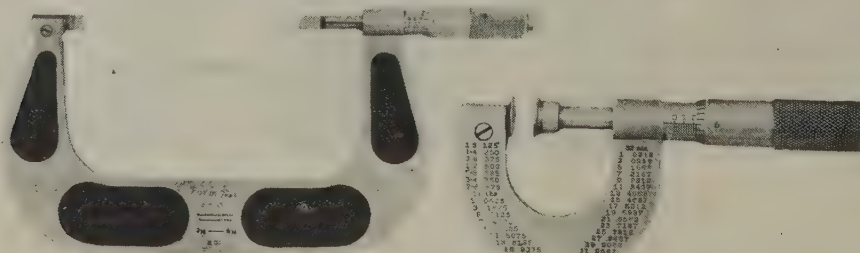
The reverse action of the vertical lever throws off the air and the reverse action of the horizontal lever opens the dies. An ejector plate automatically removes the cooled casting and the cycle of operation is completed. The picture shows the machine without dies in place.

Micrometers for Measuring Forming Tools

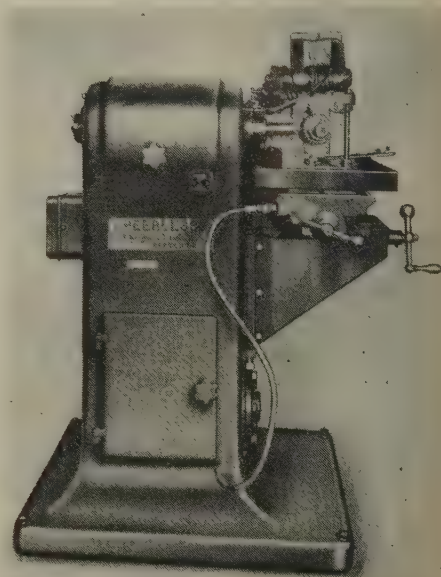
TWO micrometers for checking the accuracy of forming tools have been brought out by the Brown & Sharpe Mfg. Co., Providence. One of the instruments, shown at the right in the illustration, is provided with ½-in. diameter disks on its anvil and spindle end to permit taking measurements in places inaccessible to regular micrometers. The disks are

1/16 in. thick in the center and 0.020 in. thick at the outer edge. The measurement of a form up to ⅜ in. deep and over 0.020 in. in width can be taken with this micrometer, which is furnished in one size for measuring 0 to 1 in., by thousandths of an inch.

The thin blade ends of the anvil and spindle of the micrometer caliper shown at the left in the illustration



Accuracy of Forming Tools May Be Checked Conveniently



Peerless Gear-Tooth Chamfering Machine Has Inclosed Motor

at 45 teeth per minute, depending on the required pitch and form, although the makers say that greater speeds have been attained. Changing to gears of different sizes is a matter of a few minutes, and pitch change requires slightly longer time. The picture shows the set-up on rounding the corners of external teeth, but by a slight shift it can likewise be employed for rounding internal teeth. The machine is offered to work to close mechanical tolerances at speeds limited only by cutter endurance. Timken roller bearings are employed to assure smooth chatterless operation, and generous proportions are counted on to eliminate vibration.

The area of the base is 26 x 36 in., the overall height is 49½ in., and the net weight is 1800 lb.

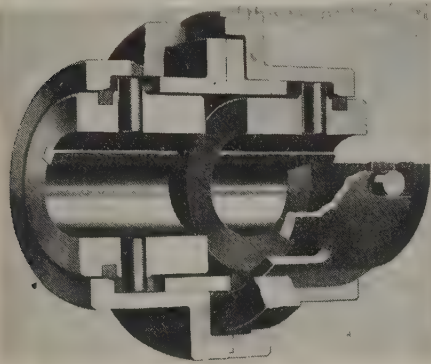
Full-Floating Flexible Coupling

A NEW type of flexible coupling is announced by the T. L. Smith Co., Milwaukee. It is known as the Flex-Ring full-floating coupling and in design approaches the universal joint with a shock-absorbing member

set between shafts, end play of shafts and shock. The Flex-Ring is designed to handle these conditions even when present to an excessive degree.

Torsional load is transmitted through one or more ring-shaped springs made of alloy steel. It is said that these springs are not subjected to any wear from endwise motion of the shafts, nor from angular or offset misalignment, since they are confined in a housing eliminating all motion except opening and closing under stress. In a reversing drive it is not necessary to increase the size of the coupling, as there is no reversal of stresses in the torque elements.

The coupling has been used on compressors and other units since 1924. About a year ago the company gave it a severe test on one of its own boring mills where the shaft had an offset of $3/32$ in. The test was continued throughout the year and at times the mill was purposely overloaded as high as 90 per cent. After a year's use under these extreme conditions, the Flex-Ring is said to be still in perfect condition.



Torsional Load Is Transmitted Through Ring Shaped Springs Made of Alloy Steel

added. It is claimed that it compensates for all possible conditions existing in a direct drive, such as angular misalignment of shafts, off-

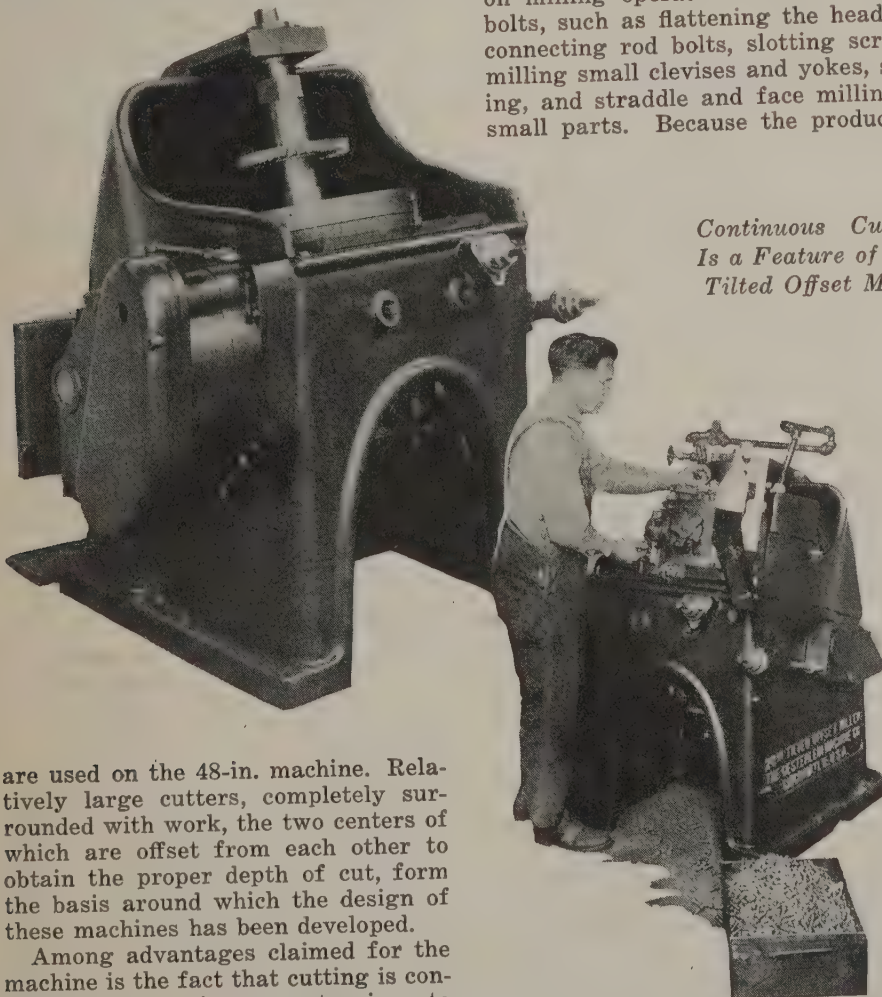
Tilted Offset Milling Machine

TWO views are shown of a new 28-in. tilted offset miller, built by the Oesterlein Machine Co., Cincinnati. Its design incorporates the same general principles of offset milling as

starting point. Many parts are undercut at the same time. The feed automatically decreases in the bottom of the cut.

The 28-in. unit is intended for use on milling operations on screws and bolts, such as flattening the heads of connecting rod bolts, slotting screws, milling small clevises and yokes, sawing, and straddle and face milling of small parts. Because the production

Continuous Cutting Is a Feature of This Tilted Offset Miller



are used on the 48-in. machine. Relatively large cutters, completely surrounded with work, the two centers of which are offset from each other to obtain the proper depth of cut, form the basis around which the design of these machines has been developed.

Among advantages claimed for the machine is the fact that cutting is continuous—there is no returning to

on such work by the offset process is limited only by the number of parts an operator can handle, means are provided in the work-holding fixtures for automatically clamping, unclamping and ejecting the parts, thereby leaving the operator's entire time for loading. Such a fixture is illustrated.

Some of the features of the machine are as follows:

Provision for the use of 20 gal. of coolant a minute,

A large chip basin within the base,

Frictionless bearings throughout, including spindle,

Relatively care-free lubrication system,

Heat-treated, multiple, splined gears and shafts throughout,

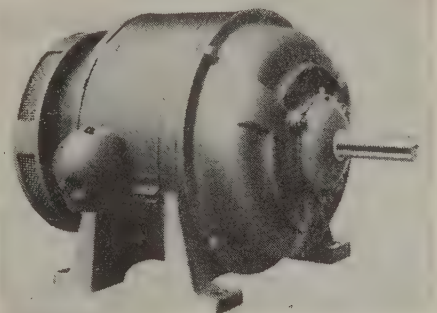
Adaptability to the use of automatic fixtures.

The machine has an 18-in. diameter table, swings 28-in. diameter, allows 14 in. from table to outboard arbor bearing, uses $2\frac{3}{4}$ -in. diameter arbor, weighs 2600 lb. net, and is driven by a 3-hp. 1800 r.p.m. motor mounted on the back of the machine, connected by chain with the driving sprocket.

Inclosed Electric Motor Fan Cooled

FULLY-INCLOSED fan-cooled induction motors are made by the Reliance Electric & Engineering Co., Cleveland. They are made in sizes of $1\frac{1}{2}$ hp. to 40 hp., but for the larger sizes a so-called skeleton frame motor is used, one of which is shown in the accompanying cut.

As is generally apprehended, motors of this type may be used in places subject to great quantities of mill dust and dirt, and at the same time may



be smaller than otherwise would be the case were measures not provided for the internal cooling of the motor parts, let alone keeping open the magnetic gaps within the motor.

A single exhaust fan is mounted on an extension of the shaft in the case of the Reliance construction outside the front bearing bracket. The external cooling air is drawn in through openings at the center of the back bearing bracket. The air passes over the radiating bonnets and stator and is exhausted at the front end, with the protection of heavy netting, as shown. For those desiring further particulars, the company has prepared a small catalog containing sectional drawings of both the skeleton frame and the riveted frame motor.

German Mills Threaten Wage Lockout

British Foresee Advantage from German Suspension—Welsh Tin
Plate Mills Resume Output Restriction

(By Cable)

LONDON, ENGLAND, Oct. 22.

CLEVELAND pig iron is quiet as most of the output is going to local steel works and supplies for sale in the open market are limited. The threat of a lockout in Germany, early in November, is considered as a possible favorable development for British producers.

Stocks of hematite iron have almost all been absorbed and supplies for early delivery are expected to be scarce. Buyers are consequently endeavoring to cover their future requirements and output may be increased. Foreign ore is quiet as German consumers have covered most of next year's requirements.

Imports of steel into Britain are larger, but new buying is light. Finished iron and steel is unchanged. The shipbuilding industry continues depressed. The Clyde Shipbuilding Co. is closing its Port Glasgow yard and dismantling it. Day, Summers & Co. are closing their Southampton works. Lloyd's Register for the quarter ended in September reveals a decrease in British tonnage under

construction of 112,000 tons, compared with the end of the second quarter, and 447,000 tons compared with the third quarter of last year. Compared with the third quarter of 1927, Clyde shipbuilding declined 28 per cent and North East Coast building 47 per cent.

Tin plate is quiet. Welsh makers have agreed to increase the restriction of output for 13 weeks beginning at the end of November, to offset the shortage of orders for the rest of this year. All mills will close for three weeks during that period. Prices for forward delivery are firm, many makers having sold half their production for the first six months of 1929.

Galvanized sheets are quiet but prices are steady. Merchants have sold Japan thin-gage black sheets for November-December shipment.

Continental markets are quiet, with but little buying by British consumers and overseas markets and prices are consequently easier. The International Wire Rod Cartel meets in Luxemburg, Oct. 26, when it is expected that prices will be advanced and the cartel renewed for another six months from the end of December.

increase of 15 pf. per hr. The employers offered minor concessions, which would have increased the wages of about 2000 of the 225,000 workmen affected, but these proposals were refused. The Labor Unions will probably request arbitration, and under the law the Government has authority to make a decision binding on both parties. Steel wages were last advanced at the beginning of this year, but by only 2 pf. per hr. Should wages be increased materially, syndicate domestic prices will be advanced. At present prices are unchanged, but the syndicates show reserve in concluding new contracts for future delivery. A strike involving 50,000 workmen is in effect at North Sea and Baltic shipyards.

Domestic and export markets are quieter than at the beginning of the month. In September, for the first time since February, 1927, pig iron output was less than 1,000,000 tons. The percentage of production by Rhenish-Westphalian furnaces in the first three quarters of 1928 is but little less than the output in the same months of 1927, but there a sharp decline appears in the production of Silesia and of the Siegerland-Lahn-Dill districts. The total German pig iron production in the first nine months was 9,638,384 metric tons, compared with 9,694,106 tons in the same period of 1927. September output was 985,413 tons, compared with 1,104,658 tons in September, 1927. The number of furnaces in blast at the end of September was 99, against 116 at the beginning of the year. Domestic pig

German Lockout in November

Wage Increase in Steel Mills Refused but May Be Arbitrated—Export and Domestic Trade Quiet

BERLIN, GERMANY, Oct. 13.—Throughout the northwestern iron and steel industry notice has been posted

of a lockout effective Nov. 1. Employees have denounced the existing wage agreement, and demanded an

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

	£0	17 3/4 s.	\$4.31
Durham coke, del'd.....	1	2	to 1 2 1/2
Bilbao Rubio ore*.....	3	8 1/2	to 3 9 1/2
Cleveland No. 1 fdy.....	3	6	16.64 to 16.89
Cleveland No. 3 fdy.....	3	5	16.04
Cleveland No. 4 fdy.....	3	5	15.80
Cleveland No. 4 forge.....	3	4 1/2	15.68
Cleveland basic (nom.)...	3	5	15.80
East Coast mixed.....	3	10	17.11
East Coast hematite.....	3	10 1/2	17.23
Rails, 60 lb. and up.....	7	15	to 8 5
Billets.....	6	2 1/2	to 6 10
Ferromanganese.....	13	15	66.83
Ferromanganese (export)...	14	0	68.04
Sheet and tin plate bars, Welsh.....	6	0	29.16
Tin plate, base box.....	0	18	to 0 18 1/4
Black sheets, Japanese specifications.....	13	7 1/2	65.00
Ship plates.....	7	12 1/2	to 8 2 1/2
Boiler plates.....	9	0	to 10 10
Tees.....	8	2 1/2	to 8 12 1/2
Channels.....	7	7 1/2	to 7 17 1/2
Beams.....	7	2 1/2	to 7 12 1/2
Round bars, 3/4 to 3 in..	7	10	to 8 0
Steel hoops.....	9	0	to 10 0
Black sheets, 24 gage.....	10	0	2.14
Galv. sheets, 24 gage.....	13	10	to 13 15
Cold rolled steel strip, 20 gage, nom.....	16	0	3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

	£3	3s.	to £3	5s.	\$15.31	to \$15.80
Foundry pig iron (a):						
Belgium.....	3	3	to 3	5	15.31	to 15.80
France.....	3	3	to 3	5	15.31	to 15.80
Luxemburg.....	3	3	to 3	5	15.31	to 15.80
Basic pig iron (nom.):						
Belgium.....	3	3			15.31	
France.....	3	3			15.31	
Luxemburg.....	3	3			15.31	
Coke.....	0	18			4.37	
Billets:						
Belgium.....	5	1			24.54	
France.....	5	1			24.54	
Merchant bars:						
Belgium.....	6	2 1/2			1.35	
France.....	6	2 1/2			1.35	
Luxemburg.....	6	2 1/2			1.35	
Joists (beams):						
Belgium.....	5	3			1.13	
France.....	5	3			1.13	
Luxemburg.....	5	3			1.13	
Angles:						
Belgium.....	6	0			1.30	
1/2-in. plate:						
Belgium (a).....	6	14			1.48	
Germany (a).....	6	14			1.48	
3/8-in. ship plate:						
Belgium.....	6	9			1.42	
Luxemburg.....	6	9			1.42	
Sheets, heavy:						
Belgium.....	6	1			1.33	
Germany.....	6	1			1.33	

(a) Nominal.

iron prices have been weaker, and less tonnage is going to foundry consumers. While pig iron in the international market has been firmer, there has been no reflection of this strength in Germany.

In semi-finished products the greatest domestic demand is for billets. The market for slabs is quiet. Sheet rolling mills report declining sales. Demand from the shipyards and from boiler manufacturers is smaller. Foreign buying of tubes has declined and producers are operating not more than 60 per cent of their capacity. The domestic market for bars has been quiet since the beginning of the month, so that German mills are able to execute export orders promptly and obtain slightly higher prices than other Continental producers. As much as £6 8s. per ton (1.41c. per lb.) f.o.b. is quoted today while in the fall of 1927 export bars sold at £4 12s. to £4 13s. (1.01c. to 1.02c. per lb.). Mills are now obtaining £1 15s. (\$8.50) per ton more for exports than a year ago, but domestic prices have advanced only 7 m. (\$1.67) per ton. The iron and steel foreign trade balance continues to improve.

The quarterly report for Sept. 30, of the Vereinigte Stahlwerke A. G., Düsseldorf, reports orders in hand at only 68.1 per cent of the volume of September, 1927. Output of coal, coke, pig iron and steel in the third quarter exceeded the second quarter.

A recent official inquiry into German mining as compared with before the war shows the total value of mine output in 1927 as 2,930,000,000 m., which is 39 per cent greater than in 1913 within the present frontiers. Even allowing for higher prices, 31.9 per cent for this group of commodities, the value exceeds the pre-war. Compared in tons, coal output in 1927 exceeded the pre-war by 9.1 per cent, lignite by 72.5 per cent. Iron ore output declined by 9.3 per cent and zinc output increased by 17.6 per cent.

German Tin Plate Mills Get British Orders

HAMBURG, GERMANY, Oct. 7.—The Welsh-American tin plate agreement has brought about a rather unusual situation in export trade. British exporters of tin plate in London, Manchester, Liverpool and Glasgow who are unable to supply their customers in foreign markets have sent numerous inquiries to German makers. German makers, who exported a total of 300 to 500 tons of tin plate a month prior to the war, have been shipping about 3000 tons monthly this year, and trial orders that they now have from British exporters are expected to increase this total considerably. In the past practically no German tin plate has been sold in South and Central American countries or in Canada, the German markets being the Scandinavian countries, Portugal and Italy. The trial orders from British exporters are for shipment to Canada and South American markets.

Tube Cartel Maintains High Prices

Consumers in Europe Object to High Domestic Market and Seek Pipe in Britain, Holland and United States

DÜSSELDORF, GERMANY, Oct. 4.—An example of what may occur when a combination of producers controls a product internationally is afforded by the International Tube Cartel. Domestic and export prices of tubes are fixed by the cartel in France, Belgium, Germany, Czechoslovakia, Luxembourg, Hungary, Poland and the Saar. Exports of tubes from one member country to another are not permitted by the association, so that domestic prices in these countries are maintained at a high level, despite complaints of consumers.

As an example of the high domestic prices that can be maintained by such an association of producers, the difference between the German domestic and export prices is at present 70 to 80 m. (\$16.66 to \$19.04) per ton, while in the bar market there is a difference of only 17 m. (\$4.05) per ton. Consumers, in charging that the high prices quoted by the tube makers are unjustified, cite a recent sale of tubes, totaling about 2,000,000 m. (\$476,000), made on reparations account to the French railroads by a small outsider, the Röhrenwerke at Bielefeld. The price of the seller was

30 per cent lower than the quotations of members of the association.

It was claimed by the tube cartel that the seller would undoubtedly incur a loss from this order unless inferior material were furnished. Tests of tubes delivered to the French railroads showed the material to be satisfactory, and, following the order, shares of the company advanced 20 per cent in the stock market.

There are two European countries not members of the tube cartel, Holland and Great Britain. Although British prices are high, Stewarts & Lloyds, Ltd., Glasgow, is disposing of substantial quantities of tubes through merchants in Cologne, and the Dutch works, Staalwerke de Maas, Maastricht, which started producing tubes in September, has established offices in Germany and is under-quoting the cartel. Merchants are inquiring for tubes from makers in the United States and, despite the tariff and high American prices, it is believed that the present level of the German tube market would permit business to be done with buyers at seaports, such as Hamburg, Bremen and Stettin.

Less Foreign Competition in Britain

Pig Iron More Active—Tin Plate Mills Full—Dock at Singapore Expected to Require Large Steel Tonnage

LONDON, ENGLAND, Oct. 12.—With the approach of winter, iron and steel makers are beginning to take stock of their position. Foreign competition has been curtailed to some extent by the recent upward movement in Continental prices, although there have been few reductions in British quotations. Rather, the tendency among British producers is to ask higher prices on most products.

Pig iron is slightly more active. It no longer pays to import foreign material, so that consumers have been paying more attention to domestic sources of supply. There is keen competition among the various producing districts. The Scottish Light Castings Association, at the beginning of this year, placed a substantial contract for foundry iron with Cleveland furnaces, but those producers, through their reluctance to make a concession in price, have lost the renewal of the contract, which has gone to Midland furnaces at about 2s. (48c.) less than the Cleveland figure.

Conditions in the hematite market are better. Export users are returning to the use of British material, and some desirable business has been placed for both domestic and overseas shipment. Stocks of hematite are still

fairly large, but they are being reduced, and if the present demand is maintained it will be necessary to blow in additional furnaces.

A considerable amount of activity has developed in semi-finished material, as a consequence of the high prices and extended deliveries ruling on Continental steel. Welsh sheet bar makers, in particular, have sold many thousands of tons to the tin plate mills and are now asking a 2s. 6d. (60c.) per ton advance for delivery next year.

The one weak spot in finished material is the heavy plate market. New shipping contracts are meager and there is practically no export demand. Consequently mills find it difficult to secure sufficient tonnage to enable them to operate more than part time. Current shipbuilding is fairly active and a good number of vessels have been launched recently, but the volume of new business will not replace the orders being completed.

Sheet and tube mills are moderately active, tin plate mills are assured of good business for next year, and in certain branches of construction and engineering work domestic demand will keep steel plants well occupied for several months. There are also some

important contracts for new bridges in foreign markets. The releasing of the Admiralty contract for the erection of the new Singapore Dock will result in the placing of large orders for reinforcing steel. Ordinary merchant business for export continues very quiet.

European Rail Prices Weaken

HAMBURG, GERMANY, Oct. 6.—Despite optimistic reports, the European Rail Makers' Association is said to be on the point of being dissolved. It is common knowledge among Continental producers that the British members have been selling a larger tonnage of rails than is specified in their allotment, at the same time opposing all efforts of the association at restriction. Consequently, some of the larger Continental mills in France and the Saar oppose continuation of the association.

Early dissolution is not expected, but evidence of lack of control ever members is accumulating. Some rail producers, believed to be in France, Luxemburg and the Saar, are selling through merchants at £6 8s. 9d. to £6 9s. (\$31.29 to \$31.35) per ton, f.o.b. Antwerp, although the official selling price is £6 10s. (\$31.59) for Thomas steel rails. This is the first time in the two years of the association's existence that concessions from official prices have been reported. The rail association is the only all-inclusive syndicate of European and British producers.

British Government Buys Wire Abroad

HAMBURG, GERMANY, Oct. 6.—A contract for \$310,000 worth of telephone and telegraph wire has been placed by the British Postal Department with the German Wire Makers' Association. This is the second large wire order placed with a foreign maker by the British Postal Department, the first, totaling \$190,000, having gone to the Trefileries du Havre in France last September. These are the first large orders placed abroad by this department since 1914, and the reason given is that British wire makers established a pool to maintain high prices for these contracts.

Foundry Equipment Orders Decline

Bookings of members of the Foundry Equipment Manufacturers Association declined in September, but were larger than for any other month this year except August and May. The index of both gross and net orders for 20 companies was 170, using average monthly shipments for the years 1922, 1923 and 1924 as a base of 100. The index of orders in August was 278. The index of shipments in September was 129.7, compared with 154.1 in August. Unfilled orders at the end of September stood at 529.7, compared with 467.2 a month previous.

To Discuss Machinery Trade Problems

Conference Called at Washington of Representatives of Machinery and Equipment Associations to Correct Uneconomic Practices

ON the request from secretaries of several of the associations in the machinery field, a conference of machinery and equipment trade associations was called by Hugh P. Baker, manager Trade Association Department, Chamber of Commerce of the United States. The meeting was held at Montauk Point, Long Island, N. Y., Sept. 29. E. F. DuBrul, general manager National Machine Tool Builders Association, was elected chairman, and Philip P. Gott, assistant manager Trade Association Department, Chamber of Commerce of the United States, was elected secretary of the conference.

Among the uneconomic practices discussed were the following: Wasteful buying; misrepresentation of materials; free engineering service; holding patterns for unlimited period; unlimited maintenance service.

A second conference has now been called for Thursday, Nov. 8, at 10 a.m., at the Chamber of Commerce of the United States Building, Washington, to give further consideration to the subjects of the first conference and also unfair competitive practices, unknown costs of doing business and obsolescence. W. H. Rastall, chief of Industrial Machinery Division of the Bureau of Foreign and Domestic Commerce, and H. C. Dunn, Domestic Commerce Division of the Department of Commerce, will outline further possible subjects which may be considered by this conference group.

The classifications and schedules which the Census Bureau will use in the special survey at Cleveland will be mailed to secretaries, and suggestions relative to these will be considered.

Those present at the first conference were as follows:

Harry Botsford, Society for the Development of Internal Combustion Power, Titusville, Pa.

J. R. Boyd, National Crushed Stone Association, Earle Building, Washington.

C. W. Conner, American Road Builders Association, 914 National Press Building, Washington.

C. R. Dimm, Flour Mill Machinery Manufacturers Association, care of Robinson Mfg. Co., Muncy, Pa.

E. F. DuBrul, National Machine Tool Builders Association, 826 Provident Bank Building, Cincinnati.

E. P. Essley, Associated Machine Tool Dealers, 551 Washington Boulevard, Chicago.

Charles M. Haskins, National Association of Waste Material Dealers, 1109 Times Building, New York.

W. S. Hays, Power Transmission Association, Drexel Building, Philadelphia.

C. B. LePage, American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Verne E. Minich, American Foundry Equipment Co., 366 Madison Avenue, New York.

R. M. McClure, National Laundry Allied Trades Association, 111 West Washington Street, Chicago.

John W. Ogren, Elevator Manufacturers Association of the United States, 407 Conway Building, Chicago.

H. C. Dunn, Domestic Commerce Division, Department of Commerce, Washington.

R. M. Hudson, assistant director, Bureau of Standards, Washington.

W. H. Rastall, chief, Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington.

Philip P. Gott, assistant manager, Trade Association Department, Chamber of Commerce, Washington.

Mr. Rastall called attention to the fact that, according to the income tax report for 1924, 51.8 per cent of the firms reporting classified under "Machine, Tool and Metal Working Machinery" reported no profit.

Mr. Dunn pointed out that the changes in style constitute serious problems for the machinery industry. Do the machinery manufacturers and users realize, it was asked, that the life of a machine is not only determined by its productive ability but by the desire of the ultimate consumer to purchase the products of that particular machine. The Domestic Commerce Division upon request of the machinery industry may make a survey of the obsolescence of machinery.

Italian Ministry Suggests Closing Some Steel Plants

The Italian Ministry of Economy reports that the 60 steel and iron works in the country are producing at only about 50 per cent of their maximum capacity. The ministry suggests that the same tonnage of finished iron and steel could be produced at lower cost if half these works closed and only the largest and most modern continued operations.

Closing these plants would throw several thousand men out of work, but the consequent decrease in the cost of finished steel and iron, it is believed, would create employment for some 10,000 engineering workers.

The manufacturing interests of Italy are at present hampered by a heavy duty on foreign steel and iron, which forces up prices in Italy, and by Government pressure on employers to retain more workers than are necessary to meet present demands.

Half of Immigrants from Canada and Mexico

WASHINGTON, Oct. 20.—Immigrants admitted to the United States in August totaled 24,629, of whom 12,970 were males and 11,659 were females, according to the Bureau of Immigration. Emigrants leaving the United States in August were 6488, of whom 4062 were males and 2426 were females. Canada, with 6104, led in the number of emigrants to this country, followed by Mexico with 5557. From overseas, Germany contributed the largest number, 2782. The Irish Free State sent 1395; Italy, 1538; Great Britain, 1197, and the Scandinavian countries, 1302. Countries of eastern Europe sent 2264 immigrants.

Science Applied to Open-Hearth Practice

Pittsburgh Conference Listens to Exposition Made in Non-Technical Terms—Abnormal Steel Studied

PRACTICE sat at the feet of theory at the second open meeting of the Metallurgical Advisory Board to Carnegie Institute of Technology and the United States Bureau of Mines in Pittsburgh, Friday, Oct. 19, when Dr. C. H. Herty, Jr., physical chemist United States Bureau of Mines, gave a progress report on plant research on 40, 90 and 250-ton open-hearth furnaces. In the simplest language and by lantern slides remarkable for their clearness, he provided an entirely understandable explanation of the elimination of non-metallic inclusions from open-hearth steel. This report, easily the outstanding event of the gathering, showed how to determine whether a heat of steel was to be killed or reboiled. The author was commended further for having written something that the non-technical man of the open hearth might understand, particularly since so much that has been written previously has lost its effectiveness because the man in the shop cannot interpret, let alone apply it. Discussion by the 150 or more men present did not cease with the completion of the afternoon session, but extended informally throughout the dinner at the Pittsburgh Athletic Association.

Like the first open meeting held in Pittsburgh about a year ago, Friday's conference gathered a group of those interested in metallurgy from both a practical and an educational standpoint. As explained in *THE IRON AGE*, Oct. 27, 1927, page 1171, the metallurgical advisory board supervises a joint research activity. United States Bureau of Mines contributes one-half the cost of the work, while Carnegie Institute of Technology supplies one-third and the remainder is contributed by steel makers who will benefit by the results.

F. N. Speller, director of metallurgy and research National Tube Co., Pittsburgh, is the new chairman of the board, succeeding T. D. Lynch, consulting metallurgical engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, who has filled that office for the past three years. G. A. Reinhardt, chief metallurgist Youngstown Sheet & Tube Co., Youngstown, Ohio, was elected vice-chairman, succeeding Dr. Earl Blough, technical director Aluminium, Limited, Pittsburgh.

In the morning Dr. V. N. Krivobok, associate, Bureau of Metallurgical Research, Carnegie Institute of Technology, presented an illustrated report on case carburizing research. He observed that it had been necessary to attack the problem from chemical and physical bases and determine the rate of diffusion and the distribution and size of non-metallic inclusions. He also reviewed effects of the different alloys upon the normality of the steel. Dr. H. W. Gillett, chief division of

metallurgy, United States Bureau of Standards, Washington, agreed with Dr. C. H. Herty, Jr., that oxygen has an important influence upon abnormality. He thought the plan of research was good, but warned that the problem was complex and the research likely to be long. M. A. Grossman, metallurgist Central Alloy Steel Corporation, Canton, Ohio, thought the way to the answer was in separating the variables, since the depth of the case is the same in normal as in abnormal steel.

Dr. F. M. Walters, Jr., director Bureau of Metallurgical Research, Carnegie Institute of Technology, mentioned the need of a pure manganese as a primary step in the study of steel and illustrated by lantern slides a furnace for making manganese metal 99.94 per cent pure, with the possibility of further refining to 99.99 per cent. This development will be described at length in a forthcoming issue.

Improved Uses of Coal and By-Products

A second international Conference on Bituminous Coal will be held at Carnegie Institute of Technology, Nov. 19 to 24. More than 100 speakers, representing 12 nations, will take part. Features on the program include:

Monday, Nov. 19. "Coal Problems in Perspective," by Lord Melchett (Sir Alfred Mond), London, England, and a session on low temperature distillation.

Tuesday, Nov. 20. "Coal, Hydrogen and Capital," by F. zur Nedden, Berlin, Germany, and a conference on pulverized fuel.

Wednesday, Nov. 21. "From Coal to Rubber," by Prof. Fritz Hofmann, Breslau, Germany, and a conference on purification and cleaning of coal.

Thursday, Nov. 22. Sessions on the liquefaction of coal and on combustion for power.

Friday, Nov. 23. "Some Thoughts of an Inventor on Scientific Research and Inventions," by Georges Claude, Paris, France, and conferences on gas.

Billings & Spencer Co. to Be Reorganized

The Billings & Spencer Co., Hartford, Conn., maker of drop forgings, tools and drop forging machinery, will soon submit to stockholders a plan for the reorganization of the company, contemplating the issuance of 105,000 shares of \$10 per value stock in substitution for present outstanding preferred and common stocks, the elimination of bonds with accrued interest and the payment of the company's outstanding bank loans. The plan has received the approval of directors and a syndicate of bankers has underwritten the proposed new stock issue.

David J. Post has been elected chairman of the board of the company, a newly created office. He has been a director in the Billings & Spencer Co.

for a number of years and is also chairman of the Hall-Thompson Co. and of Veeder-Root, Inc., both of Hartford. Other officers of the Billings & Spencer Co. are Frederic C. Billings, president and treasurer; A. H. Deute, vice-president and general manager, and C. T. Smith, secretary and assistant treasurer. Messrs Billings, Deute and Post and Richard J. Goodman, Edward Milligan, Lucius F. Robinson, Nelson Smith and L. Edmund Zacher will constitute the board of directors of the new company.

Pacific Coast Steel Interests Confer

More than 140 executives connected with the iron and steel industry in California met at the Hotel Whitcomb, San Francisco, Oct. 12, to attend the Northern California Regional Conference of the Iron, Steel and Allied Industries of California. Group meetings, representing merchant bar jobbers, steel mills, structural steel fabricators, foundries, general manufacturers and reinforcing steel bar jobbers, were held in the morning. Following a luncheon, resolutions affecting the industry on the Pacific Coast were presented to the executive committee for further consideration. The fifth annual conference will be held at Del Monte, Jan. 24 to 26.

Call to Meet on Shafting Standards

The sectional committee on the Standardization of Shafting will hold a meeting at the headquarters of the American Society of Mechanical Engineers, New York, Oct. 31, at 10 a.m., to consider the revision of certain standards developed by the committee some time ago. The proposed American Standard Woodruff Key dimensions which has recently been approved by the sub-committee will be considered. At this time eleven national organizations have been requested to appoint an official representative to serve on this sectional committee.

Plant to Make Carbology Cutting Tools

Carbology Co., Inc., is reported to be planning the construction of a new plant at or near Schenectady, N. Y., for the manufacture of metal and carbide alloys, to cost more than \$150,000 with equipment. The company was formed recently with a capital of 7000 shares of stock, no par value, by P. R. Mallory and interests identified with General Electric Co. Mr. Mallory is head of P. R. Mallory & Co., Inc., 350 Madison Avenue, New York, manufacturer of tungsten products, with plant at Port Chester, N. Y. Carbology is the trade name of a new tool material featured at the Steel Treathers' Exposition in Philadelphia earlier in the month, and described in the last issue of *THE IRON AGE*.

New Card of Extras on Hot-Rolled Strip

The Sharon Steel Hoop Co., Sharon, Pa., has announced a new card of extras on hot-rolled strip steel. As nearly all contracts for the fourth quarter have been closed on the old basis, the new extras, though immediately effective, probably will not apply to much tonnage until the first quarter of 1929. The company states that the extras are the result of more than a year's study of production costs of various widths and gages.

"In the card which has been in general use for some years," says the company, "the extras on the quite narrow sizes were so low in relation to costs as to make it unavoidable that a high base price be quoted to secure any profit on these small, light sections. On the wide sizes, the old card was thought to be consistent with mill practice of some years ago, when it was difficult, and, in some cases, impossible to roll wide sizes in light gages. All wide sizes in the usual strip gages were then expensive and troublesome to roll and therefore took high extras. Today's practice is such that large numbers of mills produce the wide sections much more economically than formerly, so that practically no regard has been given to the list of extras on the wide sizes. These practices have caused confusion and demoralization, and have, to a great extent, destroyed the usefulness of the old card.

"Our new card of extras, we believe, will overcome these difficulties and will be to the advantage of both buyer and seller in permitting a uniform base price to be built up under the new card of extras. If this should be

the result, it will permit the trade to have the same knowledge of the market situation as to strips as now pertains to bars, plates and other standard hot-rolled steel products."

The old card of extras failed to take into consideration the pickling costs on all sizes 1 1/2 in. and wider. The new card has three divisions of pickling extras, one on sizes under 1 1/2 in., another on sizes from 1 1/2 in. to 6 in. and a third on 6 1/16 in. to 24 in.

It is said that other manufacturers are preparing to adopt the same card.

National Advertising for Steel Advocated

"The steel industry is the only large and important industry that has failed to seek the benefits of a national advertising campaign to educate the public as to merits and advantages of steel," said Charles F. Abbott, executive director American Institute of Steel Construction, in an address on Oct. 16 to the Advertising Club of Washington. "Unfortunately, there are a few leaders of this industry who still seemingly refuse to believe that advertising pays."

"It is to be hoped," he said, "that the time is not far distant when the steel industry may undertake a national advertising campaign to promote public education as to steel. No investment could be made offering greater opportunities for profit than that of a properly conducted national advertising campaign to win public support and thereby extend the consumption of steel, particularly in bridges and buildings, where public influence is frequently evident.

"The industry which grasps the full meaning of the new form of competition and adapts its policies to meet it will inevitably outstrip those which are unable to recognize the change that confronts them, or which fails to place the proper valuation on public opinion as the controlling factor in industrial progress."

Sheet Sales in September 370,936 Gross Tons

Sales of steel sheets showed a sharp gain in September and were greater than during any previous month of the year except March, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. Sales in September were 370,936 gross tons, compared with 254,397 tons in August. Production last month amounted to 318,907 tons and shipments were 322,876 tons, both falling off slightly from the previous month. Unfilled orders, which on Oct. 1 amounted to 539,960 tons, showed a gain of 40,000 tons over those of Sept. 1. The September report and comparisons follow:

	Sept.	Aug.	July
Total number of mills	721	721	721
Capacity per month	450,500	506,000	464,422
Percentage re- porting	70.1	70.1	70.1
Sales	370,936	254,397	333,357
Production	318,907	329,396	267,685
Shipments	322,876	324,691	278,310
Unfilled orders	539,960	498,023	550,468
Unshipped orders	102,313	102,825	106,653
Unsold stocks	44,519	51,636	55,280
Percentages to Capacity			
Sales	117.5	71.7	102.4
Production	101.0	92.8	82.2
Shipments	102.2	91.5	85.5
Unfilled orders	171.0	140.4	169.1
Unshipped orders	32.4	29.0	32.8
Unsold stocks	14.1	14.6	17.0

New Card of Extras on Hot-Rolled Strip Steel Proposed by Sharon Steel Hoop Co.

B. W. Gauge No.	Thickness	WIDTH																			Extra for Slitting 1½" & Wider	Extra for Pickling			B. W. Gauge No.
		⅜"	7⁄16"	½"	9⁄16"	5⁄8" to 11⁄16"	3⁄4" to 13⁄16"	7⁄8" to 15⁄16"	1" to 1 1⁄8"	1 1⁄8" to 2"	2 1⁄8" to 2 1⁄2"	2 1⁄2" to 3"	3 1⁄8" to 3 1⁄2"	3 1⁄2" to 4"	4 1⁄8" to 5"	5 1⁄8" to 6"	6 1⁄8" to 8"	8 1⁄8" to 10"	10 1⁄8" to 12"	12 1⁄8" to 24"		Under 1 1⁄2"	1 1⁄2" to 6"	6 1⁄8" to 24"	
3/16"	.187"	1.50	1.30	1.00	.85	.70	.55	.45	.30	.25	.20	.20	.10	.10	.10	.10	.10	.10	.10	.05	.25	.55	.40	.25	3/16"
7	.190-.180	1.50	1.30	1.00	.85	.70	.55	.45	.30	.25	.20	.20	.10	.10	.10	.10	.10	.10	.10	.05	.25	.55	.40	.25	7
8	.179-.162	1.50	1.30	1.00	.85	.70	.55	.45	.30	.25	.20	.20	.10	.10	.10	.10	.10	.10	.10	.05	.25	.55	.40	.25	8
9	.161-.146	1.50	1.30	1.00	.85	.70	.55	.45	.30	.25	.20	.20	.10	.10	.10	.10	.10	.10	.10	.05	.25	.55	.40	.25	9
10	.145-.132	1.60	1.40	1.05	.90	.75	.60	.50	.40	.30	.25	.25	.15	.15	.15	.15	.15	.15	.15	.10	.25	.55	.40	.25	10
1 8"	.125	1.60	1.40	1.05	.90	.75	.60	.50	.40	.30	.25	.25	.15	.15	.15	.15	.15	.15	.15	.15	.25	.55	.40	.25	1 8"
11	.131-.118	1.60	1.40	1.05	.90	.75	.60	.50	.40	.30	.25	.25	.15	.15	.15	.15	.15	.15	.15	.15	.25	.55	.40	.25	11
12	.117-.105	1.70	1.50	1.15	.95	.80	.65	.55	.40	.35	.30	.30	.20	.20	.20	.20	.20	.20	.20	.15	.25	.55	.40	.25	12
13	.104-.090	1.80	1.60	1.20	1.00	.85	.70	.60	.55	.40	.35	.35	.25	.25	.25	.25	.25	.25	.25	.20	.25	.70	.55	.35	13
14	.089-.076	2.00	1.70	1.30	1.05	.90	.75	.65	.55	.40	.35	.35	.30	.30	.30	.30	.30	.30	.30	.20	.25	.70	.55	.35	14
15	.075-.068	2.20	1.80	1.40	1.10	.95	.80	.70	.55	.40	.35	.35	.30	.30	.35	.35	.35	.35	.35	.30	.40	.70	.55	.35	15
16	.067-.061	2.40	2.00	1.50	1.20	1.00	.85	.75	.60	.45	.40	.40	.40	.45	.45	.40	.40	.40	.40	.30	.40	.70	.55	.35	16
17	.060-.054	2.60	2.20	1.70	1.30	1.10	.90	.80	.60	.50	.45	.45	.45	.55	.60	.60	.60	.60			.40	.90	.70	.45	17
18	.053-.047	2.90	2.40	1.90	1.50	1.20	1.00	.85	.70	.55	.55	.55	.60	.70	.80	.80	.75	.75			.55	.90	.70	.45	18
19	.046-.041		2.70	2.10	1.70	1.40	1.10	.90	.80	.65	.70	.70	.75	.80	.95	1.00					.55	.90	.70	.45	19
20	.040-.035			2.30	1.90	1.60	1.30	1.00	.90	.85	.90	.95	1.00	1.05	1.15	1.20						1.25	1.05		20
21	.034-.032			2.70	2.30	1.90	1.50	1.20	1.10	1.10												1.25	1.05		21
22	.031-.028			3.20	2.70	2.30	1.80	1.50	1.40	1.40												1.25	1.05		22
23	.027-.025				3.20	2.70	2.20	1.80	1.60	1.60												1.25	1.05		23

QUANTITY EXTRAS				
Less than 2000 lbs. but not less than 1000 lbs. of one size				25c per 100 lbs.
Less than 1000 lbs. of one size				50c per 100 lbs.
CUTTING EXTRAS				
	2000 lbs. or more	Under 2000 lbs. to 1500 lbs.	Under 1500 lbs. to 1000 lbs.	Under 1000 lbs. to 500 lbs.
Cutting to lengths of 60" and over with pieces	No charge	.10	.20	.40
Cutting to lengths over 48" to 59" inclusive	.10	.20	.30	.50
Cutting to lengths over 24" to 48" inclusive	.15	.25	.35	.55
Cutting to lengths over 12" to 24" inclusive	.30	.40	.50	.70
Cutting to lengths over 60" without end pieces	10% Extra per 100 lbs.			

Extras for galvanizing and flaring will be quoted on application. Extras for higher than .20% carbon will be quoted on application. Subject to change without notice.

Urges Distributers to Extend Sheet Uses

Metal Branch of American Hardware Association Hears Favorable Reports on Progress of Simplification

THE opportunity offered distributers to extend the use of sheet steel products was emphasized by George H. Charls, president National Association of Flat Rolled Steel Manufacturers, Cleveland, in an address before the Metal Branch, National Hardware Association, meeting at Atlantic City, N. J., Oct. 16. Mr. Charls dealt at length with the future possibilities of sheet steel and told of the work being done by the Sheet Steel Trade Extension Institute to bring out these potentialities. The distributer, he pointed out, is in a splendid position to realize considerable profits by following up the work already done and helping to broaden the market for sheet products. A considerable part of the increase in sheet steel consumption is already being taken up by demands from new sources and this, according to Mr. Charls, is only demonstrative of what may follow if the work is continued

Market Conditions Good

B. C. McMahon, Bethlehem Steel Co., Bethlehem, Pa., spoke briefly on market conditions throughout the steel industry with special emphasis on sheets and tin plate. Although there has been a slackening in the demand for tin plate in recent weeks, he stated that the storm in Florida and the West Indies would occasion a considerable decrease in the pack of canned goods this season and probably lead to a very heavy pack in 1929, thus pointing to a good year for tin plate.

Discussing conditions in the sheet industry, he said that prospects looked better now than had been the case for several months. Mills are running at a high rate and deliveries have been extended. Prices, which until now, have been the most unfavorable factor in the industry, have improved somewhat, but there is still room for considerable advance. Distributers, he emphasized, are very important factors in sheet consumption, particularly of the galvanized product, and will continue to grow more important as the uses of this product grow more diversified. In spite of low prices, however, he said that the steel industry has kept wages at a high level, the average weekly pay envelope for the industry as a whole averaging \$33.87, as compared with \$27.30 for a group of 20 other important industries.

Reports Progress in Roofing Simplification

In the report of the sheet steel simplification board of review, W. L. Latta, Wheeling Steel Corporation, Wheeling, W. Va., chairman, stated that the Department of Commerce schedule No. 28, referring to sheet

steel had been reaffirmed and that schedule No. 78 on galvanized roofing had been improved upon. A representative of the Department, who was present at the meeting, stated that over 94 per cent of the manufacturers of sheet steel now adhered to the standard sizes specified.

Louis Kuehn, Milwaukee Corrugating Co., Milwaukee, presenting the report of the eaves trough and conductor pipe board, stated that the association had been successful in securing the adoption of 28 gage and heavier as the minimum weight for eaves trough. He stated that 96 per cent of the distributers in the country had adopted this standard.

The protest of the distributers to the lower discounts on sheets recently adopted by the mills was discussed in THE IRON AGE last week, page 970.

Plans for Third World Foundry Congress

During the past winter the committee on international relations of the American Foundrymen's Association has been engaged mainly on preliminary arrangements for the third International Foundrymen's Congress which will be held in London, June 11-15, 1929, under the auspices of the Institute of British Foundrymen. The first international congress was held in Paris in September, 1923; the second was held in Detroit in September, 1926.

Officials of the Institute of British Foundrymen will be hosts to the 1929 congress. Plans which have been agreed upon provide for the American delegation leaving New York either May 11 or 15, 1929, in order to arrive in England in time for a three weeks' sight-seeing pre-convention tour of England and Scotland, which will include several days in London prior to the opening of the congress on June 11. Important British foundry centers will be visited.

At an early date Thomas Cook & Son, the official travel agent of the tours, will submit a recapitulation of the pre-convention and post-convention trips for the committee's final approval and when approved it will be submitted to the A. F. A. members. If, in the meantime, anyone desires further information as to accommodations, rates, etc., he should write to Thomas Cook & Son, 585 Fifth Avenue, New York.

During the week of the congress itself in London what is expected to be the largest exhibition of foundry and shop equipment ever held in Europe will be staged under the auspices of the British foundrymen's organization. At the sessions of the congress papers will be read and discussed by the

world's most prominent foundrymen.

Since the announcement of the tour at the Philadelphia convention of the American Foundrymen's Association, a surprisingly large number of foundrymen have made inquiry as to details regarding the tour, indicating that marked interest is being displayed. Accommodations will be limited, especially for the pre-convention tour of Great Britain.

Awards to Hoover the John Fritz Medal

The John Fritz gold medal, the highest honor bestowed by the engineering profession of this country, has been awarded for 1929 to Herbert Clark Hoover, it is announced by the Engineering Foundation, 29 West Thirty-ninth Street, New York.

"The choice of Mr. Hoover," according to the announcement by Alfred D. Flinn, director of the foundation, "ended a process of selection begun a few years ago. The award was tentatively made a year ago by the John Fritz Medal Board, which is composed of 16 recent past presidents of the four national societies of civil, mining and metallurgical, mechanical, and electrical engineers, having together a membership of nearly 60,000. By this award, which was unanimous, the board sought to express the high appreciation of Mr. Hoover's professional brethren for his distinguished attainments as an engineer, particularly in mining operations in this and other countries, and his great services as a man to his fellows.

"Notable among his engineering achievements are the successful introduction into other countries of improved American mining methods. His scholarly accomplishments are also worthy of mention, especially his translation into readable English from difficult mediaeval Latin of Agricola's famous book 'De Re Metallica.' Mrs. Hoover was associated with him in this enterprise, which occupied 'leisure' hours at one period some years ago."

The citation accompanying the award reads: "To Herbert Hoover, engineer, scholar, organizer of relief to war stricken peoples, public servant."

Plans Study of Wire Rope

A research into the causes of breakdown in wire rope is being organized by a committee of American Society of Mechanical Engineers, jointly with Engineering Foundation. It is planned to construct a testing machine which can reproduce all the varied service conditions to which such rope is subjected. The society would be glad to hear from technical men particularly interested in any phase of the manufacture or use of wire rope.

Fluorspar Duty Increased 50 Per Cent

President's Proclamation Follows Investigation by Tariff Commission, Raising Import to \$8.40 Per Gross Ton

WASHINGTON, Oct. 23.—Increased by 50 per cent, from \$5.60 to \$8.40 per gross ton, by a Presidential proclamation of Oct. 17, the new duty on metallurgical fluorspar becomes effective Nov. 16. It affects only spar containing not more than 93 per cent of calcium fluoride, embracing grades used by the steel and foundry industries, but does not affect the acid and ceramic grades whose costs of production could not be adequately obtained by the Tariff Commission. The commission conducted the inquiry upon application of domestic producers of spar for a 50 per cent increase in the duty through the flexible provision of section 315 of the tariff act. The increased duty, as proclaimed by President Coolidge, is stated in terms of the gross ton because it is the accepted legal unit. Stated in net tons, the increase is from \$5 to \$7.50. The cost report was based on conditions in 1925.

The commission said that the rate of duty shown by the difference in costs of production of spar of the metallurgical grades, containing not more than 93 per cent calcium fluoride, in the United States and the principal competing country (England) necessary to equalize the differences within the limit provided in section 315 is the rate of \$8.40 per long ton, equivalent to \$7.50 per net ton. The report found that the total cost of production in 1925, including transportation to Philadelphia, was \$28.14 for domestic metallurgical spar and \$12.10 for English spar, a difference of \$16.04, while the total cost with transportation to Pittsburgh was found to be \$25.89 for domestic spar and \$15.76 for English spar, a difference of \$10.13. The Pittsburgh district consumes roughly 50 per cent of the fluorspar used in this country, while the Philadelphia district consumes approximately 10 per cent. About 10 per cent of the Pittsburgh consumption is foreign material and the remainder is domestic. Virtually all of the spar used in the Philadelphia district is imported. The latter district is the principal port of entry and the principal market in the United States for imported spar.

The commission said that the present duty of \$5.60 per gross ton does not equalize the difference in costs of production of fluorspar in the United States and England. The difference in costs of production of spar of the metallurgical grades in the United States and in England, it was stated, are greater than the amount of the present duty increased by the total maximum increase authorized under section 315, irrespective of whether the cost comparison is limited to factory costs of production or includes transportation costs to Philadelphia and Pittsburgh.

Costs of production were not ob-

tained by the commission from foreign producers because access to cost records was denied. The report said it was assumed that, in the absence of evidence to the contrary, the cost of production of imported spar is not more than the wholesale foreign price or value as shown by invoices. Invoices of imports in 1925, 1926 and the first half of 1927 were analyzed to ascertain the price of imported spar at foreign plants, the cost of shipment to ports in the United States and the grade of fluorspar shipped. While England was found to be the chief competing country in 1925, Germany was the principal source of spar imports in 1927, supplying 31,829 tons, or 45 per cent of the total, against 18,449 tons, or 26 per cent, from the United Kingdom.

In appearing at the hearing in July of last year on the fluorspar inquiry, Vice-President C. A. Buck of the Bethlehem Steel Co., who protested against an increase in the duty, estimated that his company consumes 80 per cent of the fluorspar imported. It does not use domestic spar because the foreign material can be obtained more cheaply. Mr. Buck attacked the cost figures of the commission in its preliminary report and said that, in considering the costs of producing in England, there was no account of the cost of depreciation, capital investment of plants and related items. He also contended that English spar was largely a reclaimed product from lead mines, but that these stocks are becoming exhausted, after which the English operators will have to resort to deep mining of fluorspar as is done in the United States.

Bethlehem Asked for Lower Duty

Mr. Buck further contended that an increase in duty would be a source of discrimination against the steel industry in the East because the industry in the West consumes domestic spar and would not be adversely affected by a higher duty. It was stated by Mr. Buck that the Bethlehem Steel Co. consumed 33,000 tons of fluorspar in 1926 and that if, as suggested by domestic producers, an increase of 50 per cent in the duty would mean only 20c. a ton additional in the cost of producing steel, the increase to the Bethlehem company alone would be \$82,500 a year. Mr. Buck also contended that it is not the intention of the tariff act that the costs of high-cost domestic producers shall be equalized with foreign production costs by levying heavy import duties or even that an average domestic cost "which has been unduly inflated because of the high costs of a few small producers should be used for the purpose of comparison." Mr. Buck said that even if the duty were increased it would make no difference in the source of Bethlehem's supply

because the imported material would still have to be relied on rather than domestic material, which, it was argued, could not reach the Eastern markets on account of the freight differentials. Mr. Buck had asked that the duty be reduced by at least \$1.71 per ton, which was declared to be the difference in the cost of the domestic product and the English product laid down at Pittsburgh in favor of the American spar.

Domestic Fluorspar Mines Aided by Tariff Increase

One result of the recent action by President Coolidge in approving an increase of 50 per cent in the import duty on foreign fluorspar is that the Hillside Fluorspar Mines will immediately begin the construction of a loading dock on the Mississippi River at Rosiclare, Ill. The company for some time has had plans and specifications ready for this dock, but has delayed starting the work pending the decision just made by the President under the authority granted him by the present tariff law. With the completion of the new dock, the company will be able to serve by river shipments its customers who are able to take shipments that way and that means all of the large steel companies in the Wheeling and Pittsburgh districts, all of which are located on the Ohio, Monongahela and Allegheny Rivers.

Another large fluorspar company for some time has been using the rivers in supplying its Pittsburgh district customers, and the saving in the delivered price to consumers has been about \$2 a ton when the barges of commercial towing companies have been used, and even more when the steel companies have allowed the use of their own barges, returning without cargo.

Between the added impost on foreign fluorspar and the lower delivered charges made possible by river deliveries, the domestic producers should now be able to operate their mines at a profit, a condition that was not possible when the imported product had a substantial delivered price advantage over domestic fluorspar at consuming points as far west as Pittsburgh and Wheeling. Figuring domestic gravel fluorspar at \$17 per net ton at mines, and a river barge rate of \$3 from southern Illinois to Pittsburgh, and handling charges of 50c. per ton, the delivered cost would be \$20.50. Assuming the addition of the full increase of \$2.50 a net ton in the import duty to the present price of foreign gravel fluorspar of \$16, the price would be \$18.50, Atlantic seaboard, to which would have to be added \$3.13 to \$3, the rail freight to the Pittsburgh district, a total of \$21.65 to \$22.07 per net ton. This advantage for American producers exists, however, if delivery is made by water, as the all-rail rate from domestic mines to the Pittsburgh district is \$5.25 per net ton, producing a delivered price based on \$17 at mines of \$22.25.

This Issue in Brief

Don't limit your interests to shop matters, Department of Commerce representative tells industrial engineers. Savings made by production economies may be wiped away by changes forced on business by new conditions. Engineers should study the broad trends of business.—Page 1028.

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Are we wasting money on super-accuracy? As much waste results from needless super-accuracy as from undue inaccuracy, says speaker at industrial engineers' meeting. Warns manufacturers against paying for greater accuracy than the work warrants.—Page 1031.

* * *

Purchasing agents have greater influence upon national prosperity than any other group of operators, says Truscon official. Buyers are not to blame for attempting to eliminate "prosperity margin" on purchases. Sales managers should refuse to furnish goods at less than true value.—Page 1023.

* * *

Finds it does not pay to make all kinds of bolts and nuts on automatic machinery. "Slow sellers" are not made in sufficient quantities to justify the expense of designing and installing special machinery. In these cases semi-automatic or even hand-operated machines are the most economical.—Page 1016.

* * *

Surest way to invite price competition is to refuse to consider a competitor. Competitors should confer and discuss openly their opinions, handicaps and progress, says building equipment manufacturer. Contact and understanding between competitors is essential in properly sizing up the buyer's arguments.—Page 1023.

Age-hardening after cold-drawing is due to carbon. Carbon-free iron is not subject to aging. Phenomenon of age-hardening may be due to the reduced solubility of carbon and iron oxide in ferrite, caused by distorted crystals.—Page 1014.

* * *

Prevent segregation of blast furnace charge by depositing material on the stock line rapidly and lessening the drop. Increasing the bell drop and the angle of the bell will help accomplish this.—Page 1014.

* * *

"Dangerous shortage report" warns material supervisor that stock of a certain part is running low. One person in each department of automotive plant is designated to watch the stock.—Page 1013.

* * *

Good welders produce uniformly good welds, tests reveal. Steel fabricator finds that work of good welders does not vary 10 per cent. The same applies to the poor welders, but there is a considerable difference between the best work of the good man and the worst work of the poor workman.—Page 1026.

* * *

Welding of steel structures will not result in worth-while economies if buildings are designed for riveting and then welding substituted, says welding machine builder. Shop and erection costs would then be of the same order.—Page 1027.

* * *

Automobile output for fourth quarter expected to break all records. No major recession is in sight. Detroit employment barometer has again turned upward and is 50 per cent higher than it was a year ago.—Page 1062.

We could well afford to forget production costs and focus all our energies on distribution problem, says Department of Commerce executive. Savings made in distribution add just as much to annual profits as do production economies, and ought to be easier to make.—Page 1029.

* * *

Great upturn in scrap exports arouses attention of consumers. Exports for first eight months of 1928 were 2½ times those of same period of last year. August, 1928, established a record, at 70,538 tons.—Page 1032.

* * *

"Buying a market" is oftentimes an expensive procedure. Some manufacturers fail to recognize that the fact that a certain product is successfully marketed by one company does not mean that any group can derive profits from the same field.—Page 1023.

* * *

Bases purchase orders on sales forecasts. Purchasing department of automobile plant solicits bids and places contracts for estimated requirements for 12 months. Shipping orders are then placed at intervals during the year.—Page 1010.

* * *

Using salesmen for mass selling is wasteful. Advertising can do this more economically, says building equipment manufacturer, for it conserves the salesmen's time by serving as an introduction.—Page 1022.

* * *

Sales expansion gained through price-cutting is deceptive. No matter what the gain, it would be better if the same brain power were placed back of constructive distribution, says manufacturer.—Page 1023.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Cost of Noise

AMERICAN workmen seem to be deaf to industrial noises; it might almost be said that Americans are deafened by industrial noises. The roar of rapid and powerful machinery, the clanking of hammers and presses, the grinding of gears (still with us), the puffing of engines and the whistling of exhausts, the ringing of bells and shrieking of sirens—all rise into a crescendo so characteristic of industrialism that the modernist composes "music" to its rhythm. We tolerate this bedlam despite the fact that we all avoid mechanical noises in the home, and pay premiums for silent vacuum sweepers, refrigerators, and household appliances, and judge a motor car by its quiet passing. Even though we search for economies in manufacture, we endure violent noises, every one of which represents waste. Would not an efficiency engineer be lost in a factory, which though busy was quiet?

Perhaps the construction operations in our big cities are no guiltier than other branches of industry elsewhere, but they do seem to proceed with utmost disregard for ear-drums—and some of it seems avoidable. Popular opinion and local ordinances have long since demanded mufflers on gas engines, yet an excavator thinks nothing of parking an air compressor alongside the curb, cranking it up, and when it is not blowing off into the throbbing atmosphere, it is pumping air into pneumatic concrete breakers peppering away like so many machine guns.

Such unnecessary noise is doubtless costly. Street railroads, which have been constant offenders, are beginning to realize this. For instance, car noises in San Francisco are being reduced by more precisely cut gear teeth, and the amplification of such clatter as yet remains is prevented by lead rings inside the gears, sound-absorbing fabric in the car floors, and rubber pads between trucks, bolsters and bodies. Crossings are made of one-piece steel castings, and the wheels ride over on their flanges. This prevents battering at the slots cut in the rail heads; noise is further reduced by imbedding the entire track layout in solid asphalt. The public service company reports that this type of crossing not only prevents resonance from the pavement, and avoids shocks passing through to adjacent buildings, but also is much more economical to maintain and presents a smoother roadway for other vehicles. It is also to be expected that less noisy vibration in the rolling stock will result in lower repair bills.

The cost of construction rackets in big cities is less easy to estimate. But if anyone thinks it is of no importance, let him ask a hotel proprietor alongside an extensive building operation! At the American Welding Society meeting recently it was stated that at least 50 rooms in a Philadelphia hotel had been practically

uninhabitable for nearly a year on account of the noises from adjacent subway and building construction. This represents a loss of approximately \$100,000 income to this one proprietor!

Silent construction is emphasized for welded structural steel erection. For example, as described on another page of this issue, a 12-story hotel at Hot Springs, Ark., was built between two similar structures without the resounding clatter of rivetting guns, and the extra cost of \$8 per ton was undoubtedly justified. The erector said the only improvements he could now suggest would be quiet gears on the hoists and lead faces on the erectors' mauls!

Whether welded erection is inherently more costly than rivetted joints may be questioned. Again, it may be true that the compressed air industry may be able to develop a silent squeezer, portable enough for erection purposes. At any rate, it should be a matter of congratulation that so young a process can compete at no greater a handicap with one which is entrenched behind years of engineering practice and trade union domination. When steel designers work out connection details which can be bolted up adequately and easily, yet provide for the necessary welding in the "down" position; when a sufficient number of trained welders is available; when inspectors and building codes understand and provide for the new method, it may be expected that the overall cost of silent erection will decrease.

Our philosophy is that the best is always cheapest. If welded erection is really a better method from an engineering and constructor's viewpoint, it will before long be demonstrated to cost less than the noise we have accepted for so long as a necessary evil. In such an event, the structural trades will adopt welding as a matter of course. But even if welding should always cost more, there will be many places where the silent method will be demanded by a harassed community, despite the extra. It would not be the first time that the value of public convenience and well being has overshadowed minor financial considerations, and hastened the adoption of some revolutionary proposal.

Straining for Super-Precision

INSTRUMENTS for measuring with utmost precision both linear and angular dimensions have come on in bewildering array in the past two decades. Some of these permit measurements which can be regarded as accurate to the millionth part of an inch. They depend in the most refined types upon the optical splitting up of the length of a light wave. Such devices reflect the highest credit upon those who have developed them.

With such ardor has this work been prosecuted,

however, that it has quite outrun practical needs of plant operation. In cases brought out at a recent meeting in the Engineering Societies Building, New York, purchasers had specified equipment with a required precision far beyond what was reasonable. In each case the manufacturer had quoted upon the devices, but without exception a conference had resulted in deliveries representing much lower precision than was at first demanded, and at a fraction of the initial cost. How often the matter has gone ahead on the original lines was not brought out and we have no means of knowing. However, it was said at the meeting that in many plants 20 per cent of the entire shop cost of producing materials is unproductively expended on attaining undue precision.

If this estimate be correct, it would seem in order for buyers and sellers of high-precision equipment to get together to determine what tolerances are necessary, and then to have the equipment made on that basis rather than on the buyer's knowledge that instruments of *n*th degree precision can be had.

Cartels and Competition

IN Europe the cartel idea has been widely adopted as a means of stabilizing prices and paving the way for industrial profits. Because of the agitation here and there for amendment of our anti-trust laws to permit price regulation such as is practiced by the Continental syndicates, our market news from Europe this week is pertinent.

The high domestic prices maintained by the European tube cartel have caused consumers to place orders with mills in non-member countries. Signs of disaffection are appearing in the heavy rail syndicate, the most inclusive of international steel cartels. One member country insists on taking business in excess of its quota, and a number of mills in other member countries are cutting the cartel price. By curious coincidence the Welsh-American tin plate understanding is also under indirect attack. British exporters, restricted in the amount of the Welsh product that they can handle, are buying German tin plate for resale on the world market.

These reports from abroad, although not yet conclusive in their significance, are nevertheless testimony to the difficulties that beset organized efforts to fix prices and parcel out markets. They remind us that our own price pools of a generation ago usually were broken through violations by members. Artificial restraints on business often invite their own destruction, particularly if they fail to take into account the interests of consumers and possible changes in production methods and costs.

There is reason to pause and consider whether the solution of destructive price competition lies in so obvious a remedy as concerted action among competitors to fix prices and divide markets. It is possible that more indirect methods, such as are being employed in this country, may prove more effective in the long run. Industrial consolidations, in many instances, have benefited both producer and consumer, insuring profits for the former and cheaper goods for the latter. Trade associations, although not attempting to regulate prices, have been increasingly influential in the interests of better cost accounting and fair play in competition. It

is to be hoped that this kind of organized activity can further extend its usefulness in curtailing business practices that are unethical and demoralizing, at the same time preserving competition in its soundest form.

Copper and Gasoline

THE consumption of copper, both at home and abroad, has been very large this year, which is mainly for the reason that this is an electrical age. The demand has been so great that it has been steadily reducing the stock of refined shapes, and at the first of this month the total in the hands of refiners in North and South America was only about 50,000 tons. An irreducible minimum would probably be about 40,000 tons, for the refiners must keep about that quantity on hand to be able to meet promptly the specifications of their customers, as a refiner can no more deplete his stock entirely than a hardware merchant can sell his shelves bare unless retirement from business is contemplated.

In speaking of the position of copper in North and South America, we are expressing the world's position nearly enough; for the refiners of those Continents, whose whole product is sold via New York, account for about 85 per cent of the world's refining. The statistics that are now possessed are moreover pretty thoroughly revealing; for their prompt and accurate disclosure of the position, in all respects, from mines to refineries, has made it safe for manufacturers to order closely, as never before, in conformity with their requirements.

In other words, manufacturers have not felt constrained, in recent years, to carry such reserves in their yards as formerly when they were more in the economic dark; and consequently more of the industrial stock has been visible and less of it invisible than used to be. It may reasonably be conjectured, however, that manufacturers observing the steady contraction in stocks this year have been recently stocking up to some extent, as prudence would inspire; and it may also be conjectured that producers, examining the same statistics, are taking steps to increase their output, for which they have available capacity.

In the meanwhile the price for copper has been quite stable, with a slowly rising tendency. At the beginning of 1928 it was 14½c. delivered in Connecticut and now it is 15½c., domestic deliveries in other territories and foreign deliveries being quoted correspondingly. The intensity of the demand has been an adequate explanation of this trend. Any other explaining would be in respect to the very moderation in the market, which has evinced no runaway signs, although they might have been expected.

When the market neared 15c., there were some inquiries from labor as to what would be coming to it, there having been an old understanding that a crossing of that mark meant an advance in wages. The American producers responded with a general advance of 10 per cent as to wages, probably considering it wiser to do that gracefully than under duress. This increased their cost of production about 0.5c. per lb., for it may be roughly generalized that the direct cost (exclusive of capital charges, etc.) is in the neighborhood of 10c. and that the payroll comes to about half of that. Following this the price was raised to 15¼c., which buyers were quite willing to pay.

One of our daily contemporaries published an edi-

torial criticizing this advance and it has been reported that the Federal Trade Commission will investigate it. For some mysterious reason the copper producers seem to be always under governmental suspicion. In this instance the advance is alleged to have been made uniformly, whence it is inferred that it may have been collusory. This does not accredit the copper producers with either any sense or any respect for the law.

When in a strong sellers' market one merchant advances his price, and ascertains that he can get it, his competitors are quick to do likewise. Similarly and oppositely in a buyers' market, when one producer starts cutting prices. This is the same whether it be copper or gasoline.

The situation in these two commodities—copper and gasoline—during 1928 has been indeed very similar. In both of them there is an excess of producing capacity but it does not follow therefrom that there should be a complete use of capacity with the consequences of slaughtering prices and extinguishment of profit on the entire capital investment.

The production of gasoline has been well maintained, but, without there having been any such great curtailment of the stock as has occurred in copper, the price for gasoline in Mid-Continent territory has risen from about 5.5c. per gallon in the early part of this year to a midsummer price of 9.5c., which still prevails, largely owing to the mild autumn. As the weather becomes inclement and automobiling contracts, there will probably be some softening of the price for gasoline. In this as in other commodities demand is the more potent influence in making the price. Producers always want to sell as much of their commodities as profitably they can, but buyers generally do not have to pay any more than they are willing to give.

Conquest of the Air

ADDRESSING the steel treaters at Philadelphia on Oct. 11, E. P. Warner, Assistant Secretary of the Navy for aviation, reminded his hearers that 436 years ago Columbus approached these shores by a primitive method of transportation and that four years ago at about the same time a rigid airship, which is now the Los Angeles, flew from Germany to the United States. Again at almost the same period this year, another dirigible was about to cross the Atlantic. And a few days after the Philadelphia meeting the arrival of the Graf Zeppelin at Lakehurst marked another epochal event in commercial aviation.

In the historic crossing of 1492 the dependence of the navigators was almost entirely upon wood; metals played a very small role. In the years following, iron, and then steel, became essential, and today, in most forms of transportation on land and sea, steel and its alloys are mainly responsible for the high degree of speed and safety attained.

It is through research in another field, however, that the flights of the Los Angeles and the Graf Zeppelin became possible. To the discovery of the light aluminum and related alloys, properly heat-treated, must be credited the success of these giants of the air, whose framework is made of the light alloys. In this achievement, as in recent improvements in construction which have made the airplane so efficient and de-

pendable, the cooperation of the steel treater and the metallurgist has been an indispensable factor.

Freight Car Requirements

IN view of recent suggestions that the railroads are likely to be heavier buyers of freight cars in the next few months than they have been for two years or more, statistics showing the recent trend or pace should be of interest.

Class I railroads, representing about 90 per cent of the railroad mileage and 96 per cent of the total revenues, installed and retired freight train cars, including cabooses, as follows in calendar years:

	Installed	Retired
1917	117,210	62,253
1918	65,249	56,024
1919	76,019	43,274
1920	36,044	75,197
1921	63,406	69,245
1922	105,394	126,471
1923	232,060	213,789
1924	156,572	118,590
1925	139,083	128,573
1926	93,369	103,152
1927	72,410	95,753

Monthly reports for seven months of this year show, for freight cars only, 33,748 cars installed and 48,554 cars retired, while August 1 there were 13,531 cars on order.

Thus for two and a half years the trend has been to install fewer cars than are retired, and the retirements themselves have been trending downward. At the end of last year the freight carrying cars in service were as follows, for Class I roads:

All steel	799,820
Steel underframe	1,086,982
Wooden	437,299
Total	2,324,101

Some confusion of thought resulted recently from publication of a report submitted by the arbitration committee of the mechanical division of the American Railway Association, it being assumed in some quarters that wooden cars were to be legislated out of service and that heavy buying of cars would thereby be forced. It has since been explained that it is the regular policy not to legislate equipment out, but to give it a chance to wear out. The recommendation was that no wooden cars under a certain definition be accepted from owners after January 1, 1931, and no wooden cars of another description be accepted for interchange after January 1, 1934.

In view of the policy it may properly be taken that wooden cars are to be retired in future as in the recent past, according to their wearing out. No large increase in the rate of retirement is to be expected, but on the other hand an increase in installations, relative to retirements, may be expected if traffic warrants.

In this connection there are significant data. Car surpluses have been progressively decreasing. Earlier this year car loadings were running below both 1927 and 1926, but in the past few weeks they have been running ahead of those years week by week. A large surplus of cars is naturally undesirable, but it certainly would seem well for the railroads to aim at having some surplus all the time. The cost of carrying the surplus would be much less than the cost, in derangements, of even temporary shortages.

CORRESPONDENCE

Against Legislation to Legalize Resale Price Fixing

To the Editor: I note in *THE IRON AGE* of Oct. 18 a discussion by your Washington correspondent of the provisions of the Kelly-Capper bill which is to come before the next Congress. The article says that the proponents of the bill expect that the Federal Trade Commission, which is now investigating the question, will be favorable to legislation permitting manufacturers of certain trademarked or branded articles that are distributed through jobbers and retailers to fix and maintain the resale price. It looks to me as if there were some special axes to be ground in this movement.

If the producer deems it desirable to prescribe the maintenance of a resale price, let him do so if he can. He becomes then, in effect, the retailer of his own goods, the final merchandiser acting as his agent. The producer has frequently incurred the expense of national advertising for the purpose of promoting sales at his price. If the manufacturer sees fit to limit the handling of his goods to those who will obey him, that is his right. A shopkeeper who is unwilling so to agree, who is unwilling to act in the quasi-capacity of agent, has no good ground for complaint if the manufacturer refuses to let him have the proprietary goods.

If on the other hand a shopkeeper sees fit to sacrifice a portion of his margin, he has a perfect right to do so, providing he has not entered into an agreement with the producer to the contrary. There are instances of the shopkeepers of a city entering into an agreement among themselves that they will not cut prices—as to which the supplier of the goods is indifferent. But let us not have any legislation on this subject.

A trademark is essentially an identification and confers no economic privileges unless it be monopolistic. The Eastman Kodak Co. may be able to maintain a uniform price for kodak films, but the manufacturer of Camel cigarettes would commit suicide if he attempted to do so.

So far as the writer can see there is no fault in our present system of merchandising and pricing. Consumers generally welcome the opportunity to buy cigarettes, razor blades and many other things at cut prices, and bless the mail order houses, chain stores and department stores that help them to do so. This is promotive of sales, wherefore there is no reasonable ground for complaint from the manufacturers.

Without any doubt our mail order houses, chain stores and department stores are economic benefits of the first order. Likewise there is no doubt that our older system of retail merchandising is overequipped and overmanned; that is, there are too many shops and too many persons attending them. The relatively high prices that are asked in them do not inure to the profit of the shopkeepers, comparatively few of whom become well to do, but they go to pay the wages of inefficiency, including unnecessary personnel. The chain stores are now estimated to be doing about 16 per cent of the retail business of this country. That percentage is swelled by what the department stores and mail order houses perform. There is thus proceeding naturally a correction of one of our greatest economic wastes.

There are consumers who are too lazy or too incompetent to take advantage of opportunities for advantageous buying, which might put them to more trouble. Such consumers simply pay the price for certain service, which is optional with them, wherefore they deserve no special consideration. We may feel sorry for the small shopkeepers and their clerks who are being thrust out of occupation; but similarly do we feel sorry for the surplus coal miners, for the surplus weavers and spinners, and others who are being forced into new and strange employments. The economic pressure is precisely analogous. Although we have sympathy for such persons in what is always a painful readjustment, that does not mean that either they or anyone else have claims for support by the body public.

The subject of resale prices is distinctly one to be let alone to go its own way. Anything of the nature of legislative price-fixing is abhorrent. Anything that the Federal Trade Commission or Congress might do would be meddling and pretty sure to be mischievous.

Laissez Faire.

Increase in Fluorspar Duty Has Saved the Domestic Situation

To the Editor: The action of President Coolidge in raising the duty on fluorspar meets with the approval of all the producers of that mineral in the United States. As a matter of fact the imports of fluorspar have been, so far as the miners are concerned, a scandal. The foreigners in sending spar to this country, in my opinion, abused their privilege. They made the deliberate attempt to destroy the American industry and they came perilously near succeeding. What with cheap labor abroad and ballast rates across the ocean for freights the American spar miners have had no show whatever. The whole market was controlled and in the power of the foreigners.

In producing spar we pay the American rates of wages, we pay high prices for all our mining supplies and explosives, and to reach our markets we are paying the highest rates of freight that have ever been known—in many cases more than twice as much as we paid 15 years ago. We are not complaining of these things; they are part and parcel of our American industrial system; they belong to the large American plan of general prosperity. But because of our low duty the foreigners flooded the country with spar and the American miners have been denied their share of business, let alone their share of profits. We have been faced with an unfair and unjust competition and conditions can only be remedied by an adequate tariff. This increase that the President has just declared will tend to give us a share of the American market and it is highly probable that the spar mines that have been shut down so long, with all their investments idle, will be able to resume operations.

Furthermore, it is my belief that our American spar is of a substantially better quality than foreign spar. Practically all the spar produced in America comes from southern Illinois and western Kentucky. It is nearly all one region, cut across, however, and divided by the Ohio River. Gloom and despondency has been the chief factor in that region for the past five years. Idle mines, idle miners, have been the rule. Those interested in the spar industry are hoping to speedily see a change in the situation.

JAMES A. GREEN.

Cincinnati, Oct. 19.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Nov. 1—Activity in Steel Consuming Industries; Nov. 15—Position of Iron and Steel Producers.

Iron and Steel Markets

Primary Materials Still Advancing

Prices of Scrap, Pig Iron and Coke Make Further Gains—
Pipe Line Order Calls for 45,000
Tons of Steel

THE fundamental strength of the iron and steel market is emphasized by continued advances in primary materials. Prices of pig iron, scrap and coke have made fresh gains, giving added support to an already strong situation in finished steel.

The pressure of steel producers to increase output has magnified the scarcity of scrap, and a consequent driving of blast furnaces to obtain a compensating increase in pig iron tonnage has created extra demands for furnace coke. Heavy melting scrap at Pittsburgh has advanced another 25c. to \$18 a ton, an increase of \$4 a ton since the third week in July and the highest price since September, 1926. Furnace coke at Connellsville, after rising 10c. a ton last week, has gone up another 15c. to \$2.90.

The pig iron market is also feeling the effects of the enlarged needs of steel companies. Their refusal to sell their surplus supplies has created a shortage of basic iron in the Valleys in the face of several sizable inquiries. This factor for price strength in what is primarily a steel producing district is matched by expanding demands for foundry grades in other territories.

At Chicago, Cleveland, Detroit and Ironton, foundry iron has advanced 50c. a ton. Sales of 38,000 tons at Cleveland were made up in large part of supplementary purchases for the current quarter. Reports from other centers also indicate that buyers had underestimated their requirements. Contracting for the first quarter has not yet assumed large proportions except in the Chicago district, where orders have been placed for fully 40 per cent of melters' requirements for that period.

In finished steel there are evidences, although not yet conclusive, that the peak of activity has been passed. At Pittsburgh shipments exceed incoming business in most products, notably bars, plates and shapes. At Cleveland a decline in bookings is also reported, but in the East the tonnage taken so far this month in the heavier rolled products has kept pace with that entered in the corresponding weeks in September.

Bar prices are especially strong in Eastern markets, where many buyers face the necessity of paying 2c., Pittsburgh, contrasted with 1.90c. to 1.95c., paid by contract customers for the quarter. At Chicago, specifications again exceed shipments, after a noticeable drop a week ago, and new business is slightly above the average of the past 12 weeks. Chicago prices for plates, shapes and bars are stronger, with 2c. rapidly giving way to 2.10c., an advance of \$2 a ton.

Steel production still holds at close to 90 per cent of capacity. Slightly reduced output is reported by Valley mills.

Current recession in the demand from the automotive industry is regarded as temporary, pending the starting of production on new models about the middle of next month. The Chevrolet company, the largest manufacturer bringing out a new car, has released its first orders for body steel and will shortly buy fender stock. Makers of automobile frames will resume operations at close to capacity in the third week of November.

The September report of independent makers of sheets and strips sustains the view that buyers ordered and specified freely to escape the reduction in cash discount effective Oct. 1. Sales were equivalent to 117.5 per cent of capacity and shipments 102.3 per cent.

Railroad equipment inquiries are increasing when car scarcity is being reported for the first time in several years. Whether this coincidence is significant or not, in view of the fact that instances of car stringency are isolated and by no means alarming, the week brought the Rock Island into the market for 2750 cars and the Canadian National for an additional 1500. Early inquiries are expected from the Missouri Pacific for 3000 cars and from the Buffalo, Rochester & Pittsburgh for 1000. The Pennsylvania has placed an order for 1000 box cars with its own shops.

The Roxana Petroleum Co. has divided 45,000 tons of 10-in. pipe for an oil line from McCamey to Houston, Tex., between a Youngstown and a Pittsburgh mill. The Southern Natural Gas Co. is inquiring for 25,000 tons of 4 to 24-in. pipe.

Two base prices on hot-rolled strip, rather than a single base, are being rather generally adopted, following issuance by the Sharon Steel Hoop Co. of a card of extras embracing all widths from $\frac{3}{8}$ in. to 24 in.

Leading producers of ferromanganese have opened their books for all of next year at \$105, seaboard, the price now ruling. Heretofore contracts have been on a six months' basis.

A 50 per cent increase in the duty on gravel fluor-spar (from \$5 to \$7.50 per net ton) will go into effect Nov. 19. An advance of \$1 a ton to \$18, mines, on domestic fluorspar for first quarter delivery is reported as a possibility.

Copper has again advanced $\frac{1}{4}$ c. a lb. to 15 $\frac{1}{2}$ c., delivered in the Connecticut Valley. This is the highest price since May 16, 1923.

For the first time in many months THE IRON AGE pig iron composite price is higher than it was a year earlier. It is now \$17.92 a ton, compared with \$17.84 last week and a year ago. The finished steel composite remains at 2.362c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 23, 1928	Oct. 16, 1928	Sept. 25, 1928	Oct. 25, 1927
No. 2 foundry, Philadelphia....	\$20.76	\$20.76	\$20.76	\$19.76
No. 2, Valley furnace.....	17.00	17.00	17.00	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	20.94
No. 2, Birmingham.....	16.25	16.25	16.25	17.25
No. 2 foundry, Chicago*.....	19.00	18.50	18.50	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.00	20.00
Basic, Valley furnace.....	17.00	17.00	16.25	17.00
Valley Bessemer, del'd P'gh.....	19.26	19.26	19.01	19.76
Malleable, Chicago*.....	19.00	18.50	18.50	18.50
Malleable, Valley.....	17.50	17.50	17.25	17.50
Gray forge, Pittsburgh.....	18.26	18.26	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	32.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	32.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.75

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, New York.....	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.22½	2.17½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.19½	2.14½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 23, 1928 Cents	Oct. 16, 1928 Cents	Sept. 25, 1928 Cents	Oct. 25, 1927 Cents
Sheets, black, No. 24, P'gh.....	2.75	2.75	2.65	2.80
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.85	2.75	3.00
Sheets, galv., No. 24, P'gh.....	3.50	3.50	3.40	3.70
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.85
Sheets, blue, 9 & 10, P'gh.....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.30
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh..	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist.				
mill.....	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$18.00	\$17.75	\$16.75	\$14.50
Heavy melting steel, Phila.....	16.00	16.00	15.50	14.00
Heavy melting steel, Ch'go.....	14.00	14.00	13.00	11.50
Carwheels, Chicago.....	13.75	13.75	13.50	13.50
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.50	15.00	14.75
No. 1 cast, Philadelphia.....	17.00	17.00	17.00	16.50
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.00	14.00
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.50
No. 1 RR. wrot., Ch'go (net)...	12.75	12.75	12.00	10.00

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.90	\$2.85	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	15.62½	15.25	15.25	13.25
Electrolytic copper, refinery...	15.25	15.00	15.00	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	5.95
Zinc, New York.....	6.60	6.60	6.60	6.30
Lead, St. Louis.....	6.32½	6.32½	6.32½	5.95
Lead, New York.....	6.50	6.50	6.50	6.25
Tin (Straits), New York.....	48.75	48.50	48.62½	58.50
Antimony (Asiatic), N. Y.....	10.50	11.00	11.00	11.00

Pittsburgh

Primary Materials Strengthen as Heavy Steel Operations Draw on Scanty Supplies

PITTSBURGH, Oct. 23.—The primary materials rather than steel have held the center of the stage in the past week. With a further advance of 25c. a ton on heavy melting steel scrap in this market, the scramble of dealers to obtain material for delivery on old orders has not subsided, and to make the situation even stronger there have been some rather large purchases in the Youngstown district at \$18 to \$18.50, which effectually shut off the possibility of local dealers getting material in the West. Advances of 50c. to \$1 a ton are being sought on pig iron, especially on the basic grade, which seems to be badly wanted for prompt shipment by at least four melters. Coke is keeping up with the procession. No spot furnace fuel for prompt delivery is available under \$2.90 per net ton at Connellsville ovens and sales of small lots at as high as \$3.

The movement in these materials is a direct reflection of the exceptional activity in the steel market over the past 45 days. The steel companies have been persistent in demanding delivery of scrap on their orders, and, in the absence of large supplies, prices have soared steadily. Pig iron has gained in value with the rise in scrap and coke has stiffened because of the demands occasioned by the necessity of driving blast furnaces to the limit to get all the pig

iron that is needed with scrap scarce and finished steel orders large.

The steel market, however, lately has given signs that the peak of the activity was being passed. Again in the past week shipments have outrun incoming business in most products, notably in bars, plates and shapes. Some of the sheet makers report having added slightly to backlogs in the past week and some of the producers of strips have a similar report. If an order for 40,000 tons of pipe for

a Texas oil line has not already been placed, it is likely to be in the next few days. Generally, however, order books are beginning to grow smaller, and a fresh wave of buying will be necessary to sustain plant operations at the present rate. In the Youngstown district, a slight recession has taken place, despite the fact that sheets appear to be the most active of all steel products and Youngstown is the center of production. Ingot production for the Pittsburgh-Wheeling-Youngstown-Johnstown district, however, remains at about 90 per cent of capacity.

The matter of the new base prices and the card of extras for hot-rolled strips has been clarified by the appearance of a card embracing all widths from ⅜ in. to 24 in., with a base price of 1.90c. for material 6 in. and wider and of 2c., base, for stock under 6 in. Several manufacturers have announced adoption of this card, which will probably now find general use.

Steel prices generally are firm, a condition usual to periods like the present, with producers well supplied with orders and buyers covered against their immediate needs.

Pig Iron.—Generally higher prices are being sought for pig iron, but as yet have been unrealized, as the price ideas of buyers are not moving upward as rapidly as those of producers. Most producers now are quoting basic iron at \$18 and are holding malleable and Bessemer at the same price, while the common asking price on foundry iron is \$17.50 for No. 2, all prices being f.o.b. Valley furnace. At least four melters of basic iron are reported as interested in supplies, and, as the steel companies still are refusing to sell any of their surplus, merchant furnaces are seizing the opportunity to put the market back on a profitable basis. One sale of slightly less than 2000 tons of basic iron, somewhat off in analysis, is reported at a price that figures out to \$17.50, Valley furnace, for strictly standard analysis iron, but aside from this sale there has been no business to justify a higher price than \$17. A fair appraisal of the market on this grade is \$17 to \$18, the lower price representing the last sale of importance of standard iron and the higher figure being what now is wanted by producers. Small sales of both Bessemer and malleable iron are reported at \$18, Valley furnace, but in the past week quite as much tonnage has been sold at \$17.50. There also have been sales at \$17. Aside from basic iron, there is very little consumer interest and in that grade the call is for iron for prompt delivery, which makes the higher asking prices somewhat of a premium for early shipment. The Carnegie Steel Co. has put on a blast furnace of its Edgar Thomson group. This reflects a big demand for sheet bars and the approach of the rail rolling period. The Bethlehem Steel Co. has taken off a furnace at Johnstown, Pa.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00 to \$18.00
Bessemer	17.50 to 18.00
Gray forge	16.50 to 17.00
No. 2 foundry	17.00 to 17.50
No. 3 foundry	16.50 to 17.00
Malleable	17.50 to 18.00
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Leading producers have announced a price of \$105, Atlantic seaboard, on ferromanganese.

this price to be good for all of next year. Willingness to take business for the entire year represents a departure, as hitherto contracts have been on a six months' basis. The price announcement is much earlier than usual, owing, it is said, to a desire by producers to stop suggestions recently current that an advance was likely.

Hot-Rolled Flats.—The Sharon Steel Hoop Co. has issued a new card of extras covering widths from $\frac{3}{8}$ in. to 24 in. This range of widths takes in the hoop and band sizes and means that these products and strips now are on a common card and a common base, which for widths less than 6 in. is 2c., Pittsburgh, and for 6 in. and wider, 1.90c., Pittsburgh. The Republic Iron & Steel Co. and several other producers have announced adoption of this card and of a double base price, splitting at 6 in. Eventually, a single base for all widths is probable, as in formulating the new card the Sharon Steel Hoop Co. announces that the effort has been to correct inequalities that existed in the old card, and a single base, plus the new extras, corrects those errors. Strip mill capacity in this district still is heavily engaged, with orders and specifications almost equaling shipments. Not much business yet has been done on the new base prices or extras, because so many users are under contract for this quarter on the old base and card.

Cold-Rolled Strips.—Makers are very firm at 2.85c., base Pittsburgh, on new business and some business is being taken on that level, although the bulk of the shipments carry a price \$2 a ton less.

Semi-Finished Steel.—A large movement of billets, slabs and sheet bars on contracts continues. Most non-integrated strip and sheet producers were able to secure this month's requirements on third quarter contracts carrying prices \$1 a ton below fourth quarter prices, but are using up supplies so rapidly that it is doubtful whether they can go far into November without ordering against contracts for this period. Strip and sheet mills have rarely been more

heavily engaged. Wire rods are moving steadily, and the price is well maintained at \$42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—Shipments of these products are exceeding incoming business, and, with order books decreasing, delivery promises on new business in bars have shortened slightly. At the beginning of the month many mills were mentioning four weeks as the earliest delivery on popular sizes, but now they can be had in two to three weeks. Delivery promises have not been extended on shapes or plates, and the latter are available for fairly prompt shipment. Prices are very firm at a range of 1.90c. to 2c., base Pittsburgh, with the lower figure available chiefly to important buyers, while the higher figure refers to small and unattractive tonnages and is being paid more frequently for bars than for shapes and plates. Structural shops here uniformly report quiet business in the past week. Much business is in prospect.

Rails and Track Supplies.—The larger roads depending upon Pittsburgh mills for a good part of their rails and track supplies have not yet distributed orders for their 1929 requirements. But the expectation of the early closing of this business creates a better feeling in this division of the market. Light-section rails and small spikes are very slow.

Tubular Goods.—The market is running in its recent grooves, with a good demand for seamless oil country pipe, a steady demand for butt welded pipe for building construction and heating purposes, but only a moderate degree of activity in lap welded pipe aside from that required for pipe lines. Most makers have backlogs in the latter class, and a local and a Youngstown maker will divide an order for 450 miles of 10-in. pipe for an oil line from McCamey to Houston, Tex., while there is an inquiry out for 25,000 tons of 4 to 24-in. pipe from the Southern Natural Gas Co.

Wire Products.—Nails are rather slow with most makers, but wire products business as a whole is making a

THE IRON AGE Composite Prices

Finished Steel

Oct. 23, 1928, 2.362c. a Lb.

One week ago.....	2.362c.
One month ago.....	2.348c.
One year ago.....	2.293c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14 :	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4 :	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5 :	2.403c.,	May 18
1925	2.560c.,	Jan. 6 :	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15 :	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24 :	2.446c.,	Jan. 2

Pig Iron

Oct. 23, 1928, \$17.92 a Gross Ton

One week ago.....	\$17.84
One month ago.....	17.71
One year ago.....	17.84
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.92,	Oct. 23 ;	\$17.04,	July 24
1927	19.71,	Jan. 4 ;	17.54,	Nov. 1
1926	21.54,	Jan. 5 ;	19.46,	July 13
1925	22.50,	Jan. 13 ;	18.96,	July 7
1924	22.88,	Feb. 26 ;	19.21,	Nov. 3
1923	30.86,	Mar. 20 ;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.22c. to 2.32c.
Del'd New York.....	2.24c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

Narrower than 6 in., P'gh.....	2.00c.
6 in. and wider, P'gh.....	1.90c.
Narrower than 6 in., Chicago.....	2.10c.
6 in. and wider, Chicago.....	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle.....	\$1.27
2000 bundle lots.....	1.25
Larger lots.....	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.75c. to 2.95c.
Strips, Cleveland.....	2.75c. to 2.95c.
Strips, del'd Chicago.....	3.05c. to 3.25c.
Strips, Worcester.....	3.00c. to 3.10c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
Rounds and squares.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1½.....	45	19½	19½	1½ to ¾.....	+11	+39	
1½ to ¾.....	51	25½	25½	¾.....	22	2	
¾.....	56	42½	42½	¾.....	23	11	
¾.....	60	48½	48½	1 to 1½.....	30	13	
1 to 3.....	62	50½	50½				

Lap Weld

2.....	55	43½	43½	2.....	23	7	
2½ to 6.....	59	47½	47½	2½.....	26	11	
7 and 8.....	56	43½	43½	3 to 6.....	28	13	
9 and 10.....	54	42½	42½	7 to 12.....	26	11	
11 and 12.....	53	40½	40½				

Butt Weld, extra strong, plain ends

1½.....	41	24½	24½	¾ to ¾.....	+19	+54	
1½ to ¾.....	47	30½	30½	¾.....	21	17	
¾.....	53	42½	42½	¾.....	23	12	
¾.....	58	47½	47½	1 to 1½.....	30	14	
1 to 1½.....	60	49½	49½				
2 to 3.....	61	50½	50½				

Lap Weld, extra strong, plain ends

2.....	53	42½	42½	2.....	23	9	
2½ to 4.....	57	46½	46½	2½ to 4.....	29	15	
4½ to 6.....	56	45½	45½	4½ to 6.....	23	14	
7 to 8.....	52	39½	39½	7 to 8.....	21	7	
9 and 10.....	45	32½	32½	9 to 12.....	16	2	
11 and 12.....	44	31½	31½				

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 3 in.....	37
3 in.....	40
3½ to 3¾ in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	+18
1½ to 1¾ in.....	+8
2 to 2½ in.....	—2
2½ to 3 in.....	—7
3½ to 4½ in.....	—9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	1 Ten
	2 Tens
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	2 in.....	48
1½ to 1¾ in.....	55	3¼ to 3½ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	45
2½ to 3 in.....	42		

Hot Rolled

2 and 2½ in.....	40	3¼ to 3½ in.....	56
2½ and 3 in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

good showing in comparison with the average for this time of the year. Prices are well maintained on all products. Bright nails are being sold in carload lots at \$2.55, base, per keg to jobbers, but evidence is lacking that all makers are insisting upon an advance of 10c. per keg to others who are able to buy in carload lots.

Sheets.—The market still is extremely active, and some makers report that they have added slightly to their backlogs, bookings in the past week having exceeded their shipments. The monthly report of the National Association of Flat Rolled Steel Manufacturers on September sheet business fully sustained the current reports that buyers were ordering and specifying freely to escape the lower cash discount effective Oct. 1, and to avoid higher prices named on the common finishes for this quarter. Sales of the independent companies reporting were 117.5 per cent of capacity and shipments 102.2 per cent of capacity, making the month one of the best since records were made public. Mills are encountering reports of lower prices, but, generally, the quoted prices are ruling. No material letdown in the demand from motor car body builders is reported here, as loss of business incident to the slowing up of some companies is offset by increasing production by others. Mill operations remain at full physical capacity, with some producers running at full theoretical capacity.

Tin Plate.—Business still is rather slow, although some makers in the past week have enjoyed a slight increase in orders. General line tin plate is in good demand, and there is a fairly good export business. Packers' can requirements have been satisfied for this year and not much business for early 1929 needs is expected until prices have been announced.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—Typical of such market conditions as the present, are reports that this mill or that has bought and paid an even higher price than has recently prevailed for heavy melting steel. Such reports are that the United States Steel Corporation bought a big tonnage, that the Jones & Laughlin Steel Corporation, which has been out of the open market for several years, was a purchaser, and that a large tonnage of heavy melting steel was bought by Youngstown steel companies. There is some acceptance of the report about the Youngstown purchases in the fact that steel works in that district are operating practically full and deliveries on low-priced scrap orders were not sufficient. But fresh buying in this district has been very light on the part of steel producers and the market has been chiefly made by dealer purchases to cover short sales. The market has strengthened, however, and, while no sales of heavy melting steel into consumption are noted at more than \$18, there appears to be none of this grade available at less. Compressed sheets are not available at less than \$17.50 and the market is firmer on heavy breakable cast which has sold at \$14.50. Steel foundry grades also are firmer.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	\$18.00
Scrap rails	17.50
Compressed sheet steel	17.50
Bundled sheets, sides and ends	\$15.50 to 16.00
Cast iron car wheels	15.25 to 15.75
Sheet bar crops, ordinary	18.00
Heavy breakable cast	14.00 to 14.50
No. 2 railroad wrought	18.00
Heavy steel axle turnings	15.00 to 15.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	19.00 to 19.50
Low phos., light grade	18.00 to 18.50
Low phos., sheet bar crops	19.00 to 19.50
Hvy. steel axle turnings	15.00 to 15.50

Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50

Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 12.75
Short mixed borings and turnings	12.50 to 12.75
Cast iron borings	12.50 to 12.75
No. 2 busheling	11.25 to 11.75

Rolling Mill Grades:	
Steel car axles	19.00 to 20.00
No. 1 railroad wrought	13.50 to 14.00
Sheet bar crops	18.00 to 18.50

Cupola Grades:	
No. 1 cast	15.50 to 16.00
Rails 3 ft. and under	18.00 to 18.50

Cold-Finished Steel Bars and Shafting.—Reports as to business vary somewhat, but such slowing down as there has been in automobile production has not been felt. There is still much insistence on deliveries. Prices are firm at 2.20c., base Pittsburgh or Chicago.

Bolts, Nuts and Rivets.—Business is good enough to sustain an operation of approximately 60 per cent of capacity. Makers consider this a satisfactory operation, since so many

large consumers are making their own supplies. Prices are firm.

Coke and Coal.—Spot furnace coke is scarce this week owing to some extra demands from a Buffalo steel company anxious to increase pig iron production and a local steel company unable, on account of low water, to transport by river as much coke as is needed from its own ovens. Coke for immediate delivery has readily commanded \$2.90 per net ton at ovens and even \$3 has been paid for small lots. More ovens are going in, however, and coke for delivery next week is plentiful. Spot foundry coke is doing well at unchanged prices. The coal market is good only in household sizes, with slack still a drug on the market.

Pig Iron in Detroit at \$19; Scrap Firm

DETROIT, Oct. 23.—Producers of pig iron serving the district are quoting \$19, and the market is very firm on this base. Despite reduction in melt in automotive shops, due to change in models, the stove and furnace manufacturers have increased melt sufficiently to take up the slack, with the result that shipments of pig iron are about the same as in September.

The market on old material in the district is very firm, with flashings registering an advance of 25c. per ton.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	10.00 to 10.50
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

Adopts Simplified Brands for Sheet Steel

The American Sheet & Tin Plate Co., Pittsburgh, has adopted a new single brand for its products. The new brand will be applied in white on black sheets and in black on galvanized sheets. Trade names and grade designations will not be included within the brand hereafter, but will be placed below the brand in plain letters. When Keystone copper steel is used the fact will be indicated by a large Keystone symbol placed back of the branding.

The number of electric hoists ordered in September, according to the records of the Electric Hoist Manufacturers Association, E. Donald Tolles, secretary, 165 Broadway, New York, showed an increase of 11.2 per cent over August. In value orders showed a 26.7 per cent increase. Shipments fell off 10.5 per cent from August. The association will meet Nov. 22 at the Hotel McAlpin, New York.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	*\$33.00
Rerolling, under 4-in. to and including 1½-in.	34.00
Forging	38.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$33.00

*Cleveland mill base on large billets, slabs and sheet bars is \$33.

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron.....	9.25c. to 9.50c.

Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.90 to \$3.00
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines.....	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to \$1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$33.50 to \$38.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	F.o.b. Jackson County, Ohio, Furnace
	Per Gross Ton
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	F.o.b. Jackson County, Ohio, Furnace
	Per Gross Ton
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. An-niston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00 to \$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania . . .	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2½
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base Per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Chicago

Iron and Steel Markets Take on Renewed Strength—Pig Iron Up 50c.—Car Inquiries Larger

CHICAGO, Oct. 23.—Practically every branch of the Western iron and steel market has taken a stronger position in the past week. Prices for plates, shapes and bars are firm, and the circle of buyers which has been successful in placing orders at 2c. per lb., Chicago, is rapidly narrowing. Pig iron has been advanced 50c. to \$19 a ton., local furnace, and sales for delivery in the first quarter are heavy. Cold-rolled strip has been advanced \$2 a ton, and producers expect to announce in a few days higher quotations on sheets.

Specifications for finished steel, after the drop of a week ago, are again heavier than shipments, and sales are a trifle above the average for the past 12 weeks. An upturn in demand from manufacturers of automobiles is noted, but schedules make it appear that output, though down only a small percentage, will not again reach the proportions of early October until new models are put in production about the middle of November. Frame makers are scheduled to resume at nearly capacity output about the third week of next month.

Structural shops have backlogs fully 20 per cent heavier than a year ago, and the outlook is favorable, since the slackening in building operations appears to affect principally those structures which do not make heavy use of steel.

The Rock Island has added 1000 gondolas and 250 flat cars to its inquiry of several days ago for 1500 box and stock cars.

Pig Iron.—Northern foundry iron has been advanced 50c. a ton to \$19 for the No. 2 grade. Sales for 1929 delivery are large, and the trade estimates that not less than 40 per cent of first quarter requirements have been covered. A melter west of Chicago has ordered 1200 tons for delivery after the turn of the year. A user in Muskegon, Mich., has contracted for five boat-loads to be shipped from Lake Erie ports. The first cargo, 3300 tons of silvery from Buffalo, has been unloaded. A Buffalo seller will ship another cargo of silvery and one of foundry iron and a furnace at Toledo will send two boat-loads of foundry iron. Sales of charcoal iron are unusually active at \$24 a ton, furnace. A shortage exists in several grades. Southern iron prices are strong, and there is talk of an advance to \$17, Birmingham. Although first quarter books in silvery have not been officially opened, it is said that protection at present prices will be extended. Prices are strong, and an advance of \$1 a ton is a possibility. Shipments of Northern iron are heavier than in September, and prompt deliveries are demanded.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil.	1.75 to 2.25..	\$19.00
N'th'n No. 1 fdy., sil.	2.25 to 2.75..	19.50
Malleable, not over 2.25 sil.		19.00
High phosphorus		19.00
Lake Super. charcoal, sil.	1.50....	27.04
So'th'n No. 2 fdy. (all rail)		22.26
Low phos., sil. 1 to 2, copper free		\$29.00 to 29.50
Silvery, sil. 8 per cent.		29.79
Bess. ferrosilicon, 14-15%.		46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Books have been opened on 50 per cent ferrosilicon for 1929 delivery at \$83.50 a ton, deliv-

ered. Car lot orders are priced at \$88.50. Forward contracting is active, fully six weeks earlier than a year ago. The first half price for ferromanganese is announced at \$105 a ton, seaboard. Buyers are showing some interest in future requirements. Spiegeleisen is steady at \$32 to \$33 a ton, Hazard, Pa., for the 19 to 21 per cent grade. A user in this district has closed for 600 tons for delivery next year.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Railroad car buying prospects are brighter as a result of an inquiry by the Rock Island for 2750 cars. The trade is expecting an inquiry from the Missouri Pacific for 3000 cars. Inquiries now before the trade, plus the 3000 cars which seem reasonably assured, call for not less than 120,000 tons of steel. In addition to this tonnage, steel will be needed by the Chicago, Burlington & Quincy and the Chicago, Indianapolis & Louisville for miscellaneous cars to be built in the shops of these roads. Specifications from car shops are small, covering only miscellaneous needs for small car orders placed in recent months. Need for plates in oil fields on the Pacific Coast and in the Southwest is more urgent. A Chicago mill has taken two orders for more than 5000 tons of oil storage tank plates for delivery in the Southwest. There is still 5000 tons on inquiry in that part of the country, and in addition several oil producing companies in the West will buy an aggregate of 4000 tons. A California oil pipe line will take 50,000 tons. Chicago plate mills are engaged at close to 80 per cent of capacity. Specifications from pipe makers are light; legal matters are being arranged that will release a large tonnage against contracts recently placed. Prices are firm at 2c. to 2.10c., Chicago.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Specifications for mild steel bars are heavy, and deliveries from several Chicago mills have been set back about one week. Following the drop of a week ago, releases from manufacturers of automobiles are

larger, but they have not regained the ground previously lost. Forgers in the Chicago area are taking steel to meet full capacity operations. Although orders for automobile parts are lighter, there is an increasing demand for forgings from builders of cranes and construction machinery such as will be used in flood control work in the Mississippi River valley. New business in soft steel bars is measurably larger under the influence of several sizable fourth quarter contracts placed by railroads. Prices remain firm at 2c. to 2.10c. per lb., Chicago. With contracting well out of the way, producers are attempting to narrow the circle of buyers who are quoted less than 2.10c. The iron bar market is quiet both in new buying and specifications. Spot purchases of alloy steel bars are in good volume, but backlogs are growing lighter. Specifications from the automobile trade are heavier, but not equal to the rate in the early weeks of October. New orders for rail steel bars are fully equal to shipments, and both local mills continue to operate on a double turn basis. The bed trade, which usually curtails output at this time of the year, is still taking steel in good tonnage. Deliveries of rail steel bars are not better than four weeks on the average, and prices are firm.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Warehouse Business.—Shipments have gradually expanded for several weeks and now are measurably larger than in September. Prices are steady.

Cast Iron Pipe.—This market continues dull in the absence either of contractors' awards or public lettings. Several contractors' jobs are in the making, but not much can be expected from municipalities until after the November elections, when a number of bond issues will be voted on. Private buyers find that their needs are covered by scattered orders for a few lengths. Deliveries to the northern part of the country are in good volume, and backlogs resulting from orders from this section are rapidly dwindling. Deliveries are prompt on practically all sizes. Prices for small lots are steady at \$35 to \$37 a ton, Birmingham, for diameters 6 in. and larger. The Lynchburg Foundry Co. is low bidder at Milwaukee at \$36.75, Birmingham, on 100 tons of 8-in., Class C, pipe. This is equivalent to \$45.25, delivered.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43.20 to \$45.20; 4-in., \$47.20 to \$49.20; Class A and gas pipe, \$4 extra.

Cold-Rolled Strip.—Prices have been advanced \$2 a ton, making current quotations 2.85c. to 2.90c. per lb., Cleveland. The freight rate to Chicago is 30c. Specifications, though somewhat lighter than in previous weeks, are about equal to shipments, and deliveries are not better than three weeks.

Reinforcing Bars.—The largest award is 600 tons of rail steel bars for

a housing project in Chicago. Active projects are fully 50 per cent heavier than in September. Some of this prospective business is accounted for by the revival of several old projects. A liberal amount of small work is being let. Backlogs afford five to seven weeks' work. Pressure for deliveries is insistent as cold weather approaches, but shops are meeting requirements except when delayed by the lengthened deliveries from mills. Prices remain unstable, with a leaning toward the weak side, this being especially true of reinforcing bars made from billets.

Hot-Rolled Strip.—Revisions in prices have been made, and quotations now are 2.10c. per lb., Chicago, for widths under 6 in. and 2c. for 6 in. and wider. Shipments from mills are holding up well; deliveries average two weeks.

Structural Material.—Awards during the week totaled 2200 tons. Fresh inquiry is for 4000 tons. Dullness in lettings in recent weeks is now being felt by shops that find backlogs materially reduced. Anxiety to book tonnage is leading to keener competition, with the result that the gain in prices in the early part of the fall has disappeared. Building operations are curtailed, but more generally in the classes of structures that do not call for heavy tonnages of steel. Of special interest is the growing demand for industrial types of buildings. Contracts for steel by fabricating shops are small, it being evident that structural material will be purchased as jobs are taken. Deliveries range from two to five weeks. Prices are steady at 2c. to 2.10c., Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Wire Products.—Little change has taken place in this market in the past week. Releases by the manufacturing trade hold at a steady rate, but needs of the jobbers are small and uncertain. Mill output continues larger than shipments, as producers round out and enlarge stocks.

Rails and Track Supplies.—A Western railroad has entered an order for 3000 tons of standard-section rails for

immediate delivery. Backlogs are measurably smaller, but output remains unchanged. Inquiry for rails before the trade is marking time. Several railroads are preparing to come into the market for large tonnages. Orders for track accessories are unusually light and inquiry now in the market is small in total. Users of light rails have entered orders for several carloads.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Sheets.—Mills are bringing a substantial volume of business to the mills. Prices are so strong that in the minds of many in the trade a \$2 a ton advance is near at hand. Specifications continue in sufficient volume to support hot mills at a shade under capacity. Deliveries range from four to five weeks on all grades except box annealed, which can be had in three to four weeks. There is a noticeable drop in demand from the roofing trade. This has come unusually early this year and is accounted for by the lack of demand in rural districts and the fact that manufacturers had built heavy stocks in anticipation of the fall trade.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.65c.; No. 10 blue ann'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Coke.—Prices are firm at \$8 a ton, f.o.b. local ovens. Shipments have grown heavier in the week.

Bolts, Nuts and Rivets.—Prices for these commodities are firm. Small rivets are quoted at 70 and 10 to 70 per cent off list, depending on the size of orders. Specifications are heavier from a wide circle of users.

Old Material.—The Chicago scrap market is strong, notwithstanding that several of the light tonnage grades are coming out on tracks faster than demand warrants. Dealers are said to have paid as high as \$14.75 a gross ton, delivered, for heavy melting steel, and a producer of this grade has been offered above \$15 for a round tonnage of strictly first grade material. Mills are freely offering to take this grade at \$14.50, delivered. On the other hand, steel axles and couplers and knuckles often appear as distress tonnage and can be sold only in outlying parts of the district. In some quarters there is a move to buy further in advance; a user of short rails is willing to place orders for requirements for the next three months. Higher prices have released a considerable quantity of scrap, and dealers, in an effort to move it rapidly, have shipped to mills faster than the cars can be unloaded, with the result that users have been forced to limit consignments. It is observed by some that the inrush of scrap does not necessarily indicate a surplus, but rather that reserves usually on hand at this time of the year are being rapidly reduced and that the potential supply is already below normal. In-

cluded among railroad lists is 5000 tons offered by the Burlington and 1000 tons of relaying rails that will be sold by the St. Paul.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.00 to \$14.50
Shoveling steel.....	14.00 to 14.50
Frogs, switches and guards, cut apart, and misc. rails	15.50 to 16.00
Hydraul. compressed sheets	12.25 to 12.75
Drop forge flashings.....	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels	17.25 to 17.75
Railr'd tires, charg. box size	17.25 to 17.75
Railr'd leaf spring cut apart	17.25 to 17.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	15.75 to 16.25
Coil springs.....	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings.....	14.00 to 14.50
Low phos. punchings.....	16.00 to 16.50
Low phos. plate, 12 in. and under	15.50 to 16.00
Blast Furnace Grades:	
Axle turnings.....	11.00 to 11.50
Cast iron borings.....	11.00 to 11.50
Short shoveling turnings..	11.00 to 11.50
Machine shop turnings....	6.75 to 7.25
Rolling Mill Grades:	
Iron rails.....	14.75 to 15.25
Rerolling rails.....	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft..	17.25 to 17.75
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	13.75 to 14.00
Malleable Grades:	
Railroad.....	15.25 to 15.75
Agricultural.....	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles.....	25.50 to 26.00
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought...	12.75 to 13.25
No. 2 railroad wrought...	12.50 to 13.00
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.00 to 13.50
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast....	14.00 to 14.50
Stove plate.....	11.75 to 12.25
Grate bars.....	12.50 to 13.00
Brake shoes.....	11.75 to 12.25
*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.	

Former Sanderson Company Acquires New Plant

Following the recent purchase of the merchant iron and steel business of the E. P. Sanderson Co., Cambridge, Mass., by Joseph T. Ryerson & Son, Inc., Chicago, the Sanderson company is closing negotiations for the purchase of the neighboring plant of the American Net & Twine Co. and will occupy it for departments of business not included in the sale to the Ryerson company. The Sanderson organization, however, will not operate under the old name, as the Ryerson purchase included the name as well as the good will of the company. The Sanderson heavy hardware and blacksmithing departments and the Cutter & Wood division, devoted to mill supplies, will have increased facilities in the new plant.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel..	2.15c. to 2.50c.
Reinforc'g bars, rail steel..	2.00c. to 2.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10)...	3.35c.
Spikes, stand, railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 3 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Philadelphia

Eastern Mills Still Engaged at High Rate—Reading Divides 30,000-Ton Rail Order—Scrap Higher

PHILADELPHIA, Oct. 23.—Eastern mills continue a high rate of operation, fortified by a heavy volume of specifications against fourth quarter contracts. Bar and plate prices are firm, and the sheet market is strong except for some recently reported concessions of \$1 a ton on black sheets. Structural mills are in a better position as to tonnage than in some months. Plate producers have quoted on an inquiry from a local shipyard for 13,500 tons of plates required for four vessels, awards of which are pending.

Distribution of the 160,000 tons of rails required for next year by the Pennsylvania Railroad has not yet been made. The Reading has placed 30,000 tons of rails, of which 24,000 tons went to the Bethlehem Steel Co. and 6000 tons to the Carnegie Steel Co.

Iron and steel scrap prices continue to advance. A large eastern Pennsylvania plate mill is understood to have closed on a sizable tonnage of No. 1 heavy melting steel at \$16.50 per ton, delivered, an advance of 50c.

Pig Iron.—Sellers are asking \$20.50 per ton, base, on small lots of foundry iron, but \$20, base, is still obtainable on desirable tonnage. Foundries are accepting full shipments on their contracts. Interest in first quarter tonnage is developing; sellers are asking \$20.50 per ton, base, for that delivery. About 20,000 tons of basic iron wanted for first quarter delivery by a large eastern Pennsylvania consumer has not been placed. Low phosphorus demand is improving, and prices are firm. No decision on resuming operation has been reached by the northern New York producer of low phosphorus iron; its yard stocks have been greatly reduced.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.76 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 21.76
East. Pa. No. 1X, 2.17 to 2.26	21.76 to 22.26
Basic (del'd east. Pa.)	19.75
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Billets.—Makers are quoting \$34 per ton, Pittsburgh, on small lots of rerolling billets, but on larger tonnages \$33, Pittsburgh, applies. Forging grade is quoted at \$38, Pittsburgh.

Bars.—Mills have specifications to engage them at their present rate of operation for four to five weeks. Prices are firm at 2c., Pittsburgh, or 2.32c., Philadelphia, on new business, with deliveries on contracts for this quarter at 1.90c. and 1.95c., Pittsburgh.

Shapes.—Operating rates of producers in eastern Pennsylvania are high and specifications on contracts are in good volume. Prices are being maintained quite firmly at 2.05c. to 2.10c., f.o.b. nearest mill, or 2.11c. to 2.16c., Philadelphia, based on Pencoyd, Pa. Fabricating shops are well occupied with contracts and are bidding on

a number of local projects, of size, including a new plant for the Atwater Kent Mfg. Co., the Reading Commercial Building and a hospital. Several thousand tons of material will be required for grade crossing elimination on the Reading Railroad, near Philadelphia.

Plates.—A Camden, N. J., shipyard has asked for prices on 13,500 tons of plates required for four vessels for the American Express Line, on which it is bidding. Quotations on new business are firm at 2.15c., Coatesville. Even preferred buyers are no longer offered tonnage at 2.10c., Coatesville, or 2.20c., Philadelphia. Specifications against contracts are heavy, and mills report a good volume of new business in prospect.

Sheets.—Blue annealed prices are firm at 2c., Pittsburgh, or 2.32c., Philadelphia, and on small tonnages mills are beginning to obtain 2.10c., Pittsburgh. This strength is partly balanced by reports that the 10c. extra on wide sheets is not always obtained when tonnage for a preferred customer is under consideration. Black sheets are quoted at 2.75c., Pittsburgh, or 3.17c., Philadelphia, and a few concessions of \$1 a ton are reported to have been made recently. Galvanized sheets are firm at 3.50c., Pittsburgh, or 3.82c., Philadelphia, and some makers are considering an advance.

Warehouse Business.—October will

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅝-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'd sheets (No. 10)	3.00c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

evidently show about the same volume of purchasing from warehouse stocks as September. Prices are firm. Jobbers who stock reinforcing bars are endeavoring to eliminate the concessions from 2.80c. per lb., which have been common for a number of months.

Imports.—In the week ended Oct. 20 imports of pig iron were only 125 tons, of which 75 tons was from Norway and 50 tons from Sweden. Ore arrivals were confined to 1960 tons of manganese ore from British India. Steel imports were 75 tons of structural shapes from Germany and 27 tons from France, 99 tons of steel bars and 30 tons of billets from Sweden, 39 tons of wire rods from Germany and 18 tons of steel bands from France.

Old Material.—A large eastern Pennsylvania plate mill is understood to have bought a sizable tonnage of No. 1 heavy melting steel at \$16.50 per ton, delivered, from two Eastern brokers. All grades of scrap continue strong, and it is said by sellers in this district that higher prices in western Pennsylvania should immediately be reflected in this market. Specification pipe has been bought at \$15.50 per ton and couplers and knuckles at \$18 per ton, delivered. Blast furnace scrap is rather inactive, but one broker is paying \$11 per ton, delivered to Swedeland, Pa.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$16.00 to \$16.50
Scrap T rails	\$15.50 to 16.00
No. 2 heavy melting steel	13.00 to 13.50
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.50 to 12.00
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00 to 15.50
Shafting	19.00 to 20.00
Steel axles	22.00 to 23.00
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	17.00 to 17.50
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	15.50 to 16.00

Fabricated Steel Plate Orders Smaller

WASHINGTON, Oct. 23.—Orders for fabricated steel plates in September totaled 40,225 tons, or 50.4 per cent of the capacity of the plants of the 51 firms reporting to the Department of Commerce. August orders amounted to 47,245 tons, or 59.9 per cent of capacity. The September orders were distributed as follows: Oil storage tanks, 18,572 tons; refinery materials and equipment, 5021 tons; tank cars, 684 tons; gas holders, 1642 tons; blast furnaces, 386 tons; stacks and miscellaneous, 13,920 tons.

New York

Pig Iron and Finished Steel Gaining Strength—Sales of Bars at 2c. Increasing

NEW YORK, Oct. 22.—The pig iron market continues to show signs of strength. Gains in foundry melt are reflected in requests for deliveries ahead of those scheduled. An increasing number of orders for shipment in the current quarter are being placed by consumers who underestimated their requirements in contracting for this period. Close to 12,000 tons was sold in this territory during the week, most of it supplementary tonnage for delivery in the next two months. Sales of foundry iron continue to be made at \$17, base Buffalo, but a fair tonnage has been closed at an advance of 50c. a ton, some of it for deliveries extending into first quarter. As yet, however, buyers have shown little interest in their next year's requirements and producers are not pressing for business that far ahead. The General Electric Co. has bought 500 tons each for its Lynn and Pittsfield, Mass., plants and 1200 tons for Elmira, N. Y. The Eastern Malleable Iron Co. is inquiring for a total of 1000 tons of malleable for its Troy, N. Y., and Wilmington, Del., plants. The New Jersey Zinc Co., New York, is in the market for 200 tons of No. 1X. About 5000 tons of iron is pending, most of it for shipment in this quarter.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25		\$21.91
*Buf. No. 2, del'd east.		
N. J.		20.28
No. 2, del'd east. N. J.		
tidewater	\$20.01 to	21.25
East. Pa. No. 2 fdy., sil.		
1.75 to 2.25	20.89 to	22.02
East. Pa. No. 2X fdy., sil.		
2.25 to 2.75	21.39 to	22.52
East. Pa. No. 1X fdy., sil.		
2.75 to 3.25	21.89 to	23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Steel bars mills are drawing sharper lines as to what buyers are entitled to the minimum prices. With contract customers covered for the quarter at 1.90c. and 1.95c., Pittsburgh, there has been virtually a withdrawal of the 1.90c. price, and a good many buyers find that they cannot do better than 2c. In plates and shapes, the strength of prices is not so marked, but a good many of the current transactions are at 2.27½c., New York, for plates and at 2.24½c., New York, for shapes, and only the largest buyers are openly getting lower quotations. Even in such cases the minimums are 2.22½c., New York, for plates and 2.19½c. for shapes. The price situation is apparently tending toward quotations of 2c., Pittsburgh, on all three products for first quarter. For Eastern plate and shape mills, this would mean 2.15c., f.o.b. mill, the present small-lot price. Specifications against fourth quarter contracts are in good volume. The first

three weeks of October brought in tonnages equal to those booked in the first three weeks of September, but as the last week of September was considerably ahead of other weeks of that month, and, as there is no prospect that ordering between now and Nov. 1 will be on such a large scale, it is fairly certain that the October total of steel orders in this district will be less than that of September.

Warehouse Prices, f.o.b. New York

	Base per Lb.	
Plates and structural shapes	3.30c.	
Soft steel bars, small shapes	3.25c.	
Iron bars	3.24c.	
Iron bars, Swed. charcoal	7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—		
Rounds and hexagons	3.50c.	
Flats and squares	4.00c.	
Cold-roll. strip, soft and quarter		
hard	5.15c. to 5.40c.	
Hoops	4.50c.	
Bands	4.00c.	
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.	
Long terme sheets (No. 24)	5.60c. to 5.80c.	
Standard tool steel	12.00c.	
Wire, black annealed	4.50c.	
Wire, galv. annealed	5.15c.	
Tire steel, 1½ x ½ in. and larger	3.30c.	
Smooth finish, 1 to 2½ x ¼ in.		
and larger	3.65c.	
Open-hearth spring steel, bases	4.50c. to 7.00c.	
Machine bolts, cut thread:	Per Cent Off List	
¾ x 6 in. and smaller	60	
1 x 30 in. and smaller	50 to 50 and 10	
Carriage bolts, cut thread:		
¾ x 6 in. and smaller	60	
¾ x 20 in. and smaller	50 to 50 and 10	
Coach screws:		
½ x 6 in. and smaller	60	
1 x 16 in. and smaller	50 to 50 and 10	
Boiler Tubes—	Per 100 Ft.	
Lap welded, 2-in.	\$17.33	
Seamless steel, 2-in.	20.24	
Charcoal iron, 2-in.	25.00	
Charcoal iron, 4-in.	67.00	

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12

Wrought Iron—

½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.	
No. 22	3.75c. to 3.95c.	
No. 24	3.80c. to 4.00c.	
No. 26	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Steel for the new Chrysler Building, Lexington Avenue and Forty-second Street, New York, amounting to 16,000 to 17,000 tons, will probably be let within a week. The Harris Structural Steel Co. has been awarded 6000 tons of fabricated steel for New York subways. It appears that orders for about 20,000 tons of steel products, mostly plates, shapes and sheet steel piling, for the Brooklyn water tunnel will not be bought by the general contractor, Patrick McGovern, Inc., until about the first of the year. About 2500 tons of plates will be needed for 15 New York Central barges, on which the Dravo Contracting Co., Pittsburgh, is reported to be low bidder.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.32½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c.

Cast Iron Pipe.—Buying is limited to small lots of water pipe and it will be several weeks before the first of the inquiries appear on gas pipe for spring delivery. Several of the larger privately owned utility companies are understood to have estimates of spring requirements of gas pipe ranging from 5000 tons to as much as 20,000 tons. A few sizable tonnages of water pipe are in the market or in prospect. Dallas, Tex., is expected to call for new bids on about 25,000 tons of water pipe. Albany, N. Y., is planning to issue an inquiry soon after election, calling for about 50,000 tons of 48-in. pipe. This will be one of the largest single pipe orders placed in the United States in recent years. At the opening of bids on 14,000 tons of water pipe, by Warwick, R. I., on Oct. 16, the low bid was submitted by Herbert Kennedy Co., New York, representing the Pont-a-Mousson works in France. Award has not yet been made, and the town committee is studying all bids carefully. The Pont-a-Mousson works, which has not appeared recently as an active competitor for pipe tonnage in the United States, has booked some large contracts in foreign markets, including 50,000 tons of 32-in. pipe for Maracaibo, Venezuela and 14,000 tons for Caracas and other cities in that country, 14,000 tons from different Cuban cities and 4200 tons for Athens, Greece.

Prices per net ton, deliv'd New York. Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Sheets and Strip.—The volume of specifications and new orders for sheets is surprisingly large in view of the recent widespread coverage. Black sheets are firm at 2.75c., Pittsburgh, galvanized are also firm at 3.50c., while blue annealed sheets are at 2c. for sizes up to 45 in. and 2.10c. for over that width. Local representatives of makers of hot and cold-rolled strip steel have received notices of price advances. On hot-rolled strip two base prices have been named—1.90c., Pittsburgh or Cleveland, on wider than 6 in. and 2c. on 6 in. and narrower. The advance on cold-rolled strip is \$2 a ton, making the new quo-

tation 2.85c., Pittsburgh or Cleveland.

Wire Products.—Some makers of wire nails have notified jobbers that hereafter the minimum is \$2.55, Pittsburgh, per keg. Preferred jobbers have been getting a \$2 concession from the open market price. An effort will be made by these mills to establish a \$2.65 price for dealers and consumers in carload lots.

Warehouse Business.—Based on sales in the first three weeks of this month, jobbers in this district report that October will be one of the best months of the year. Demand for structural steel from stock continues heavy, and there is a steady flow of business in black and galvanized sheets. Prices are becoming quite firm. Concessions on sheets are difficult to obtain except when the quantity differentials are applied.

Coke.—Standard furnace coke is strong at \$2.85 to \$3.05 per net ton, Connellsville, and it is becoming more difficult to place orders at the lower price. Standard foundry grade is also slightly stronger, but quotations still range from \$3.50 to \$3.75 per net ton, Connellsville. Standard brands are unchanged at \$4.85 per net ton, ovens, or \$8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 per ton to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Reinforcing Bars.—A terminal warehouse at Jersey City for the Delaware, Lackawanna & Western Railroad will require 8500 tons of reinforcing bars instead of from 2000 to 3000 as first reported, and is the largest job in this territory for some time. Reinforcing steel for the water tunnel extending through Manhattan from Yonkers to Brooklyn will probably not be bought until after the first of the year. The largest new project is a power plant at Amenia, N. Y.,

requiring about 660 tons. A considerable amount of work has been closed recently, and new inquiries are not coming out to replace the larger jobs in the aggregate of work in prospect. Prices are considered satisfactory.

Old Material.—Except for heavy breakable cast, buying prices of brokers are strong with a tendency to advance. Shipments of breakable cast on contracts have been heavy recently, so that consumers have adequate stocks of this grade and are not seeking prompt delivery on contracts. One consumer in New Jersey has reduced its price 50c. a ton. Specification pipe is being bought at \$15 per ton, delivered Lebanon, Pa., based on a recent purchase by a consumer at \$15.50 per ton. Brokers shipping blast furnace scrap to Swedeland, Pa., are paying \$11 per ton, delivered. No. 1 heavy melting steel is unchanged, although it is reported that a tonnage has been closed by an eastern Pennsylvania mill at \$16.50 per ton, delivered, which is a 50c. advance in the eastern Pennsylvania market.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$12.00 to \$12.50
Heavy melting steel (yard)	8.75 to 9.50
No. 1 hvy. breakable cast.	12.50 to 13.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	9.25 to 10.25
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	8.00 to 8.50
Cast borings (blast furn. or steel works)	7.00 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	18.00 to 18.50
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire	8.50 to 9.00
No. 1 railroad wrought	11.75 to 12.25
No. 1 yard wrot., long	10.75 to 11.25
Rails for rolling	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
Stove plate (foundry)	9.50 to 10.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25
<i>Prices per gross ton, deliv'd local foundries:</i>	
No. 1 machy. cast	\$17.00 to \$18.00
No. 1 hvy. cast (columns, bldg. materials, etc.)	
cupola size	15.00 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	14.50 to 15.50

steel bars at 1.90c., Cleveland. A leading Detroit automobile company which recently bought a round tonnage of steel bars from a Cleveland mill and which often has been able to get a price concession, is understood to have placed its order at 1.75c., Cleveland.

Pig Iron.—The features of the market are price advances on foundry and malleable iron by several of the Lake furnaces and inquiries for a round tonnage of basic iron, the supply of which is not plentiful. A north central Ohio steel plant, which recently was a buyer of basic, has again come in the market, this time for 15,000 to 20,000 tons. One producer has quoted \$17.50, and it seems doubtful whether this grade can be bought at a lower price. The inquiry for 3000 to 5000 tons of basic for the Alliance, Ohio, plant of American Steel Foundries is still pending. One Cleveland producer has opened its books for foundry and malleable iron for the first quarter at \$18, with full silicon differentials, for outside shipment and at \$18.50 for local delivery, a 50c. per ton advance, and has made the same advance for the remainder of the year and has taken some business at the new prices. Another has made the same advance, but is not seeking business, as its present commitments will carry it well through the first quarter. A 50c. a ton advance to \$19 has been made for Michigan delivery for the first quarter. One Lake furnace interest that recently advanced its price to \$18.50 for the coming quarter has made another 50c. advance to \$19 for the remainder of the year. Sales by Cleveland interests increased to 38,000 tons the past week; a large part of this business was for delivery this year. Recent price advances for the first quarter are expected to have a tendency to cause some hesitation on the part of buyers until the prices are well tested. Two inquiries for low phosphorus iron, each for 2000 tons, are pending. While makers are asking \$27, Valley, for small lots, \$26.50 can still be done on round tonnages. Shipments continue heavy in the automotive and other fields aside from jobbing foundries, which are only moderately busy in this territory.

<i>Prices per gross ton at Cleveland:</i>	
N't'n fdy., sil.	1.75 to 2.25 \$19.00
S't'n fdy., sil.	1.75 to 2.25 22.25
Malleable	19.00
Ohio silvery, 8 per cent.	28.00
Basic Valley furnace	17.00 to 17.50
Stand. low phos., V'ley fur.	\$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Sales have dwindled the past week, and buying for shipment this season is practically over. The consumption of Lake ore during September was 4,607,963 gross tons, or a decrease of 153,011 tons, compared with August. This decrease is accounted for by the shorter month. The amount consumed in September last year was 4,089,493 tons. The amount at furnaces Oct. 1 was 29,707,911 tons and the amount on hand at furnaces and Lake Erie docks Oct. 1 was 35,808,367 tons, compared with 39,295,539

Cleveland

Slight Falling Off in Steel Demand—New Base Prices on Hot-Rolled Strip—Pig Iron Advanced

CLEVELAND, Oct. 23.—Some of the mills report a moderate and others quite a sharp falling off in specifications and still others are getting about as many orders as earlier in the month, but for smaller tonnages. A slowing down in the demand was to be expected after the heavy bookings late last month and early in October. Consumers are starting to get shipments against late September specifications, and many will not need to order additional material for some time. There is some recession in the demand for steel from the automotive industry. This is noticeable locally in lighter specifications for steel bars from forge shops. Detroit reports a well sustained demand this month from motor car companies, although it is expected that orders from this source will be more restricted during the next few weeks. There is not much activity in the building field or in other fields that might bring out good-sized orders for special work.

An order for half of a Texas pipeline requiring 6000 tons of plates has been placed with the Biggs Boiler Works, Akron. An Eastern mill will supply the steel. The Detroit, Toledo & Ironton Railroad is inquiring for 13,000 tons of rails.

The market has become well stabilized at recent prices. Outside mills are holding fairly firmly to 1.95c., Pittsburgh, for steel bars, plates and structural material and to 1.95c. to 2.05c. for steel bars when quoting on a Cleveland base. Local mills quote

tons on the same date a year ago. Central district furnaces during September consumed 2,429,655 tons, an increase of 51,713 tons. Lake front furnaces used 2,016,566 tons, a decrease of 201,452 tons. All-rail furnaces consumed 91,698 tons, a decrease of 1481 tons, and Eastern furnaces used 70,044 tons, a decrease of 1791 tons. There were 161 furnaces using Lake ore in blast Sept. 30, an increase of six for the month. The late season ore movement promises to be heavy. With a promising outlook in the iron and steel industry, the two leading ore shippers have materially increased shipping orders with outside vessel companies.

Strip Steel.—Specifications for hot-rolled strip continue fairly heavy. The new card of extras has been rather generally adopted. Mills using these extras are quoting two base prices, 2c., Pittsburgh, for widths to 6 in., inclusive, and 1.90c. for strip over 6 in. The new card will not apply to much fourth quarter business, as most consumers are covered for the present quarter. Cold-rolled strip is firmer. One producer has announced 2.85c., Cleveland and Pittsburgh, as its minimum price and another has advanced to a flat 2.95c. price. However, some of the mills are still quoting 2.75c. for round lots.

Fluorspar.—The 50 per cent advance in the duty on gravel fluorspar, made by Presidential proclamation and effective Nov. 19, will, in the opinion of domestic producers, shut out of the Pittsburgh district foreign fluorspar used in the steel making industry. Imported fluorspar is shipped on a gross ton basis, but is figured on a net ton basis in the domestic market to conform with the method of marketing the domestic material. The advance increases the duty from \$5 to \$7.50 per net ton and covers fluorspar with 93 per cent and less of calcium fluoride, so that the increased duty applies only to the gravel fluorspar. Consumers in the Pittsburgh district use 10,000 to 12,000 tons of gravel fluorspar per annum, and competition for this business between the foreign and domestic grades frequently has had a tendency to depress the price of the latter. Previous to the announcement of the tariff advance, the gravel fluorspar market developed a firmer tone, with at least one producer holding for a \$1 a ton advance to \$18, mines. The price for next year has not yet been named.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforce. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.50c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'l'd sheets (No. 10).....	3.35c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

Sheets.—Specifications are heavy and some of the mills are having difficulty in satisfying delivery demands. On automobile body sheets, several mills are not promising shipments before Dec. 1. The market is firmer and little is heard of price concessions. Blue annealed sheets are out of line with plate prices, and, as a result, some consumers who ordinarily use plates are substituting sheets, as these in 3/16-in. in the narrower widths are \$4 a ton cheaper than corresponding plate material.

Cold-Finished Bars.—Orders for screw machine parts for the new models of Chevrolet cars are being placed and these are stimulating the demand for cold-finished bars. Business as a whole is less than in September, as the price advance brought out liberal specifications late last month against expiring contracts. Prices are firmer.

Semi-Finished Steel.—The leading local producer announces that it has sold its entire merchant output for the fourth quarter at the prices recently named. Specifications are heavy against contracts.

Wire Products.—Nails and wire are in light demand. Regular prices appear to be well maintained in this territory.

Reinforcing Bars.—Small lots are in fair demand, but otherwise the market is dull. Prices are irregular. For mill orders, 1.85c., Pittsburgh, evidently can still be done.

Warehouse Business.—The volume of business shows some decline. Orders are as numerous as earlier in the month, but for smaller lots. Sheets are in good demand.

Coke.—Ohio by-product foundry coke has been reestablished at \$7.75 per ton, Painesville, for November shipment. By-product coke for domestic use is moving fairly well, and a general price advance of 50c. a ton is expected Nov. 1. At present egg coke

is quoted at \$5, Cleveland, for outside, and at \$4.50, Valley ovens.

Bolts, Nuts and Rivets.—Bolt and nut makers report a slight improvement in orders. Good specifications are coming from the automotive and farm implement industries and from jobbers. Prices are firm. The demand for rivets is steady, but moderate.

Old Material.—The local market continues quite active and firm, but prices are no higher than a week ago, and there is a slight indication of an easier market tone. For delivery to local mills against outstanding orders, dealers are paying the quoted prices and are getting all the scrap they need. In the Youngstown district, heavy melting steel and compressed sheet scrap are bringing \$16.50 to \$16.75 from dealers. A local dealer was able to buy a small tonnage of heavy melting steel from a Pittsburgh district broker at \$17.50, or the same price that the latter was paying a week ago.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.....	\$14.00 to	\$14.50
No. 2 heavy melting steel.....	13.25 to	13.50
Compressed sheet steel.....	13.50 to	14.00
Light bundled sheet		
stamp'gs.....	11.50 to	11.75
Drop forge flashings.....	12.25 to	12.75
Machine shop turnings.....	9.25 to	9.75
No. 1 railroad wrought.....	12.75 to	13.00
No. 2 railroad wrought.....	14.50 to	15.00
No. 1 busheling.....	13.00 to	13.25
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops.....	16.00 to	16.50
Low phos., billet, bloom		
and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.....	16.50 to	17.00
Low phos. plate scrap.....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	10.50 to	10.75
Mixed bor'gs and short		
turn'gs.....	10.50 to	10.75
No. 2 busheling.....	10.50 to	10.75
Cupola Grades		
No. 1 cast.....	16.50 to	17.00
Railroad grate bars.....	11.00 to	12.00
Stove plate.....	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable.....	16.00 to	16.50
Rails for rolling.....	16.25 to	16.50

New Electrolytic Zinc Plant at St. Louis

ST. LOUIS, Oct. 20.—Announcement has been made by officials of the Evans-Wallower Lead Co. of plans for the erection in East St. Louis, Ill., of a plant for the production of electrolytic zinc, which, already under construction, will be located adjacent to the plant of the Monsanto Chemical Works and the Cahokia power plant of the St. Louis Union Electric Co., from which the power will come.

The plant has been designed to use low-grade Western concentrates with the recovery of by-products. However, in periods of over-production in the tri-State district, zinc concentrates from Joplin, Mo., will be used. The effect of operation of a plant of this kind, it is said, will be to stabilize the markets for concentrates and metals rather than disturb the balance between output and consumption.

The electrolytic process to be used

is stated to make a higher grade of zinc than any now on the market and, as announced by the Bunker Hill Co., will approximate 99.99 per cent purity. Chief among the uses of the metal will be in the brass and die casting industries. By-products will include cadmium, manganese dioxide used in the manufacture of dry cells, and lead. The new plant of the Evans-Wallower Lead Co. probably will be operated through a subsidiary known as the Evans-Wallower Zinc Co., and will operate on the Tainton process of electrolytic deposition of metal from the roasted zinc concentrates.

A second order for a 17-ton iron ore unloader has been placed by the Bethlehem Steel Co. with the Wellman-Seaver-Morgan Co., Cleveland. This will be a duplicate of an unloader bought a few weeks ago. Both machines will be erected at the Lackawanna plant of the Bethlehem company at Buffalo.

San Francisco

Pipe Line in Oregon Takes 1200 Tons of Plates—Steel Business Mostly in Small Orders

SAN FRANCISCO, Oct. 20 (By Air Mail).—Little of importance occurred in the Coast markets for iron and steel products the past week, the majority of both sales and inquiries involving lots of less than 100 tons. The largest award called for 1200 tons of plates for a pipe line at Hood River, Ore., booked by the Steel Tank & Pipe Co.

Pig Iron.—Foundry operations in southern California have improved to some extent, owing to the activity in the Santa Fe Hills oil fields, and demand for pig iron is increasing. However, inquiries and sales have involved small lots.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Only two awards exceeding 100 tons of reinforcing steel bars were reported this week. The larger, 435 tons, for the Balboa High School in San Francisco, went to the Pacific Coast Steel Co. An unnamed interest took 200 tons for an apartment on South Hobart Street, Los Angeles. A fair volume of pending business is being figured. Out-of-stock prices on reinforcing steel bars continue low, and 1.80c., base, is general. On merchant bars the price appears firm at 2.35c., c.i.f.

Plates.—The only sizable plate award of the week went to the Steel Tank & Pipe Co., Portland, Ore., and called for 1200 tons for a pipe line at Hood River, Ore. Bids will be opened next week on 231 tons of 24-in. riveted pipe for Seattle. The Shell Oil Co. has taken no action on its inquiry for 3100 tons for 10 80,000-bbl. tanks for its Domingues refinery. Prices are unchanged at 2.20c. to 2.25c., c.i.f. Coast ports.

Shapes.—No structural steel awards exceeding 100 tons were reported during the week, and no inquiries of importance developed. The War Department has approved the modified plans and has granted the Southern Pacific a permit to construct a bridge, over a mile long, across the Carquinez Straits at Martinez, Cal. While no

definite estimate of the steel tonnage has yet been given out, the bridge will require about 20,000 tons. Plain material continues firm at 2.35c., c.i.f. On foreign shapes, 1.57c., c.i.f., duty paid, appears to be the lowest quotation.

Cast Iron Pipe.—A slight improvement in demand for cast iron pipe is noticed, but there were few awards during the week. The United States Cast Iron Pipe & Foundry Co. took 1095 tons of 20-in. pipe for a high-

pressure system in Honolulu. Los Angeles opened bids this week on approximately 2000 tons of 6 and 8-in. centrifugal pipe, and Honolulu has taken bids on 700 tons of 12 to 24-in. pipe. Bids will be opened Nov. 5 on 106 tons of 4 to 10-in. Class B pipe for the improvement of Turquoise Street, San Diego, Cal. Bids go in next week on 1284 tons of 24-in. Class B pipe for Seattle; alternate bids are being taken on riveted pipe.

Coke.—Movement of foundry coke has not been heavy. About 4500 tons of English coke is scheduled to arrive on the Coast about the middle of November. English by-product coke is quoted at from \$11.50 to \$13 a net ton, incoming dock, while beehive coke is held at \$16 a net ton.

Boston

Pig Iron Firm—A 50c. Advance Quoted for First Quarter—Scrap Market Strong and Active

BOSTON, Oct. 23.—Strict adherence to quoted prices by Buffalo furnaces has brought a firm pig iron situation in New England. Buffalo interests have been endeavoring to get 50c. a ton additional on iron for first quarter. While little business has been done for that delivery, the quoting of a higher price reflects the strong attitude of Buffalo producers. More than 3000 tons was sold the past week, divided between the Mystic and Buffalo furnaces. Inquiries for more than 1000 tons may be closed soon.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	.....	\$21.91
*Buffalo, sil. 2.25 to 2.75	.....	\$21.91 to 22.41
†Buffalo, sil. 1.75 to 2.25	.....	20.78
†Buffalo, sil. 2.25 to 2.75	.....	20.78 to 21.28
East. Penn., sil. 1.75 to 2.25	.....	23.65
East. Penn., sil. 2.25 to 2.75	.....	24.15
Va., sil. 1.75 to 2.25	.....	25.71
Va., sil. 2.25 to 2.75	.....	26.21
Ala., sil. 1.75 to 2.25	.....	23.16 to 25.02
Ala., sil. 2.25 to 2.75	.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Reinforcing Bars.—For the Packard Motor Building, 150 tons of bars was placed with the Truscon Steel Co., and Joseph T. Ryerson & Son, Inc., was awarded 180 tons for a mercantile building on Brookline Avenue.

Coke.—Foundries continue to place orders in good volume, showing that pig iron melt is substantial. Local producers expect a good business during the next month or six weeks.

Old Material.—Demand from Pittsburgh mills keeps the local scrap market busy. In addition, there is buying for export. About the last of the month a 5000-ton shipment will leave for Danzig. In view of the fact that Pittsburgh mills have taken so much scrap in the past month, there is a scarcity in some lines. No. 1 heavy melting steel has advanced again, and now is bringing \$11.50 to \$12, f.o.b. cars here, while No. 2 steel strengthened to \$10 to \$10.50. The Worcester mill has bought heavy melting steel at

\$13.50 to \$14, delivered. Turnings have advanced to \$7 to \$7.50.

Buying prices per gross ton, f.o.b. Boston rate, shipping points:

No. 1 heavy melting steel	.....	\$11.50 to \$12.00
Scrap T rails	.....	10.00 to 10.50
Scrap girder rails	.....	9.50 to 10.00
No. 1 railroad wrought	.....	10.50 to 11.00
No. 1 yard wrought	.....	8.00 to 8.50
Machine shop turnings	.....	6.25 to 6.75
Cast iron borings (steel works and rolling mill)	.....	6.50 to 7.00
Bundled skeleton, long	.....	8.50 to 9.00
Forge flashings	.....	9.00 to 9.50
Blast furnace borings and turnings	.....	7.00 to 7.50
Forged scrap	.....	6.50 to 7.00
Shafting	.....	14.50 to 15.00
Steel car axles	.....	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	.....	9.50 to 10.00
Rails for rolling	.....	10.50 to 11.00
Cast iron borings, chemical	.....	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	.....	\$14.00 to \$14.50
No. 1 machinery cast	.....	15.50 to 16.00
No. 2 machinery cast	.....	13.50 to 14.00
Stove plate	.....	10.50 to 12.50
Railroad malleable	.....	15.00 to 15.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	 3.365c.
Structural shapes—	
Angles and beams	 3.365c.
Tees	 3.365c.
Zees	 3.465c.
Soft steel bars, small shapes	 3.265c.
Flats, hot-rolled	 4.15c.
Reinforcing bars	 3.265c. to 3.54c.
Iron bars—	
Refined	 3.265c.
Best refined	 4.60c.
Norway rounds	 6.60c.
Norway, squares and flats	 7.10c.
Spring steel—	
Open-hearth	 5.00c. to 10.00c.
Crucible	 12.00c.
Tie steel	 4.50c. to 4.75c.
Bands	 4.015c. to 5.00c.
Hoop steel	 5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	 *3.55c. to 5.55c.
Squares and flats	 *4.05c. to 7.05c.
Toe calk steel	 6.00c.
Rivets, structural or boiler	 4.50c.

Per Cent Off List

Machine bolts	 50 and 5
Carriage bolts	 50 and 5
Lag screws	 50 and 5
Hot-pressed nuts	 50 and 5
Cold-punched nuts	 50 and 5
Stove bolts	 70 and 10

*Including quantity differentials.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	 3.15c.
Soft steel bars	 3.15c.
Small angles, $\frac{1}{8}$ -in. and over	 3.15c.
Small angles, under $\frac{1}{8}$ -in.	 3.55c.
Small channels and tees, $\frac{1}{4}$ -in. to 2 $\frac{3}{4}$ -in.	 3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	 5.00c.
Black sheets (No. 24)	 5.00c.
Blue ann'l'd sheets (No. 10)	 4.00c.
Galv. sheets (No. 24)	 5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger	 5.65c.
Com. wire nails, base per keg	 \$3.40
Cement c't'd nails, 100-lb. keg	 3.40

St. Louis

Increase in Pig Iron Buying—Some Sales for First Quarter —Scrap Continues to Advance

ST. LOUIS, Oct. 23.—Buying of pig iron took a spurt the past week, the St. Louis Gas & Coke Corporation selling 15,400 tons, more than 3500 of which was for shipment in the first quarter. These were the first sales for next year's delivery. The market is firm, and an advance of 50c. a ton is expected by the local maker, whose shipments for October give promise of being the largest in its history. An important factor in the increasing melt in this district is the stove industry, which is unusually busy. A large part of a lot of 5000 tons of foundry iron bought by a local broker is expected to go to stove manufacturers. Two Belleville stove foundries bought 2500 tons and 500 tons of foundry iron respectively for first quarter, while a third in that center bought 150 tons for prompt delivery. A local stove plant took 500 tons for prompt delivery. St. Louis jobbing foundries took 1700 tons, including a lot of 1200 tons for first quarter. All of the sales were of foundry grades, except 2000 tons of malleable to an Illinois melter for first quarter.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis..	20.16
Southern No. 2 fdy., deliv'd	20.67
Northern malleable, deliv'd	20.16
Northern basic, deliv'd	20.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Foundry coke is being consumed in larger quantities, but buying continues on a small scale.

Finished Iron and Steel.—Specifications for plates, shapes and bars continue in fairly large volume. Business in galvanized sheets has slumped considerably, largely because most buyers placed orders before the discount reduction. Structural fabricators report business extremely dull, with no projects of consequence in sight. Reinforcing bar buying is light; the only letting of the week was 300 tons to the Laclede Steel Co. for a warehouse and office building. Warehouse busi-

ness made a good start this month, but fell off somewhat during the last 10 days.

Old Material.—Three of the largest consumers in the St. Louis industrial district came into the market, buying a total of about 15,000 tons of old material for delivery over the next 60 days. The purchases were distributed among a number of dealers, and consisted of heavy melting and shoveling steel, rails and specialties. While dealers' stocks are low, old material is being offered more freely by country dealers. The recent heavy buying gave added strength to the market here, and advances were recorded in heavy melting steel, heavy shoveling steel, miscellaneous standard-section rails, No. 2 railroad wrought, No. 1 railroad wrought, steel angle bars, No. 1 machinery cast and stove plate. The Frazier-Davis Construction Co. will buy 400 tons of 80-lb. relaying rails for use on the approach to the

St. Louis municipal bridge. Railroad lists include: International & Great Northern, 640 tons; Chicago & Alton, 810 carloads; Chicago, Rock Island & Pacific, 161 carloads; Chicago, Milwaukee, St. Paul & Pacific, 43 carloads; and Frisco, 27 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$13.00 to \$13.50
No. 2 heavy melting or shoveling steel.....	12.00 to 12.50
No. 1 locomotive tires....	14.50 to 15.00
Miscel. stand-sec. rails including frogs, sw'ches and guards, cut apart..	14.00 to 14.50
Railroad springs.....	15.25 to 15.75
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling	9.25 to 9.75
Cast iron borings	8.50 to 9.00
Iron rails	13.00 to 13.50
Rails for rolling.....	15.00 to 15.50
Machine shop turnings....	9.00 to 9.50
Steel car axles	18.25 to 18.75
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	20.25 to 20.75
No. 1 railroad wrought...	11.50 to 12.00
Steel rails, less than 3 ft..	15.50 to 16.00
Steel angle bars	13.75 to 14.25
Cast iron carwheels.....	13.50 to 14.00
No. 1 machinery cast.....	15.00 to 15.50
Railroad malleable	13.50 to 14.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate	12.25 to 12.75
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Canada

Pig Iron and Steel Production in Dominion Has Shown Large Gains This Year

TORONTO, ONT., Oct. 23.—The production of iron and steel in Canada continues to increase. September production of pig iron totaled 90,516 tons, which was slightly under the 91,522 tons in August, but was almost double the 52,470 tons produced in September, 1927. Compared with August, September figures showed increases in tonnage of basic and foundry grades, but these were not sufficient to offset the decline in production of malleable iron. Output of basic iron advanced to 57,424 tons from 54,826 tons in August; foundry iron, at 21,292 tons, compares with 15,210 tons in August, and malleable iron dropped from 21,481 tons in August to 11,800 tons in September. For the nine months ended with September, pig iron production totaled 745,473 tons, an increase of 31 per cent over the 570,414 tons reported for the first nine months of 1927, and 46 per cent greater than the output of 496,876 tons produced in the corresponding period of 1926.

Production of ferroalloys in Canada fell off sharply in September to 2008 tons from 2537 tons in August. For the nine months' period, production totaled 33,414 tons, a decline of 28 per cent from the 42,834 tons produced in the corresponding nine months of 1927.

September production of steel ingots and direct steel castings amounted to 99,888 long tons, an increase of 13 per cent over the 88,677 tons produced in the previous month and 84 per cent greater than the 54,250 tons reported for September, 1927.

Output of steel ingots and direct steel castings for the nine months ended with September totaled 919,710 long tons. This tonnage was 36 per cent over the 674,289 tons reported for the corresponding nine months of 1927, which in turn was 12 per cent greater than the 600,542 tons produced in the first three quarters of 1926. This year's output to date included 888,039 tons of steel ingots and 31,671 tons of direct steel castings.

Pig Iron.—A strong demand continues to feature business in this market. Buyers are showing keen interest and are placing orders for small lots, mostly for immediate needs, although some are ordering for late fall and early winter. Spot orders of from 50 to 300 tons were closed during the week, with total sales running about 1200 tons. Prices are holding firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00

Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Structural steel continues in strong demand. Orders in prospect for early closing include: 1200 tons for office building at Ottawa, Ont., for the Sun Life Insurance Co., Montreal; 3500 tons for Dominion Government building on Wellington Street, Ottawa; 300 tons for collegiate

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, 7/16-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts	60
Carriage bolts.....	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

building at Oshawa, Ont.; 200 tons for factory on Beaudy Street, Montreal, for the Eagle Shoe, Ltd.; 150 tons of structural and 100 tons reinforcing bars for factory building for R. C. Jamieson & Co., 264 St. Patrick Street, Montreal; 1000 tons structural and 350 tons reinforcing bars for bridge at Sherbrooke, Que., for municipal government; 250 tons structural for Y. M. C. A. building at St. Catharines, Ont.; 500 tons reinforcing bars for hospital at Essendale, Victoria, B. C.; 200 tons reinforcing bars for store building for S. W. Randall, 675 Richards Street, Vancouver, B. C.; 200 tons for warehouse for Northern Electric Co., Ltd., 313 Water Street, Vancouver, B. C.; 150 tons for office building for the Coast Investment Corporation, Ltd., 425 Howe Street, Vancouver, B. C.

Old Material.—Transactions in iron and steel scrap continue in good volume in the Toronto and Montreal markets. Sales for the week were well up to the high level for the year, but were almost entirely for spot delivery.

With consumers showing more interest in the market, and winter weather only a short distance away, dealers are giving attention to yard supplies. Buying by the local dealers has increased and some large tonnages are going into yards for winter distribution. Some purchases of large tonnages recently were at 50c. per ton above the general market.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast.....		16.00
Stove plate.....		13.00
Standard carwheels.....		16.00
Malleable.....		13.00
	Per Net Ton	
	Toronto	Montreal
No. 1 machinery cast.....	15.00	
Stove plate.....	9.00	
Standard carwheels.....	13.00	
Malleable scrap.....	13.00	

Detroit

Fourth Quarter Automobile Production Will Break All Records—No Major Recession in Sight

DETROIT, Oct. 23.—Prospects for a continuance of the present highly satisfactory conditions in the automotive industry are good. Apparently, fourth quarter earnings and fourth quarter production will break all records. There may be temporary slackening up about the first of 1929, but such a movement should not prove serious.

The employment barometer of the Employers' Association has again turned upward after several weeks of recession. The present total is 293,563, an increase of 553 over the figure reported a week ago. This compares with 195,295, the figure of a year ago. The employment figure for the 51 large plants in Toledo, as of Oct. 5, shows 36,314—a 445 unit increase over the preceding week and an increase of 13,743 over the corresponding week in 1927.

Every assembly plant in the Ford organization is now in operation, and production is running at 5500 units a day, with reasonable assurance that the previous production record on Model T cars will be equaled. Approximately 500,000 cars and trucks have been produced by the Ford plants since the first of the year. It is said that the Ford organization can turn out 10,000 units a day without further additions of equipment. Ford still has about 600,000 unfilled orders on the books. Approximately 125,000 employees are working in the Detroit plants.

The production schedule at Willys-Overland plant is based on an output for the current month of between 22,000 and 25,000 units, which will exceed the September production of

22,000 units. About 1100 cars per day are being turned out by this organization.

The 1927 production of the Marmion Motor Car Co. has already been exceeded in the first nine months of the current year by 4000 units. Total production to Oct. 1 was about 16,000 units.

The Packard Motor Car Co., to Oct. 1, had shipped 37,033 cars, an increase of approximately 53 per cent over the 1927 figure to that date.

The Murray Body Co. has practically completed a program for increasing capacity from 425 bodies a day to approximately 900. All units are operating at capacity.

The Fisher Body Corporation is planning a production of 1,250,000 Chevrolet bodies in its Cleveland plant during the coming year. The plant is now down for inventory.

The Chrysler Corporation of Canada has bought 67 acres between Ford City and Walkerville, Ont., for the erection of a plant to cost approximately \$1,500,000. The present plant in Windsor will be used to turn out parts. Approximately 360 cars per day will be the capacity of the new plant.

The Hayes Body Corporation is preparing for a 1929 schedule of something over \$20,000,000 worth of bodies.

The Motor Wheel Corporation is contemplating an expansion program which will include a new building 220 ft. square for the production of wire wheels. This will bring the wire wheel capacity to 6000 a day. Another building 200 x 400 ft. will be used for hub manufacture.

Birmingham

Steel Orders, Excepting Rails, Keep Mills Busy

BIRMINGHAM, Oct. 23.—Pig iron buying* is confined to small lots for early needs. Several of the larger melters are covered for the fourth quarter, but a portion of the iron for this period is yet to be sold. Inquiries are light and involve small tonnages. Shipments are falling a little below production for the first time in several weeks. No change has been made in furnace operations since Oct. 7. Of the 18 in blast, 15 are on foundry, two on basic and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic.....	16.25

Finished Steel.—The market is characterized by a strong demand and a good run of orders in all lines except steel rails. The rail mill of the Tennessee company has been closed down during the past few weeks owing to lack of business. Rail inquiries the past week were better than in any recent week. Other mill operations are at a high rate. Mills are unable to supply the demand for sheets. Bars, plates and shapes are stronger than at any time in months. Prices are unchanged, and mills are holding closely to quotations. Structural steel fabricators have sufficient business to keep them busy for several weeks. Reinforcing bar orders are coming in well. Open-hearth operations have been the same during the past two weeks; the Tennessee company is operating seven at Fairfield and the Gulf States Steel Co. four at Alabama City. The Tennessee company will place some of its open-hearths at Ensley in operation this week.

Cast Iron Pipe.—Several small orders are being booked, but the total tonnage is light. Plants continue to operate at about the same rate, but unfilled tonnage is less than half that of a month ago. Shipments are fair, and very little pipe has been stocked this month. Quotations are unchanged from \$36 to \$37 on 6-in. and larger sizes.

Coke.—Foundry coke is moving in fair volume. Quotations are unchanged from the \$5 base for both spot and contract coke.

Old Material.—An undertone of strength continues, and demand is better than at any time this year. Prices are unchanged. Pressure for delivery continues strong, and shortages have developed in some lines.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	19.00 to 20.00
Iron axles.....	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Cincinnati

Pig Iron Sales Decline But Prices Are Steady—Steel Specifications Are in Smaller Volume

CINCINNATI, Oct. 23.—Pig iron sales have fallen off the past week, although shipments to consumers on current contracts are in normal volume. The only important sale was 750 tons of Northern foundry iron to a Springfield, Ohio, melter by a Lake Erie producer. Most buyers in this district have contracted for their needs for the remainder of the year, and inquiries for the early part of 1929 are scarce. Prices are firm, with northern Ohio sellers quoting a minimum of \$17.50, base furnace. Southern iron is unchanged at \$16.25, base Birmingham. The only Ironton, Ohio, furnace interest which has iron to offer is asking \$17.50, base furnace.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25.....	\$19.39
Ala. fdy., sil. 1.75 to 2.25.....	19.94
Ala. fdy., sil. 2.25 to 2.75.....	20.44
Tenn. fdy., sil. 1.75 to 2.25.....	19.94
S'th'n Ohio silvery 8 per cent.....	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—The coke market continues active, and users are taking liberal quantities of by-product foundry coke on contracts. Beehive foundry coke from the Wise County and New River districts also is moving at a fairly good rate. By-product foundry coke is steady at \$7 per net ton, f.o.b. ovens, or \$9.14, delivered Cincinnati, and this price is expected to stay in effect through November. The schedule for domestic grades, however, may be advanced 50c. a ton on Nov. 1.

Finished Material.—District sheet mills report that specifications and orders declined slightly the past week, but indications are that the decrease will be more than offset by the substantial volume of incoming business this week. Shipments this month are about paralleling production, and unfilled tonnage assures 100 per cent mill operations for at least two weeks. Demand remains unusually well balanced. The release of specifications by automobile makers getting into production on new models should aid substantially in keeping the market strong. The roofing season in the South has

been fully up to normal, largely because of favorable weather. Prices are well established at 2.75c. to 2.85c., base Pittsburgh, for black, 2c. for blue annealed and 4c. for automobile body sheets. Bars, structural shapes and plates are quoted at 1.95c. to 2c., base Pittsburgh, but bookings in October have been considerably less than in September, when consumers were taking out sizable tonnages on third quarter contracts. In wire goods there has been an improvement in sales. Common wire nails are unchanged at approximately \$2.69 per keg, delivered Cincinnati.

Old Material.—While district steel mills are not anticipating future requirements by making purchases of scrap, prices continue firm, with cast iron grades and rail items advancing 25c. to 50c. a ton on account of a shortage in yard stocks.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.50 to \$14.00
Scrap rails for melting....	14.00 to 14.50
Loose sheet clippings....	9.50 to 10.00
Bundled sheets.....	10.25 to 10.75
Cast iron borings.....	9.75 to 10.25
Machine shop turnings....	9.25 to 9.75
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling.....	6.50 to 7.00
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires....	13.50 to 14.00
No. 2 railroad wrought....	13.50 to 14.00
Short rails.....	18.50 to 19.00
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast....	18.00 to 18.50
No. 1 railroad cast.....	14.25 to 14.75
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	13.50 to 14.00
Agricultural malleable....	12.50 to 13.00

Buffalo

Pig Iron Inquiries Include Some for First Quarter—Steel Plants Busy—Scrap Goes Higher

BUFFALO, Oct. 23.—A strong tone is apparent in the pig iron market. Inquiries are more numerous, and the total is about 4500 tons of all grades, with a 1000-ton lot of malleable heading the list. A 900-ton inquiry for foundry iron and two for 500 tons each are also active. A malleable inquiry for 700 tons is accompanied by one for 300 tons of low silicon foundry and 100 tons of high silicon foundry. Several 100 to 200-ton lots are also up for bidding. Among the inquiries are some lots for the first quarter, the first real interest exhibited in that delivery. No pig iron was shipped on the barge canal last week. Prices are holding firm.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00 to \$18.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25.....	18.50 to 19.50
Malleable, sil. up to 2.25.....	17.50 to 18.50
Basic.....	17.00 to 17.50
Lake Superior charcoal....	27.28

Old Material.—No. 1 heavy melting steel is now at \$16.75 to \$17, some substantial sales having been made at \$16.75 and smaller sales at \$17. A local dealer is reported to have purchased a tonnage of No. 1 heavy melting steel at Bradford, Pa., for \$15.75, on cars. Four markets now exist here for blast furnace borings and turnings, and several sales are reported at \$12. Stove plate is stronger, a sale having been made to a district foundry

dry at \$15.50. Some sales of knuckles and couplers, rolled steel wheels and short steel rails at \$17.75 have been made. The Pittsburgh district is offering \$18 for No. 1 heavy melting steel. Considerable No. 2 steel is reported as going to Pittsburgh from this district.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$15.75 to \$17.00
No. 2 heavy melting steel.....	14.25 to 16.00
Scrap rails.....	14.25 to 14.50
Hydraulic comp. sheets....	12.00 to 12.50
Hand bundled sheets.....	13.50 to 14.00
Drop forge flashings.....	14.75 to 16.00
No. 1 busheling.....	13.50 to 14.00
Hvy. steel axle turnings....	7.50 to 8.00
Machine shop turnings.....	14.50 to 15.00
No. 1 railroad wrought....	
Acid Open-Hearth Grades	
Knuckles and couplers....	17.50 to 18.00
Coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends.....	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings..	12.00 to 12.50
Blast Furnace Grades	
Short shov. steel turnings..	12.00 to 12.50
Short mixed borings and turnings.....	11.00 to 12.00
Cast iron borings.....	11.00 to 12.00
No. 2 busheling.....	11.00 to 12.00
Rolling Mill Grades	
Steel car axles.....	18.75 to 19.25
Iron axles.....	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast....	16.00 to 16.50
Stove plate.....	14.50 to 15.00
Locomotive grate bars....	13.00 to 13.50
Steel rails, 3 ft. and under.	17.50 to 18.00
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades	
Industrial.....	16.00 to 16.50
Railroad.....	16.00 to 16.50
Agricultural.....	16.00 to 16.50

Finished Iron and Steel.—Specifications are holding up well and considerable new business is coming out in all lines. The bar and shape price is being maintained at 2.05c. to 2.10c., Buffalo, and sheet prices are firm at 2.75c. for black; 4c. for automobile

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops.....	4.00c. to 4.25c.
Bands.....	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.....	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.....	39.00

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

body and 3.50c. to 3.60c. for galvanized. Automobile body sheet business is still holding at capacity of the local mill. A 250-ton State building at Napanoch, N. Y., went to the Kellogg Structural Steel Co.; also several miscellaneous jobs of less than 100 tons of fabricated steel have been

awarded. Bolt and nut business is exceptionally good, though jobbers' orders are lighter. The Donner Steel Co. is operating eight of its nine open-hearths; Bethlehem's Lackawanna plant, 23 out of 24 open-hearths; Seneca Iron & Steel Co., 95 per cent, and Buffalo Bolt Co., 75 per cent.

Railroad Equipment

Chicago, Rock Island & Pacific Inquires for 2750 Cars— Pennsylvania to Build 1000 Box Cars

WITH the Chicago, Rock Island & Pacific inquiring for 2750 freight cars, the Canadian National asking for bids on 1500 cars in addition to its previous wants and the Buffalo, Rochester & Pittsburgh soon expected to enter the market for 1000 box cars, the railroad equipment market is showing the most activity in several months. Outstanding orders during the week were given to company shops, the Pennsylvania having placed 1000 box cars and the Chicago, Indianapolis & Louisville, 100 of a similar type.

Chicago, Rock Island & Pacific has inquired for 1000 50-ton steel underframe, single-sheathed box, 500 40-ton stock, 1000 gondola and 250 flat cars. Road is soon expected to enter market for 250 ballast cars.

Canadian National is inquiring for 1000 automobile and 500 40-ton refrigerator cars. This is in addition to its recent inquiry for 1500 box, 300 flat and 30 tank cars.

Buffalo, Rochester & Pittsburgh is expected to enter market for 1000 box cars and 25 locomotives.

New York Central is asking for bids on rebuilding for 50 70-ft. steel underframe coaches.

Chicago, Burlington & Quincy will build 20 all steel suburban coaches, one dynamometer car and 11 trailers at its Aurora, Ill., shops.

Pennsylvania Railroad will build 1000 steel box cars at its Altoona, Pa., shops.

Chicago, Indianapolis & Louisville will build 100 box cars in its own shops.

Chicago & North Western is inquiring for 100 caboose cars.

Canadian Pacific is building 25 caboose cars in its own shops.

Lazote, Inc., Wilmington, Del., has ordered 25 tank cars from General American Tank Car Corporation.

Barrett Co. has ordered six tank cars from General American Tank Car Corporation.

Pennsylvania Railroad, through its associated company, Transcontinental Air Transport, Inc., has ordered 10 trimotored monoplanes for combined rail and air service between Atlantic and Pacific coasts from Ford Motor Co.

Cleveland Union Terminals Co. has ordered unstated number of electric locomotives from General Electric Co.

Manufacturers Railway, St. Louis, will purchase two eight-wheel switching locomotives.

cent report a shortage of skilled workers and 2 per cent note an unsatisfied demand for unskilled labor. In 1927 8 per cent reported a shortage of skilled workers, and 2 per cent, of unskilled labor. Wage increases since last fall are reported by 77.4 per cent, of whom 4.5 per cent note large increases and 72.9 small, while among those reporting decreases 22.4 per cent note small reductions. In 1927 27 per cent reported large and small decreases. Increased production over the previous year is reported by 65 per cent, compared with 50 per cent so reporting last year; greater sales quantities are reported by the same percentage of replies, compared with 49 per cent noting increased sales volume in 1927, and higher sales values are noted by 52 per cent, as against 38 per cent so reporting in 1927.

Reinforcing Steel

Railroad Warehouse Will Take 8500 Tons

ADDITION of 5500 tons to the previous requirements for a railroad terminal warehouse at Jersey City brought the total of new projects reported during the last week to 6700 tons. The following awards of 4100 tons include none of outstanding size:

BROOKLYN, 300 tons, subway section 5, route 107 under Schermerhorn Street; from Necaro Co., Inc., general contractor, to Concrete Steel Co.

BROOKLYN, 500 tons, building for Brooklyn Ash Removal Co., Inc., to Truscon Steel Co.

CRANFORD, N. J., 330 tons, grade separation work for Central Railroad of New Jersey, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 275 tons of rail steel bars, apartment building at Seventy-third Street and South Shore Drive, to Inland Steel Co.

CHICAGO, 600 tons of rail steel bars, negro housing project, to an unnamed bidder.

CHICAGO, 500 tons of rail steel bars, Hodgson Building, to Inland Steel Co.

CHICAGO, 100 tons of rail steel bars, garage on Madison Street, to an unnamed bidder.

CHICAGO, 700 tons, Powhatan Hotel, to American System of Reinforcing.

ST. LOUIS, 200 tons, office building and warehouse for N. O. Nelson Mfg. Co., to Laclede Steel Co.

LOS ANGELES, 200 tons, apartment building on South Hobart Street, to unnamed interest.

SAN FRANCISCO, 435 tons, Balboa School, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

AMENIA, N. Y., 660 tons, power plant development; M. Kantrawitz, Albany, N. Y., general contractor.

JERSEY CITY, 8500 tons, terminal warehouse for Delaware, Lackawanna & Western Railroad Co.; previously reported as 3000 tons.

CINCINNATI, 300 tons, building for Union Gas & Electric Co.

AKRON, OHIO, 200 tons, Wiener Building.

CHICAGO, tonnage not stated, Nurses' Home, for Cook County Hospital.

CHICAGO, 200 tons, apartment building; R. DeGoyer, architect.

ST. LOUIS, 200 tons, Deaconess Hospital, Clayton and Oakland Avenues.

Survey Finds Business Improved

Reports from 4000 Manufacturers Indicate Prosperous Conditions with 94 Per Cent Reporting Favorable Outlook

PRESENT business, immediate trade prospects, inventories, employment conditions, demand for labor, the wage scale paid and the degree of industrial peace enjoyed by industry all show an improvement over last year, according to a survey by the National Association of Manufacturers made public at the organization's annual convention, which was held Oct. 22 to 24 in New York. Based upon replies to a questionnaire received from about 4000 companies since Oct. 1, the survey presents a current picture.

A summary of the survey shows that present trade is reported as favorable by 93 per cent of those reporting, of whom 17.3 per cent pronounce it excellent, 41.4 per cent good, 34.5 per cent fair and 6.8 per cent poor. In 1927 the percentage of favorable returns was 91 per cent. Even better are the expectations for winter trade, 94 per cent of the replies viewing prospects as favorable. Excellent prospects are reported by 14.3 per cent, good by 43 per cent and fair by

36.7 per cent. Only 6 per cent of the reporting companies regard the outlook as poor. In 1927, 92 per cent reported a favorable outlook. Better business than last fall is reported by 50.7 per cent, with 24.1 per cent noting it unchanged, and 25.2 per cent reporting it not so good as in 1927. Last year 33 per cent reported an improvement in business, with 40 per cent reporting a falling off as compared with the year before. Depleted inventories are reported by 16.3 per cent, normal stocks by 74.2 per cent, and an oversupply of goods on hand by 9.5 per cent. Last year 11 per cent reported their inventories overstocked.

Increased employment over last fall is reported by 67.9 per cent, of whom 14.5 per cent report large increases and 53.4 small gains. Of those reporting a decrease, 3 per cent recorded a large falling off, and 29.1 per cent a small decrease. Last year 57 per cent reported large and small decreases.

Although the supply of all classes of labor appears to be normal, 13 per

Non-Ferrous Metal Markets

Copper Active With Prices Advanced, Tin Quiet But Stronger, Lead and Zinc Unchanged

Copper.—Another advance of $\frac{1}{4}$ c. per lb. has been made and the market is very strong. The increases were preceded by quite heavy sales last week and it is estimated that domestic orders totaled about 25,000 tons, with foreign sales about 20,000 tons. The domestic price for electrolytic copper was advanced on Monday, preceded by some sales on Saturday, to 15.50c., delivered in the Connecticut Valley. On Monday, all producers were quoting this price and reporting sales. On Tuesday, the official price of Copper

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Oct. 23	Oct. 22	Oct. 20	Oct. 19	Oct. 18	Oct. 17
Lake copper, New York.....	15.62½	15.62½	15.37½	15.37½	15.37½	15.37½
Electrolytic copper, N. Y.*.....	15.25	15.25	15.00	15.00	15.00	15.00
Straits tin, spot, N. Y.	48.75	49.50	...	49.62½	48.95	48.87½
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32½	6.32½	6.32½	6.32½	6.32½	6.32½
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price $\frac{1}{4}$ c. higher.

Exporters Inc., was advanced to 15.75c., c.i.f. European ports. Producers report active demand from all sources and some sellers have willingly made sales into January. Most of the buying is for December-January shipments, with foreign consumers also purchasing October-November. Domestic consumers are virtually covered to the end of the year. Lake copper is active and higher at 15.50c. to 15.62½c., delivered.

Tin.—In the week ended Saturday, Oct. 20, sales were light at about 800 tons. Dealers took the major portion, consumers buying little. It is evident that the latter are well covered for the rest of the year. Arrivals, which have totaled 5930 tons this month, are heavy and stocks are ample both here

and in London. There is also 6610 tons afloat and there are no signs of a famine. The market here Tuesday was quiet, with spot Straits tin quoted at 48.75c., New York. London prices Tuesday were as follows: Spot standard, £222 5s.; future standard, £220 2s. 6d., and spot Straits, £222 10s. The Singapore price was £224 2s. 6d. The feature of these quotations is the fact that the premium of spot Straits over spot standard is only 5s., whereas a month ago it was £2 10s. per ton.

Lead.—This market has been quite active and strong in the last few days, with prices unchanged at 6.32½c., St. Louis, and 6.50c., New York, the latter being the contract price of the leading interest. Buying has been participated in by all the leading con-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.50c. to 51.50c.
Tin, bars	52.50c. to 53.50c.
Copper, Lake	16.50c.
Copper, electrolytic.....	16.25c.
Copper, casting.....	15.50c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar.....	56.50c.
Copper, Lake	16.00c.
Copper, electrolytic.....	16.00c.
Copper, casting	15.75c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	59.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	33.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	20.00c.
Copper, hot rolled.....	24.75c.
Copper, cold rolled, 14 oz. and heavier	26.50c.
Seamless Tubes—	
Brass	24.87½c.
Copper	25.75c.
Brazed Brass Tubes.....	28.00c.
Brass Rods.....	17.75c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products were advanced $\frac{1}{4}$ c. on Oct. 22, the first change since Sept. 24. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	20.00c.
Copper, hot rolled.....	24.25c.
Zinc	9.75c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass.....	24.87½c.
Copper	25.75c.

Rods—

High brass	17.75c.
Naval brass	20.50c.

Wire—

Copper	17.50c.
High brass	20.50c.
Copper in Rolls.....	23.25c.
Brazed Brass Tubing.....	28.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.25c.	14.50c.
Copper, hvy. and wire	12.75c.	13.75c.
Copper, light and bottoms	11.25c.	12.375c.
Brass, heavy.....	7.50c.	8.50c.
Brass, light	6.25c.	7.25c.
Hvy. machine composition	10.00c.	11.25c.
No. 1 yel. brass turnings	9.25c.	9.75c.
No. 1 red brass or compos. turnings.....	9.25c.	10.25c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago

Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	20.00c.	
Copper, hot rolled.....	24.25c.	
Copper, cold rolled, 14 oz. and heavier	26.50c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	26.37½c.	
Copper	27.25c.	
Brass Rods.....	17.75c.	
Brazed Brass Tubes.....	28.00c.	

sumers. On some days a little metal has been available at 6.30c., St. Louis.

Zinc.—Activity is not pronounced, but moderate sales are reported by producers each day. Quotations are unchanged at 6.25c., East St. Louis, or 6.60c., New York, although it is stated that on one or two occasions the metal has changed hands at 6.22½c., East St. Louis. The ore situation is virtually unchanged both as to price and output. The quotation is still \$40, Joplin, and the production last week was about 10,800 tons. Shipments were a little over 10,500 tons so that stocks were practically unchanged at about 56,800 tons.

Antimony.—Prices for Chinese metal are lower due to larger stocks in China and less demand here. Quotations on Tuesday were 10.50c. for spot and 10.25c. for futures, duty paid, New York.

Nickel.—Ingot nickel in wholesale

lots is quoted at 35c., shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 23.—Shipments are steady but new sales are light. Prices for lead are higher. The old metal market is quiet in sales though shipments are in good volume.

Prices, per lb., in carload lots: Lake copper, 15.50c.; tin, 49.50c.; lead, 6.45c.; zinc, 6.35c. in less-than-carload lots; antimony, 12.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards of 25,500 Tons Include 6000 Tons for New York Subway—21,000 Tons in New Projects

AWARDS declined considerably from the average of recent weeks, amounting to only 25,500 tons. Included were 6000 tons for New York subway work and 4000 tons of plates for an oil company in the West. New projects, totaling 21,000 tons, included 4000 tons for railroad grade crossing work at Manayunk, Pa., 3000 tons for Cleveland Union Terminals Co. bridges and 3000 tons in buildings for a copper company at El Paso, Tex. Awards follow:

STATE OF MASSACHUSETTS, 275 tons, highway bridges, to Boston Bridge Works, Inc.

NEW YORK, 6000 tons, subway section 3, route 106, to Harris Structural Steel Co.

NEW YORK, 1200 tons, George Washington Hotel at Lexington Avenue and Twenty-third Street, to A. E. Norton, Inc.

NEW YORK, 400 tons, apartment building at Fifty-eighth Street and First Avenue, to McClintic-Marshall Co.

NEW YORK, 1100 tons, building on East Nineteenth Street for Sisters of the Sacred Heart, to Hinkle Steel Construction Co.

BROOKLYN, 400 tons, apartment building at 57 Pierpont Street, to Lehigh Structural Steel Co.

NAPANOCH, N. Y., 250 tons, staff and cell building, to Kellogg Structural Steel Co.

ROCHESTER, N. Y., 600 tons, grandstand, to Genesee Bridge Co.

PHILADELPHIA, 130 tons, foundation for electrification of Norristown branch of Philadelphia Electric Co., to Belmont Iron Works.

PHILADELPHIA, 100 tons, mill building for Cramp-Morris Co., to Belmont Iron Works.

PITTSBURGH, 630 tons, four river barges for Pittsburgh Plate Glass Co., to Midland Barge Co.

WILKES-BARRE, PA., 730 tons, building for Bell Telephone Co., to Shoemaker Bridge Co.

NEW CASTLE, PA., 400 tons, North Street bridge, to Independent Bridge Co.

VIRGINIAN RAILWAY, 400 tons, bridge, to Virginia Bridge & Iron Co.

SOUTHERN RAILWAY, 600 tons, bridge in Kentucky, to American Bridge Co.

STATE OF KENTUCKY, 1650 tons, Pope's Lick viaduct, to American Bridge Co.

SYLACAUGA, ALA., 220 tons, addition to

Avondale Mills, to Ingalls Iron Works.

SANFORD, FLA., 110 tons, fruit packing plant, to Ingalls Iron Works.

ALABASTER, MICH., 600 tons, building for United States Gypsum Co., to American Bridge Co.

DETROIT, 800 tons, building for Chrysler Corporation, to Russell Wheelan Foundry Co.

CHILLICOTHE, OHIO, 1100 tons, paper mill, to McClintic-Marshall Co.

PHILO, OHIO, 300 tons, gallery for power house, to Dauchy Iron Works, Chicago.

RACINE, WIS., 100 tons, building for Walker Mfg. Co., to Midland Structural Steel Co., Chicago.

ROCK ISLAND, ILL., 1600 tons, building for International Harvester Co., to McClintic-Marshall Co. and Gage Structural Steel Co.

BLOOMINGTON, ILL., 385 tons, office building, to Mississippi Valley Structural Steel Co.

CHICAGO, 100 tons, building for Midland Terra Cotta Co., to Midland Structural Steel Co., local.

EAST ST. LOUIS, ILL., 100 tons, Parks Airport, to St. Louis Structural Steel Co.

KANSAS CITY, MO., 4000 tons of plates, tanks for Roxana Petroleum Corporation, to United Iron Works.

HOOD RIVER, ORE., 1200 tons plates, pipe line, to Steel Tank & Pipe Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 800 tons, public schools 92 and 96.

ORANGEBURG, N. Y., 1000 tons, Rockland State Hospital buildings.

EASTON, PA., 500 tons, building for Lafayette College.

PHILADELPHIA, 2700 tons, building for Atwater-Kent Mfg. Co.

PHILADELPHIA, 500 tons, General Hospital at Thirty-fourth and Pine Streets.

NORRISTOWN, PA., 500 tons, addition to Montgomery County Court House.

MEDIA, PA., unnamed tonnage, Delaware County Court House.

DOVER, N. J., 700 tons, buildings at Picatinny Arsenal.

READING RAILROAD, 4000 tons, grade crossing eliminations at Manayunk, Pa.; call for bids not yet issued.

CLEVELAND, 3000 tons, catenary bridges for Cleveland Union Terminals Co.

CLEVELAND, 500 tons, bridge for Nickel Plate Railroad.

ELMHURST, ILL., 190 tons, school; Midland Structural Steel Co., Chicago, low bidder.

DULUTH, MINN., 2000 tons, lift bridge; American Bridge Co., low bidder.

EL PASO, TEX., 3000 tons, buildings for Nichols Copper Co.

KANSAS CITY, MO., 450 tons, Kline Building.

PARADISE, MONT., 600 tons, highway bridge across Columbia River.

SACRAMENTO, CAL., 206 tons, highway work in San Diego County; bids Nov. 7.

LOS ANGELES, 120 tons, hospital on Glendale Boulevard; bids being taken.

LOS ANGELES, 250 tons, apartment building on South Wilton Place; bids being taken.

Scrap Institute Discusses Classifications

Modification of the present specifications on scrap for freight rate purposes was discussed at a meeting of the classification committee of the Institute of Scrap Iron and Steel in New York, Oct. 18. It was suggested that such a modification would permit shipments of material under a scrap classification, even when it is not intended for remelting. Certain tests to be applied to the classification of scrap were proposed by Murray N. Billings of the Illinois Steel Co.

Alloy steel scrap specifications were considered at a meeting of the specifications committee of the institute on Oct. 17. The committee agreed to study the uniform specifications drawn by the United States Department of Commerce and discuss them at the next meeting of the committee to be held in Philadelphia.

Sheet & Tube to Add New Bar Capacity

The Youngstown Sheet & Tube Co. will install a 10-in. bar mill and a 14-18-in. bar mill with a monthly capacity of 30,000 tons, at its Indiana Harbor works, and will make additions to the open-hearth furnace capacity at that works sufficient to supply the extra requirements of these new mills. The latter are to be of the Morgan continuous type. Expansion of the open-hearth furnace department is to include an increase in the soaking pit capacity. Work is to be started immediately on these changes.

The National Enameling & Stamping Co., Inc., has moved its offices at Milwaukee to 12 Twelfth Street, that city.

PERSONAL

L. N. HOPKINS, since 1905 purchasing agent for the Chicago, Burlington & Quincy Railroad Co. and associated with the company for 43 years, retired on Sept. 1. He has been succeeded by JOSEPH R. HAYNES, who has been assistant purchasing agent for 23 years.

JOHN MCARTLE, recently identified with the Chrysler Corporation, Detroit, has been elected vice-president and general manager and a director of the Jordan Motor Car Co., Cleveland. E. S. JORDAN has been reelected president of the company, and A. F. ENGLAND, secretary, treasurer and a director.

SAMUEL P. GILBERT has resigned as purchasing agent for the Sharon, Pa., plant of the Westinghouse Electric & Mfg. Co. to become president of the Rogers Paper Mfg. Co., South Manchester, Conn.

RALPH K. FORD, formerly of the Ford Coal & Coke Co., is now identified with the Buffalo office of Rogers Brown & Crocker Brothers, Inc.

JOHN WANAMAKER has been appointed purchasing agent for the Apollo Steel Co., Apollo, Pa., succeeding GEORGE T. MCCARTHY.

CHARLES RANDOLPH, who has been buyer for the forge plant of the Chevrolet Motor Car Co., Detroit, has resigned to enter business on his own account as a distributor of pneumatic lathe grinders and supplies.

J. NEWTON SMITH, for a number of years vice-president and treasurer of the Boston Woven Hose & Rubber Co., Boston, has been elected president of that company, succeeding the late GEORGE E. HALL. He will also continue as treasurer. ARTHUR C. KINGSTON, director of sales, has been elected a vice-president.

BOYD B. JACK, formerly vice-president and general manager of the Empire Steel Co., Cleveland, has been appointed assistant to the president of the West Penn Steel Co., Brackenridge, Pa.

WALTER F. MUNNIKHUYSEN has been appointed district engineer for the Koppers Construction Co., Pittsburgh, with offices at 823 Peoples Gas Building, Chicago.

H. PARKER, purchasing agent for the Rome Wire Co., Rome, N. Y., has been placed in charge of that company's new plant at Mobile, Ala. He has been succeeded at Rome by STANLEY O. WILLIAMS.

LOUIS A. HAWTHORNE has been appointed development engineer for the

Atlas Fence Co., 25 Verona Avenue, Newark, N. J. He was formerly associated with the Carnegie Steel Co. and with the General Electric Co. in a similar capacity and has had wide experience in the fence industry.

S. W. PERRY, formerly representative of the DeVilbiss Co., Toledo, Ohio, with headquarters at Monmouth, Ill., has joined the sales organization of the Alexander Milburn Co., Baltimore, and will represent the company in its Middle Western territory.

M. C. RHODES, recently in the engineering department of the Riley Stoker Corporation, Worcester, Mass., has been appointed manager of the mechanical department of the Standard Power Equipment Corporation, St. Louis.

F. C. BIGGERT has relinquished the presidency of the United Engineering & Foundry Co., Pittsburgh, and George T. Ladd, vice-chairman Com-



F. C. BIGGERT

bustion Engineering Corporation, has been elected to succeed him. Mr. Biggert had expressed a desire to be relieved of the business management of the company, as he believed that his value to it would be materially increased if his entire time could be devoted to matters of engineering and research. He remains with the company as vice-president and senior engineer. Mr. Ladd, following early association with the rolling mill and roll business, founded, and for many years headed, the George T. Ladd Boiler Co., acquired by the International Combustion Engineering Corporation a few years ago. Mr. Ladd, in going with this organization, became president of the Ladd Water Tube Boiler Co. and the Heine Boiler Co., another subsidiary of the International Corporation.

LESLIE WHEELER, treasurer Pickands, Brown & Co., Chicago, has returned from a four months' visit in Europe.

S. C. BLOOM and CHARLES F. KAMRATH have established a consulting and architectural engineering business with offices in the Monadnock Block, 330 South Dearborn Street, Chicago.

D. A. CRAWFORD, president Pullman Car & Mfg. Corporation, Chicago, has been elected executive vice-president of the Pullman Co.

F. B. COYLE, metallurgist International Nickel Co., New York, addressed a joint dinner meeting of the Quad-City Foundrymen's Association and the American Society for Steel Treating at the LeClaire Hotel, Moline, Ill., on Oct. 15.

A. W. VAN BUREN, formerly Chicago sales manager for the Consolidated Machine Tool Corporation of America, has joined the sales organization of the E. L. Essley Machinery Co., 551 West Washington Boulevard, Chicago.

HANS P. DAHLSTRAND, chief engineer steam turbine department, Allis-Chalmers Mfg. Co., has been elected president of the Engineers' Society of Milwaukee. WILLIAM E. CRAWFORD, electrical engineer A. O. Smith Corporation, has been named vice-president; H. W. ROHDE, secretary, and WALTER R. MUELLER, treasurer. New directors include JOSEPH B. ARMITAGE, chief mechanical engineer Kearney & Trecker Corporation, and C. T. EVANS, electrical engineer Cutler-Hammer Mfg. Co.

DR. W. H. HATFIELD, Sheffield, England, addressed the Washington chapter of the American Society for Steel Treating on Oct. 3. His remarks were related largely to the Campbell Memorial lecture which he delivered before the American Society for Steel Treating at the annual convention in Philadelphia.

A. SERTON of The Hague, Netherlands, is now in the United States seeking a connection to sell in Europe steel specialties of American manufacture, such as alloy steels. For some years he formerly had residence in this country and represented in Europe the one-time Consolidated Steel Corporation. His temporary quarters are at 508 West 112th Street, New York.

GEORGE E. BALDWIN, formerly New York special sales representative Poldi Steel Corporation, has been appointed district sales manager for Braeburn Alloy Steel Corporation, Braeburn, Pa., in the metropolitan district of New York, including the State of Connecticut, with office at 55 West Forty-second Street, New York.

VERNON W. WELLS, Carborundum Co., Niagara Falls, N. Y., was the

principal speaker at October meeting of the Fort Wayne chapter of the American Society for Steel Treating. He talked on the manufacture of grinding wheels and on carborundum for furnace linings and other purposes. NORMAN L. DENBLE, Central Alloy Steel Corporation, Massillon, Ohio, will speak at a meeting of the chapter Nov. 21.

P. J. GORDON, for many years superintendent at Youngstown for the Republic Iron & Steel Co., has been appointed assistant to W. M. NECKERMAN, general manager.

Obituary

ERNEST L. DILDINE, founder of the Dildine Bridge & Iron Works Co., Hannibal, Mo., died Oct. 16. He was born at Summerville, South Norwich, Canada, in 1858 and for 20 years was in business at Cameron, Mo. He established the Dildine company at Hannibal 17 years ago.

FRED M. PRESCOTT, president Prescott Co., Menominee, Mich., manufacturer of oil pumps, saw mill machinery, etc., died Oct. 17, after a brief illness. He was 67 years of age. He was born in Denver, Colo., and was graduated from Cornell University in 1885. After conducting a hardware and mining supply business at Ironwood, Mich., he went to Milwaukee in 1904 and founded the Fred M. Prescott Steam Pump Co. Upon the purchase of the business by the International Steam Pump Co. in 1912, Mr. Prescott moved to Menominee to take charge of the Prescott Co., founded in 1867 by his father, the late D. Clinton Prescott, and expanded its saw mill machinery business to embrace electrically and steam driven pumping units. Two sons, Curry and Fred, Jr., are associated with the enterprise. Mr. Prescott was a member of the board of control of the Michigan College of Mines and Technology, Houghton, of the Lake Superior Mining Institute, the Engineers Club of New York, and the Hydraulic Club of New York.

LEON FALK, a director of the Weirton Steel Co. and the Edgewater Steel Co. and vice-president of the Federated Metals Co., died at Rochester, Minn., Oct. 20. He was born in Pittsburgh 58 years ago, and had spent the greater part of his life in that city. He was one of the founders of the Duquesne Reduction Co. and the Crown Chemical Co., now subsidiaries of the Federated Metals Co.

FRANK GIFFORD DREW, chairman of the board of the Winchester Repeating Arms Co., New Haven, Conn., died on Oct. 19, following an automobile accident at Pine Beach, N. J., which occurred as he was returning from the convention of the National

Hardware Association at Atlantic City. He was born at Philadelphia in 1872 and became associated with the Winchester organization in 1903. He served in the sales department for a number of years and in 1916 became head of that department. He was elected president in 1924 and two months ago, wishing to be relieved of

the more strenuous executive duties of the company, he was made chairman of the board. He was also vice-president of the Winchester-Simmons Co. and of the Simmons Hardware Co. During the war he was a member of the advisory board of the Bridgeport Ordnance District, United States War Department.

Steel Industry Presents Good Record

Chairman Taylor of Steel Corporation's Finance Committee Addresses Conference on Industries

ECONOMIC improvement in production of iron and steel came in for attention by Myron C. Taylor, chairman of the finance committee United States Steel Corporation, in an address Oct. 24 at a Conference of Major Industries at Columbia University, New York. His paper covered the progress of the industry in America and its position in the world today, the investment and profit return and a word in general on the future.

Speaking of the efforts to reduce costs, he gave the following general averages based on total tonnage and total employees of a sufficient number of plants to make them typical of the industry:

Annual Output of Finished Steel Products per Employee Engaged in the Manufacture of Iron and Steel

In 1902.....	65.45 tons
1927.....	80.91 tons
Increase	15.46 tons
Per cent of increase..	23.62%

"While this increased productivity of labor," said he, "can be attributed principally to installation of labor-saving machinery, equipment and facilities, substitution of larger and modern type units of production for many small and obsolete plants abandoned, and to improvements in operating methods, it also is due in considerable part to the progressive attitude of American workmen, who more and more have realized the vital relationship existing between volume and quality of production and higher wages.

"Present average earnings of iron and steel workers in the United States, according to a recent report published by the National Industrial Conference Board, is 12 per cent higher than the average hourly rate paid by all of the industries covered in the report mentioned, and is more than 50 per cent higher than the average labor rate paid by a number of the industries included."

Early in the address Mr. Taylor massed some figures to visualize the magnitude of the business in all its branches and ramifications. "One might say that to produce and convert each year into its multitude of finished forms our 1926 output of 48,000,000 tons of raw or ingot and casting steel requires the handling of about 200,000,000 tons of raw materials and the employment of 1,000,000 workers, receiving upward of \$1,400,000,000," he said. "The total value of

the manufactured products of the industry safely may be stated to be at least \$3,000,000,000, while the business turnover represented by sales of products moving through their several stages to the ultimate consumer reaches the large total of about \$7,000,000,000."

Profit Return Steadily Downward

In the matter of profit returns, he said in part: "From published reports of the leading corporations in the trade, it has been estimated that the capital put into the industry as original investment plus net profits retained, is upward of \$4,750,000,000, and that if valuations of tangible properties owned and used be rated at current-day cost of reproduction, less accrued deterioration on that basis, the total would be at least \$6,000,000,000.

"If profit return were to be calculated with reference to present values based on reproduction and reacquirement cost, the return would be probably somewhere around 4 per cent. The trend of profit return on investment for the past quarter century, eliminating the war period, has been steadily downward. In the case of the leading interest in the industry the annual average for the five years 1902 to 1906 was 6.67 per cent."

Fabricated Structural Steel Orders Continue Heavy

WASHINGTON, Oct. 23.—Orders for fabricated structural steel reported to the Department of Commerce in September totaled 243,942 tons, or 84 per cent of the monthly capacity of 292,015 tons of the 201 reporting firms. They compare with 285,508 tons, or 95 per cent of a capacity of 301,070 tons of 214 reporting firms in August, a record month. Computed bookings in September were 315,000 tons, against 356,250 tons in August, while computed shipments were 277,500 tons and 296,250 tons respectively, being 74 and 79 per cent of capacity.

For the nine months ended with September computed bookings were 2,553,750 tons, compared with 2,276,000 tons for the corresponding period of last year. Computed shipments have been below bookings: 2,283,750 tons in nine months this year and 2,156,250 tons last year.

Machinery Markets and News of the Works

Prospects Continue Good

Machine Tool Buying Expected to Hold Up to
End of Year at Least

MACHINE tool orders in the past week have lagged slightly behind the average of preceding weeks, but the amount of buying still in prospect leaves little doubt that business over the remainder of the year will continue at a fairly high rate. Some reports are that the total of October orders may equal that of September.

One of the large orders was for 42 special welding machines, totaling about \$300,000, placed by a Western company with the Niles-Bement-Pond Co.

The automobile industry continues one of the largest buyers. The Rolls Royce Co. of America, Springfield, Mass., is inquiring for about 30 machines. The aviation industry has become a more promising source of business. The E. W. Bliss Co., Brooklyn, has bought some machines and will

require, in all, about 50 for production of the Bliss Jupiter airplane engine.

Machine tool companies are bidding on the large list of the Norfolk & Western Railroad. The Chicago, Milwaukee, St. Paul & Pacific is about to place orders against a recent list. The New York Central has placed a few miscellaneous orders.

R. Hoe & Co., New York, printing press manufacturers, will soon place orders for six planers and prices have been asked for on about 20 lathes.

Some machine tool plants have sufficient orders to maintain current production schedules to the end of the year. Deliveries on a few types of tools range from eight to 10 weeks, although on the general run of equipment the range is nearer four to six weeks.

New York

NEW YORK, Oct. 23.—Orders for machine tools so far this month indicate that the total may be less than that of September. While some sellers report a slight falling off in business, others see no marked change. Business in prospect is large. The E. W. Bliss Co., Brooklyn, is buying equipment for the manufacture of Bliss Jupiter airplane engines, and its total requirements are said to be about 50 tools. The Rolls Royce Co. of America, Springfield, Mass., is getting prices on about 30 tools. R. Hoe & Co., New York, printing press manufacturers, will soon place orders for six planers and are getting bids on about 20 lathes. The New York Central placed a number of orders in the week, and the General Electric Co., Schenectady, was also a buyer. The Niles-Bement-Pond Co. booked an order for 42 special welding machines, totaling about \$300,000, from a Western company.

Other orders reported by Niles-Bement-Pond Co. are: One 36 in. x 14 ft. Time-Saver lathe, two No. 108 Ransom grinders, Cincinnati high-speed tapping ma-

chine, Cincinnati high-speed bench tapping machine, Aurora 20-in. drill, two Brown & Sharpe universal grinders, Niles-Acme 24-in. heavy-duty shaper, three Ransom 12-in. grinders, Acme 2-in. bolt cutter and Long & Alstatter I-beam punch. Pratt & Whitney division sold three No. 1 deep-hole drilling machines, five jig borers, 20 x 120-in. lathe, universal die sinker, 4½ x 12-in. thread miller.

Gotham Can Co., 225 Broadway, New York, is having plans drawn for a three-story plant at Brooklyn, to cost about \$40,000 with equipment. James McKillop, 821 Manhattan Avenue, Brooklyn, is architect.

Utah Copper Co., 25 Broad Street, New York, has plans for a new copper leaching plant near Bingham, Utah, to cost more than \$250,000 with equipment.

Procurement District, Signal Corps, Brooklyn, will receive bids until Nov. 6 for 3500 batteries, 2500 terminal wing-nuts, 2500 half-hinges, 25,000 machine screws, and other electrical equipment, circular 28.

Nash Queens Motor Corporation, 9430 Merrick Boulevard, Jamaica, L. I., will soon take bids for a three-story service, repair and garage building, to cost about \$230,000 with equipment. Brutus Gund-

lach, 110 East Forty-second Street, New York, is architect.

DeYoung & Moscovitz, 11 East Forty-fourth Street, New York, architects, have plans for a two-story addition to automobile service, repair and garage building, 100 x 125 ft., including improvements in present building, to cost about \$115,000 with equipment.

Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, has arranged for increase in capital of Fairchild Aviation, Ltd., a Canadian subsidiary, to more than \$500,000, and plans early construction of new plant near Lac a la Tortue, Que., to manufacture airplanes and seaplanes, including parts production and assembling, for small aircraft and multi-motored transports. Initial works are reported to cost more than \$250,000. Company has recently discontinued working agreement with Vickers, Ltd., Montreal, for manufacture of Fairchild airplanes in Canada. Sherman M. Fairchild is president.

Ovens, power equipment, conveying and other machinery will be installed in three-story addition to plant of Pioneer Baking Co., 120 Getty Avenue, Paterson, N. J., to cost \$100,000. A. W. Lang, 1904 Madison Avenue, is architect.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., is said to be planning construction of new steam-operated electric power plant at South Amboy, N. J., to cost more than \$450,000 with equipment.

New Jersey Bell Telephone Co., 1050 Broad Street, Newark, has plans for a two-story automobile service, repair and garage building for company motor trucks and cars, to cost about \$130,000 with equipment. Voorhees, Gmelin & Walker, 101 Park Avenue, New York, are architects.

Board of Education, Oradell, N. J., is said to be planning installation of manual training equipment in new three-story junior high school, for which superstructure will soon begin, to cost \$385,000. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

C. Mundt & Sons, 53 Fairmount Avenue, Jersey City, N. J., manufacturers of perforated metals, have awarded general contract to Peter Redfern & Sons Co., 569 Jackson Avenue, for a one and one-half story machine shop. John T. Rowland, Jr., 30 Journal Square, is architect.

Northern New Jersey Oil Co., 395-407 Riverside Avenue, Newark, has acquired adjoining property for expansion in storage and distributing plant.

Board of Education, Newark, has taken title to property occupied by Newark Academy as site for new building for Fawcett School of Industrial Arts, now at 55 Academy Street, to cost more than \$200,000. Newark Academy will remove to new building on First Street.

Chromium Engineering Corporation, 246 Fifth Avenue, New York, will soon open chromium plating plant with facilities for all kinds of chromium plating. Corporation has previously been engaged only in

The Crane Market

MUCH of the present activity in overhead traveling cranes is in the Middle West. In the New York and New England districts, inquiries for single cranes continue to accumulate, but prospective buyers are slow to place business. Sellers of locomotive cranes and steam shovels report a moderate volume of

inquiry, largely from contractors. In New York, Patrick McGovern, Inc., contractor on a water tunnel from Yonkers, N. Y., to Brooklyn, is reported to have bought a large number of steam shovels from an Ohio builder. D. C. Serber, Inc., New York, contractor, is understood to have bought two 5-ton truck cranes.

Among recent purchases are: Union Carbon & Carbide Co., New York, 10-ton, 56-ft. span electric crane for Duluth, Minn., from Whiting Corporation.

New York Central Railroad, New York, 25-ton, standard gage locomotive crane, from unnamed builder.

supervision and installation of chromium plating plants for manufacturers and job shops and new plant is designed for convenience of manufacturers who do not have sufficient work to warrant operating individual plant.

Atlas Steam Pressing Iron Corporation, 282-286 South Street, Newark, N. J., has been formed to manufacture steam pressing irons. Company is in production and is in market for brass couplings and fittings and metal steam hose.

South Atlantic

BALTIMORE, Oct. 22.—American Tin Co., 70 South Franklinton Road, Baltimore, recently formed by William M. Connor and associates, is reported arranging for early operation of local plant.

Club Aluminum Co., 1238 Fullerton Avenue, Chicago, manufacturer of cooking utensils, will discontinue operations at 3500 East Biddle Street, Baltimore, and will remove to Chicago where production will be concentrated in future. Chicago plant will be enlarged with addition, totaling about 30,000 sq. ft. of floor space, to cost more than \$75,000. William A. Burnette is president.

American Oil Co., American Building, Baltimore, has revised plans for a one-story storage and distributing plant at Philadelphia, to cost about \$35,000 with equipment. T. J. O'Connell is company engineer.

Tidewater Transportation Co., care of Moses G. Nusbaum, 1208 West Armistead Bridge Road, Norfolk, Va., recently formed by Mr. Nusbaum and associates, plans new two-story motor bus service, repair and terminal at Brooke Avenue and Boush Street, to cost \$350,000 with equipment. Philip B. Moser & Co., Law Building, are architects.

Town Council, Pulaski, Va., has authorized plans for municipal airport on 60-acre tract, to include hangar, repair and reconditioning shops, oil storage and distributing building and other units.

Supply section, office of chief of engineers, Munitions Building, Washington, will receive bids until Nov. 7 for two 75-kw. motor-generator sets, a.c. and d.c., respectively, two automatic starting compensators, two substation switchboards, three transformers, and four switchboard panels, circular 2.

Fred H. Merritt, Duluth, Minn., and associates are negotiating with Chesterfield Land & Coal Co., Chesterfield, Va., for purchase of about 8000 acres of coal lands between Chesterfield and Winterpock and plan development. Project will include an electric power plant, by-products coal works, machine shop and other units.

Board of Education, Griffin, Ga., will take bids before close of month for new vocational school for colored students. William J. Chase, 140 Peachtree Street, Atlanta, Ga., is architect.

Broad River Power Co., Columbia, S. C., has begun construction of a new unit at steam-operated electric power plant at Parr Shoals to increase capacity to 72,500 kw., to cost more than \$1,000,000 with transmission lines. Company is operated by General Gas & Electric Co., 50 Pine Street, New York.

Board of Awards, Baltimore, Charles F. Goob, chief engineer, has filed plans for one and two-story storage and freight terminal at McComas Street terminal, 100 x 160 ft., including mechanical handling equipment, to cost \$950,000. J. E. Greiner Co., Lexington Building, is engineer.

Board of Commissioners, Star, N. C., T. J. Ellis, commissioner, in charge, is planning purchase of electrically-operated pumping equipment, motor-driven air compressor and accessories, for municipal water system.

Pittsburgh

PITTSBURGH, Oct. 22.—Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, is arranging an expansion program at New Kensington plant to cost over \$1,000,000 with equipment.

Board of Education, Washington, Pa., plans installation of manual training equipment in new high school to cost \$850,000. E. B. Lee, Seventh and Smithfield Streets, Pittsburgh, is architect; C. L. Woolridge, Fulton Building, Pittsburgh, is consulting engineer.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has acquired 12 acres on William Penn Highway, near Wilkinsburg, Pa., as site for new radio experimental station, to include steel towers, power house, mechanical shops and other structures. Dr. Frank Conrad is in charge of radio division of company.

Pillsbury Flour Mills Co., Minneapolis, Minn., is said to be planning new plant at Wellsburg, W. Va., including elevating, screening and other equipment, to cost about \$165,000.

United States Engineer Office, Huntington, W. Va., will receive bids until Oct. 30, for one electrically-operated deep well pumping unit, with accessories, and storage tank, circular 70.

Russell, Burdsall & Ward Co., Port Chester, N. Y., has awarded general contract to Austin Co., Pittsburgh, for one-story addition to plant at Coraopolis, Pa., 55 x 100 ft., to cost close to \$50,000 with equipment.

Board of Education, Scottsdale, Pa., is said to be planning installation of manual training equipment in two-story addition to high school to cost \$145,000, for which plans are being completed by W. C. Eckles Co., Lawrence Savings & Trust Building, New Castle, Pa., architect.

Adamston Flat Glass Co., Clarksburg, W. Va., manufacturer of sheet glass

products, is said to be planning an expansion program, including construction of new glass-making unit, to cost over \$600,000 with machinery. New interests recently have become identified with company.

New England

BOSTON, Oct. 22.—Board of Trustees, Massachusetts Institute of Technology, Cambridge, Mass., has awarded general contract to Chase & Gilbert, 250 Stuart Street, Boston, for a one-story engine testing laboratory, 65 x 150 ft., to cost more than \$70,000 with equipment. Coolidge & Carlson, 89 State Street, Boston, are architects.

Bristol Co., Waterbury, Conn., manufacturer of temperature recording instruments, parts, etc., has filed plans for one-story addition to plant at Platts Mills, 48 x 140 ft., to cost over \$40,000 with equipment. It is said that another unit will be built soon.

Boston Ice Co., 110 State Street, Boston, is considering rebuilding of part of plant at Sharon, Mass., destroyed by fire Oct. 13.

Moth Aircraft Corporation, Graybar Building, New York, recently organized to take over license to manufacture in United States D. H. Moth aircraft of deHavilland Aircraft Co., Ltd., London, England, is said to be concluding arrangements for lease of about one half of plant of Rauch & Lang, Inc., Willimansett, Mass., manufacturer of automobiles, and 28 acres adjoining for testing and landing field. It is planned to begin production in November for assembling of aircraft, exclusive of motors, which will be secured from deHavilland company. Initial output will be on basis of 300 planes per annum. Company has arranged for stock issue to total \$690,000, portion of fund to be used for new plant. Minton M. Warren is president.

American Fork & Hoe Co., Keith Building, Cleveland, has awarded general contract to J. M. Swan & Sons, St. Johnsbury, Vt., for one and two-story addition to St. Johnsbury plant, to cost about \$50,000 with equipment.

Abrasive Machine Tool Co., Dexter Road, East Providence, R. I., has awarded general contract to Hunes Construction Co., Central Falls, R. I., for a one-story machine shop, 60 x 150 ft., to cost about \$28,000 with equipment.

Courtland Grinding Wheel Co., Huntington Road, Chester, Mass., has awarded general contract to A. M. Cowles, 5 Crown Street, Westfield, Mass., for two-story addition to cost about \$35,000 with equipment.

Prairie Window Ventilator Co., Georgia Avenue, Providence, R. I., is arranging for installation of enameling equipment in unit recently completed to double present capacity. C. I. Bigney is general manager.

Plant and equipment of Washburn

Chair Co., Warren, Mass., will be sold at public auction on Oct. 25. Sale will include wood-working and other machinery, lumber, merchandise and real estate.

Philadelphia

PHILADELPHIA, Oct. 22.—Bids are being asked on general contract until Oct. 29 by Atwater Kent Mfg. Co., Philadelphia, for one-story addition, 515 x 900 ft., to cost over \$900,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Stern & Co., 712 Market Street, Philadelphia, furniture, have leased a new multi-story building to be erected at Sixth Street and Glenwood Avenue, for new storage and distributing unit, with mechanical and woodworking shop, finishing department, etc., to cost over \$600,000 with equipment. LeRoy B. Rothschild, 215 South Broad Street, is architect.

Philip S. Tyre, 114 South Fifteenth Street, Philadelphia, architect, has plans for new two-story automobile service, repair and garage building, to cost approximately \$175,000 with equipment.

Cramp-Morris Industrials, Inc., Richmond and Norris Streets, Philadelphia, manufacturer of turbine engines and other heavy machinery, has awarded general contract to Fred A. Havens Co., 845 North Nineteenth Street, for one-story pipe shop, 58 x 200 ft.

South Jersey Port District, Camden, N. J., is disposing of bond issue of \$2,000,000, proceeds to be used for construction of marine terminal on Delaware River, in cooperation with City Council, to include warehouses with mechanical handling equipment. Project will cost about \$4,000,000.

American Ice Co., City Center Building, Philadelphia, has plans for a one-story plant at Ocean City, N. J., to cost over \$50,000 with equipment. C. Leslie Weir, 41 East Forty-second Street, New York, is engineer.

Pennsylvania Tool & Mfg. Co., 6 West Gay Street, York, Pa., has awarded general contract to Carson Linbaugh, 544 West King Street, for an addition to cost about \$25,000 with equipment.

Following recent reference to proposed manufacture of aircraft engines at plant of F. Wesel Mfg. Co., Scranton, Pa., manufacturer of machinery for printing, photoengraving, etc., a company has been formed under name of General Airmotors Co., with capital of \$30,000, which will make application for State charter on Oct. 25. It is headed by Louis A. Watres, president of Scranton Chamber of Commerce, and Robert B. McClave, vice-president and general manager McClave-Brooks Co., Scranton, manufacturer of grates, castings, etc. It was erroneously stated that Wesel plant had been secured under lease for this manufacture; new company has contracted with Wesel company for production of initial units of five-cylinder, 100-hp. type. Robert S. Moore, designer of engine, will supervise manufacture. Paul W. Gardner, general manager Wesel company, is a director of new organization.

Crane Co., 1301 Locust Street, Philadelphia, with headquarters at Chicago, is completing plans for one-story factory branch and distributing plant at Norristown, Pa., to cost about \$40,000 with equipment. E. Lane Crawford, 509 Swede Street, Norristown, is architect.

McCaffrey File Co., Philadelphia, has been formed with capital of \$100,000 to take over and expand company of same

name with plant at Fifth and Berks Streets. New organization is headed by George B. and John H. Whitwell.

Keystone Aircraft Corporation, Bristol, Pa., has been merged with Loening Aeronautical Engineering Co., 420 East Thirty-first Street, New York, and will increase facilities to manufacture large planes of transport type, in addition to military aircraft.

Cleveland

CLEVELAND, Oct. 22.—While sales are holding up fairly well the market was not quite so active the past week as during the previous week or two. A slowing down in orders is reported in the Michigan territory where automobile companies have been buying considerable equipment for making new models. Business in this territory is still coming in for the most part from automobile parts manufacturers.

White Motor Co. has not yet started to buy equipment it will need for bringing out a new truck model. Its requirements will include drilling and horizontal boring machines. There is an increase in the number of new companies entering the metal-working field in Cleveland which should stimulate the local market.

Smith-Armstrong Forge, Inc., incorporated with a capital stock of \$150,000, will establish a plant at 1209 Marquette Road, Cleveland, to manufacture flat die hammered forgings. Its owners are E. A. Smith and E. Armstrong, for 14 years connected with Machinery Forging Co., Cleveland.

Goodyear Tire & Rubber Co., Akron, Ohio, will establish a tire manufacturing unit in the South to take advantage of favorable production costs and distribution economies. Location has not yet been announced.

Air-Way Electric Appliance Corporation, Toledo, Ohio, manufacturer of domestic electric equipment, is disposing of stock issue of \$6,000,000, part of fund to be used for expansion in production.

Ovens, power equipment, conveying and other machinery will be installed in new three-story plant to be erected by Miami Bread Co., 2256 Robinwood Avenue, Toledo, Ohio, to cost more than \$100,000. Mills, Rhines, Bellman & Nordhoff, Ohio Building, are architects.

Patterson Welding & Repair Co., East Liverpool, Ohio, lately formed by R. L. Cawood, head of Patterson Foundry & Machine Co., has taken over former works of last noted company on South Broadway for new plant. Operation will begin in November. Mr. Cawood will be president and John S. Scott, secretary and treasurer.

Superior Body Co., Lima, Ohio, manufacturer of automobile bodies, has awarded general contract to H. U. Tuttle, Lima, for one-story addition, 60 x 200 ft., to cost about \$32,000 with equipment.

Eaton Axle & Spring Co., East 140th Street, Cleveland, has awarded general contract to Crowell & Little Construction Co., Hanna Building, for one-story addition, 330 x 400 ft., to cost more than \$400,000 with machinery.

Alliance Aircraft Corporation, Alliance, Ohio, will build new one-story plant for parts production and assembling, 60 x 275 ft., to cost about \$50,000 with equipment.

Plant, foundry, machinery and equipment of Carroll Foundry & Machine Co.,

and Bucyrus Road Roller Co., Bucyrus, Ohio, will be sold at public auction on Oct. 30 by Industrial Plants Corporation, 25 Church Street, New York, auctioneer. Sale will include machine tools, foundry and electrical equipment.

Gulf States

BIRMINGHAM, Oct. 22.—Bids will soon be asked on revised plans by Long & Lewis Hardware Co., 2014 Second Avenue, Bessemer, Ala., for one-story storage and distributing plant, 150 x 300 ft., at Birmingham, to cost \$85,000 with equipment. H. J. Skinner, 2208 Dartmouth Avenue, Bessemer, is architect.

City Council, Austin, Tex., is said to be arranging fund of \$1,250,000 for extensions and improvements in municipal lighting plant and waterworks, with installation of additional equipment.

Missouri-Kansas-Texas Railway Co., Dallas, Tex., has awarded general contract to T. H. Johnson, Citizens' National Bank Building, Sedalia, Mo., for new terminal facilities at Smithville, Tex., including engine house, machine shop, wheel shop, etc., to cost over \$150,000 with equipment.

Automatic machinery, conveying, packing and other mechanical equipment will be installed in new two-story plant, 110 x 120 ft., to be built by Houston Coca-Cola Bottling Co., 1210 Washington Street, Houston, Tex., to cost close to \$90,000 with equipment. Pringle & Smith, Norris Building, Atlanta, Ga., are architects. Alfred C. Finn, Bankers' Mortgage Building, Houston, is associate architect.

Shreveport Oil & Refining Co., Shreveport, La., recently formed of Shreveport, Jefferson, and St. Bernard oil companies, is planning new refinery and distributing plant on 10-acre tract on Mississippi River, near New Orleans, reported to cost more than \$650,000 with machinery.

Common Council, Laredo, Tex., is having plans drawn for municipal airport on 380-acre tract recently acquired, to include hangar, machine shop, reconditioning works and other units. Jack Beretta, San Antonio, Tex., is architect.

Board of Education, Brady, Tex., is said to be planning installation of manual training equipment in new high school to cost \$135,000, for which plans are being drawn by Henry T. Phelps, Hicks Building, San Antonio, Tex., architect.

Firestone Tire & Rubber Co., Akron, Ohio, is completing plans for new factory branch and distributing plant at Tampa, Fla., to cost about \$100,000 with equipment. F. J. Kennard & Son, 303 Zack Street, Tampa, are architects.

Tri-Tex Utilities Co., Gunter Building, San Antonio, Tex., has plans for natural gas pipe line in northern part of Zavalla County, and portions of La Salle and Frio Counties, totaling close to 200 miles, to cost over \$1,000,000 with compressor stations and auxiliary equipment.

Texas Co., Houston, Tex., has acquired about 100 acres near El Paso, Tex., and is reported considering new oil refinery to cost more than \$500,000.

City Council, Waco, Tex., plans installation of power equipment, pumping and other machinery for extensions in municipal waterworks, to cost about \$2,000,000. Floyd & Lockridge, Wilson Building, Dallas, Tex., are engineers.

Mississippi Power Co., Gulfport, Miss., has authorized extensions and improvements, including construction of 110,000-volt power transmission line in north-

western part of State, including substation and distributing facilities, to cost more than \$90,000.

Claude Neon Federal Co., 2038 Line Street, Shreveport, La., J. O. McFaddin, president, plans new factory to manufacture electric signs and displays.

Buffalo

BUFFALO, Oct. 22.—Augert Auto Parts Co., 652 Broadway, Buffalo, has plans for a new two-story plant unit to cost about \$25,000. L. P. Hoffman, 52 Rose Street, is architect.

Rochester Central Power Co., Rochester, N. Y., has acquired properties of Preston Power Corporation and Lake Ontario Power Corporation, operating at Sodus. Webster, Ontario, Williamson and vicinity, and will consolidate. Expansion will be carried out in district noted, including transmission line construction.

Bernard C. Maier, 1946 East Main Street, Rochester, and associates have organized Rochester Marine Co., with capital of \$25,000, and plan establishment of local plant to manufacture marine engines, including parts and assembling. Emmett J. Cassidy, Charlotte Station, Rochester, is interested in company.

Bendix Corporation, South Bend, Ind., manufacturer of four-wheel automobile brakes, has acquired a controlling interest in Eclipse Machine Co., Elmira, N. Y., heretofore held by General Motors Corporation, and will exercise active management in future. Acquired company specializes in production of automobile starting equipment, airplane equipment and machine parts, and operates plants at Elmira, East Orange, N. J., and Walkerville, Ont. These plants will be continued as in past, and expansion program will be arranged. Electric Auto Lite Co., Toledo, Ohio, has also acquired an interest in Eclipse organization. John W. Ferguson is president of reorganized company.

Stewart Bronze & Aluminum Foundry, Inc., Buffalo, care of Alfred R. Mock, 629 Linden Avenue, recently organized by Mr. Mock and associates, plans early operation of foundry for production of brass, bronze, aluminum and other castings.

Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, has filed plans for a one-story addition to cost about \$30,000.

St. Louis

ST. LOUIS, Oct. 22.—Plans have been filed by N. O. Nelson Mfg. Co., 928 Chestnut Street, St. Louis, manufacturer of plumbing equipment and supplies, for two-story unit, 150 x 257 ft., to cost about \$250,000 with equipment. Preston J. Bradshaw, 718 Locust Street, is architect.

American Eagle Aircraft Corporation, 2330 Harrison Street, Kansas City, Mo., plans new plant at Fairfax airport, Kansas City, Kan., to manufacture airplanes, including parts production and assembling, to cost more than \$200,000 with equipment. E. E. Porterfield, Jr., is president.

Ovens, power equipment, conveying and other machinery will be installed in new baking plant, 100 x 145 ft., at Hot Springs, Ark., by Robert H. Kittelberger, 424 Ouachita Street, to cost about \$100,000, for which contract has been let to J. D. Johnson, 233 Central Avenue.

Wirt-Franklin Oil Co., Ardmore, Okla.,

is said to be planning construction of new oil refinery near Oklahoma City, Okla., to cost more than \$225,000 including machinery.

Curtis Mfg. Co., Keinlen Avenue, St. Louis, manufacturer of pneumatic machinery, including air hoists, air compressors, cranes, etc., has arranged for sale of stock in amount of \$2,220,000, a portion of fund to be used for expansion.

Robertson Aircraft Corporation, St. Louis, Frank H. Robertson, president, has plans for hangar, 100 x 120 ft., machine and mechanical shop, 70 x 120 ft., and other units at Lambert airport, Anglum, near St. Louis. McDonald-Condie, Inc., 502 North Taylor Street, is architect.

Kentucky Cement Corporation, care of Hunt Engineering Co., New York Life Building, Kansas City, Mo., engineer, recently formed with capital of \$2,500,000 by F. B. Drew, McAlester, Okla., and associates, is having plans drawn for new mill near Frankfort, Ky., to cost more than \$2,000,000 with machinery. Project will include boiler plant, machine shop and other units. Leigh Hunt of engineering company noted, is in charge of equipment purchases.

Cudahy Packing Co., 111 West Monroe Street, Chicago, is said to be planning addition to plant at Kansas City, Mo., including conveying and other mechanical handling equipment, to cost over \$150,000.

Greenlease-Moore Cadillac Co., 1201 South Main Street, Tulsa, Okla., has taken bids on general contract for four-story service, repair and sales building, 100 x 140 ft., to cost about \$130,000 with equipment. Noble B. Fleming, Commercial Building, is architect.

Chicago

CHICAGO, Oct. 22.—Reports vary as to the condition of the machine tool market. It is generally agreed however, that inquiry is well sustained, but analysis of new sales gives rise to speculation as to how October will compare with recent months. Much incomplete business is before the trade and the bulk of current sales comes from diversified sources.

International Harvester Co. has closed on most of the list for its Rock Island plant. Tractor manufacturers continue to buy miscellaneous items and it is reported that several large lists may develop from this source. Nash Motors Co. is figuring on further equipment for its Milwaukee plant. Studebaker Corporation, South Bend, Ind., has closed for several tools and a forging plant in Chicago has ordered three large machine tools. A 16-in. shaper has been purchased by a local screw machine parts manufacturer. The railroads are quiet except for action now being taken on Chicago, Milwaukee, St. Paul & Pacific list.

Aetna Ball Bearing Mfg. Co., 737 High Street, Chicago, has purchased 80,000 sq. ft. of property, improved with one-story brick building.

Dallas Brass & Copper Co., 820 New Orleans Street, Chicago, has purchased property in West Grand Avenue district, adjoining present plant, served by Chicago, Milwaukee, St. Paul & Pacific Railway.

American Ironing Machine Co., Algonquin, Ill., has been reorganized with E. C. Peter, president; M. J. Broderick, vice-president and general superintendent; W.

T. Peter, treasurer, and B. C. Getzelman, secretary.

Caspers Tin Plate Co., 1438 West Thirty-seventh Street, Chicago, has awarded general contract to Poirot Construction Co., 38 South Dearborn Street, for one-story unit to cost about \$100,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Carleton Screw Products Co., 121 Twenty-seventh Avenue, S. E., Minneapolis, Minn., has leased a one-story building, 40 x 150 ft., to be built at Hiawatha Avenue and Twenty-fourth Street, for new plant.

Board of Education, Main Township, Park Ridge, Ill., contemplates installation of manual training equipment in three-story high school between Park Ridge and Des Plaines to cost about \$500,000, for which bids will soon be asked on general contract. Zook & McCaughey, 222 West Adams Street, Chicago, and J. D. Chubb, 109 North Dearborn Street, are associated architects.

Banner Brass Foundry, 1807 Washington Street, Cedar Falls, Iowa, C. W. Olsen, head, is considering new one-story foundry, 40 x 100 ft., to cost about \$24,000 with equipment.

City Council, Durango, Colo., plans installation of power equipment, pumping and other machinery for extensions and improvements in municipal waterworks, to cost \$350,000. A. L. Kroeger is city engineer.

Chrysler-Illinois Co., 3900 South Michigan Avenue, Chicago, representative for Chrysler automobile, is considering new one-story storage, service and repair building, to cost about \$100,000.

Altorf Brothers Co., East Peoria, Ill., manufacturer of washing machines, will soon begin erection of an addition, 100 x 600 ft., which will increase its floor space nearly 30 per cent.

Rockford Die & Tool Co., 727 Seventh Street, Rockford, Ill., has construction under way on a new factory to cost \$10,000.

Cincinnati

CINCINNATI, Oct. 22.—Machine tool bookings continue to parallel those of September and indications are that unless there is an unexpected slump in orders the coming week, October will take a place beside the two previous months from the standpoint of sales. A good portion of the tools purchased in the past two weeks have come from diversified sources. However, the automobile industry has been by far the biggest buyer and upon sustained demand from that field depends, to a large extent, machine tool activities in the closing month of the year and early part of 1929.

Many local plants have sufficient unfilled orders to maintain current production schedules almost through the remainder of 1928. Deliveries on some types of tools cannot be made in less than eight to 10 weeks, although on the general run of equipment four to six weeks is nearer the average. Automobile makers in the Chicago district as well as in Detroit territory have bought new equipment. A Milwaukee company is expected to place an order for the manufacture of about 20 special machines.

In the railroad field local builders are bidding on the Norfolk & Western list, on four engine lathes for the Southern Pacific and two lathes for the Burlington. Several Cincinnati machine tool makers

report a fair volume of business from European countries in the last two months. While these sales in the aggregate constitute only a small part of total bookings, they are of large enough proportions to show that foreign users, especially those operating automobile factories, are interested in American high-production tools.

Ohio Valley Oxygen Co., 942 Kenyon Avenue, Cincinnati, has asked bids for a one-story addition, to cost \$35,000 with equipment. J. G. Steinkamp & Brother, Mercantile Library Building, are architects. F. R. Williamson is president.

G. R. Boeckling Motor Car Co., 1900 East Third Street, Dayton, Ohio, will take bids in November for new two-story service, repair and garage building, to cost approximately \$100,000 with equipment. Gebhardt & Schaeffer, Miami Savings & Trust Building, are architects.

Weinman Pump Mfg. Co., 276 Spruce Street, Columbus, Ohio, has awarded general contract to Middle States Construction Co., 1183 Essex Avenue, for a two-story building to cost about \$22,000.

Memphis Natural Gas Co., Memphis, Tenn., is disposing of bond issue of \$6,000,000, part of proceeds to be used for expansion, including construction of pipe line, 210 miles long, compressor stations and auxiliary work.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Oct. 29 for tire pressure gages, vulcanizing knives, wrenches, and other tools, circular 153; until Nov. 5 for 1000 tow target assemblies, circular 160.

Board of Education, Covington, Ohio, is said to be considering installation of manual training equipment in new senior and junior high school to cost \$160,000. Marley Leyley, Tecumseh Building, Springfield, Ohio, is architect.

Milwaukee

MILWAUKEE, Oct. 22.—Machine-tool business continues in good volume. Only a shortage of skilled machinists and other shop labor is restricting further expansion of production and, in some instances, delay in getting deliveries of new equipment. Demand is broad and diversified, with the automotive industries in general the most active buyers.

Aluminum Goods Mfg. Co., Manitowoc, Wis., has started work on a seven-story addition, 115 x 302 ft., to main plant in Manitowoc. It will be used both for manufacturing and warehousing and will cost about \$600,000 complete. Plans are by W. Fred Dolke, Jr., architect, 9 South Clinton Street, Chicago.

Wisconsin Tool & Mfg. Co., 1219 Thirtieth Street, Milwaukee, specializing in production of heavy dies for automotive industry, is preparing to move into its new plant at Forty-fourth and State Streets, representing an investment of \$150,000 and affording 60,000 sq. ft., six times former area.

Waukesha Motor Co., Waukesha, Wis., has broken ground for second unit of a \$600,000 enlargement program. It will be two stories, 44 x 264 ft., and used as a shipping and storage building. A 3-ton crane has been purchased from Harnisfeger Corporation. A. W. Dietzel is plant engineer.

Plans are being completed by W. G. Kirchhoffer, consulting engineer, Madison, Wis., for a water softener plant for University of Wisconsin, Madison. Equipment will include two 2,000,000-gal.

pumping units, one steam turbine, several motors, chemical feeder, power mixer, etc. Bids for building and equipment will be taken shortly by J. D. Phillips, business manager, Board of Regents, Madison.

Wisconsin Power & Light Co., Madison, Wis., has placed contract with S. Morgan Smith, 33 South Clark Street, Chicago, for two waterwheels for a \$150,000 hydro-electric generating plant improvement of its subsidiary, Rockton Light & Power Co., Rockton, Ill. Generators and other equipment remain to be purchased. Mead & Seastone, Madison, are consulting engineers, and E. J. Kallevang is chief engineer.

Wisconsin Radiator & Body Co., 570 National Avenue, is starting work on an addition to cost \$25,000 complete. Meredith Brothers Co., 253 Washington Street, local, is general contractor.

Nash Motors Co., Kenosha, Wis., has let complete contract to Worden-Allen Co., Chicago, for a new forge shop and heat treating plant, 160 x 190 ft., at Racine. In connection with power plant improvements for this division, Charles A. Cahill & Sons, 214 Mason Street, Milwaukee, consulting engineers, are taking bids on two 150-ft. steel stacks, 78 in. diameter. David M. Averill is general manager at Racine.

Sivyer Steel Casting Co., Milwaukee, is completing work on a one-story foundry addition, 48 x 52 ft., and a new power house, 70 ft. sq., at West Milwaukee.

Detroit

DETROIT, Oct. 22.—Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich., manufacturer of iron castings, is planning expansion program to cost more than \$500,000, to include new foundry units and additional equipment.

Heywood Starter Co., 6547 St. Paul Street, Detroit, manufacturer of starting equipment for aircraft motors, is disposing of a stock issue to total \$187,500, the majority of proceeds to be used for expansion. Edward Hughes is general manager.

Chrysler Corporation, Detroit, is having plans drawn for one-story addition to plant on East Jefferson Avenue, for enameling to cost over \$85,000; also for a five-story addition to same plant for general service to cost more than \$130,000. Smith, Hinchman & Grylls, Marquette Building, are architects. For its Dodge Brothers Division, company plans one-story assembling unit, 120 x 1900 ft., to cost more than \$750,000 with equipment.

Edward Sterner Co., Flint, Mich., plumbing equipment and supplies, is said to be planning to rebuild portion of storage, distributing, pipe fitting and mechanical plant recently destroyed by fire.

Board of Education, Pontiac, Mich., plans installation of manual training equipment in new Washington junior high school to cost \$475,000, for which bids have been asked on general contract. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

National Stamping Co., 617 Glover Avenue, Detroit, has awarded general contract to W. J. C. Kaufmann, 10610 Shoemaker Street, for one-story addition for enameling, to cost more than \$40,000.

Lincoln Mfg. Co., 2630 Erskine Street, Detroit, manufacturer of electrical equipment and supplies, has awarded general contract to Lerner-Sobel Co., Book Build-

ing, for four-story plant, 86 x 100 ft., to cost about \$100,000 with equipment.

McManus Steel & Iron Co., Detroit, recently formed with capital of \$500,000, will take over and succeed to plant and business of Ruhl Malleable Co., 3290 Wight Street. New company is disposing of 50,000 shares of common stock to provide funds for purchase and expansion. Patrick J. McManus, formerly connected with Buhl company, is president and general manager of the new organization.

Muskegon Piston Ring Co., Sixth and Alpha Streets, Muskegon, Mich., will soon take bids for one-story addition, to cost more than \$25,000 with equipment. Frank Forster, Lyman Block, is architect.

Holcroft & Co., 6545 Epworth Boulevard, Detroit, manufacturers of furnaces, ovens, etc., have plans for one and two-story addition, 105 x 180 ft., to cost more than \$100,000 with equipment. C. L. Phelps, Detroit Savings Bank Building, is architect.

Standard Self-Lock-Nut Co., Muskegon, Mich., has been formed to manufacture self-lock nut depending on frictional contraction for holding and gripping power. Andrew Wierengo, president Standard Malleable Iron Co., Muskegon, is president of new company. Plant is at Muskegon and company will manufacture product from malleable iron made by Standard company.

Allied Products Corporation, Detroit, has succeeded to business and properties of Victor-Peninsular Co., Detroit; Richard Brothers Die Works, Detroit and Hillsdale, Mich., and Indiana Lamp Corporation, Connersville, Ind. General offices of new concern will be at 4646 Lawton Avenue, at plant of Victor-Peninsular Co. R. O. Cunningham, formerly president Indiana Lamp Corporation, is president of new company, and former executives of various units will remain in charge of their respective plants.

Wise & Braisted, General Motors Building, Detroit, have been appointed district sales agents in Michigan for Roller-Smith Co., 233 Broadway, New York.

C. H. C. Co., 417½ Liberty Street, Jackson, Mich., has been formed to manufacture screw machine products and tools. Company is in operation and is in market for screw stock and tool steel. Work will be done by contract.

Harris-Beasley, Inc., 1304 Harper Avenue, Detroit, has been organized to do electroplating, specializing in chromium plating, polishing and buffing.

Indiana

INDIANAPOLIS, Oct. 22.—Contract has been let by Mid-States Steel & Wire Co., Crawfordsville, to Warner & Wirt, local, for one-story foundry, 85 x 245 ft., to cost about \$45,000 with equipment.

Chevrolet Automobile Sales, 345 North Capitol Avenue, Indianapolis, operated by Jones-Whitaker Sales Co., is having plans drawn for a two-story service, repair and sales building, to cost about \$100,000 with equipment.

Continuing its expansion program, Studebaker Corporation, South Bend, has awarded general contract to Ralph Sollitt & Sons, 518 East Sample Street, for one-story addition, 62 x 300 ft., to cost about \$80,000. Lockhart & Fett, Associates Building, are architects. Plans are also being drawn by same architects for a two-story building, 90 x 200 ft., to cost about \$50,000.

Department of Health, Indianapolis, is having plans drawn for new power house at city hospital, to cost more than \$350,000 with equipment. R. Frost Daggett, Continental Bank Building, is architect; C. R. Ammerman, same address, is consulting engineer.

City Council, Evansville, has plans for municipal airport on Princeton Highway, including hangars, machine and repair shop, oil storage and other units, to cost \$175,000. B. Russell Shaw, Arcade Building, St. Louis, is engineer.

Louisville Pipe Organ Co., 1615 North Thirteenth Street, Terre Haute, Ind., has been organized to manufacture pipe organs. Residence and mortuary organs are equipped with automatic reproducing roll attachment. Contracts for equipment have been let and plant is in operation.

Diamond Chain & Mfg. Co., Indianapolis, has completed arrangements with I. H. Dexter Co., Goshen, N. Y., to manufacture Clark flexible coupling, made and sold by Dexter company for 15 years. Couplings are made in sizes for slow or high speeds and continuous or reciprocating drives. Diamond company has awarded general contract to Hall Construction Co., Board of Trade Building, for two additions, four stories, 60 x 160 ft., and one story, 40 x 100 ft., to cost over \$125,000 with equipment. Bishop, Knowlton & Carson, 312 North Meridian Street, are architects.

Pacific Coast

SAN FRANCISCO, Oct. 18.—Santa Maria Airlines, Inc., Santa Maria, Cal., has plans for two new hangars and one-story machine shop to cost more than \$75,000.

City Council, Turlock, Cal., will receive bids until Nov. 4 for four motor-driven pumping plants, including pumping units and accessories. A. P. Ferguson is city clerk.

Great Western Power Co., 530 Bush Street, San Francisco, has asked sub-bids for all portions of work for new steam-operated electric generating plant, one story, 150 x 180 ft., to cost more than \$3,000,000 with equipment. Harold K. Fox is chief engineer; McClellan & Junkersfeld, 68 Trinity Place, New York, are consulting engineers.

Majestic Furnace & Mfg. Co., 1723 Westlake Avenue, North, Seattle, has purchased additional property and is considering new one-story unit, 95 x 290 ft., to cost about \$60,000.

Coal Carbonizers, Inc., Centralia, Wash., recently organized, has acquired plant and business of Mendota Coal & Coke Co., Mendota, B. H. Johnston, president, and is said to be planning construction of new coal carbonizing and reduction plant to cost more than \$400,000 with equipment.

Joseph Kreutzer, 1801 South Hope Street, Los Angeles, and associates have engaged Austin Co. of California, Inc., 777 East Washington Street, to prepare plans for airport near Culver City, consisting of four hangars, aircraft factory for parts and assembling, experimental building and school, two machine and repair shops and other units, to cost about \$280,000.

Southern California Edison Co., Los Angeles, has approved plans for one-story mechanical shop and testing works near Visalia, Cal., with one-story equipment storage and distributing plant, 61 x 220 ft., steel tank of 75,000-gal. capacity on 100-ft. steel tower and other structures, to cost about \$250,000.

Idaho Portland Cement Co., Pocatello, Idaho, E. J. Simons, president, is contemplating new mill at Inkom, Idaho, to cost more than \$600,000 with machinery.

Union Oil Co., Grant and Kentucky Streets, Bellingham, Wash., will soon begin construction of oil storage and distributing plant to cost \$125,000 with equipment.

Canada

TORONTO, Oct. 22.—Machine tool business continues in good volume and inquiries indicate a steady demand for some time to come. Although buying is well distributed and covers many lines of manufacture, the automotive industry is the principal purchaser at the moment. The Steel Co. of Canada, Ltd., Hamilton, is expected to come into the market soon for considerable equipment for its proposed \$6,000,000 plant addition and has already placed orders for several cranes. The Algoma Steel Corporation, Sault Ste. Marie, Ont., and the Dominion Iron & Steel Co., Sydney, N. S., have been buying recently. The railroads have also taken car shop equipment and have small lists out for replacement tools.

Durant Motors of Canada, Ltd., Toronto, has purchased site with 750 ft. frontage on Laird Drive, Leaside, and will erect a plant building to cost \$75,000.

General Motors of Canada, Ltd., Oshawa, Ont., will double capacity of its stamping plant by an addition 105 x 400 ft., to cost with equipment \$80,000. Contract has been awarded to Gay Co., Oshawa. Other additions are under way.

Enamel & Heating Products, Ltd., will make extensions and alterations to its plants at Sackville and Amherst, N. S. Work will be started immediately on a one-story building at Sackville, 50 x 100 ft. At Amherst facilities for handling enameling requirements of company will be increased. Stove manufacturing will be concentrated at Sackville and building at Amherst where a few stoves are now manufactured will be turned into a wet process enameling plant. An electrically-driven compressor will be installed and arrangements are being made to start another oven.

W. H. Cooper, 6 Hughson Street North, Hamilton, Ont., has been awarded general contract for two-story addition, 60 x 120 ft., to plant of Wallace Barnes Co., Ltd., Hamilton, manufacturer of steel wire springs, etc.

Frankel Salvage Co., Ltd., Eastern Avenue, Toronto, has been awarded contract for one-story addition, 140 x 170 ft., for A. R. Williams Machinery Co., Ltd., 64 Front Street West, Toronto.

Pannill Door Co., Toronto, will establish a manufacturing plant at Frederick and Front Streets, and will require woodworking machinery and tools.

Walter G. Hunt & Co., Ltd., 1405 Bishop Street, has been awarded general contract for an addition to forge foundry for Canadian Tube & Steel Products, Ltd., 107 Hamilton Street, Ville Emard, Que., to cost \$10,000.

Wood Hydraulic Hoist & Body Co., 1025 Tecumseh Road, Windsor, Ont., has awarded contract to the Reynolds Wood Co., for a one-story addition, 80 x 85 ft., to cost \$25,000.

MacLaren Firm, Ltd., Birmingham, Que., has awarded general contract to William I. Bishop, Ltd., 10 Cathcart Street, Montreal, for a power plant, on the Lievre River, to cost \$15,000,000.

R. D. Ferguson, New York, is engineer. Work will also include erection of a 250-ton paper mill, sulphite mill, etc.

Great Lakes Power Co., Ltd., 527 Queen Street East, Sault Ste. Marie, Ont., has awarded contract to Lang & Ross, 623 Queen Street East, for a power plant in connection with its \$1,000,000 power development project near Sault Ste. Marie.

Western Canada

City Council, Nelson, B. C., has awarded contract to Stuart Cameron & Co., 543 Granville Street, Vancouver, B. C., for construction of a hydroelectric plant, including reinforced concrete power house and water storage dam, to cost approximately \$150,000. R. C. Affleck is engineer.

Clayburn Co., Ltd., 850 Hastings Street, Vancouver, B. C., will start work soon on a manufacturing plant at Kilgard near Abbotsford, B. C., to cost \$300,000.

Plant of Dominion Rubber System (Manitoba), Ltd., Princess Street, Winnipeg, was destroyed by fire Oct. 14.

Foreign

ABOUT 80 per cent of tractor plant of Ford Motor Co., Detroit, will be removed from Fordson, Mich., to Cork, Ireland, where production will be largely concentrated in future, owing to increased demand from European countries. Cork plant will be developed for larger output. It is expected to have removal completed early in coming year. Tractor production was discontinued at Fordson works several months ago and while this branch will not be permanently abandoned in United States, all space at Fordson will be given over for some time to manufacture of Ford automobiles.

Department of Public Works, State of Rio Grande do Sul, Brazil, is planning early call for bids for construction and installation of a number of hydroelectric power plants for light and power to different municipalities. It is also proposed to electrify railroad between Santa Maria and Porto Alegre, about 250 miles.

Soviet Russian Government, Leningrad, through Amtorg Trading Corporation, 165 Broadway, New York, its official buying agency, has contracted with International General Electric Co., 120 Broadway, for electrical machinery and supplies for a six-year period, in total amount from \$21,000,000 to \$26,000,000 in that time, including equipment for hydroelectric power development, power substations, transmission and distributing lines, and other operating service. During first two years purchases are to aggregate not less than \$5,000,000 nor more than \$10,000,000, and succeeding four years not less than \$4,000,000 per annum.

Port Commission, Genoa, Italy, has authorized extensions and improvements to include construction of large storage and distributing warehouse, with mechanical handling equipment, including 14 lifting cranes, estimated to cost \$212,000.

Andes Copper Mining Co., 25 Broadway, New York, operating porphyritic copper ore properties in Province of Atacama, Chile, has disposed of a block of stock, a portion of proceeds to be used in connection with development and expansion of mines, including installation of equipment. Company is a subsidiary of Anaconda Copper Mining Co.

Tagil Mills, Leningrad, Russia, have fund of \$1,000,000 for extensions and improvements in sheet iron works, to include installation of rolling machinery, manufacture of roofing and other products, to cost approximately one-half of sum noted.

THE IRON AGE

New York, November 1, 1928

ESTABLISHED 1855

VOL. 122, No. 18

Handling Parts Orders by Conveyor

Much Labor Saved by System Adopted by Packard—
One Continuous Conveyor Used

BY B. R. HORSLEY

FOR 28 years the Packard Motor Car Co. has been turning out automobiles. Ample evidence could be adduced to show that the product is a long-lived car, from a survey of the very large number of old models still in use. The company has not built a truck in over eight years and yet not a day passes without several parts orders arriving for service on Packard trucks.

A corollary to the large number of old models still in use is the necessity of a parts service department equipped to furnish promptly and economically any or all parts, materials, tools or accessories that could be required for the continued satisfactory use of any car or truck the company ever produced. Dedicated to this purpose, a modern four-story steel and concrete structure, covering an entire city block and affording 240,000 sq. ft. of floor space, has been built, to be devoted exclusively to the Service Parts Manufacturing and Merchandising Division. Operated independently of production departments, with its own executive offices occupying a portion of the second floor of the building, the service parts division is acknowledged to be

one of the most modern and best equipped parts departments in the automotive industry.

About one-third of the building is occupied by the service office, stockroom, shipping and receiving departments. The other two-thirds of the building, mostly on the upper floors, is used for manufacturing and assembling all parts not used on current production cars. The stockrooms located on the lower floors house all of the smaller parts and those parts most frequently ordered. These are stored in steel bins and on steel shelves, accessible to stockroom employees.

Distributing these parts from the receiving department to the various sections in which they are stored and moving them again, piece by piece, to the packing department to be assembled into multiple parts orders was a great and growing problem, requiring a steadily increasing number of employees. To minimize this handling cost and speed up the filling of multiple parts orders a continuous chain-type conveyor 827 ft. long was installed by the Palmer-Bee Co., Detroit.

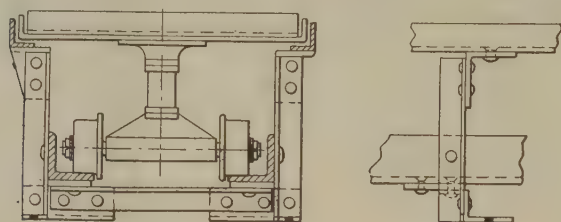
Because the conveyor follows a devious route, making

STARTING with the company 17 years ago, B. R. Horsley has been manager of the Service Parts Merchandising Division of the Packard Motor Car Co. for the past eight years. For some years he was shunted about from one section of the department to another until he had gained a wide knowledge of the workings of all of them. Thus, when a vacancy occurred at the head of the department, Mr. Horsley was prepared to fill it. He has traveled extensively for the company, studying service methods and distribution problems in practically every automotive plant in the country, in mail-order houses and other plants confronted with similar problems. He is largely responsible for the remarkably effective ordering system and conveyor assembly plan about which he writes here. Now many of the plants he visited are sending representatives to investigate the system which Mr. Horsley has helped to evolve.

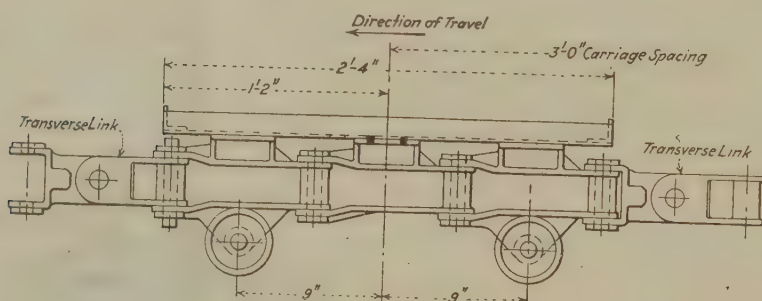
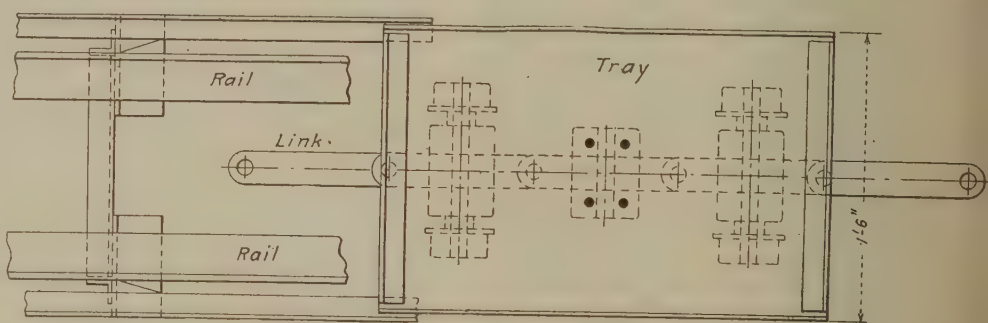


many turns, dips and rises in its course as it visits, in turn, the receiving, packing and shipping departments and every section of the parts storage department on the ground floor, it was imperative that the chain be adaptable to turning in any direction. This is accomplished by running the chain on edge, so that the regular chain joint pins permit turning in any horizontal direction, as when the chain goes around a sprocket and allows the conveyor to double back on its route in the receiving department.

At this point the heaviest loads are placed upon the trays of the conveyor, which is, therefore, only a few inches from the floor. At some points, as in the packing and checking department, where the employees work at benches, the conveyor is waist high. At other points it rises to about 7 ft. from the floor to clear aisles in which employees pass



ELEVATION (Below) of Conveyor with Tray, in the Parts Department. This shows the universal joint couplings which make possible the many turns, rises and dips along the route of the conveyor. At right is plan of conveyor without trays attached, showing tops of the vertical links in the chain, 9 in. apart, and the flanged wheels, on axles 18 in. apart. Cross-section (above) shows flanged wheels riding on steel angle tracks and angle guard rails to protect employees from the moving trays



back and forth. Transverse joints in the chain, 3 ft. apart, between adjoining trays, make possible these rising and dipping bends. The trays, of which there are 279, are 18 in. by 28 in., made of sheet steel with a 1 1/4-in. flange all around to prevent round pieces from rolling off. Propelled by a 5-hp. motor, the conveyor travels at the rate of 60 ft. a minute, completing a round trip in less than 15 min.

Along the route of the conveyor for the greater part of its length are steel stock bins and shelves especially adapted to carrying small quantities of the more active parts. Just back of these readily accessible bins and shelves, in rows running at right angles to the conveyor, are the larger bins and shelves where surplus stocks of material are carried. From these overflow stocks the smaller bins and shelves, closer to the conveyor, are replenished as their small stocks become depleted from the filling of orders.

When new shipments of parts and materials arrive in the receiving room they are carefully checked by receiving clerks and each lot is placed on a tray of the conveyor, with a large cardboard bearing a symbol letter which designates the section of the stockrooms to which it is destined. This

enables the stockroom employees to note from a distance which of the approaching trays bear parts and material for their respective sections. Each lot is taken from the conveyor by the employee detailed to the section in which it is to be stored and is placed in the larger surplus bins and shelves back of those closest to the conveyor.

This arrangement of carrying surplus stocks at some distance from the conveyor leaves the space along both sides of the conveyor available for the greatest possible assortment of parts in small quantities. These small stocks are not grouped together by models, as might be expected, nor are parts of a similar nature to be found close to each other in the racks and bins. It has been found advantageous to separate parts resembling each other in size and form. This reduces the possibility of errors on the part of the stockroom man. He will find a required part located among parts so different that his common sense will enable him to recognize the part wanted. The same advantage helps him to place incoming stocks where they belong, with little effort.

It is not required of the stockroom man that he be either a mechanic or a clerk. He does not check the order nor does he write the destination of the outgoing part. He can perform all his duties satisfactorily without a lead pencil. All clerical work has been taken away from him by the unique ordering system used in the division.

Parts orders, originating with the dealers, are first sent to Packard distributors, located in approximately 100 cities throughout the country. The very close relations between the dealers, the distributors and the factory have helped to bring about a simplified routine which aids materially in the prompt shipment of parts. All parts orders sent to the factory are issued by the distributors on forms furnished by the factory. These orders are set up in blocks of six copies to each order and are filled out completely in the distributor's office, eliminating delays and possible errors, which might result if the orders had to be copied at the factory. Two sizes of order forms are provided, one with six item lines for small orders, the other with 12 lines. Each set consists of the following copies of the form:

1. Service stores office—stock and shipping copy.
2. Factory service office reference copy.
3. Section copy.
4. Packing copy.
5. Acknowledgment copy.
6. Distributer's hold and reference copy.

In filling out an order the distributor furnishes the shipping destination of the parts, the incorporated or registered name of the person or company to whom the parts are to be charged, shipping instructions, amounts of each part required, parts numbers and names of parts. When completely filled out the first five copies are mailed to the factory. The sixth copy is retained by the distributor for reference and follow-up work. Upon receipt of the five copies at the factory they are time-stamped and checked for correctness.

A count of the items ordered is then made to allow for the scheduling of the order and to control the volume of

Packard

MOTOR CAR COMPANY
DETROIT, MICHIGAN

SERVICE PARTS INVOICE

REFERENCE **Nº 181314**



CHARGE TO **EARLE C. ANTHONY, INC.**
ADDRESS **SAN FRANCISCO, CALIF.**

SHIP TO **SAME**

ADDRESS

INVOICE NO. **SK 153450**

NO. PAGES **1** PAGE NO. **1**

DATE OF INVOICE **8-28-28**

DATE SHIPPED **8-28-28**

CODE	ORDER NO.	SHIPPED VIA AND REGISTER NO.	QUANTITY SHIPPED	PART NUMBER	MODEL SYMBOL	PREPAID CHARGES	PRICE EACH	AMOUNT	ACCOUNTS RECEIVABLE
5000	03148	3150 E	1-	162597 B			4.20*	4.20 -	G-310
5000	03148	3150 E	1-	162598 A			4.20*	4.20 -	
5000	03148	3150 E	1-	159716 B			9.00	9.00 -	G-311
5000	03148	3150 E	2-	162030 C			.70	1.40 -	
5000	03148	3150 E	2-	166823 C			.80	1.60 -	G-314
5000	03148	3150 E	16-	158723 A			.95	15.20 -	
5000	03148	3150 E	6-	158123 A			.7	4.20 -	G-318
5000	03148	3150 E	2-	158050 B			.75	1.50 -	
5000	03148	3150 E	2-	158216 B			.2	.4 -	G-317
5000	03148	3150 E	6-	163395 B			.4	2.40 -	
5000	03148	3150 E	2-	163479 B			1.00	2.00 -	
5000	03148	3150 E	4-	158648 B			6.00	24.00 -	
							TOTAL *	63.80 -	

TO **Packard** DISTRIBUTORS SUNDRY AND PART ORDER

MOTOR CAR COMPANY
DETROIT, MICHIGAN

Ship to **Earle C. Anthony, Inc.** Charge to **Earle C. Anthony, Inc.**

Street Address **901 Van Ness Avenue** Address **San Francisco, Calif**

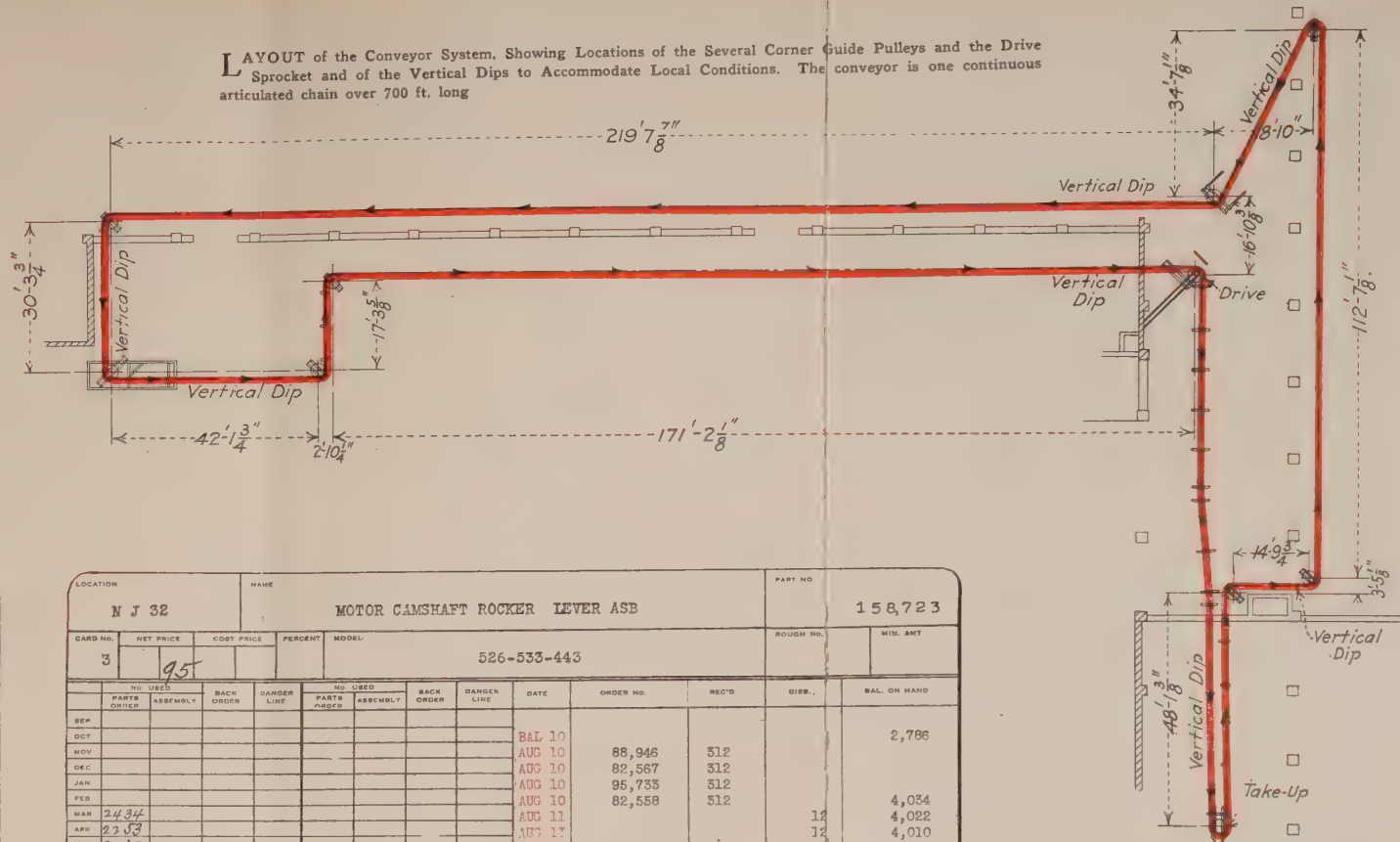
City and State **San Francisco, California**

Quantity Order Quantity Shipped Quantity Ordered Piece No. DESCRIPTION (Always state Piece Number as given in Parts List and Name Name) Factory Bin Location SELLING Each Amount COST

1	1	162597	B	Front axle spring left	Comp South Hall 420 420			
1	1	162598	A	Front axle spring right	Th L 420 420			
1	1	159716	B	Headlight	Top 134 9.00 9.00			
2	2	162080	C	Headlight door glass	J. 64 .70 1.40			
2	2	166823	C	Headlight door glass	Th L .80 1.60			
16	16	158723	A	Motor camshaft rocker lever assembly	Th J-32 .95 15.20			
6	6	158123	A	Motor camshaft rocker lever housing gasket	B 1162 .07 42			
2	2	158050	B	Motor camshaft rocker lever pin	L-T 3-9 .75 1.50			
2	2	158216	B	Motor camshaft rocker lever spring	S-H-7-4 .02 .04			
6	6	163395	B	Motor carburetor gasket	S-V-2-8 .04 .24			
2	2	163479	B	Motor carburetor spray tube assembly	Th L 1.00 2.00			
4	4	158648	B	Motor connecting rod and bushing left assembly	Th L 6.00 24.00			

Checked By VTB 109 Partial By VTB 121 PLS 45 CRATES BOXES Signed J. H. Clark 2773 6380

LAYOUT of the Conveyor System, Showing Locations of the Several Corner Guide Pulleys and the Drive Sprocket and of the Vertical Dips to Accommodate Local Conditions. The conveyor is one continuous articulated chain over 700 ft. long



LOCATION		NAME		PART NO.								
N J 32		MOTOR CAMSHAFT ROCKER LEVER ASB		158,723								
CARD NO.	NET PRICE	COST PRICE	PERCENT	MODEL	ROUGH NO.	MIN. AMT.						
3	95			526-533-443								
NO USED		BACK ORDER	DANGER LINE	NO USED		BACK ORDER	DANGER LINE	DATE	ORDER NO.	REC'D	DISB.	BAL. ON HAND
PARTS ORDER		ASSEMBLY		PARTS ORDER		ASSEMBLY						
SEP								BAL 10				2,796
OCT								AUG 10	88,946	312		
NOV								AUG 10	82,567	312		
DEC								AUG 10	95,735	312		
JAN								AUG 10	82,558	312		
FEB								AUG 11			12	4,054
MAR	2434							AUG 17			12	4,022
APR	2253							AUG 13	82,707	312		4,010
MAY	2067							AUG 14			6	4,322
JUN	3029							AUG 15			56	4,316
JUL	5292							AUG 15				4,280
AUG	421	8-15	9035					AUG 15	88,297	312		
SEP								AUG 15	82,718	312		4,904
OCT								AUG 16			24	4,880
NOV								AUG 17			46	4,854
DEC								AUG 22	88,547	312		
JAN								AUG 22	88,402	312		
FEB								AUG 22	88,497	312		
MAR								AUG 23			388	5,770
APR								AUG 24			67	5,282
MAY												5,215
JUN												
JUL												
AUG												
STOCK		BAL. ON HAND		STOCK ORDERS		DATE		REC'D	BAL. DUE			
DATE	SHIPPER NO.	DISB.		ORDER NO.								
			9-1	Main	BAL 10							
				88,701	AUG 17	312				5,668		
				82,707	AUG 15	312				5,356		
				82,718	AUG 15	312						
				88,297	AUG 15	312				4,732		
				88,497		312						
				88,402		312						
				88,547	AUG 22	312				3,796		

BILLING on the Above Actual Order Was Made on Hollerith Key Punch and Tabulating Equipment. These bills are made out from the original copy of the distributor's order after the parts are shipped. Bills show the date, distributor's code, his order number, amount shipped, part number, selling price and total selling price. The distributor's name and address appearing on this bill is the only typing done

UNIQUE Order Blank (Right) Used by Packard Motor Car Distributors in Ordering Parts and Sundries from the Factory in Detroit. Six copies are made out by the distributor and five are sent to the factory. One of these is cut into strips, one strip to each item on the order. The strips are distributed to the various sections of the department. An employee in each section locates the item called for on the strip reaching him and places it on the chain conveyor, together with the strip from the section copy of the order and a colored and numbered card indicating the section of the checking and packing department where the order is to be assembled. The upper left corner on the copy, where the distributor's name and address appear, is a perforated coupon which can be detached and used as mailing direction on parts small enough to be sent by parcel post

ONE of the 16,000 Stock Record Cards Which Are Posted Daily From the Orders Shipped to Distributors. These definitely control the number of parts, materials and tools on hand, as all cards upon which entries have been made are off-set in the trays containing them, to be scanned by the order clerks, who keep the on-hand supply of each part above an established danger limit.

SECTION

R

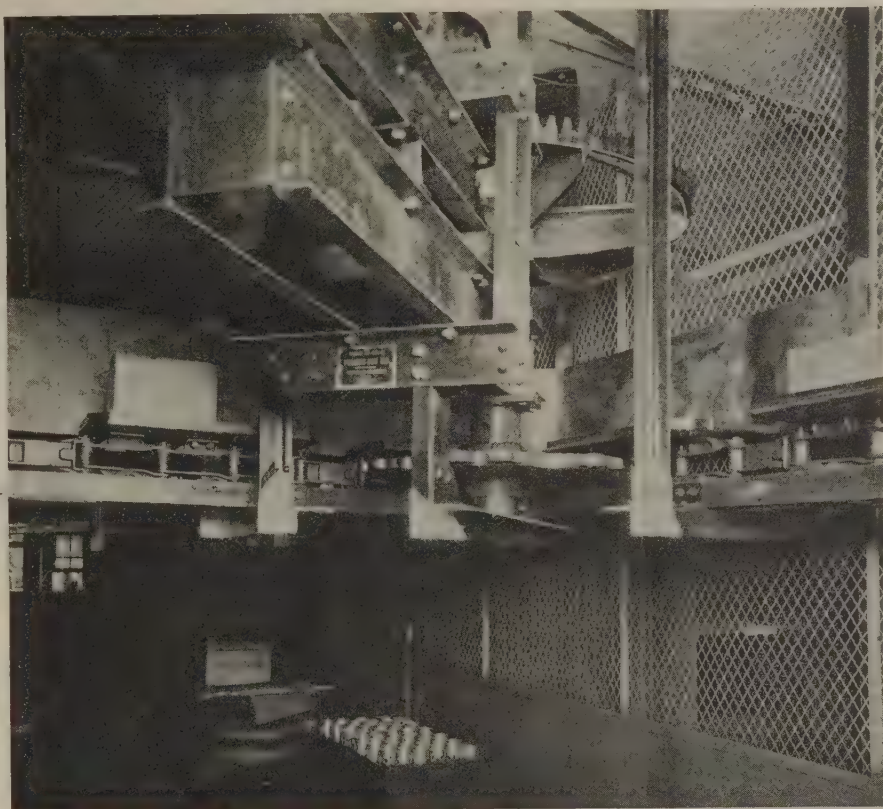
LETTERED Section Cards Are Used on Incoming Parts to Designate the Section to Which Each Item of a Shipment Is To Be Delivered. Above lettered card is one of the numbered, vari-colored cards placed on each loaded tray moving toward the packing and shipping departments. Attached to the card by a clip is the slit section of the order

work. The five copies still intact are then passed over location and price records, where they are checked for correctness of part number and name. At this point the factory bin location is filled in and the selling price and cost per cent are entered. The order is then scheduled for the

In other words, this copy is cut into as many different orders as there are different items on the complete order, to permit quick circulation of the orders to the various sections in which the required items are located and the simultaneous selection of all items on one complete order.

POWER Plant of the Continuous Chain Conveyor Used to Assemble Parts and Sundries in the Parts and Service Division of the Packard Motor Car Co. A 5-hp., 750 r.p.m. motor and the large bevel gear shown give the conveyor a speed of 60 ft. a minute. The conveyor is raised to make room for employees passing through the aisles, giving clearance of 6 ft. 6 in.

CHECKING and Packing Sections (Below), Where Each Part Ordered Is Lifted from the Tray, Accompanied by the Strip from the Order Blank Bearing Its Part Number, and a Colored Card or "Flag," Designating at Which Section It Is to Meet and Be Assembled. With the Other Items Clipped from the Same Order. Having the four remaining copies of the order, the inspectors remove all items for each order from the trays and check them against the complete order. After the last item has arrived, the checker pushes the completed order across the bench to the packers



stock department, stamped with a large numeral indicating the hour in which it must be filled, time-stamped and delivered to the stockroom.

Upon receipt of the order in the stockroom the No. 3 copy, or Section Copy, is detached; the other four are placed in a folder and delivered to the checkers, where they are filed according to the schedule hour. The section copy is then passed under a printer's hand shear, where it is cut into small, horizontal strips, one item line to each strip.

These slips are delivered to the various sections, each slip going to the stock man in charge of the section in which the required item is located.

After selecting the required part or the specified number of the part ordered on the slip that reaches him, the stockroom man places the slip on one of the moving trays of the conveyor with the parts wanted from his section. His only other responsibility is to place on the same tray a colored tag indicating to which checker his contribution is destined.

LONGEST Straight-Away Section of the Parts Assembling Conveyor (in Oval). This section, 207 ft. long, is devoted to very small parts such as small gears, pinions, nuts and bolts, washers, etc. Stockroom employees take off the slit sections of the order blank, select the part ordered and place both together on the conveyor a few seconds after the orders reach them. These steel bins are supplied with parts from other surplus bins, running at right angles to the aisle, on the left



RECEIVING Room (Above), Visited by the Chain Conveyor, Which Distributes to the Various Sections of the Department Shipments of Parts and Sundries Arriving by Rail and Motor Truck from Other Plants and from Other Parts of the Packard Plant. Each item placed on the tray bears a lettered card denoting the section of the department where the item is to be taken off and stored in the steel bins which line portions of the conveyor, or to the auxiliary surplus bins which run out at right angles to the conveyor at various points along its route. At this point the conveyor is closest to the floor because of the great weight of some of the items to be placed upon it here



AT This Point (Right) the Assembly Conveyor Makes a Short Excursion Into the Section of the Department Devoted to Special Tools Adapted to Packard Equipment and Supplied to Dealers, Through the Distributors, from the Factory. Here the flexibility of the conveyor is given its most severe test, as it must turn an acute angle and make a rise of 5 ft. 6 in. in a short incline to clear an aisle. Because some of the heaviest items are put on the conveyor at this point, the trays are only 14 in. from the floor



Small parts are placed in paper bags and the slip is clipped to the bag. Larger parts have the slips attached to them before they are placed on the tray.

Arrived at the checking and packing department, the parts are removed from the conveyor by the checker whose symbol card accompanies them. He checks the items against the other copies of the order that are still in his possession and assembles them with the other parts for the same order, arriving from other sections of the stockroom. Each checker handles only orders from a certain territory, with the result that orders from a given distributor are always handled by the same checker. Parts called for by several orders from the same distributor accumulate on the same section of the checkers' bench, insuring the most compact and economical packing.

As each order is completed the checker fills in on all copies of the order blank the quantity of each part that is to be shipped and makes a back-order note of any parts that may be missing for one reason or another and which are to be shipped later. The checker then passes the parts across the checkers' bench to the packers' bench. The No. 1 Shipping Copy and the No. 4 Packing Copy of the order go with the material to be shipped. The No. 2 Factory Service Office Copy and the No. 5 Acknowledgment Copy of the original order are retained temporarily by the checker, who later sends them to the Service Stores Office. The No. 2 copy is kept for stock record entries and for follow-up work on any items back-ordered. As soon as the parts are checked and ready to be packed for shipment the No. 5 Acknowledgment Copy is mailed to the distributor, to inform him which parts are being shipped and which, if any, are back-ordered, to follow in a later shipment.

When the parts are packed in the shipping case the No. 4 Packing Copy is packed inside the case with the parts and the case is then nailed up. On the outside of the case is attached the No. 1 Service Stores Office—Shipping Copy. A slat and roller gravity conveyor is used to move the packed shipping cases from the checking and packing department to the shipping department, where the shipping copy of the order is removed from the packing case and transportation papers are issued. A rubber stamp is used to indicate on each order how and when the parts were shipped. These orders are forwarded to the Service Stores Office, where the billing of the parts is done from the No. 1 Service Stores Office Copy after shipment is made. Prices on these orders are checked for accuracy in the service office, after which they are grouped with other orders from

the same distributor, so that each invoice covers as many orders and items as possible.

Hollerith key punch and tabulating equipment is used to complete the invoice. A card is punched for each item shipped, showing the date, distributor's order number, distributor's code, amount shipped, part number, selling price, total selling price and cost per cent. Placed in the tabulating machine these cards make out the invoice showing all the information that has been punched upon them. A typist then enters upon the invoice the incorporated or registered name of the person or company to whom the parts are to be charged and the name of the consignee.

Stock record cards for the control of material on hand are a very important part of the Packard parts system. A definite record, posted daily, is kept of every part carried in the service department. Record cards are filed numerically by part number and show the part name, bin location, selling and cost price, models on which the part is used, record of all orders for new material, record of all parts disbursed and balance on hand. After each entry the cards are offset in the file so they can be examined by a special order clerk for check-up purposes. At the end of each month a summarized entry of the total number sold during the month is made and a danger limit is established and entered upon the card. This danger limit is the basis of control of the amount to be carried on hand and covers an average three months' supply.

To assist in keeping these records accurate a perpetual inventory system is carried out. When the entries on the records indicate that a reconciliation should be made between the amount shown to be on hand and the actual amount in the bin a special inventory form is made out and sent to the parts department, where an inventory is taken. The form is properly filled out and returned to the office, where a check is made and, when there is any substantial discrepancy, the correct amount is filled in on the card. This system detects all possible errors and keeps the records and bins in balance.

At the end of each month a special report is compiled by models under which the parts are classified. This report shows the total selling value of all parts sold, the total cost value and the profits made by each model. Additional reports are compiled showing the value of shipments by transportation classification, value of shipments per vehicle in the field, etc. A quarterly inventory is taken and analyzed by models. This is to assist in assuring complete control of inventory and turnover.

Index of National Prosperity

An unusual index has been added to the large number with which we are familiar in the shape of a British Index of National Prosperity. This has been prepared for *Economist*, London, by G. D. Rokeling and its presentation has a foreword by Sir Josiah C. Stamp.

Briefly, an index of production combined with an index of net real income from foreign investment gives an index of real national income. This number divided by an index number of population gives an index of national income per person, which for practical purposes is the measure of national prosperity. The index of production is based on the volume of raw material worked up by industry, the number of productive workers and the consumption of coal as the principal source of heat and power. The two latter items are each given double the weight of the raw material imports. The net real income from foreign investment is based upon Board of Trade estimates, influenced by Government payments and by an index number of wholesale prices.

In putting the final index together, the index of production is given a weight of 24 times that of the income from

foreign investment. The figures obtained for a series of years, as indicating the measure of national prosperity, are as follows:

1920.....	101.2	1924.....	100.0 (base)
1921.....	77.3	1925.....	99.5
1922.....	88.9	1926.....	91.2
1923.....	93.3	1927.....	105.3

Material Handling Systems

An exceptionally comprehensive catalog of material handling systems has been put out by the Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. It deals with overhead means of handling products of all descriptions, whether outdoor or indoor. Illustrations are numerous, including many taken in plants of users of the equipment. A large number of details is shown as to parts of the equipment, and, in particular, its flexibility is stressed. Both mono-rails and light cranes running on two rails are shown, together with gantry cranes, jib cranes, and other overhead types of handling facilities.

Mold Gates for Diverse Castings

Those Producing Whirling Action of Metal—
Riser Horn Gate and Pop Gate and Runner

BY PAUL R. RAMP*

[Following the first of three sections of this article, which appeared at page 943 of THE IRON AGE for Oct. 18, and in which the author showed correct methods of preparing gates for molds for face plates, die blocks, cast-teeth gears, driving box shoes and globe valves, Mr. Ramp in this installment takes up several other specific cases and tells why certain methods of treatment will give the best results.—*Editor.*]

Designing a Skim Gate

DETAILS of a standard skim gate, with four examples of how the skim gate can be used to obtain the benefits desired, are shown in the first illustration. Metal enters the pouring gate and is choked at the inlet gate *B*, and the impurities rise to the top of the skimmer *E*. But to have a standard in making these skim gates the various dimensions may be summarized.

When the pouring gate is 1 in. in diameter at *H*, the skimmer should be 2 in. in diameter at *I*. The distance *J* between the outside of the pouring gate and the outside of the skimmer should be no less than $2\frac{3}{4}$ in., if it is at all possible to have this much room in the flask. If the flask is not large enough for a skim gate of these dimensions, it is better to use a larger flask.

The passage leading from the pouring gate to the skimmer should always be as wide as the diameter of the pouring gate, and about $1\frac{3}{4}$ in. deep. This point is shown at *K*. Where this passage enters the skimmer at *L*, it should be as wide as the outside diameter of the skimmer and about $2\frac{1}{2}$ in. deep. These dimensions can be varied to suit conditions. The standard skim gate described here is what can be considered ideal. But the relation of the diameter of the pouring gate to that of the skimmer could not be worked out on a regular scale, at least any further than a 2-in. pouring gate and a 4-in. skimmer. There are few cases where a skimmer gate of this character would be used as large as this.

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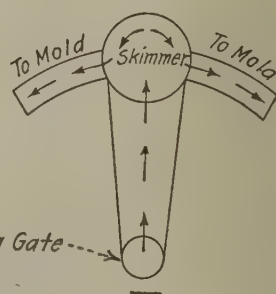
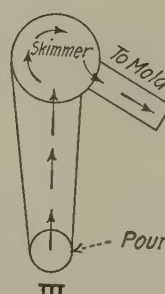
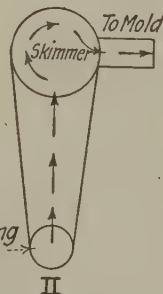
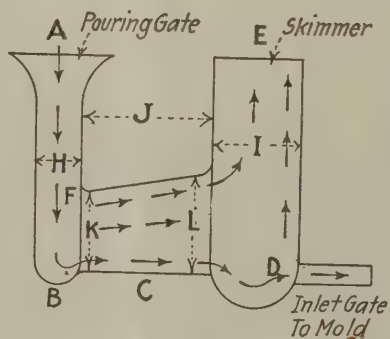
Sketches I, II, III and IV are layouts showing different arrangements for the skim gate. Sketch I is of what might be termed a straight-away skim gate. The metal enters the pouring gate and travels in a straight line to the skimmer, and from the skimmer through the inlet gate to the mold. If the gate is filled quickly enough to choke at *A* this is a very effective gate. But Sketch II shows a more effective plan for skimming. The metal leaving the pouring gate flows into the skimmer and is forced to make a half circle before it can enter the inlet gate to the mold.

This creates a whirling action of the metal and forces all the impurities or lighter substances to the center of the skimmer, which allows them to rise freely to the top of the skimmer. Sketch III shows a more effective plan than Sketch II because the location of the inlet gate leading to the mold is located in such a manner as to create a still greater whirling effect. Sketch IV presents a method used to meet a different problem, where two castings are fed from the same pouring gate and skimmer. The arrows indicate the manner in which the metal enters and leaves the skimmer on its passage to the molds. This plan gives better results than would be obtained if a casting were poured with a gate similar to that in Sketch II.

The whole plan is to design a gate that will effectively choke the metal where it enters the inlet gates that lead to the mold, and at the same time provide a free escape for all impurities collected at this point.

Whirl Gate for Shaft Mold

ANOTHER view gives two cross-sections of a mold for a cast iron shaft or plunger or roller. This casting must be free from defects and should be cast on end in dry sand. The most effective gate to use on a mold of this character, to produce a clean casting, is a whirl gate as shown. Metal poured into the pouring basin *A* flows through the down gate and enters the whirl gate at *B*. It travels through the whirl gate and enters the mold at *E*. The circular view is a horizontal cross-section of the mold, showing the form of the whirl gate at *C*.



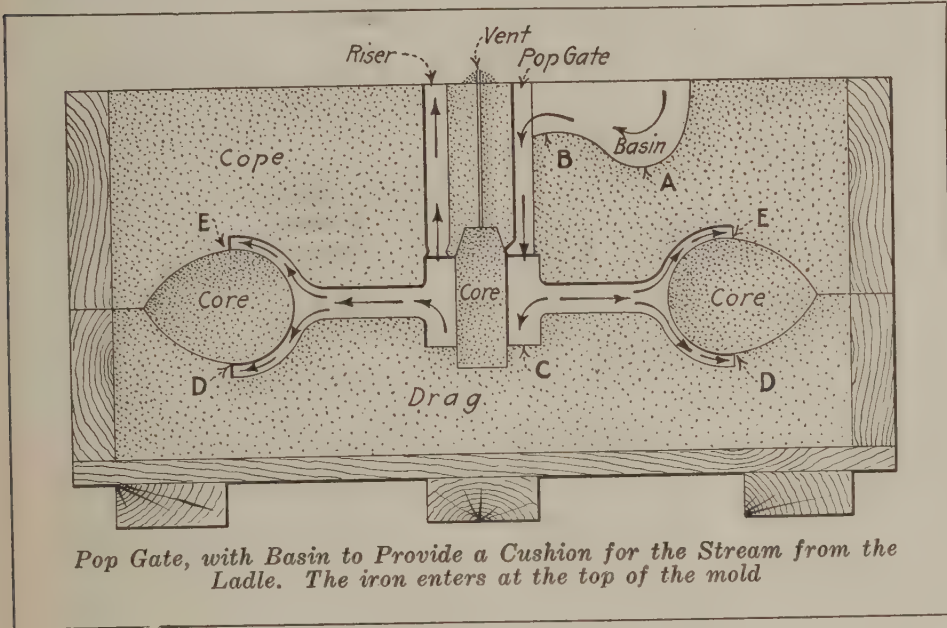
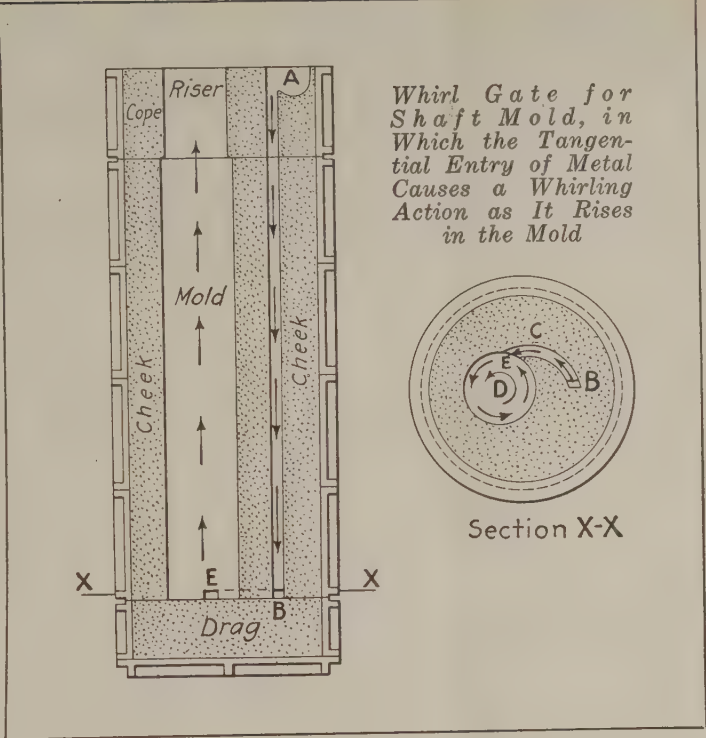
Skim Gate Arrangements, with Vertical Section (at Left) and Four Plans. Why one plan is better than another is explained in the text

The arrows indicate the manner in which the metal enters this mold on a tangent, compelling the metal to travel in a circular path until the mold is filled. This whirling motion forces all the impurities to the center of the column of metal and prevents any of it from clinging to the sides of the mold. The result is that all dirt and other impurities go up into the riser, above the upper limit of the mold proper. When the riser containing the dirt is removed, a perfect, clean casting remains.

Riser Horn Gates

OCCASIONALLY there are cases where a horn gate cannot be used in the drag part of the mold, and neither can the mold be gated on the outer edge, on account of a thin knife edge at this point; owing to the fact that a large riser or feeding head is desired in the solid hub, it cannot be gated in the hub. This condition presents another problem in gating, and the correct method in cases of this kind is the use of what we term a riser horn gate.

A riser horn gate is a horn gate that leads the metal directly into the riser, as shown in the cross-section of a disk mold with a heavy, solid hub. It would be impossible to gate this mold on the outer edge, which is indicated by *E*. Both sides of this disk blade, shown at *DDDD*, must be perfectly clean, which is another reason why the metal should



is the proper gating method used. This is illustrated in the cross-section of a sheave mold. The metal is poured into basin A. The basin must be filled very quickly in the beginning, so as to choke the metal at B, where it leaves the basin and flows through a pop gate down through the bottom of the hub at C. As soon as the hub is filled the metal flows toward the outer edge of the mold, indicated by D, continues to fill the mold up to E, and finally ascends to the top of the mold and up the riser. This plan distributes the metal evenly all over the mold and eliminates the possibility of the casting being thicker at one point than another. That happens often when a mold is gated on the outer edge, as more pressure is exerted there, which tends to strain the mold and make it swell adjacent to the gate.

not enter the mold at any such point as this.

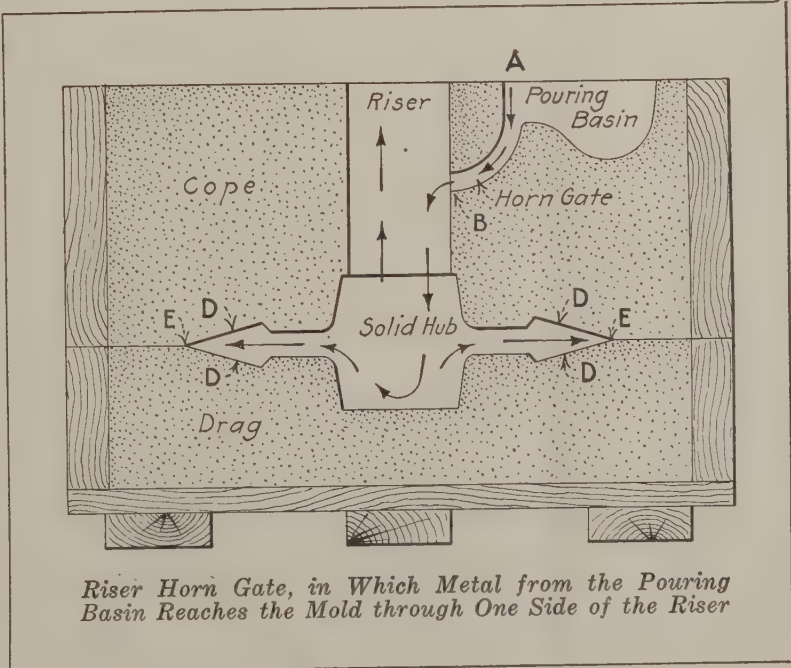
For economical reasons it is not desirable to use the horn gate in the drag, as shown in our other sketch of a horn gate. (Page 945, Oct. 18 issue.)

To insure a solid hub, a riser or feeding head almost as large as the hub itself is used. This prohibits the use of a pop gate on the hub, and the riser horn gate is used as shown. In this case the metal is poured into the pouring basin and is choked at A, where it enters the horn gate; it then flows through the horn gate into the riser at B.

In daily practice, where a large variety of work is made, this combination of riser and horn gate is often very desirable. It is hardly necessary to state that it would be disastrous to attempt to pour a mold of this kind directly through the top of the riser, and expect to get a good casting.

Pop Gate and Runner

IN making molds for sheaves and other castings which cannot be poured at the outer edge, and which cover an area so great as to make it impossible to use a horn gate, the pop gate and runner



In making the pop gate the basin must always be lower at A, to provide the usual cushion for the metal to drop on. Care must be taken not to have the bottom of the pouring basin too close to the upper section of the mold. When the bottom of the pouring gate is too close, gas is confined between the basin and the upper section of the mold, and the result is either the bottom of the basin scabs or the upper section of the mold. If the bottom of the basin scabs there is danger of the loose sand produced finding its way into the hub portion of the mold. If the upper section of the

mold has scabs the casting will be found full of sand holes.

Pop gates as described here can be used effectively on pulleys, gear wheels and similar castings. But more care must be exercised in making a gate of this character than with any other kind. And more care must be used in pouring through a gate of this character, as the only place it is possible to choke the gate and hold back the slag is at the point where the basin enters the pop gate.

(To be concluded)

Gray Iron As An Engineering Material

More Knowledge Needed About Actual Strength in Castings— Vital Problems That Must Be Solved

AT a joint meeting of the Newark Foundrymen's Association and the Metropolitan Section of the American Society of Mechanical Engineers held in Newark, N. J., Wednesday evening, Oct. 24, J. W. Bolton, metallurgical engineer of the Lunkenheimer Co., Cincinnati, was the principal speaker. His topic was "Gray Iron: An Engineering Material."

The first part of Mr. Bolton's address was a brief review of the structure of gray iron, and its relationship to various physical properties. The speaker then devoted the rest of his time to a discussion of the engineering properties. Among the points stressed were the following: Reliability of gray iron castings has improved greatly during the last few years. This is particularly true in foundries utilizing technical control.

The most important theoretical development in gray iron metallurgy is the increased knowledge of the relationship of graphitic carbon to the mechanical properties of the iron. It was pointed out that highest strength irons usually are low in total carbon, with pearlitic or even sorbitic matrix, with small general grain size and, most particularly, with very fine distribution of graphitic carbon. The answer to the problems of cast iron as an engineering material is not universal adoption of higher strength cast irons. It is furnishing the engineer with more complete and accurate information of the various grades of cast iron so that he can make intelligent selection therefrom.

Knowledge of Strength in Castings Essential

Speaking of the necessity for soundness and uniformity it was reiterated that gray iron castings are produced which are as thoroughly reliable as can be cast in any metal. For design purposes the engineer must know the strength of the iron in the castings. The quality of the iron "in the ladle" is of no value to him. It is possible to correlate test bar results to properties of the metal in the castings so that the engineer can obtain a sufficiently close idea of the mechanical properties of the iron in the castings.

Careful analysis was made of the stress strain relationships characteristic of cast steel, gray iron, and bronze. Research by the speaker's company has shown that the initial permanent deformation of cast iron subjected to stress may approach zero on repeated loading. The modulus of elasticity of the material increases. Indeed the metal seems to approach the nature of a truly elastic material. It is suggested that it may be possible that the mechanical properties of gray iron improve under many actual service conditions. Furthermore, if initial set is permissible, the useful stress resistance of the iron may be a high proportion of the initial breaking load.

In a discussion of various other engineering properties

the speaker pointed out the excellent wear resistance of gray irons and deprecated condemnation of all grades of iron for use at elevated temperatures on account of failures occasioned by the selection of improper grades. Many irons retain their strength up to 800 deg. Fahr. and remain practically free from growth at this temperature. The lecture was concluded with the following summary:

Real Questions That Must Be Answered

It would be possible to go on at great length and in detail recounting the various grades of cast iron and their physical properties. But the questions before us are: What does gray cast iron offer the engineer? and how will the foundryman offer the engineer what he needs? Possibly these can be summarized as follows:

1.—Gray iron castings can be and are made with a degree of uniformity and soundness not exceeded by any cast product.

2.—They can be obtained with a tensile strength anywhere from 20,000 lb. to 60,000 lb. per sq. in. Excellent and easy machining grades corresponding to the American Society for Testing Materials high-test specifications of 33,000 lb. per sq. in. are made by many responsible foundries. Other lower strength irons have a wide field of usefulness.

3.—If a slight initial set is permissible, the useful strength of gray iron may be a quite large percentage of its ultimate strength.

4.—The low-carbon high-strength irons resist shock far better than the weaker varieties. The fatigue limit stress of gray irons may be 33 per cent of their ultimate strength.

5.—Gray irons have high hardness compared to their machinability. Their wearing properties are exceptional and deserve more attention from designers.

6.—Better grade irons maintain their strength and hardness well at elevated temperatures. Such irons are not subject to growth at lower temperatures—say under 800 deg. Fahr. for some conditions. The 450 deg. Fahr. restriction seems unfortunate when applied to better grades of iron.

7.—Gray iron resists some types of corrosion very well—for example, concentrated sulphuric acid and various caustic liquors. One comparison with steel is afforded by looking under some of the piers at Atlantic City.

8.—Easy machinability of gray iron has led to some abuses. Close grained tough iron naturally cuts a little harder than inferior grades. Considering its strength and hardness, gray iron machines very readily as compared to some other cast materials. One cannot have his cake and eat it too.

9.—The foundryman should know more about his own product to enable him to market it more intelligently. There are many grades of cast iron, and too little information available on any of them.

10.—The engineer needs more accurate and detailed information. It is up to the founder, through his technical and trade associations, to furnish the proper data. To do this costs money, and a penny-wise pound-foolish attitude is not going to advance the industry.

Points Way to Continued Prosperity

President Schwab Urges Institute Members to Cultivate New Uses for Steel and to Cease Price Cutting and Plant Expansion

COMMENTING on excellent current business conditions, which apparently are unaffected by the coming national election, President Charles M. Schwab of the American Iron and Steel Institute forecast a period of prosperity transcending anything yet experienced. In addressing the thirty-fourth general meeting of the institute at Hotel Commodore, New York, Oct. 26, Mr. Schwab not only emphasized the promising outlook, but urged the need for a policy that will at once give the iron and steel industry its deserved share of prosperity and a more definite assurance of continued good times. There are apparently three ways, he said, in which the industry can be stabilized on a prosperous basis. These are:

1. By stimulating the demand for steel.
2. By discouraging increases in producing capacity.
3. By avoiding uneconomic price cutting.

"For 10 years," Mr. Schwab stated, "we have been struggling to overcome conditions occasioned by the war period. These conditions are largely behind us and we are entering a constructive era of business engineering. . . . Our problems are not essentially different from the problems of other basic industries. They are not insoluble, but they must be solved in the future, as they have been in the past, without unlawful agreement, or collusion. They can and will be solved when we, the leaders of our industry, appraise better fundamental principles of economics, and apply them in our various lines of activities."

Mr. Schwab's address reflected a broad grasp of current business problems in their far-reaching ramifications. He saw in the new attitude of the public and the Government toward so-called "big business" one of the best promises of continuing prosperity. He recognized the stake American business has in maintaining the buying power of American workers. He commended efforts to improve the economic status of the farmer as of prime importance in

achieving a better distribution of prosperity, to the benefit of all classes and all industries.

Must Develop New Uses for Steel

"Much has been done," said Mr. Schwab, "to increase the demand for steel by finding new fields in which it may advantageously be used, but much more can and should be done. An extension of the activities of research departments not only to make improvements in the quality of our products and in the methods of producing them, but also to discover new uses for them, is desirable. A closer cooperation between the producers of steel and our customers, promoting a better understanding of our customers' problems and resulting in our providing steel which will more perfectly meet their requirements will often prevent the customer from seeking substitutes for steel. In these and many other ways the demand for steel can be increased and thus help to restore permanently a proper balance between demand and supply."

Better merchandising, particularly in pricing, was also urged by the speaker.

"If you buy any article of merchandise in a department store," asserted Mr. Schwab, "you know that you are paying substantially the same price that any other purchaser on the same day will pay, and that it is useless for you to discuss the price with the clerk for it will not be changed. The department stores long ago learned the economic necessity of maintaining a single price open to all. The steel industry has never learned this, or, if it has learned it, has forgotten it, and instead of charging a single price open to all, we in the steel industry have been charging many prices, often quoting different customers different prices for the same products on the same day. Such a policy has resulted, and will inevitably result, in harming certain of our customers through price discrimination and

Have Foundation for Unprecedented Prosperity—Charles M. Schwab



OUR country as a whole is still in the high tide of prosperity, and prospects for the immediate future are unusually favorable. The unemployment which existed in some measure a few months ago has lessened. Workers generally are now fully employed and at good wages. The relations between labor and management were never more harmonious, due to the wise attitude of co-operation and conciliation existing on both sides.

Business sentiment is good. This is particularly reassuring in view of the fact that we are to elect a new President of the United States within two weeks. It indicates that there exists little apprehension as to the results of the election and their probable effect on business.

Although we have had several remarkably good business years in this country, fundamental conditions remain sound and I say with confidence that there has been established a foundation upon which there may be built a structure of prosperity far transcending anything we have yet enjoyed.

in hurting ourselves by inviting our customers to haggle over prices, and tempting them even to misrepresent the prices charged by our competitors in the hope of coaxing lower prices from us.

Unjustified Discrimination Should Give Way to Open-Price Policy

"Now discrimination, as between customers, in prices which reflect merely differences in tonnages or differences in the character of service demanded by our customers are entirely proper. But there are other forms of discrimination in price based upon considerations less defensible. It is obvious that, inasmuch as steel is so heavy a product and the freight rate on a long haul bears so important an influence upon the final cost, it is advantageous to consumers and economical to the industry that in the great majority of cases the product should be supplied at a fair price from the nearest available plant. For a manufacturer a considerable distance away to underbid the fair price offered by the nearby plant is obviously uneconomical and tends to indiscriminate price cutting and to cross-hauling, an unwise practice of our industry to which I referred at some length in my talk last May.

"No one will deny that the maintenance by each producer of any basic commodity of substantially uniform prices, at a proper level, is a desirable thing not only for the producers but also for the consumers. Fluctuating prices compel the consumers to speculate on the cost of their raw materials. Such stabilization of prices is entirely possible of attainment without agreement or collusion on the part of the producers. It requires merely a general recognition by the producers of two simple facts, viz.: 1. The steel business is unlike many other industries in that, within certain limits, the demand for steel products is not appreciably affected by the general price level, and, therefore, a general reduction in prices for steel products alone does not result materially in increasing demand; and, 2. It is not possible in a basic industry like ours to make effective for long at any one point two different prices for the same commodity.

"When one producer lowers his price for a particular commodity, that price will promptly be met by his competitors. The net result in the long run is that each producer continues to produce substantially the same percentage of the total tonnage as before, but with a smaller profit margin, and sometimes none at all. I believe that a general recognition of these two facts would go far to remove the first economic cause of our failure to share in the general prosperity of this country, and that the adoption of the policy of open prices, open to all without preference or discrimination, would be of benefit alike to our industry and to our customers."

Favors Moratorium in Plant Building

Construction of additional steel-producing capacity should be discouraged by every lawful means, according to President Schwab.

"The law of supply and demand is inexorable, and if the producers of steel in this country do not voluntarily refrain from expanding capacity beyond the needs of the country, they can expect only one consequence. The law of supply and demand will promptly operate, reducing profits to the extent necessary effectively to discourage new construction, and that conditions will continue until demand has again increased sufficiently to take up the excess capacity. I wish it were possible to have a temporary moratorium on the construction of steel capacity in this country. I firmly believe that, with such cessation of new building, the relationship between demand and supply can thus be established on a basis which will insure fair and reasonable profits in the industry for many years to come, for, while our industry will, I trust, never cease growing, in my judgment the technological developments

resulting in improved processes and enlarged units alone will render unnecessary for a considerable period the building of new plants to meet increased demand."

Mr. Schwab stated that steel-making capacity in the past 12 years had been sharply increased not only by new construction to meet the demands of the war, but by improvements in methods and practices since the war.

"Coincident with this increase in our capacity there has been a smoothing in the curve of demand that has largely eliminated the peaks and depressions in the demand for steel with which the industry was familiar before the war. Whereas formerly demand exceeded capacity during certain periods, it does so no longer, and in more than five years there has not been a time of any substantial length when the capacity of the industry was unable to supply promptly the peak demand. The result has been that at no time in the last five years, until very recently, has the law of supply and demand operated to improve prices in our industry.

Steel Consumption Growing at a Slower Rate

"Along with the large increase in the steel capacity of this country, there has been, and always will be, a steady increase in the demand. But in one respect there has occurred an important change—in the past the rate of increase in demand was very rapid, and demand doubled about every 10 years, an average increase during each decade of 10 per cent per year. No longer does it increase at the old rate. It has not doubled during the last 20 years, and in the 15 years since 1913 it has increased only about 55 per cent, an average increase of less than 4 per cent per year. Consequently, although formerly the normal increase in demand afforded a prompt corrective of an over-expanded capacity, it no longer operates so promptly.

"In other words, we can no longer blindly increase our capacity relying upon the normal increase in demand to correct quickly our errors in over-building. Here is a fundamental change in our industry the significance of which has apparently not been generally realized and the present seems to me a peculiarly appropriate time to urge it upon your attention.

"Following an unusually active summer the steel industry is now operating at about 90 per cent of its capacity, and as we enter the fourth quarter there is every indication of a sustained demand that will insure a high rate of operations for the balance of the year.

"It is now a certainty that the year 1928 will establish a new record in volume of production for the steel industry of the country. Insofar as an increase in demand is the solution of our economic difficulties we are nearer to a proper relationship between supply and demand than we have been since the end of the war. This increase in demand has resulted, as should be expected, in a betterment in prices—virtually the first improvement that has occurred in five years. I hope and believe that there will be a still greater improvement in prices, sufficient to afford to the industry a return upon its investment fairly comparable with that realized by other leading industries.

"But, once a fair price basis is established, how long will it continue? As long, I say, as the proper relationship between supply and demand is maintained."

Mills Should Be Paid for Quality and Service

The price per ton that mills charge their customers is not the main consideration in relations between sellers and buyers, according to George M. Verity, president American Rolling Mill Co., Middletown, Ohio, who also addressed the institute. There is a factor of quality, service and understanding of the customer's product which is far more important. From the customer's point of view an increase in price of \$3 to \$5 a ton is insignificant; he is not interested primarily in the cost of his raw materials, but rather in his total manufacturing costs. The mills, said Mr. Verity, are

entitled to a price for the product itself, and for the quality and service they give the customer. He considered it important that steel manufacturers establish a close liaison with the users of their products.

Speaking of the difficulties that have arisen from surplus steel-producing capacity, Mr. Verity said:

"We must come to the time when the problems of production may be controlled in some legal way that will not be opposed to public interest. It can be done. It must be done."

Commenting on the fact that the steel industry has not been receiving a fair return on its investment, H. S. Wilkinson, chairman of the board Crucible Steel Co. of America, New York, said that he believed a point had been reached when benefits were accruing from the cooperative spirit manifested in discussing business difficulties.

"I believe there is more confidence among members of the steel industry today than there has been since the war," he said. "I believe there is a feeling of confidence in each other that has not existed since 1920. I believe that we are going to have an increased return and that we are entering the greatest era of prosperity since 1920."

While the steel industry will undoubtedly produce a record tonnage this year, with profits above the average, Willis L. King, vice-president Jones & Laughlin Steel Corporation, Pittsburgh, said that a serious problem is still unsolved—the proper merchandising and distribution of its products.

Myron C. Taylor Is Banquet Speaker

The banquet, held in the evening in the Grand Ball Room of Hotel Commodore, broke all records for attendance, with a total of over 1750. The principal speaker was Myron C. Taylor, chairman of the finance committee of the United States Steel Corporation. He paid tribute to the leaders of the steel industry, past and present. He saw an interesting parallel in the lives of Charles M. Schwab and James A. Farrell, both of whom rose from the ranks to leadership in their respective companies and both of whom retained the affectionate regard of their employees. His reference to Mr. Farrell as the "big man of the Steel Corporation

today," was the signal for an ovation that the latter was compelled to acknowledge.

Work, according to Mr. Taylor, is the great secret of prosperity. He saw much to be thankful for in the fact that George F. Baker, Jr., and the younger J. P. Morgan, both sons of extremely wealthy fathers, are devoting their lives to work.

Dr. Eckener a Banquet Guest

Dr. Hugo Eckener, commander of the Graf Zeppelin, briefly acknowledged the cheers that greeted him when he was introduced, and, in discussing the progress in modern air transport, said that dirigibles must, and can be expected to, increase in speed, safety and practicability.

Other distinguished foreigners who spoke were Aloyse Meyer, chairman of the International Steel Cartel and president of the Acieries Reunies de Burbach-Eich-Dudelange, Luxemburg, and Ernst Poensgen, Stahlwerks Verband and United Steel Works Corporation, Düsseldorf, Germany. M. Meyer said that what impressed him most in the American steel industry was the spirit of cooperation and collaboration that existed between management and workers. He called attention to the fact that, in visiting the country making the largest total tonnage of steel, he came from a country with the largest production per capita, 10 tons per year.

Other features of the banquet program were an address by Dr. Harry Emerson Fosdick, pastor of the Park Avenue Baptist Church, New York, and brief remarks by Dr. Elmer A. Sperry, of the Sperry Gyroscope Co.

Gary Medal to Be Awarded in Spring

At the meeting of the board of directors of the institute it was decided to award the Elbert H. Gary medal, for the most notable service to the iron and steel industry, in the spring, and the American Iron and Steel Institute medal, for the best paper of the year, in the fall. E. T. McCleary, president Republic Iron & Steel Co., was elected a director of the class of 1929. The membership of the institute was increased from 1600 to 2000; the number of associate members was raised from 600 to 800.

Abstracts of the technical papers follow:

Acoustic Laboratory for Testing Music and Other Steel Wires

BY WILLIAM BRAID WHITE

THE American Steel & Wire Co. during many years has specialized in the manufacture of wires for the music industries, meaning by that steel wires for pianos, for mandolins, guitars and banjos, for the E strings of violins, and so on. The aggregate amount of the wire thus made may

be called great or little, depending upon whether the output is measured by the ton or by the mile. A ton of piano wire of mean diameter will run to about 70 miles of length.

Piano wire output from the viewpoint of tonnage is, therefore, small, yet when we take into consideration all

BORN in Great Britain in 1878, William Braid White was graduated from Cambridge University. He became interested in musical acoustics more than 25 years ago while acquiring a practical knowledge of musical instrument manufacturing in New York, where he settled 28 years ago. In 1904 he became, and has remained, technical editor of the "Music Trade Review," New York. In 1921 he opened a laboratory in Chicago for the more practical study and investigation of acoustic problems with special reference to piano construction. In 1927 he became acoustic engineer of the American Steel & Wire Co., which position he still holds. He is a member of the American Society of Mechanical Engineers, the American Physical Society, the American Iron and Steel Institute, the American Association for the Advancement of Science, and the American Astronomical Society. He is the author of a number of books and technical papers dealing with subjects in his field.



the piano wire, all the spring wire which is in effect piano wire not up to piano requirements, and add to this all the wire used for musical strings in the smaller musical instruments, we have quite a respectable output. Furthermore, this is not the sort of product which can be turned out by the thousand tons in the certainty of the first and the last inch-length being exactly the same. The making of music wire is something which brings the steel mill and the wire drawer into a contact, far closer than most people would suppose possible, with the science of acoustics and the art of music.

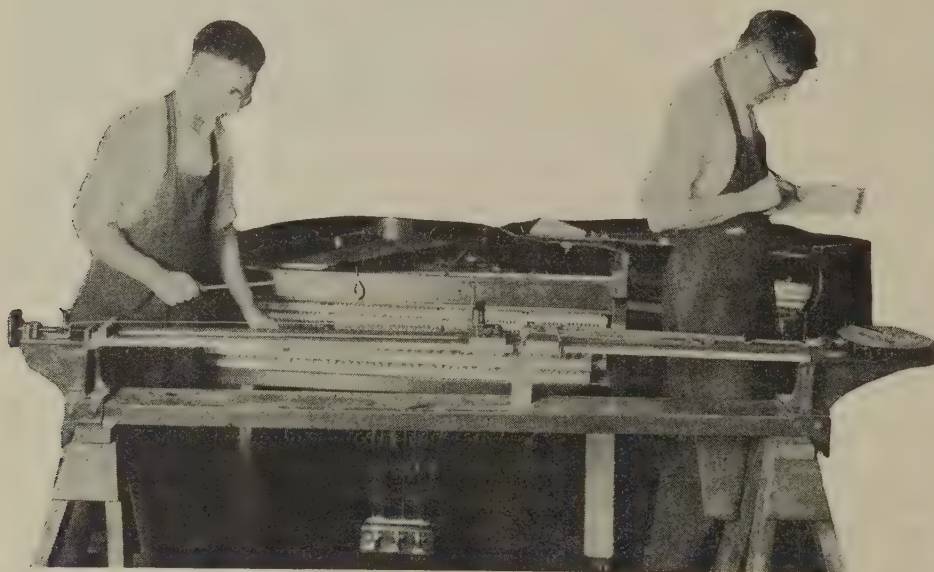
So much has been realized for a long time, and means had been sought whereby closer liaison between makers and users of steel music wires might be perfected, but it was only during very recent years that such a contact became really practicable upon a sufficiently large scale. About two years ago it became certain that the manufacture of music wire would be greatly benefited by the establishment of means whereby the requirements of musical instrument

that it anticipates rather than follows. When a great industry that is an outlet for certain special products of a manufacturer of basic material is in a position where it needs technical assistance, but at the same time is not organized to provide this from within its own resources, it is wise to proffer that assistance if it is possible.

Then, again, when a manufacturer of basic materials discovers that he can learn hitherto unknown but very valuable facts about his own product, considered from the point of view of the user primarily, and only secondarily from that of the maker, he is merely being wise in putting the discovery to account and making the most of it. That is what we have been doing in the field of this extremely specialized and highly organized product, piano wire.

We believe that we have in this laboratory started something new and valuable. The great constituent factors of the steel industry are not in the public mind usually associated with anything so ethereal as sound waves. Yet, if what I have told you has meant anything at all, then surely there is no field more favorable for the operation of the policy of constructive anticipatory research than is furnished by the music industries, the greatest and most important part of which depends absolutely upon steel wire for the very heart of its products. One might indeed speak of "the steel heart of music" and the title would be both appropriate and significant.

There is a last point to be considered, which indeed contains the conclusion I wish



*Measuring Tensions in Steel Wire
Piano Strings in the Acoustic Laboratory*

manufacturers might be more nearly determined, and to some extent anticipated.

We have been much interested in the fight which the American music industries have been making. Realizing that music in America is becoming steadily more important, and that the annual expenditures on music are increasing even faster than the increase of population, we have faith in the future of American music industries. Consequently, when it became evident that these music industries would encounter unexpectedly strong competition, we saw an opportunity to accomplish simultaneously two much needed and rather important pieces of work:

First, to accumulate a mass of much needed facts about the actual behavior of steel wires in musical instruments, to the end of thereby acquiring knowledge which could be put to use to good advantage in our drawing mills.

Second, to furnish through the same methods to the music industries technical assistance to help them to improve their methods of construction, bring their designs and production up to date, build better instruments without increasing costs already high, and in general adjust themselves to new conditions.

It was felt that the only way of increasing the output of music wires was to do whatever could be done to assist the sale of musical instruments, and that this in turn meant, so far as we were concerned, rendering scientific help in the way of research into fundamentals and the development of new ideas that might be of use to the music industries.

[The author then describes the apparatus and methods used in carrying out this research.]

It may now justly be asked: to what is all this leading? In the first place, it is a characteristic of industry today

to draw. The accomplishments of research departments in the automotive, the electrical and the chemical industries have habituated the public mind to the thought of applying scientific methods to large-scale business. Research really means nothing more than fact-finding; and scientific wonders, so-called, are merely the result of applying accuracy and patience, backed up by suitable apparatus, to the task of finding facts. Today we live in an age of substitutes and adulterants as well as of new discoveries and new applications of old ones.

No industry, however well founded it may think itself to be, can afford to neglect the possibility of some future, perhaps already imminent, form of competition arising from new discoveries in synthetic chemistry or in applied physics. Did the wire industry foresee that hairpin wire, for instance, would suddenly cease to be an important product? I could multiply examples, but my meaning will be understood. I say that today every great industry must face the fact that the application of scientific method is turning things upside down all over the world, and that no amount of good will, no magnitude of operations, no apparent essentiality of product, can render any industry safe that does not take into account the possibility of substitutes arising to steal away its most profitable markets overnight.

The research that you have seen and heard described may seem but a small thing; but it gives an idea of the field that is open to development. It is plain that industrial policy during the next few years must run in the direction of determining scientifically better methods of manufacture, reducing costs and improving product, while continually maintaining a contact through technical service and anticipatory research with the minds of customers, ascertaining

not only their wants of today, but their probable wants of tomorrow.

Opinions of Piano Makers and Users

FOLLOWING a very interesting and somewhat extemporaneous presentation of the paper by Mr. White, accompanied by an exhibition of some of the apparatus used in his laboratory, Ernest Schelling, an eminent pianist and composer, played two compositions upon a grand piano, the strings of which had been scientifically investigated by the methods illustrated by Mr. White. Preceding the playing, Mr. Schelling voiced his thanks that this is not entirely a wireless age and stated that in playing the Polonaise by Chopin, it was estimated that the energy expended by the pianist was equal to that necessary to lift two tons one foot. Mr. Schelling then performed in his masterful manner this classic composition by Chopin and later played as an

encore the "Bells at Ragusa," a place located along the shores of Dalmatia. This was presented by Mr. Schelling as an illustration of over-tones and it is understood that it was his own composition.

Commenting on Mr. White's paper, Paul H. Bilhuber, assistant manager of the factory of Steinway & Sons, New York, said that piano makers are demanding a better wire and that the cooperation between them and Mr. White's laboratory was resulting in mutual benefit. The problem before the industry was the securing of a rust-resistant wire, and he said that he felt if an alloy steel wire could be successfully produced which would be suited both for tonal effect, as well as strength, it would be superior to the present article. Wires plated with cadmium, tin and zinc had been tried, but were unsatisfactory, due to a tendency to chip and other defects. Mr. Bilhuber said that plating wire with chromium was a possibility on which more work is necessary to ascertain whether the tendency to inferior tonal results could be overcome.

Uniformity, Continuity and Magnetic Testing

BY A. V. DE FOREST

A MOVING picture constituted the principal part of the paper by A. V. de Forest. It was accompanied by explanatory remarks as the various features of certain phases of the magnetic testing of steel were unfolded on the screen. In substance Mr. de Forest said:

The term uniformity is used to mean the similarity in composition, grain structure, strength, hardness, etc., that is obtained in different pieces of steel or different portions of the same piece. Continuity on the other hand is a question of the physical integrity of the material—the absence of seams, transverse fissures, unwelded blow-holes and mechanical imperfections in general.

The usual methods of test, chemical, microscopic and mechanical, assume uniformity between test specimen and product. This assumption can be verified and large quantities of material tested by non-destructive magnetic methods. In general, different methods must be used to distinguish discontinuity from non-uniformity. The nature of the product will determine the most advantageous form of test. In some cases both are necessary.

The moving picture shows the various ways of making magnetic tests, and the kind of information that may be gathered with the different methods. The oscillograph record of the varying magnetic properties of a spring is shown as usually plotted against a continuous timing line,

and also in the form of a cyclogram or closed loop using a harmonic timing line. The mechanism of the alternating current galvanometer with separately excited field was described and the valuable features of this form of test were indicated.

Locating Fissures in Steel Rails

SOME of the recent results which have been obtained by a new method of locating defects in rails were described by Dr. Elmer Sperry of Brooklyn, after the presentation of Mr. deForest's paper. Doctor Sperry recounted some of the early history of efforts to locate fissures in rails by magnetic analysis and mentioned the work of the Bureau of Standards and some American inventors. He said that in order to show up the true inwardness of a bar of steel, it is really necessary to submit it to electrical energization, and he said that it was on this principle that his new apparatus had been constructed after consultation with various scientists in this country. It had been found by the use of this apparatus that fissures in rails can be accurately located within 1/32 in. of the actual place where they exist. It is accomplished by passing 2000 amp. of current through the rail which, if the rail has no defects, will record a straight line on the recording apparatus, but if there are



FOR a number of years A. V. deForest has been studying the magnetic properties of steel and, more especially, the correlation of these properties with metallography and physical properties. He is recognized as one of the leaders in research work in this field in the United States. He was graduated from the Massachusetts Institute of Technology in naval architecture in 1912 and was with the New London Ship & Engine Co. for a year, after which he became an instructor in civil engineering at Princeton University. Later he studied metallography at Princeton and Columbia Universities. He then spent two years in the research department of the Remington Arms Union Metallic Cartridge Co. In 1918 he assumed his present position as research engineer with the American Chain Co., Bridgeport, Conn.

any defects, the current is obliged to pass around them and thus immediately the location is recorded. By special equipment the rail is marked with white lead at the point where the defect is revealed. Doctor Sperry illustrated some parts

of his apparatus by slides and said he felt that the problem of detecting unsound rails had been solved. A detailed description of his new apparatus will appear in a later issue of THE IRON AGE.

Present Status of Structural Steel Welding

BY F. T. LLEWELLYN

SEVERAL questions were asked two and a half years ago by I. H. Edwards, chief engineer American Bridge Co., that have formed the basis of an extended research, under the latter's chairmanship, by the American Bureau of Welding. This investigation (which is yet uncompleted) covers 57 forms of simple joints in 191 sizes, welded by gas or arc. In order to determine the degree of uniformity of commercial practice that may be expected, multiple specimens are being made by 36 representative fabricators, governed by uniform procedure and inspection regulations. In the light of such results as are now available, and of the common experience of the welding industry, the answers to the questions are as follows:

1. *Can standard grades of steel be satisfactorily welded?*

The unqualified answer is "Yes" for structural steel conforming to Specifications A-7 or A-9 of the American Society for Testing Materials. The weldability of these goods is established by thousands of tests, and by satisfactory service of welded joints in important commercial structures in every section of the country. Proper welding wire must be used. (The discussion is confined to direct-current metal-arc welding.) The wire used engraves its indelible signature on the weld. American Welding Society Specifications E1A (maximum carbon, 0.06 per cent) or E1B (carbon, 0.13 to 0.18 per cent) will prove adequate.

2. *What effect will the welding operation have on the base metals that are to be united?*

The answer is that it will have no harmful effect—certainly not if the base metal is mild steel. This feature can be presented more clearly with the aid of a diagram drawn to an enlarged scale. Referring to the weld as a whole, it has been well said that welding wire normally deposits a soft steel that is purer than its source. This refers to the typical zone in the body of the weld. The transition zone never attains a thickness of 0.04 in., and only about 0.01 in. consists of the portion where there is interpenetration of base and weld metal. It is sometimes invaded by impurities from the base metal, but no impurity in the weld metal ever penetrates beyond the transition zone into the base metal. Therefore any effect of the welding

operation on the base metal beyond must be merely a thermal one.

Micrographs show that the transition from base to weld metal is marked by a reduction in grain size, that is to say, by a refining effect, but it is also sometimes accompanied by more slag inclusions than occur in other portions of the weld. In welds properly made, with good wire, these inclusions are too minute to be visible to the naked eye and should not be considered as serious defects. They do mean, however, that the metal in this zone is 70 to 85 per cent as strong as that in the body of the weld.

This weaker zone is compensated for by providing contact surfaces that are greater than the throat dimensions. In triangular fillet welds the ratio of the leg of an isosceles right triangle to the normal to its hypotenuse is happily greater than is required.

Reverting now to the thermal effect of welding: The heat is conducted across a much narrower belt than is commonly supposed. While the temperature of the arc is high, its duration at any point is brief. The base metal is raised to a bright red color over a belt whose width varies with its thickness and with the volume of the weld. It then cools freely in the air. This means that near the weld the piece undergoes precisely the same treatment as would normalize mild steel.

While this indicates that the welding operation has no harmful effect on the base metal, and why rupture (in the base metal) is more apt to occur near the weld rather than at a remoter point, it does not explain why rupture is less frequent in the weld itself. The reason is that while ordinary weld metal has a somewhat lower ultimate strength than the base metal, it has a much higher yield point. Therefore, necking, and consequent rupture, is apt to start in a normalized part of the base metal rather than in the weld.

3. *Can methods of making welds by different processes be standardized?*

The answer to this question is "Yes"! Specifications covering the making of welds by the direct current metal-arc process, and by the oxy-acetylene gas process, have



BORN in Cardiff, Wales, F. T. Llewellyn was educated in Welsh and English schools and came to this country late in 1890. His first position was in the structural steel department of the Gillette-Herzog Mfg. Co., Minneapolis. Later he was representative of this company in New Orleans, La. He supervised the first skeleton tier building in that city and the first steel frame building in Louisiana. From 1906 to 1917 he was engineer in the New York office of the Carnegie Steel Co., devoting his attention to the development of new products. In 1917 he was loaned to the Emergency Fleet Corporation and devoted his attention to the simplification of steel requirements for ships, and in allotting steel to shipyards. From 1919 to date he has been attached to the president's office of the United States Steel Corporation, and has concerned himself with new products, especially in the structural field. Mr. Llewellyn is a member of many of the American technical societies and clubs, and is president of the American Welding Society.

already been prepared by the Structural Steel Welding Committee. Already we are using $\frac{3}{8}$ -in. fillets as standard in much the same way as $\frac{3}{4}$ -in. rivets have been standard.

4. Can values be fixed on some unit basis for the strength of the more usual types of welded joint?

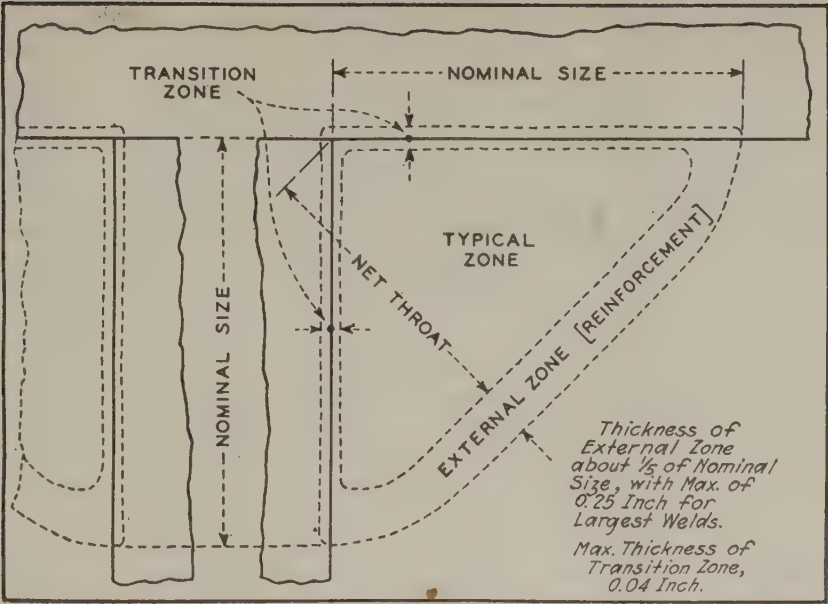
To this question a qualified answer is given. For quiescent static loads, "Yes"! For dynamic loads, "Probably Yes"! Welded joints subjected to considerable shock require further investigation. It does not follow that welded joints are unsuited to resist shock. Many structures are now in use where they perform this function very efficiently. It is a fact, however, that knowledge as to their precise behavior under shock is limited, and the need for further study along this line is urgent.

In order that working values may be useful they must be expressed in units that can be readily checked in shop or field operations. For butt welds the throat area is a suitable criterion, disregarding any reinforcement. For fillet welds in practice it seems advantageous to express values in terms per linear inch for each size of weld. The figure shows gages used by the Newport News Shipbuilding & Drydock Co. for some years, and the method of application. Checking the number, length and location of welds is also essential.

Allowable working unit values for fillet welds appear to be crystallizing at about 28 per cent of the ultimate strength under shear of the neat weld metal. This percentage assumes the depth of throat to be the minimum permitted by the gages. Thus, a value of 3000 lb. per linear inch is in frequent use for the popular $\frac{3}{8}$ -in. fillet. Since the yield point of structural steel is much lower than that of weld metal, the same factor of safety (figured on the ultimate strength) will give a bigger margin in the joint before permanent set occurs under working loads.

5. Is there some way of determining the reliability of the completed weld?

This is doubtless the most important question to be answered. From a rigorous standpoint Mr. Llewellyn believes that we can no more be certain that a specific portion of weld is sound, without destroying it, than we can tell whether a specific rivet fills the hole, without destroying it. Expressed conversely, it is just as possible to determine the reliability of a completed weld as it is possible to determine the reliability of a riveted joint.



Diagrammatic Section Through Fillet Weld

We have confidence in rivets, and rightly so, not because the inspector's hammer rings true when applied to their heads (it is well known that a poorly driven rivet can be given a resonant head), but because we have used them with satisfactory results over a long period. Confidence in rivets has been a thing of growth. Thirty-five years ago all structural specifications limited field rivets to only two-thirds the value allowed for shop rivets. Today that classification has gone, and the distinction is between hand-driven and machine-driven rivets. We have acquired confidence in the machine-driven rivet.

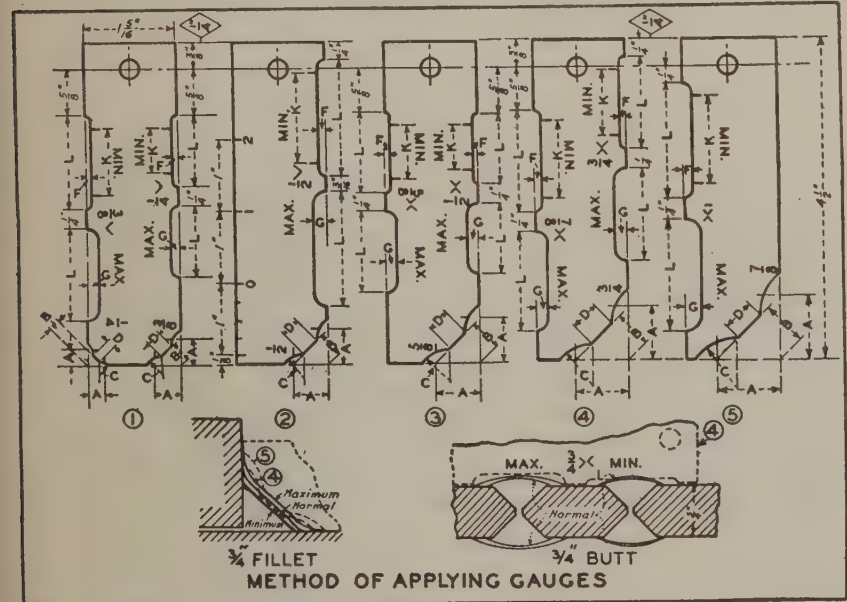
"If welding is to be considered seriously as a structural tool, similar confidence in its results must be given opportunity to develop." He cited the following means for attaining that end: (a) By familiarity with the process in the shops. (b) By removal of short sections of the joint for examinations, (c) By proof loads. (d) By testing the welder's qualifications. (e) By using proper welding wire.

6. Can the welding operations be done at a competitive cost?

With fabricating shops organized along existing lines in which welded jobs are undertaken only occasionally, competitive costs can be secured (a) on low beam-and-column buildings whose details are sufficiently simple to permit the rolled steel members to be shipped unfabricated from the mill direct to the site; (b) on shop-welded structures where savings in weight are securable, notably in truss-work wherein the net section of tension members is a criterion and where gusset plates and other expensive details can be largely eliminated; (c) on existing bridges and other structures which require reinforcement to meet added loadings.

On the other hand, competitive costs may not be securable on tall beam-and-column buildings, whose details require shop preparation, until such time as there is enough business of this character to occupy a shop continuously.

"There is a class of tall beam-and-column buildings which can be welded with advantage, regardless of present costs. This class embraces additions to buildings already occupied, where the elimination of noise during construction has real monetary value. Hotel owners are becoming alive to this feature and it is also a factor in some other commercial buildings, as well as in the case of hospitals and colleges. The saving of space during alterations, and the smaller amount of demolition made possible by welding,



Gages for Fillet and Butt Welds

also make this process economical as applied to the detailed connections of a new to an existing structure."

Other Welding Problems Mentioned

SOME further problems are worthy of study, said Charles Schenck, production engineer, Bethlehem Steel Co., Bethlehem, Pa. First, relative corrosion of weld and base metal. His experience indicated that welds made with standard bare wire rusted rapidly; coated or covered electrodes were more resistant. Meanwhile paint could be relied upon to keep this corrosion in check. Second, the scattering results of published fatigue tests on welds indicated that none of them could be relied upon. Here again, coated electrodes seemed to give better results, but the matter needs to be investigated. Third, low impact values of electric welds seem to be associated with the so-called tearing tendency of weld metal. Whether this can be improved by depositing cleaner, sounder metal, or by a different design of joint should be determined. Fourth, something ought to be known about the reason why light welds withstand higher unit shearing stresses than heavier beads.

Lastly, a similar study should indicate the reason why short welds are stronger, per unit, than long welds. Until these last two questions are answered, designers will rely upon "skip" welding, that is, getting the necessary strength by a large number of short, small fillet welds.

George H. Danforth, contracting engineer Jones & Laughlin Steel Corporation, Pittsburgh, said that his company had experienced great satisfaction in building welded structures when careful attention is given to details to simplify the design to avoid a multiplicity of small parts, and to provide for mill variations in lengths and section size. He described in some detail the building erected for the Westinghouse company at Derry, Pa. (see *THE IRON AGE*, Oct. 6, 1927, page 944). More recent experience convinced him that that building had two times as many erection bolts as necessary. In one recent plan examined there were only 15 holes for connection of companion material required on 484 purlins. In his experience one welder per 100 tons of steel would give a good erection rate, especially since no scaffolding would ordinarily be required. Recently he had offered \$5 a ton concession to be permitted to weld a 1-story shop building.

Steels Used by the Automotive Industry

BY W. J. MACKENZIE

AUTOMOTIVE steels in general use today are the nickel steels (S.A.E. 2000 series), chromium-nickel (S.A.E. 3000 series), chromium-molybdenum (S.A.E. 4000 series), chromium (S.A.E. 5000 series), chromium-vanadium (S.A.E. 6000 series), silico-manganese (9200 series), and the manganese steels (G.M.C. 1300 series).

The bulk of these steels are made by the basic open-hearth process. The figures for 1927 show that approximately 81 per cent of the total tonnage of alloy steels of all types was made by this process. This 81 per cent is to a large extent used by the automotive industry. Briefly, the basic open-hearth alloy steel process consists of producing a super-refined carbon steel, during or at the completion of which refining period the alloying elements are added.

Steels of Homogeneous Character

Close chemistry is not enough. To satisfy the industry (whose demand is for maximum freedom from segregation, the utmost in soundness, the minimum amount and size of non-metallic inclusions, controlled grain size, and all the other modern requirements of quality steel) much has been

learned, but a great deal still remains to be worked out.

High physical properties are necessary to resist the wear, fatigue and complex arrangement of dynamic stresses which obtain in the members of a light-weight, high-speed motor car. As an example, we produce daily a common S. A. E. alloy steel for gears which, with a single treatment, shows physical properties of 275,000 to 300,000 lb. to the sq. in. tensile strength, and a reduction of area of 35 to 45 per cent, at a minimum Brinell hardness of 500.

The automotive engineer today designs his parts with full confidence that the steel specified, when properly treated, will have the desired physical properties—i.e., will do the work intended. This is the result of years of experience and cooperation with the steel maker. Present chemical and physical specifications have been the outgrowth of this experience.

Uniformity a Prime Essential

Steels of uniform properties are necessary to the manufacture of parts which are to be free from distortion, and of suitable physical strength after the mass-production methods of fabrication, treating and testing employed to-



AFTER being graduated from Harvard in 1913 with the degree of B.S., W. J. MacKenzie went to work for the United Alloy Steel Corporation, Canton, Ohio. He was associated with that company in various capacities until he joined the Central Steel Co. at Massillon, Ohio, when that company started operations. After spending about a year and a half at Massillon, he returned to the company at Canton with which he was first associated, where he stayed until May, 1918. In that year he joined the newly formed alloy steel organization of the Interstate Iron & Steel Co., Chicago, with which he has been connected until the present time. Mr. MacKenzie is now vice-president of the company.

day. The automotive manufacturer can meet his schedules, calling for thousands of cars a month, because he gets uniform steels.

He knows he can set his automatic machines to get hundreds of machined parts per tool; he knows that all he has to do is to set his heat-treating furnaces at certain prescribed temperatures and day in and day out he will get finished parts of uniform physical properties. He has made an immense saving in time and money. I know of one large manufacturer who uses cold drawn nickel steel instead of plain carbon steel, which has all the strength required, because he can get a greater number of finished parts at a lower cost from the alloy steel, due to its uniformity.

[The author here launches into a consideration of the more important of the S.A.E. steels, of which he gives a comprehensive table. He tells what each type can be expected to do, where it is employed and how it is heat-treated.—*Editor.*]

Specifications Not What They Might Be

IN discussion of Mr. MacKenzie's paper, Dr. John A. Mathews, vice-president Crucible Steel Co. of America, remarked that standard specifications usually are com-

promises and rarely are entirely satisfactory to either maker or user of the material. Ordinarily they do not result in furnishing the highest grade of material. The speaker quoted from typical specifications of a generation ago, in which demand was made that "all seams, slivers, slag, dirt, etc., etc.," be eliminated from the steel. More recently certain specifications have required that the steel be a "perfect steel." Any material which can be manufactured commercially can with strict interpretation of either of these requirements be rejected, and this might easily happen on a falling market or on a long inventory.

Preparations are being made by Engineering Foundation to study the entire range of alloy steels. When the survey of our present knowledge on the subject has been charted, there probably will appear certain gaps. These will have to be filled in by special investigations. Then, with considerable assurance, it will be possible to select specific steels for special purposes and not leave the matter so much to chance as at present. Purchasing agents now often make selections of material with which they have become familiar; this, in the first instance, usually involves having had it recommended to them by the seller. This practice is not in the interest of best work and should be abolished in favor of intelligent selection from known characteristics of the material.

Observations on European Iron and Steel Conditions

BY C. A. MEISSNER

ITALY, France, Switzerland, Germany and Luxemburg give a first impression of general recovery and improvement in living conditions, and certainly in many respects improvement in industrial conditions.

About 50 per cent of all rail ties in Germany are made of steel and it is proposed by the Government Railways to increase this proportion to about 66 per cent of the total. Great attention is paid to the manufacture of steel rails and fittings, and the road beds admit in many cases of heavy trains running 50 to 60 miles an hour. There are through trains of steel construction, commodious and comfortable.

Rails up to 90 ft. 9½ in. are rolled, the long length being used more and more. All rails are straightened on roller straighteners, which seem to give satisfactory results and eliminate hand straightening, except for occasional twisted rails. Large section rails have about 0.5 per cent carbon and 0.40 to 0.60 per cent manganese.

An interesting feature in Italy, and really through a great part of Europe, is the intensive use of cable bucket

systems carrying materials from the docks and stock piles to the plants. Also, in many cases, long-distance cable systems were seen for minerals, lumber and other materials.

Large Blast Furnace Outputs

At Hamborn furnaces, near Düsseldorf, daily average production through a year on 16-ft. 5-in. hearths, in good condition and with good ore mixture, has been as high as 835 tons. This they attribute largely to the open nature of the burden. Daily averages for a month are sometimes as high as 850 tons and have reached 920 tons. Productions of 950 to 1000 tons are occasionally made for a day or two. The present daily average production, because of poor ore mixture resulting from the Swedish mine strike, is 700 tons. Average production for a campaign is about 1,200,000 tons. Varying amounts of sinter are used.

On good ore mixture slag volume is about 1100 lb. per ton of iron. On present poor ore mixture it is about 1760 lb. On good ore mixture the coke rate is from 1716 to 1870



SINCE 1905, or for 23 years, Carl A. Meissner has been chairman of the blast furnace, coke oven and open-hearth committees of the United States Steel Corporation at 71 Broadway, New York. He received a degree of Ph.B. from the School of Mines of Columbia College in 1880, and in 1915 the same institution bestowed upon him the degree of M.S. His first position in 1880 was assistant chemist, Joliet Steel Co., Joliet, Ill., and between that time and his connection with the Steel Corporation in 1905 he held positions with the Brier Hill Iron & Coal Co., Youngstown, Ohio; Vanderbilt Steel & Iron Co., Birmingham, Ala.; Londonderry Iron Co., Londonderry, Nova Scotia; Dominion Iron & Steel Co., Ltd., Sydney, Nova Scotia, and other Canadian companies. He is a member of several American technical societies and has published a number of articles on technical subjects.

lb. per ton on larger furnaces, depending, of course, on age of furnace.

Blast temperature is generally 950 to 1100 deg. Fahr. throughout Germany; higher heats slow the furnaces down too much. Hamborn is using 1200 deg. Fahr. However, one plant at Saarbrücken, France, expects to go to 1550 deg. Fahr. on minette ores and sinter. The general feeling is that there is no limit to stove heat, up to what the furnace will take without slowing down.

Cleaning of blast furnace gas by electrical precipitation is arousing a great deal of interest throughout Central Europe. Among the reasons given for this interest are the following:

1. Power consumption of electric cleaning is about one-tenth that of wet washing.
2. Cost of sludge disposal from wet washers is high.
3. Difficulty of waste water disposition is serious in some sections.
4. Shortage of water at some plants makes wet washing objectionable.
5. Several plants are putting in turbo-blowers and so do not need such clean gas as would be required for gas engines.
6. The saving of sensible heat, even after gas is partially cooled in primary coolers, is considered to more than offset the extra moisture carried by the gas.

Ferromanganese at 300 Tons a Day

One blast furnace making ferromanganese at Meiderich is noted in Europe for its large production. Hearth diameter is 11 ft. 6 in.; coke rate, 4070 lb. per ton; production, 280 to 300 tons a day of 78 per cent ferromanganese. The stove heat is 1380 to 1425 deg. Fahr.; pressure, 13 lb. per sq. in., with whatever wind this pressure will allow. Furnace volume is 15,885 cu. ft.

Ores used are 60 per cent Indian, containing 49 per cent manganese and 5 per cent iron; and 40 per cent Caucasian. Slag contains about 12 per cent Mn and is used in blast furnaces for manganese addition.

The largest furnaces in Luxemburg make about 350 tons a day. Hearth diameter is 16 ft. 5 in. A furnace with 19-ft. 8-in. hearth is now being built at Dillingen and a production of 450 to 500 tons per day is expected from it. This furnace will have skip filling. Some minette ores used have 26 to 28 per cent iron, with enough lime to be self-fluxing. There are also silicious minettes which require lime additions or are mixed with limy minettes.

Tilting Open-Hearth Furnaces Used

The Hamborn open-hearth plant furnishes about 35 per cent of plant steel requirements, the other 65 per cent being basic Bessemer steel. Four 80-ton tilting basic furnaces yield about 100 tons each. Fans are used for blowing the air in, and for drawing out the waste gases. Large checker chambers are used, which take the heat out of the waste gas to about 600 deg. Fahr., so the waste-heat boilers formerly used are now blanked off.

Fuel is mixed by-product and blast furnace gas, averaging one part by-product to two parts blast furnace. No special valves are used, the by-product gas being put into blast furnace gas main in quantity desired, just before checker chambers, so that the mixture is heated.

At Hoentrop is the newest and finest open-hearth plant in Germany. The buildings are high and large, of reinforced concrete and steel construction, as are also the bins for storage of ore, dolomite, etc. There are four basic tilting furnaces, two of 120 tons, one of 180 tons and one of 200 tons capacity. Tilting is done by one 100-hp. electric motor per furnace.

Revolving overhead charging cranes are used, though admittedly slower than floor cranes. Scrap is stored in bins beside the furnace floor, and cranes load it directly into the charging boxes, which sit on a platform opposite each furnace. The whole charge is made up on this platform, so there are no tracks in front of the furnaces. Hot metal is stored in a mixer at one end, and carried to the furnaces by the pit crane, to be poured in at the tap hole.

Exceptionally heavy water-cooled port castings are used. Front walls, as well as back walls, are of magnesite brick and roofs of arched silica brick. They figure that flat suspended roofs are more expensive to install and repair. Three water-cooled pipes between water-cooled door frames serve to hold the front walls in place. Total brick consumption is 17.6 lb. per ton of steel.

Large checker chambers are used, about 23 ft. high, with 2½-in. checker brick and about 4-in. openings. The waste gas is about 850 deg. Fahr., so no boilers are installed. Checkers are heated to 2000 to 2200 deg. Fahr., measured by recording pyrometer with fire end projecting through top of the end wall.

Ladles of 60 to 70-tons are used in the pit, two ladles for small furnaces and three ladles for big furnaces each heat. Charges average 20 per cent pig iron and 80 per cent scrap; the cost of each is about the same. A typical charge on the big furnace is:

7,000 kg. cold pig iron
30,000 kg. hot pig iron
177,000 kg. scrap.

214,000 kg. total, or 214 metric tons

Manganese content of the pig iron is 4 per cent, because the large scrap charge only runs about 0.4 per cent manganese and they want an average of 1.5 per cent in the total charge for good steel. The steel all goes into seamless tubes with 0.40 to 0.48 per cent manganese, so they add some manganese ore in the bath before tapping.

There is a somewhat greater tendency to use tilting furnaces in Europe than in this country, due to some extent to the use of higher-phosphorus materials and the ability to regulate slag conditions more carefully. Such furnaces appear to answer their needs to somewhat greater advantage than the stationary type widely used here. The percentage of pig iron and analyses of materials used here are important factors.

Water-cooling of furnaces is not so widely practised as in America, though the more recently constructed units have made provisions for cooling. The newer units more closely approach American standard practice, the buildings being of heavy type, with ample provision for stocking and charging, and roomy pits and pouring platforms.

Outstanding features noticeable during the visits included a strong tendency to Americanize the plants; especially the blast furnace plants, by following our blast furnace lines, and, in some cases, our methods of construction. In the coke oven plants we saw a number of modern American type ovens, all built with the idea of utilizing all of the rich gas in the steel mills or for public service, and heating the ovens with either blast furnace or producer gas.

[Abstracts of papers by H. J. French on "Steels Required in the Aircraft Industry," and by Dr. W. H. Hatfield on "Rust, Acid and Heat-Resisting Steels," had to be held for printing in a later issue of THE IRON AGE.]

Commerce Year Book, 1928

A wealth of information regarding the physical state of the United States is contained in No. 6 of the series of Commerce Year Books, issued under the auspices of the Department of Commerce, Washington. The volume includes 728 pages of statistically and graphically presented data, with explanatory text, and a 10-page index.

Production, employment and domestic trade occupy the leading position, with prices, foreign trade, agriculture, fuels, construction, metals, machinery, automobiles, rubber, textiles, leather, paper and printing, chemicals, transportation and banking and finance following, in that order.

Intensive study of a work of this sort would give to the reader a detailed knowledge of the resources of the United States and their exploitation that could scarcely be gained in the same amount of time elsewhere. This is Vol. 1, referring to the United States.

See Good Machine Tool Prospects

Outlook Found Promising at Convention for Business, for Further Standards, for Cooperation with Machinery Builders and for Better Trade Practices

MANUFACTURERS of machine tools held a successful meeting, the twenty-seventh annual convention of the National Machine Tool Builders' Association, at Sky Top Lodge, Cresco, Pa., Oct. 23 to 26, inclusive. It was successful from the standpoint of attendance, more individuals representing more companies being present than hitherto. It was successful also in a detail of prime importance—the meetings of the groups making different classes of machine tools, wherein were discussed trade practices, standardization and other topics spelling the advance of the industry.

In the general sessions, the items of chief importance brought before the membership were these: A suggestion that arrangements should be made to bring about a coordination among different groups of machinery manufacturers, to cover matters of common interest, this topic espoused in part by H. B. Kraut, vice-president Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; an address by H. I. Shepherd, vice-president Guardian Trust Co., Cleveland, pointing out the avenue of desirable relations between the manufacturer and the banker; specific recommendations in respect to standardization as outlined by the association's standards committee; a further discussion on the cooperation among trade associations by Dr. Hugh P. Baker, manager trade association department, Chamber of Commerce of the United States, Washington, and the procedure in machine tool accounting as now in the hands of the association's staff cost consultant, Albert E. Grover.

Industry Is Notably Active

High spots of the achievements of the association and the machine tool industry in the past year were brought out in the annual report of the general manager of the association, Ernest F. DuBrul. These are in part as follows:

The association's index of orders for each month of the last nine has run decidedly higher than for any similar period since the post war boom. In eight months up to Sept. 1 the index indicated a greater business booked than in all of last year. "Just when things are looking the rosiest, we begin to hear that deliveries are being delayed because of lack of skilled labor. So now again, as in the past, when the industry is getting a good run of orders, a short labor supply becomes a factor limiting its production.

"General business is decidedly active, and so far as can reasonably be forecast now, this activity should continue for some months. At this time, when things seem most favorable, it is not pleasant to comment on signs and portents of an unfavorable nature; yet there are such and we should not neglect them. The stock market situation is one factor that probably will react unfavorably on business. It is mere prudence and not pessimism to base our policies on a theory that some sort of slump is not far off, and that it may be somewhat bad. Then if it does not come in the near future, or if it is not bad when it comes, we will be that much more to the good.

"The wise policy is to keep inventories close to demand, and if demand goes down to let inventories also go down. Experience has shown that even with the most careful scheduling the inventory of a machine tool company is a hard thing to control in proportion to a diminishing demand. When you see our index slipping off you can adjust yourselves to the general condition with sure knowledge."

Mr. DuBrul pointed out that group activity is increasing at a very satisfactory rate and that group statistics are increasingly in demand.

In referring to the engagement of Albert E. Grover, as the cost consultant for the members, he said Mr. Grover has a slogan "that is so good that I cannot resist the temptation to give it here. He advances and proves this thesis: 'Effort Expended on Inaccurate Costs is a Complete Loss.'"

Machine Tool Show Next Year

Reporting for the exposition in Cleveland next year, he said that applications for space began coming in as soon as the blanks were sent out on Sept. 15. "In less than three weeks these totaled 80 per cent of the space used last year. In a week more, the applications overran last year's space and before the fifth week passed the applications were 13,000 sq. ft., in excess of what we used last year. This again was without any solicitation. Numbers of our previous exhibitors have applied for more space than they used last year, and many applications have come in from concerns that had not been in last year's show. Everything indicates that our 1929 show will be another tremendous success."

As it looked at the time of the meeting the members of the association will need all of the 60,000 to 65,000 sq. ft. of the main building, while non-members have asked for

some 9000 sq. ft. and 13,000 sq. ft. would be required for accessories, in the event these are admitted to the 1929 show. Decision has not yet been made as to what extra facilities will be taken for the excess demand, such as the 7000 sq. ft. arcade at the exposition building.

New Officers

Henry Buker, vice-president Brown & Sharpe Mfg. Co., Providence, was elected president of the association. H. E. D. Gray, secretary and treasurer of the Landis Tool Co., Waynesboro, Pa., is the new first vice-president, and C. C. Swift, manager of the Ohio Machine Tool Co., Kenton, Ohio, was elected second vice-president. A. H. Tuechter, president Cincinnati Bickford Tool Co., Cincinnati, succeeds E. A. Muller, King Machine Tool Co., Cincinnati, as treasurer.

C. A. Johnson, president Gisholt Machine Co., Madison, Wis.; E. J. Fullam, secretary and treasurer of the Fellows Gear Shaper Co., Springfield, Vt., and F. V. Geier, vice-president and secretary of the Cincinnati Milling Machine Co., Cincinnati, were elected directors for three years, taking the places of P. E. Bliss, the outgoing president; Henry K. Spencer, the retiring first vice-president, and Edward A. Muller.

Six Companies Admitted to Membership

Membership applications of the following companies were acted upon favorably: G. A. Gray Co., Cincinnati; Hall Planetary Co., Philadelphia; Hardinge Brothers, Inc., Chicago; Henry & Wright Mfg. Co., Hartford; Hill-Curtis Co., Kalamazoo, Mich.; and the Product Machine Co., Bridgeport. The Buffalo Forge Co., Buffalo, and the Logansport Machine Co., Logansport, Ind., joined prior to the meeting. Two members were lost in the year, one by liquidation and the other by giving up the manufacture of machine tools.

Would Federate Machinery Makers

WHAT Mr. Kraut used as a text for an informal address on the subject of coordinating machinery manufacturing companies was the development within Germany. He spoke in some detail of the Verein Deutsche Maschinenbau Anstalten, known as the V. D. M. A., which is a federation of 13 associations of machinery manufacturers, including that of the machine tool builders. Incidentally, in the interest of export trade, the association has published a large catalog printed in English. The organization

dates from 1892, when it was established by a few of the larger machinery builders. Today there are 2700 firms identified with the movement, representing 93 per cent of the entire machinery manufacturing companies and employing over 700,000 men, with an annual production in 1926 of 1,250,000,000 gold marks. The potentialities of the case, he pointed out, may be apprehended when it is remembered that there are roughly 6500 machinery builders in the United States, employing 1,800,000 men and producing machinery valued at \$2,000,000,000, and yet the industry as a whole is without a general organization and, as a matter of fact, some of the groups have none or only a loose organization.

These 13 groups in Germany cover, besides machine tool and mechanical tool builders, manufacturers of machinery in the following classifications: textiles, agriculture, locomotives, prime movers, pumps and compressors, etc., conveying machinery, paper, food, crushing, machinery parts, such as certain forgings, and special machinery, including chemical apparatus. Each of these groups has an association, as suggested. The general organization has offices in Berlin under the directorship of Karl Lange. There is an executive board of directors and a general or larger board of directors, and then committees dealing with foreign trade, import duties, raw materials, transport charges, reparations in kind (growing out of the war), bank questions, conditions of sales, exhibitions, cost accounting, accidents, industrial law, insurance, and statistics.

As showing the importance of the German institution, Mr. Kraut said that commercial treaties are negotiated by the German Government only after being considered by the association, and the same action is taken with regard to duties. The general association has a standard form of contract approved by all groups, and covering terms of sales, guarantees and engineering service. Ordinarily, payments on contracts call for one-third cash on ordering and the balance on the basis of a specific understanding, with the time for payment extended for six and sometimes 12 months. In the matter of exports, 50 per cent cash is required on placing the order and the remainder is sometimes not finally payable for 18, and sometimes as long as 24, months. General guarantees do not extend beyond six months from the date of shipment, and the agreements are specific as to the replacement of parts.

Mr. Kraut's talk was regarded as dovetailing into the movement under way among the secretaries of machinery trade associations, which met at Montauk Point, L. I., Sept. 29, to consider uneconomic practices common to makers of machinery and equipment and which group is to hold a second conference in Washington on Nov. 8.

W. S. Hays, secretary of the Power Transmission Association, addressed

the meeting on the same general topic of coordinating relations among trade associations. He would establish an instrumentality of a group of advisory engineers representing the different fields. There are such questions to be aired as the scope and field of applications of leather, rubber and chain belt drives, and of pulleys and the like, the matter of obsolescence and the hunt for new uses of machines and apparatus.

Lathe Makers to Charge for Servicing

As the result of Mr. Kraut's talk, the association voted that a committee of five should be appointed to study the question of a standard form of contract applicable in the case of selling machinery through dealers as well as in the case of direct dealing. In this connection, Col. L. S. Horner, president Niles-Bement-Pond Co., told of the decisions of the committee on engine lathes. The 17 companies represented decided they would stand back of a six months' guarantee but that a charge of \$15 a day and expenses would be demanded of a buyer for assistance in installing, demonstrating or servicing a machine.

A rather general discussion followed and the consensus of opinion seemed to be that special considerations in the case of other classes of machinery made it difficult to accept the rulings of the lathe committee for general application to other groups. In passing, it was emphasized that there was a valuable psychological effect obtained when a machine was shipped with a tag indicating by the inspector's signature that the machine had been duly inspected. It was also held that undue demands were also likely to be checked by having the tag carry a statement of the guarantee clause.

Will Supply Easily Mounted Roller Bearings

Roller bearing design came in for special attention in the report of the association's standardization committee, A. L. Stewart, chairman, and W. L. Miller and S. A. Einstein. The following covers the major items of this meeting's consideration of standards:

It was voted on the proposal of the committee that all projects looking to the standardization of machine tool elements which involve engineering consideration of construction details should be carried through by the group of machine tool builders directly interested and should be worked out within that group before submission to the American Standards Association. The matter of colors for machine tools, being a question very largely of user interest, standardization in this particular, it was voted on the committee's recommendation, was referred to the sectional committee on small tools and machine tool elements operating under the American Standards Association procedure.

The committee reported that a design of roller bearing has been worked out to provide one of cheapened cost

and capable of being mounted as easily as a plain bearing. A large roller bearing company, it appears, has prepared a list of sizes conforming to the existing standard shaft diameters and is prepared to furnish the bearings from stock at prices of standard stock bearings.

In regard to spindle end standardization the committee made the following recommendation which has been approved by the association's board of directors: The different groups affected (lathes, turret lathes, automatic lathes, automatic screw machines, grinding machines, milling machines and drilling machines) should coordinate action by a joint committee having one representative from each group; this joint committee to determine the spindle ends which are applicable to more than one type of machine and to strive to settle on as few spindle end standards as possible.

The committee recommended that the different groups consider test codes to cover the situation arising when users undertake to reject machines as not being sufficiently accurate, such codes to cover methods of testing but not standard tolerances.

Trade Association Work Constructive

A BROAD picture of the place and value of trade associations was drawn by Dr. H. P. Baker, manager of the trade association department of the Chamber of Commerce of the United States, Washington, in an address on "What Trade Associations Mean to Industry."

Tangible benefits, he pointed out, must be based on intangibles, such as good fellowship and confidence, which usually constitute the chief values in the early history of a trade association. If you have developed confidence, you are in a position to go ahead with the tangibles, he said. Among the tangibles discussed were correct cost keeping methods, cooperative research, and simplification and standardization.

In speaking of the promotional work of the new trade association department of the United States Chamber of Commerce, Dr. Baker said, "We want to get across the idea that trade associations are doing sound and constructive work, work that is of value to the consumer as well as to industry."

The "Chicago" plan of appraisal for used machine tools was outlined by E. P. Essley, E. L. Essley Machinery Co., Chicago, at the last session of the convention. J. R. Porter, Marshall & Huschart Machinery Co., Chicago, and president of the Associated Machine Tool Dealers Association, also spoke briefly on the subject, indicating that endorsement of the plan by the machine tool builders would help in extending it to other districts.

That exports of machinery will continue to increase was a belief expressed by W. H. Rastall, chief of the industrial machinery division, Department of Commerce, Washington, in



Officers of the Machine Tool Builders' Association: (from Left to Right) Henry Buker, President; H. E. D. Gray, First Vice-President; C. C. Swift, Second Vice-President; A. H. Tuechter, Treasurer; and E. F. DuBrul, General Manager

speaking on the export situation at the last session of the convention. German influence in foreign markets appears to be weakening and Swiss and English influence increasing, he said.

Machine Tool Cost Accounting Methods Discussed

THAT "effort spent on incorrect costs is a complete loss" was emphasized by Albert E. Grover, staff cost consultant of the National Machine Tool Builders Association, in a paper on "Some Important Points in Machine Tool Cost Accounting," which was presented at the third general session of the convention. Active interest in the cost finding plan proposed by Mr. Grover, which includes production center burden application, was reflected in the discussion of his paper.

It was pointed out that the first consideration of every machine tool builder is profit, and the sources of that profit. "First we arrange the accounting system so that our profit and loss statement will show classes of profit, then segregate the profit accruing from manufacturing and marketing into classes of product, further segregating to individual units where the circumstances warrant."

Use of the current market on materials, labor and burden in figuring costs of current sales was advocated. In this connection Mr. Grover said: "Would it not be better to charge our costs with the market price prevailing when we use the material in manufacturing, and charge the difference between that amount and the actual cost to 'purchasing profit,' provision for which class of profit is made on the profit and loss statement?"

Buildings and equipment, the next two items on the statement, were said to be the differences between depreciation taken into costs on reproduction values and depreciation computed on cost of acquisition. "By

setting up this amount as a profit we are able to charge depreciation on replacement values to production operations through our regular accounts, and at the same time satisfy the rulings of the internal revenue bureau," said Mr. Grover. "In effect we are reporting depreciation on cost values. We are also displaying to our officers, monthly, advantages in profit due to having purchased buildings and equipment below the market of today.

"Here again, is it not better to charge our costs with the present value of the utility we are consuming for the consumer's benefit, and show the difference between that amount and the acquisition cost as a purchasing profit, which it really is?"

It was held that the cost of maintaining excess capacity is not a proper charge to operating expense; including it in the burden application will increase the cost figures. "Competitors who do not have expense of excess capacity naturally have no such item to reckon with," he said. "Showing this segregation on the monthly statement, of loss due to excess capacity, often spurs the organization to more effective sales activities."

Production Center Burden Application Advocated

In the plan of distributing costs shown by Mr. Grover, burden is charged to manufacturing cost on the basis of normal operating hours of production centers through which the individual parts and assemblies flow. "Only plants manufacturing one article and one size of that article can secure accurate costs of finished product by distributing manufacturing burden on the basis of the direct labor or direct labor hours represented in each article," he said. "However, that result would be an unsound basis on which to establish a selling price if the cost of any excess capacity is included in the burden rate calculations."

In the general plan of burden application advocated, the plant is divided into departments, including in each department only such area and equipment as required to perform one class of work.

The burden cost of each department is divided into three classes, representing the bases of distribution necessary to state correctly the cost of operations on the product. These classes are: 1, Buildings, a place for the man to work; 2, equipment, tools for the man to work with; and 3, general supervision and clerical effort necessary to plan and record their activities; also supplies and other expenses in maintaining working conditions in the departments.

Building Expense Distributed to Production Centers

Building expense consists of depreciation, taxes, insurance, interest on investment in and repairs to buildings; also lighting and heating. The total cost of furnishing a place for the men to work is distributed to production centers on the basis of the area occupied by each.

Equipment expense consists of depreciation, taxes, insurance, interest on investment in and repairs to machinery and tools; also power. Depreciation, taxes, insurance and interest on investment are allocated to production centers on the basis of the reproduction values of machinery and tools. Repair costs, both material and labor, are charged directly to production centers.

General expense consists of supervision, taxes, insurance, interest, supplies, indirect labor, office salaries, etc. Taxes, insurance and interest cover fixed expenses on investment in inventories. Indirect labor does not include supervision and office salaries. All general manufacturing expenses are distributed direct to production centers.

The sum of building, equipment and general burden applications to each

production center, divided by the normal operating hours of the center, will result in a rate of burden that is practical to use in cost and estimate calculations.

Methods that do not comprehend the basis of distribution outlined in the paper were said to be faulty, and dangerous to the effective use of costs in establishing sales policies.

Comparisons of the results obtained by various methods of burden distribution formed an illuminating part of Mr. Grover's paper. Distribution

of burden on the basis of direct labor was said to have all the irregularities of the blanket production-hour method, with the wages paid to machine operators added. "There is absolutely no relation between operator's compensation and the cost of running the machine," he said. "Of all the inaccurate methods of burden distribution this method is the most unreliable."

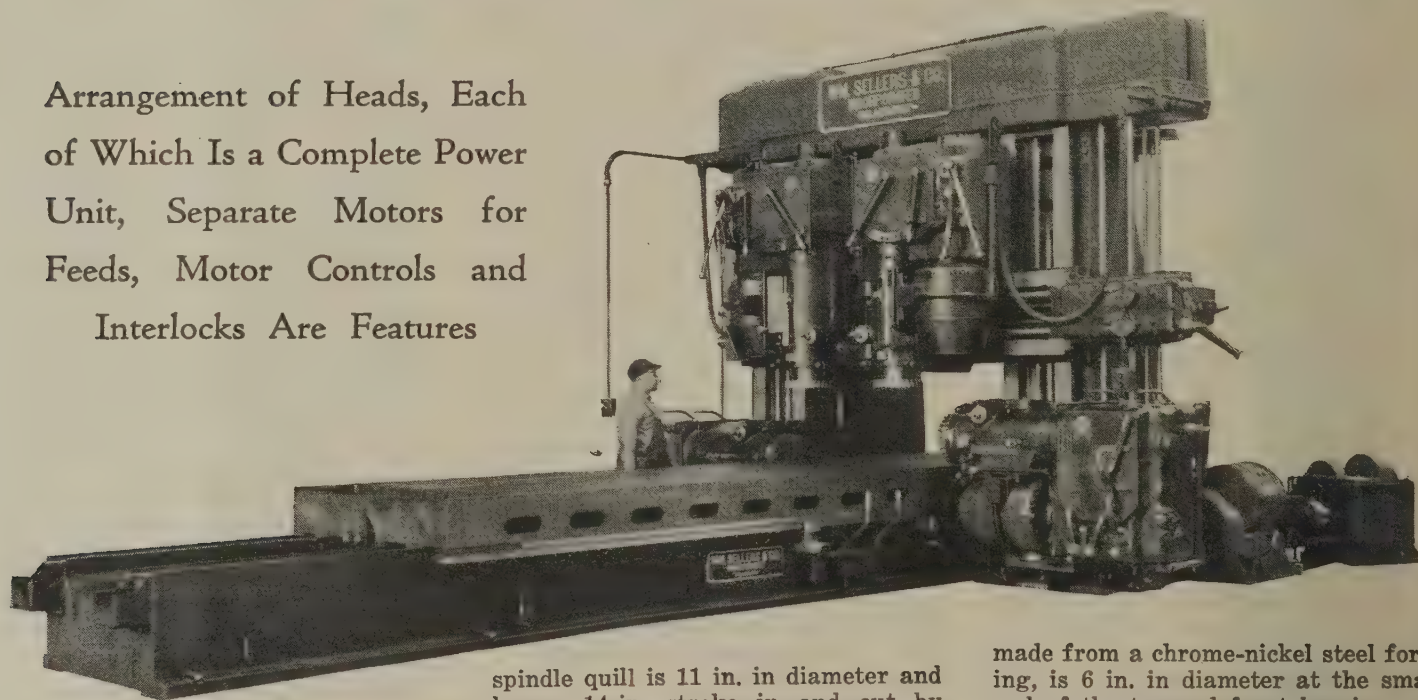
Urges Budgeting One's Business

The address of the banker, H. I. Shepherd, emphasized that "we are

coming into what may be termed a period of glorification of the properly analyzed financial statement, showing the history of business operation recorded in the usual control figures." The ability to budget or to forecast operation in business, he urged, begets confidence. It begets confidence on the part of the management of the business itself and on the part of the banker who is called upon to extend a credit which must rely for its security and its ultimate liquidation upon performance in business.

New Planer-Type Milling Machine

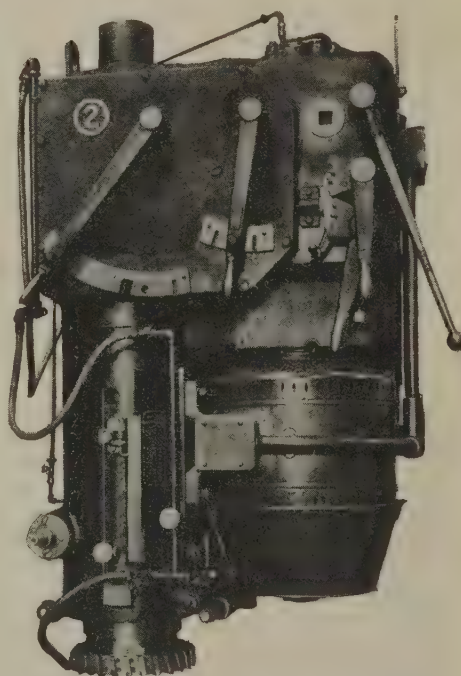
Arrangement of Heads, Each of Which Is a Complete Power Unit, Separate Motors for Feeds, Motor Controls and Interlocks Are Features



PLANER-TYPE milling machines in a variety of sizes are being placed on the market by William Sellers & Co., Inc., Philadelphia. The machine illustrated will take work 64 in. wide between the cutters on the side heads and 60 in. high between the table and the cutters on the cross-rail heads. It will mill work 20 ft. long. Bed, table, uprights and cross-rail are of massive construction to provide a rigid support for work and cutters. The machine is not an adaptation from planer design, but is made from entirely new patterns and is designed to resist the particular strains encountered in milling.

An outstanding feature is the design of the heads. The heads on the cross-rail and those on the upright are identical except for being right and left-hand. Each head is a complete power unit having its own 20-hp. motor drive. This arrangement requires only short shafts and spur gears in the drive and eliminates long splined shafts, bevel gears and worms. All gears in the heads are of chrome-nickel steel, hardened. Shafts are also of chrome-nickel steel and are carried in ball or roller bearings, with the exception of the spindle. The

spindle quill is 11 in. in diameter and has a 14-in. stroke in and out by power or by hand. The spindle,



Each Head Is a Complete Power Unit. Those on the cross-rail and on the uprights are identical except for being right and left-hand. The spindle quill is 11 in. in diameter and has a 14-in. stroke in and out by power or by hand.

made from a chrome-nickel steel forging, is 6 in. in diameter at the small end of the tapered front bearing. At slow speed it is driven by a 16-in. diameter gear through multiple splines milled in the spindle.

Feeding of Heads and Table Is by Independent Motors

Feeding of the heads is by independent motor and speed reducing box, which includes one change of gears, the motor and box being located at the right-hand side of the upright. All feeds from 1 to 4 in. or 4 to 16 in. are controlled by a field rheostat, so that small variations in amount of feed may be obtained.

Each head is provided with a stainless steel scale graduated in thirty-seconds of an inch. An adjustable pointer moves with the spindle and measurements may be read accurately on the scale. For closer readings, an indicator may be made to move with the quill and by contact with a block located on a pad on the head, thousandths of an inch or less may be measured. The table is provided with stainless steel scale and adjustable vernier allowing readings to sixty-fourths.

Table feeds, provided by an independent motor and gear unit, range from 1 to 16 in. per min. Rapid traverse is at 20 ft. per min. Variations in

table feed are also controlled by field rheostat and one gear change.

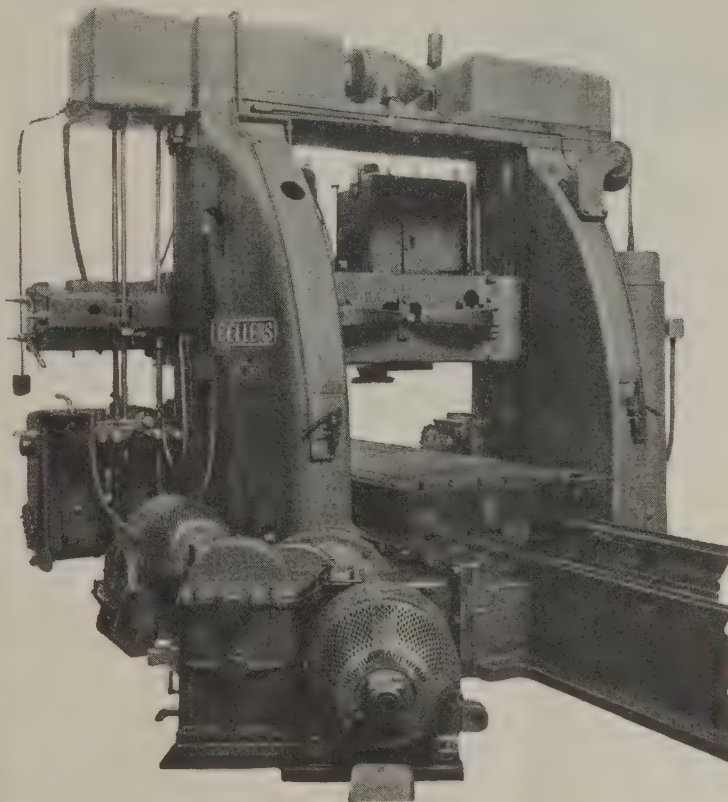
Use of separate motors for the feeds is emphasized as of marked advantage in milling irregular shapes, in that one feed may be employed without interfering with the other, and any combination may be used to give any angle of cut required. In milling the edge of irregular castings, such as turbine housings, the operator can vary the feeds to follow around the oval shape by the use of field rheostats and push-button stations, without moving from the operating position.

Power traverse for the heads and quills is provided by an auxiliary motor on top of the machine. Here again the machine is arranged for convenience, as one head may be traversed while another is being fed. This motor also raises and lowers the cross-rail. In mounting the motor half way between the two uprights the shaft running to each lifting screw is of the same length, which arrangement is

side cuts. The table is driven by spiral pinion and rack, through herringbone gears from a change gear box. End thrust on the driving shaft is taken on ball bearings which may be adjusted conveniently from outside the bed. Oil is continually circulating through these bearings.

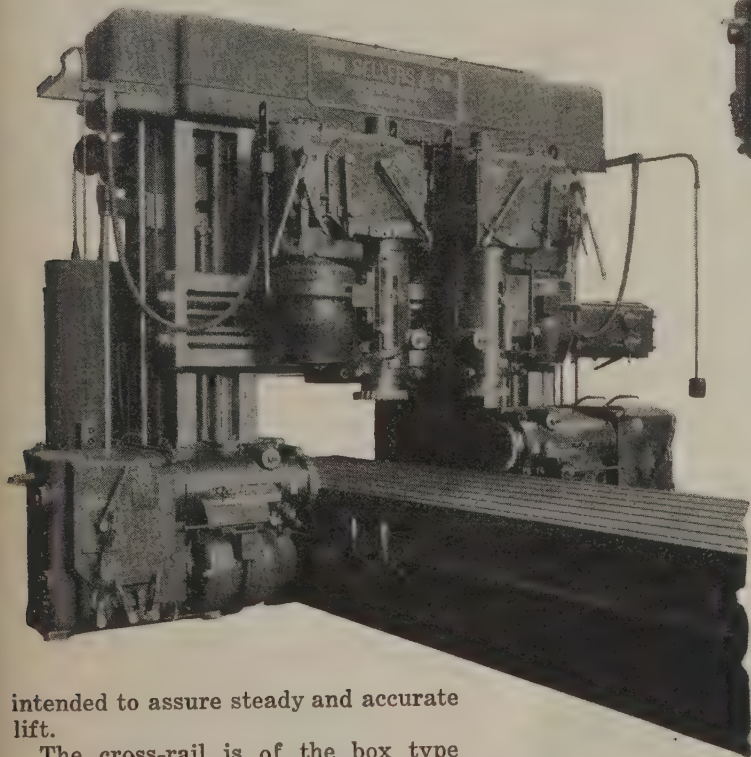
The bed is of closed-top type and is heavily reinforced between uprights. Inside the bed are located the tanks

The Cross - Rail Slides On the Face of the Column and Has a Bearing on a Vee at the Back. The clamp is operated by a single lever at the right-hand end of the cross-rail. Power traverse for the heads and quills is by means of the auxiliary motor at the top of the machine



Feeding of the Heads Is Through an Independent Motor and Speed Reducing Box. Table feeds are provided by another independent motor and gear unit. All motors are controlled from one panel and operated by push buttons at each side of the table

Interlocks are provided for the various motions; the feed motors, for instance, cannot be started in advance of the cutter motors. If a 30 per cent overload occurs on any one of the cutter motors, the feed motors will slow down until the load is lessened, when they will automatically speed up again. If a 50 per cent overload occurs on any one cutter motor the overload relay will stop it and the feed motors



intended to assure steady and accurate lift.

The cross-rail is of the box type with the back extended between the uprights, a construction that has been used for many years on Sellers boring mills and planers. The cross-rail slides not only on the face of the uprights but has a bearing on a vee at the back. A powerful clamp that may be operated by a single lever at the end of the cross-rail is provided.

The table, of deep box construction, is carried on one flat and one double-vee way. The double-vee construction, which is said to maintain accuracy under the heaviest side cuts, consists of a flat vee combined with a vee with walls inclined a very few degrees from the vertical. The table bears on the flat vee except in cases of excessive side pressure, when the upper vee holds the table in place. When there is no side thrust the upper vee clears by a few thousandths of an inch. Hold-down shoes are provided to keep the work table from lifting on the heavy

and pumps with their motors, a feature which eliminates piping that might be an obstruction and detract from the appearance of the machine.

Lubrication of the machine has been carefully worked out. Each head has its own pump and circulating system, and a pump is provided in the feed gear box to assure adequate lubrication of all bearings and gears.

Lubrication of the table ways is by force feed. The pump is driven by a separate motor and the arrangement is such that the pump must be started before the table feed motor can be started. This pump also assures continuous flow of oil through the spiral pinion box and the driving shaft bearings.

All motors are controlled from one panel and are operated by push buttons located at each side of the table.

will stop instantly. Other interlocks, as well as safety clutches, are provided to make the machine as "fool-proof" as possible.

Provision is made for cutting compound. The tank is located in the bed and has a gage glass on the outside. The pump, driven by a 1-hp. motor forces the liquid through the pipes in the uprights to the top of the machine, from which it is piped to each of the heads. An adjustable frame and two nozzles are provided for each cutter.

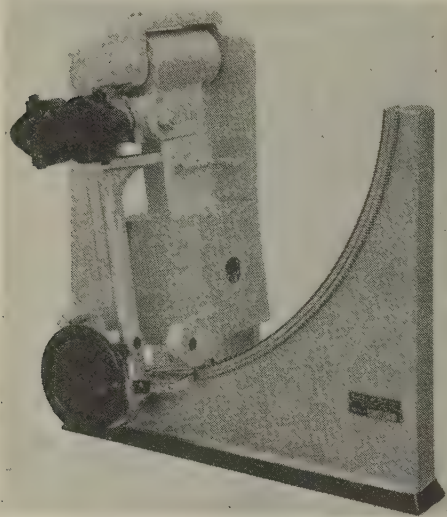
Machinery Merger to Involve Five Companies

The Foote Brothers Gear & Machine Co., Chicago, practically has completed negotiations for the acquisition of four other companies engaged in machinery manufacturing. Definite announcement of the details of the merger may be made in 30 to 60 days.

The General American Tank Car Corporation has announced plans for the formation of a European subsidiary to operate a fleet of railroad freight cars throughout Continental Europe.

New Sand Machine Makes Many Tests

A UNIVERSAL sand testing machine for measuring the green and dry bond strength of molding sand, cores, core pastes and clays has been brought out by Harry W. Dietert, Detroit. The machine can be operated by the standard American Foundrymen's Association compres-



Bond Strength of Molding and Core Sands and Other Materials Can Be Determined

sion method or by the shear control method.

The machine consists of three major parts—a substantial base, on which is mounted a pendulum weight, and a pusher arm. The pendulum weight swings on self-aligning ball

bearings, mounted on a carbon steel shaft to which the pusher arm is keyed. Various testing heads may be slipped into place on the pusher arm to make different bond tests. When testing in green bond the test head is placed in the lower hole of the pusher arm, this position giving a sensitive test to detect small changes in the bond. For the high reading dry bond test, the test head is placed in the upper hole of the pusher arm where a great breaking force is obtained.

The bond test is made by placing an A. F. A. permeability sand specimen between the test head of the pusher arm and the weight. By turning the hand wheel, the pusher arm is moved up causing the sand specimen to raise the weight. The stronger the sand the higher it will raise the weight. A rider on the scale shows the maximum height that the weight is raised. The strength of the sand in pounds is read directly from the scale, which has divisions far apart, making it easy to read in 0.2 lb., and to 0.02 lb. by interpolation.

As the machine is a dead-weight testing machine, it will stay in calibration indefinitely. Testing attachments may be provided for making the A. F. A. tensile core test, shear test, Mackin clay bond test, flexure core test and core paste tests. The testing capacity is green compression, 11 lb.; dry compression, 55 lb.; control green shear, 9 lb.; control dry shear, 45 lb.; A. F. A. tensile core, 160 lb.; Mackin clay bond and core pastes, 45 lb. The machine is 20 in. high, has a 8 x 20-in. base and weighs 134 lb.

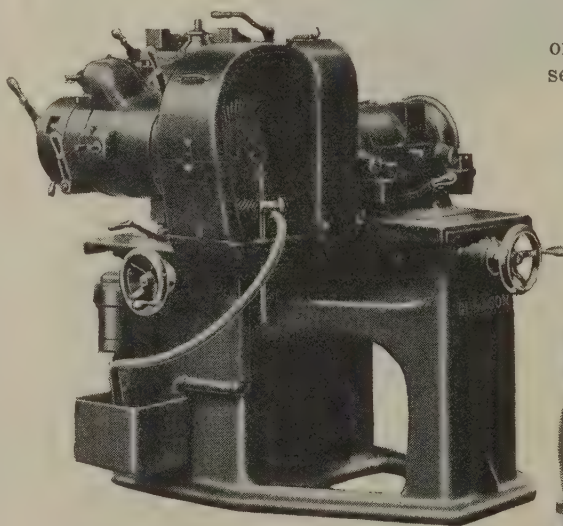
Combination Testing and Lapping Machine

THE Gleason Works, Rochester, N. Y., has brought out the 18-in. combination testing and lapping machine, illustrated, which is intended for use in the production of spiral bevel and hypoid gears. The gears are first tested after cutting, to show the proper tooth bearing, and then after hardening, for bearing and for noise. A brake on the gear or on driven head enables the operator to test them under load.

In lapping a pair of spiral bevel or hypoid gears the usual practice is to vary the settings so as to secure lapping all over the surface of the teeth. The design on which the machine illustrated is based is such that any adjustment or motion will be not in a horizontal or vertical direction only, but a combination of the two in proper proportions, so that the motion follows the tooth curve already generated. In this machine this motion is automatic and can be changed in direction to suit any job that may be put on the machine.

Gears up to 18 in. pitch diameter may be lapped on the machine. The maximum offset obtainable when testing hypoid gears is 3½ in. The maximum distance from the center of the

gear spindle to the nose of the pinion spindle is 12 in. and the minimum



distance is 3¾ in. For lapping operations, guards, a self-contained pump unit, and reservoir for the lapping compound are furnished. The standard spindles on which the work is mounted are ground 2.292 in. at the large end with ½ in. taper per foot, but special pinion heads with larger size bores can be furnished.

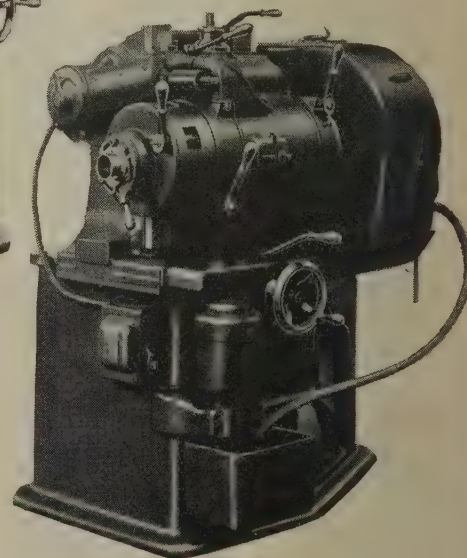
The machine is built to high standards of precision. The taper holes in the nose of the spindle are ground with the spindles in place in their own bearings to assure concentricity between the spindle bearings and bore. All bearing ways have ample area and narrow guides to maintain close alinement. The nose of the spindle is heat treated and the spindle is mounted on an improved type of matched ball bearings. These bearings are prepared and mounted under sufficient initial load so that there is no evidence of radial or axial deflection of the spindle under ordinary operating conditions. They are tested for quietness and are required to be so nearly silent that the operator has no difficulty in detecting gear noise. Labyrinth construction seals are provided to protect the bearings. There are sight oilers for convenience in maintaining the proper oil level and the lubricating oil is filtered before it reaches the bearings.

The drive spindle, which is power driven, can be run in either direction. It is provided with a lock for use when tightening and loosening the arbor nuts. The driven spindle has a wooden lined friction brake for testing gears under load. The taper in the standard spindle is the same as in the 15 in. and 10 in. spiral bevel gear generators the arbors of which will fit the testing machine.

The pinion spindle head and the gear head column are adjustable horizontally on the frame by means of hand wheels which are graduated in 0.001 in. The drive head, or pinion head, and the column upon which the gear head is mounted are clamped to the frame at front and rear by separate clamps which operate with equal tension from a single lever. The ways are square gibbed. Guards are provided over the ways to protect them from dust and red lead.

A 5-hp., 1800-r.p.m. motor is recommended for the main drive and is set in the base of the machine.

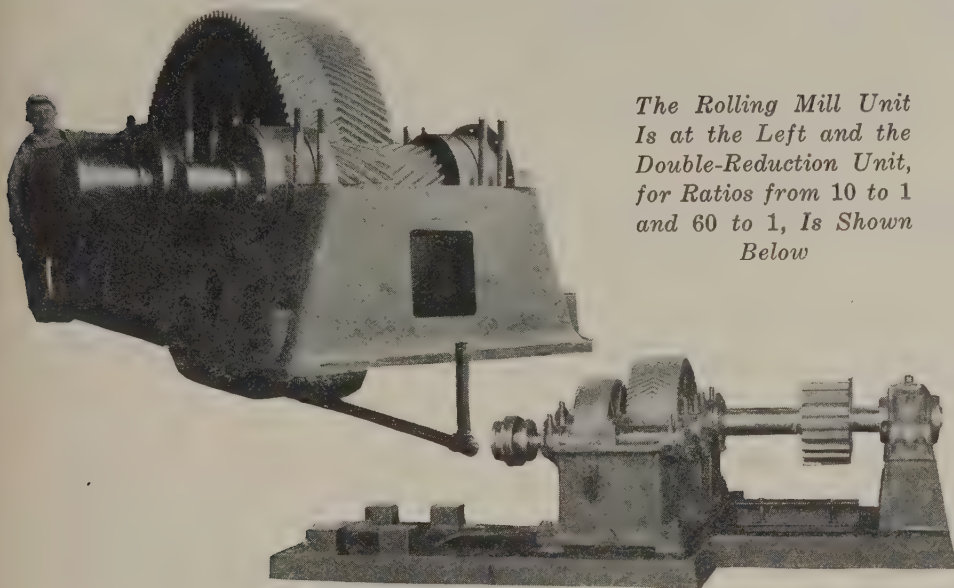
Gears Up to 18-In. Pitch Diameter Can Be Lapped



Speed Reducers with Sykes Herringbone Gears

THE Farrel-Birmingham Co., Buffalo, has announced a new series of speed reducers having Sykes contin-

the plain bearing units since in all cases the same oil may be used for gears and bearings and the splash



The Rolling Mill Unit Is at the Left and the Double-Reduction Unit, for Ratios from 10 to 1 and 60 to 1, Is Shown Below

uous tooth herringbone gears and anti-friction bearings.

The roller bearings being of the type which combine journal and thrust capacity, both pinion and gear shafts are held from end float and are therefore protected from abuse from connected mechanism. It is claimed that this type of mounting is practicable with the Sykes gear since the apices of the teeth are central in the face of the gears around the entire periphery, and no end float either of gear or pinion is necessary.

High mechanical efficiency, 98½ to 99 per cent for a single reduction and 98 to 98½ per cent for a double reduction, is also claimed. The lubrication is said to be simpler than with

and flood automatic system of lubrication is possible throughout the whole series. There is a considerable saving in space in the new design.

One illustration herewith is of a double-reduction unit suitable for ratios from 10 to 1 and 60 to 1, and powers between 5 and 200 hp. A typical outboard mounting where generated straight tooth gears are used for the final reduction is also shown.

A rolling mill unit suitable for powers between 300 and 500 hp. is also illustrated. The bearings are held in sleeves to facilitate adjustment and allow for shaft expansion. The case is of box section girder design extending from the center line of the shafts to the base.

New Die Head for Use on Screw Machines

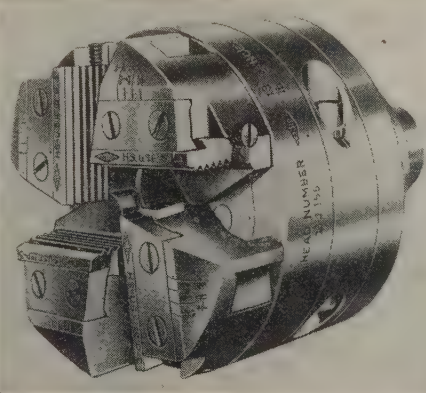
THE Landis Machine Co., Waynesboro, Pa., has brought out a new die head, named the Landex, for use on automatic screw machines.

This head, of rotary pull-off type, is opened by retarding the forward movement of the die head or die holder and is closed automatically by an attachment on the automatic screw machine. It is of carbon steel and is heat-treated throughout, and ground. The head is flexible on its shank to compensate for any misalignment in the machine or in the work to be threaded. In being supported on the front face of the head, the chasers are accessible for removal. The Landis "long life" chaser is employed.

A worm employed for adjusting the head to size is kept under the proper turning tension at all times, thereby eliminating the necessity of locking it for each adjustment for size. A micrometer dial is provided for further adjustments to suit close or free fits. The die head is locked within itself under service conditions

by the engagement of two hardened closing pins and closing pin bushings. The spring for opening the head is located in the adjusting ring and has a uniform tension for all diameters.

The heads are made in the ½, 13/16 and 1½-in. sizes and are graduated for bolt and pipe threads within their ranges. Each graduation is separate, and has its own index mark on

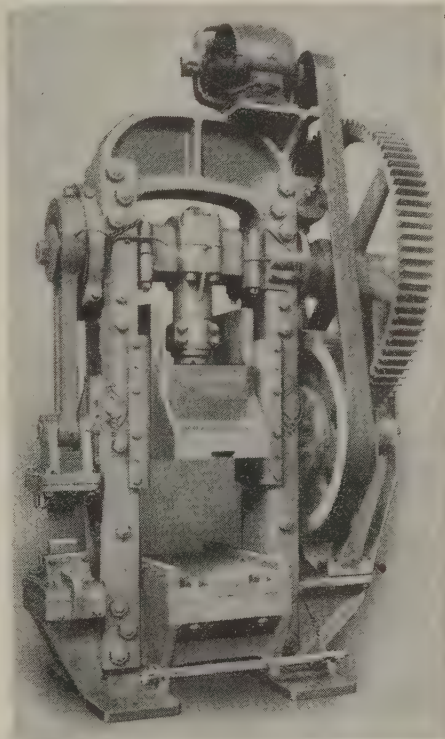


the operating ring. All passages and openings into the interior of the head are covered under service conditions to prevent entrance of dirt and chips.

Introduces a Steel-Side Press

THE adoption of forged steel side-frames for the new Chambersburg trimming press aims at the practical elimination of side frame breakage as a hazard of press operation. The press now comprises strong I-section forgings with a heavy semi-steel bed frame and yoke, an oversized crank, outboard bearings used on all shafts, and a patented friction slip flywheel.

The friction slip flywheel serves to eliminate the hazard of the flywheel bursting, or the crank or gears being broken when an overload stalls the press. The energy developed by a sudden stop of the machine instead of expending itself as a strain on



The New Chambersburg Press Has a Steel Side and Friction Slip Flywheel

all moving parts is released by the flywheel slipping on its hub against friction. Adjustments to the press are rarely necessary after slipping.

Other new features of this press are: Roller bearings on auxiliary shafts; directly renewable clutch jaws and cam (emphasized as a time saver on this most frequent of renewal jobs); a pitman adjustment that grips the threads over the length of the screw; high pressure grease lubrication to all bearings and surfaces; reduced floor space requirements and free accessibility from the rear.

This press comes with either single or double crank construction, and is built by the Chambersburg Engineering Co., Chambersburg, Pa.

Business Analysis and Forecast

Large Business Volume Will Continue

Sidewise Movement of P-V Line Indicates Stable Conditions—Too Much Reliance on Automobile Industry as Key to Demand

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

ONE outstanding point in the present business situation is the strong contrast between the position of the automobile, machine and metal industries with that of many other industries. Led by the automobile and farm machinery manufacturers, steel, copper, electrical appliances and machine tools show high activity and have continued to expand rapidly until very recently, at least. On the other hand, textiles, leather, shoes, paper, railroad equipment, building materials and coal are backward, and these industries are either operating at a low level or declining. The net result is that, while indexes of production that do not include building materials and many miscellaneous industries rise to new peaks, broader indexes of business activity, not arbitrarily weighted, either

decline or remain about stable at relatively low levels.

Such indexes are those of factory employment and railroad freight tonnage. Both were lower in September than they were a year ago. This suggests the possibility that our prosperity, great as it is in a number of basic industries, is not so uniformly distributed as is desirable. This may indicate a lack of balance.

Something of this was in mind last month when we suggested that the present industrial situation is dangerously dependent on the automobile industry. It will be noted that the sales of the General Motors Corporation fell off considerably more than usual in September. The Ford output has passed Chevrolet production and suggests the possibility of disturbing competition in the low-priced automomobile field.

Growing automobile exports are a saving factor, but it is undesirable to have so much of our prosperity dependent upon any one industry.

Outlook for Business Is Excellent

For the present, however, the automobile, machinery, steel and copper industries are thriving and the upward trend of machine tool orders is a favorable omen. Building activity is still large, due to the heavy contracts of the past few months. Retail trade in general merchandise and in automobiles is active. The effects of high money rates and low yields on invested capital, in the way of restricting the flow of capital into industry, are not yet pronounced. Any maladjustments that exist are not serious or critical—except in the case

Factors in the General Business Outlook

Favorable Factors

- (1) *The P-V line is stable at a rather high level, indicating demand and supply in fair balance, on the average.*
- (2) *Retail trade is active and gained in September; wholesale trade improved.*
- (3) *Automobile production and sales well maintained at high levels, considering the season.*
- (4) *Money easier; gold imports check advances.*
- (5) *Machine tool orders expand.*
- (6) *Financial position of most leading companies strong.*
- (7) *Stocks of commodities moderate in most industries; mercantile inventories light.*
- (8) *Political uncertainties largely removed.*

Unfavorable Factors

- (1) *Trend of building activity is downward; permits and contemplated new construction are low.*
- (2) *Money continues relatively tight, restricting new bond issues.*
- (3) *Commodity price trend turns downward.*
- (4) *Farm situation is less favorable than supposed; decline in livestock prices.*
- (5) *Trend of exports is downward.*
- (6) *Wild speculation on the stock exchange and excessive brokers' loans take an undue share of the nation's capital and attention.*
- (7) *Business failures are numerous.*
- (8) *Railroad freight traffic and gross revenue are relatively low, also factory employment, indicating that total business activity is probably not up to that of a few leading industries, and is thus not well balanced.*

of the stock market. Money is even a little easier. The decline in commodity prices during the past few weeks has been moderate and does not seem likely to become a seriously disturbing factor.

In short, in spite of some unfavorable possibilities and great excesses in speculation, the outlook for business indicates a stable and well sustained volume during the winter

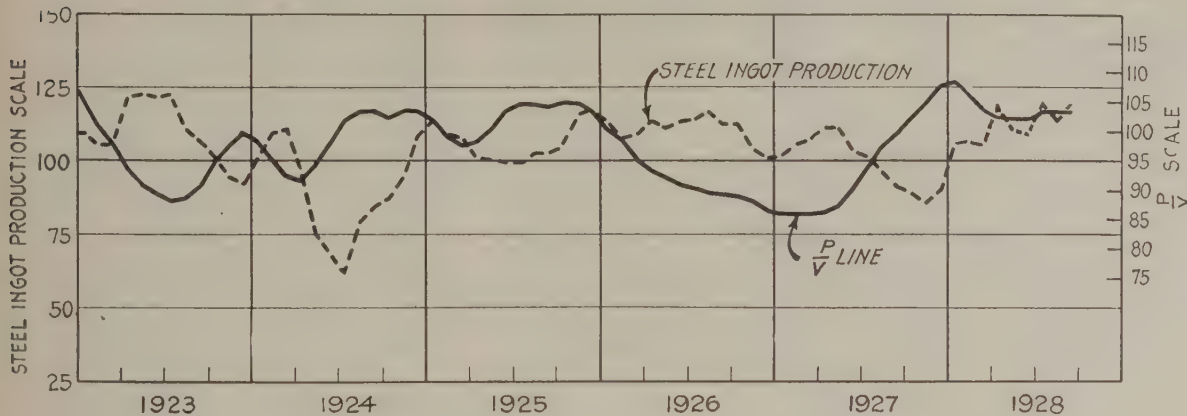
months, with earnings fair to good in a majority of industries.

Demand Adequate to Absorb Output

THE trend of the P-V line is about sidewise, at a level considerably above normal. The action of this general business barometer means that the demand for commodities is ade-

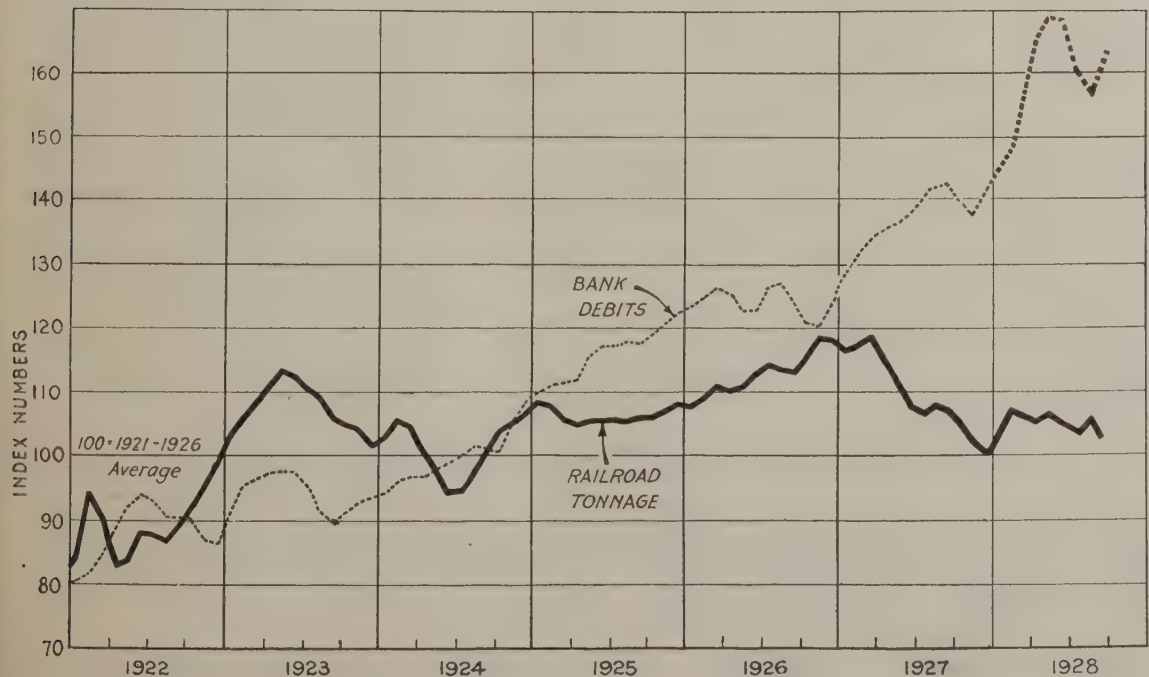
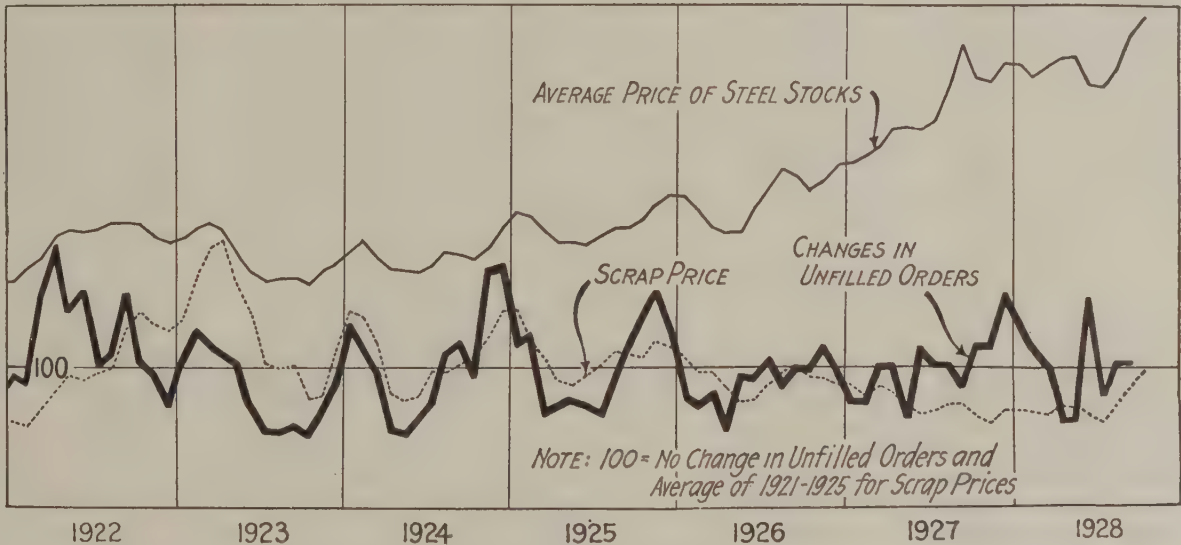
quate to absorb the quantities supplied at current prices. Of course, this applies to average conditions.

As usual, a fairly close relation exists between the trend of steel production and this barometer. As adjusted to eliminate the merely seasonal ups and downs from month to month, the underlying trend of steel ingot production was downward in May and June, then upward in July,



Sidewise Movement of P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Indicates Stable Business Conditions and Large Volume. Steel production (adjusted) continues high

Unfilled Orders Are Moving Narrowly About the Axis; Stock Prices Are Making New High Records and Scrap Prices Are Considerably Better



Bank Debits Are Inordinately High, Reflecting a Huge Volume of Speculation. Railroad tonnage, on the other hand, is at the lowest level, for the season, since 1924

since when the trend has been irregularly sidewise. There is no indication of a more than seasonal decline.

Steel Orders Gained Little on Shipments

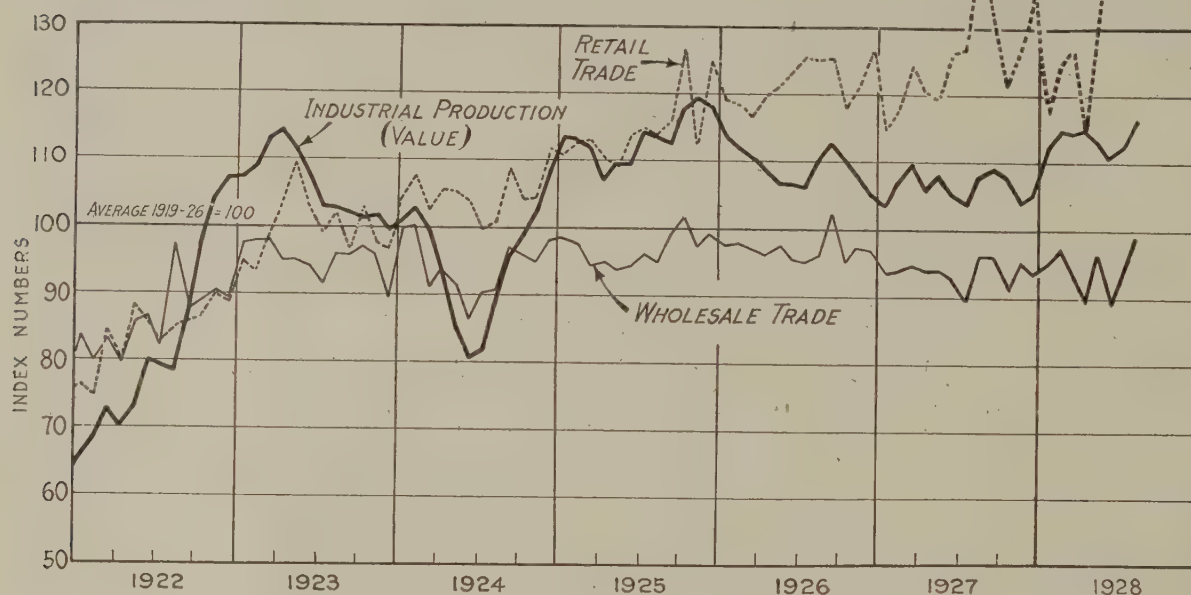
WITH reference to the second chart, at least two points are clear: (1) Steel scrap prices have advanced sharply and the market is strong at this writing; (2) the average price of steel stocks has risen further and made successive new highs in September and October. The trend of scrap prices has been a bet-

expansion in the chain store business. Neither accurately measures the true volume of business. But, after making all allowances, it may be said that both indicate that trade is active and relatively high, in comparison with industrial production.

Two other curves are low—wholesale trade and railroad freight traffic. Both are below a year ago, but show some recovery at the end. These indexes reflect the fact that the true total volume of business and industry is only moderately large, and make

est point since December, 1925, exceeding even the 1923 peak. The trend is still upward and the output in terms of value does not seem excessive, even in comparison with department store sales (which are now our only reliable indicator of retail trade).

So long as the total value of production increases along with the quantity of production, the industrial situ-



Retail Trade Continues to Show Heavy Gains, Which Are Attributed Largely to Chain-Store Business. Wholesale trade remains slow, while industrial production is progressing at the highest levels in three years

ter barometer this fall than the unfilled orders have been.

Unfilled orders of the Steel Corporation gained by only about the usual seasonal percentage in September, and accordingly the rate-of-change line in the chart moved sidewise and was only slightly above the base line. A three-month moving average would show a decline. In short, steel orders gained little on shipments, and this would usually indicate that no considerable expansion is to be expected; but speculation, both in scrap and in the stock markets, continues to run values up. In both cases the unfavorable reaction is only a matter of a little time.

Divergent Tendencies Shown

CONDITIONS illustrated in the third and fourth charts may be discussed together.

It will be noted that two curves are high—bank debits and retail trade. The former reflects an enormous volume of speculation on the stock exchanges; the latter, an extraordinary

the high rate of speculation and buying of luxuries seem excessive.

In between these extremes lies the estimated value of the industrial output. In August, this rose to the high-

ation may be called strong. Not until commodity prices cease to keep pace with increased output, and the P-V line declines, will a recession be forecast.

Steel Furniture Orders Well Ahead of Last Year

WASHINGTON, Oct. 30.—Orders for steel furniture in the "business group" in September were valued at \$2,689,009, against \$2,619,230 in August, and \$2,367,857 a year ago, according to reports received by the Department of Commerce from 34 manufacturers. Orders for shelving furniture were valued at \$799,850 and \$863,420 respectively, in 1928, and \$607,905 a year ago, according to reports received from 16 producers.

Shipments of business furniture in September were valued at \$2,754,135, compared with \$2,564,633 in August, while unfilled orders at the end of

September were valued at \$2,061,856, a decrease of \$56,562 from unfilled orders at the end of August. Orders for business furniture during the nine months ended with September were valued at \$26,494,877, an increase of \$3,371,630 or 14½ per cent over the corresponding period of last year.

Shipments of shelving furniture in September were valued at \$678,422, compared with \$836,104, while unfilled orders at the end of September and August were valued at \$753,813 and \$734,365 respectively. Orders for shelving furniture during the nine months ended with September were valued at \$6,938,395, a gain of \$1,324,571 or 23½ per cent over the corresponding period of 1927.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Nov. 15—Position of Iron and Steel Producers; Nov. 29—Activity in Steel Consuming Industries.

Large Export Movement Continues

September Total One-Fifth Below August,
But 39 Per Cent Above Last Year—
Imports Off One-Sixth

WASHINGTON, Oct. 29.—Making a decline of 59,241 gross tons, exports of iron and steel from the United States in September aggregated 228,056 tons, against 287,297 tons in August, which was the highest monthly outgoing movement since February, 1921, with a total of 393,329 tons. For the nine months ended September, 1928, exports amounted to 2,127,431 tons, an increase of 461,567 tons or 27.7 per cent over those for the corresponding period of last year with a total of 1,665,864 tons. The nine-month total of 1928 was but 55,760 tons less than the total for the entire year of 1927.

Imports in September, amounting to 57,782 tons, dropped 12,132 tons from those for August, with a total of 69,914 tons. Incoming shipments during the nine months ended with September, totaling 565,421 tons, reflected a decline of 5992 tons from the imports of 571,413 tons for the corresponding nine months of 1927.

The sharpest decline in exports during September when compared with August was in boiler tubes and welded pipe, which registered a drop of 13,957 tons from 30,948 tons in August. The second heaviest falling off in September exports was in scrap, which dropped 12,027 tons from 70,533 tons in August, the latter being the largest monthly export movement of old material on record. Scrap exports for the nine months of the current year, with a total of 423,287 tons, far exceeded such shipments for the corresponding period of last year, with a total of 175,824 tons. As in August, exports of scrap constituted the largest single item of outgoing shipments in September.

Average daily exports in September were 7602 tons, against 9260 tons in August, while the average monthly shipments for nine months were 236,381 tons in 1928, compared with 185,096 tons last year.

Most of the scrap exports in Sep-

tember went to Canada, which took 44,092 tons. Japan, taking 11,279 tons, was the heaviest overseas consumer. Exports of this commodity to Italy amounted to 1765 tons.

Of the 6721 tons of casing and oil line pipe exported in September, 3053 tons went to Venezuela, 1345 tons to Java and Madura and 732 tons to Canada. Colombia took 1140 tons of the 5403 tons of welded black pipe exports in September; Japan, 944 tons; the United Kingdom, 841 tons; Canada, 595 tons. Canada was the recipient of 14,015 tons of the 14,298 tons of skelp exported during the month, and also of 3004 tons of the 3290 tons of hoops and bands.

Taking 6888 tons, Japan was the leading purchaser of the 16,471 tons of tin plate in September; Canada took 4344 tons. During the nine months ended with September, Canada took 38,107 tons of tin plate, against 35,225 tons in the corresponding period of last year; but Japan led

Exports of Iron and Steel from the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Pig iron.....	10,228	3,513	52,559	35,088
Ferromanganese	1,253	5	8,292	534
Scrap	58,511	30,124	423,287	175,824
<i>Pig iron, ferroalloys and scrap</i>	<i>69,992</i>	<i>33,642</i>	<i>484,138</i>	<i>211,446</i>
Ingots, blooms, billets, sheet bar, skelp	17,059	11,700	106,409	70,723
Wire rods	2,824	881	28,561	11,784
<i>Semi-finished steel</i>	<i>19,883</i>	<i>12,581</i>	<i>134,970</i>	<i>82,507</i>
Steel bars	11,785	7,323	108,969	83,294
Alloy steel bars.....	1,282	292	11,107	4,028
Iron bars.....	453	126	2,922	3,482
Plates, iron and steel.....	10,989	9,780	109,562	103,726
Sheets, galvanized.....	8,701	10,454	112,699	122,440
Sheets, black steel.....	12,038	7,184	140,568	125,874
Sheets, black iron.....	1,285	1,251	11,425	12,830
Hoops, bands, strip steel...	4,249	2,253	42,055	33,280
Tin plate; terne plate....	16,471	13,242	185,472	201,973
Structural shapes, plain material	13,377	13,366	132,092	106,818
Structural material, fabricated	4,272	4,251	67,438	49,533
Steel rails	16,466	11,897	161,130	137,076
Rail fastenings, switches, frogs, etc.....	1,518	1,807	34,260	25,311
Boiler tubes, welded pipe and fittings.....	16,991	18,024	193,266	206,787
Plain wire.....	3,069	4,011	33,902	25,838
Barbed wire and woven wire fencing	4,634	4,763	54,097	38,609
Wire cloth and screening..	101	185	1,398	1,755
Wire rope	376	329	3,849	3,391
Wire nails.....	791	1,102	11,728	6,595
Other nails and tacks....	460	600	7,316	6,311
Horseshoes	34	47	340	394
Bolts, nuts, rivets and washers, except track.	916	849	9,716	9,020
<i>Rolled and finished steel</i>	<i>130,258</i>	<i>113,136</i>	<i>1,435,311</i>	<i>1,308,365</i>
Cast iron pipe and fittings	2,202	2,092	25,095	20,041
Car wheels and axles.....	2,345	1,802	12,407	13,828
Iron castings.....	545	892	8,350	8,752
Steel castings.....	379	387	7,223	5,722
Forgings	770	277	8,117	3,768
<i>Castings and forgings</i> ..	<i>6,241</i>	<i>5,450</i>	<i>61,192</i>	<i>52,111</i>
All other	1,682	1,344	11,820	11,435
Total	228,056	166,153	2,127,431	1,665,864

Imports of Iron and Steel Into the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Pig iron	10,437	9,169	104,777	93,949
Ferromanganese*	4,660	1,897	34,677	21,111
Ferrochrome†	79	30	570	412
Ferrosilicon‡	123	126	2,963	6,563
Scrap	5,727	3,302	37,650	45,165
<i>Pig iron, ferroalloys and scrap</i>	<i>21,026</i>	<i>14,524</i>	<i>180,637</i>	<i>167,200</i>
Steel ingots, blooms, billets and slabs	2,193	841	16,614	9,419
Iron blooms, slabs, etc....	1,076	1,328	12,130	11,415
Wire rods	3,269	2,169	28,748	20,834
<i>Semi-finished steel</i>	<i>3,269</i>	<i>2,169</i>	<i>28,748</i>	<i>20,834</i>
Rails and splice bars.....	891	2,773	12,982	14,620
Structural shapes	12,207	15,639	131,169	119,660
Boiler and other plates...	606	24	4,668	3,248
Sheets and saw plates....	2,347	2,451	19,912	11,939
Steel bars	7,358	9,018	70,932	72,466
Bar iron	161	168	1,613	3,164
Hoops, bands and cotton ties	1,944	2,387	15,543	26,449
Tubular products (wrot.)..	3,084	1,434	31,513	43,206
Nails, tacks, staples.....	1,365	376	7,122	4,921
Tin plate	34	22	817	980
Bolts, nuts, rivets and washers	16	40	176	289
Round iron and steel wire	378	252	3,220	3,171
Barbed wire	762	404	3,121	3,486
Flat wire; strip steel....	217	169	1,735	1,974
Steel telegraph and telephone wire	98	139	1,255	1,799
Wire rope and strand....	78	163	451	467
Other wire	78	163	451	467
<i>Rolled and finished steel</i>	<i>31,546</i>	<i>35,460</i>	<i>306,407</i>	<i>311,871</i>
Cast iron pipe.....	1,778	6,076	47,314	69,345
Castings and forgings....	163	242	2,315	2,163
Total	57,782	58,471	565,421	571,413
Manganese ore*	15,063	36,029	146,657	266,826
Iron ore	211,494	224,524	1,887,201	2,061,028
Magnesite (dead burned)..	.....	4,018	38,391	57,542

*Manganese content only.

†Chromium content only.

‡Silicon content only.

in both instances, taking 42,403 tons and 40,692 tons respectively. Peru took 962 tons of American tin plate in September.

Steel bar exports in September included 9392 tons to Canada. For the nine months, Canada took 71,737 tons, compared with 48,513 tons during the corresponding period of last year. Exports of plain structural material to Canada in September were 10,661 tons. For the nine months shipments of this material to Canada aggregated 109,345 tons, against 87,176 tons for the corresponding period of last year. Canada also was the principal buyer of steel rails, galvanized sheets, black steel sheets, plates and plain and galvanized wire in September and during the nine months.

Total exports to Canada during September were 126,102 tons, while for the nine months they were 854,620 tons, compared with 631,640 tons during the corresponding period of last year. Exports to Japan and

United States Imports of Iron and Steel Products in September

(In gross tons)	
Austria	19
Belgium	16,552
Czechoslovakia	276
France	5,414
Germany	9,743
Italy	24
Netherlands	4,457
Norway	3,366
Sweden	2,305
Switzerland	1
United Kingdom	4,191
Europe	46,348
Canada	7,629
Mexico	32
British India	3,758
Japan	15
Total	57,782

Chosen in September were 36,376 tons, and for the nine months ended with September they were 298,019 tons, against 206,826 tons for the corresponding period of last year.

Aggregating 12,207 tons, imports

of structural shapes constituted the principal item of incoming shipments in September, 6988 tons being furnished by Belgium, 3369 tons by Germany and 1377 tons by France. Of the 7358 tons of steel bars imported in September, 4391 tons came from Belgium, 1157 tons from France, 833 tons from Germany and 774 tons from Sweden. Germany supplied 1213 tons of the 3084 tons of "other pipe and tubes" imported in September, while 911 tons came from the United Kingdom, 261 tons from Canada, 245 tons from Czechoslovakia and 146 tons from Belgium.

Of the 15,063 tons of manganese ore concentrates imported in September, 4768 tons came from British West Africa, 4232 tons from Soviet Russia, 3780 tons from India and 2162 tons from Brazil. Norway supplied 3092 tons of the 4660 tons of ferro-manganese imported in September; Canada, 1047 tons; United Kingdom, 462 tons.

Sharp Decline in Machinery Exports

September 25 Per Cent Below August, But Nine Months 12 Per Cent Ahead of 1927—Imports Lower

WASHINGTON, Oct. 29.—Declining \$11,389,853, exports of machinery of all kinds in September were valued at \$32,913,382, against \$44,303,235 in

August. The decrease was reflected in most of the items, locomotives being one of the few exceptions. In September of last year exports of

machinery were valued at \$34,309,930. For the nine months ended September, however, a substantial increase over exports of the corre-

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Locomotives	\$555	\$99	\$2,548	\$4,404
Other steam engines	26	76	707	1,092
Boilers	194	58	995	667
Accessories and parts	39	101	463	427
Automobile engines	919	714	11,511	9,528
Other internal combustion engines	712	575	6,577	5,524
Accessories and parts	215	186	2,740	2,640
Electric locomotives	16	227	1,128	821
Other electric machinery and apparatus	507	449	5,824	5,685
Excavating machinery	291	459	2,242	3,606
Concrete mixers	68	92	80	832
Road-making machinery	210	147	2,245	1,703
Elevators and elevator machinery	266	334	3,208	3,661
Mining and quarrying machinery	1,014	906	10,116	10,082
Oil-well machinery	872	641	10,891	14,163
Pumps	520	559	5,916	4,802
Bending and power presses	363	75	1,732	391
Forging machines	73	96	610	772
Machine tools*	832	997	12,219	11,410
Other metal-working machinery and parts	383	336	4,494	3,551
Textile machinery	756	818	9,733	6,314
Sewing machines	495	335	6,387	4,322
Shoe machinery	95	116	1,339	1,244
Flour-mill and gristmill machinery	317	27	334	400
Sugar-mill machinery	510	958	3,295	3,228
Paper and pulp mill machinery	158	182	2,244	2,866
Sawmill machinery	48	54	672	596
Other woodworking machinery	115	102	1,389	1,055
Refrigerating and ice-making machinery	659	404	7,083	7,807
Air compressors	401	362	5,008	4,484
Typewriters	1,363	1,464	15,660	15,412
Power laundry machinery	122	30	877	1,171
Typesetting machines	347	352	3,371	3,247
Printing presses	374	401	4,453	4,673
Agricultural machinery and implements	8,498	8,690	90,182	72,456
All other machinery and parts	10,580	12,888	127,050	112,187
Total	\$32,913	\$34,310	\$365,323	\$327,273

*Principal details in another table.

Imports of Machinery Into the United States

(By Value)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Metal-working machine tools	\$35,516	\$46,861	\$433,247	\$328,140
Agricultural machinery and implements	245,791	310,017	4,381,958	3,751,852
Electrical machinery and apparatus	154,497	121,699	1,143,902	1,341,845
Other power-generating machinery	3,256	655	9,249	8,726
Other machinery	780,238	611,144	7,270,990	6,445,898
Vehicles, except agricultural	280,430	257,610	2,323,625	1,774,464
Total	\$1,499,728	\$1,347,986	\$15,562,971	\$13,650,425

Exports of Power-Driven Metal-Working Machinery

	September, 1928		August, 1928	
	No.	Value	No.	Value
Engine lathes	56	\$105,444	86	\$243,694
Turret lathes	14	35,291	37	129,768
Other lathes	46	87,149	91	193,436
Vertical boring mills and chucking machines	6	14,093	17	36,068
Thread-cutting and automatic screw machines	47	57,212	58	98,399
Knee and column type milling machines	26	60,464	50	91,789
Other milling machines	37	65,975	60	101,102
Gear-cutting machines	23	66,719	48	141,695
Vertical drilling machines	19	18,157	44	86,024
Radial drilling machines	14	40,339	14	48,622
Other drilling machines	75	25,103	81	61,128
Planers and shapers	25	39,694	52	105,532
External cylindrical grinding machines	73	128,215	82	201,025
Internal grinding machines	27	55,797	54	146,143
Metal-working tool-sharpening machines	65	36,214	59	28,513
Total	553	\$835,866	833	\$1,712,938

sponding period of last year was made, being \$365,323,328 as compared with \$327,272,896.

Exports of industrial machinery in September were valued at \$14,872,197, against \$19,173,465 in August and \$14,307,188 in September of last year. For the nine months ended with September they were valued at \$164,361,944, compared with \$150,425,125 for the corresponding period of last year. Exports of power-driven metal-working machinery in September were valued at \$1,660,115, against \$2,650,532 in August and \$1,554,950 in September, 1927. For the nine months ended with September, 1928, the present and last year, exports were valued at \$19,017,249 and \$13,747,990 respectively. Exports of agricultural implements and vehicles in September were valued at \$8,498,000, against \$13,697,000 in August. Exports of power-driven metal-working machines listed in

THE IRON AGE table totaled 553 in number, valued at \$835,866, in September against 833, valued at \$1,712,938, in August.

Imports of machinery and vehicles in September were valued at \$2,226,391, compared with \$2,729,543 in August and \$2,198,617 in September of last year. For the nine-month periods the values were \$21,194,752 in 1928 and \$21,103,263 in 1927, a difference of only \$91,489. Imports of industrial, office and printing machinery in September were valued at \$1,428,520, against \$1,829,834 in August and \$1,370,674 in September of last year. In the nine months of 1928 and 1927 they were valued at \$13,205,462 and \$12,697,399 respectively.

Imports of machinery as listed in THE IRON AGE table were valued at \$1,499,728 in September, against \$2,081,751 in August and \$1,347,986 in September of last year.

loft under the roof, a scaffolding was prepared for the erectors, but this was found unnecessary as the workmen were able to work quite rapidly by climbing up the lattice-like work as they bolted it ahead of them.

In spans of 30 to 60 ft., the rhomboid roof weighs about 2¼ lb. per sq. ft. and the standardized units in 5-ft. and 10-ft. lengths are of a broad U shape 5½ in. between the two 2¼-in. flanges. These units weigh about 2½ lb. per ft. It is suggested by the designer that on larger spans somewhat larger dimensions and heavier gage sheets could be used. As yet no standardization of various weights for different designs has been attempted.

These roofs are being sold in Germany for barns and other agricultural purposes, but they are suggested as a desirable method of constructing aircraft hangars, large arenas and convention halls. The selling price in Germany is at present about 25c. per sq. ft. and the cost of manufacturing, including galvanizing, is placed at about \$125 per metric ton, f.o.b. works.

This type of construction is claimed by its producers to weigh about 40 per cent less than the usual roofing, and loading tests made by the German manufacturers are said to show that the roof will carry double the load of a regular design.

German Develops Steel Lattice Roof

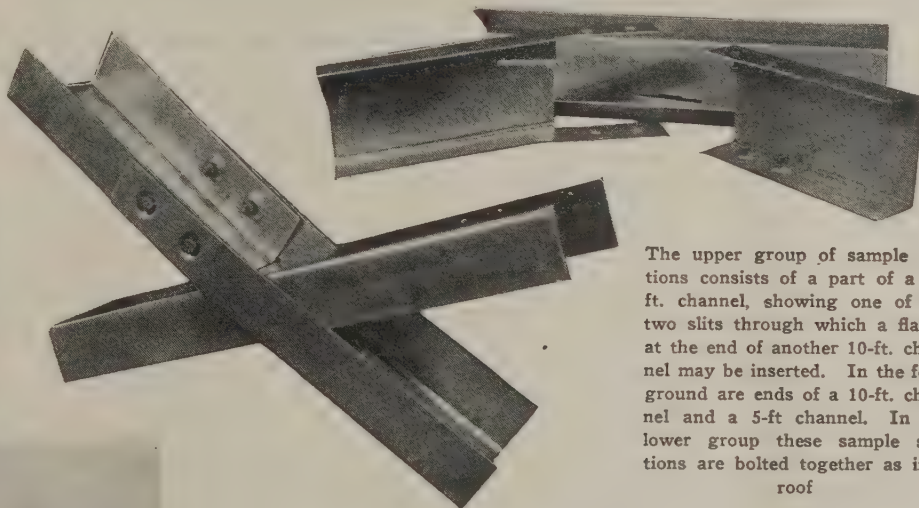
American Company Has License to Use Pressed Steel Channels, Bolted Together, for Arenas, Public Halls, Etc.

LICENSE to manufacture pressed steel channels for a new type of roof structure developed in Germany has been acquired by the Blaw-Knox Co., Pittsburgh. Patented by Emil Moritz Huennebeck, it is known as rhomboid trussless roof construction. Since its development it has been manufactured in Germany by the Rautennetz-Gesellschaft M.B.H., Duesseldorf. As indicated in the accompanying reproduced photographs, the materials used throughout consist of pressed metal channels. They are of two standard lengths, one 5 ft. and the other 10 ft., pressed from No. 14 gage sheets, which are later galvanized.

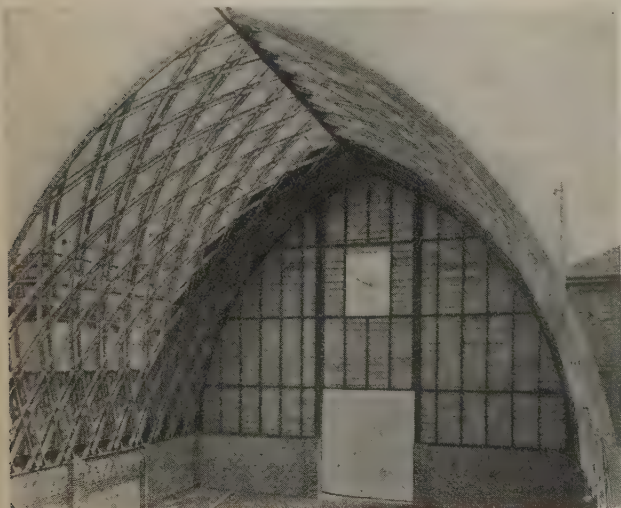
The web of the longer channel is cut away at each end, leaving an overhang of about 5 in. on one flange and 6 in. on the opposite flange at each end. Two countersunk holes for bolts are punched in each flange and the ends are sprung sufficiently to admit the abutting channel, to which it is

bolted. The shorter piece has a slit close to one flange and substantially parallel with it, the slit to admit the overhanging flanges of the 10-ft. channel. The cut is shaped to permit the countersunk bolt holes in these flanges to pass.

In erecting the first experimental building, which was a barn with stables on the first floor and a large



The upper group of sample sections consists of a part of a 10-ft. channel, showing one of the two slits through which a flange at the end of another 10-ft. channel may be inserted. In the foreground are ends of a 10-ft. channel and a 5-ft. channel. In the lower group these sample sections are bolted together as in a roof



This experimental barn constructed in Germany as one of the buildings in an all steel farm exhibition, shows the completed rhomboid roof ready for the sheets or other outside covering. Similar construction on a larger scale is suggested for aircraft hangars, large arenas, or factory buildings

mobile and there is the expectation that this amount will be increased to 40 to 60 lb., as the Ford company has sent out blueprints covering 12 to 15 parts to both malleable foundries and drop forge plants for estimates. In the old model T Ford there were 90 lb. of malleable castings, which was reduced to 74 lb. about two years ago when the hubs were changed from castings to forgings. In the new model A forgings replaced malleable castings until quite recently. It is understood that Ford production has been delayed by inability to get desired deliveries on drop forgings.

European Steel Business Less Active

Buying Smaller Since Decline of Prices from Peak—French Expect Home Construction to Continue Through Winter

(By Cable)

LONDON, ENGLAND, Oct. 29.

PIG iron is quiet, but Cleveland producers expect to book further substantial tonnages before the end of the year. Consumers, however, are limiting their purchases to immediate requirements. Export demand is poor, but the threatened German lockout in November may bring improvement.

Hematite is still moderately active in the domestic market and Italian consumers are buying special grades. Foreign ore continues quiet.

Finished iron and steel markets are quiet generally. Although there is some export demand for heavy steel, sales are small. Rail and sheet mills are moderately busy.

Swan, Hunter & Wigham Richardson, Ltd., have a contract for a 15,000-ton floating oil factory to cost £275,000 (\$1,336,500) from the Viking Whaling Co. Clyde shipyard joiners have ceased working overtime as a protest at the refusal of employers to in-

crease wages by 5s. (83c.) per week.

Tin plate is quiet and prices are easier with makers seeking to book orders for shipment over the remainder of the year. Prompt and early shipment tin plate has sold at 18s. (\$4.37) per base box, but for delivery next year the price has been 18s. 1½d. (\$4.40) per base box, f.o.b. works port.

Galvanized sheets are steady, with a fair trade in small orders. Some mills are sold out until January, but others need tonnage for November shipment. Japan is buying a few small lots of light and heavy-gage black sheets.

Continental iron and steel markets are quiet, with prices steady following the recent decline. German production in September, was 985,000 metric tons of pig iron, 1,190,000 tons of steel ingots and cast steel and 941,000 tons of rolled steel products. Italian output in the first half of this year was 204,000 metric tons of pig iron and 892,000 tons of steel ingots.

ally paid. It has been pointed out to the correspondent of THE IRON AGE in Germany, by the United Steel Works, Düsseldorf, and by the Federation of German Steel Manufacturers, that, while German wages are generally considered to be much lower than British, they are in most cases higher, both actually and relatively.

Actual wage payments to workmen are higher than a table of wage rates would show, as practically all steel workers are receiving the 25 per cent bonus for overtime work. In considering wage averages, the higher wages of foremen must be included. It is further explained that wages are relatively higher, as the cost of living in Germany is lower than in Britain and a majority of the workmen live in cottage dwellings provided for them by the companies at fixed rentals of 25 to 40 m. (\$5.95 to \$9.53) per month, buying food and other necessities from the company stores at low prices.

Wages paid to foremen, it is said, are considerably higher than in Great Britain and were, at the end of September of this year, 340 m. (\$80.99) per month for a blast furnace foreman, 450 m. (\$107.19) per month for a Bessemer converter foreman, 410 m. (\$97.66) per month for an open-hearth foreman, 465 m. (\$110.76) per month for a foreman of a bar rolling mill, 610 m. (\$145.30) for the foreman of a sheet rolling mill, 330 m. (\$78.61), for a foundry foreman. These wages are based on an hourly

German Wages More Than They Appear

Bonus Payments to Married Men and for Overtime Represent 25 Per Cent More Than Scale Shows

HAMBURG, GERMANY, Oct. 13.—German steel producers claim that the wages quoted for German steel workers in the recent comparison of Euro-

pean and American wages made by the United States Bureau of Labor Statistics (THE IRON AGE, Sept. 20, page 732) do not represent those actu-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.			\$4.31		
Bilbao Rubio ore*.....	1 2s.	to £1 2½		5.35	to	\$5.48
Cleveland No. 1 fdy.....	3 8½	to 3 9½		16.64	to	16.89
Cleveland No. 3 fdy.....	3 6			16.04		
Cleveland No. 4 fdy.....	3 5			15.80		
Cleveland No. 4 forge...	3 4½			15.68		
Cleveland basic (nom.)..	3 5			15.80		
East Coast mixed.....	3 10			17.11		
East Coast hematite.....	3 10½			17.23		
Rails, 60 lb. and up.....	7 15	to 8 5		37.66	to	40.10
Billets	6 2½	to 6 10		29.77	to	31.59
Ferromanganese	13 15			66.83		
Ferromanganese (export)	14 0			68.04		
Sheet and tin plate bars,						
Welsh	6 0			29.16		
Tin plate, base box.....	0 18	to 0 18½		4.37	to	4.40
Black sheets, Japanese						
specifications	13 7½			65.00		
Ship plates	7 12½	to 8 2½				
Boiler plates	9 0	to 10 10		1.63	to	1.74
Tees	8 2½	to 8 12½		1.74	to	1.84
Channels	7 7½	to 7 17½		1.58	to	1.69
Beams	7 2½	to 7 12½		1.53	to	1.63
Round bars, ¾ to 3 in..	7 10	to 8 0		1.62	to	1.69
Steel hoops	9 0	to 10 0		1.92	to	2.14
Black sheets, 24 gage...	10 0			2.14		
Galv. sheets, 24 gage...	13 10	to 13 15		2.93	to	2.98
Cold rolled steel strip, 20						
gage, nom.	16 0			3.42		

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron-(a):						
Belgium	£3 3s.	to £3 5s.		\$15.31	to	\$15.80
France	3 3	to 3 5		15.31	to	15.80
Luxemburg	3 3	to 3 5		15.31	to	15.80
Basic pig iron (nom.):						
Belgium	3 3			15.31		
France	3 3			15.31		
Luxemburg	3 3			15.31		
Coke	0 18			4.37		
Billets:						
Belgium	5 1			24.54		
France	5 1			24.54		
Merchant bars:						
Belgium	6 2½			1.35		
France	6 2½			1.35		
Luxemburg	6 2½			1.35		
Joists (beams):						
Belgium	5 3			1.13		
France	5 3			1.13		
Luxemburg	5 3			1.13		
Angles:						
Belgium	6 0			1.30		
½-in. plate:						
Belgium (a).....	6 14			1.48		
Germany (a).....	6 14			1.48		
¾-in. ship plate:						
Belgium	6 9			1.42		
Luxemburg	6 9			1.42		
Sheets, heavy:						
Belgium	6 1			1.33		
Germany	6 1			1.33		

(a) Nominal.

rate of 1.12 m. to 2.03 m. (27c. to 48c.) for an 8-hr. day, to which is added 25 per cent an hour for overtime work. If the employee is married and has children the wage is increased by 30 to 80 m. (\$7.15 to \$19.06) per month.

The average wage paid by the United Steel Works in September to all workmen in the blast furnace and steel works departments, including foremen, apprentices, transport workers, skilled and unskilled labor, was 231 m. (\$55.02) per month. The average wage to skilled workmen, excluding foremen, was in the same month 295 m. (\$70.27). As a result of bonus payments for overtime, the unskilled workman actually receives 23.3 per cent more than his wage rate shows and the skilled worker receives 27.3 per cent more. From September, 1927, to September, 1928, wages to steel mill workers have advanced an average of 17.8 per cent.

The United Steel Works has expanded its interests recently by ab-

sorbing the shares of a large plate and strip steel mill at Charlottenhütte and the Siegerner Eisenindustrie. These acquisitions increase the annual capacity of the corporation 350,000 to 400,000 tons. The statement of the United Steel Works for the third quarter shows 172,595 employees, compared with 177,090 in the second quarter of this year, and 15,394 clerical and technical workers compared with 15,530 in the second quarter. Domestic sales amounted to 231,700,000 m. (\$55,190,940), compared with 215,600,000 m. (\$51,355,920) in the second quarter, and export sales totaled 136,800,000 m. (\$31,585,760), compared with 124,600,000 m. (\$29,679,720). Pig iron output in the quarter was 1,547,987 metric tons, compared with 1,541,871 tons, and semi-finished output was 1,652,311 tons, compared with 1,619,150 tons. During the quarter four Siemens-Martin furnaces ceased operation, two of which were scrapped.

Most mills are well filled with orders, and rolling mills in the North, which buy semi-finished steel in the open market, are experiencing considerable difficulty in securing sufficient for their requirements. In some instances only about half their total needs has been shipped, and importation from Belgium is being considered.

Finished Material.—Domestic buying is heavy, and, with building construction continuing at a high rate, merchants' stocks of structural material and bars have been depleted and many buyers are seeking to replenish their stocks promptly, foreseeing a large demand from the building trade through the winter months. Deliveries being offered, except to a few preferred customers, range from two to six months. Export demand continues fair, but bars are quoted at £6 7s. per ton (1.40c. per lb.), f.o.b. Antwerp, compared with £6 12, per ton (1.45c. per lb.) about a month ago. Beams show a slight advance at £6 2s. 6d. per ton (1.35c. per lb.), compared with £6 per ton (1.34c. per lb.) early in September. Wire rods also have advanced from £6 12s. per ton (1.45c. per lb.) in September to the present market of £6 16s. per ton (1.49c. per lb.), f.o.b. Antwerp. At a recent meeting of the foremost producers of hoops and strip steel in France, Germany, Belgium and Luxemburg, it was agreed to establish uniform selling methods and extras. A committee was selected to examine the various suggestions made, to ascertain that they did not conflict with the present agreement governing exports of tubes and strips.

Sheets.—Formation of a sheet comptoir is again under discussion, and announcement of its organization is expected soon. The sheet market is lagging considerably behind other products, with prices unchanged but generally easy on heavy and medium gages. The lighter gages continue fairly firm, with demand improved.

French Domestic Trade Heavy

Building Expected to Continue Through Winter—German Export Competition Expected to Increase

PARIS, FRANCE, Oct. 10.—Exports of iron and steel are being maintained at a high level, but at present export prices there is a growing possibility of keen competition from the United States and Great Britain, except in certain materials, such as sheets, the prices of which have lagged slightly behind those of other steel products. Another factor that is expected to contribute to a decline in exports is the growing need of German mills for tonnage, which has caused curtailment of their activity in some cases.

In the French domestic market, demand continues large and all branches of the iron and steel industry are well engaged, output being limited only by shortage of labor. Some of the mills rolling heavy material have not put all mills into operation because of the shortage of skilled and semi-skilled workmen. New export business is being sought, especially in the French colonies, and considerable tonnage may be booked for large public works in Indo-China. The present domestic building program is extensive, and in the Paris area the usual winter decline in construction work is not expected.

The domestic market is firm, but further advances in prices are not expected, as producers, in most cases, are opposed to a higher price level, believing that it would lead to demands for wage increases and higher coal quotations.

Pig Iron.—Heavier demand from foundry consumers has brought about an increase in the tonnage available for October from 36,000 tons to 42,000 tons. On this additional 6000 tons, furnaces have agreed to quote an ad-

vance of 10 fr. (39c.) per ton, or 450 fr. (\$17.55) per ton, f.o.b. Longwy, which will be the market for November and December delivery.

Semi-Finished Material.—Export prices are strong, but show some variation, depending upon the tonnage on the books of the mill seeking business. Blooms are at £4 8s. (\$21.38) per ton, compared with £4 10s. (\$21.87) per ton early in September, billets £4 10s. (\$21.87), compared with £4 15s. (\$23.07) about a month ago, and sheet bars £5 (\$24.30), compared with £4 10s. (\$21.87) a month ago.

Belgian Steel Prices Lower

Mills Granting Concessions and Quoting Earlier Delivery—Pig Iron Weak Despite High Price of Scrap

ANTWERP, BELGIUM, Oct. 13.—Business in the domestic market is smaller and prices are beginning to decline slightly from the recent peak. Mills, however, are still in a strong position with plenty of tonnage on their books, and the concessions that have been granted by some mills on certain sizes of finished steel are not regarded seriously. Producers have suddenly begun to offer December-January delivery, which buyers claim is proof that the long delays in shipments, previously reported, were exaggerated. A contributing factor to the decline of activity in Belgium is probably the corresponding reduction of demand in the French market, where mills for the past fortnight or

more have exhibited increasing willingness to grant concessions.

Pig Iron.—Prices show a tendency toward weakness and No. 3 phosphoric foundry iron is quoted at £6 1s. 6d. to £6 2s. 6d. (\$29.52 to \$29.76) per ton, f.o.b. Antwerp. The market on iron and steel scrap, however, is still high, with No. 1 cast for foundries at 128 Belgas (\$17.79) and No. 2 cast at 118 Belgas (\$16.40) per ton.

Semi-Finished Material.—Despite slight softness evident in finished steel and some weakness in the pig iron market, semi-finished material is strong, prices showing a continued upward trend. Only a few transactions are reported, but this is largely because of lack of interest in further

tonnage on the part of makers. Blooms of Thomas grade range from £4 9s. (\$21.63) per ton for 8-in. to £4 16s. (\$23.33) per ton for 4-in. Billets are quoted at £4 19s. (\$24.06) per ton for 3-in. to £5 1s. (\$24.54) per ton for 2-in., all f.o.b. Antwerp.

Finished Material. — Buyers are pressing for lower prices, and concessions from the recent peak of the market are not unusual. French and Luxemburg mills show themselves quite willing to accept plenty of tonnage, even at the lower prices beginning to prevail. Steel bar prices

are easier, except in the small sizes, on which certain producers continue out of the market. Quotations have declined to as low as £6 2s. 6d. per ton (1.35c. per lb.), but the average range of the market is from £6 3s. 6d. to £6 4s. per ton (1.36c. to 1.37c. per lb.), f.o.b. Antwerp. Structural rounds are stronger at £6 2s. 6d. per ton (1.35c. per lb.), and beams are quoted at £5 2s. 6d. per ton (1.13c. per lb.). Demand for steel hoops is light and prices are weaker, with the market at about £6 5s. per ton (1.38c. per lb.), f.o.b. Antwerp.

Steel Imports Are Small

Sellers Here Offer Distress Lots at Low Prices—American Export Rail Prices High

NEW YORK, Oct. 30. — Interest among American consumers in foreign steel is limited. This lack of demand has resulted, in recent weeks, in sales of imported structural material at low prices, despite a continually advancing market in Europe. In the past week, Continental mills have begun to show willingness to quote slightly lower prices, the export market having declined about 5c. per 100 lb. Structural shapes are quotable today at about 1.75c. per lb., delivered New York. Bars are still quoted by European mills at from 1.95c. to 2c. per lb., delivered.

Export business continues small. Chinese merchants are buying small lots of wire shorts, both plain and galvanized, and some tin plate waste

waste. Recent business with Japan has been largely in rails. Yokohama municipality has awarded several hundred tons of grooved and guard rails to an American mill, and the Imperial Government Railways is taking bids on 300,000 tie plates, about 1000 tons. On several recent quotations to Japan on rails, the price of American mills has not been sufficiently low to obtain the business. On a tonnage of 16-lb. and 20-lb. sections the American bid was \$42.50 per ton, c.i.f. Japanese port, while the Continental quotation was £6 8s. (\$31.10) per ton, c.i.f. An inquiry for 50-lb. rails brought out a quotation from the United States of \$36.50 per ton, c.i.f., but it was not low enough to secure the order.

Ore to Be Mined in North Sweden

New Company to Operate in Pitea District—Pig Iron Producers Seek Tariff Protection

STOCKHOLM, SWEDEN, Oct. 13.—A new corporation with a capital of 1,000,000 kr. (\$267,720), has been organized to engage in mining iron ore in the Pitea district, province of Norbotten, northern Sweden. In addition to mining, the company intends to produce iron and steel. It is understood that the ore in the Pitea district is equal in quality to the deposits in Lapland, both being near the sea-coast and convenient for transportation.

The controversy over tariff protection for pig iron played an important part in the recent elections. Producers demanded better protection against low-priced iron from other European countries, and B. G. Prytz, president A. B. Svenska Kullager Fabriken, Gothenburg, argued that Sweden is not in a position profitably to produce iron on a sufficiently large scale for its requirements, as there is a decided shortage of coal. Producers seeking protection pointed to low foreign wages, arguing that Continental prices were largely dictated by the Belgian market, where wages are

about 50 per cent less than in Sweden.

The pig iron market has recently begun to show improvement, partly because of firmness in the European market and partly as a result of a decline in production and an exhaustion of stocks during the prolonged strike at the iron mines. Pig iron output in the first eight months of this year was only 237,300 tons, compared with 275,800 tons in the same period of 1927. Steel output, however, increased, 371,000 tons of ingots having been produced in the first eight months compared with 330,000 tons in the first eight months of last year. The output of rolled products was 268,000 tons, compared with 216,000 tons in corresponding period in 1927.

Exports of iron ore, which reached a minimum in May, have recovered, with mines again in operation. Shipments for the first eight months of the year, however, were only 1,979,496 metric tons, compared with 6,856,468 tons in the same period of last year and 4,612,453 tons in the first eight months of 1926.

Prepare for Engineering Congress in Japan

More than 200 engineers and scientists, it is expected, from New York, Chicago, Boston, Philadelphia and other section of the United States will be numbered among the guests at a royal garden party to be held on the grounds of one of the Imperial Palaces of Japan and at a banquet tendered by the Prime Minister of Japan, in connection with the first World Engineering Congress which will be held in Tokio next year.

Dr. Elmer A. Sperry, chairman of the American committee of the congress, has announced that the delegation will be given an opportunity to observe the engineering and industrial projects of Japan and will be taken on excursions which will cover practically all of the historic, scenic and other points of interest in that country. Committees throughout the United States are arranging for the American attendance and for the papers to be delivered by American engineers.

Maurice Holland, 29 West Thirty-ninth Street, New York, is executive secretary of the American committee. The members of the committee include Edward Dean Adams, H. Foster Bain, W. L. Batt, J. Vipond Davies, E. DeGoyler, Gano Dunn, Bancroft Gherardi, George Gibbs, E. M. Herr, Charles H. Herty, F. B. Jewett, F. R. Low, James H. McGraw, Charles A. McAllister, Ralph Modjeski, William H. Nichols, L. A. Osborne, John V. W. Reynders, Calvin W. Rice, Charles M. Schwab, Alfred P. Sloan, Jr., Elmer A. Sperry, John F. Stevens, Gerard Swope, Calvert Townley, H. H. Westinghouse and William E. Wickenden, New York; W. W. Atterbury and Samuel M. Vauclain, Philadelphia; Howard E. Coffin, J. H. Hunt, W. B. Mayo and C. F. Kettering, Detroit; William Green, Rear Admiral John Halligan, John Hays Hammond, O. C. Merrill, and George Otis Smith and Major-Gen. Edgar Jadwin, Washington; D. C. Jackson, A. E. Kennelly, Arthur D. Little, and S. W. Stratton, Cambridge, Mass.; William Butterworth, Moline, Ill.; C. C. Chesney and E. Wilbur Rice, Jr., Schenectady, N. Y.; W. F. Durand and Charles D. Marx, Stanford University, Cal.; John R. Freeman, Providence, R. I.; Samuel Insull, Chicago; Dexter S. Kimball, Ithaca, N. Y.; Robert A. Millikan, Pasadena, Cal.; Thomas A. Edison, Orange, N. J.; C. F. Scott, New Haven, Conn.; Ambrose Swasey, Cleveland; Elihu Thompson, West Lynn, Mass.; Daniel Willard, Baltimore, and Orville Wright, Dayton, Ohio. Herbert Hoover is honorary chairman of the American committee.

The super airship Graf Zeppelin on its first air voyage over the Atlantic brought to America 2200 invitations to prominent business men throughout the United States to attend the Leipzig Trade Fair in March, 1929.

Public Indifference Injures Railroads

Manufacturers Stress Importance of Railroad Prosperity to General Business—Assail Anti-Trust and Tariff Laws

EMPHASIZING the importance of transportation in developing stabilization in industry, S. P. Bush, American Rolling Mill Co., Middletown, Ohio, struck the keynote at a session of the annual convention of the National Association of Manufacturers devoted to the relationship of railroad transportation to the economic welfare of the country. The association held a convention Oct. 22 to 24 at the Waldorf-Astoria, New York. In presenting the report of the association's transportation committee, of which he is chairman, Mr. Bush pointed out that the rapid development of airplane and motor truck service in recent years has complicated transportation problems, though at the same time it has made transportation potentially a greater force in bringing about industrial stabilization.

He stated that the committee recognizes the need for greater and more intimate coordination of rail and motor transportation, particularly at congested terminals. It also favors the proposal now under consideration whereby the railroads of the country will take over and manage the railroad express business.

The low rate of return on investment realized by the railroads and the indifference on the part of the public to their condition was discussed by Samuel O. Dunn, editor *Railway Age*, New York. He pointed out that the railroads earned only 4.3 per cent on their investment last year and that similarly poor earnings had been realized since 1922. At the same time, he added, the carriers have improved their service immeasurably and this has made possible a reduction of inventories in many industries, thus releasing a large amount of capital for other uses. He referred, as did Mr. Bush, to the recapture clause of the Transportation Act, which provides that the excess of net earnings of any railroad, above 5¼ per cent, must be divided with the Government. It was brought out that the average return of the railroads since 1922 has been only 4.66 per cent, and that while certain roads may have exceeded the Government's figure in a single year, over a period of years they have not. On account of this condition it was suggested that the basis governing recapture should be five years instead of one, so that poorer earnings in one year can be compensated by better earnings in another.

The Jones Bill, now before Congress, which proposes to create a reserve fund of \$150,000,000 for Federal works in times of general

depression, was referred to by Frank W. Noxon, secretary Railway Business Association, as an important factor looking to the stabilization of railroad earnings. "When construction sags," said Mr. Noxon, "down goes railroad traffic. When work on plants of all sorts slows down the depression ramifies throughout all occupations, curtailing freight and passenger traffic and cutting down railroad earnings. A reserve fund, when called out, would furnish immediate employment to thousands of workers and would also bring demand for material from at least 27 different industries. This stimulus would radiate to many other industries and the nature of the public works program would affect every community."

Railroad Purchases Are Business Indicator

Speaking on the relation of railroad expenditures to general business activity, E. B. Leigh, president Chicago Railway Equipment Co., Chicago, stated that many persons not identified with the railroad supply industry show an interest in the welfare of the railroads because when the roads are making normal expenditures upon their properties general business is good. "Three questions," said Mr. Leigh, "seem in order as to the period in which we now are. First, are railroad outlays sub-normal; second, is there any extraordinary factor capable of sustaining general business during a term of sub-normal railroad expenditure, and, third, has general business been, or is it now being, sustained at a normal rate of growth?"

Mr. Leigh pointed out that railroad expenditures have been sub-normal to the extent that the roads, over a five-year period, have been purchasing only enough materials and equipment to hold inventories at a new minimum. As examples of extraordinary factors which have been sustaining general business during a time of sub-normal railroad buying, the speaker mentioned the development of the automotive industry and the phenomenally high rate of building construction. "For many years," he said, "it was common to say that the railroads consumed from 40 to 50 per cent of the total steel output. From 1920 to 1927, this ratio averaged barely 25 per cent." In answer to the third question as to whether or not business has been sustained at a normal rate of growth, Mr. Leigh pointed out that the rate of increase in railroad ton miles during the last ten years has not by a wide margin been sustained

at the pace set after the depressed years of 1893 and 1907.

Commenting on the future prospects, Mr. Leigh said: "In due course the railroads will have taken up all the slack they can in inventory and in efficient use of facilities. Volume of traffic will have developed through the natural growth of population and higher standards of living among consumers. Expenditures on railroad property will average relatively greater than at present. It is perhaps too soon to affirm the doctrine, 'expenditures on railroad property measure volume of general business,' but this factor in our national economy is bound to be at all times so gigantic that it is timely now and always will be to urge a continuance of watchfulness and activity to the end that the financial strength of the railroad shall not be undermined by unsound policy."

Anti-Trust Laws Provoke Competition

Declaring the Sherman Anti-Trust Law is harmful to American industry and that, while intended to prevent the creation of holding corporations which might obtain a monopoly of production, it has actually encouraged corporate mergers, Robert J. Adams, treasurer Adams Mfg. Co., New York, maintained that business needs an affirmative law in its place. The Sherman law, he said, as presently interpreted, operates to produce the exact opposite of what it was designed to do; that is, it stifles competition by making it difficult for the small producers to continue in business. The horizontal consolidations of units seem to be lawful. As a consequence several of our industries have dominant factors which produce commodities formerly competitive and fix the price thereon, while the uncombined competitors of these combinations, working as individual units, are denied by the Sherman law the right to agree on prices even though the agreed prices are not unreasonable.

"All competent authorities," Mr. Adams continued, "are agreed that the anti-trust laws are antiquated, inept and burdensome. The law assumes an honorable business man is a criminal if he uses extra precaution to earn a profit on his investment. It assumes that any agreement is illegal until proved by the perpetrators to be otherwise. That condition makes it expensive, if not almost impossible, to do business successfully."

In solving the problem, the speaker stated that an agency should be created which would be competent to

gather the necessary information to form the basis of a new law. "If the Bureau of Census or any other bureau of the Department of Commerce were given the power to collect all essential statistics on industry and commerce, we might have an excellent fact compendium to begin with. The work would be enough, in fact, to keep an entirely new bureau engaged. It would at least provide a central agency with sufficient authority to gather all the necessary statistics and other data essential to a proper understanding of the day by day development of our business life.

"We are in need of an affirmative statute, one that is calculated to aid and protect industry rather than a law like that under which we are now supposed to operate. The original idea in creating the Federal Trade Commission was to give us just that body we now feel such a need of. It was supposed to advise business men and to assist in putting a stop to unreasonable methods of competition. Price fixing would tend to stagnate business and curtail legitimate competition. It might deprive the consuming public of the right to benefit from manufacturing progress. It would be best to avoid any semblance of price fixing, but that should not

prevent us from endeavoring to prevent price cutting."

George M. Verity, president American Rolling Mill Co., Middletown, Ohio, advocated a reinterpretation of the anti-trust laws. In his opinion the need of restricting free operation of business has disappeared and a reverse situation has now developed. "Greater stabilization and uniformity of operation and control of both production and distribution," he said, "so that savings made may not be dissipated in unnecessary and uneconomic competition, is the great need of industry today."

Urge Federal Tariff Board

Stressing the importance of the tariff in preserving American standards of living, William W. Nichols, Allis-Chalmers Mfg. Co., Milwaukee, and chairman of the association's committee on tariff, reiterated suggestions of the association's board of directors that a non-partisan, semi-judicial board, appointed by the President, be set up in place of the present Tariff Commission. Such a board, he stated, should "be capable of basing its findings on sound and all-inclusive economic considerations.

"Unfortunately," he said, "a fun-

damental weakness so impairs the usefulness of the present commission as to make its continuance a grave question in the minds of some people. Its bi-partisan character suggests a Congressional sincerity in meeting the issues. This bi-partisan division has blocked progress for years. Such tariff increases and the few decreases that have been made to date by the commission have been so trivial in comparison with needs as to hold up for ridicule the whole performance of one of the most important Government institutions."

Suggesting methods by which the National Association of Manufacturers might contribute to tariff reform, Joseph W. Randall, J. Randall & Brothers, Philadelphia, advised the indorsement of a protective tariff free from discrimination or special privilege. He approved the plan of allowing each industry to appoint its own representatives to make recommendations to Congress and to the President regarding its tariff needs without definite or implied support of such schedule by any association representing a variety of trades and industries, leaving Congress and the President to decide whether the schedules so recommended meet the requirements of a tax on imports.

Conditions in Different Industries

Foundries Report Business Not Quite So Favorable—Outlook Excellent in Machinery Field

ANALYSIS by industries of the business survey made by the National Association of Manufacturers, a general review of which appeared in *THE IRON AGE* last week, indicates excellent conditions in the iron and steel industry, some improvement in the foundry business and excellent prospects in the machinery trade.

Iron and Steel Industry Thriving

In the iron and steel industry excellent business is reported by 21 per cent of the companies replying to the questionnaire, good conditions by 43 per cent, fair by 31 per cent, with 5 per cent pronouncing it poor. Twelve per cent of the replies expect an excellent winter business, 51 per cent good, 30 per cent fair, and 7 per cent poor. Compared with last fall, business is pronounced better by 50 per cent, not so good by 36 per cent, and unchanged by 14 per cent. Inventories are regarded low by 15 per cent; normal, by 80 per cent; and overstocked, by 5 per cent. A large increase over last fall in employment is noted by 11 per cent, with 57 per cent noting a small increase, and 32 per cent noting a small decrease. A dearth of skilled workers is reported by 13 per cent, but the supply of unskilled workers is adequate. Small increases in wages since last fall are reported by 76 per cent, and a small decrease

by 24 per cent. Increased production over last fall is reported by 73 per cent, greater sales quantities by 70 per cent, and higher sales values by 60 per cent. The industry is reported 97 per cent free of strikes.

Foundries Lag Slightly

In iron foundries and machine shops trade conditions are pronounced excellent by 8 per cent, good by 40 per cent, fair by 36 per cent, and poor by 16 per cent, with the outlook for winter regarded as excellent by 7 per cent, good by 31 per cent, fair by 49 per cent, and poor by 13 per cent. Last fall's business in the experience of 36 per cent of those reporting is exceeded, with 38 per cent reporting a falling off over last year, and 26 reporting it unchanged. Low stocks on hand are reported by 12 per cent, normal by 74 per cent, and an over supply by 14 per cent. A large increase in employment since last fall is reported by 17 per cent, a small gain by 40 per cent, a large decrease by 5 per cent and a small decrease by 38 per cent. A shortage of skilled workers is reported by 28 per cent, and of unskilled labor by 2 per cent, while large increases in wages over last fall are reported by 10 per cent, small increase by 70 per cent, large decrease by 4 per cent, and a small decrease by 16 per cent. Greater production than at this time last year is reported by

64 per cent, large sales quantities by 50 per cent and higher sales values by 30 per cent. No strikes are reported in the industry.

In the machinery industry excellent business is reported by 25 per cent, good by 28 per cent, fair by 36 per cent, and poor by 19 per cent, while 14 per cent regard the outlook for winter as excellent, 46 per cent as good, 36 per cent as fair, and 4 per cent poor. Compared with last fall, business at present is pronounced better by 49 per cent, not so good by 27 per cent, and unchanged by 24 per cent. Low inventories are reported by 19 per cent, normal by 70 per cent, and overstocked by 11 per cent. A large increase in employment since last fall is reported by 14 per cent, a small increase by 56 per cent, a large decrease by 2 per cent and a small decrease by 28 per cent. Thirty per cent report a shortage of skilled labor, and 2 per cent an inadequate supply of unskilled workers. Production is higher than last year, according to 68 per cent; sales quantities greater, 65 per cent; and sales values higher, 64 per cent.

For number of long-time employees, the Jeffrey Mfg. Co., Columbus, Ohio, maker of conveying and crushing machinery, believes it stands in almost a unique position. The employees have a 20-year service club in which there are 292 active members. At the annual picnic in September, 32 new members were added to the roster. The president of the 20-year service club, O. R. Ehret, has a service record of 49 years.

Refractories Men Discuss Specifications

Methods of Making Tests Considered at Fall Meeting— Proposal to Avoid Duplication of Effort

ABOUT 70 men interested in refractories and their use gathered in the Hotel Vanderbilt, New York, Oct. 24, to discuss problems germane to their work. This was the fall meeting of the American Refractories Institute. Mainly, the meeting was given over to a discussion of specifications for fire-brick for various purposes, and to a consideration of test methods whereby specifications could be checked. Standard load tests, spalling tests, and size requirements formed the subjects of separate papers.

In the morning session there was discussion of a proposal to join hands with the American Ceramic Society in so far as work of the two organizations overlaps, and thus by mutual effort avoid duplication of work. This proposal was received with approval by the members present but must have ratification from the board of directors.

Tests Under Load, Hot

Load tests on brick formed the subject of a paper by C. E. Bales of the Ironton Fire Brick Co., Ironton, Ohio. He showed slides depicting a standard form of furnace for making load tests at high temperatures. About ten brick are handled at once in the furnace, each being subjected to a load of 25 lb. to the sq. in., provided by springs attached to one-half of the grip and adjustable from outside the furnace. Heat is applied at 2462 deg. Fahr. (1350 deg. C.), and surface combustion of gas is used. It is possible to control the atmosphere in the furnace. The test follows the specifications of the American Society for Testing Materials.

While this test is supposed to show the refractoriness of the brick, it does not show how the material will perform in service. Tests of 50 or more types of brick, which were made at the Mellon Institute, Pittsburgh, under the refractories fellowship, showed an average deformation of 5.7 per cent under these tests. Progressive loads were applied; the first test being at 10 lb., then 25, and then 40 lb. to the sq. in., with ascending deformation under the successive increases in load.

Causes of Spalling

Spalling tests were taken up in a paper by Scott McDowell, who referred to the thermal spalling of silica brick, caused by rapid temperature changes. Characteristics of brick were shown on a diagram which gave the expansion ratio of different brick at various temperatures of heating. There is a quick jump in the expansion of silica brick, beginning at 575 deg. Fahr. and running up to 1250 deg. Within this range spalling is

bad; above 1250 deg., however, there is no further expansion and rapid changes in temperature above that point no longer induce spalling. In the range of 100 deg., from 575 to 675 deg., the expansion of silica brick jumps from 1/16 in. to each foot of length to 1/2 in. Strains set up from this cause are relieved by cracking, either internally or on the surface, the latter giving rise to spalling.

Because of wide variations in results on individual bricks, the spalling test, involving dipping in water, should always be made on at least five samples, and preferably on ten. If the percentage loss is to mean anything, the number of dips involved at high temperature should be specified. There may be no spalling in the first three or four dips, and then a chunk will come off on the next one.

Machine for Brick Measuring

Size requirements were taken up by Mr. Phelps of the Mellon Institute, with particular reference to a machine that has been developed at the institute for measuring brick between two plane parallel surfaces. The head is so designed that the 4 1/2-in. and the 9-in. dimensions may be measured without changing the position of the measuring element. For the thinner 2 1/2-in. dimension, however, the head is reversed in position, bringing a third plane surface into play. The lower member, which operates in conjunction with any one of the three upper surfaces, is movable, the extent of its motion being indicated by graduations in connection with the handle operating the moving mechanism. This denotes departure either side of the standard length, width or thickness.

The machine is portable, weighing about 60 lb., and is customarily set on a table or bench. It may be used readily by either the manufacturer or the consumer, and can be made at a cost of about \$60 each in lots of 25 machines.

Announce Personnel of Sanderson Company

Edward P. Sanderson, Robert H. Sanderson, John J. Nolan, William G. Hepburn, Robert A. O'Donnell, William T. Ryan, Leigh N. Vaughan, George McLean and James F. Welch, former officers and members of the E. P. Sanderson Co., Cambridge, Mass., and John C. Huxley, William Robinson, Lester E. Stevenson, Harold Bellamy, Davis G. Wallace and Curtis M. Blood, former managers and members of the Cutter & Wood supply department of the E. P. Sanderson Co., have organized a new company under the firm name of Cutter, Wood & Sanderson Co., succeeding to the mill sup-

ply, heavy hardware, horseshoeing supply and automobile trimming departments of the E. P. Sanderson Co., not sold or transferred with the recent sale of the steel departments to the Joseph T. Ryerson & Son, Inc. The new company will occupy quarters at 222 to 232 Third Street, Cambridge, Mass.

Cleveland Selected for Trial Industrial Census

WASHINGTON, Oct. 30.—The Department of Commerce has arranged to make a trial census of industrial purchases; that is, purchases by manufacturers of raw and semi-finished materials, supplies and equipment. A census of these primary stages of distribution was felt necessary to supplement the census of wholesale and retail distribution made some time ago in 11 cities. The object of each of these censuses is to provide an idea of valuable information to be sought and how to prepare schedules to obtain such information in a national census of distribution such as is provided for in the authorization bill for the fifteenth decennial census (1930) pending approval of the Senate.

While many cities could have qualified for the industrial purchase census, Cleveland was decided upon because of the cooperation offered by the Cleveland Chamber of Commerce, as well as the evident suitability of the city's manufacturing situation. Cleveland had in 1925, according to the census of manufactures for that year, 2212 factories, among which 91 different classifications of industry were doing at least \$100,000 business annually. The total value of products was \$1,094,000,000. Among the leading industries are iron and steel, motor vehicles, foundry and machine shops, electrical machinery and apparatus, slaughtering and meat packing, paints and varnishes, stoves and appliances, clothing, bread and bakery products.

Makes Loans for Further Shipbuilding

WASHINGTON, Oct. 30.—The Shipping Board has issued a statement that it would be another year before the full effect of the Jones-White act on American shipping can be entirely appraised. Its stimulation, however, is cited to show present conditions. Two loans from the construction fund have actually been concluded, those of the American Line Steamship Corporation, in aid of the construction of the Virginia and a sister ship as yet unnamed, and four loans have been authorized for the Export Steamship Corporation, which proposes to build four combination passenger and cargo vessels. Construction has been started on the two American line ships and bids for the construction of the four Export ships will be opened Nov. 5. Three loans, involving the construction of seven ships, are now being negotiated.

Gray Iron Institute to Meet Nov. 14

The Gray Iron Institute, Terminal Tower Building, Cleveland, will hold its first annual meeting Nov. 14 at the Cleveland Chamber of Commerce rooms in the same building. Reports of officers will be received, directors elected for the ensuing year and matters of policy determined.

The institute has shown a healthy growth since it was organized in Philadelphia, May 18. At that meeting directors were chosen for a six months' period, the incorporation of the institute was authorized and other steps were taken to place it on a well established business basis. Since that time considerable progress has been made. Several additional members have been added and the organization now comprises 70 gray iron foundry companies in various sections of the country.

The board of directors has appointed the following nominating committee to name nominees for directors: Chairman Howard J. O'Neil, Western Foundry Co., Chicago; Paul C. DeWolf, Brown & Sharpe Mfg. Co., Providence, R. I.; David L. Sacks, Louis Sacks Foundry, Inc., Newark, N. J.; Harry Cooke, Olney Foundry Co., Philadelphia; William F. Bornfleth, Cream City Foundry Co., Milwaukee.

Davison Development of Neville Island

Davison Coke & Iron Co., Pittsburgh, is moving ahead steadily with its construction program at Neville Island, which includes a cement plant, a battery of by-product coke ovens, a new power plant, betterments to the Neville furnace acquired from the American Steel & Wire Co., and the building of a dock for handling river borne freight. The dock will be built by the Dravo Contracting Co., Pittsburgh. Building foundations will be built by the Rust Engineering Co., Pittsburgh. The Allis-Chalmers Mfg. Co., Milwaukee, has the contract for the cement mill machinery and two De Laval turbo blowers for the blast furnace will be furnished by the Dravo-Doyle Co., Pittsburgh.

Engineers to Discuss New Methods of Shipment

On Dec. 6, at a special session of the American Society of Mechanical Engineers, New York, six papers will be read treating from different angles the problem of shipping materials on skid platforms. Mechanical methods of handling, common in plants throughout the country, have recently entered the distribution field and the Department of Commerce has sponsored a movement to standardize equipment and provide interchangeability in use.

The keynote paper will be delivered by R. L. Lockwood of the department,

who will trace the development of shipping material on skid platforms, outline the possibilities for growth and explain the importance of interchangeability in the equipment. Other speakers will be J. V. Miller, assistant general storekeeper Chicago, Milwaukee, St. Paul & Pacific Railroad, "Application of Skid Shipment to the Stores Department of a Large Railroad and the Economies Obtained"; George B. Wright, freight traffic manager Detroit & Cleveland Navigation Co., "Material Handling by an Inland Waterway Transportation Company"; C. B. Crockett, industrial truck department Society for Electrical Development, New York, "Economic Aspects of Skid Shipment from the Standpoint of the User"; F. J. Shepard, Jr., treasurer Lewis-Shepard Co., Boston, "The Part Played by the Manufacturer of Trucks and Skids in the Adoption of Interchangeable Equipment"; F. E. Stocker, resident manager McCormick Steamship Co., "Application of Skid Shipment in the Field of Ocean Transportation."

New Gas for Protection Against Fire

The American-LaFrance & Foamite Corporation, Binghamton, N. Y., through its industrial fire equipment division, has placed on the market a system of carbon dioxide protection against fire known as the Alfite system. It employs an inert gas known as Alfite confined in a liquid state in metal cylinders 51 in. in height and 8½ in. in diameter under a pressure of 900 to 1000 lb. When the system is placed in operation a plunger ruptures a copper disk used to seal the gas in the cylinder and permits the gas to pass through piping to nozzles located at the fire. Here the gas is liberated into the room or space being protected, where it expands and dilutes the air, thus to smother the flame. The system may be operated manually, semi-automatically or automatically, and a variety of operating devices are available.

Trade Extension Flight to South America

To improve trade relations with the South and Central American countries an American-made tri-motored monoplane will make a non-stop flight from North America to South America, and will then tour the principal Latin-American countries. In each of the trade centers visited an industrial moving picture will be shown, describing the American cities supporting the flight and a group of representative industries that are seeking Latin-American trade. In addition, a booklet on American products, printed in the languages of the countries visited, will be distributed.

The organization behind the undertaking is the South American Trade Extension flight. Hugh Morrow, president Sloss-Sheffield Steel & Iron

Co., Birmingham; Gen. William L. Seibert, chairman Alabama State Docks Commission and the Boulder Dam Commission, and S. C. King, vice-president of the Bank of Ensley, Ensley, Ala., are initial members of an advisory board now being selected. Lieut. Donald C. Beatty of the 106th Aero Squadron is chief pilot and director of the flight. The Bank of Ensley is acting as trustee for the organization and S. C. King is trust officer.

Program of Institute of Steel Construction

The program of the sixth annual convention of the American Institute of Steel Construction, to be held at Biloxi, Miss., Nov. 13 to 17, includes the following papers:

"Steel and Its Markets," by C. H. MacDonald, Colorado Fuel & Iron Co.

"Structural Steel in the Federal Building Programs," by J. Edward Cassidy, consulting engineer, Washington.

"Welding as Applied to Structural Steel," by Fred T. Llewellyn, president American Welding Society.

"Flame Cutting of Structural Steel," by E. A. Doyle, consulting engineer Union Carbide & Carbon Corporation, New York.

"The Buyer's Attitude on Competitive Selling," by L. F. Boffey, editor *Purchasing Agent*.

"Character in Salesmanship," by C. K. Woodbridge, president Kelvinator Corporation, Detroit.

"Fire Protection," by Clinton T. Bissell, associate consulting engineer National Board of Fire Underwriters.

"Steel Joists in Buildings," by Frank Burton, consulting engineer, Detroit.

"Art in Bridge Design," by Dr. J. Horace McFarland, chairman Pennsylvania State Art Commission.

British Steel Imports and Exports Both Decline

WASHINGTON, Oct. 29.—Imports of iron and steel products into Great Britain in September aggregated 184,464 gross tons, a decrease of 32.2 per cent under imports of 272,368 tons in August, while exports from Great Britain in September amounted to 295,123 tons, a decline of 20.2 per cent under outgoing shipments of 369,779 tons in the preceding month, according to a radiogram received by the Iron and Steel Division, Department of Commerce, from Commercial Attaché William L. Cooper, London.

The sharp decrease in September imports was due to a drop in almost all lines. The only gains were in 2904 tons in "all other manufactures" and 2845 tons in pig iron, together with an inconsequential increase in cast tubes. The greatest drop was in ingots and blooms, which fell off 46,576 tons, or from 114,472 tons to 67,896 tons.

Of the drop of 74,635 tons in exports, the greatest declines were in tin plate, 17,898 tons; galvanized sheets, 15,430 tons; plates and sheets, 15,076 tons, wrought tubes, 7753 tons, and steel bars, 2654 tons. The only gain of consequence was in pig iron, 3364 tons.

Discuss Blast Furnace Problems

Eastern States Association Finds Advantage in Using Open-Hearth Slag—Touches on Bell Diameters

PITTSBURGH, Oct. 27.—Attendance at the fall meeting of the Eastern States Blast Furnace and Coke Oven Association at the Shannopin Country Club, Ben Avon, Pa., Friday, Oct. 26, suffered from the fact that the fall meeting of the American Iron and Steel Institute was being held the same day in New York. Smaller representation than usual at the blast furnace and coke oven meeting failed to affect the interest, which ran high in such matters as the efficiency and the quality of the iron produced in large modern steel works blast furnaces as compared with those of smaller dimensions.

The benefits derived from the use of open-hearth slag to replace limestone in the blast furnace were stressed. With slag running as high as 27 per cent in iron, there was not only this addition to yield, but the use of limestone could be cut by 400 to 500 lb. per ton. There was altogether, making allowance for the high manganese content of the slag iron, a possible saving of 50c. per ton in the cost of making pig iron.

Discussion of the distribution of the burden touched strongly on the size of the bell and the stock line, and the need of a definite relationship between the bell and stock line dimensions if there was to be the distribution of charge that would permit penetration of the gas. The trend toward the small bell was held to be correct if it did not result in one too small. A 12-ft. bell and a 17-ft. stock line was said by several speakers to be the proper proportion relationship.

The discussion of the relative merits of coke made from straight high volatile coal and that produced from

a mixture of low and high volatile coal veered more favorably to the latter. What the makers of blast furnace refractories are doing to improve their quality was told by the representative of one of the larger manufacturers, who pointed out with an increased use of flint instead of plastic clays the brick might suffer in appearance.

While it was said that credits of close to \$2 a ton might be made from blast furnace gas, there was also a suggestion that a study of the costs of the equipment necessary to utilize fully the waste heats might make the investment of doubtful value, since the saving would be burdened with the added financial overhead.

A. E. Maccoun, superintendent of blast furnaces Edgar Thomson works, Carnegie Steel Co., Braddock, as chairman of the round table discussion, ably handled the meeting. B. W. Winship, superintendent of coke plant Bethlehem Steel Co., Steelton, Pa., and president of the association, presided at the evening meeting, at which W. L. Stevenson, chief engineer Pennsylvania State Department of Health, and F. H. Waring, T. E. Dugan, E. S. Tisdale, holding similar positions in the State health departments of Ohio, Kentucky and West Virginia, detailed the successful solution of the problem of phenolic wastes from coke plants in rivers drawn upon for drinking water.

President Winship announced the appointment of O. O. Malleis, chief chemist Koppers Co., Pittsburgh, to succeed John W. Hacker, formerly superintendent of coke plant Central Alloy Steel Corporation, Massillon, Ohio, as chairman of the coke testing committee of the association.

built. The common control of the two companies is the basis of reports that Aston iron would be used for making seamless pipe, but officials of the Byers company say no arrangement of this sort has been made and that none is contemplated.

Eliminates Hand Puddling Methods

The Aston process is one designed to eliminate the costly hand puddling method of making wrought iron and is a system of independently refining the base metal and then effecting disintegration of this metal and incorporation of the slag to produce wrought iron.

The base metal is refined to a degree conforming to commercially pure iron characteristics in a Bessemer converter. This molten metal is poured from a ladle into a thimble containing molten slag of puddling characteristics. Without application of either manual or mechanical working of the mass, the metal is disintegrated into a sponge, impregnated with molten slag. The resultant ball or sponge is pressed to a rectangular bloom, and rolled to billet or bar sections.

In addition to the refining accomplished in the converter, the entry of the metal into the slag is said to secure a high degree of super refining. In addition, the dominant characteristic of wrought iron, namely, the uniform and fine dissemination of slag throughout the product, is effected.

H. A. Brassert & Co., Chicago, who have cooperated with the A. M. Byers Co. at Warren, Ohio, in developing the Aston process for making wrought iron, have been given the contract for the engineering for the new Byers plant. The plant will consist, in addition to the department to make the wrought iron, of a 40-in. blooming mill, a 42-in. universal plate mill, an 18-in. and a 16-in. semi-continuous skelp mill and a 14-in. and a 9-in. skelp mill. When completed it will have an annual capacity of 360,000 tons of skelp and plate.

A. M. Byers Co. Plans Large Expansion

Plant and Equipment for Utilization of Aston Process of Making Wrought Iron Will Cost \$10,000,000

EXPERIMENTAL work by the A. M. Byers Co. at its Warren, Ohio, plant with the Aston process for making a synthetic iron having the same chemical and physical properties as hand puddled wrought iron has been attended by success sufficient to warrant production of the new material upon an enlarged scale. Accordingly, the Byers company will soon begin work on a new plant to be erected on a site of 112 acres recently acquired at Harmony, Pa., not far from the steel fabricating district which embraces Ambridge and Economy, Pa.

Complete plans for the new plant call for an expenditure of \$10,000,000 and include pipe mills, a blast furnace, a by-product coke plant and a river terminal for handling inbound raw materials and river shipments of finished products. The initial units of

the new plant, with a monthly capacity of 15,000 tons, will include the cupolas for melting cold pig iron, Bessemer converters for refining the molten iron, the thimbles for holding molten slag of puddling characteristics, and rolling mills for bringing the ingot to skelp form. The South Side plant of the company in Pittsburgh, containing one butt welding and two lap welding furnaces, capable of making pipe from ¼ in. to 12½ in. diameter is to be utilized for making pipe of the Aston iron. The company plans to spend \$1,000,000 in betterments at that plant.

The Byers company and Spang, Chalfant & Co., Inc., are under the same control, and the latter recently absorbed the Standard Seamless Tube Co., with a plant at Economy near where the new Byers plant is to be

Martin Aircraft Plant Goes to New Company

Commercial airplanes will be built in Cleveland by the Great Lakes Aircraft Corporation, incorporated to take over the plant now occupied by the Glenn L. Martin Co. The new company will acquire all the present equipment of the Martin plant. The Martin company will move in January to Baltimore, where it will devote its attention exclusively to the manufacture of military aircraft. It is understood that about \$2,000,000 was involved in the sale of the Martin plant. William R. Wilson, president Guardian Trust Co., Detroit, and for many years identified with the automotive industry in that city, is chairman of the board of the Great Lakes Aircraft Corporation.

Wholesale Prices Higher in September

Commodity prices in September are reported by the United States Bureau of Labor Statistics at 100.1, on the basis of the 1926 average at 100 for 550 items. This represents a substantial increase from the 98.9 recorded in August and is still further above the 96.5 of September, 1927. Farm products and foods show the heaviest advances of any items during the month. Live stock and poultry in the one group and meats in the other recorded advances of more than seven points in each instance. Fractional advances were made in fuels, metals, building materials, chemicals and the miscellaneous items, while there were fractional recessions in leather and textile products. House furnishing goods showed no change.

Metals and metal products are placed at 100.5, compared with 100.4 a month earlier and with 97.6 a year ago. Iron and steel and non-ferrous metals both advanced slightly, while automobiles showed a fractional recession and agricultural implements and other metal products were unchanged from the preceding month.

Food prices have gone so high, in some items, that the bureau's index of retail prices shows the several grades of beef at the highest level in many years—higher even than in the war period or in the price "bulge" of 1920.

Coke Production at Higher Daily Rate in September

WASHINGTON, Oct. 20.—Total production of by-product coke for the 30 days of September was 3,958,682 net tons, against 3,994,924 tons in the 31 days of August, according to the Bureau of Mines. The daily average rose from 128,869 tons to 131,956. Production of beehive coke in September was 312,000 tons and the daily rate was 12,520 tons, against 10,667 tons in August. Total output of both by-product and beehive coke for September was 4,270,682 tons, compared with 4,282,924 tons in August.

Steel Castings Orders Largest Since May

Aggregating 82,173 tons, or 57 per cent of the monthly capacity of 144,200 tons of the 129 makers reporting to the Department of Commerce, orders for commercial steel castings in September were the largest since May, when new business amounted to 86,414 tons.

Orders in August were 81,452 tons, or 56 per cent of capacity. Production in September totaled 75,199 tons, or 52 per cent of capacity, against 87,320 tons in August.

Orders in September were divided as follows: Railroad specialties, 35,234 tons, or 52 per cent of this class of capacity; miscellaneous castings, 46,939 tons, or 65 per cent of capacity.

Production in September included

25,311 tons of railroad specialties, or 38 per cent of such capacity, and 49,888 tons of miscellaneous castings, or 65 per cent of such capacity.

Total orders for the nine months ended with September were 737,222 tons, against 727,314 tons for the corresponding period of last year. Production for the nine months of this year was 765,773 tons, compared with 784,977 tons for the corresponding period of last year.

Malleable Castings Orders Show Slight Loss

Orders for malleable castings in September totaled 55,278 tons, against 56,415 tons in August, according to reports received by the Department of Commerce from the principal manufacturers. Production was 56,650 tons, or 63.2 per cent of capacity, compared with 61,833 tons, or 68.5 per cent of capacity in August, while shipments were 55,645 tons and 58,914 tons, respectively.

Orders for the nine months of the present year totaled 492,039 tons, against 440,825 tons for the corresponding period of last year. Production was 529,158 tons and 495,902 tons, respectively.

Smaller Output of Steel Boilers Reported

New orders in September covered 1420 steel boilers, with heating surface of 1,251,268 sq. ft. These are the smallest figures in several months, but are above those of September, 1927, which were 1312 units and 1,152,265 sq. ft. The August figures were 1649 boilers and 1,459,652 sq. ft. For the first nine months of the year orders totaled 12,466 units and 11,833,937 sq. ft., compared with 12,387 units and 12,771,356 sq. ft. last year.

Steel Barrel Production Falls Off in September

Production of steel barrels in September is reported by the United States Department of Commerce at 593,255 units, with shipments totaling about the same amount. This represents 50.2 per cent of capacity. There has been a sharp falling off from immediately preceding months, in which new high records were made. The September figure, which is the lowest since February, compares with 677,313 units in August. It is, however, much higher than the 521,899 units of September, 1927.

Unfilled orders at the end of the month were the lowest since Nov. 30, 1927. They called for a total of 996,820 barrels, of which 292,686 were for delivery within 30 days.

Shipments of members of the Steel Barrel Manufacturers' Institute in September numbered 328,597, and unfilled orders at end of month called for 377,922 units. The business of the month is reported at \$949,164. Capacity was used to the extent of 48

per cent, representing 24.3 per cent for I.C.C. barrels and 54.5 per cent for light barrels.

River Steel Movement Heavy

The down-river movement of steel from the Pittsburgh district was heavy again in September. The monthly report of the Pittsburgh office of the United States Engineers' Corps shows the Ohio River movement to have been 125,062 net tons, compared with 124,751 tons in the preceding month and 98,809 tons in September last year. For the nine months ended with Sept. 30, Ohio River steel shipments from the Pittsburgh district were 894,306 tons, a monthly average of 99,367 tons. In the same period last year the total was 487,504 tons, an average of 54,169 tons monthly.

Automobile Output Within 2 Per Cent of 9-Month Record

WASHINGTON, Oct. 27.—Production of motor vehicles in the United States in September declined to 413,722 from 461,356 in August, according to the Department of Commerce. Of the September output, 358,872 units were passenger cars and 54,850 were trucks. The August output of passenger cars was 400,593 while the production of trucks was 60,763. The September, 1927, figures were 226,443 passenger cars and 33,944 trucks, a total of 260,387.

Nine-month automobile and truck production this year has far exceeded that for the corresponding period of last year, totaling 3,469,075, against 2,906,672 vehicles, a gain of 19.3 per cent. The output of passenger cars for the nine months in 1928 was 3,064,237, and of trucks, 404,838; comparing with 2,540,312 and 366,360 respectively for last year.

In 1926, the record year, the total production in the first nine months was 3,540,153, or 2 per cent ahead of 1928. This included 3,153,922 passenger cars and 386,231 trucks. In 1925, which had a total production within 1 per cent of that of 1926, and exceeded it in trucks, the nine months showed 2,746,877 passenger cars and 387,447 trucks, a total of 3,134,324.

September production of automobiles in Canada, as reported to the Department by the Dominion Bureau of Statistics, was 16,572 passenger cars and 4621 trucks, compared with 24,274 passenger cars and 6971 trucks in August.

Apparent consumption of babbitt metal in September was the largest for any month since August of last year. Reports received by the Department of Commerce place the total at 5,308,403 lb., compared with 4,755,662 lb. in August and with 4,792,367 lb. in September, 1927. For the first nine months the total was 43,263,987 lb., compared with 46,024,504 lb. last year.

This Issue in Brief

Unreliable cost figures result when manufacturing burden is charged on the basis of direct labor cost, except when plant makes only a single article, of one size, says cost accountant. "There is no relation between operator's compensation and the cost of running the machine." Burden should be charged on the basis of normal operating hours.—Page 1097.

* * *

Costs less to make certain parts of alloy steel than of plain steel. Automobile parts manufacturer uses cold-drawn nickel steel instead of plain carbon steel, which has the necessary strength, because uniformity of the alloy steel gives lowest cost per finished part.—Page 1093.

* * *

Loans can be secured more easily if manufacturer is able to budget or to forecast operations. Confidence on the part of the banker and of the management of the business itself is promoted by ability to forecast or to budget.—Page 1098.

* * *

Stock danger limit is established monthly. Automobile manufacturer calculates parts danger limit monthly, and provides for an average three months' supply.—Page 1081.

* * *

To obtain clean castings, skim gate should be designed to choke the metal where it enters the inlet gates that lead to the mold, and at the same time provide a free escape for all impurities collected at this point.—Page 1082.

* * *

Ford is now using about 15 lb. of malleable castings in Model A cars, and may increase to 40 to 60 lb. Castings replace forgings, due, it is understood, to failure to get forging deliveries.—Page 1107.

Stable and well-sustained volume of business during the winter months is indicated, says Dr. Haney. The outlook is that earnings will be fair to good in a majority of industries.—Page 1105.

* * *

Highest strength castings are usually low in total carbon, with pearlitic or even sorbitic matrix, says metallurgist. General grain size is small, and there is a very fine distribution of graphitic carbon.—Page 1084.

* * *

Fluctuating prices compel steel buyers to speculate on the cost of their raw material, says Charles M. Schwab. Policy of open prices would be of benefit alike to producers and consumers, he declares. Price stabilization is possible without collusion on part of producers.—Page 1086.

* * *

Flaws in steel rails can be accurately located within 1/32 in. of actual place where they exist, by passing an electric current through the rail. If the rail has no defects, recording apparatus will show a straight line. If there are defects, the current is obliged to pass around them, thus immediately recording the location.—Page 1090.

* * *

Fatigue tests on welds are needed. Scattering results of published fatigue tests indicate that none of them can be relied upon, says Bethlehem Steel Co. executive.—Page 1092.

* * *

Rusting of welds is retarded by using coated or covered electrodes, engineer declares. Rust resistance is better than when standard bare wire is used, he says. Recommends study of relative corrosion of weld and base metal, and meanwhile recommends paint to keep corrosion in check.—Page 1092.

Speeds stockroom operations by mounting on conveyor trays cardboard symbols designating the section to which trays are routed. Thus stock clerks can tell from a distance which trays are for their respective sections and be ready to remove their trays without confusion.—Page 1076.

* * *

True volume of business and industry is only moderately large, says Dr. Haney. Railroad freight traffic and wholesale trade are both below what they were a year ago. In comparison, the high rate of speculation seems excessive.—Page 1104.

* * *

Errors in handling stock are reduced by placing similar kinds of parts in different sections of stock room. Parts resembling each other in size and form can advantageously be separated, automobile manufacturer finds. Thus each stock man has parts so different that he has no trouble in recognizing parts wanted on requisitions.—Page 1076.

* * *

Heart of parts storeroom is one continuous conveyor serving every department. Chain-type conveyor in automobile parts storeroom follows a devious route, making dips, turns and rises. It carries parts from stock clerks to checkers and stock replenishments to stock clerks.—Page 1076.

* * *

Export trade in steel continues high. September shipments were below August but 39 per cent above last year. Machinery exports declined sharply, September having been 25 per cent below August, and 4 per cent under September, 1927.—Page 1105.

A. I. FINDLEY
Editor

THE IRON AGE

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In Prosperity Prepare

IN time of prosperity prepare to keep prosperity. This was the gist of the presidential address of Charles M. Schwab before the fall meeting of the American Iron and Steel Institute. He believes that the problems of the post-war period are largely behind us and that industry has the foundation for a prosperity far beyond anything it has yet seen. In so saying he was not merely expressing the native optimism that has carried him far on the road of success, but he supported the statement by one of the most searching and comprehensive analyses of steel trade conditions ever presented to the institute.

A fundamental change to which the address called attention is the retarded growth of steel consumption. Once demand virtually doubled every decade; in the past 15 years it has increased only 55 per cent. Thus the industry can no longer rely on expanding consumption quickly to overtake overexpanded capacity. Warning against the temptation to add new plant under the stimulus of recent prosperity, Mr. Schwab urged a temporary "moratorium" on such construction. Demand, he said, is now more nearly in balance with supply than at any time since the war, and this favorable relation can be quickly upset.

Along with his caution against plant expansion Mr. Schwab made a plea for an open one-price policy in selling steel. On first thought this might seem like overstressing the need of a more stable market, in view of recent improvement in prices. But, as Mr. Schwab pointed out, it is idle to expect to cure indiscriminate price cutting in periods of slack demand merely by preaching economic truths. Obviously the time to initiate reforms in selling is when demand and supply are fairly balanced. And the way to make such reforms stick is by preventing the balance from being disturbed by overbuilding.

A third specific offered by President Schwab is the development of new uses for steel. Here is an activity to which the individual producer may well devote the energies that are often unwisely expended in adding to capacity or in fighting for 100 per cent operation in a time of 80 per cent demand. By creating new outlets the danger of a recurring surplus supply is reduced. As was well said by George M. Verity, president of the American Rolling Mill Co., in the discussion on Mr. Schwab's address, steel producers must establish a better liaison between the mills and their trade. They must make the customer's business their study, helping him to find the material best suited to his needs and assisting him in working out the problem of fabricating it to best advantage. When such service is given, new uses for steel will be found and

the tonnage price of raw material will become a secondary consideration, since the steel user's main interest is in reducing his total manufacturing cost.

All three of Mr. Schwab's suggestions are practical and sound. They call for no radical departure from principles under which the industry has grown to its present stature. They urge no concerted action in regulating either prices or production. They are convincing counsel for more intelligent conduct of business, putting faith in voluntary cooperation and individual initiative. Most constructive of all and of largest significance is that part of the address dealing with new uses for steel. As *THE IRON AGE* often has pointed out, no other field holds such promise for united effort by the members of the institute and in no other activity can it find greater justification for its existence.

Economics of Steel Making

MYRON C. TAYLOR, chairman of the finance committee of the United States Steel Corporation, delivered last week at Columbia University an economic address on the steel industry that was erudite and informing. It would be helpful if there were equally masterly summaries of other major industries. An aggregation of such would go a long way toward illuminating our industrial and economic position. We shall try to analyze Mr. Taylor's survey and to correlate it with a broader one.

Mr. Taylor reports that the production of 48,000,000 tons of steel ingots in 1926 involved the labor of a million workers and the use of 200,000,000 tons of material. That material may be reckoned as comprising 70,000,000 tons of iron ore, 81,000,000 tons of coal and 14,000,000 tons of limestone, besides other things.

We are unable to follow the estimate of a million workers employed in the production of 48,000,000 tons of steel ingots. The Steel Corporation itself in 1926 employed a little over 250,000, and inasmuch as it produced about 42 per cent of all the steel and about 43 per cent of the iron ore, there is indicated a total occupation of about 600,000. On the basis of the Steel Corporation data the total employment would have been about 32,000 in the mining of iron ore, about 62,000 in mining coal and making coke and 61,000 in transportation, the remainder of the employment in this industry being in its metallurgy and manufacturing. This is, however, a measure of only the steel industry. Iron and steel together employ more persons. According to the census for 1925 about 50,000 were employed in iron mining and about 850,000 in metallurgy and manufacturing. If we con-

jecture about 100,000 in accompanying coal mining and coke making we should arrive at a total of about 1,000,000 for the iron and steel industry. Perhaps it was something like this that Mr. Taylor meant.

According to Mr. Taylor all workers of the iron and steel industry received an average of about \$1,400 in the year, their average rate of wages being 12 per cent higher than the hourly average in all the industries covered in the recent report of the National Industrial Conference Board. The average of the Steel Corporation alone was higher than that, the figure for all employees being \$5.94 per day, and \$5.82 if the salaries of general administrative and selling force be excluded. The total payment for wages came to \$1,846 as the average for the year. We may compare that figure with the average of \$1,656 received by 1,800,000 workers in steam railroad transportation, which is another of our major industries. We may make further comparison with the estimate by Dr. W. R. Ingalls of the total national internal income in 1926 as 74.2 billion dollars, which would be \$1,613 for the estimate of 46,000,000 workers. The total internal income is a direct function of work in one way or another, inasmuch as even dividends and interest must be expended in some form of work.

In Mr. Taylor's calculation the actual investment in the steel industry is about \$4,750,000,000; but replacement cost, less accrued deterioration, would be at least \$6,000,000,000. On the former basis the profit yield in 1927 was only 5.29 per cent, compared with 6.89 per cent in 1926 and 5.66 per cent in 1925. If computed on reproduction value the returns would be correspondingly smaller. Either way the capital estimates are on the basis of an overbuilt industry, the steel works having an aggregate annual capacity of 60,000,000 tons of open-hearth and Bessemer steel ingots compared with a maximum requirement of 50,000,000 tons. No industry can operate continuously at 100 per cent of rated capacity, but also it may be said that no industry requires a surplus of 20 per cent.

In so measuring the country's excess capacity in steel Mr. Taylor definitely confirms Mr. Schwab's judgment, expressed last Friday, that "the technological developments resulting in improved processes, and enlarged units alone will render unnecessary for a considerable period the building of new plants to meet increased demand."

The Culmination of Research

A YEAR ago, and again last Friday, the program of the American Iron and Steel Institute contained an unusual feature, worthy of imitation by other engineering and industrial associations. Rarely indeed do the faithful listeners hear anything beyond sober technical details. Judge the glad relief when a year ago S. M. Kintner and last week W. B. White gave vivacious accounts of those by-products of industrial research which help make the world more livable and enjoyable. By means of such researches the iron master becomes less a producer of humdrum bolts and spikes, and turning patron of the arts gives the artist more perfect instruments for expression and devices whereby his art may be broadcast so that all who listen may be uplifted. A year ago Mr. Kintner, in illustrating recent advances made possible by the vacuum tube, recreated for his de-

lighted audience the weary but resonant voices of the "Two Black Crows." On Friday, Ernest Schelling (an equally human virtuoso) "discussed" Mr. White's paper on the testing of piano wires by drawing forth, from a Steinway grand piano, bells and rippling waves, floating clouds and dancing feet and stormy passion.

With Mr. Schelling we are glad this is not yet an altogether wireless world.

Automobiles Take More Steel

IN the manufacture of automobiles, trucks and replacement parts about 25 per cent more steel is being used this year than in 1926, hitherto the record year. A more precise statement will be made available by the annual presentation of THE IRON AGE at the beginning of the new year, dealing with "Where steel went in 1928." As compared with 1926 there is an increase in the number of automobiles and trucks made, and an increase in the consumption of steel per unit. While there is an increase this year in the total steel production, that is a smaller increase, and the result will be a record high proportion of the total steel passing into the automotive industry, probably about 17 per cent, against 14½ per cent shown by our presentation for 1926.

The Department of Commerce reports 413,722 passenger cars and trucks made in the United States in September, and adding Canada at 21,193 gives a total for the month of 434,915. With a slight upward revision now made for August that month's total is 492,601. The total of cars and trucks, United States and Canada, for nine months is 3,671,727.

Whether there was an actual decrease in rate from August to September is a question. Counting Ford at five days a week and others at five and a half days there was a decrease in working time from August to September of about 15 per cent, but the Department of Commerce reports production as "factory sales," and the extra Saturday, Sunday and holiday in September might perhaps be regarded as increasing rather than diminishing the month's opportunities. Striking a daily average for the two months and rating October at 95 per cent, November at 90 per cent and December at 70 per cent would make a year's total of 4,850,000, which may thus be taken as a fairly liberal estimate.

Given the number of units produced, a weight factor is requisite. Our annual returns of "where steel went," divided by the number of cars and trucks produced, showed decreasing quantities per unit through 1924, as Ford and other light cars became more prominent. Thereafter substantial increases occurred, for several reasons, more closed bodies, more all-steel bodies, in 1927 the light production of Ford and of late the trend of many cars, including Ford, to be made heavier as the much more powerful engines required a stiffening all around. In our present estimate we assume 15 per cent more steel per unit than was shown for 1926, which involves a slight increase over 1927. The increase over 1926 in the number of units is about 8 per cent. With more cars in service, more replacement parts are produced.

As to steel production, this year's steel ingot total promises to run above 49,000,000 tons. With so much fine steel being made, the proportion of rolled steel to ingots may be taken at 73 per cent against the

74 per cent of 1926, which would make 3 per cent increase in rolled steel production.

Putting all these factors together, we have about 25 per cent increase in automobile steel from 1926 to 1928 and an increase in the automobile percentage of total steel from 14½ to about 17.

It is of interest just at the moment that lately the proportion of the steel output taken for automobiles has been considerably above the year's average, probably somewhat over 20 per cent.

Standard Machine Tool Market

IN an editorial discussion of "British Machine Tools," inspired by the recent machinery exposition at Olympia, *Engineering* lays emphasis on the still existing market for standard machine tools as distinguished from special purpose machinery required in mass production. Of course, such a market remains in Great Britain in a probably greater ratio of importance than in the United States. At the present time the American demand for standard tools is greater than for some years, riding along on the wave of buying of more or less special machinery.

The London editorial goes on to say: "We hear a great deal in these days of the progress of the American special machine, and of the wonderful developments which are taking place as a result in manufacturing plants of the United States. While all the world may become thus highly organized mechanically in some distant future, it cannot be contended that at present the world demand for tools has been exhausted when the requirements of these specialized factories have been met."

The point will be conceded naturally, but with the reservation, as applied to the United States, that the use of special purpose machinery is not by any means confined to the large establishments. The English writer cites the extreme case of immense plants which manufacture for and maintain the Bell Telephone system, and continues in a general discussion of the trade in Great Britain, with pertinent comment, as follows:

All said and done, such trade forms only a part of the total, even in such a country as the United

States. The bulk of the work is done on more general lines, simply because a great deal of it will not, even with the application of the utmost amount of ingenuity, lend itself to stereotyping. Here (in England) where our manufacturing methods are not at their best, cast on the same gigantic proportions, the works requiring special machines are relatively few and the demand at best is for single tools, instead of dozens. In such cases it may be attractive to the buyer to deal in the American market. The factory methods of that country have been so loudly proclaimed, it is natural that he should wish to adopt a tool successfully applied over there. He is also faced with the possibility that if he tries to get his requirements met over here and allies himself with a toolmaker for the purpose, the machine produced may be inordinately expensive. This is the unavoidable consequence of the small demand. Yet it is satisfactory to know that, even in such lines, our makers can make headway, and that today designers and makers are ahead of the requirements of the most modern factories in the country.

We have referred to the non-specialized work to be done. Of this there is a great amount all over the world, including both the United States and this country. While American special machines may contribute in no small degree to our retained imports, it is not generally accepted that the special purpose tool is imported largely by this country from Germany. If this is so, it follows that for some reason or other Germany is supplying us with tools which our makers could equally well produce, which certainly should not be the case.

The United States is dotted over with manufacturing plants and such establishments as railroad repair shops, in which standard machinery is used to a greater or less extent and always will be used. Unfortunately, perhaps, for their makers, a characteristic of machines of this class is that even in their old age they can do the work required, though at much less speed and much higher cost when compared to the production by modern tools of similar type. In the last few years replacement of antiquated equipment has been much slower than it should have been, but signs now are that business from these sources will result in a quickened market for standard tools; though at the same time, in many cases, obsolete machinery will be replaced by specialized tools.

Record Run on a Merchant Furnace

RECORDS of blast duration have not been reported as carefully as daily tonnage production of blast furnaces. Stack "A" of the Toledo Furnace Co. ran on one lining from Nov. 6, 1919, to Aug. 22, 1928—a period of 8 years, 9 months and 16 days. This is not the longest one-blast period ever reported, as one small furnace was in constant operation on the same lining for over 10 years. But that small stack made, nearly all that time, one grade of iron—standard Bessemer pig.

Outstanding in the achievement of the stack at Toledo is the fact that it made during its run 1,823,251 tons of pig iron—far in excess of any tonnage ever before produced on one lining. The average was 564 tons a day over the entire 3212 days. What is still more notable, the furnace steadily

increased its daily average by years, so that, during its last year of operation, it made more daily tonnage than during any other year. Its average output in 1926 was 602 tons a day; in 1927, 614 tons; in 1928, 627 tons. The amount of "off" iron made averaged only 1.8 per cent. The amount ran up sharply during the year of the coal strike, owing to the use of poor coal. Leaving out that year, the "off" iron ran only 1.2 per cent of the total, while during the last three years it averaged less than ½ per cent of "off" metal.

This record would not be such an exceptional achievement for a steel works furnace employed in making basic iron continually. But the Toledo furnaces are run on merchant pig iron, and almost every variety except Bessemer is made to meet the specifications of more than 200 customers. To fill the requirements of this trade this furnace has made all grades of

foundry iron, from 1 to 3 per cent in silicon; malleable iron, from 1.25 to 2.75 per cent in silicon; and standard basic. And it has, during the entire period, been frequently shifted from one grade to another—18 different specifications having been made in one 28-day period.

Before this run the furnace was rebuilt and provided with a new shell. The stack, as rebuilt, had an 18-ft. hearth diameter, a 24-ft. bosh and a height of 84 ft. There are no cooling plates above the mantle. After the furnace was blown out, the lining was found smooth and true to circle, and showed no signs of scaffolding. It was 20 in. thick at top of stack, 1 ft. at the middle, and 3 ft. at the mantle. The salamander in the hearth, 214 tons, contained various grades of pig iron made in the furnace. Usually the amount of salamander removed when a furnace is blown out is much larger.

Sharp Increase in October Iron Output

Estimates Indicate a Daily Rate of 108,800 Tons, the Largest in 17 Months—Net Loss of Two Furnaces

ESTIMATES of pig iron production for October indicate a sharp increase over September. Figures collected by wire on Tuesday, Oct. 30, from companies estimating their output for the last three days in most cases, show the October total to be approximately 3,372,000 gross tons, or nearly 108,800 tons per day for the 31-day month. Compared with 102,077 tons per day made in September, this is an increase of about 6.5 per cent. The October daily rate is therefore the largest in the last 17 months, or since May, 1927, when it was 109,385 tons per day. It is also the largest daily rate for October since 1918,

when it was 112,482 tons. In fact, there have been but two October daily rates exceeding that of this year—in 1918 and 1916. Reports indicate a net loss of two furnaces during October—eight furnaces were blown in and 10 were shut down. Apparently, therefore, 195 furnaces were operating at the end of the month as against 197 on Oct. 1. Actual production returns for October will be published in THE IRON AGE of Nov. 8 and the estimates of daily rate and of furnaces in blast may be somewhat altered by the final figures.

Steel Company Earnings

Steel Corporation in Nine Months Has Earned \$8.17 per Share of Common Stock

EARNINGS of the United States Steel Corporation for the third quarter of 1928 were at a rate of \$3.31 per share of common stock (after providing for the preferred stock), compared with \$2.75 in the second quarter and \$2.15 for the third quarter of 1927. The earnings for the nine months of 1928 stand at \$8.17, or more than enough for the regular 7 per cent annual common dividend, with what comes in the fourth quarter available for surplus minus appropriations for betterment or expansion. On the basis of the present issue of 7,116,235 shares of common stock, the net earnings available to common stockholders was, for the first nine months of 1925, 1926 and 1927, \$6.74, \$9.35 and \$7.74 respectively. The net earnings before deducting either preferred or common stock dividends were \$29,886,259. For the third quarter of 1927 they were \$21,585,425, and for the second quarter this year, \$25,868,758. The surplus

for the three quarters amounts to \$20,811,898, in the face of a larger depreciation for the third quarter than for the larger reductions on this account made for the second quarter. The accompanying table shows the statement, including earnings of recent years.

Bethlehem's Prospects Good

The Bethlehem Steel Corporation's net income in the September quarter was \$4,272,528, equivalent after preferred dividends to \$1.43 a share on the common stock. Although off slightly from the \$4,529,328 or \$1.57 a share earned in the June quarter this year, it was a large gain over the \$2,788,053 or 61c. a share earned in the third quarter last year. Net income for the nine months ended Sept. 30, 1928, totaled \$12,186,974, compared with \$13,454,771 in the first nine months of 1927 and with \$15,764,851 in the corresponding period of 1926.

Although the earnings for the first

three quarters this year are the lowest in three years, this does not indicate a decline in the full year's net, as the last quarter of 1927 was the lowest of the year and this year it seems likely to be the highest. In commenting on the situation, President Eugene G. Grace states that current operations are at approximately 94 per cent of capacity, the highest in the company's history, and that the price situation at the end of the third quarter was decidedly better than at the end of the second. Billing prices in the third quarter had shown no important change from the second but the benefit of the price advances on the

Earnings of United States Steel Corporation

EARNINGS IN RECENT YEARS			
Quarters	1928	1927	1926
1st	\$40,934,032	\$45,584,725	\$45,061,285
2nd	46,932,986	46,040,460	47,814,105
3rd	52,148,476	41,373,831	52,626,826
4th	.....	31,247,529	53,502,525

EARNINGS FOR THIRD QUARTER		Total Earnings
July, 1928.....		\$16,133,679
Aug., 1928.....		18,597,178
Sept., 1928.....		17,417,619

Total earnings after deducting expenses, taxes and interest	\$52,148,476
Less charges and allowances for depletion, depreciation and amortization, as follows:	
To subsidiary companies	\$14,837,905
To sinking funds on corporation bonds	2,937,113
	17,775,018
Net income.....	\$34,373,458
Deduct: Interest corporation bonds	\$3,991,128
Premium on bonds redeemed	496,071
	4,487,199
Balance	\$29,886,259
Dividends:	
Preferred 1% per cent	\$6,304,919
Common, 1% per cent	12,453,411
	18,758,330
Surplus for the quarter	\$11,127,929

heavier products is now being felt and should be reflected in fourth quarter shipments.

Unfilled orders, as of Sept. 30, 1928, amounted to \$58,725,602, representing bookings of 634,000 tons, as compared with \$51,761,908 or 515,000 tons on June 30, and with \$52,321,794 or 419,000 tons on Sept. 30, 1927.

Other Companies Not Up to 1926 Totals

Other large steel companies, as the accompanying table shows, in most cases earned more in the first nine months this year than in the corresponding period of 1927, but failed to equal their figures for the first three quarters of 1926. However, nearly all the companies show satisfactory returns in the past quarter and indicate recovery from the slump of 1927.

Colored plug fuses for electric light circuits, a color for every size, have been put on the market by the Trico Fuse Mfg. Co., Milwaukee.

Comparison of Earnings of Leading Steel Companies

(In Thousands of Dollars)

Company	Third Quarter 1928	Second Quarter 1928	Third Quarter 1927	First 9 Mo. 1928	First 9 Mo. 1927	First 9 Mo. 1926
Bethlehem Steel Corporation.....	4,273	4,529	2,788	12,186	13,455	15,765
Central Alloy Steel Corporation....	1,161	1,265	810	3,401	2,648	3,432
Donner Steel Co., Inc.....	404	307	58	796	288	650
Gulf States Steel Co.....	140	204	150	682	521	565
Inland Steel Co.....	2,089	2,550	1,244	6,931	5,590	5,035
Jones & Laughlin Steel Corporation	4,505	4,241	2,607	11,649	9,842	11,760
Otis Steel Co.....	951	907	468	2,694	1,401	2,857
Republic Iron & Steel Co.....	1,281	1,054	502	2,822	2,535	3,755
Superior Steel Corporation.....	15	31	*33	*17	*117	276
United States Steel Corporation....	29,886	25,869	21,585	77,087	74,050	85,433
Youngstown Sheet & Tube Co.....	2,718	2,492	1,539	6,872	5,857	11,994
Total	47,423	43,449	31,718	125,103	116,070	141,522

Producers of Pig Iron, Coal and Coke

By-Products Coke Corporation....	328	404	432	1,098	1,080	.....
M. A. Hanna Co.....	723	543	418	1,170	777	534
Virginia Iron, Coal & Coke Co.....	*28	*47	*43	*96	*180	*13

*Deficit.

Iron and Steel Markets

Railroad Demand Expanding

Rail Purchases and Equipment Programs May Offset

Tapering Steel Requirements of Automobile Industry

—Pig Iron Prices Still Rising

IMPENDING purchases of railroad equipment and seasonal orders for rails, a sustained demand for pig iron that has forced prices to still higher levels and further signs of strength in finished material, particularly bars, are encouraging features of the iron and steel market.

Developments of the week, however, do not all point in the same direction. The steady advance in heavy steel scrap at Pittsburgh, which began in July, has been interrupted by a 25c. a ton decline. Further evidences of the tapering operations of the automobile industry have been brought to light, and a gradual reduction of mill backlogs with a corresponding shortening of deliveries is indicated.

Steel production, however, holds at close to 90 per cent, and pig iron output has reached a record rate for the year.

Telegraphic estimates of pig iron production for October collected by THE IRON AGE indicate a total of 3,373,000 gross tons for the 31 days, or 108,800 tons per day. The daily output exceeds that of September by 6.5 per cent and is the highest in 17 months. It was also the best average for October reached in any year except 1918 and 1916.

Of particular interest in the steel trade are accumulating indications that diminishing demands from some consumers are likely to be offset by heavier demands from others.

The seasonal rail buying movement brought out orders during the week for 159,600 tons from the Pennsylvania and 50,000 tons from a Western road. The St. Paul is in the market for 50,000 tons, and early inquiries are expected from the Burlington, the North Western and the Illinois Central. While rail orders may be smaller than last year, options on additional tonnage are likely to be proportionately larger, as was the case with the Pennsylvania.

Railroad equipment inquiries include one for 3000 cars from the Missouri Pacific. Buying programs to be launched after election call for upward of 40,000 cars, more than half of which are likely to be placed before the close of the year. Freight car orders so far this year have totaled less than 30,000 cars, the poorest showing since 1921.

Another outlet for steel that is reopening is shipbuilding, which is being stimulated by the Merchant Marine act. The steel required for five vessels to be built on the Atlantic seaboard totals 17,200 tons.

Fabricated steel awards, including an informal contract for 11,300 tons for New York subways, aggregate nearly 42,000 tons, the largest total in six weeks.

Automobile output, although undergoing a seasonal decline, is nevertheless higher than usual for this time of the year. Steel orders for the new Chevrolet model have been delayed a week or two, but the demands of the Ford company are increasing in conformity with a steady gain in output, which has now reached more than 5500 units daily.

Shipments of finished steel exceed bookings in virtually all districts except Chicago. Pressure for deliveries is heavy in both the Cleveland and Chicago districts, specifications in the latter market having been the largest for any week this year.

Finished steel prices are strong in most centers, with steel bars well established at 1.95c., Pittsburgh, or \$1 a ton above the recent minimum. Despite occasional shading on black sheets in the East, most reports indicate a firm sheet market, with advances of \$2 to \$3 a ton for next quarter a probability.

The tin plate price for the first half of 1929, soon to be named, is unlikely to show any change from the present quotation of \$5.25 per base box, Pittsburgh.

The upward swing of pig iron prices has not yet been halted. In the Chicago, Valley and Buffalo markets all grades went up 50c. a ton. At Philadelphia, basic pig iron rose 25c. a ton on a 10,000-ton sale. A scarcity of basic grade is particularly pronounced in the Valleys. Sales of foundry and malleable iron at Cleveland totaled 42,000 tons, compared with 38,000 tons the previous week. Furnace stocks of merchant iron have been sharply reduced.

The reaction in scrap prices at Pittsburgh, although interpreted there as reflecting less urgent demands on the steel mills, finds little support in other important market centers. Although a less buoyant situation is reported at Youngstown and Philadelphia, stronger prices are the rule elsewhere, with heavy melting scrap 50c. a ton higher at Chicago and Cleveland and 25c. higher at St. Louis.

Spot furnace coke prices at Connellsville, although unchanged, are growing easier in keeping with an increase in available supplies of the fuel.

Exports of iron and steel in September, although 20 per cent below those of August, were 39 per cent larger than a year ago. Exports in the first nine months, excluding scrap, showed a gain of 14½ per cent over the same period in 1927.

THE IRON AGE composite price for finished steel has advanced from 2.362c. to 2.369c. a lb., the highest figure since June, 1927. The pig iron composite has risen from \$17.92 to \$18.25 a ton—the first time it has been above \$18 in more than a year.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
No. 2 foundry, Philadelphia....	\$20.76	\$20.76	\$20.76	\$19.76
No. 2, Valley furnace.....	17.50	17.00	17.00	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	19.69
No. 2, Birmingham.....	16.25	16.25	16.25	16.00
No. 2 foundry, Chicago*.....	19.50	19.00	18.50	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.00	20.00
Basic, Valley furnace.....	17.50	17.00	17.00	17.00
Valley Bessemer, del'd P'gh...	19.76	19.26	19.01	19.76
Malleable, Chicago*.....	19.50	19.00	18.50	18.50
Malleable, Valley.....	18.00	17.50	17.25	17.50
Gray forge, Pittsburgh.....	18.76	18.26	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	32.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	32.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	32.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.75

Finished Iron and Steel,	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, Pittsburgh.....	1.95	1.90	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, New York.....	2.29	2.24	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.22½	2.22½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.19½	2.19½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.80
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.85	2.75	3.00
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.70
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.85
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.25
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh..	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist.				
mill.....	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
Heavy melting steel, P'gh.....	\$17.75	\$18.00	\$17.00	\$14.50
Heavy melting steel, Phila....	16.00	16.00	16.00	14.00
Heavy melting steel, Ch'go....	14.50	14.00	13.25	11.50
Carwheels, Chicago.....	14.25	13.75	13.75	13.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.50	15.00	14.75
No. 1 cast, Philadelphia.....	17.50	17.00	17.00	16.50
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.00	13.50
No. 1 RR. wrot., Philadelphia..	15.50	15.50	15.50	15.50
No. 1 RR. wrot., Ch'go (net)...	12.75	12.75	12.00	9.75

Coke, Connellsville, Per Net Ton at Oven:	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
Furnace coke, prompt.....	\$2.90	\$2.90	\$2.75	\$2.85
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals,	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.25	15.62½	15.25	13.25
Electrolytic copper, refinery...	15.75	15.25	15.00	13.00
Zinc, St. Louis.....	6.25	6.25	6.25	5.80
Zinc, New York.....	6.60	6.60	6.60	6.15
Lead, St. Louis.....	6.32½	6.32½	6.32½	5.95
Lead, New York.....	6.50	6.50	6.50	6.25
Tin (Straits), New York.....	49.25	48.75	49.75	57.50
Antimony (Asiatic), N. Y.....	10.50	10.50	11.50	11.00

Pittsburgh

Steel Operations Unaffected by Slight Letup in Urgency of Demand—Pig Iron Up 50c.—Scrap Easier

PITTSBURGH, Oct. 30.—In a general way, incoming business in steel is falling behind shipments, but the difference has been too slight to affect either steel works or rolling mill operations, which at the close of October are not far from the high point of about the middle of the month. Rail business now reaching the mills in rather good volume is clear gain, since at this time of the year shipments of rails do not amount to much. In strips and sheets, there is almost a balance between shipments on old orders and fresh tonnage releases. In bars, plates and shapes, shipments are drawing pretty heavily against backlogs, this being apparent less in mill operations than in the ability of manufacturers to promise more prompt deliveries than they would a few weeks ago.

There is still a strong hope that the railroads will buy cars and locomotives, but it still is a hope largely unrealized. Cheerful reports from the oil industry possibly mean an improved demand next spring for oil well pipe, but right now there is only moderate activity in that product, even seamless pipe having slipped some in demand in the past week or two. It is commonly accepted that automotive industry's requirements will be smaller in November and December than they have been over most of the year to date.

Taking all factors into the picture, and adding the fact that with the approach of the end of every year there is some influence upon demand in inventory considerations, the common opinion is that the high point of fall activity has been reached and passed. But there is no expectation of a big recession from current levels.

The scrap market has stopped ad-

vancing in the past week and has eased a little both as to offerings and prices. This probably reflects the passing of the urgency in the demand for steel and consequently in the need of driving production to the limit.

The shortage of available supplies of basic iron has found reflection in a price advance of 50c. a ton, with a sale of 10,000 tons and several other good-sized tonnages in prospect. All grades of iron have moved up 50c. a ton in the past week, but sales and demand count less heavily in foundry, malleable and Bessemer grades than in basic iron, the merchant production of which is moderate, while steel companies do not seem to care to part with any surplus supplies they may have.

There is a very firm tone to the steel market. Bars are clearly quotable at a minimum of 1.95c. On new business, strip makers want much more than they are getting on most of the current contract shipments. Sheet makers not only are firm at current prices, but are beginning to talk about higher prices on first quarter contracts.

Pig Iron.—A horizontal advance of 50c. a ton has been definitely established in pig iron prices in this market. One sale of 10,000 tons of basic iron has been made by a Valley producer for shipment to an Ohio steel company at \$17.50, furnace, or \$19.15, delivered, the freight from shipping point being \$1.65 per ton. The delivered price is equal to \$17.89 at either Youngstown or Cleveland, as the freight rate from those points to the destination of this tonnage is \$1.26 per ton. Besides numerous smaller lots, there has been a sale of 1500 tons of No. 2 foundry iron at \$17.50, Valley furnace. The support in sales of the advance in Bessemer and malleable grades is less imposing than that in the other grades, and the principal factor in the higher prices is the smallness of current production available for open market sale. There is more interest on the part of melters in basic iron than in the other grades, although a considerable tonnage of foundry iron for shipment over the next three or four months is included in total bookings of 75,000 tons reported by one merchant producer as the business of the past month. The Edgewater Steel Co. has inquired for 2000 to 4000 tons of basic iron for December-January shipment. It is said that the Sharon Steel Hoop Co., in preparation for the blowing out of its own furnace at Lowellville, Ohio, is seeking a round tonnage of basic iron, and it is generally believed that the Central Alloy Steel Corporation will buy more. The Valley steel manufacturers seem to have no basic iron for sale, and that also is the situation with Pittsburgh district companies, which ordinarily make more than their own requirements. Merchant production of basic iron is somewhat larger than it has been, as the Claire furnace, Sharpsville, Pa., now is running on that grade. It is reported that preparations are being made for starting the Struthers furnace, Struthers, Ohio; owners have secured an option on some ore and the work of repairing and relining the furnace is under way with an idea of blowing in about Dec. 15. The Jones & Laughlin Steel Corporation has put on the one

idle Eliza furnace and now has all furnaces except the Soho stack in production.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50 to \$18.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	18.00
Low pnos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Hot-Rolled Flats.—Incoming business in strips is almost equal to shipments and both still are on a high scale. Demands for the Ford Motor Co. are very heavy, and, while little steel is moving to the maker of another low-priced car, it is figured that merely the production of dealers' displays of a new model will give heavy impetus to the steel requirements of this builder. The new base prices and the new card of extras now are being quoted by almost all makers, but only a small amount of business has been written on the new schedules, owing to the fact that so many consumers are covered on their requirements for the remainder of this year. On such new business as is developing, the card which produces the highest price is used by some makers, whose need of additional business is not pressing.

Cold-Rolled Strips.—Shipments are very heavy and so is incoming business. Several producers find tonnage releases substantially equal to shipments on older orders. Makers are holding firmly to 2.85c., base Pittsburgh, on new business.

Ferroalloys.—Makers of ferrosilicon have announced a continuance of this year's prices for 1929, or \$83.50 for 50 per cent and \$130 for 75 per cent on contracts. No advance is expected on ferrophosphorus for shipment next year. Ferromanganese also is to continue at its present price on 1929 contracts. Deliveries are good against existing contracts in keeping with the high rate of steel works operations, but there is no rush on the part of consumers to sign contracts for next year. In view of a guarantee against a decline in the price of ferromanganese, it is not surprising that buyers are slow to cover.

Semi-Finished Steel.—The market

is quite firm at \$33, Pittsburgh and Youngstown on billets, slabs and sheet bars. On a few small lots of billets, which had to be delivered more promptly than most makers could promise, \$34, Pittsburgh, was obtained. This price, however, was largely a delivery premium price as consumers generally are getting good deliveries on contracts, some of which are for third quarter and carry the lower price that ruled in that period. Specifications generally are in keeping with the fact that sheet and strip mill operations are averaging close to physical capacity. Wire rods are steady at \$42, base Pittsburgh or Cleveland, and are moving well.

Bars, Plates and Shapes.—Bars now appear to be unobtainable at less than 1.95c., base Pittsburgh, and that is as low as some makers will go on new business in plates and shapes, but strengthening of prices is not as complete in the two latter products as in bars, because of variations in the order books and the size of the current demands. Mills at no time have been as heavily obligated on plates as on either shapes or bars and have had better bookings of bars than shapes. It is, therefore, natural that bar prices should show strength in advance of the other products. Bars are quotable at 1.95c. to 2c., but 1.90c. has not disappeared on desirable tonnages of plates and shapes. It is generally believed that an effort will be made to further stiffen prices on first quarter business. In new demands and specifications, bars make a better showing than shapes and plates. Demand for fabricated steel is rather dull.

Rails and Track Supplies.—Rail bookings of the local mill have been further enhanced by the distribution of the Pennsylvania Railroad orders for a total of 159,600 tons. There has not been a corresponding gain in bookings of the track fastenings, as the railroads now follow a policy of ordering spikes, tie plates, etc., when track laying starts. Light-section rails are very quiet and small spikes are dull.

Wire Products.—In a general way, business is making a favorable show-

THE IRON AGE Composite Prices

Finished Steel

Oct. 30, 1928, 2.369c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.293c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.364c., Feb. 14;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Oct. 30, 1928, \$18.25 a Gross Ton

One week ago	\$17.92
One month ago	17.84
One year ago	17.54
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.25, Oct. 30;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.27c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

Narrower than 6 in., P'gh.....	2.00c.
6 in. and wider, P'gh.....	1.90c.
Narrower than 6 in., Chicago.....	2.10c.
6 in. and wider, Chicago.....	2.00c.

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	0.25	\$8.00
2100 (1½% Nickel).....	0.55	8.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Iron	Galv.
1½.....	45	19½	1½ to ¾.....	+11	+39
1½ to ¾.....	51	25½	¾.....	22	2
¾.....	56	42½	¾.....	28	11
¾.....	60	48½	1 to 1½.....	30	13
1 to 8.....	62	50½			

Lap Weld

2.....	55	42½	2.....	28	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	53	40½			

Butt Weld, extra strong, plain ends

1½.....	41	24½	¾ to ¾.....	+19	+54
1½ to ¾.....	47	30½	¾.....	21	17
¾.....	53	42½	¾.....	28	12
¾.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	28	9
2½ to 4.....	57	46½	2½ to 4.....	29	16
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 3 in.....	30
3 in.....	37
3½ to 4 in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	+18
1½ to 1¾ in.....	+8
2 to 2½ in.....	-2
2½ to 3 in.....	-7
3½ to 4½ in.....	-9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	1 Ten
	2 Tens
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1½ to 1¾ in.....	55	3½ to 3¾ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	45
2½ to 3 in.....	42		

Hot Rolled

2 and 2½ in.....	40	3½ to 3¾ in.....	56
2½ and 3 in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	43

Less carload, 4 points less. Add \$3 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.....	

ing in comparison with other years at this season. Prices are firm, but there is still a lack of uniformity in the application of the extra 10c. per keg in carload lots of nails to others than jobbers.

Tubular Goods.—Line pipe still forms the bulwark of mill operations. While there are reports of improvement in the oil market, this development has not yet been translated into increased oil well pipe demands. Seamless pipe, which recently was so active for this purpose, particularly for shipment to California, is quieter and lapwelded oil country pipe still is very slow. Buttwelded pipe is moving very steadily, but individual orders are small. The Milwaukee maker of electrically welded pipe is reported to have taken 140 miles of 12 in. pipe for a line from the Jennings field in Zapata County, Tex., to Monterey, Mexico, for the Houston-Gulf Gas Co. In tubing, there is a fairly good movement of merchant tubes and a really good one in mechanical tubing.

Sheets.—There is no material let-down in the demand for sheets, and price ideas of producers are growing stronger. No great difficulty attends sales of black sheets at 2.75c., base, blue annealed at 2c., base, and galvanized at 3.50c., in which incidentally some effort is being made to eliminate the jobbers' preferential of 10c. per 100 lb. Higher prices are mentioned on first quarter business, with a possibility that an advance of \$3 will be sought on black and galvanized sheets and a \$2 a ton advance over present prices of body and blue annealed sheets. Mill operations remain well up toward physical capacity.

Tin Plate.—The recession in demand and mill operations appears to have ended and, while the market is far from active, it is doing better in both sales and mill engagement than it did recently. As the time approaches for the naming of 1929 first

half prices for tin plate, it is becoming apparent that the present price of \$5.25 per base box, Pittsburgh, for coke tin plate will be continued.

Cold-Finished Steel Bars and Shafting.—Specifications for this month will show some loss as compared with September, but in view of the heavy releases last month and the fact that specifications this month were against fourth quarter contracts carrying an advance of 10c. per 100 lb., it was expected that buyers would be cautious. Buyers generally appear to have accepted the advance, but it was not until about a week ago that 2.10c., base, disappeared.

Coke and Coal.—Spot furnace coke prices are the same as a week ago, but supplies are somewhat more ample and more sales are being made at the lower than at the higher limit of the price range. Producers are talking strongly as to prices on first quarter contract tonnages, because of the strong pig iron situation. There is the possibility of a good-sized order for coke for the Struthers Furnace Co., which is likely to be blown in in December. The Jones & Laughlin Steel Corporation has escaped the necessity of buying coke for the latest addition to its active blast furnace by firing some of the rectangular ovens at its Aliquippa works. Foundry coke is moving well both in spot sales and in specifications on contracts. There is too much coal for prices to show much strength. Prices are weak even on household fuel, which is in good demand, and prices are off 25c. a ton from those of a month ago. Slack coal still is a drug on the market.

Old Material.—The market has a slightly easier tone in the steel works grades, and heavy melting steel this week is quotable at \$17.50 to \$18, against \$18 a week ago. Failure of the Steel Corporation to purchase, as was expected a week ago and its decision again yesterday to defer purchases, has exerted considerable influence upon dealers, as has also the fact that another Pittsburgh district steel company, which bought very little scrap during the rise from \$14 to \$18 in heavy melting steel and was expected to be a buyer, now appears to have escaped the necessity of purchasing. It is still hard for dealers to pick up large tonnages, but on the other hand there are definite tenders of heavy melting steel at \$17.75. Melters generally are out of the market and, with less pressure for deliveries, dealers are not scrambling so urgently for supplies. Compressed sheets command the same prices as heavy melting steel and that also is the situation in Youngstown, where \$18.50 was paid for both steel and compressed sheets. Turnings are slightly firmer and some rather high prices have been paid for single carloads of steel car axles for quick shipment, which have gone at \$22.50 in such cases, or 50c. to \$1 a ton above what can be obtained on orders for later delivery. The November scrap list of the Baltimore & Ohio Railroad

contains 10,200 and the Pennsylvania Railroad list contains approximately 40,000 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$17.50 to \$18.00
Scrap rails	17.00 to 17.50
Compressed sheet steel....	17.50 to 18.00
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels.....	15.25 to 15.75
Sheet bar crops, ordinary..	18.00
Heavy breakable cast.....	14.00 to 14.50
No. 2 railroad wrought....	18.00
Heavy steel axle turnings..	15.00 to 15.50
Machine shop turnings....	11.50 to 12.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Roller steel wheels.....	19.00 to 19.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates.....	19.00 to 19.50
Low phos., light grade.....	18.00 to 18.50
Low phos., sheet bar crops	19.00 to 19.50
Hvy. steel axle turnings...	15.00 to 15.50

Electric Furnace Grades:

Low phos. punchings.....	18.50 to 19.00
Hvy. steel axle turnings...	15.00 to 15.50

Blast Furnace Grades:

Short shoveling steel turnings	12.50 to 12.75
Short mixed borings and turnings	12.50 to 12.75
Cast iron borings.....	12.50 to 12.75
No. 2 busheling.....	11.25 to 11.75

Rolling Mill Grades:

Steel car axles.....	21.00 to 22.00
No. 1 railroad wrought...	13.50 to 14.00
Sheet bar crops.....	18.00 to 18.50

Cupola Grades:

No. 1 cast.....	15.50 to 16.00
Rails 3 ft. and under.....	18.00 to 18.50

McClintic-Marshall Co. Buys Buffalo Shop

The McClintic-Marshall Co. has acquired from the Bethlehem Steel Co. the Lackawanna Bridge Co., Buffalo, and has incorporated the plant as the McClintic-Marshall Co. of Buffalo. This fabricating shop was acquired by the Lackawanna Steel Co. before the latter was absorbed by the Bethlehem Steel Co. With the acquisition of this unit, the McClintic-Marshall Co. now has structural steel fabricating plants at Buffalo, Pottstown, Pa., Pittsburgh, Chicago and Los Angeles.

To Review Progress in Gas Welding

International Acetylene Association will hold its twenty-ninth annual meeting at the Congress Hotel, Chicago, Nov. 14, 15 and 16. The first day will be given over largely to committee activities. A feature of a later session will be an address by Prof. C. F. Keel of Basle, Switzerland, who will review the European practices in generating, handling and utilizing acetylene gas. A comprehensive series of reports on the use of oxy-acetylene welding in American industries will also be presented. Meetings on Nov. 15 will be held jointly with Gas Products Association.

The executive offices of the Boston Bridge Works, Inc., Boston, formerly at 47 Winter Street, are now at the company's works, Sixth and Binney Streets, Cambridge, Mass.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets, (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets.....	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and over.....	*\$33.00
Rerolling, under 4-in. to and including 1½-in.	34.00
Forging	38.00

Sheet Bars

Per Gross Ton

Open-hearth or Bessemer.....	\$33.00
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*Cleveland mill base on large billets, slabs and sheet bars is \$33.

Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	34.00

Skelp

Per Lb.

Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

Per Gross Ton

*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	

Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.90 to \$11.25

Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₃ , delivered	50c. to 55c.

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.90 to \$3.00
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens. Foundry, by-product, New En- gland, del'd	8.00 11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ½-in., f.o.b. Pa. mines..	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines..	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines....	90c. to 1.10

Ferromanganese

Per Gross Ton

Domestic, 80%, furnace or seab'd.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....	\$33.00
Domestic, 16 to 19%.....	32.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$83.50 to \$88.50
75%	130.00 to 140.00

Per Gross Ton

10%	\$35.00
11%	37.00

Per Gross Ton

12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. deliv- ered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocabontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. An- niston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium, fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00 to \$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00
Standard size	45.00

Chrome Brick

Per Net Ton

Standard size	\$45.00
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Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including
¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E..	70
Stove bolts in packages, Pittsburgh..80, 10 and 2½	
Stove bolts in packages, Chicago..75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago..75, 20, 10, 5 and 2½	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base Per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread..85 and 5	
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Demands Hold to a High Level—Pig Iron Prices Advanced 50c. a Ton

CHICAGO, Oct. 30.—Miscellaneous users of steel, finding needs larger and mill deliveries less certain and more extended, have issued heavy specifications, with the result that the past week was one of the most active of the year. A part of this tonnage is attributed to an active spot rail business and in a small measure to the beginning of shipments against 1929 rail orders. Nevertheless, industry as a whole is reaching a higher level in production. Quantities of steel used by the automobile manufacturers have lessened but are still large, while agricultural implement makers are making heavier drafts against contracts. The use of forgings is expanding and more diversified, and local forge shops are holding to capacity output.

Sales of finished steel products are well up to the average of the past four weeks. The bulk of this tonnage is for nearby requirements, that is 30 to 60 days, which is the range of deliveries of plates, shapes and bars. The total volume of contracts for fourth quarter is larger than in the preceding three months.

Structural steel awards total 3000 tons and fresh inquiry is for 5000 tons. In Chicago, several municipal projects will come before voters in November.

Railroad equipment orders are light, but there are indications that the Santa Fe, the Wabash, the Illinois Central and the Chicago & North Western will soon announce car building programs.

Steel mill output remains steady at 85 per cent of capacity.

Pig Iron.—An advance of 50c. a ton on foundry, malleable and high phosphorus pig iron has been put in effect, making foundry iron \$19.50 for the base grade and \$20 for the No. 1 grade and malleable and high phosphorus \$19.50. Total shipments in October are equal to, if not heavier, than those of the best previous month this year. Spot orders are numerous, many of them for fill-in tonnages for delivery over the remainder of the year. Several additional first quarter contracts have been placed, a Michigan user having ordered 4000 tons. The Chicago market is in the best position in about five years; stocks in the hands of users and producers are low and the demand is consistent and heavy. There is a possibility that the Mayville furnaces, now held in reserve, may be lighted. Reports are denied that basic iron is reaching Chicago by boat. That a shortage exists, however, is apparent because an order for 5000 tons has been turned down by a local producer.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	20.00
Malleable, not over 2.25 sil.....	19.50
High phosphorus	19.50
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free	\$29.00 to 29.50
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Many contracts for 50 per cent ferrosilicon for 1928 have been closed, and some users are plac-

ing orders for next year's requirements of ferromanganese. One contract for ferromanganese is for 2500 tons. Spiegeleisen is quiet.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—It is reported here that the Missouri Pacific has definitely entered the market for 3000 freight cars, requiring close to 45,000 tons of plates, shapes and bars. The Rock Island, following closely on its inquiry for 2750 freight cars, is now in the market for 15 70-ft. suburban cars and the trade believes that this number will be increased before orders are placed. Among purchases this week are 300 refrigerators ordered from the Pullman Car & Mfg. Corporation by the Northern Refrigerator Co. The Chicago & North Western has inquired for 400 gondolas and will come out for additional cars in a few days. Chicago producers have taken orders for 5500 tons of plates for oil storage tank construction in the Southwest and 6000 tons is on inquiry from that section of the country. Plate mills are well engaged on miscellaneous orders and the needs of structural shops. Deliveries range from three to four weeks.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Demand for mild steel bars is steady and deliveries range from four to six weeks. Forgers in the Chicago district are operating at close to capacity. The lessened demand from manufacturers of automobiles has been offset by an expansion of uses in other directions, notably builders of heavy machinery and machine tools. Owing to the character of this heavier work, some shops are finding that output is at the rate of 120 per cent of capacity as gaged by normal production when turning out automobile parts. Automobile schedules now made out for 30 days indicate a uniform demand for bars from that source. Mild steel bar prices are steady at 2c. to 2.10c. per lb., Chicago. No change is reported in the iron bar market, in which prices are steady at 2c. to 2.10c., Chicago. A fair volume of spot buying in alloy bars is noted and specifications are such that local

mills are shipping at a rate close to 85 per cent of capacity. Expansion of miscellaneous uses has in part offset the drop in demand from manufacturers of automobiles. Specifications for rail steel bars are lighter as the month comes to a close. Total shipments, however, in October compare favorably with the best month this year. Orders for fence posts are light because buyers are awaiting the announcement of spring terms on Nov. 6.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Cast Iron Pipe.—The Chicago cast iron pipe market continues to mark time. A sprinkling of car lot orders are being placed from day to day, and on that kind of business prices are steady at \$36 to \$37, Birmingham, or \$44.20 to \$45.20, delivered Chicago, for diameters 6 in. and larger. Akron, Ohio, will receive tenders on 500 tons of 12 and 16-in. pipe. Shipments against old orders continue heavy, as contractors face cold weather in a few weeks. Several contractors' jobs which sellers had expected would develop are still in the formative stage, with the outlook unfavorable for orders because of the nearness of winter weather. Deliveries are prompt on all common sizes.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$44.20 to \$45.20; 4-in., \$48.20 to \$49.20; Class A and gas pipe, \$4 extra.

Structural Material.—Structural shops in this district are well engaged, and specifications issued by them are for liberal quantities of steel. The new Chicago Postoffice is brought a step nearer by the announcement that a local firm of architects will prepare the plans. A bridge at Duluth requiring about 2000 tons will be re-advertised, according to advices received here. The American Bridge Co. was low bidder on the first figures taken, but bids for the complete structure are said to have overrun the money available.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Wire Products.—Specifications from the manufacturing trade are holding to the level of the past few weeks. Automobile builders are taking smaller quantities, partly because this is the season when demand for motor cars slackens and partly because several of the largest makers are changing models. Several automobile plants expect to resume heavier operations about the middle of November. Lighter shipments to automobile centers are partly offset by increased demand from a wide circle of scattered industries. In fact, the net loss in deliveries to the manufacturing trade is not discouraging to sellers. The jobbing trade presents a different picture; the expected increase in fall trade has not come. Especially disappointing has been the scarcity of woven wire fencing orders; normally, this is an active season for this commodity. Orders for nails are few in number and usually of small size, supporting output not above 20 per cent of capacity. Business in the South

shows little change, while orders from the Northwest are in smaller total tonnage. Wire mill output is steady at 65 per cent of capacity.

Rails and Track Supplies.—The Pennsylvania Railroad has distributed orders for 159,600 tons of standard-section rails as follows: 46,900 tons to Carnegie Steel Co., 31,300 tons to Illinois Steel Co., 71,900 to Bethlehem Steel Co., and 9500 tons to Inland Steel Co. Other purchases include 50,000 tons ordered for 1929 shipment to a Western railroad and several miscellaneous lots for immediate delivery. Scattered orders for nearby shipment and small releases against 1929 contracts are holding Chicago rail mills at an output that averages not far from 50 per cent of capacity. Several railroads have ordered a total of 3000 tons of track supplies for shipment this year. Fresh inquiry for future delivery totals 62,000 tons, including 50,000 tons for the Chicago, Milwaukee, St. Paul & Pacific. It is reported that the Illinois Central, the Chicago & North Western and the Burlington will soon follow with inquiries for tonnages approximately equal to their 1927 purchases.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—Moderate activity again marks the reinforcing bar market. Shop operations are spotty, some being as low as 50 per cent of capacity. Some shops are experiencing trouble in getting mill shipments satisfactory for their delivery schedules. Shipments are pointing downward and this, combined with the approach of winter, is making sellers anxious for work. The result is a further softening of prices on all quotations except those for small tonnages. Recent orders have been taken for rail-steel reinforcing bars at 1.85c., Chicago warehouse, and on attractive tonnages 2.10c. a lb. is not uncommon for the billet bar commodity. It is reported that a round tonnage will be

needed for a plant addition to the Stewart Warner Speedometer Corporation, Chicago.

Coke.—Chicago delivered prices are firm at \$8.75 and oven quotations are \$8. Shipments to foundries are heavy.

Old Material.—Dealers are asking \$15 a gross ton, delivered, for heavy melting steel. Brokers' trades range from \$14.75 to \$15 a ton. On the whole, this market is strong except in steel axles, the supply of which is far ahead of demand. Cast iron borings have gone up 50c. a ton on sales totaling more than 5000 tons. Sellers are asking higher prices for railroad malleable, which is scarce. Cast iron wheels are in active demand in small lots and readily bring 50c. a ton more than last week. Stocks in the hands of large users are of moderate size in spite of the volume of recent shipments, which in some cases have overtaxed unloading facilities at local plants. The St. Paul is offering 5000 tons of rerolling rails and the Burlington will dispose of 4700 tons of miscellaneous scrap.

*Prices deliv'd Chicago district consumers:
Per Gross Ton*

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.50 to 16.00
Hydraulic compressed sheets	12.50 to 13.00
Drop forge flashings.....	10.00 to 10.50
Forg'd, cast and r'd steel carwheels	17.25 to 17.75
Railr'd tires, charg. box size	17.25 to 17.75
Railr'd leaf spring cut apart	17.25 to 17.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs.....	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings.....	14.00 to 14.50
Low phos. punchings.....	16.00 to 16.50
Low phos. plate, 12 in. and under	15.50 to 16.00
Blast Furnace Grades:	
Axle turnings.....	11.50 to 12.00
Cast iron borings.....	11.50 to 12.00
Short shoveling turnings...	11.50 to 12.00
Machine shop turnings...	7.25 to 7.75
Rolling Mill Grades:	
Iron rails.....	14.75 to 15.25
Rerolling rails	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft..	17.50 to 18.00
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	14.25 to 14.50
Malleable Grades:	
Railroad	15.75 to 16.25
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and trans- oms	20.50 to 21.00
Iron car axles	25.50 to 26.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought...	12.75 to 13.25
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth...	13.00 to 13.50
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast....	14.00 to 14.50
Stove plate.....	11.75 to 12.25
Grate bars.....	12.50 to 13.00
Brake shoes	11.75 to 12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Prices for these commodities remain strong, and there is still talk among the trade of an advance. Specifications are fully equal to shipments, which represent close to 85 per cent of hot mill capacity. Deliveries to the roofing trade are light, but improvement in this situation is looked for in November, when roofing materials are used in greater quantities in the South. New buying is in small volume and backlogs are steadily being reduced. Many buyers have specified close to their full contract obligations and sellers believe that a round tonnage will be needed to fill out the fourth quarter. Sheets are moving rapidly through jobbers' hands, as shown by shipments from mills to that trade. Agricultural implement manufacturers are using large quantities of sheets, and their specifications against contracts that have been placed in the last 30 days are heavy.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications are measurably heavier. Producers, especially those who furnish bolts, nuts and rivets to manufacturers of agricultural machinery, find that operations at 65 per cent of capacity match closely with shipments. Output for the industry averages well over 60 per cent, and some producers have expanded to 70 per cent of capacity. Prices are firm for all commodities.

Industrial Power Plant for 1800 Lb. Steam Pressure

A boiler and power plant designed for 1800 lb. steam pressure is to be erected for the Philip Carey Mfg. Co., Cincinnati, manufacturer of asbestos and magnesia high-pressure steam pipe insulation, at its Lockland, Ohio, works. W. E. S. Dyer, consulting engineer, Philadelphia, will design and have charge of the construction. The high-pressure steam generating equipment will be furnished by Combustion Engineering Corporation, New York. Integral economizers, water-cooled furnace walls, air preheaters, superheaters and pulverized fuel equipment will comprise the units.

The main generating units will consist of two 5000-hp. vertical triple expansion, direct connected engines, operating with 1400 lb. pressure at the throttle, at a temperature of 800 deg. Fahr., and exhausting against 60 lb. back pressure above the atmosphere. To each engine will be direct connected a three-phase alternator. All the equipment for this plant will be placed with American manufacturers, except the main engines, which will be furnished by A. Borsig, Berlin, Germany. The operating cycle of this plant is expected to make it one of the most efficient steam plants in the world.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq. tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c'd'd nails, base per keg.....	3.10

Philadelphia

Pennsylvania Railroad Orders 159,600 Tons of Rails—10,000 Ton Sale of Basic Pig Iron at \$20, Delivered

PHILADELPHIA, Oct. 30.—Steel deliveries are becoming less extended, most mills offering shipments in 10 days to two weeks, compared with two and three weeks or more early in the month. The past week has brought a slight lull in buying, but shipments on contracts continue in good volume. Bar mills are still heavily booked ahead and in a slightly stronger position on tonnage than the plate, structural or sheet mills. Plate prices show some irregularity, depending upon the position of the individual producer, so that prices range from 2.05c. to 2.15c., Coatesville. Black sheets still show occasional concessions of \$1 a ton from 2.75c., Pittsburgh. The Pennsylvania Railroad has placed its 1929 rail requirements, totaling 159,600 tons, of which 71,900 tons went to the Bethlehem Steel Co., 9500 tons to the Inland Steel Co., and 78,200 tons to Steel Corporation mills. Some sizable plate buying is in prospect by shipyards, which are bidding for contracts or have received awards for new ship construction.

Pig Iron.—Quotations on foundry iron are still from \$20 to \$20.50 per ton, furnace, for delivery to the end of this year and \$20.50 per ton, minimum, for first quarter shipment. Some small contracts for the next quarter are reported and a moderate volume of inquiry. Low phosphorus demand continues good, and prices are strong but unchanged. Basic iron shows a further advance on a sale of 10,000 tons at \$20 per ton, delivered. The Coatesville user of basic, inquiring for about 20,000 tons, has not yet bought.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.....	\$20.76 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.....	21.26 to 21.76
East. Pa. No. 1X.....	21.76 to 22.26
Basic (del'd east. Pa.)....	19.75 to 20.00
Gray forge.....	19.75 to 20.25
Malleable.....	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)....	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace).....	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.....	24.54
Va. No. 2X, 2.25 to 2.75 sil.....	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Domestic and British producers have opened their books for next year and the domestic makers report a substantial tonnage booked at \$105 per ton, seaboard, quoted for delivery throughout the year. British makers have not yet closed many contracts, although they have announced \$105 per ton, seaboard, as the 1929 price.

Bars.—Deliveries are slightly less extended than a few weeks ago, but still range from 10 days to about three weeks, depending upon the sizes specified. Bar mills are generally in a stronger position on tonnage than plate, shape or sheet producers, and no concessions from 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., Philadelphia, are reported on new business.

Shapes.—Quotations are on a basis of mill nearest to consumer, so that there is considerable absorption of freight rates in some instances. On most business the shape market continues at 2.05c., f.o.b. mill, or 2.11c. per lb., delivered Philadelphia, based on 2.05c., Pencoyd. Fabricators are well filled with tonnage and some de-

sirable projects are pending. The New York Shipbuilding & Dry Dock Co., Camden, N. J., has received the contract for a Grace Line vessel, which will probably require 1200 to 1300 tons of shapes.

Plates.—Although most mills are well booked, 2.15c., Coatesville, or 2.25c., Philadelphia, is not yet the minimum on new business. Preferred buyers are still able to obtain 2.10c., Coatesville, and occasionally there are transactions at 2.05c., Coatesville, or 2.15c., Philadelphia. Mills are offering slightly earlier delivery than a few weeks ago, shipments ranging from 10 days to two weeks. Some substantial plate tonnage is in prospect for shipbuilding, a Grace Line ship let to the New York Shipbuilding & Dry Dock Co., Camden, requiring about 3700 tons, and four vessels for the American Express Lines, which are still pending, about 13,500 tons. The fabricated pipe line at Lardner's Point may bring 6000 to 7000 tons of plates to an eastern Pennsylvania mill, if the contract for fabrication goes to a company in the East.

Sheets.—Except for continued reports of concessions of \$1 a ton to preferred buyers of black sheets, the market continues at 2.75c., Pittsburgh, or 3.07c., Philadelphia. Galvanized

sheets are unchanged at 3.50c., Pittsburgh, or 3.82c., Philadelphia, and blue annealed are quoted at 2c. and 2.10c., Pittsburgh, or 2.32c. and 2.42c., Philadelphia. Continuous mill sheets are still quoted at about 1.90c., Pittsburgh. New orders for sheets are small, and mill deliveries have receded to about two weeks or less compared with three to five weeks quoted at the beginning of the month.

Warehouse Business.—October purchases from stock have been slightly larger than those of September, but the month does not rank with the largest of the year. Prices are firm, and black and galvanized sheets are stronger, although small concessions are still evident, usually based on failure to quote the higher base price intended for small lots.

Imports.—In the week ended Oct. 27, 503 tons of pig iron arrived at this port from British India, 1401 tons of manganese ore from Chile, 750 tons of chrome ore from India and 30 tons of ferromanganese from the United Kingdom. Steel arrivals consisted of 106 tons of steel bars, 16 tons of shapes and 5 tons of steel bands from France, 709 tons of shapes, 9 tons of steel bars and 6 tons of bands from Belgium and 15 tons of strip steel from the United Kingdom.

Old Material.—Prices no longer show the strong undertone evident for some weeks, and brokers who are filling contracts report a good supply of certain grades at slightly lower buying prices. A dealer who is buying agent for a Phoenixville consumer has reduced his offers 25c. a ton and is quoting \$11.50 per ton for machine shop turnings, \$13 per ton, delivered, for yard grade of heavy melting steel and \$12.50 per ton, delivered, for stove plate. A sale of No. 1 cast scrap has been made at \$18 per ton, delivered, but it is understood to have been on a high freight rate. Chemical borings have brought \$16 per ton on a recent sale and No. 1 railroad wrought shows an advance of 50c. a ton to \$16.50 per ton on deliveries to a Lebanon, Pa., consumer.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.....	\$16.00 to \$16.50
Scrap T rails.....	15.50 to 16.00
No. 2 heavy melting steel.....	13.00 to 13.50
No. 1 railroad wrought.....	16.00 to 16.50
Bundled sheets (for steel works).....	11.50 to 12.00
Machine shop turnings (for steel works).....	11.50 to 12.00
Heavy axle turnings (or equiv.).....	12.50 to 13.50
Cast borings (for steel works and roll. mill)....	11.00 to 11.50
Heavy breakable cast (for steel works).....	16.50 to 17.00
Railroad grate bars.....	13.00 to 13.50
Stove plate (for steel works).....	13.00
No. 1 low phos., hvy., 0.04% and under.....	19.00 to 20.00
Couplers and knuckles....	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
No. 1 blast f'nace scrap....	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.).....	15.00 to 15.50
Shafting.....	19.00 to 20.00
Steel axles.....	22.00 to 23.00
No. 1 forge fire.....	12.50 to 13.00
Cast iron carwheels.....	16.50 to 17.00
No. 1 cast.....	17.50
Cast borings (for chem. plant,.....	15.00 to 16.00
Steel rails for rolling.....	15.50 to 16.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.70c.
Plates, ⅜-in.....	2.90c.
Structural shapes.....	2.70c.
Soft steel bars, small shapes, iron bars (except bands).....	2.80c.
Round-edge iron.....	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.....	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforc. steel bars, sq. twisted and deform.....	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.....	3.45c.
Cold-fin. steel, sq. and flats.....	3.95c.
Steel hoops.....	3.60c.
Steel bands, No. 12 to ⅜-in., inclus.....	3.35c.
Spring steel.....	5.00c.
*Black sheets (No. 24).....	3.85c.
†Galvanized sheets (No. 24).....	4.60c.
Blue ann'd sheets (No. 10).....	3.00c.
Diam. pat. floor plates—	
¼-in.....	5.30c.
⅜-in.....	5.50c.
Rails.....	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

New York

Large Car-Building Program in Prospect—Pig Iron Advance by Buffalo Furnaces Stimulates Sales

NEW YORK, Oct. 30.—Spot demand for pig iron remains active, indicating that melters rather generally are in need of supplementary tonnage. Sales in this territory for the week, which totaled more than 13,000 tons, were stimulated to some extent by a general advance of 50c. a ton to \$17.50, base Buffalo, on foundry iron for both current and first quarter deliveries. Politics, which has been without noticeable effect on business, is commencing to influence the attitude of buyers as election day draws near. While there is considerable interest in pig iron requirements for the first quarter, very little has been bought for that period, and it is evident that users are postponing action until election results are known. The Eastern Malleable Iron Co. has closed for 1500 tons of malleable, to be distributed among its plants at Naugatuck and Union City, Conn., Troy, N. Y., and Wilmington, Del. Low phosphorus pig iron is more active than for some time in both sales and inquiries. The Richardson & Boynton Co. has closed for a round tonnage of foundry iron for its Utica, N. Y., plant. The Foran Foundry & Mfg. Co., Flemington, N. J., is in the market for 1000 tons for November-December shipment. Abendroth Brothers, Port Chester, N. Y., are inquiring for 250 tons each of No. 2X and No. 1X for early delivery. An advance in the ocean freight rate on pig iron from Europe, effective Jan. 1, is expected to be announced next week. An increase of about \$1.25 in the ocean rate from India, effective on the same date, was recently made public. Importers have sold virtually their entire allotment of Indian iron for deliveries until about March 1, when the last shipments leaving the Orient prior to Jan. 1 will reach this country.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25		\$22.41
*Buf. No. 2, del'd east.		
N. J.		20.78
No. 2, del'd east. N. J.		
tidewater	\$20.01 to	21.89
East. Pa. No. 2 fdy., sil.		
1.75 to 2.25	21.39 to	22.52
East. Pa. No. 2X fdy., sil.		
2.25 to 2.75	21.89 to	23.02
East. Pa. No. 1X fdy., sil.		
2.75 to 3.25	22.39 to	23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Definite assurance has been given to railroad car building companies by a number of railroads that they will come into the market before Jan. 1 or early in 1929 for large quantities of freight cars. It is estimated that inquiries for 40,000 to 50,000 cars are in sight, with the probability that more than half of these will be bought before the end of the year. Considering that the total number ordered in the first nine months of the year did not exceed

30,000, including about 5000 to be built in railroad companies' own shops, the present prospect is the most impressive that car builders have faced in more than a year. Car purchases so far in 1928 are the smallest since the war, excepting 1921, when only 23,000 cars were ordered. The peak year since the war was 1922, with orders for about 180,000 cars. It is known that some railroads have

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¾ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	.60
1 x 16 in. and smaller	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.	
No. 22	3.75c. to 3.95c.	
No. 24	3.80c. to 4.00c.	
No. 26	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30	4.30c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

their lists ready to submit to car builders for bids, but are awaiting the result of the national election. Three roads are mentioned as about to inquire for upward of 5000 cars each, another has a schedule of 4500 and several will inquire for lots ranging from 1000 to 3000. Local steel company offices report that specifications against contracts in October have held up at a high rate, but new business has declined. The total of specifications and new orders in the month has fallen somewhat behind the September figure. Prospects continue promising for large awards of structural steel. Not less than 15,000 tons in apartment house projects may soon be closed, having been held up pending the outcome of an appeal to the city administration for a change in the building code permitting the use of lighter sections for certain stresses. This appeal was denied. A leading fabricator has been awarded 11,300 tons of fabricated steel work for the New York subways. Steel bar prices are firmer at 1.95c. to 2c., Pittsburgh, 1.90c. having disappeared except to a few large contract buyers. Plates and structural shapes have not shown the strength of bars. The common prices on plates are 2.22½c. and 2.27½c., New York, while on shapes 2.19½c., New York, is quoted to large buyers, smaller buyers paying \$1 or \$2 a ton higher.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Ferroalloys.—Announcement has been made by practically all sellers of ferromanganese that their books are open for 1929 at the unchanged quotation of \$105, seaboard basis. Some contracts have been made for next year, but this has not been general. Quotations for 1929 for 50 per cent ferrosilicon will also be unchanged at \$83.50 per ton, delivered, on contract and at \$88.50 for orders not covered by contract. There will be no change in next year's quotations for standard ferrochromium containing 65 to 70 per cent chromium and 4 to 6 per cent carbon, namely, 11c. per lb. of contained chromium. Business in spiegeleisen is confined to small lots; no announcement of 1929 prices has been made.

Cast Iron Pipe.—Seasonal quiet has set in, and current buying is limited to carload lots or less to complete pipe installations. Southern pipe makers continue to quote prices considerably higher than the bids of Northern foundries, but the latter have recently been advancing quotations. The low bid on 14,000 tons of pipe for Warwick, R. I., not yet awarded, is understood to have been \$36.40 per net ton on the 6-in. pipe, quoted by the Herbert Kennedy Co., New York, agent for the French maker. The lowest bid of an American maker on the 6-in. was \$43.50 per ton, delivered, submitted by the Warren Foundry & Pipe Co. The low bid on 1300 tons of water pipe for Herkimer, N. Y., was

submitted by the United States Cast Iron Pipe & Foundry Co.

Prices per net ton, deliv'd New York:
Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Fluorspar.—Domestic users of foreign fluorspar have covered as heavily as possible against material already in this country or due to arrive before Nov. 19, when the increase in duty goes into effect. Some purchases were made at as low as \$15 per net ton, duty paid, but it is reported that this price was made on off-grade material and that standard spar brought \$16 in most instances. It will probably be some time before the market on foreign spar is again tested, but it is assumed that delivered prices will reflect the higher duty, at least in part.

Reinforcing Bars.—This market has been rather quiet in the last week. The tonnage booked was mostly in small lots. General contractors' bids will close tomorrow on the Delaware, Lackawanna & Western Railroad terminal warehouse at Jersey City, requiring about 8500 tons. Among the new projects announced is a bridge at East 238th Street, New York, which will take 250 tons, and a building in Manhattan for the Interborough News Co., for which the tonnage is being estimated. Prices are unchanged.

Warehouse Business.—The past month has been better than September with most jobbers, and in some cases warehouses report the largest month's business of the year. Demand for structural steel and bars continues large despite the advanced season. Black and galvanized sheets also are fairly active. While small concessions are still reported on sheets, prices are firmer than for several months.

Coke.—Standard furnace coke is firm at \$2.85 to \$3.05 per net ton, Connellsville, and foundry coke is unchanged at \$3.50 to \$3.75 per net ton, Connellsville. Standard brands remain at \$4.85 per net ton, ovens, or \$8.56 per net ton, delivered to north-

ern New Jersey, Jersey City and Newark, and \$9.44 per ton to New York and Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Buying prices of brokers are beginning to show irregularity, recent sales of some grades justifying advances, while offers on other grades are slightly lower. Heavy breakable cast is being bought at \$16 per ton, delivered to a Harrisburg consumer, with a \$3.78 per ton freight rate from New York, and at \$16 per ton, delivered to a Florence, N. J., foundry, with a \$2.90 freight rate. No. 1 railroad wrought has been bought by a broker at \$16.50 per ton, delivered Lebanon, Pa. Foundry grade stove plate is going to a consumer at West Mahwah, N. J., at \$12 per ton, delivered. No. 1 heavy melting steel is unchanged, but despite slight weakness in the Pittsburgh district, which might affect the eastern Pennsylvania market, it is pointed out that on a special list of the Pennsylvania Railroad, on which bids were opened last week, the heavy melting steel brought \$19.05 and \$18.50 per ton, Youngstown, on about 2000 tons. The monthly list of the Pennsylvania totaling about 40,000 tons is offered this week.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$12.00 to \$12.50
Heavy melting steel (yard)	8.75 to 9.50
No. 1 hvy. breakable cast	12.25 to 13.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	9.25 to 10.25
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	8.00 to 8.50
Cast borings (blast furn. or steel works)	7.00 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	18.00 to 18.50
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire	8.50 to 9.00
No. 1 railroad wrought	12.25 to 12.75
No. 1 yard wrot. long	11.25 to 11.75
Rails for rolling	12.50 to 13.50
Cast iron car wheels	13.00 to 13.50
Stove plate (foundry)	10.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00 to \$17.50
No. 1 hvy. cast (columns, bldg. materials, etc.)	
cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.50 to 15.00

month, evidently will not get in production on its new models as soon as planned and this has resulted in withholding orders for steel. Large orders for Chevrolet parts have been placed with stamping and other parts makers, but releases against these orders are slow in coming out.

Inquiry in the structural field is light. An export inquiry from Japan for 2500 tons of structural material for cargo handling equipment to be erected at Dairen, Manchuria, is being figured on by a Cleveland fabricator.

Prices are firm at 1.95c., Pittsburgh, for steel bars, plates and structural material. The Cleveland base price for steel bars ranges from 1.90c. to 2.05c.

Pig Iron.—A fairly active buying movement is under way for the first quarter in some sections served by Cleveland interests, although foundries in the Cleveland district are not yet showing much interest in iron for that delivery. Producers with headquarters in Cleveland sold 42,000 tons in foundry and malleable iron the past week, compared with 38,000 tons the previous week. About 75 per cent of this business was for the first quarter. A few inquiries have come out for the first half, but furnaces are declining to quote beyond the quarter. Another inquiry for basic iron has come in the market, this being for 5000 tons from a north central Ohio consumer. Two basic inquiries totaling 20,000 tons or more, previously reported, are apparently still pending. Prices on foundry and malleable iron are firm at the recent advance to \$18, Cleveland, for outside shipment, with one Lake furnace holding to \$18.50 for western and central Ohio and Indiana delivery. In Michigan, \$19 is the ruling price. Business taken during the week was at the advanced prices. In the Valley district, the foundry iron market appears to be holding more firmly to \$17.50. The only price change reported during the week is a 50c. advance in Buffalo, where foundry and malleable iron are now quoted at \$18.50 and \$19 respectively. October shipments will show some gain over September, which was a heavy month in shipments. Furnace stocks have been reduced considerably this month.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$19.00
S'th'n fdy., sil.	1.75 to 2.25	22.25
Malleable		19.00
Ohio silvery, 8 per cent		28.00
Basic Valley furnace	\$17.00 to	17.50
Stand. low phos., V'ley fur.	26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Ore shipments are going along at a heavy rate and the movement by water in October will amount to 8,200,000 tons, or more than 1,500,000 tons gain over the corresponding period last year. With the recent increase in shipping orders, the season's movement is expected to run considerably above that of last year, when total shipments by rail and lake were 52,343,336 tons. There has been some additional chartering of vessels to handle ore.

Cleveland

Pressure for Steel Deliveries Becomes More Insistent— Pig Iron Sales Made for First Quarter

CLEVELAND, Oct. 30.—Pressure for deliveries became the predominating feature of the local steel market during the week, this being particularly true of bar products. There has been an increase in inquiries for lots from a carload to 100 tons from consumers who evidently have about used up their stocks of certain sizes and want quick shipments against new specifications. Price has ceased to be an outstanding factor. With the recent falling off in specifications, the volume of business in this territory during October will be somewhat below that of September, and, while reports do not indicate that deliveries have improved, mills are making heavy inroads into their orders, and some will be able to make better shipments shortly.

Demand for steel from the automotive industry has decreased somewhat because of the seasonal decline in that industry, although it is still operating

at greater capacity than is usual at this time of the year. The Chevrolet Motor Car Co., which was expected to order a large tonnage of steel this

Semi-Finished Steel.—Specifications for sheet bars and slabs continue heavy. Some of the consumers are anxious to accumulate stocks, but are unable to do so, as deliveries are rather slow. There is very little new inquiry, as practically all buyers are covered for the remainder of the year.

Sheets.—A fair amount of new business is coming out in this territory, but there has been a slowing down in specifications from the automotive industry, and in some cases shipments to that industry are being deferred. The Chevrolet Motor Car Co. has purchased a heavy tonnage of auto body sheets for its new models, which were expected to come out Nov. 1, but it is stated that a Cleveland plant that will manufacture the bodies will not start taking shipments in good volume until late in November. Most mills are three to six weeks behind on deliveries. The bulk of the new business is being taken at regular prices, although some price shading is still in evidence.

Strip Steel.—Mills continue to get specifications against contracts for hot-rolled strip. One or two mills during the week adopted the new card of extras and a 2c., Pittsburgh, price for 6-in. and narrower material and 1.90c. for wider material. There is not much new business. Cold-rolled strip is moving well. Some of the mills are still quoting this product at 2.75c., Cleveland and Pittsburgh, for good lots, while others are asking 2.85c.

Wire Products.—Wire is moving well to the manufacturing trade, but nails are quiet. Shading to \$2.45 per keg on nails is still reported in some sections, although leading producers are not making concessions.

Warehouse Business.—October sales show a fair gain over those of September, as deferred mill deliveries are proving a help to warehouse business. The demand for sheets has declined. Prices are firm.

Reinforcing Bars.—Work involving a fair tonnage is still pending, but new inquiry is light. Warehouses are holding closely to 2.25c. Pittsburgh, for cut lengths, but are able to get only small lots at that price. Rail steel bars are quoted at 1.85c., mill.

Coke.—There is only a moderate amount of activity in foundry coke, as most consumers are under contract. Prices are unchanged at \$3.75 to \$4.85 for standard Connellsville brands and \$7.75, Painesville, for Ohio by-product coke, the latter price being for No-

vember shipment. Domestic coke continues active.

Old Material.—The local market continues very firm and prices are higher on heavy melting steel and machine shop turnings. However, Pittsburgh dealers are not offering local dealers as high prices as they were paying a week ago. Prices in Cleveland have not advanced as much as in the Pittsburgh and Valley districts, and local dealers have found it necessary to mark their prices up further to obtain scrap for shipment to Cleveland mills. Dealers now are paying up to \$14.75 for ordinary No. 1 heavy melting steel and \$14 for No. 2 and as high as \$10 for machine shop turnings. Youngstown district mills are understood to have made some scrap purchases. Dealers claim that \$17.50 is the best they can get from mills for No. 1 heavy melting steel for that district. November lists issued by the Michigan automobile companies in-

clude 4400 tons from Dodge Brothers and 4500 tons from the Buick plant.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.50 to \$15.00
No. 2 heavy melting steel.	13.50 to 14.00
Compressed sheet steel.	13.50 to 14.00
Light bundled sheet	
stamp'gs	11.50 to 11.75
Drop forge flashings.	12.25 to 12.75
Machine shop turnings.	9.50 to 10.00
No. 1 railroad wrought.	12.75 to 13.00
No. 2 railroad wrought.	14.50 to 15.00
No. 1 busheling.	13.00 to 13.25
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.	16.00 to 16.50
Low phos. billet, bloom and slab crops.	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap.	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings.	10.50 to 10.75
Mixed bor'gs and short turn'gs	10.50 to 10.75
No. 2 busheling.	10.50 to 10.75
Cupola Grades	
No. 1 cast.	16.50 to 17.00
Railroad grate bars.	11.00 to 12.00
Stove plate.	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable.	16.00 to 16.50
Rails for rolling.	16.25 to 16.50

Reinforcing Steel

Two New Projects Call for 2000 Tons Each

WITH an office building at Boston calling for 2000 tons and highway work in Tennessee requiring a similar tonnage, new projects reported to THE IRON AGE in the last week totaled 6225 tons. The following awards of 4650 tons include 1000 tons for an apartment building at Chicago:

WHITE PLAINS, N. Y., 155 tons, garage, to McClintic-Marshall Co.

NEW YORK, 110 tons, warehouse on East Thirty-sixth Street for New York Steam Corporation, to Jones & Laughlin Steel Corporation.

NEW YORK, 100 tons, ash dump at foot of East Seventy-third Street, to Tidewater Structural Materials Corporation.

ASBURY PARK, N. J., 300 tons, convention hall, to Jones & Laughlin Steel Corporation.

WASHINGTON, 500 tons, bridge, to Concrete Steel Co.

FORT BRAGG, N. C., 325 tons, barracks buildings, to Connors Steel Co.

OXFORD, MISS., 115 tons, dormitory, to Connors Steel Co.

MEMPHIS, TENN., 100 tons, National Bank of Commerce building, to Laclede Steel Co.

EVANSTON, ILL., 250 tons of rail steel bars, Young Men's Christian Association Building, to Inland Steel Co.

CHICAGO, 1000 tons of rail steel bars, apartment building at 1420 Lake Shore Drive, to Calumet Steel Co.

CHICAGO, 400 tons of rail steel bars, apartment building at Seventy-second Street and South Shore Drive, to Joseph T. Ryerson & Sons.

CHICAGO, 400 tons, apartment building, awarded by A. & E. Anderson to Kalman Steel Co.

STATE OF ILLINOIS, 100 tons of rail steel bars, road work, to American System of Reinforcing.

EAST CHICAGO, ILL., 800 tons of rail steel bars, buildings for United States Gypsum Co., to Calumet Steel Co.

SACRAMENTO, CAL., 395 tons, highway work in Sonoma County, to Pacific Coast Steel Co.

SAN FRANCISCO, 675 tons, Sears-Roebuck warehouse, to Soule Steel Co.

LOS ANGELES, 164 tons, Rubio Wash Storm Drain, to Blue Diamond Co.

HOQUIAM, WASH., 100 tons, City Hall, to Northwestern Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 2000 tons, United Shoe Machinery Corporation office building.

NEW YORK, 250 tons, East 238th Street bridge, Corbetta Concrete Corporation, low bidder on general contract.

NEW YORK, tonnage being estimated, building for Interborough News Co.; Russell G. Corey, architect.

CLEVELAND, 150 tons, addition to Hanna garage.

CINCINNATI, 300 tons, Heberle School, general contract awarded to Penker Construction Co.

NASHVILLE, TENN., 2000 tons, highway projects for State Highway Commission.

CHICAGO, 250 tons, apartment building on Commonwealth Avenue; H. B. Ryan, architect.

CHICAGO, tonnage being estimated, plant addition for Stewart-Warner Speedometer Corporation.

MILWAUKEE, 900 tons, addition to Catholic institution.

WALLA WALLA, WASH., 100 tons, Veterans' Hospital; bids opened.

SACRAMENTO, 127 tons, highway work in San Luis Obispo County; bids Nov. 14.

LOS ANGELES, 145 tons, laundry, South San Pedro Street; bids being taken.

The Superior Steel Corporation, Carnegie, Pa., will start operation in the next few weeks of a new electrically-driven 8-in., 4-stand horizontal hot strip mill, on which it will roll strips as narrow as $\frac{3}{8}$ in. wide up to 3 in. to No. 22 gage. Hitherto, the narrowest strips this company has been able to roll have been 1 in. and then in the heavier gages.

William Jessop & Sons, Ltd., Sheffield, England, steel exporter, has appointed the Pigott Steel Co., 620 Frankfort Avenue, Cleveland, as agent in the Cleveland district.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.35c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Pacific Coast

Cast Iron Pipe Market More Active—2000 Tons for Los Angeles Store Largest Structural Award

SAN FRANCISCO, Oct. 27. (By Air Mail)—Demand for iron and steel products on the Pacific Coast is holding up fairly well, but most bookings of the week called for relatively small lots. Included among the larger lots were 2000 tons of structural shapes for Bullock's Store, Los Angeles, booked by the Llewellyn Iron Works, and approximately 1600 tons of cast iron pipe, divided between two makers.

Pig Iron.—A slight improvement in the rate of operations among jobbing foundries in northern California is reported. Specialty plants, such as sanitary ware and stove foundries, continue to operate on fairly heavy schedules. Pig iron prices are unchanged. Imports of foundry iron in July totaled 1248 tons, compared with 1441 tons in June and 1050 tons in July, 1927.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—One of the largest reinforcing bar awards in the San Francisco district during the past month or two went to Soule Steel Co. and called for 675 tons for a warehouse for Sears, Roebuck & Co. The Pacific Coast Steel Co. took 395 tons for highway work in Sonoma County, California. Pending business totals more than 5000 tons, the largest project calling for 1800 tons for the Life Science Building at Berkeley. Prices on out-of-stock material have shown no signs of strengthening, and 1.80c., base, is general both in the Los Angeles and San Francisco districts. Imports of bars, both merchant and reinforcing, during July totaled 3615 tons, compared with 2487 tons for June and 2199 tons for July, 1927.

Plates.—The Beall Tank & Pipe Co. secured the largest award of the week, calling for 230 tons for an 18-in. welded pipe line for the Beebe Orchard Co., Wenatchee, Wash. The Pacific Coast Engineering Co., Oakland, Cal., booked 100 tons for Plummer ball joints for various interests. Bids were opened this week on 231

tons of 24-in. riveted pipe for Seattle, alternate bids being taken on cast iron pipe. The United States Engineer Office, San Francisco, will open bids next week on 185 tons of 20-in. shore pipe. Importations in July totaled less than 250 tons. So far this year 680 tons has been brought in. Prices range from 2.20c. to 2.25c., c.i.f.

Shapes.—Pending business does not exceed 6000 tons. The McClintic-Marshall Co. Central Works is low bidder on 2300 tons for the Methodist Book Concern Building, San Francisco. During July, 1428 tons of foreign material came in at Pacific ports. This compares with 1455 tons for June and 2192 tons for July, 1927. Plain domestic material is firm at 2.35c., c.i.f., while foreign shapes are about 1.60c., c.i.f., duty paid.

Cast Iron Pipe.—The cast iron pipe market was active during the week. Los Angeles placed 866 tons of 12-in. Class 350 pipe, with the American Cast Iron Pipe Co. and 720 tons of 6-in. Class 350 with the Pacific States Cast Iron Pipe Co. Various street improvement projects in Seattle, involving 300 tons, went to the United States Cast Iron Pipe & Foundry Co., as did 659 tons of 6 to 24-in. for the Young Street improvement job in Honolulu. Phoenix, Ariz., placed 537 tons of 2 to 12-in. Class B pipe with an unnamed company. E. J. Treacy secured 145 tons for the Franklin Street improvement project in San Francisco, calling for 18-in. Class B pipe. Bids were opened this week on 1284 tons of 24-in. Class B pipe for Seattle, alternate bids being received on riveted steel pipe. H. E. Conner, Redwood City, Cal., was low bidder on 144 tons of 4 and 6-in. Class B pipe for street improvement in Tulare, Cal. In July, 4135 tons of cast iron pipe was imported, compared with 1231 tons in June and 2375 tons in July, 1927.

Steel Pipe.—The largest award of the week involved 300 tons of 4-in. pipe for the Santa Maria Gas Co., Santa Maria, Cal., and was booked by Grinnell Co. Distributors report a better movement from stock. Importations of tubular products, exclusive of cast iron pipe, during July totaled 2157 tons, compared with 2169 tons in June and 4158 tons in July, 1927.

Coke.—Sales and inquiries are limited to unimportant lots for prompt shipment. Imports in July totaled 4659 tons, compared with 4901 tons in June and 3054 tons in July last year. English beehive coke is quoted at \$16 a net ton, delivered incoming dock, and English by-product at from \$11.50 to \$13 a net ton.

Birmingham

Southern Basic Iron Shipped to the Orient—Steel Demand Continues at a Good Rate

BIRMINGHAM, Oct. 30.—In pig iron, this is an in-between buying period, so new sales are light. Estimates by makers as to the amount of fourth quarter iron under contract in the district range from 85 to 95 per cent. Prices are firm at \$16.25 for last quarter delivery. No inquiries are being received for first quarter iron. All makers report October shipments larger than those of September. About 4000 tons of basic iron has been exported to the Orient during the last three weeks, shipments being made by barge on the Warrior River. Another shipment for about half this quantity is scheduled for early November. Iron production is steady. Furnace operations have not been changed since the first week of October. Of the 18 in blast, 15 are on foundry, two on basic and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.	16.75
Basic	16.25

Finished Steel.—Owing to the closing of the rail mill of the Tennessee company at the end of the first week of October, the percentage of plant operations in the district last month was considerably lower than in September. There has been a good im-

provement in rail inquiries during the past two weeks. In lines other than rails, backlogs are increasing despite high mill operations. Prices are strong. A large amount of structural steel business is in prospect. Mills are operating full time and some are on double shift. The Southern Steel & Rolling Mill will furnish 450 tons of bars for a new warehouse for the Stockham Pipe & Fittings Co. The aggregate tonnage of reinforcing bar business is good, although it is made up mostly of small orders. The Connors Steel Co. has booked an order for 325 tons for a barracks building at Fort Bragg, N. C. The active open-hearths in the district were increased to 14 when the Tennessee company put on three at Ensley on Oct. 23. Seven are active at Fairfield, and the Gulf States Steel Co. continues with four at Alabama City.

Cast Iron Pipe.—There is little demand from either private or municipal sources. Backlogs are low as a result of recent light bookings. On the few sales that are being made, makers are holding closely to quotations of \$36 to \$37 on 6 in. and larger sizes. Production remains steady.

Coke.—Practically all foundry coke consumers not under contract are buying as needed, sales averaging two to

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{8}$ -in. and over	3.15c.
Small angles, under $\frac{3}{8}$ -in.	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	3.75c.
Spring steel, $\frac{3}{4}$ -in. and thicker ..	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'l'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger ..	5.65c.
Com. wire nails, base per keg ..	\$3.40
Cement c't'd nails, 100-lb. keg ..	3.40

three weeks ahead of requirements. Coke under contract is moving out in fairly satisfactory volume. Quotations remain at \$5 for both spot and contract.

Old Material.—Sales have dropped off a little, and some consumers have held up shipments for the present. Dealers are still experiencing a little trouble in finding material to apply on some contracts. Prices are fairly firm.

Boston

Pig Iron Price Trend Upward—Scrap Gains Further Strength—Structural Steel Projects Revived

BOSTON, Oct. 30.—The trend of pig iron prices unquestionably is upward. The most active Buffalo furnace is getting \$17.50 a ton, furnace, for No. 2 plain and \$18 for No. 2 X. For No. 1X \$19 a ton, furnace, is openly quoted, but has been shaded. Other New York State iron is generally \$18 a ton, base furnace, with 50c. a ton differentials. The Mystic Iron Works is meeting the Buffalo and other New York State furnace prices. Virginia iron is \$20 a ton, base furnace, with not more than 50,000 tons available. New England foundries in general are busier than at any time this year and have purchased several thousand tons of iron in the past week. The market has been more active than in previous weeks of October. Sales included one lot of 1800 tons of No. 2X to a Massachusetts melter, about 800 tons of No. 2X and No. 1X to a stove maker in this State, and numerous smaller lots for fourth quarter and first quarter. Two small lots of charcoal iron were sold at \$24 a ton, base furnace. Indian iron is sold into December. The largest open inquiry in the market is from the Gilbert & Barker Mfg. Co., Springfield, Mass., for 1000 tons of foundry iron, deliveries to run into 1929.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.41
*Buffalo, sil. 2.25 to 2.75..	22.91
†Buffalo, sil. 1.75 to 2.25..	21.28
†Buffalo, sil. 2.25 to 2.75..	21.78
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	\$23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Coke.—October deliveries of by-product foundry coke will run ahead of those in September, largely because of increased production by the New England Coal & Coke Co. Ovens are still behind on deliveries, however. Foundries are specifying against contracts for stocking purposes as well as for current needs. The price is still \$11 a ton, delivered within a \$3.10 freight rate zone. The November price has not been announced. The outstanding feature of the coke market is the large demand for do-

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

mestic fuel. New England fuel is meeting stiff competition from coke made outside these States, which is bringing less than \$8.30 a ton, delivered to dealers.

Shapes and plates.—The market for standard shapes is now firmly established at 1.90c. per lb., Pittsburgh, and indications point to 2c. after Oct. 31, when lower-priced protection given large consumers will be withdrawn. The plate market also is firm at 1.90c., Pittsburgh.

Fabricated Steel.—Several fabricating jobs that have been dormant for months have come to life, and the market is more active. Figures will soon be asked on several thousand tons for a local office building, on 2000 tons for a Brookline, Mass., apartment hotel, on a larger tonnage for the Boston & Maine Railroad hotel, while numerous other jobs ranging from 100 to 500 tons bring the aggregate of probable business to at least 15,000 tons.

Warehouse Business.—Local warehouses are moving more iron and steel products than in months. Current orders are numerous and involve larger

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zeos	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

quantities than in any month this year.

Old Material.—Scrap prices are holding strongly, while supplies are growing smaller. Brokers with old contracts cannot fill them except at a financial loss. Material moving out of New England is going to eastern as well as to western Pennsylvania. New England consumers apparently have covered their requirements for the remainder of 1928. Pennsylvania consumers will not pay more for rails for rerolling than for No. 1 heavy melting steel. While \$6.25 to \$6.50 a ton on cars shipping point is the general price range on steel mill borings and mixed borings and turnings, at least one broker is paying \$6.60. Unable to secure steamer space for Danzig shipments owing to heavy grain exports to England and the Continent, exporters have temporarily stopped buying. The export market for automobile scrap is therefore nominal at \$10 to \$10.25 a ton, on dock here. The Navy Yard, Boston, and the Boston & Albany Railroad on Nov. 1 will close bids on a small amount of scrap.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
Scrap T rails	11.00 to 11.50
Scrap girder rails.....	10.50 to 11.00
No. 1 railroad wrought....	11.50 to 12.00
No. 1 yard wrought.....	9.50 to 10.00
Machine shop turnings....	7.00 to 7.50
Cast iron borings (steel works and rolling mill)...	6.25 to 6.60
Bundled skeleton, long....	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.25 to 6.60
Forged scrap	7.00 to 7.50
Shafting	14.50 to 15.00
Steel car axles	16.50 to 16.75
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.00 to 10.50
Rails for rolling.....	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.....	15.50 to 16.00
No. 2 machinery cast.....	13.50 to 14.00
Stove plate	11.00 to 11.50
Railroad malleable	15.00 to 15.50

Youngstown

Steel Shipments Exceed New Business

YOUNGSTOWN, Oct. 30.—Most of the 10-in. pipe for the Roxana Petroleum Co. oil line from McCamey to Houston, Tex., will be furnished by the Youngstown Sheet & Tube Co. The complete line will take about 45,000 tons. All of the pipe mills of this company, except one butt-weld unit, which ordinarily is held for emergency demands, are in operation. The Republic Iron & Steel Co. is keeping five of its seven units in production. Line pipe still is the backbone of the demand, but there is a constant call for seamless pipe for deep well drilling. Excepting on line pipe, in which there is usually active competition and resultant variation in quotations, prices are holding well, and in the secondary market the price situation is better stabilized than in several years.

Mills in this district are well sup-

plied with sheet orders, although in most cases shipments on old business are outstripping new bookings. The steel output of nine open-hearth furnaces of one local sheet maker is required for the sheets going to the Ford Motor Co. That company is steadily increasing its production and late reports indicate a daily output of more than 5500 units. Demands from several other car builders are lighter than recently. Sheet prices are holding well, although it is admitted that occasional concessions in the common finishes are encountered. These deviations, however, are not viewed with concern, as in the strongest of markets there is always some business that goes at less than the regular prices.

In general, order books appear to be

decreasing. Steel works operations are in the main holding a little below the extreme peak of a fortnight ago. Promises of deliveries on new inquiries are less extended, which would rather point to some recession in plant activities as backlogs work down.

In the scrap market, sales of heavy melting steel at \$18.50 to a local melter, who also bought compressed sheets at \$18 or possibly a little more and turnings at \$13, stand out. These purchases, however, are looked upon as the end of the rise in scrap, which had its basis in the urgency of steel demands, which forced a high rate of steel production and consequently increased the use of scrap, since it was considered doubtful that the demand would hold sufficiently long to warrant the starting of idle blast furnaces.

operating practically at full capacity and are taking liberal tonnages of bars. Prices are firm at 1.95c. to 2c., base Pittsburgh. In common wire nails there has been no deviation from the regular schedule of \$2.69 per keg, delivered Cincinnati. District sheet mills have slightly bettered their position in the past week from the standpoint of backlogs. A healthy demand is reported from consumers and little change in this favorable situation is anticipated in the next 30 days. By that time producers are confident that automobile companies will be coming into the market rather heavily for their requirements. Galvanized sheets are steady at 3.50c., base Pittsburgh, blue annealed at 2c., black at 2.75c. and automobile body stock at 4c. Cold-rolled strip steel is firm at 2.75c. to 2.85c., base Pittsburgh. Makers of rail steel reinforcing bars are quoting 1.85c. to 1.90c., base mill.

Old Material.—While the market is holding its recent gains and there have been further advances in a few items, there are signs of increasing caution on the part of dealers. Some scrap has been purchased in the past few days at less than was paid a week ago. District mills are content to go along with present yard stocks without anticipating future needs. The Big Four has a list totaling 1600 tons closing this week.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel....	\$13.50 to \$14.00
Scrap rails for melting....	14.00 to 14.50
Loose sheet clippings....	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings.....	9.75 to 10.25
Machine shop turnings....	9.25 to 9.75
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought...	13.50 to 14.00
Short rails.....	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	14.75 to 15.25
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.25 to 10.75
Railroad malleable	13.50 to 14.00
Agricultural malleable....	13.00 to 13.50

Cincinnati

Southern Ohio Foundry Iron Advanced 50c. a Ton—Steel Demand Continues Fairly Strong

CINCINNATI, Oct. 30.—While pig iron sales have been confined to small miscellaneous lots for prompt delivery, prices remain strong. Northern Ohio foundry iron is quoted at \$18, base furnace, and southern Ohio foundry at \$18, base Ironton, an advance of 50c. a ton. A Tennessee producer is offering iron for first quarter shipment at \$16.25, base Birmingham, but Alabama furnace interests are not willing to sell beyond this year at that price. In fact, the possibility of an increase of 50c. or 75c. a ton on Southern iron is being discussed in the local trade. The only sizable pending inquiry calls for 600 tons of foundry for a Michigan melter. Jackson County silvery iron is firm at \$25, base furnace, for 8 per cent.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25.....	\$19.89
Ala. fdy., sil. 1.75 to 2.25.....	19.94
Ala. fdy., sil. 2.25 to 2.75.....	20.44
Tenn. fdy., sil. 1.75 to 2.25.....	19.94
S'th'n Ohio silvery 8 per cent.....	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—Despite a slight slackening of demand for by-product foundry coke in the last two weeks, shipments

in October have been ahead of those of September; in domestic grades the betterment has been even more pronounced on account of cooler weather. By-product coke makers have announced that the current schedule of \$7, ovens, will stay in effect during November, but an increase of from 25c. to 50c. a ton on egg and walnut sizes is certain, although the exact amount has not been determined. For delivery during the remainder of this year and during the first six months of 1929, Wise County beehive foundry coke is being sold at \$5 to \$5.25, ovens, and New River foundry at \$6.50 to \$7, ovens.

Finished Material.—Specifications and orders for bars, structural shapes and plates have trended upward on account of a well diversified demand from all consuming lines. Agricultural implement manufacturers are

St. Louis

Pig Iron Sales Exceed 16,000 Tons—Scrap Again Advances on Heavy Buying

ST. LOUIS, Oct. 30.—Another week of heavy buying marked the pig iron market here, sales of the St. Louis Gas & Coke Corporation totaling 16,350 tons, of which 2750 tons was malleable, 2000 tons basic, and the remainder foundry iron. Most of the purchases were for shipment in the first quarter, although buying for prompt delivery and November-December was unusually heavy. Several weeks ago it was believed that buying for the last quarter had been completed, but the situation changed largely through the activities of stove foundries. Stove plants here and in Belleville and Quincy are enjoying a

tremendous volume of business, which has been stimulated by the production of novelty enameled heaters, lines that are much sought in rural communities. Mail order houses have been heavy buyers of these stoves. More than 7000 tons of the local maker's sales of foundry iron went to stove manufacturers, in lots from 100 to 1000 tons, the latter order to a local manufacturer for shipment this year. Shipments continue heavy and the local maker, operating only one of its two furnaces, has been able to reduce materially its surplus stock of iron. The Granite City maker is selling in Chicago territory at recent advances of makers there, but has

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

made no advance here because of Southern competition.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$19.50 to \$20.00
N'th'n No. 2 fdy., deliv'd St. Louis..	21.16
Southern No. 2 fdy., deliv'd.....	20.67
Northern malleable, deliv'd.....	21.16
Northern basic, deliv'd.....	21.16

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—Buying of plates, shapes and bars has subsided, and new business in sheets also is lighter. Warehouse business is about on a par with this time last year, although slightly better than last month. Fabricators of structural steel report little business.

Old Material.—Prices for old material continue to advance, following heavy buying by four large consumers during the past week to 10 days. Strength in Chicago and other centers has also added to the firmness of the market here. Stocks in the hands of some consumers are sufficient for the next four to six weeks, while others' stocks are low. Most consumers are more eager to buy than dealers are to sell at present levels. Advances of 25c. a ton were recorded in heavy shoveling and melting steel, No. 2 railroad wrought, steel car axles, railroad springs, steel angle bars, railroad malleable, and stove plate, while miscellaneous standard-section rails are 50c. higher and steel rails less than 3 ft. are up \$1.50. No. 1 machinery cast is \$1 lower. Railroad lists include: Pennsylvania, 7165 tons; Chicago, Burlington & Quincy, 4695 tons; Union Pacific, 2723 tons; Terminal Railway of St. Louis, 2250 tons; Big Four, 1650 tons; Missouri Pacific, 111 carloads; Chicago, Milwaukee, St. Paul & Pacific, 102 carloads; Nickel

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets	3.75c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Plate, 26 carloads; Nickel Plate (rail), 17 carloads; Mobile & Ohio, 10 carloads; Standard Oil, 5 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel.....	12.25 to 12.75
No. 1 locomotive tires....	14.50 to 15.00
Miscel. stand-sec. rails including frogs, sw'ches and guards, cut apart..	14.50 to 15.00
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought...	13.25 to 13.75
No. 1 busheling	9.25 to 9.75
Cast iron borings	8.50 to 9.00
Iron rails	13.00 to 13.50
Rails for rolling.....	15.00 to 15.50
Machine shop turnings....	9.00 to 9.50
Steel car axles.....	18.50 to 19.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans. 20.25 to 20.75	
No. 1 railroad wrought...	11.50 to 12.00
Steel rails, less than 3 ft..	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels.....	13.50 to 14.00
No. 1 machinery cast.....	14.00 to 14.50
Railroad malleable	13.75 to 14.25
No. 1 railroad cast.....	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under	26.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

and stove plate and malleable scrap are gaining strength in Ontario. Montreal dealers report good orders for machinery cast, wrought iron and steel axles and heavy melting steel. Export business from the Montreal district is increasing.

Dealers' buying prices:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00	
Rails, scrap	10.00	9.00	
No. 1 wrought.....	9.00	11.00	
Machine shop turnings..	7.00	5.00	
Boiler plate.....	7.00	6.00	
Heavy axle turnings....	7.50	6.50	
Cast borings	7.50	5.00	
Steel turnings	7.00	5.50	
Wrought pipe	5.00	5.00	
Steel axles	14.00	20.00	
Axles, wrought iron....	16.00	22.00	
No. 1 machinery cast....		16.00	
Stove plate		13.00	
Standard carwheels.....		16.00	
Malleable		13.00	

	Per Net Ton
No. 1 machinery cast....	15.00
Stove plate	9.00
Standard carwheels.....	13.00
Malleable scrap.....	13.00

Buffalo

Pig Iron Advanced—Scrap Strong

BUFFALO, Oct. 30.—Buffalo pig iron has been advanced 50c. a ton, bringing the Buffalo base for No. 2 plain foundry to \$17.50 for outside delivery and to \$18.50 for district delivery. The malleable price is up to \$18 for outside delivery and to \$19 for this district. Books have been opened for first quarter on these bases and considerable inquiry has come out. Among the lots sought are 2000 tons of malleable, 2500 to 3500 tons of foundry for a melter in the Utica district, two from the vicinity of New York City for 1000 tons of foundry each, one for 1000 tons from New England and one for 1500 tons of foundry. The General Electric Co. is in the market for part of 1000 tons of foundry and malleable for its Erie, Pa., plant. The Eastern Malleable Iron Co. bought 1000 tons of malleable for Wilmington, Del., and Troy, N. Y. Several 500-ton inquiries for foundry and malleable have come out, mostly from the East. The situation in the immediate district is that almost all the melters are covered for this quarter and have not yet gone into their requirements for the first quarter. Reports here are that Port Henry iron is now being sold on an \$18.50 to \$19 base. No pig iron was shipped over the barge canal last week.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25..	\$17.50 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.00 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.00 to 20.00
Malleable sil. up to 2.25..	18.00 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal...	27.28

Finished Iron and Steel.—Operations are being maintained by Buffalo mills at the high rate of recent weeks. Bars are being quoted at 2.05c. to 2.10c. and plates and shapes at 2c. to 2.10c., Buffalo. On black sheets, 2.75c. is firm, and on galvanized the range is 3.50c. to 3.60c. Specifications are

Canada

Pig Iron and Scrap Markets Continue Active—Viaduct Takes 7000 Tons of Steel

TORONTO, ONT., Oct. 30.—Current pig iron business is almost entirely confined to spot delivery, but such orders are appearing frequently. A few inquiries have appeared for foundry and malleable iron for winter requirements of consumers who are prepared to take immediate delivery. Shipments against contracts are going out on schedule. Production of iron continues at the former high level, with seven furnaces active. Prices are strong.

Prices per gross ton:

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60
	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00
	Imported Iron, Montreal Warehouse
Summerlee	33.50
Carron	33.00

Structural Steel.—Several new projects have been announced requiring tonnages of structural and reinforcing steel. The Dominion Bridge Co., Toronto, has been awarded upward of 7000 tons of steel for the new Toronto viaduct. About 5000 tons will be required for a bridge between Lachine and Coughnawaga for the Department of Public Works, Quebec. For a new automobile building for the Canadian National Exhibition, Toronto, 1200 tons will be needed.

Old Material.—Buying is general throughout Ontario and Quebec. Large consumers in the Toronto and Hamilton districts are furnishing the bulk of current business, but in most cases these consumers are not placing forward contracts. Heavy melting steel and turnings are going to consumers in the Hamilton district in large tonnages and new orders are appearing. Machinery cast is in strong demand

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

very good. Reinforcing bar business is confined to small lots, but the price is firm at 2.515c., warehouse. The Buffalo State Hospital addition will require about 350 tons of fabricated structural shapes. Operations at the Bethlehem Lackawanna plant are at 90 to 95 per cent, with all the mills on double turn and the rail mill in operation; the Donner Steel Co. is also running at 95 per cent, the Seneca Iron & Steel Co., 95 per cent; the Wickwire-Spencer Corporation, 95 to 100 per cent, and the Buffalo Bolt Co., 75 per cent. The steel making facilities at Lackawanna plant have been increased by the operation of the Bessemer plant.

Old Material.—The market is strong, but there have been no new sales of size. Many old orders are still out, and dealers are finding it difficult to fill some \$15.50 orders for No. 1 steel. Great activity is apparent in this district on the part of Pittsburgh and Youngstown dealers, who are negotiating for Nos. 1 and 2 steel. A mill which last week bought strictly No. 1 grade heavy melting steel at \$16.75 to \$17 has notified dealers to regulate shipments. Some hydraulic compressed sheets are going

New Officers of Foundrymen's Sand Committee

Following the resignation of B. D. Fuller as chairman of the American Foundrymen's Association committee on molding sand research, Fred Erb of the Erb-Joyce Foundry Co., Detroit, and vice-president of the A. F. A., has been appointed general chairman of the committee. Mr. Fuller retains his interest in the committee's activities and remains on the executive committee.

A new position, that of technical director, has been created in the committee's organization, and Dr. H. Ries, head of the department of geology of Cornell University, has been selected to fill the position.

Dr. Ries has been connected with the work of the committee since its inauguration in 1921, first as chairman of the sub-committee on geological survey of foundry sand resources and later as chairman of the sub-committee on tests. One of the most eminent of economic geologists of the country and an authority on clays, Dr. Ries was a pioneer in investigating foundry sands, for his work in 1904 and 1905 on the surveys of the foundry

to Youngstown from Buffalo at \$15.75 to \$17, Youngstown. A car of knuckles and couplers has been sold for \$18.50, but the ruling price is nearer \$17.50. Some machine shop turnings have been sold at \$8.50 to \$9, and the local blast furnaces will pay \$11.50 for short shoveling steel turnings. Considerable difficulty is being experienced by dealers in filling outstanding orders for stove plate, which they are now buying at more than they sold for.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$15.75 to \$17.00
No. 2 heavy melting steel.....	14.25
Scrap rails.....	15.50 to 16.00
Hydraulic comp. sheets.....	14.25
Hand bundled sheets.....	12.00 to 12.50
Drop forge flashings.....	13.50 to 14.00
No. 1 busheling.....	14.75 to 16.00
Hvy. steel axle turnings.....	13.50 to 14.00
Machine shop turnings.....	8.50 to 9.00
No. 1 railroad wrought.....	14.50 to 15.00
Acid Open-Hearth Grades	
Knuckles and couplers.....	17.00 to 17.50
Coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends.....	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings.....	11.00 to 11.50
Blast Furnace Grades	
Short shov. steel turnings.....	11.00 to 11.50
Short mixed borings and turnings.....	11.00 to 12.00
Cast iron borings.....	11.00 to 12.00
No. 2 busheling.....	11.00 to 12.00
Rolling Mill Grades	
Steel car axles.....	18.75 to 19.25
Iron axles.....	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast.....	15.50 to 16.00
Stove plate.....	14.50 to 15.00
Locomotive grate bars.....	13.00 to 13.50
Steel rails, 3 ft. and under.....	17.50 to 18.00
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades	
Industrial.....	16.00 to 16.50
Railroad.....	16.00 to 16.50
Agricultural.....	16.00 to 16.50

dry sand resources of Michigan and Wisconsin was perhaps the earliest systematic investigation of foundry sands. For his earlier work in connection with the committee in its development of sand testing methods, honorary membership in the American Foundrymen's Association was conferred upon Dr. Ries.

The committee on molding sand research, organized in 1921 as a joint committee of the A. F. A. and of the engineering division of the National Research Council, under the chairmanship of Mr. Fuller, recently issued its second volume of "Standard and Tentatively Adopted Methods of Testing and Grading Foundry Sands." The work of the committee as a whole has been of great value to foundrymen in placing foundry sands under technical control. Its future work will be to simplify test methods, carry on research projects and formulate sand grading classifications.

By-Product Coke Corporation is preparing plans which will result in a substantial increase in pig iron output by its Federal furnace property at Chicago.

Railroad Equipment

Large Orders Placed in Company Shops

FREIGHT cars placed in company shops featured the market this week. Orders included 500 automobile cars by the Norfolk & Western, 300 box cars by the Southern Pacific and 300 refrigerator cars by Swift & Co. The Northern Refrigerator Co. has placed 300 refrigerator cars with a car builder. The Buffalo, Rochester & Pittsburgh, whose prospective inquiry for 1000 box cars was mentioned last week, may also purchase 1000 hopper cars. Details of the week's business follow:

Delaware, Lackawanna & Western has ordered 20 locomotives from American Locomotive Co. and has placed 100 box cars with American Car & Mfg. Co.

Alaska Railroad has ordered one Mikado type locomotive from Baldwin Locomotive Works.

Pacific Fruit Express is inquiring for one 0-4-0 type locomotive.

Norfolk & Western expects to purchase 10 all-steel express cars and five mail and baggage coaches. This road has also placed orders for 500 all-steel automobile box cars at its Roanoke, Va., shops.

Chicago, Rock Island & Pacific is inquiring for 15 passenger coaches.

Swift & Co. are building 300 refrigerator cars in their own shops.

Southern Pacific, Texas Lines, will build 300 box cars in its own shops.

Chesapeake & Ohio has renewed its inquiry for six gas-electric rail motor cars.

Chiriqui Land Co., Panama, is inquiring for 50 15-ton freight cars.

Royal State Railways of Siam have made inquiry through C. P. Sanderson, 100 Broadway, New York, for 300 low side all-steel cars of 12 tons capacity.

Northern Refrigerator Co. has ordered 300 refrigerator cars from Pullman Car & Mfg. Corporation.

Buffalo, Rochester & Pittsburgh is now expected to inquire for 2000 freight cars, instead of 1000, as reported last week. In addition to 1000 box cars, it will probably ask for 1000 hopper cars.

Canadian National's car requirements are now stated to be 3300, of which about 2300 will be placed in Canada and the remainder in the United States.

Illinois Central will buy four electric switching locomotives.

Chicago & North Western is in the market for 400 low side gondola cars. Inquiries for additional cars will be made in a few days.

Detroit Scrap Market Continues Strong

DETROIT, Oct. 30.—Shipments of pig iron, which are approximately the same as for September, promise to be on a higher basis in November, when new automobile models get into production.

The market on old material continues strong.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$13.00 to \$13.50
Borings and short turnings.....	9.00 to 9.50
Long turnings.....	8.00 to 8.50
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast.....	19.00 to 20.50
Hydraul. comp. sheets.....	12.25 to 12.75
Stove plate.....	11.00 to 12.00
No. 1 busheling.....	10.00 to 10.50
Sheet clippings.....	8.00 to 8.50
Flashings.....	10.75 to 11.25

Non-Ferrous Metal Markets

Copper Again Advanced and Active, Tin Quiet and Strong, Lead and Zinc Unchanged

Copper.—Prices have advanced $\frac{1}{2}$ c. per lb. in the past week. Electrolytic copper was sold on Oct. 26 at 15.75c., delivered in the Connecticut Valley, and then went to 16c. on Oct. 29. This was followed on Oct. 30 by an advance in the export price by Copper Exporters, Inc., to 16.25c., European ports. Producers say that consumers have become anxious about future supplies and prices, and have caused the advances. They feel that many consumers have overbought. They assert, however, that there is or will be plenty

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.50c. to 51.50c.
Tin, bars.....	52.50c. to 53.50c.
Copper, Lake.....	16.75c.
Copper, electrolytic.....	16.50c.
Copper, casting.....	15.75c.
Zinc, slab.....	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.25c. to 10.25c.
Antimony, Asiatic.....	12.75c. to 13.25c.
Aluminum No. 1 ingots for re-melting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar.....	56.50c.
Copper, Lake.....	17.00c.
Copper, electrolytic.....	17.00c.
Copper, casting.....	16.75c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar.....	9.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	59.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	33.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	20.25c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	25.12 $\frac{1}{2}$ c.
Copper.....	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods.....	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 30	Oct. 29	Oct. 27	Oct. 26	Oct. 25	Oct. 24
Lake copper, New York.....	16.25	16.25	16.00	16.00	15.62 $\frac{1}{2}$	15.62 $\frac{1}{2}$
Electrolytic copper, N. Y.*.....	15.75	15.75	15.50	15.50	15.25	15.25
Straits tin, spot, N. Y.	49.25	49.12 $\frac{1}{2}$	....	48.45	48.45	48.50
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$	6.32 $\frac{1}{2}$
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price $\frac{1}{4}$ c. higher.

of copper to go around and that anxiety is not well founded. Domestic consumers have been buying into January, with estimates that 80 per cent of their requirements for that month are covered. Some producers are now selling for February delivery. Sales to foreign consumers have been very heavy in October, with the total estimated at over 80,000 tons up to Oct. 30. Domestic consumers are practically covered through December, but foreign users must still buy some metal for this year, although they, too, have purchased considerable for January delivery. Lake copper is also active and higher at 16.12 $\frac{1}{2}$ c. to 16.25c., delivered, the latter price for delivery on the Atlantic seaboard.

Tin.—Sales for the week ended Oct.

27 were about 1000 tons, with dealers practically the only buyers. The market has been featureless and quiet, with consumers well covered to Dec. 31 and not buying. On Oct. 29, the London market advanced because of purchases of about 600 tons by a new tin company, recently organized, which has been active in selling stock. The market here on that day was very quiet, with only 100 tons sold. Tuesday, Oct. 30, there was more activity, about 250 tons changing hands at 49c. to 49.25c. for spot delivery, New York. London quotations Tuesday were £226 7s. 6d. for spot standard, £222 15s. for future standard, and £226 15s. for spot Straits. Arrivals thus far this month have been heavy at 6940 tons, with 6120 tons reported afloat.

Non-Ferrous Rolled Products

Mill prices on brass products were advanced $\frac{1}{4}$ c. on Oct. 25 and a similar amount on Oct. 27, while quotations on copper materials have been raised $\frac{3}{4}$ c. in the last week, $\frac{3}{8}$ c. on each of the above dates. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	20.50c.
Copper, hot rolled.....	25.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass.....	25.37 $\frac{1}{2}$ c.
Copper.....	26.50c.

Rods—	
High brass.....	18.25c.
Naval brass.....	20.25c.

Wire—	
Copper.....	17.87 $\frac{1}{2}$ c.
High brass.....	21.00c.
Copper in Rolls.....	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire.....	13.50c.	14.50c.
Copper, light and bottoms.....	11.50c.	12.75c.
Brass, heavy.....	7.75c.	9.00c.
Brass, light.....	6.50c.	7.50c.
Hvy. machine composition.....	10.25c.	11.25c.
No. 1 yel. brass turnings.....	9.25c.	9.75c.
No. 1 red brass or compos. turnings..	9.50c.	10.50c.
Lead, heavy.....	5.25c.	5.625c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.625c.
Sheet aluminum.....	12.50c.	14.50c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....	20.50c.	20.50c.
Copper, hot rolled.....	25.00c.	25.00c.
Copper, cold rolled, 14 oz. and heavier.....	27.25c.	27.25c.
Zinc.....	10.00c.	10.00c.
Lead, wide.....	9.75c.	9.75c.

Seamless Tubes—		
Brass.....	26.87 $\frac{1}{2}$ c.	
Copper.....	27.87 $\frac{1}{2}$ c.	
Brass Rods.....	18.25c.	
Brazed Brass Tubes.....	28.50c.	

Lead.—Better than normal buying has prevailed recently, with the main interest in prompt and November delivery. Consumers thus far have shown little desire to purchase December metal. In the West, prices are firm at 6.32½c., St. Louis, with the quotation of the leading interest unchanged at 6.50c., New York, as its contract price.

Zinc.—Producers report a fair amount of business each day, and it is expected that October will show a respectable total in sales. Prices continue steady at 6.25c., East St. Louis, or 6.60c., New York. The ore situation is unchanged. The price is still \$40, Joplin; production and shipments last week practically balanced.

Antimony.—The market is quiet and Chinese metal is unchanged at 10.50c. for spot and 10.25c. for futures, duty paid, New York.

Nickel.—Wholesale lots of ingot

nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 30.—Prices for copper and tin have advanced in an active market. The old metal market is stronger and sales are in good volume.

Prices, per lb., in carload lots: Lake copper, 16.75c.; tin, 49.75c.; lead, 6.40c.; zinc, 6.35c.; in less-than-carload lots; antimony, 11.50c. On old metals, we quote copper wire, crucible shapes and copper clips, 11.75c.; copper bottoms, 10.50c.; red brass, 10.50c.; yellow brass, 8c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Co.; open-hearth building, 2800 tons, to McClintic-Marshall Co., and merchant mill building, 3935 tons, to Hansel Elcock Co.

BLOOMINGTON, ILL., 400 tons, office building, to Mississippi Valley Structural Steel Co.

DECATUR, ILL., 900 tons, Staley Building, to Mississippi Valley Structural Steel Co.

WENATCHEE, WASH., 230 tons, plates, 18-in. pipe line, Beebe Orchard Co., to Beale Tank & Pipe Co.

OAKLAND, CAL., 100 tons, plates, Plummer ball joints, to Pacific Coast Engineering Co.

LOS ANGELES, 2000 tons, Bullock's department store, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

ROCKLAND, ME., 100 tons, Nurses' Home. BOSTON, 1500 tons, Medical Arts building. BOSTON, Brighton district, 500 tons, high school.

PROVIDENCE, R. I., 150 tons, savings bank. NEW YORK, 5000 tons, apartment buildings for A. E. Lefcourt in Fifty-eighth Street near Sixth Avenue and in Fifty-ninth Street near Seventh Avenue.

NEW YORK, 2500 tons, apartment building at Third Avenue, Forty-seventh and Forty-eighth Streets.

NEW YORK, 1000 tons, public school No. 96.

NEW YORK, 900 tons, apartment building at Sixty-seventh Street and Central Park West.

NEW YORK, 900 tons, loft building at Fifth Avenue and Thirty-sixth Street.

NEW YORK, 700 tons, apartment building at Eighty-sixth Street and East End Avenue.

NEW YORK, 600 tons, apartment building at 237 East Twentieth Street.

NEW YORK, tonnage being estimated, apartment building at 602 East Eighty-fourth Street.

NEW YORK, tonnage being estimated, apartment building at Seventy-eighth Street and Amsterdam Avenue.

NEW YORK, tonnage being estimated, St. Vincent's Hospital at West New Brighton, S. I.

BROOKLYN, tonnage being estimated, apartment building at Prospect Park West and Garfield Place.

PHILADELPHIA, 2200 tons, plant for United States Gypsum Co.

PHILADELPHIA, 1000 tons, building for Philadelphia General Hospital; reported last week as 500 tons.

PHILADELPHIA, 900 tons, Institute for Mental Diseases.

NORFOLK & WESTERN RAILWAY, 500 tons, bridges.

NASHVILLE, TENN., 2000 tons, highway projects for State Highway Commission.

MEMPHIS, TENN., 900 tons, bank building. LOUISVILLE & NASHVILLE, 1000 tons, bridges.

STATE OF ALABAMA, 2000 tons, highway bridges.

BUFFALO, 2000 tons, manufacturing building for Curtiss Airplane & Motor Co.; James Stewart & Co., Inc., general contractor.

FLINT, MICH., 600 tons, auditorium.

BUFFALO, 350 tons, addition to State hospital.

CHICAGO, 3300 tons, office building at 2042 Lake Shore Drive.

CHICAGO, 1100 tons, store building on South State Street.

SAN FRANCISCO, 2300 tons, Methodist Book Concern Building; McClintic-Marshall Co., low bidder.

Fabricated Structural Steel

Awards Total 30,400 Tons With 6700 Tons for Steel Mill Extensions—33,500 Tons in New Projects

AWARDS of 30,400 tons included 6700 tons for extensions to the Indiana Harbor, Ind., plant of the Youngstown Sheet & Tube Co. and 6860 tons for a group of jobs at New York. New projects, amounting to 33,500 tons, were featured by a number of jobs of fair size. Awards follow:

EAST HAMPTON, MASS., 275 tons, bridge, to Boston Bridge Works, Inc.

BETHEL, VT., 184 tons, State bridge, to Boston Bridge Works, Inc.

NEW YORK, 6860 tons in the following awards as reported to the Structural Steel Board of Trade, Inc.: addition to St. George Hotel, Brooklyn, and service building for Willard Parker Hospital in East Tenth Street, to McClintic-Marshall Co.; loft building at 42 West Forty-eighth Street and apartment building at Park Avenue and Ninety-sixth Street, to Lehigh Structural Steel Co.

NEW YORK, 2500 tons, loft building at Madison Avenue and Fifty-second Street, to A. E. Norton, Inc.

NEW YORK, 700 tons, apartment building at 2780 Broadway, to Easton Structural Steel Co.

NEW YORK, 200 tons, building for Plaza Trust Co. at 655 Fifth Avenue, to La-Cour Iron Works.

NEW YORK, 100 tons, addition to office building at 58 Varick Street, to Structural Iron Works.

NEW YORK, 500 tons, theater at St. Mark's Place, Staten Island for Isle Theater Corporation, to Harris Structural Steel Co.

BROOKLYN, 1200 tons, St. John's Law School, to Hinkle Steel Construction Co.

BROOKLYN, 220 tons, pan house at Greenpoint plant of Improved Cinder Co., to Belmont Iron Works.

BROOKLYN, 160 tons, bank and office building in Wyckoff Street, to National Bridge Works.

CLINTON, N. Y., 500 tons, bridge for State Highway Department, to American Bridge Co.

MOUNT VERNON, N. Y., 166 tons, Junior beams for Terrace Arms apartment building, to Jones & Laughlin Steel Corporation.

JERSEY CITY, 1200 tons, Journal Square Theater, to Harris Structural Steel Co.; reported previously to unnamed fabricator.

KENVILLE, N. J., 150 tons, building for Hercules Powder Co., to Austin Co., Cleveland.

HARRISBURG, PA., 350 tons, Mystic Shrine Zembo Temple, to Jones & Laughlin Steel Corporation.

PHILADELPHIA, PA., 600 tons, addition to Trayler-Allerton Hotel, to Bethlehem Fabricators, Inc.

STATE OF VIRGINIA, 370 tons, Nottoway River bridge, to Virginia Bridge & Iron Co.

BIRMINGHAM, 450 tons, warehouse for Stockham Pipe & Fittings Co., to Southern Steel Works.

SOUTHERN RAILWAY, 600 tons, bridges, to American Bridge Co.

KALAMAZOO, MICH., 1000 tons, Kalamazoo Trust and Savings Bank Building, to American Bridge Co.

DETROIT, 1500 tons, building for United States Gypsum Co., to American Bridge Co.

CLEVELAND, 475 tons, Nickel Plate Railroad bridge, to Fort Pitt Bridge Works.

MUNCIE, IND., 100 tons, Junior beams, Nurses' Home, Ball Memorial Hospital, to Jones & Laughlin Steel Corporation.

SÃO PAULO, BRAZIL, 261 tons, Junior beams, General Motors Corporation assembly plant, to Jones & Laughlin Steel Corporation through Mahon Structural Steel Co., Detroit.

EVANSTON, ILL., 165 tons, cafeteria wing for Township High School, to Wend-nagel & Co., Chicago.

CHICAGO, 265 tons, canopy for La Salle Street station, to Edgers Schillo Co., local.

CHICAGO, 1125 tons, Trust & Savings Bank Co., to American Bridge Co.

INDIANA HARBOR, IND., 6735 tons, extensions for Youngstown Sheet & Tube

PERSONAL

GEORGE T. LADD, whose election as president of the United Engineering & Foundry Co., Pittsburgh, was announced in *THE IRON AGE* last week, designed and built the largest water tube boilers in the world, at the Fordson plant, Ford Motor Co., and has many and varied business and engineering interests. He was born at Edinburgh, Ohio, in 1871, and was



G. T. LADD

graduated from the Sheffield Scientific School, Yale University, in 1891. He then went to Pittsburgh and entered the employ of the Pittsburgh & Lake Erie Railroad, with which he was connected until 1893, when he entered Cornell University and two years later was graduated with a mechanical engineering degree. For the next three years he was a designer at the Brooks Locomotive Works, Dunkirk, N. Y., leaving that company to become mechanical engineer in charge of engine and boiler sales for the Bass Foundry & Machine Co., Fort Wayne, Ind. After 11 years in that capacity he engaged in private consulting engineering in Pittsburgh and in 1910 organized the George T. Ladd Co., a combustion engineering company. The Ladd Water Tube Boiler Co. was organized in 1925, and shortly afterward it was taken over by the International Combustion Engineering Corporation, which about the same time bought out the Heine Boiler Co. Mr. Ladd went with the International corporation, as president of both the Ladd and Heine companies. He also became works manager of the parent organization and a member of its technical advisory board. Mr. Ladd is chairman of the Pittsburgh Testing Laboratories and an official of the Woodings Forge & Tool Co., Verona, Pa., the Davis Brake Beam Co., Johnstown, Pa., and the Columbian Enameling & Stamping

Co., Terre Haute, Ind. He is a Lieutenant-Commander in the United States Naval Reserve.

MARO JOHNSON, assistant engineer of the Illinois Central Railroad, was elected president of the American Railway Bridge & Building Association at the thirty-eighth annual convention held in Boston last week.

JOHN W. HACKER, formerly superintendent of the coke plant of the Central Alloy Steel Corporation, Massillon, Ohio, has joined Dyer Engineers, Inc., Cleveland. His successor is JOHN M. KOMP.

JOHN P. BANKSON has been appointed Cleveland district manager of sales General Refractories Co., Philadelphia. He has been with the company for six years, most of that time in the Cleveland office.

RALPH M. BARNES has been appointed assistant professor of industrial engineering at the State University of Iowa, Iowa City.

HAROLD C. OSMAN, secretary Nugent Steel Castings Co., Chicago, and heretofore in charge of sales for that company, has been appointed works manager.

C. F. WILLIAMS has resigned as manager of sales for the Basic Products Co., subsidiary of the Allen S. Davison Co., Pittsburgh, to become sales manager of the Ward & Shaw Co., Cleveland, commercial printer. His successor is HUGH D. LARGEY, formerly Pittsburgh district manager of sales for the Colonial Steel Co., Pittsburgh. Mr. Williams, who is a graduate of the University of Illinois, class of 1910, was engaged in news-



C. F. WILLIAMS



H. D. LARGEY

paper and trade paper editorial work prior to joining the Davison company in 1917. Mr. Largey is a graduate of Pennsylvania State College and had a brief experience in the open-hearth department of the Allegheny Steel Co., Brackenridge, Pa., before engaging in sales work with the Colonial company in 1922.

JOHN N. CRITCHLOW, formerly Detroit district sales representative Oliver Iron & Steel Corporation, Pittsburgh, is now its general manager of sales. He has been located in Detroit



J. N. CRITCHLOW

for a number of years, first as district sales manager Pittsburgh Crucible Steel Co., Pittsburgh, and later as a manufacturers' agent handling the products of the Atlas Drop Forge Co. and the Bethlehem Steel Co., besides those of the Oliver corporation. Before engaging in sales work he had been an inspection engineer for the United Alloy Steel Corporation and the Bethlehem Steel Co.

FRANK N. SPELLER, director of the department of metallurgy and research, National Tube Co., was elected chairman of the metallurgical advisory board for the Carnegie Institute of Technology and the United States Bureau of Mines at a meeting of the board in Pittsburgh, Oct. 19. Mr. Speller, whose term is for three years, succeeds T. D. LYNCH, metallurgist Westinghouse Electric & Mfg. Co., East Pittsburgh.

CHARLES PACK has resigned as first vice-president and assistant general manager of the Doehler Die-Casting Co., New York, and has established a consulting office at 2720 Woolworth Building, New York.

LOWELL S. MONROE, formerly advertising manager Electric Controller & Mfg. Co., Cleveland, has joined the engineering staff of the Copperweld Steel Co., Glassport, Pa., and will be in charge of service data.

R. L. AGASSIZ, chairman Calumet & Hecla Consolidated Copper Co., New York, was reelected president of the Copper and Brass Research Association, 25 Broadway, New York, at the annual meeting held Oct. 25.

GEORGE H. ADAMS has been made director of sales for the Bunting Brass & Bronze Co., Toledo, Ohio. He has had a large and varied experi-



G. H. ADAMS

ence with the sales and engineering problems of the bearing industries, and prior to his connection with the Bunting company was automotive engineer of the SKF Industries, Inc., New York. He was also chief engineer of the Bock Bearing Co., Toledo.

DR. J. T. NORTON, JR., chief chemist Ludlum Steel Co., Watervliet, N. Y., will discuss Nitralloy at the meeting of the Cincinnati chapter of the American Society for Steel Treating on Nov. 1.

E. S. CARMAN has resigned as secretary and chief engineer of the Osborn Mfg. Co., Cleveland, to establish himself as a consultant on general industrial engineering under the name of Edwin S. Carman, Inc., with offices in Carnegie Hall, Cleveland. He continues to hold a stock interest in the Osborn company, and in his consulting capacity will give special attention to foundry problems.

WILLIAM D. BLISS, former professor of mechanical engineering at Marquette University, Milwaukee, has been appointed a professor in the mechanical engineering department of the Agricultural and Mechanical College of Texas, College Station, Tex.

R. J. McINTOSH has been appointed manager of the steel piling department, Bethlehem Steel Co., in charge of engineering and sales, with offices at Bethlehem, Pa.

TAYLOR ALLDERDICE, president National Tube Co., Pittsburgh, has been made a director of the Pittsburgh Hotels Corporation.

OBITUARY

WILLARD LAMB VELIE, president of the Velie Motor Corporation and of the Velie Monocoupe Aircraft Corporation, Moline, Ill., died at his home in that city on Oct. 24, following a brief illness. He was born at Moline in 1866, a grandson of John Deere, the founder of the agricultural implement manufacturing company of that name. He attended preparatory school at Andover, Mass., and was graduated from Yale University in 1888. For a time he was associated with Deere & Co., but in 1898, he founded the Velie Carriage Co. and five years later, the Velie Motor Corporation. The aircraft company bearing his name was founded more recently, but the factory had reached a daily capacity of six planes. A son, Willard Lamb Velie, Jr., is active in this branch of the family business.

ALFRED G. PLACE, chief electrical engineer Youngstown Sheet & Tube Co., Youngstown, died in that city on Oct. 25, following an operation. He was formerly vice-president of the American Institute of Electrical Engineers.

ROBERT H. CORBETT, chief erecting engineer Nordberg Mfg. Co., Milwaukee, and associated with this industry for more than forty years, died Oct. 16 after an illness of two months. He was born at Springfield, Ill., in 1858, but had lived in Milwaukee since boyhood.

JOHN E. LONERGAN, head of the John E. Lonergan Co., Philadelphia, founder and machinist, died suddenly at Sacramento, Cal., on Oct. 23, aged 87 years. He was born in Ireland and settled at Philadelphia in 1875, having been actively engaged in business in that city until the time of his death. He had patented several devices now used by the Southern Pacific Railroad. He was also president of the H. Brinton Co. and of the California Vineyards Co.

Considerable Increase in Productive Activity

Productive activity in the United States, estimated by *Electrical World* from monthly electrical energy consumption, is given as 134.5 in September, on a base of 100 as the average in 1923-1925. The latest figure shows a sharp increase from the 120.8 of August and is still further above the 118.4 of a year ago. For the first nine months the average has been 121.6, which represents a gain of more than 5 per cent over the 115.4 recorded for the first nine months of 1927.

JAMES A. SMITH, for the last 15 years superintendent of the Schenectady, N. Y., plant, General Electric Co., died Oct. 25, at his home in Schenectady, the victim of a stroke suffered the night before. He was born at Hartford, Conn., May 25,



J. A. SMITH

1873, and in 1888 was employed by the Pratt & Whitney Co., in Hartford, about a year later entering its apprentice shop. He was sent to Chicago to install the Pratt & Whitney exhibit at the World's Fair and, in 1900, was selected to install and demonstrate the company's exhibit at the Paris exposition. From 1901 to 1903 he was associated with the Niles-Bement-Pond Co., and, in 1905, was made superintendent of the Dutchess Tool Works, Fishkill Landing, N. Y., which position he held until he joined the General Electric Co. in 1910. At first he was assistant to the mechanical superintendent at the Schenectady plant and shortly became superintendent of one of the shops. He was appointed general superintendent in July, 1913. He was a member of the company's manufacturing committee and in this capacity was well known in the machine tool and machinery trade.

In the metal industries group the September advance has been still greater. Both the rolling mills and steel plants and the metal-working plants (ferrous and non-ferrous) showed between 125 and 126 in August. In September, however, the figures are 141.2 for the rolling mill group and 144.2 for the metal-working group. A similar advance is shown for the automobile industry, including parts, which went from 143.2 in August to 161 in September. For the first nine months the average of the metal industries group was 126.5, against 113.1 in the corresponding period of 1927.

Machinery Markets and News of the Works

October Business Fairly Large

Machine Tool Orders in the Month May Equal Those of August and September

MACHINE tool business in October may have equaled that of August or September, and in individual instances the sales of the past month probably exceeded those of September. Some machine tool plants are running at practically full capacity, with occasional night shifts, and a good many of the tool companies have enough orders on their books to carry production at the current rate through the remainder of the year.

Reports from Cincinnati are that fully half of the October business booked by plants in that district came from automobile companies or parts makers. In the Chicago district, tractor manufacturers have contributed a good share of the orders. Railroad buying has not been large, but an

improvement is expected in view of larger repair and car-building programs of the principal carriers. The Chicago, Milwaukee, St. Paul & Pacific has placed the final orders on a list totaling about \$80,000. Orders are expected soon against the large list of the Norfolk & Western.

The Industrial Rayon Co., which will equip a machine shop at Covington, Va., is inquiring for about 40 tools. The Briggs Mfg. Co., which is reequipping its Cleveland plant for the manufacture of bodies for Ford cars, has bought seven machines of various kinds. The White Motor Co., Cleveland, has begun the purchase of shop equipment for the manufacture of a new type motor.

New York

NEW YORK, Oct. 30.—Prospective business in machine tools continues large, and some sizable purchases have been made in the past week. The E. W. Bliss Co., Brooklyn, has closed on a part of its list of about 50 tools, including a gear cutter, grinder and turret lathes, new, and several items of used equipment. The total of the list may be reduced by the transfer of some tools to the airplane engine plant from other departments. The General Electric Co., Schenectady, continues an active buyer of equipment and has pending two 25-in. lathes and a 4-ft. radial drill. The New York Central has closed recently on two turret lathes, a radial drill, a milling machine and an engine lathe. The Norfolk & Western list is still open.

Niles-Bement-Pond Co., reports sales of 10 engines and bench lathes in the past week. Other sales by this company included a No. 1-A jig boring machine, four No. 2 jig boring machines, No. 4-A universal die sinker, automatic grinder for thread milling cutters, 6 x 120-in. thread milling machine, two 6-in. and one 12-in. vertical shapers, duplex hand centering machine, 40 x 16-ft. planer, 36 to 44-in. side-head boring mill, two No. 108 Ransom grinders, Cincinnati high-speed tap-

ping machine, No. 2 universal grinder, and a 24-in. super-heavy duty shaper.

Bids have been asked by Miller Parlor Frame Co., 266 Maujer Street, Brooklyn, for new two-story plant, to cost about \$140,000 with equipment. S. J. Fox, 66 Court Street, is architect.

Sturges Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., plans rebuilding part of plant destroyed by fire Oct. 22, with considerable loss to building and equipment.

Atlantic Gypsum Products Co., 40 Recor Street, New York, will build a one-story crushing plant with storage and distributing facilities, to cost about \$35,000.

Cleveland Container Co., 10630 Berea Road, Cleveland, has leased space in Hoboken Factory Terminal Building, Hoboken, N. J., for new Eastern factory branch and distributing plant. Company recently acquired plant and business of Tulip Container Corporation, Flushing, L. I., which will be removed to new location.

Rizzuto Motor Co., Peekskill, N. Y., has plans for new one-story service, repair and garage building, to cost about \$100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Electric Storage Battery Co., West End Avenue and Sixty-fourth Street, New

York, has leased two-story building at 201 West Sixty-fourth Street, and will remove to new location and increase capacity. Headquarters are at Philadelphia.

Charles Pfizer & Co., 11 Bartlett Street, Brooklyn, manufacturers of chemicals, have awarded a general contract to Barney Ahlers Construction Co., 110 West Fortieth Street, New York, for a seven-story factory, to cost \$320,000 with equipment.

Dwight P. Robinson & Co., Inc., 125 East Forty-sixth Street, New York, has filed plans for an eight-story automobile service, repair and garage building at 205-13 East Sixty-fourth Street, to cost approximately \$500,000 with equipment.

Charles Freshman Co., 240 West Fortieth Street, New York, manufacturer of radio equipment, has leased space at Bush Terminal, South Brooklyn, for expansion in storage and distributing division.

H. E. Magnuson, 420 Lexington Avenue, New York, architect, has plans for a new automobile service, repair and garage building at Brooklyn, to cost about \$100,000 with equipment.

Ramapo-Ajax Corporation, Hillburn, N. Y., manufacturer of railroad frogs, switches, etc., is reported planning construction of new plant at Seattle, 100 x 200 ft., to cost over \$200,000, for occupancy by its subsidiary, Racor Pacific Frog & Switch Co.

Controlling interest in Fokker Aircraft Corporation, Hasbrouck Heights, N. J., and Wheeling, W. Va., has been acquired by Pacific Coast interests, headed by James A. Talbot, president Richfield Oil Co., Bartlett Building, Los Angeles, and Harris M. Hanshue, president of Western Airways, Inc., same city. Company will be reorganized with capital of about \$4,000,000. Plans are under way for expansion in two plants noted and for new plant near Los Angeles to manufacture aircraft of commercial, military and other types. Last noted reported to cost more than \$500,000. Anthony G. H. Fokker, heretofore head of company, will remain with new organization as designer and technical expert.

Union Sign Co., 825 East Jersey Avenue, Elizabeth, N. J., is having plans drawn for one-story plant, 50 x 100 ft., on adjoining site, to cost about \$25,000 with equipment. Jacob Wind, Jr., 1450 North Broad Street, Hillside, is architect.

Pollak Mfg. Co., Inc., Kearny, N. J., manufacturer of oil and fuel tanks for aircraft, airplane parts, etc., is concluding purchase of plants and businesses of Universal Screw Machine Products Co. and Progress Sheet Metal Works, 541 Devon Street, same place, and will consolidate with organization. Plans are under way for general expansion. Purchasing company is disposing of 400,000 shares of stock for purchases and extensions. Leo L. Pollak is president.

Armour & Co., Union Stock Yards, Chicago, meat packers, are completing plans for new multi-story plant and abattoir at Jersey City, N. J., to cost about \$1,000,-

The Crane Market

ACTIVITY in other branches of the machinery business has not yet been reflected in the field of overhead and locomotive cranes. A fair volume of inquiry continues to accumulate including several lists calling for four to six overhead cranes. One of these lists is from the Waterfront Service Co., Brooklyn, N. Y., and asks for bids on six 5-ton, 67-ft. span gantry cranes for installation on a dock. Engineers are Moore & Dunford, 110 East Forty-second Street, New York. Inquiries for locomotive cranes are scattered among contractors and industrial users.

000 with machinery. J. D. Andrews is chief engineer for company.

Dalton Tool & Machine Corporation, with executive offices at 8 West Fortieth Street, New York, is now manufacturing at its plant at Bridgeton, N. J., all tools formerly made by Dalton Tool Corporation. Eugene P. Herrman, president, and Edwin H. Jonson, treasurer, are also affiliated with Stewart Steel Products Co., manufacturer of fire alarm apparatus, iron castings and general line of metal products.

Aerial Machine & Tool Corporation, New York, has removed from 79 Grand Street, to larger quarters at 591 Hudson Street.

South Atlantic

BALTIMORE, Oct. 29.—Contract has been let by Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, to Consolidated Engineering Co., 20 East Franklin Street, for one, two and four-story addition, 150 x 600 ft., at Highlandtown plant, to cost about \$275,000 with equipment. L. R. White, Hearst Tower Building, is architect. Charles E. McManus is president.

Celanese Corporation of America, Inc., Amcelle, near Cumberland, Md., has awarded contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for new boiler plant and machinery building at rayon mill, to cost \$250,000 with equipment. Other additions are planned to cost about \$400,000 with machinery.

Bartgis Brothers Co., Hamburg and Bush Streets, Baltimore, manufacturer of paper board products, has acquired property of Thistle Cotton Mills, Inc., Ilchester, Md., on 90-acre tract, and will remodel for new plant to cost over \$200,000 with machinery. Fred L. Smith, 21 East Fortieth Street, New York, paper mill engineer, will prepare plans and place equipment awards.

Chemical Warfare Service, Edgewood Arsenal, Md., is asking bids until Nov. 6 for 27,000 springs, circular 51; until Nov. 5 for 10,000 aluminum die castings, angle tubes, circular 48, and 10,000 flutter valves, circular 47; until Nov. 7 for 6200 sq. ft. wire cloth, circular 50, and 4700 sheets of perforated tin, circular 51.

Carolina Power & Light Co., Raleigh, N. C., has construction under way on new hydroelectric power plant on Pigeon River, near Waterville, N. C., for initial capacity of 67,000 hp. to be increased later to 100,000 hp. Extensions will be made in transmission lines. Entire project will cost more than \$800,000. Company is disposing of preferred stock, portion of pro-

Among recent purchases are:

Lockwood, Greene & Co., engineers, 1 Pershing Square, New York, 15-ton, 31-ft. 11-in. span, 1-motor, overhead crane for Rome, Ga., from Box Crane & Hoist Corporation.

Phoenix Utility Co., 71 Broadway, New York, 60-ton, electric overhead crane for a power station in the West from the Cleveland Crane & Engineering Co.

National Analine & Chemical Co., 40 Rector Street, New York, 15-ton, gasoline operated crawl-tread crane from the McMyler-Interstate Co.

ceeds to be used for construction and improvements.

McClaren Rubber Co., Charlotte, N. C., will make extensions and improvements in automobile tire plant to increase capacity about 25 per cent. to cost more than \$85,000.

General Purchasing Officer, Panama Canal, Washington, is asking bids until Nov. 15 for cable and wire, filing machine, motors, pumps, switches, scoop shovels, cable clips, turnbuckles, wire lath, wire cloth, pipe and pipe fittings, and other kindred products, Panama Schedule 1915.

Southern Lime Products Co. recently organized as subsidiary by S. J. Groves & Sons Co., Cordele, Ga., general contractor, has work under way on new quarrying and crushed stone plant at lime rock properties near city; later second unit will be built. Project is reported to cost more than \$40,000.

Plant of Atlanta Plow Works, 1200 Marietta Street, Atlanta, Ga., was damaged by fire on Oct. 18. Losses were confined to forge room and machinery departments. Rebuilding will begin at once.

Philadelphia

PHILADELPHIA, Oct. 29.—Contract has been let by Huck-Gerhardt Co., Inc., Lucerne and G Streets, Philadelphia, to Paul Broz, 2515 West Huntingdon Street, for two-story addition to millwork plant, 51 x 200 ft., to cost about \$75,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect.

J. L. Langsdorf, Philadelphia, has awarded general contract to Lam Building Co., 1001 Wood Street, for one-story machine shop, to cost about \$25,000 with equipment.

Union Battery Co., Philadelphia, has purchased tract, 335 x 420 ft., heretofore held by Six Wheel Co., as site for new factory, to cost more than \$75,000 with equipment.

United States Gypsum Co., 300 West Adams Street, Chicago, has awarded general contract to Morton C. Tuttle Co., 31 St. James Avenue, Boston, engineer and contractor, for new plant at Philadelphia, to manufacture wallboard, building tile, etc.

Arthur L. Shay and James D. Evans, 2055 Washington Avenue, Philadelphia, receivers for Schuylkill Railway Co., Schuylkill Traction Co. and Lakeside Railway Co., will receive bids until Nov. 7 for all or part of electrical machinery, copper and steel, poles and miscellaneous equipment of companies in Schuylkill County.

Taylor-Wharton Iron & Steel Co., High Bridge, N. J., 25-ton special design locomotive crane from the Industrial-Brown-hoist Corporation.

Miehle Printing Press Co., Chicago, two 3-motor, 10-ton, overhead electric cranes from Milwaukee Electric Crane & Mfg. Corporation.

International Harvester Co., Chicago, three electric cranes for tractor plant from Harnischfeger Corporation.

Chicago, Rock Island & Pacific, Burr Oak, Ill., two 15-ton overhead electric cranes from Harnischfeger Corporation.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has arranged for increase in capital from \$70,000,000 to \$120,000,000, a portion of fund to be used for general expansion, including oil refinery and pipe line construction in Texas.

Borough Council, Mount Ephraim, N. J., has authorized installation of pumping plant in connection with sewage expansion program to cost about \$100,000, for which bids will soon be asked by Remington & Vosbury, 509 Cooper Street, Camden, N. J.

Whiskette Mfg. Co., Terre Hill, Lancaster County, Pa., recently formed by John M. Wenger, Terre Hill, and associates with capital of \$25,000, is said to be planning early operation of local plant to manufacture steel wool specialties. R. G. Jolly, 3240 North Thirteenth Street, Philadelphia, and Paul B. Malebranche, 136 East Essex Avenue, Lansdowne, Pa., are interested in new company.

Board of Trustees, Lafayette College, Easton, Pa., has asked bids on general contract for three-story mining engineering building, to be known as John Markle Engineering Hall, to cost more than \$200,000 with equipment. C. Z. Klauder, 1429 Walnut Street, Philadelphia, is architect.

John S. Smith, Salisbury, Md., formerly operating Salisbury Shipyard, has taken over idle plant of Seaford Boat Works, Seaford, Del., and will expand. Work will soon begin on one-story unit, 30 x 72 ft.; later new shipways will be built and other construction and repair shops erected. Seaford Chamber of Commerce is interested in project.

Holland Furnace Co., 5154 Catherine Street, Philadelphia, with main plant at Holland, Mich., has leased three-story building at 2721-5 Edgemont Street, for new storage and distributing plant.

E. M. Hanson & Co., 130 North Fourth Street, Philadelphia, have been appointed distributors in Philadelphia territory for chucks, chain hoists and trolleys made by Union Mfg. Co., New Britain, Conn.

Cleveland

CLEVELAND, Oct. 29.—Machine tool business is good and October sales will probably show a gain over September. Orders are plentiful for single machines largely from makers of automotive parts. Quick deliveries are usually desired and some manufacturers are losing orders because they cannot meet these demands. One local manufacturer of

automatic machines cannot promise delivery before February on one size and some other machine tool builders are well filled with orders for the remainder of the year. Manufacturers regard the outlook favorable for a good volume of business until the close of the year.

Briggs Mfg. Co., shut down for some time, and which is re-equipping its Cleveland plant to manufacture bodies for Ford cars, purchased seven machines during the week, including drilling machines, lathes and hack and band saws. Industrial Rayon Corporation, Cleveland, sent out an inquiry for about 40 machines for equipping a machine shop, maintenance department and pattern shop in a new plant it will build at Covington, Va. Machine shop will be used to manufacture special machinery. Inquiry includes three 12 to 36-in. lathes, milling machines, upright and radial drills, pipe machines and hack saws. White Motor Co., Cleveland, which will require additional machinery to manufacture a new type of motor, purchased two multiple-spindle drilling machines the past week.

Some local machine tool plants are operating overtime and report a scarcity of skilled labor.

C. & G. Cooper Co., Mount Vernon, Ohio, has purchased manufacturing department of Hope Engineering Co., Mount Vernon, including plant and engine designs. Cooper company has for some time found it necessary to go outside of Mount Vernon for manufacturing capacity and this acquisition will permit it to further expand its facilities in that city. Hope line of vertical gas engines and compressors will fill out the Cooper line, which has consisted of slow speed horizontal types, chiefly in larger sizes. Hope Engineering Co. hereafter will concentrate more on pipe line and construction end of its business, which has become its major interest.

General Motors Corporation, Detroit, has bought plant and business of Guide Motor Lamp Co., 2130 West 110th Street, Cleveland, at a reported price of \$913,690. Plant has been transferred to Delco-Remy Co., a General Motors subsidiary and will be operated with present personnel. H. J. Monson has been president of Guide Company.

Cold Metal Process Co. has moved its equipment from 2318 Logan Avenue, Youngstown, to enlarged quarters in part of plant formerly occupied by Youngstown Boiler & Tank Co., at Mahoning and Glenwood Avenues. Company manufactures shim steel under special patents and will fabricate this metal. L. A. Beeghly, president of Standard Slag Co., Youngstown, and associates, are principal interests in Cold Metal Process Co. which has been in operation for several years. Much of this time its work was experimental, but it is now engaged in commercial production.

Bids will be received by Board of Education, Sixth and Rockwell Streets, Cleveland, until Nov. 12, for one-story foundry for vocational school on Eagle Avenue, to cost \$40,000 with equipment. G. M. Hopkinson is school architect.

Goodyear Tire & Rubber Co., Akron, Ohio, is arranging financing for an expansion and improvement program to cost about \$10,000,000, including new units at local mills, new tire manufacturing unit in South, and other work.

Cloyes Gear Co., 1614 Collamer Avenue, Cleveland, has awarded general contract to Mitzel Co., Keith Building, for one and two-story units, 32 x 140 ft., to cost over \$50,000 with equipment.

Small & Rowley, Terminal Tower Build-

ing, Cleveland, architects, have plans for one-story automobile service, repair and garage building to cost \$150,000.

Sunlight Electric Mfg. Co., Warren, Ohio, manufacturer of electric motors, etc., has filed plans for two-story plant, 40 x 120 ft., to cost about \$40,000 with equipment.

Royal Brass Mfg. Co., 1420 East Forty-third Street, Cleveland, has awarded general contract to Super-Built Construction Co., 1836 Euclid Avenue, for one-story addition, 35 x 130 ft., to cost about \$37,000.

Chicago

CHICAGO, Oct. 29.—Most Chicago machine tool dealers report October sales close to, if not exceeding, the best month of the year. Fresh inquiry bulks large, but is more widely scattered than heretofore in the absence of large lists from tractor plants. Agricultural implement manufacturers, however, are not dormant. They are making miscellaneous purchases in good volume and new lists are expected before the end of the year. Punch presses are in active demand and many types of used machine tools are eagerly sought. Some sales are being made for delivery after Jan. 1.

Chicago, Milwaukee, St. Paul & Pacific has closed last items on an \$80,000 list and Emerson-Brantingham Co., Rockford, Ill., has also made purchases. International Harvester Co. has ordered some new equipment for its Chicago tractor plant, and a screw machine parts manufacturer has purchased a 14-in. x 6-ft. lathe. Nash Motors Co., Milwaukee, has added an 18-in. lathe to its machine tool equipment.

F. Thomas, 616 East North Street, Decatur, Ill., will build a machine shop addition, 24 x 60 ft.

W. J. Spengler, 2320 Milwaukee Avenue, Chicago, will build a one-story brick machine shop, 50 x 109 ft.

Despatch Oven Co., 116 First Avenue North, Minneapolis, maker of all types of ovens, has plans for new manufacturing building to take care of increased business.

Plans have been filed by Stewart-Warner Speedometer Corporation, 1828 Diversey Parkway, Chicago, for 10-story factory unit, 88 x 103 ft., to cost about \$300,000 with equipment.

General Engineering Works, 340 West Huron Street, Chicago, manufacturer of screw machine products, will soon take bids for one-story addition to cost about \$85,000 with equipment. Weiss & Niestadt, 53 West Jackson Boulevard, are architects.

Albertson Co., Sioux City, Iowa, manufacturer of automobile tools, etc., has awarded general contract to W. A. Klinger, Inc., Wamoch Building, for four-story and basement unit, 42 x 150 ft., to cost more than \$65,000 with equipment.

Allis-Chalmers Mfg. Co., West Allis, Wis., is said to have plans under way for new plant at Springfield, Ill., to manufacture tractors, including parts and assembling divisions, to cost more than \$100,000.

Power equipment, conveying and other machinery will be installed in new plant to be built by W. F. Hall Printing Co., 4600 Diversey Avenue, Chicago, to cost more than \$600,000.

Minneapolis Threshing Machine Co., Hopkins, Minn., has awarded general contract to C. F. Haglin & Sons Co., National Building, Minneapolis, Minn., for one-

story addition, to cost \$100,000 with equipment.

Western Harvester Co., subsidiary of Caterpillar Tractor Co., San Leandro, Cal., will establish plant on 75-acre tract at East Peoria, Ill., opposite Caterpillar factory, to manufacture Holt combine harvester and provide for expansion of Caterpillar production. New plant will cost about \$1,000,000. Details of construction are now under way.

International Harvester Co. has awarded contract to Priester Construction Co., Davenport, Iowa, for two-story factory unit, 88 x 550 ft., at Rock Island, Ill., to manufacture engines and castings for tractors.

Super-Maid Aluminum Ware Co., Chicago, has purchased plant of Roseland Can & Wire Goods Co., 612 Harrison Avenue, Rockford, Ill., and is transferring equipment to that place. Roseland company will probably establish plant elsewhere. Chicago company operates foundry and two factories in Chicago and Rockford plant is first branch established.

Rockford Pattern Works, 2414 Eleventh Street, Rockford, Ill., maker of wood and metal patterns, has changed name to Rockford Standard Pattern Works, 250 Mill Street, Rockford.

La Salle Aircraft Corporation, Ottawa, Ill., has been organized to manufacture airplanes. Company intends to build plant and has leased local 71-acre tract for airport and factory site. When work begins it will be in market for materials and equipment.

New England

BOSTON, Oct. 29.—The local machine tool market is dull. October sales by dealers in this district will probably fall considerably below those of September, but will run slightly ahead of October, 1927. Manufacturers of metal-working equipment, as a whole, did better this month than in September, and exceeded October, last year.

Inquiry for used equipment is much better than that for new, particularly for presses and other tools the supply of which is limited. Dealers in foundry equipment have had the best month so far this year, molding machines being in especially good demand. Local representatives of manufacturers of such equipment have not only booked a good business in New England but have taken some excellent Canadian orders. Certain types of conveying equipment also have sold well the past month. Mead-Morrison Mfg. Co., East Boston, is well booked on handling equipment for coke manufacturers, and is figuring on a large order for new coke ovens to be built outside of New England.

Warren Telechron Co., Ashland, Mass., has awarded contract for a plant addition. Fay, Spofford & Thorndike, 44 School Street, Boston, are engineers.

Claflin Sumner Coal Co., 32 Pleasant Street, Worcester, Mass., has awarded contract for a scale house and service station. Handling equipment will be purchased. Cutting, Carlton & Cutting, 44 Front St., Worcester, are architects.

Fisk Rubber Co., Chicopee Falls, Mass., has started work on a plant addition.

Brown & Sharpe Mfg. Co., Promenade Street, Providence, R. I., will soon begin work on an addition and alterations to its foundry. Jenks & Ballou, 1035 Grosvenor building, Providence, are engineers.

C. Leslie Weir, 41 East Forty-second Street, New York, will close bids Nov. 5 on a one-story, 125 x 150 ft., ice manufacturing plant at Malden, Mass., for Boston Ice Co., 11 Deerfield Street, Boston.

Derryfield Co., Inc., Manchester, N. H., on Nov. 7 will sell its personal property, including equipment, stock in trade and finished material.

Plans are being drawn by Capital Parlor Frame Co., 470 Tolland Street, East Hartford, Conn., for one-story factory to cost about \$50,000 with equipment. G. Zunner Co., 182 High Street, Hartford, is architect.

Bellows Falls Hydro-Electric Corporation, Bellows Falls, Vt., operated by New England Power Association, Worcester, Mass., is disposing of a bond issue of \$9,000,000, fund to be used in connection with hydroelectric power development at Bellows Falls and Walpole. Project is estimated to cost \$13,000,000, and remainder of fund will be secured through sale of stock issue. Frank D. Comerford is president.

Boston Filter Co., Broadway, Chelsea, Boston, has acquired two-story factory at 43-47 Harvard Square, Charlestown, for new plant.

Atlas Mfg. Co., 125 Water Street, New Haven, Conn., manufacturer of hardware products, wire goods, etc., has acquired Ansonia Novelty Co. Ansonia, Conn., manufacturer of metal specialties and will merge with its organization. Ansonia business will be removed to New Haven, where expansion will be carried out.

Swift & Co., 60 North Market Street, Boston, meat packers, have plans for two-story plant at Malden, Mass., with refrigerating department and other mechanical facilities, to cost about \$85,000.

Arthur H. Abbott, Inc., 88 Broad Street, Boston, has been appointed New England district sales agent for Roller-Smith Co., 233 Broadway, New York.

Buffalo

BUFFALO, Oct. 29.—Contract has been let by Precision Die Casting Co., Syracuse, N. Y., to J. D. Taylor, Syracuse, for one-story unit at Cleveland, to cost about \$100,000 with equipment.

New York Power & Light Corporation, Johnstown, N. Y., has secured permission to carry out expansion and improvement program at Truxton, Home, Cortlandville and Fabius and other points, including transmission lines, power substations, etc., to cost \$838,000.

H. I. Sackett Electric Co., 251 Pearl Street, Buffalo, electrical equipment and supplies, has acquired a four-story building with about 21,000 sq. ft. of floor space for new storage and distributing plant.

Continental Can Co., Syracuse, N. Y., has authorized increase in capital from 750,000 to 2,000,000 shares of stock, no par value, a portion of fund to be used for expansion.

Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, has awarded general contract to James Stewart & Co., 17 East Forty-second Street, New York, for initial units of new plant at Tonawanda, N. Y. Company has secured contract for quantity of airplanes for Chile totaling about \$900,000.

Hickok Mfg. Co., Rochester, N. Y., has purchased five-acre tract at St. Paul and Scranton Streets, and will begin work immediately on new plant. Building will be of one-story, with about 100,000 sq. ft. of floor space. For a time company will

use both old plant on State Street and new factory, but later it expects to concentrate manufacturing operations in new plant.

Betson-Jewell, Inc., Rome, N. Y., maker of refractory materials, has been merged with Cyclone Grate Bar Co., Buffalo, and offices of combined company will be located in latter city. Earlier in year machinery of the Betson-Jewell organization was removed from Rome to North Bend, Ind. Frank J. Jewell, president of Rome company, will continue to represent company in home territory in a sales capacity, but has severed his connection as manager.

Niagara Sprayer & Chemical Co., Inc., Middleport, N. Y., has been organized to take over properties and business of Niagara Sprayer Co. and affiliated company, Niagara Chemical Co., Inc. Business will be continued without essential changes in personnel or policy. Company also has plants at San Francisco, Jacksonville, Fla., and Burlington, Ont.

Cincinnati

CINCINNATI, Oct. 29.—Machine tool sales the past week have deviated little from the level maintained in the early part of October, and from the standpoint of fresh orders the month is assured of a place alongside August and September. There are individual instances of decreased bookings in the past 30 days, but in great measure these are offset by an equal number of companies which this month are bettering their September record. It is safe to say that approximately 50 per cent of the business booked in the last two months has originated in the automobile industry.

While a slight slackening in sales is anticipated in the immediate future, as a natural consequence of recent heavy buying, machine tool builders are of the opinion that business will continue good during the remainder of the year. Meanwhile, production shows no signs of falling off and the volume of unfilled orders precludes such a possibility in the next month.

Contract has been let by Delco-Remy Corporation, First and Madison Streets, Dayton, Ohio, to Hillsmith & Co., Dayton, for one-story addition, 75 x 120 ft., to cost about \$50,000 with equipment. Company contemplates new seven-story unit to cost about \$200,000 and will soon have plans drawn.

City Council, Troy, Ohio, George L. Smith, service director, plans addition to municipal electric light and power plant to double present capacity, including installation of turbine unit and auxiliary equipment, to cost about \$85,000.

Board of Education, Hamilton, Ohio, contemplates installation of manual training equipment in new two-story junior high school, to cost about \$500,000. F. J. Mueller, Rentschler Building, is architect.

H. Blockman & Co., 376 North Front Street, Memphis, Tenn., paper goods, plan new four-story storage and distributing plant, to cost more than \$80,000 with handling and other equipment.

Smith-Mills Coal Mines Co., Henderson, Ky., plans rebuilding part of tippie and boiler plant recently destroyed by fire.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Nov. 6 for one universal bench saw, rip, cut-off, and miter, with motor drive, circular 168; 50 field instrument testing frames, circular 157; until Nov. 7 for 2000 connecting rod bearing and cap as-

semblies, circular 170; until Nov. 12 for aircraft supplies including extension assemblies, cowling assemblies, radiators, pulleys, fasteners, bolts, windshield assemblies, etc., circular 147.

W. L. Smith, head of Jefferson Investment Co., Exchange Building, Memphis, Tenn., and associates plan automobile service, repair and garage building, 150 x 156 ft., to cost more than \$100,000 including tools and equipment.

Johnson Flying Service, Dayton Airport, Vandalia, Dayton, Ohio, E. A. Johnson, president, plans construction of new hangar with repair facilities.

Jones Sand Co., 277 East Long Street, Columbus, Ohio, steel molding sand, has changed its name to Industrial Minerals Co.

Detroit

DETROIT, Oct. 29.—Contract has been let by Frost Gear & Forge Co., South Horton Street, Jackson, Mich., to North-Moller Co., local, for one-story addition, 100 x 160 ft., with extension, 50 x 100 ft., to cost about \$110,000 with equipment.

Michigan Steel Tube Products Co., Holbrook and Buffalo Streets, Detroit, manufacturer of electric-welded tubing, has engaged Christian W. Brandt, Kresge Building, architect and engineer, to prepare plans for an addition, to cost about \$300,000 with equipment.

Ajax Bolt & Screw Co., 6623 Gratiot Avenue, Detroit, will rebuild part of plant destroyed by fire Oct. 22, with loss reported over \$300,000 including equipment.

Cadillac Sales & Service Co., 121 Wayne Street, Pontiac, Mich., will ask bids in about 60 days for new four-story service, repair and sales building, to cost about \$130,000 with equipment. Fisher Brothers, 24 West Huron Street, are architects.

Monnier Brothers & Co., Algonac, Mich., manufacturers of boat hoists, etc., plan new unit to cost more than \$40,000 including equipment. It is understood that present works will be removed to new location and capacity increased.

Murray Body Corporation, Russell and Aberle Streets, Detroit, is arranging for increase in capital from 300,000 to 900,000 shares of stock, no par value, a portion of proceeds to be used for expansion.

Erb Joyce Foundry Co., Vassar, Mich., has plans for one-story foundry addition, to cost more than \$40,000 with equipment.

American Ship Building Co., Detroit, has placed its local plant on market, consisting of 15 acres at foot of Orleans Street, on Detroit River, previously known as Detroit Drydock & Engine Works. Company will concentrate operations in future at shipyards at Lorain and Cleveland, Ohio, where increased output will be developed. W. H. Gerhauser is president.

Michigan Steel Corporation, Ecorse, Mich., is disposing of bond issue of \$1,250,000, a portion of fund to be used for expansion. George R. Fink is president.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has asked bids on general contract for two and three-story addition, 550 x 700 ft., to cost more than \$450,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Federal Screw Works, 3401 Martin Street, Detroit, has acquired plant and business of Chelsea Screw Co., Chelsea, Mich. Purchased property will be known

as. Chelsea Division, with operations in charge of M. J. Dunkel, heretofore president of company, who will continue as vice-president of such division.

Russel Wheel & Foundry Co., Detroit, engaged in fabrication and erection of steel structures and in heavy machine work, has changed name to Russel Steel Construction Co.

Pittsburgh

PITTSBURGH, Oct. 29.—A well sustained demand is commonly reported by machine tool dealers, most of whom find sales to be small individually, but fairly numerous. As yet the Westinghouse Electric & Mfg. Co. has bought only a few of the items in its fourth quarter list.

J. C. and Christ Rieger, Fulton Building, Pittsburgh, architects, have plans for three-story automobile service, repair and garage building at Turtle Creek, Pa., to cost about \$85,000 with equipment.

United States Engineer Office, Pittsburgh, will soon take bids for river improvements in local district to cost more than \$1,000,000, including emergency dam, lock-operating machinery, power plant equipment for Deadmans Island fixed dam. Bids will be asked in about 60 days for lock buildings, including power station and other machinery.

West Virginia Hydro-Electric Co., Charlottesville, Va., is planning construction of hydroelectric power station on New River, near Hinton, W. Va., to cost over \$400,000.

In connection with expansion program at New Kensington, Pa., Aluminum Co. of America, Inc., is also considering additions in fabricating plant, to cost \$500,000 with machinery, not included in main program.

Board of Public Education, Forbes and Bellefield Streets, Pittsburgh, is asking bids until Nov. 8 for machine shop equipment for Liberty junior high school; wood-working machinery for Osceola school; drafting tables for South Hill high school; cast iron boilers, etc.; specifications at office of George W. Gerwig, secretary.

J. I. Thomas, Lewistown, Pa., is establishing a new plant at South Juniata and West Charles Streets, Hollywood district, to manufacture sheet metal products, brass and copper specialties, etc.

St. Louis

ST. LOUIS, Oct. 29.—Contract has been let by Meeker Advertising Co., Third and Michigan Streets, Joplin, Mo., manufacturer of advertising novelties, etc., to Albert Woods, 2802 Joplin Street, for new unit to cost about \$100,000 with equipment.

Board of Public Service, St. Louis, will receive bids until Nov. 20 for 10-ton electric box crane for municipal fire department.

American Eagle Aircraft Corporation, 2330 Harrison Street, Kansas City, Mo., is disposing of a stock issue of \$675,500 for expansion, including new plant at Fairfax airport, Kansas City, Kan. Crescent Propeller Co., a subsidiary, will also increase output for manufacture of propellers for Eagle aircraft, as well as other specialties.

Chamber of Commerce, Norman, Okla., is at head of project to construct and operate municipal airport, including hangars, repair shops and other units, to cost about \$50,000.

Corona Silica, Inc., care of H. R. McKnight, Tulsa, Okla., president, recently

formed by Mr. McKnight and associates with capital of \$750,000, plans development of silica properties near Rogers, Ark., including construction of grinding and refining mill. Project will cost over \$400,000.

E. J. Rodda Motor Co., 200 South Lawrence Street, Wichita, Kan., is having plans drawn for new service, repair and garage building, to cost about \$145,000 with equipment. S. S. Voight, 524 South Lawrence Street, is architect.

Sinclair Pipe Line Co., Sinclair Building, Tulsa, Okla., has plans for one-story and basement machine shop to cost about \$20,000 with equipment; company also plans similar unit at Drumright, Okla., to cost approximately like sum. Work will soon begin on 10 pumping plants for pipe line from Tulsa district to Chicago, to cost about \$200,000 with equipment.

American Foundry & Mfg. Co., Ninth and Wright Streets, St. Louis, will rebuild part of plant unit destroyed by fire Oct. 20.

Board of Education, St. Louis, has authorized call for bids for five-story vocational high school at Grand Boulevard and Windsor Place, to cost about \$3,000,000 with equipment. R. M. Milligan is commissioner of school buildings in charge.

Missouri Carriage Works, Inc., 1915 Broadway, Kansas City, Mo., has awarded general contract to Morley Brothers, Dwight Building, for two-story addition to cost about \$40,000 with equipment. Hans Von Unwerth, Finance Building, is architect and engineer.

Gulf States

BIRMINGHAM, Oct. 29.—Contract has been let by Wackman Welded Ware Co. of Texas, Inc., Sawyer Street, Houston, Tex., to Forrest W. McNeir, 2603 Chartres Street, for one-story plant, 92 x 200 ft., to cost about \$55,000 with equipment. Headquarters are at Seventh and Victor Streets, St. Louis.

Dallas Power & Light Co., Dallas, Tex., has authorized expansion and improvement program to increase capacity about 50 per cent, and to cost about \$2,750,000.

American Battery Products Corporation, Wichita Falls, Tex., C. V. Chermendy, head, is contemplating new plant to cost about \$50,000 with equipment.

Asiatic Petroleum Co., Ltd., 65 Broadway, New York, is completing plans for storage and distributing plant on 60-acre tract at Port Tampa, Fla., including pumping plant and power station, to cost more than \$100,000 with equipment.

City Council, Waco, Tex., plans municipal airport on 200-acre tract, including hangars, repair and reconditioning shops and other units, for which appropriation of \$75,000 has been approved. E. E. McAdams is city manager.

Shell Pipe Line Co., affiliated with Roxana Petroleum Co., Shell Building, St. Louis, plans construction of new pipe line from McCamey, Tex., to new refinery on ship channel near Houston, Tex., to cost more than \$1,000,000. A storage and distributing plant will be built at McCamey, with steel tanks of 80,000-bbl. capacity, pumping stations and auxiliary equipment.

Linde Air Products Co., 30 East Forty-second Street, New York, and 504 Dolores Street, San Antonio, Tex., has awarded contract to Sumner-Sollitt Co., San Antonio, for one-story plant on Cassiano Street, to cost about \$40,000 with equipment.

City Council, Brownsville, Tex., plans extensions and improvements in municipal

electric light and power plant and waterworks, with installation of additional equipment, to cost \$150,000, for which bonds will be issued.

Texas Co., Texas Building, Houston, Tex., has acquired property at San Antonio, Tex., for new oil refinery, and will carry out project in connection with similar plant on site recently purchased at El Paso, Tex. Plants are reported to cost about \$1,500,000, including pipe line construction, and are scheduled for completion next summer. A third refinery at Amarillo, Tex., with rating of 90,000 bbl. a month, is also planned.

National Portland Cement Co., Houston, Tex., care of C. S. Atkinson, 3406 La-Branch Street, secretary and treasurer, recently organized with capital of \$250,000, plans operation of local works to manufacture special white cements. It has acquired plant and business of Gates Chemical Co., Mary and North San Jacinto Streets, and will operate as unit.

Aransas Compress Co., Corpus Christi, Tex., plans construction of third unit to cotton compress plant to cost about \$140,000.

Carlos B. Schoeppl, Consolidated Building, Jacksonville, Fla., architect, is completing plans for automobile service, repair and garage building, to cost about \$145,000 with equipment.

Indiana

INDIANAPOLIS, Oct. 29.—Acme Tool & Machine Co., 924 Fort Wayne Avenue, Indianapolis, has awarded general contract to Leroy Wakefield, 5805 Morris Street, for one-story machine shop, 40 x 115 ft., to cost about \$25,000.

City Council, Columbia City, has awarded general contract to G. A. Walters, Columbia City, for municipal power plant, to cost about \$50,000 with equipment.

Commercial Testing & Engineering Co., 37 West Van Buren Street, Chicago, engineer, has plans for two-story addition to boiler plant at Progress Laundry, 428 East Market Street, Indianapolis, to cost about \$30,000.

V. L. Wright, Anderson, and associates are organizing company to establish plant to manufacture aircraft motors, of radial air-cooled, five-cylinder type, 100 and 159 hp. D. J. DesChamps will be engineer, in charge of production.

Klieber-Dawson Machine Co., 316 North State Street, Indianapolis, has awarded general contract to Austin Co., Cleveland, for one-story machine shop, to cost about \$30,000 with equipment.

New Jersey, Indiana & Illinois Railway Co., 1508 West Division Street, South Bend, has awarded general contract to John Nelson Co., Monroe Building, for new engine terminal, with engine house, repair shop, etc., to cost about \$50,000.

Crown Machine Co., 4301 Newton Avenue, Indianapolis, has filed plans for one-story machine shop, 54 x 140 ft., to cost about \$28,000 with equipment.

Pacific Coast

SAN FRANCISCO, Oct. 24.—General Petroleum Corporation of California, Higgins Building, Los Angeles, is completing plans for first two units of new oil refinery at Hermosa Beach, near Los Angeles, where 1000-acre site is available. Plant will have initial capacity for handling 30,000 bbl. per day, with storage and distributing facilities of 1,200,000 bbl., to cost about \$2,000,000.

Standard Pipe & Supply Co. 4437 Santa Fe Avenue Los Angeles has awarded general contract to John Flick, 6820 Seville Avenue, Huntington Park, for one-story storage and distributing plant, 50 x 240 ft., to cost over \$50,000 with equipment.

San Francisco Aircraft Specialties Corporation, San Francisco, care of J. R. Gilbert, 408 Warren Road, San Mateo, Cal., recently formed by Mr. Gilbert and associates, is planning new works for airplane production, including parts production and assembling, to cost about \$60,000 with equipment.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for new equipment storage and distributing plant in Mission district, including repair department, to cost about \$100,000 with equipment. Engineering department of company is in charge.

Reed Roller Bit Co., 1317 Esperanza Street, Los Angeles, has awarded contract to Union Iron Works, 5125 Santa Fe Avenue, for addition to machine shop.

State Highway Commission, Sacramento, Cal., is considering new equipment maintenance and repair shops near Eureka, Cal., to cost more than \$75,000 with equipment. G. B. McDougal, Sacramento, is State architect.

Puget Sound Glass Co., Anacortes, Wash., is said to be planning new plant at Seattle, to cost more than \$200,000 with machinery. W. H. Nichols is president.

Pacific Coast Cement Co., 3801 East Marginal Way, Seattle, has awarded general contract to Pacific Coast Engineering Co., Seattle, for one-story addition to cost \$175,000; also contract to MacDonald Engineering Co., Seattle, for addition to storage and distributing plant to cost approximately \$75,000.

Power and refrigerating machinery, conveying and other equipment will be installed in one and two-story and basement plant, 125 x 140 ft., of Rocky Mountain Packing Corporation, Murray, Utah, to cost \$200,000.

Kay Steel Co., Alhambra, Cal., is completing plans for one-story unit, 80 x 240 ft., to cost over \$60,000 with equipment; a crane runway will be installed. Emmett G. Martin, Chester Williams Building, Los Angeles, is architect.

Norman S. Wright, with offices at San Francisco, Los Angeles and Seattle, has been appointed Pacific Coast agent for products of Bayonne Bolt Corporation, 117 Liberty Street, New York.

Canada

TORONTO, Oct. 29.—Machine tool sales hold at a good level with a steady flow of one or two unit orders from diversified sections. Both dealers and builders report good orders from automobile manufacturing districts, garages and repair shops. Second-hand and rebuilt tools are moving freely. Small tools also are in good demand.

Plant of Rideau Power Co., Merrickville, Ont., was damaged by fire to extent of \$80,000. Equipment was almost a total loss. It is planned to rebuild immediately.

Board of Water Commissioners, Oshawa, Ont., has instructed city engineer, W. C. Smith, to obtain prices on installation of a complete auxiliary pump for city pumping station.

Avon River Power Co., Windsor, N. S., having acquired Stewiacke Electric Light & Power Co., Ltd., plans construction of

a plant at Falls River, N. S., to supply power to municipalities in district. With transmission lines it will cost about \$160,000.

Norton Co. of Canada, Ltd., 3 Beach Road, Hamilton, Ont., manufacturer of grinding wheels, etc., has awarded contract to W. H. Cooper, 6 Hughson Street, North, for an addition to cost \$25,000.

Firth Brothers, 144 James Street North, Hamilton, Ont., is erecting a four-story and basement plant, 84 x 149 ft., to cost \$250,000. John Poag & Son, 9 Westinghouse Avenue, has general contract. A number of sub-trades have been let.

City Engineer's Department, Montreal, is preparing plans for a power plant to cost about \$100,000. H. A. Terreault is engineer.

Western Canada

Restmore Mfg. Co., Ltd., 1000 Parker Street, Vancouver, B. C., manufacturer of woven wire springs, furniture, has awarded contract to E. J. Ryan Contracting Co., for four-story addition, 33 x 260 ft., to cost \$25,000. J. E. McKenzie, 5 Fairfield Building, is architect.

Barrett Roofing Co., foot of Oak Street, Point Grey, B. C., has awarded contract to Dominion Construction Co., for one and one-half story addition, 50 x 75 ft.

Regal Oil Refining Co., Ltd., Calgary, Alta., has awarded contract to Foster Construction Co., 918 Eighth Avenue West, for one-story oil refinery, 42 x 60 ft., and pump house, 18 x 24 ft.

Foreign

PLANS are being arranged by Lysaghts, Ltd., Newcastle, Australia, for expansion and improvements in iron and steel mills, including new buildings, to double present capacity.

Administracion General de Las Usinas Electricas del Estado, Canelones, Uruguay, has completed plans for new electric power plant at Montevideo to cost about 3,000,000 pesos (about \$3,060,000), and will take bids soon on general contract.

South African Railways, Johannesburg, are asking bids until Nov. 15 for one overhead runway system for new cargo shed.

L. & N. Brown Coal Co., Ltd., London, England, subsidiary of Sensible Heat Distillation, Ltd., same city, has arranged with Australian Shale Corporation, Hobart, Tasmania, for new coal carbonization plant in Tasmania, with capacity for handling 100 tons of coal per day. Plant will be operated by Australian company under direction of Brown Coal company.

A phosphate manufacturing company at Dunedin, New Zealand, has approved plans for expansion and improvements, including modernization of present works, and has arranged fund of about £120,000 (approximately \$600,000) for project, including new equipment.

Council, Wellington, New Zealand, is asking bids until Dec. 3 for one plate bending machine.

Ruhr Gas Co., Essen, Germany, is planning construction of pipe lines from Ruhr coal fields to distant and neighboring centers, including line to Hanover, about 125 miles, latter to cost more than \$2,000,000 with compressor plants. Company is arranging for sale of bonds totaling \$10,000,000, large part of fund to be used for program.

National Aeronautical Research Laboratory of City of Berlin, Germany, has plans for new airport in vicinity of

Tempelhof, consisting of hangars for commercial and research planes, machine and repair shops, testing laboratories, oil storage and distributing buildings and other units, to cost about \$250,000. Three similar airports are planned in other districts, one at former Zeppelin field at Stanken, to include training schools and aircraft production facilities.

New Trade Publications

Surge Tanks.—Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago. Booklet of 20 pages illustrating and describing Johnson differential surge tanks for hydraulic power plant regulation. The pamphlet sets forth advantages following the use of such equipment, compares different types and illustrates such tanks located in many parts of the country.

Nickel Steel.—International Nickel Co., New York. Pamphlet No. 12 on nickel steel and its applications is entitled "Alloy Steel for Boiler Construction." It is reprint of a paper by Charles McKnight of that company, delivered at the semi-annual meeting of the American Society for Steel Treating at Montreal, Canada, in February, 1928.

Heat Treatment.—Stanley P. Rockwell Co., Hartford, Conn. Bulletin No. 2808 discusses the importance of time control in heat treatment where distortion is detrimental.

Tramrails.—Cleveland Electric Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe. Catalog No. 4, describing and illustrating completely for the first time the company's standardized overhead conveying equipment. The design of the tramrail rails is described, together with illustrations of installations. Also covered are hand-propelled carriers operating on tramrails, rack carriers to operate on tramrail systems, tramrail systems for molding machines, and sand riddles, chain hoist carriers, furnace chargers, gantry and jib cranes, transfer bridges and various accessories.

Measuring Labor Operations.—Haynes Corporation, First National Bank Building, Chicago. Pamphlet of 56 pages devoted to the Mani system of measuring labor and comparing its efficiency, man by man, operation by operation, or department by department. The system is said to have been in use for six years and to provide economies and added information regarding the progress of the business.

Valves.—Merco Nordstrom Valve Co., Engineers Building, Cleveland. Catalog No. 6 of 142 pages illustrates and describes Nordstrom valves, which are of the plug-cock type, lubricated. A wide variety of patterns is shown, with dimensions for the different sizes under each type. Elevations and plans supplement the halftones, while there are a number of sectional views.

Compressors.—Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. Four bulletins devoted to compressors of various types. No. 700 of 24 pages illustrates and describes duplex air compressors driven by power, giving details of construction as well as installation views. No. 720 of 24 pages illustrates and describes straight-line air and gas compressors driven by steam or other power. No. 786 of eight pages covers vertical duplex compressors, and No. 788 of eight pages covers vertical simplex air compressors.

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Time Saved on Multiplicity of Parts

Mechanical Handling in Plating Department of Cash
Register Plant More Than Doubles
Turnover of Material

BY BURNHAM FINNEY*

WHEN a product is made up of many small parts, one of the puzzling problems for the manufacturer to work out is the most economical means of handling the units within and between various departments. When the number of parts totals 42,000, as it does in the plant of the National Cash Register Co., Dayton, Ohio, the problem becomes far more difficult than in the average metal-working factory. Furthermore, success in keeping down costs necessarily depends upon the efforts exerted in that direction by each individual department, if the plant

in its entirety is to benefit to the greatest possible degree.

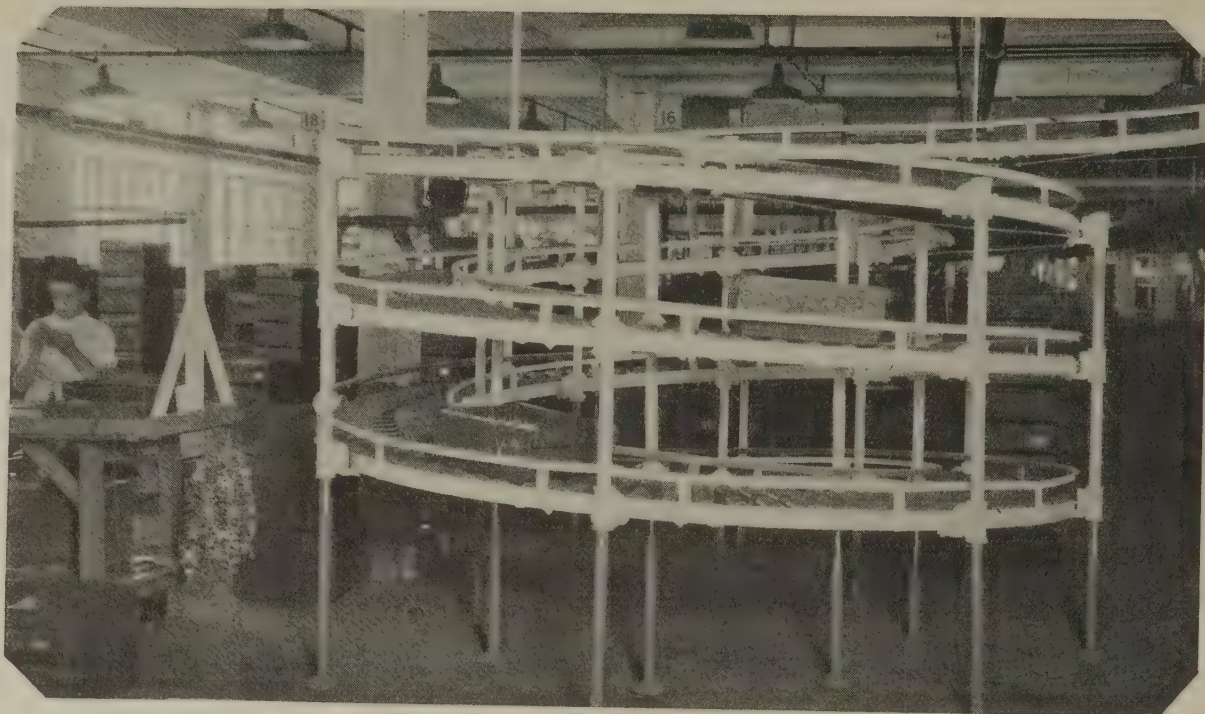
Recently attention has been centered on solving most efficiently the mechanical handling problem in plating departments, and in this direction the National Cash Register Co. has been able to make a substantial saving. The greatest expense in manufacturing is said to be the time material is idle between operations. In cutting down this idle time about 60 per cent, a distinct advance over previous handling methods has been made in the plating department.

In the process of making cash registers more than 32,000 individual parts pass through the plating department. Many of the parts cannot be scheduled for plating at stated inter-

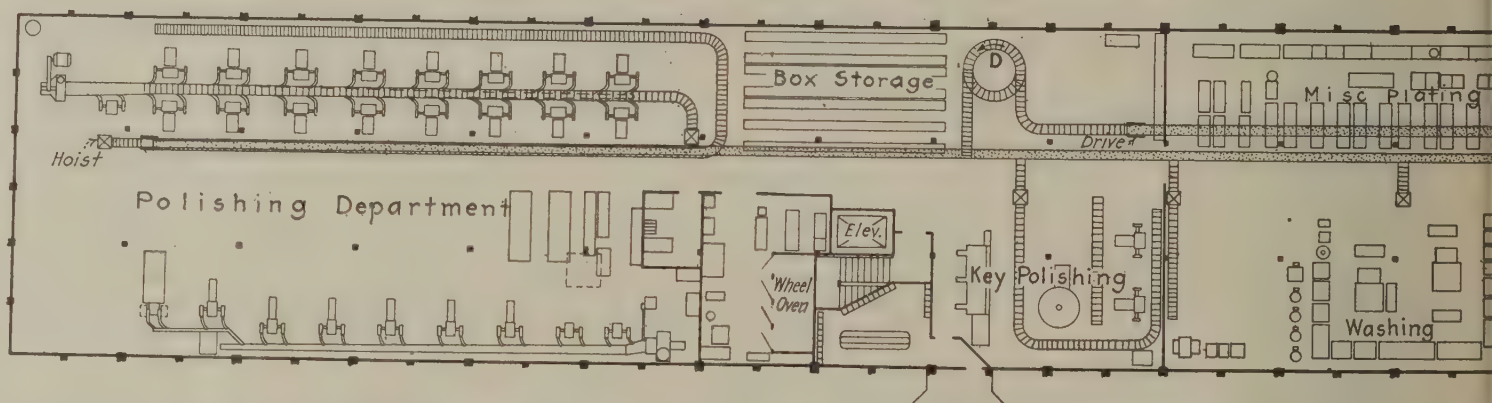
*Resident editor at Cincinnati for THE IRON AGE.



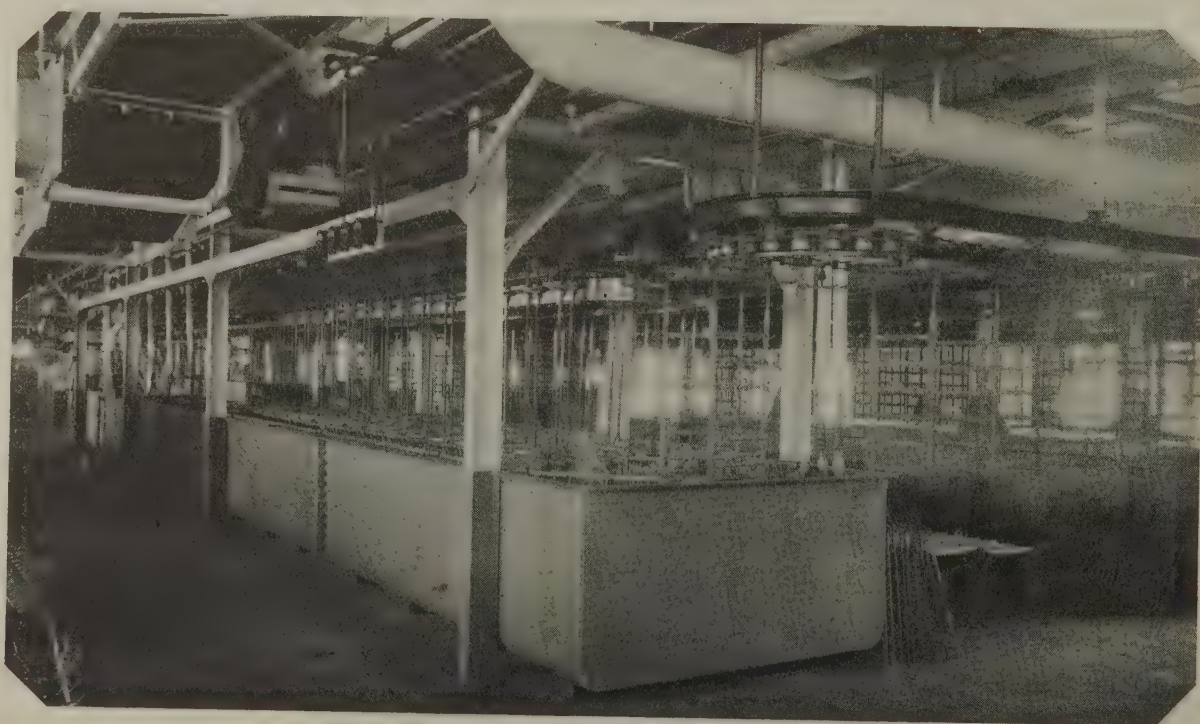
PARTS Received and Shipped by the Department Pass Through a Central Overhead Station in Charge of One Man, Who Dispatches Tote Boxes to Their Proper Destinations



FROM Belt and Roller Conveyors Spurs Lead to Spiral Roller Conveyors, Down Which Material Passes to Point Where It Is to Be Used. B on plan is an example

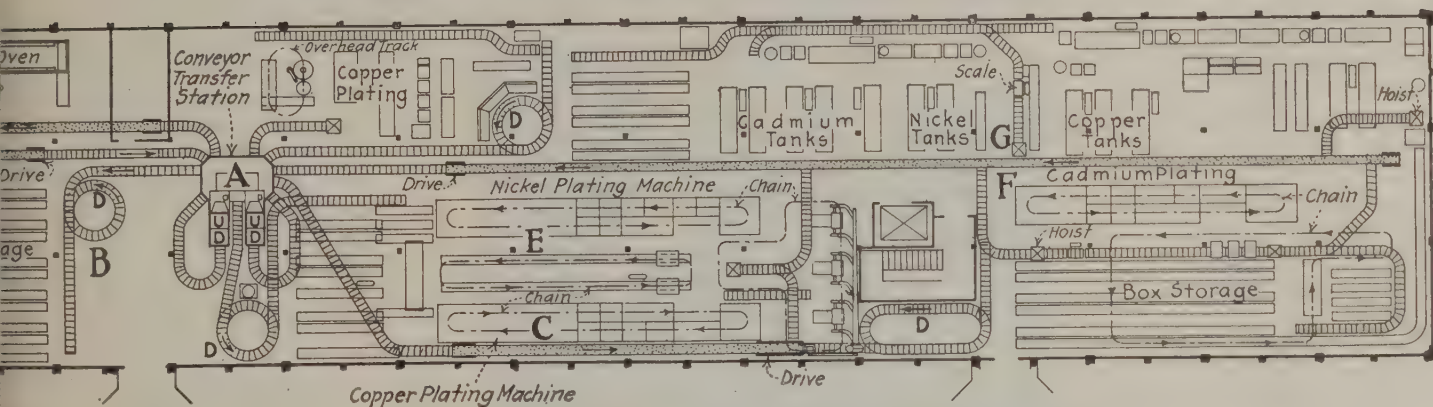


FROM Transfer Station A Tote Boxes Are Dispatched to Proper Destinations. B is one of operators. D represents a downward movement. Cleaning and electroplating conveyors are shown with lines. All roller conveyors are shown with lines.



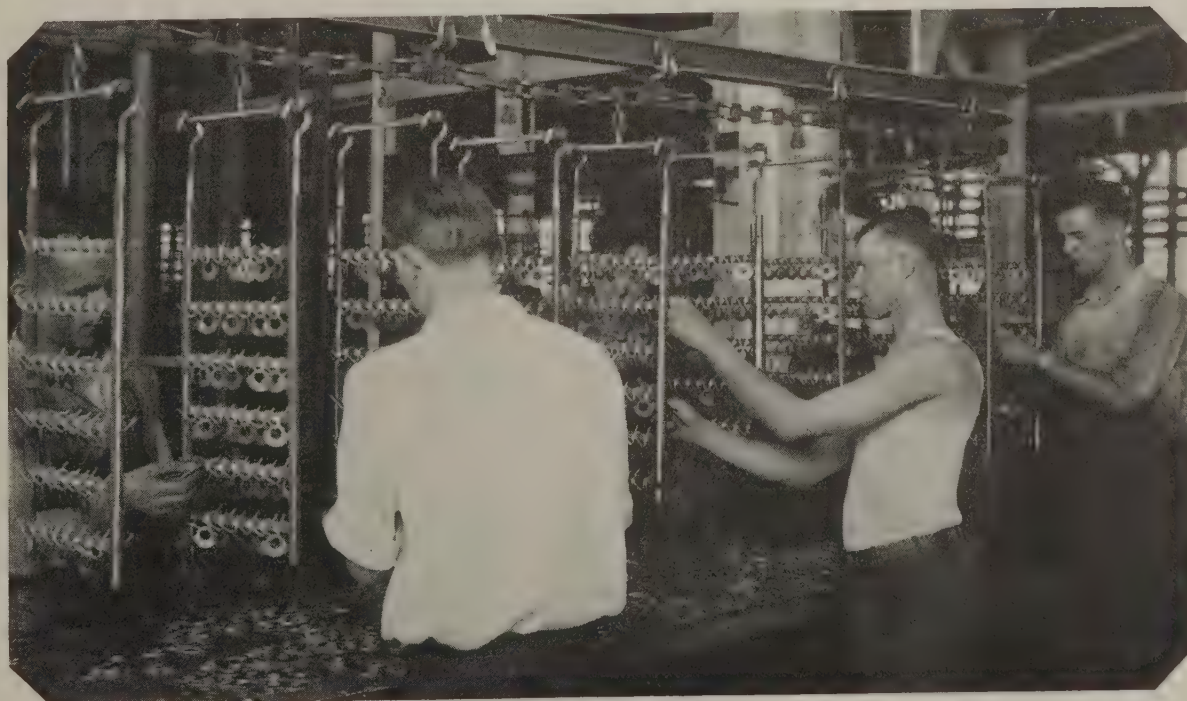
AUTOMATIC Cleaning and Electroplating Conveyors for Nickel and Copper Plating Parallel Each Other and Are Closely Connected by Overhead Conveyor. These are shown at E on plan

COPPER Plating and Nickel Plating Operations on Cash Register Keys are Closely Linked with Buffing by Overhead Conveying System (C on Plan). Movement of keys past buffing machines is timed to conform to needs of operators



Conveyors leading down to floor below. At C is copper plating machine delivering to buffing. Plating racks are loaded at F. G is one of several small hoists marked with crossed lines. E is a railroad track; belts are stippled

PARTS to Be Cadmium Plated Are Racked by Hand Ready for Passage to Automatic Cleaning and Electroplating Conveyor (F on Plan). Some racks hold 42 parts, others double that number



vals, further complicating the problem of arranging equipment to the best possible advantage. The manner in which the company has met this situation is detailed in this article.

Overhead Conveyors Save Floor Space

To conserve space and to use most profitably the present quarters occupied by the department, roller and belt conveyors have been installed overhead. All material received comes in through a central overhead receiving station, in charge of one man, from which gravity conveyors go out to the various stations. Wherever the carrying out of the system of gravity conveyors would interfere with the headroom needed by workmen, because of the necessary downward slope, a combination of gravity and belt conveyors has been used. The gravity type extend from the central station to the point where the desired minimum height above the floor is reached; there the conveyor deposits material on a belt conveyor which takes it to its destination.

In certain instances conveyors have top and lower runs because all finished parts are sent out of the department as well as received through the central overhead station, which is adjacent to elevators passing all floors in the building. However, in other cases it has been found desirable to have separate incoming and outgoing conveyors paralleling each other. From the conveyors, branch spurs lead to spiral roller conveyors, down which the material passes to the station where it is to be used. When plated parts are ready to be dispatched to the next operation, they are placed on a small vertical elevator which carries the material upward to a roller conveyor just under the ceiling, which passes it to the central station.

All parts are transported in tote boxes. When the dispatcher at the central overhead station receives a box, he looks at the route card accompanying it and shunts the material to the station to which it must go. He follows the same procedure when plated parts arrive at the station, the tote boxes being deposited by him on the elevator to go to the department where the next operation is to be performed.

Cadmium plating of parts is done automatically by means of a cleaning and electroplating conveyor, which is closely linked with a sprocket and chain overhead conveyor on which cash register parts are racked. Standard racks made of brass and steel, covered with rubber, hold 42 parts each, although some racks have double that capacity. Parts are taken from tote boxes and put on a table by workmen. From the table the parts are placed by hand on the racks, which, when filled, are suspended by hooks from the overhead conveyor. This conveyor bounds a rectangular space in which the tote boxes are stored.

Loaded racks move along the conveyor to the point where the cadmium plating process begins. There they are transferred to the plating conveyor by hand. After passing through the plating process, which returns them to the position from which they started, the plated parts are removed from the racks and are placed in tote boxes by the same workman who started them on their journey. The empty racks then are put on the overhead sprocket and chain conveyor, which carries them again to the workmen at the loading station.

Cadmium plating consists of nine operations. Parts first are dipped in a potash soaking and cleaning bath for a period of 7 min. and then pass through an electric cleaner and cold water rinse. Next they are submerged in a hydrochloric pickle dip for 2½ min., after which they go through two cold water rinses. The parts then are submerged in the cadmium plating bath for 6 min. This is followed by a cold water rinse, a hot water rinse and passage for 6 min. through a hot air drying oven. During the entire process the conveyor moves at a speed of 48 in. a minute.

Nickel plating of cash register parts, also, is done with the aid of an automatic cleaning and electroplating conveyor, the consecutive operations being as follows:

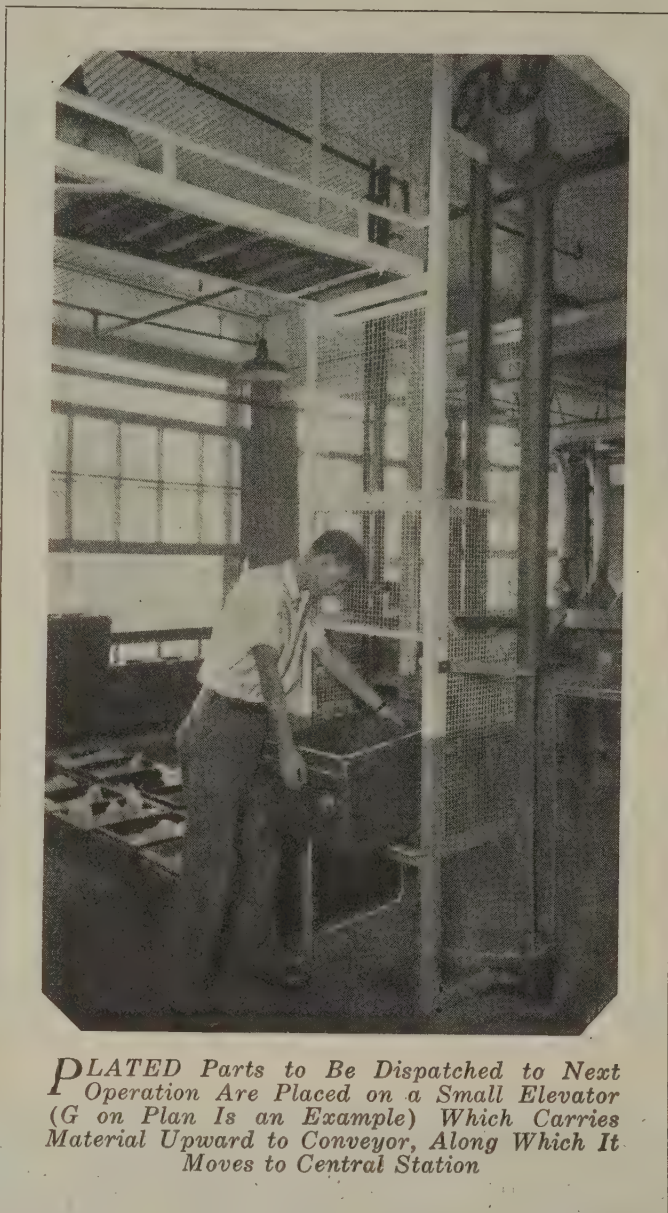
1. Soaking and electric cleaning.
2. Cold water rinse.
3. Hydrochloric pickle.
4. Cold water rinse.
5. Cyanide dip (hooded).
6. Cold water rinse.
7. Cold water rinse.
8. Nickel plating (42½ min.).
9. Cold water rinse.
10. Hot water rinse (hooded).
11. Hot air drying oven (6 min.).

With the exception of the fact that there are no electric cleaning and no cyanide dip, the process used in copper plating parts is similar to that of nickel plating.

Each automatic plating machine is equipped with a 3-hp. motor and a 6-volt, 2500-amp. generator, electrically driven for the plating tank, while the electric cleaning solutions collectively are taken care of by a 12-volt, 5000-amp. generator. Power for the operation of the belt conveyors is supplied by one 5-hp. motor, two 3-hp. motors and one 1-hp. motor.

Keys Are the Main "Production" Item

Cash register keys are the only part that comes to the plating department regularly and for which a definite daily schedule is planned. Keys are racked by hand, in the same manner as the parts for cadmium plating, and move by an overhead chain and sprocket conveyor to the copper plating conveyor, to which the racks are transferred. After the keys are copper plated, the racks are transferred back to the overhead sprocket chain conveyor, which carries them a short distance to buffing machines to be copper buffed. Here the movement of the racks is timed to conform with



PLATED Parts to Be Dispatched to Next Operation Are Placed on a Small Elevator (G on Plan Is an Example) Which Carries Material Upward to Conveyor, Along Which It Moves to Central Station

the needs of the machine operators. Each workman who removes a rack from the conveyor buffs all of the keys on the rack before returning it to the conveyor.

From this point the racks of keys go on the conveyor to the nickel plating machine, where the handling process is the same as that in connection with copper plating. After being nickel plated, the keys, still on the racks, go again to the buffing operators, who nickel buff them and deposit them in tote boxes. When the tote boxes are filled, they are lifted by hand on to the vertical elevator nearby, which carries them to the overhead belt conveyor for passage to the overhead central station and thence out of the department.

All small parts, except those which are to be nickel plated, are lacquered. They are racked by a workman who then dips the rack in a pot of lacquer. He suspends the rack on a cross bar over the pot to let the excess lacquer drip off, after which he puts the rack on a cross bar in a gas baking oven designed and built by the Detroit Sheet Metal Works, Detroit. The rack containing the parts normally completes a revolution in the oven in 15 min., although the speed can be changed to meet varying conditions. The oven has a temperature range from 130 to 450 deg. Fahr., to handle either lacquered or japanned work.

On a large number of parts entering the manufacture of cash registers, it is often found convenient and necessary to localize the carbonizing and hardening on certain mechanisms: (1) where the part must be strong and ductile to withstand shocks; (2) where machining operations must be performed after the part is hardened; (3) where deformation or warping of the part is likely to take place during the heat treatment. When large quantities of small parts are to be treated, the most convenient and least expensive method is to copper plate them in bulk, to prevent

carburezing of the parts where such a process is not needed. Such parts are copper plated in horizontal plating barrels. Since the average carbonization is 0.020 in., a minimum thickness of copper of 0.0005 in. is required. However, the thickness of copper varies to some extent according to the depth of the carbonization required. After being copper plated, the parts are machined at the points where they are to be hardened.

For localized carbonizing and hardening, barrel-plated copper has been found to be superior to still tank plating. The success of this method of plating is attributed to the dense, compact plate obtained by the burnishing effect of the parts rolling over each other in the barrel.

Work in Process Reduced 60 Per Cent

While the new system of handling parts in connection with the cadmium, copper and nickel plating has been in operation only a few weeks, its merits already are manifest. The time of the work in process has been reduced 60 per cent, or—to put the results in another way—the turnover of material in the department has been more than doubled. By utilizing what was heretofore waste space overhead for the movement of materials, the department has been able to increase its output, even though utilizing a smaller working area. In addition, the necessity for handling parts by hand, except for racking and unracking, has been virtually eliminated and labor costs have thereby been reduced.

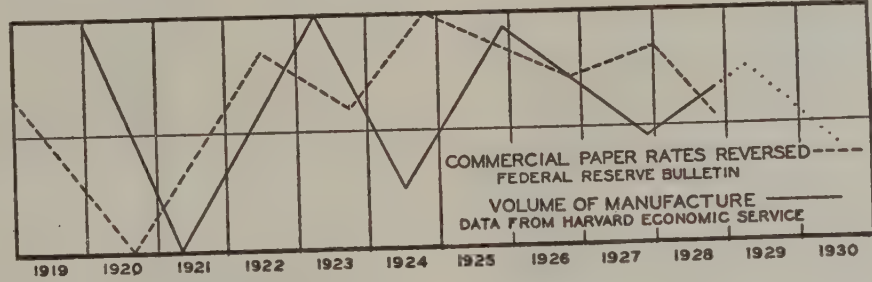
In thus revamping the plating departments, the company has proceeded one step beyond the earlier changes in handling its enameling work. These were described in THE IRON AGE of June 14, page 1672. Attention was there directed to the elimination of congestion, the more uniform results obtained with decreased handling, reduction by 80 per cent in stock in process and a substantial increase in output.

Business to Reach Peak in 1929, According to Forecaster

BUSINESS will continue to expand until it reaches a peak in 1929, according to the long-time forecaster of the Simonds Saw & Steel Co., Fitchburg, Mass. Discussing this forecast in the Nov. 1 issue of *Looking Ahead*, Alvan T. Simonds, president of the company, says in part:

In May, 1926, speaking before the financial section of the American Management Association, my assistant, John G. Thompson, basing his forecast upon the accompanying chart, which is our long-time forecaster, declared that business had reached its peak in the spring of 1926 and would decline in its general movement until the latter part of 1927, and then revive through 1928 to its next peak in 1929. Up to date this forecast is correct. It may be found in the printed report of the meeting. He now declares that business is moving to its next peak in 1929, from which it will decline in its general movement until about the middle of 1930, according to how long commercial money rates continue their present general upward movement. He is again basing his forecast upon the chart above. This chart is prepared simply to show trend and that one line moves up and down similarly to the other. No attempt is made to decide upon and show a normal for either line.

I am not going to forecast. I ask each reader of *Looking Ahead* to study the chart for himself. The long dot line represents major movements in interest rates on prime commercial paper in New York as reported in the *Federal Reserve Bulletin*; the solid line represents major movements in the volume of manufacture, as reported by the Harvard



Economic Service; the round dot line represents approximately the line that the volume of manufacture will follow in the immediate future if the sequences shown by the chart up to date are to continue, i.e., if increasing

money rates are to be followed as they have since 1919 by declining volume of manufacture.

The chart shows three downward movements in money rates (remember money rates are reversed on the chart) followed by three upward movements in the volume of manufacture. Today we are in the third of these upward movements in the volume of manufacture, following the downward movement in money rates from November, 1926, to January, 1928. The chart also shows four upward movements in money rates. The first three of these are followed by downward movements in the volume of manufacture. Will the fourth, as shown on the chart from January, 1928, to date, be followed by a downward movement in the volume of manufacture as shown by the round dot line on the chart? The chart shows the facts as found by two reliable reporters of business conditions. Decide for yourself whether the immediate future is to be like the past since the war in the correlation of movements in money rates with movements in business. Certain it is that credit in the United States is in an unhealthy condition. We have lost nearly a half billion of our gold reserves, and at the same time a mania for speculation, based largely upon credit, has developed. In some way or other, sooner or later, we shall have to pay for our spree.

Mass Production Welding Operations

Oblique Welder Prevents Surface Markings—Flash Welder Eliminates Hand Labor—Portable Welders Simplify Jigs—Trolley Conveyor Guarantees Steady Production

BY JOSEPH W. MEADOWCROFT*

A COMPARISON of the various methods used on all-steel automobile bodies (a manufacture designed with welding as its main operation) shows that the following changes have taken place from 1914 to 1928. Arc welds on each assembled body have decreased from 5 to 1 per cent; oxy-acetylene welds have decreased from 48 to 30 per cent; spot and flash welds have increased from 47 to 69 per cent. The reduction in arc welds is due to the change of methods. For instance, the outside door panel was tacked to the assembled inside frame of an all-steel door, but the arc "tacks" required filing off metal at points of contact, this building up being due to the continuous striking of a new arc.

Fig. 1 shows a machine developed especially for this operation. The entire inner panel is energized while the single die makes the weld. This machine, known as the oblique spot welder, due to its indirect means of welding, is designed and built in our own plant. The transformer is of Budd split type, only four bolts need to be loosened to remove the coils. The strands for energizing the inside

panel are of sufficient size to carry the ampere load, and of sufficient flexibility and properly counterweighted to permit the entire welding of the door with one handling. The work is shown in Fig. 2, exactly as it comes from the machine. At the left is the inside, showing spot welds; at the right is shown the clean surface of the outside panel.

Flash welding has been applied in recent years for making long seams in sheets. Fig. 3 shows a machine of standard design, used for flash welding of all two-piece cowls of earlier design, and all roof panel joints in the newer closed bodies. Between the clamps can be seen a roof panel in horizontal position and a quarter panel standing upright. The machine takes 125 kw., is power driven, and fully automatic.

Fig. 4 shows the interior view of the machine used to flash weld the seams of a tonneau. It is also of standard design, equipped with a Budd sizing fixture, and has two individual welding units mounted on one bed plate. Each unit is equipped with one 200-kw. welding transformer, has

*Assistant Works Manager, Edward G. Budd Mfg. Co., Philadelphia. Extracts from an address before the American Welding Society, Oct. 9.

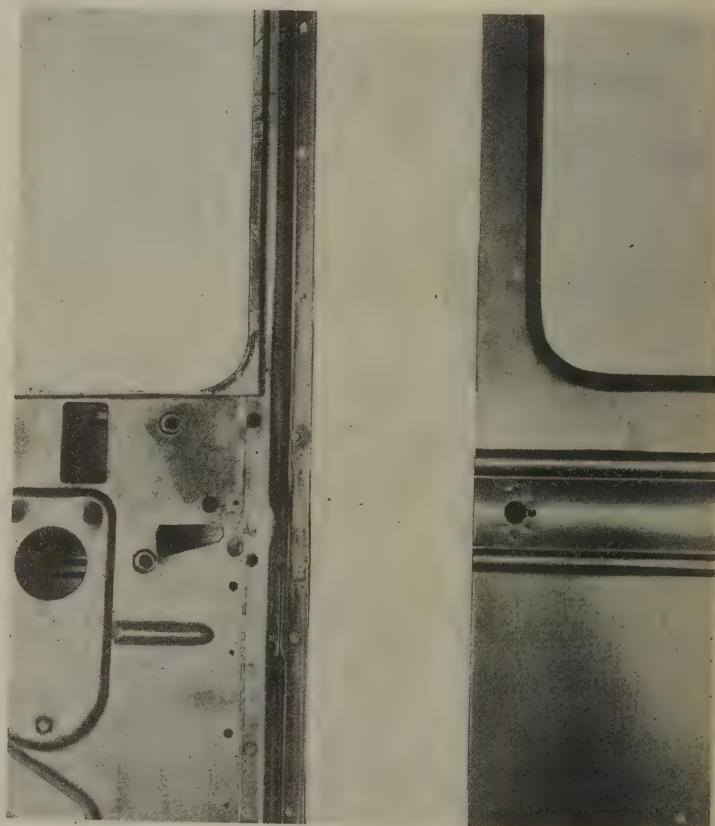


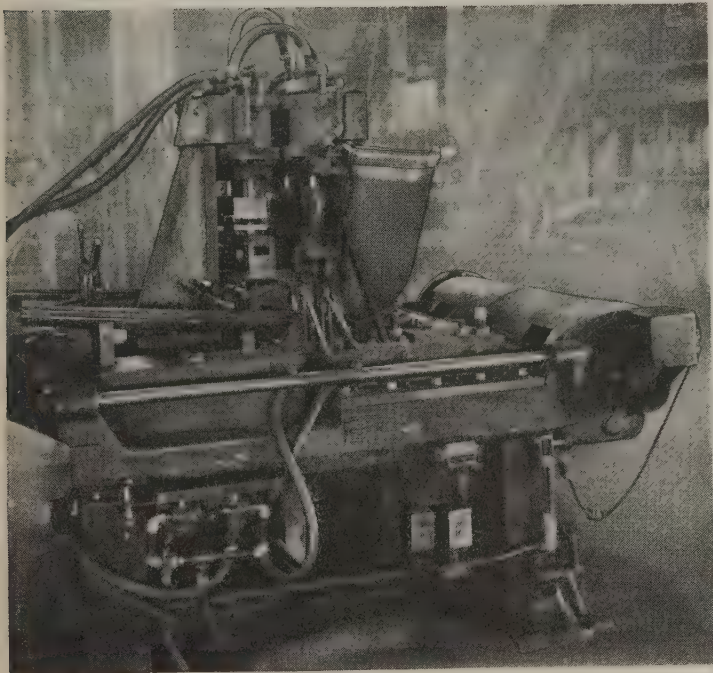
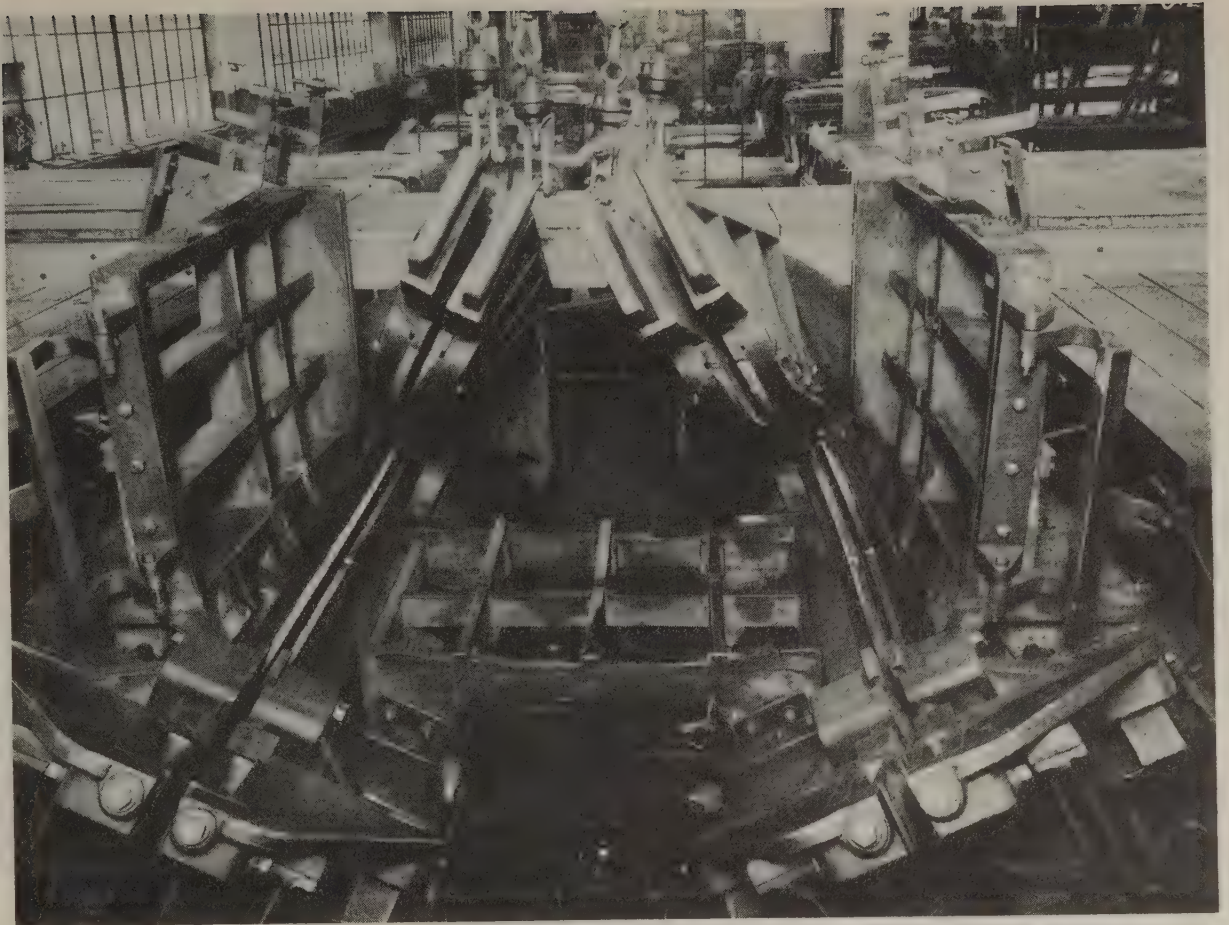
Fig. 1 (at Left)—Oblique Welder. When current comes in through upper electrode it makes a spot weld on flange and flows out through terminal clamped to inner frame. Lower die is insulated and carries away no current

Fig. 2—Unretouched View of Work from Oblique Welder. At left is inner side of seam, showing electrode marks. At right is outer view of door panel, showing not even heat marks at the spot welds

Fig. 3 (Lower Left)—Flash Welder for Roof Panel Joints. If illustration is viewed upside down it will be clearly seen that the work clamped in place is a quarter side panel and roof panel for a coupe

Fig. 4 (at Right)—Looking Down Into the Clamping Fixtures of Flash Welder for Joining Sides to Rear of Steel Auto Body

Fig. 5 (Lower Right)—Toggle Clamps Shown on Floor Are Eliminated by Use of Portable Spot Welders for Assembly Operations

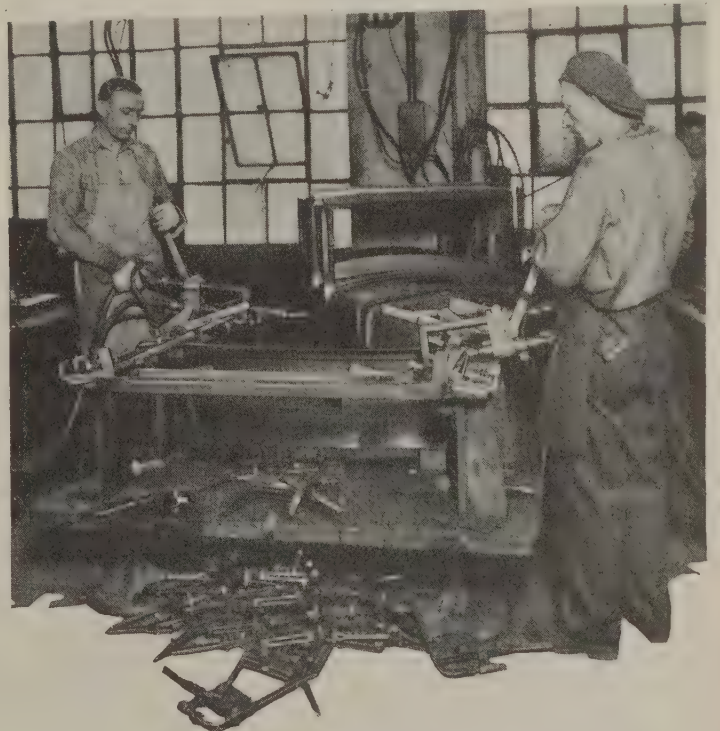


a capacity of 70 in. of 0.043 standard auto body stock and operates by a 2 hp. motor. The weight of the assembled machine is approximately 52,000 lb. The welding dies are of aluminum bronze, to withstand the extreme pressures required to prevent slippage at the weld line. The pressure developed across the face of the dies amounts to approximately 32 tons.

I will give some illustrations of spot welding assembly for front ends. This unit is standard on a line of coupe, sedan, cabriolet and delivery cabs, thus demanding exceptionally high production. Various difficulties have been eliminated by our manually operated "welding conveyor."

The most important operation of the entire assembly is to locate properly the partly assembled outside shell to the interior strengthening or supporting framework. This was

accomplished by jiggging the sub-units in an assembly fixture by means of loose toggle clamps. An improvement in this feature has been the installation of portable spot-welding machines of standard manufacture. Two of these in the hands of operators are shown in Fig. 5; the toggle clamps on the floor are no longer needed. A few spots are placed at fixed points by each operator and the piece is removed. We have found a decided improvement in applying the portable spot welding machine in the line, as it has eliminated a large number of toggle clamps along with the maintenance that they ordinarily require. Another advantage to be found in this assembly method is that once the



pieces have been properly alined and tacked in place by means of the portable welding machine, no further attention is required, as it will undoubtedly be in perfect alinement when completed.

Fig. 6 shows the unit passing through one of a number of operations on the high production side of the conveyor. The length of track is 296 ft., and accommodates 19 standard upright welding machines. Space is provided between the welding machines, allowing one or more pieces to hang in a neutral position, where any small parts are assembled by jigs to the main unit. The hanger shown is very flexible, allowing the unit to be turned into any required position. This is characteristic of all other operations, as no helpers are required. The trolleys support a sheave wheel or pulley permitting the unit to be placed at such different heights as the various operations may require. The figure also shows that the operator has freedom of both hands. The welding operator along the conveyor is assigned to a certain task and his entire efforts can be localized to this task, in that he is not hampered by a helper moving the piece in a directly opposite position to that desired; neither are his thoughts distracted by the following piece, as ample space is provided between each machine to accommodate at least one piece in a neutral position.

All obstacles encountered in the welding line are overcome in the following manner:

1. Sufficient machines are provided along the conveyor to split up or divide any operation by time study so that the amount of production expected from each operator is equalized.
 2. The piece is carried along on hangers that permit any position to be attained. Where a desired position is not possible, the machine is reconstructed.
 3. Space is provided, where necessary, between the welding machines where the setter up is located. He applies the jig and piece, and the jig is returned by the operator. Enough jigs are provided.
 4. A minimum amount of floor space is required on high productions as no bank of material exists between operations.
 5. A minimum amount of handling eliminates damage and dents in the completed unit.
 6. A ceiling switch leads to a duplicate line of machines, the one side manned by a skeleton crew. From the latter experienced operators are drawn to keep the main line in full operation (110 units per hour) at all times.
- In this explanation of our welding line conveyors I have attempted to illustrate the mass production by welding and

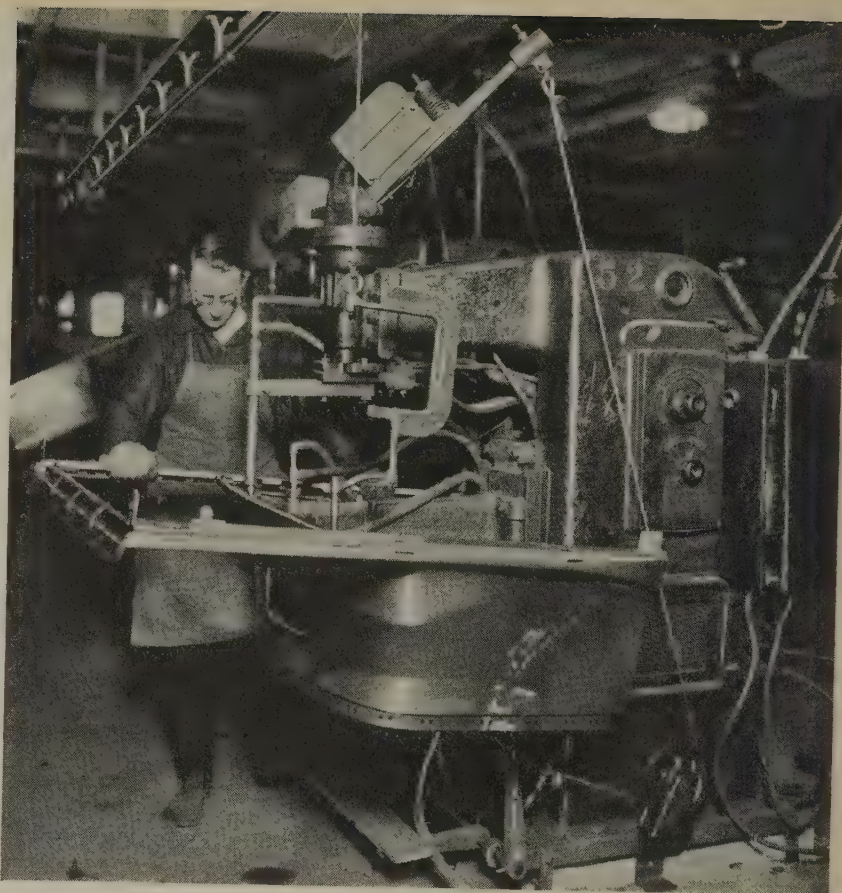


Fig. 6—One of the 19 Machines Required to Assemble Front Ends of Auto Bodies. Slight pressure on foot treadle starts an automatic cycle which completes one spot weld

the difficulties encountered in the handling of a bulky piece. Our method of spot welding is the ordinary one established many years ago, but our application in this respect is entirely new. Large production has been handled by this method for the past two years and it is needless to say that our first thought, in lining up new production, is to establish a welding line conveyor. By means of this production device we have solved the following problems:

1. The sequence of operation.
2. The production per welding machine.
3. The many positions of the piece during welding.
4. The jiggling or locating of small parts to the assembled unit.
5. Minimum floor space.
6. The handling of the unit in a manner that will keep it free from floor marks and other defects.
7. The failure of operators to report each shift.

Standard Thermometer and Pyrometer Points

SINCE the determination of absolute temperatures according to the thermodynamic scale is accompanied by great experimental difficulties, the United States Bureau of Standards, the (British) National Physical Laboratory and the German Physikalisch-Technische Reichsanstalt have agreed upon certain fixed points and methods of interpolation for reproducing the theoretical scale for practical purposes. Details of the methods of determination and interpolation are given in Research Paper No. 22 of the Bureau of Standards, by George K. Burgess, director. The primary points all at one atmosphere pressure, are as follows:

Boiling point of oxygen	— 182.97 deg. C.
Melting point of ice	0.000
Boiling point of water	100.000
Boiling point of sulphur	444.60
Melting point of silver	960.5
Melting point of gold	1,063

For temperatures below 660 deg. C. the platinum resistance thermometer is to be used for standard; from 660 to 1063, the platinum thermocouple; above 1063, measurements of black body radiation.

Points intermediate to the above are recommended for calibration of secondary thermometers, as follows:

Carbon dioxide sublimates	— 78.5 deg. C.
Mercury freezes	— 38.87
Transformation of sodium sulphate	32.38
Naphthalene condenses	217.96
Tin solidifies	231.85
Benzophenone condenses	305.9
Cadmium solidifies	320.9
Lead solidifies	327.3
Zinc solidifies	419.45
Antimony solidifies	630.5
Copper solidifies	1,083
Palladium solidifies	1,555
Tungsten melts	3,400

Making of Bolts on a Large Scale

Methods Employed for Mass Production
at the Lebanon, Pa., Plant of
Bethlehem Steel Co.

BY GEORGE A. RICHARDSON*

A PREVIOUS article described the initial steps in the manufacture of bolts and nuts at the Lebanon, Pa., plant of the Bethlehem Steel Co. and continued with the processes required in the semi-finishing and finishing departments for the production of the many varieties of nuts. This article traces the steps taken in the finishing of bolts.

The hot bolt department of the Lebanon plant is largely a jobbing one, for in addition to the usual run of bolts varied heading and upsetting operations are carried on. Rivets to special and Government specifications are made here; likewise all special jobs, such as long guy rods which have to be upset on one end.

The nature of the work here is such that automatic machines cannot be used to advantage, and hence the equipment is hand fed and of a comparatively standardized type. Whenever possible, special machinery is used, a recent development being the installation of drop-in die forging machines, on which the gathering can be done in two or three operations on one heat. For instance, in the case of two

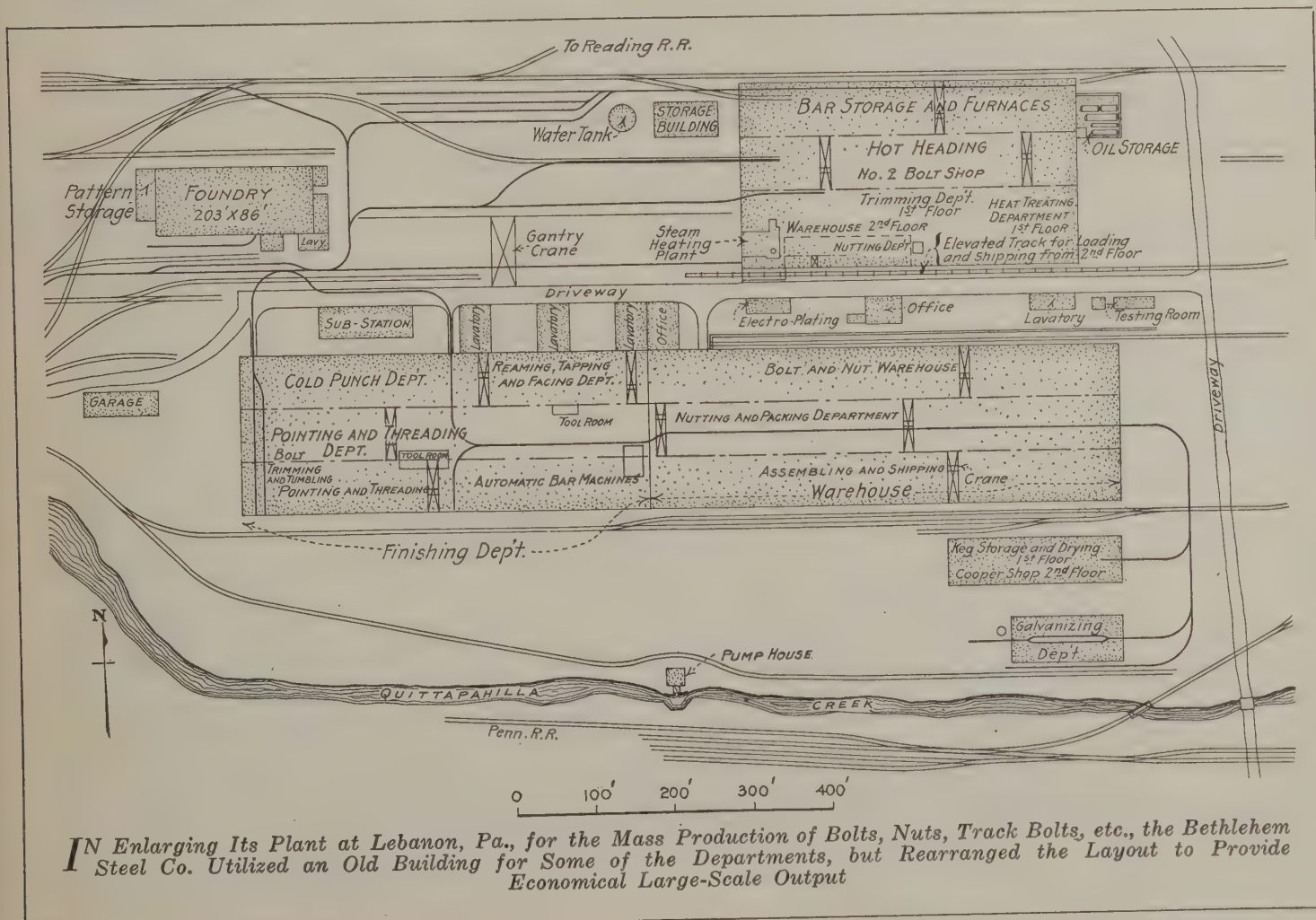
operations, the head will be formed in the first and chamfered in the second. The arrangement of a machine of this type is such that three dies can be mounted on the header, one above the other. Grooves or slots in the side of the frame in front of the header are so located that they are opposite to the dies. The operator takes the heated bar, and, as he pushes it forward against the header, uses one of the slots or grooves as a guide. As the header goes back for the second stroke he drops his rod in the second position and thence to the third position. This speeds up production considerably.

Bolts from 3/16 in. diameter to 2 in. diameter are made in this shop, square and hexagon heads predominating. The bar stock is sheared to the required length on its arrival, heated and upset.

Automatic Machines for Cold Bolts

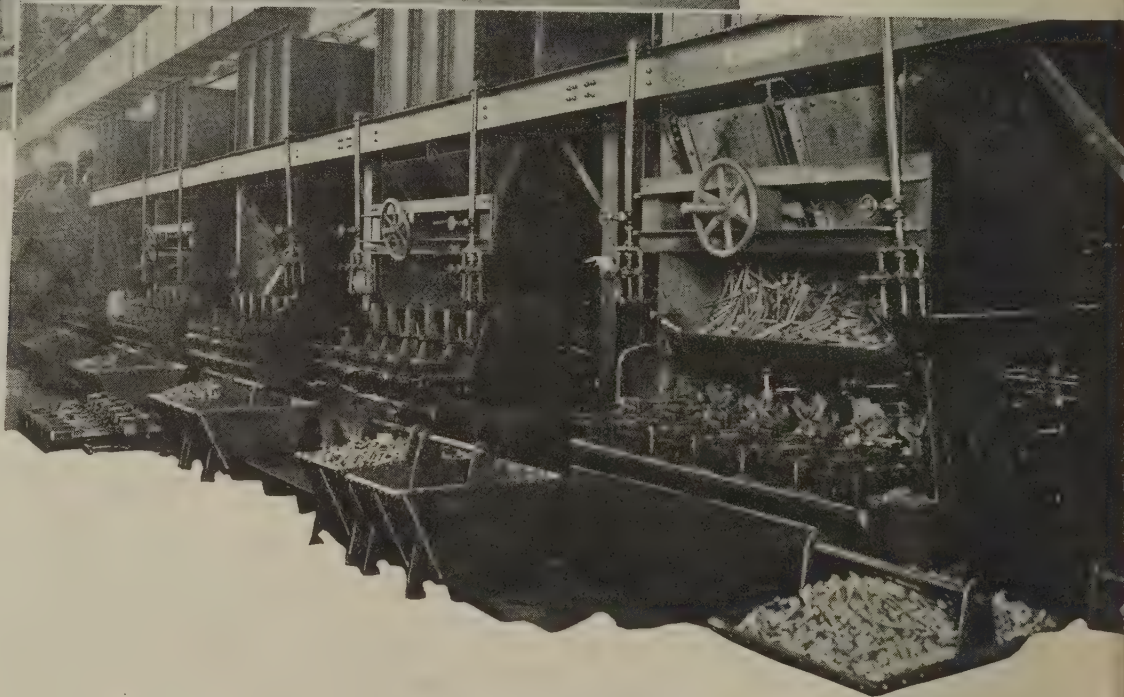
In direct contrast to that of the hot bolt department, the work in the cold bolt department is carried on entirely with automatic machines. The nature and volume of the work readily lend themselves to this type of production.

*Bethlehem Steel Co., Bethlehem, Pa.





VARIOUS Types of Machines Are Used for Pointing Bolts, Depending Partly on the Size of the Bolts. The semi-automatic pointing machines (below) take care of short bolts up to 3 in. diameter



THE Work in the Cold Bolt Department (Above) Is Done Entirely With Automatic Machines, Which Turn Out from 70 to 125 Bolts per Min., According to Size

Bolts from 3/16 in. diameter to 5/8 in. diameter, inclusive, can be made from stock in cold-drawn coils.

Machines of various types are used, some of the variations depending upon the size of the stock. Equally important are the kind and amount of upsetting required. For instance, in one row there are single-stroke, two-stroke and triple-stroke machines. In a single-stroke machine the operations are as follows: Gripping dies open and as the stock advances, close again tightly, while the material is sheared to length. The sheared piece of stock is then moved side-wise opposite the header, which comes forward and forms a head. The gripping dies then open, the bolt is pushed out and drops on to a belt conveyor which carries it to the container. In the case of the double-stroke machines there are two dies mounted on the header. On the first stroke an upsetting die comes forward and upsets the end of the material. During the back stroke the header rises so as to bring the second die in position, and on the next forward stroke the final heading is done. The header then drops to its initial position and the operations are repeated. In a triple-stroke machine there are three dies and three strokes in all.

Rivets from 3/16 in. to 1/2 in. are regularly made and 5/8 in. diameter rivets are occasionally made on a single-blow machine. Rivets are always annealed. For the general range of bolt-making operations, the double-stroke machines are used, but where large, thick heads are required the triple-stroke machine gives the best results.

Annealing is done after cold heading to remove forging strains. All bolts and rivets are annealed or heat-treated.

Some idea of the production of machines of this character can be gained from the following figures: Speed of operation of machines making bolts: 1/4 to 5/16 in. diameter,

125 bolts per min.; 3/8 to 1/2 in., 86 bolts per min.; 1/2 to 5/8 in., 70 bolts per min.

Miscellaneous Work Done in Threading Shop

No. 3 threading shop can be called the rod and turnbuckle department, for here are made rods, turnbuckles, clevises, etc., mostly for bridge, dock and wharf work. The miscellaneous nature of the operations involved intimately ties up the routine of this department with that of a number of others. A few examples give an idea of this:

Billets for turnbuckles are sheared at the mill and drop-forged in the forge department. The flash or fin formed during the forging operation is trimmed, both inside and out on a cold press or cold punch machine in the threading department, where the necessary drilling and tapping is also done.

Rods are rolled at the 10 in. or other mills and sheared to desired length in the threading department. All remaining operations such as upsetting, threading and placing nuts, turnbuckles or clevises are done here.

Clevises are made on a large hammer in the smith shop, trimmed hot and then sent to the threading department for drilling. They then go back to the smith shop to be "set" or "formed" to customers' requirements and return a second time to the threading department for final finishing.

The equipment of the threading department consists of standard types of forging and threading machines. The nature of the work precludes the use of automatic machinery. Facilities are provided for threading jobs up to 4 in. diameter. In addition to the specialties already mentioned, sleeve nuts, street railway tie rods, both round and flat, various types of guy rods, straps, eye-nuts, etc., are made here. An interesting example of the special jobs which go

through here is a four-part tie rod for dock use, having a clevis on each end and two turnbuckles between.

Material that is to be finished in the finishing department is transferred by rail. All materials are assembled in individual containers in a room set apart for this purpose and loaded on buggies hauled by an electric locomotive on a narrow-gage track.

The remainder of the work of the finishing department has to do with finishing bolts. Although this work is divided, large bolts being handled in the middle bay and smaller bolts in the south bay, the general nature of the operations is the same, and one description will suffice for two separate and distinct units. As mentioned, large bolts are those $\frac{5}{8}$ in. in diameter and upward. All material comes in at the upper or west end of the bays, where it is unloaded and despatched by crane to machines for the first of the operations which are described in their relative order, as follows:

Trimming.—The nature of the trimming operation depends on whether the bolts have been made cold or hot. Bolts up to $\frac{5}{8}$ in. diameter are made cold and have a round flat upset for a head. This is trimmed to a hexagon or square, as desired. In the case of bolts made hot, the flash or fin formed in the forging operation has to be removed. In the middle bay most of the bolts, by reason of size, have been made hot.

Two types of trimming machines are in use. Standard bolts are trimmed on automatic machines; special bolts on hand fed machines of simpler design. The hand fed machines are semi-automatic in their action, and are made in

several sizes. A revolving drum is provided. Near each end and properly spaced around the circumference are holes which serve as position locks. Trimming dies are mounted around the circumference of the middle of the drum, and in the course of rotation the bolts are set shank downward in the dies by hand. At the top point of travel spindles come down into the locking holes and hold the drum in position. At the same time a punch comes down and pushes the bolt through the die. The bolt in turn drops out on a scrap separator where the scrap is removed. On the smaller machines of this character handling bolts up to $\frac{1}{2}$ in. diameter by 6 in. long, as a maximum. One man can trim 35,000 bolts per day.

Bolts Trimmed by Automatic Machines

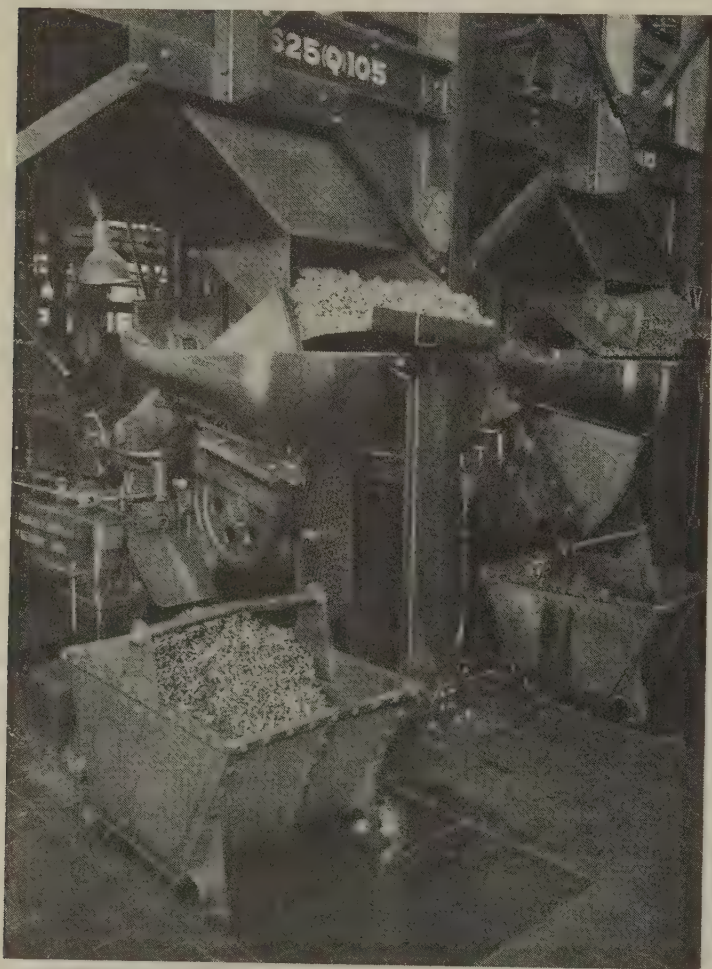
Bolts to be trimmed are brought to each automatic machine by crane in containers and dumped into the large storage bin located directly above the operating mechanism. They feed down into an open hopper in the middle of which a knife-like device moves up and down. This blade is known as the center board, and is made up of two plates kept apart by separators so that there is a slot in the top edge. The width of this slot depends upon the size of the bolts that are to be handled, and different center boards are provided for each size. As the center board moves up through the hopper, some of the bolts fall into the slot and hang on the edges by the head. A continuation of the upper travel makes the slope of this slot great enough so that the bolts slide down to the lower end by their own weight, and enter a small chute or track which serves as a

AUTOMATIC Heading Machines (Right) Facilitate Rapid Production. On some machines of this type the head will be formed in the first and chamfered in the second



AUTOMATIC Vertical Pointing Machines, Equipped With Two Rotating Spindles, Point a Maximum of 80 Bolts per Min. for Each Spindle (Left). Nine of these machines, operated by two men, point about 300,000 bolts per day

continuation of the slot. At the junction of the slot with this track a mechanical monitor stops the progress of all bolts not properly delivered and returns them to the hopper. From the lower end of the track, the bolts are transferred one at a time to the header by a series of mechanical motions that appear almost human. A cut-off clevis holds back the descending blanks and at the proper instant by a rocking motion separates and releases the lowermost bolt, allowing it to fall into the spring jaws of a carrier or transferring finger device. This finger picks up the bolt which is hanging downward with the head up, turns it through an angle of 90 deg. during the transfer period and places it in a header in a horizontal position with the head out. The header then comes forward and pushing the bolt



TWO Types of Trimming Machines Are Used, the Automatic, Shown in the Illustration, and Hand Fed Machines of Simpler Design for Special Bolts. About 18,000 bolts per day can be trimmed on these machines, two of which are operated by one man

through the trimming die causes the head to be trimmed and the bolt ejected at the front of the machine. Scrap drops underneath.

About 18,000 bolts per day can be trimmed on these machines, two of which are run by one man. The slowness in operating speed is offset by the improved quality of the work, resulting from the fact that the punch does not run into the die.

Work of a miscellaneous character is also handled in the trimming department. Normally, boat and dock spikes, etc., are pointed hot while making. Occasionally, however, pointing cold is called for and in this case the work is done here with a punch type press provided with a taper die. Machines adapted to this use are also used for bending U-bolts.

Tumbling.—All bolts are tumbled after trimming for cleaning and to get rid of burrs and sharp edges. Sawdust is used for cleaning, and a riddle at the discharge end of the tumbler separates all scrap from dirt. The bolts themselves drop on an inspection belt.

Pointing and Threading.—These, of course, are important operations. The types of machines are numerous. Their use depends partly on the size of the bolts and partly on other conditions. Some are automatic, some semi-automatic and a few are hand-operated. For simplification these descriptions will be grouped on the basis of type as follows:

(a) **Automatic Vertical Pointer.** These machines are provided with two rotating spindles moved alternately up and down by a rotating cam. On the ends of the spindles are heads containing the pointing dies. Bolts feed automatically and as the spindle comes down the pointing is done. On the up stroke a slide comes down and pushes the bolt out of the machine. A maximum of 80 bolts per min. can be pointed by each spindle. There are nine of these machines in all, operated by two men. The average production is in the neighborhood of 300,000 bolts per day within size limits $\frac{1}{4}$ to $\frac{5}{8}$ in. diameter x $\frac{3}{4}$ in. to 4 in. long.

(b) **Automatic Vertical Threader.** The only point of difference from the above machine lies in the dies. Spindles rotate at a speed of 450 r.p.m.; oil pressure 60 lb. Two men and eleven machines average 110,000 bolts per day. Size limits $\frac{1}{4}$ to $\frac{3}{8}$ in. diameter x $1\frac{1}{2}$ to 4 in. long.

(c) **Automatic Pointing and Threading Machine.** Both operations are performed on the same machine. Bolts feed down a runway and are carried over to the die head by a conveyor. At this point, a jaw-grip holds the bolt steady while it is raised in a horizontal position. The pointing tool comes up against it first and is followed by the threading head. Sixteen of these machines average 70,000 bolts a day. Only $\frac{1}{2}$ -in. bolts are handled in lengths ranging from $2\frac{1}{4}$ to 6 in.

Semi-Automatic and Special Machines

(a) **Pointing Machines.** Special job lots are pointed on hand-operated machines, which have a capacity of about 20,000 bolts a day. Short bolts up to 3 in. in diameter are taken care of on semi-automatic machines which handle about 30,000 a day. Large work is pointed on a rotating turret, 18,000 a day being an average output.

(b) **Pointing and Threading.** Among the special machines are some designed for handling long bolts. The pointing is done first, followed by the threading; 9000 bolts a day can be machined, lengths ranging from 6 to 36 in.

(c) **Thread Rollers.** In addition to the cutting method of threading, many bolts are threaded on thread rolling dies. Standard cold-made bolts $\frac{3}{8}$ in. diameter and smaller are threaded on hand fed roll threaders. Thirteen machines, each with a capacity of about 30,000 bolts per day, can handle almost any length in diameters ranging from $\frac{3}{16}$ in. to $\frac{7}{8}$ in. All of the threading is done cold. Thread rollers of greater capacity will thread cold bolts from $\frac{1}{2}$ to $2\frac{1}{4}$ in. in diameter.

(d) **Gimlet Pointing.** Some orders call for gimlet points. The machines used for this purpose have a stationary die which is moved forward by hand at an angle against the revolving bolt. About 12,000 a day can be pointed, diameter range $\frac{1}{4}$ in. to 1 in.; maximum length, 46 in.

(e) **Miscellaneous.** Miscellaneous jobs are threaded on hand fed threaders. Quite a few varieties of miscellaneous work are done in this same department. For instance, any drilling required for cotter pins can be done economically on a production basis. Turned and finished bolts and bolts made of special steel are worked up and threaded on stud machines and turret lathes. Stud bolts can be threaded all over; accuracy of threading is obtained by use of a lead screw. Head shaving machines are provided to meet the needs of work of that character.

All cold bolts are treated and blued, the process used cleaning the surface, increasing the strength, relieving strains set up in heading and giving a black finish that prevents rust. One of the advantages of this process is that a clean bolt is obtained for packing.

Special Steels for Special Purposes

Requirements of the Aircraft Industry Are Broad and Exacting—Alloy Steels for Rust and Heat-Resisting Purposes

THERE were two papers presented at the thirty-fourth general meeting of the American Iron and Steel Institute in New York on Oct. 26 on special steels for special purposes. One was a paper by Dr. W. H. Hatfield as noted below. It was read by title only because

it was not possible for the author to be present. Doctor Hatfield delivered the Campbell memorial lecture before the American Society for Steel Treating at Philadelphia on Oct. 10 and in THE IRON AGE of Oct. 18 a brief biographical sketch of him was published.

Steel Requirements of the Aircraft Industry

BY H. J. FRENCH

WHILE the tonnage requirements for steels used in the construction of actual flying equipment will probably remain small, quality steels are used, whose value per unit of weight is relatively high. The business secured during the first seven months of 1928 from the aircraft industry has led one steel manufacturer to conclude that the demand during 1929 will be not less than 1500 tons of alloy steels for engine parts, 3000 tons of alloy steel for tubing, 100 tons of alloy steel for bearings and 50 tons of alloy steel sheet and strip. The total has a market value of about one million dollars.

Stated in terms of airplanes the recorded and estimated production is as follows:

Year	Number of Planes	Value
1926.....	1,200	\$8,900,000
1927.....	1,828	14,130,000
1928.....	7,000	.....

Over 10,000 engines will be built in 1928, one manufacturer producing 160 per month.

Disregarding the steel demanded for manufacturing plants, tools and equipment, and for hangars, flying field and service stations, the technical requirements fall into two natural groups: (a) for engines and (b) for aircraft structure.

There are three general requirements for steels used in the construction of actual flying equipment. They should have (1) high strength per unit of weight to permit lightness in the craft; (2) high quality to insure reliability and satisfactory performance; (3) ease of fabrication; and sometimes (4) the ability to meet special performance or maintenance requirements.

As shown in the table, hard drawn wire has the highest strength per unit of weight of any of the commonly used materials of construction. The strength-weight factors of heat-treated alloy steels are about the same as some of the light alloys. However, the latter have a higher bulk modulus; for equal weight and strength the aluminum alloy parts will have a greater thickness and therefore have greater rigidity (stiffness) than the corresponding steel parts.

Aircraft steels must have a high order of purity, cleanliness and uniformity. Inspection can make or mar the reputation of the products. In individual cases each bar of steel, for such parts as piston pins, may be analyzed chemically and the treated parts each examined for flaws and hardness. Crankshafts and connecting rods are generally etched at some stage of manufacture to assist in the detec-

tion of minute imperfections, and finally ground or polished all over. For some time, one steel manufacturer has examined microscopically for inclusions all alloy steel billets intended for high-strength aircraft engine parts such as crankshafts. The commercial production of such super-clean steels requires modifications in mill practice and the trend has been toward the electric furnace product, since it is difficult to meet these requirements regularly with open-hearth steels. In some cases cleanliness has been obtained at the expense of other desirable properties. The super-clean steels are generally coarse grained and are difficult to heat treat without cracking. Impact values of the quenched and tempered steels also may be low and the forging ranges are narrow.

Strength-Weight Factors and Elastic Moduli of Wrought Metals Used for Aircraft

(Approximate Values in Tension)

Materials	Elastic Moduli, Million Lb. per Sq. In.	Strength, Lb. per Sq. In.	Specific Gravity	Strength per Unit of Weight Divided by 1000
Music wire, $\frac{1}{8}$ -in. diameter	27 to 30	325,000	7.85	42
Structural alloy steel, heat treated.....	27 to 30	100,000 to 200,000	7.85	13 to 25
High nickel-chromium corrosion - resistant steels	27 to 30	100,000 to 150,000	7.85	13 to 19
Duralumin (4 Cu, 0.5 Mg, 0.5 Mn, 0.25 Si, balance Al).....	10	55,000	2.85	19
Magnesium alloy (4 Al, 0.4 Mn, balance Mg) ..	5 to 6	35,000 to 45,000	1.77	23
Mild steel, normalized. .	27 to 30	55,000	7.85	7
Aluminum, annealed....	10	12	2.7	4.4

At present there are two schools of thought, one holding that present good commercial qualities should be utilized; the other contends that the best is none too good for this stage in aircraft development, when standards of performance and reliability are being developed. The latter school seems to be in the majority, and if the steel manufacturer will look upon the aircraft industry as a testing laboratory and utilize the lessons it will teach in obtaining cleanliness, uniformity and special properties, at least a part of the older industry will learn much about steel making and about the application to quantity production of some of the information now available but not applied.

Corrosion is one of the most important problems to be defeated, especially in equipment operating over or near salt water. The use of protective coatings may enable the designer to use methods and products which would otherwise

not serve satisfactorily. Corrosion of duralumin gives concern at times, especially near the lower wing hinges on sea-planes. The structure here is somewhat open and may be splashed or covered with salt spray when floating. Corrosion by inter-crystalline attack causes the metal to become quite brittle; frequently this is concentrated near the rivets.

Corrosion in parts working under rapid reversal of stress is especially damaging. Heat-treated nickel-silicon steel, when properly protected, has an endurance limit of 108,000 lb. per sq. in., but when wet with mildly corrosive liquids the piece will endure alternations of stress no higher than 12,000 lb. per sq. in. When corrosion and repeated stress both come into play, only the high-chromium steels can be considered to be in competition with duralumin (with its corrosion-fatigue limit at about 8000 lb. per sq. in.) on a strength-weight fatigue basis. This illustrates why duralumin and stainless steels (not carbon steels) are the competing materials in the airships which the British are reported to be building in parallel. Performance records for these two ships should throw much light on the relative efficiency of duralumin and stainless steel construction.

Slightly over 50 per cent of the weight of an air-cooled motor is steel. Nearly all of it is alloy steel, except the cylinders. Those of the Gnome engines, manufactured in the United States about 1916, were made of about 0.5 per cent carbon steel forgings normalized after forging. Liberty engine cylinders, produced during the early part of the World War, were formed hot from seamless steel tubing or pierced and drawn from forged blanks of steel containing about 0.4 per cent carbon and then heat treated. Steels containing about 0.45 per cent carbon are used in the cylinder barrels of modern air-cooled engines, such as the Whirlwind, Wasp and Hornet. One manufacturer is using nickel steel castings, another is using welded chromium-molybdenum steel, and there is a possibility that the nitrided special steels will find application in cylinder construction. Recent experiments in France showed that the latter work in contact with ordinary carbon steels and aluminum alloys without excessive heating. The wear of pistons and rings was reduced, and oil consumption did not increase as rapidly with continued operation as with ordinary carbon steel cylinders.

Steels used for engine forgings are shown in the table—medium-carbon, nickel-chromium analyses are favored. However, there is no standardization. So long as the required mechanical properties can be secured by simple heat treatment, the chemical composition is of much less importance

than the quality of the steel and the ease of forging and machining. Flaky fractures, hair line seams or cracks, inclusions and lack of uniformity are viewed with suspicion and have probably caused more rejections than chemical requirements.

Exhaust valves are an example of severe performance requirements. Operating conditions vary with the engine but temperatures up to 1600 deg. Fahr. are encountered. Hollow stems filled with oil, mercury or salt have been used to reduce the operating temperatures, and this device, as well as other features of design, has been helpful in prolonging the life of valves. However, there is still need for improved valve steels that will better resist erosion from the hot exhaust gases, have a low rate of oxidation, maintain their hardness at exceedingly high temperatures and permit easy fabrication and the production of hard strong stems.

Valves frequently fail by a portion of the head burning away, by mushroomed stems, by excessive scaling and by cracked heads. Of the many steels used, those shown in the table seem now to have the preference.

The wooden propeller has now been replaced quite largely by the metal, which does not chip and split when operating in snow and sleet. However, metal propellers are subject to fatigue and special attention must be given to the surface finish. Most are made of a forged aluminum alloy containing about 4.5 per cent copper, 0.75 per cent manganese, 0.75 per cent silicon, and the remainder aluminum. Steel propellers have been produced and, according to some writers, are entirely satisfactory for fast planes. However, they have not yet been used to any great extent in America.

There is still a wide difference in materials and methods for fuselage and wing construction, not only due to the different requirements of a small messenger plane and a huge bombing sea-plane, but also due to the practices of the different countries.

In England there has been a tendency to retain wood construction and, where metals are employed, to use steels where possible. Aluminum alloys have gained considerable favor in Germany and France, while in the United States steel and duralumin construction are both widely used.

Even in cases where the required stiffness can be obtained, steels have apparently less chance of successful application in small equipment than in large, since for equal strength and weight the steel parts are so thin that manufacturing difficulties are encountered and corrosion in any degree becomes dangerous. In this country practice varies

Typical Steels Used in Aircraft Engines
Chemical Composition—Per Cent

Steel	C	Mn	Si	Ni	Cr	V	Mo	W	Co	Remarks
Chemical Composition—Per Cent										
Structural Alloy Steels for Crankshafts, Connecting Rods and Other High Stress Engine Parts										
3½ per cent nickel*.....	0.40	0.65	...	3.5	...	...	...	...	...	Connecting rods and bolts Crankshafts Most popular composition for crankshafts
Nickel-chromium.....	0.40	0.65	...	1.25	0.6	...	...	...	...	
Nickel-chromium†.....	0.40	0.65	...	1.75	1.0	...	...	...	...	
Nickel-chromium.....	0.40	0.65	...	1.0	1.0	...	...	...	...	
Nickel-chromium.....	0.35	0.65	...	3.0	0.75	...	...	...	...	
Chromium-vanadium.....	0.35	0.80	...	...	0.9	0.18	...	...	...	Carburized—for valve tappets
Nickel-chromium.....	0.15	0.65	...	1.25	0.6	...	...	...	...	
Gears and Pins										
Chromium-vanadium.....	0.50	0.70	...	...	0.9	0.18	...	...	...	Carburized } Drive and reduction gears Gears and case hardened pins Oil hardened gears
5 per cent nickel.....	<0.17	0.35	...	5.0	...	...	...	...	...	
Nickel-chromium.....	<0.12	0.45	...	3.5	1.5	...	...	...	...	
Nickel-chromium.....	0.35	0.45	...	3.5	1.5	...	...	...	...	
Valves										
Chromium-silicon.....	0.45	...	2.5	...	8.0	...	...	...	...	Inlet and exhaust valves
Chromium-tungsten.....	0.60	...	...	...	0.75	...	...	1.75	...	Inlet valves
Chromium-tungsten.....	0.60	...	...	...	3.5	...	...	13.5	...	Inlet and exhaust valves
Chromium-tungsten.....	0.60	...	...	...	3.5	...	...	16.5	...	Inlet and exhaust valves
Cobalt-chromium.....	1.3	...	...	...	13.0	...	0.75	...	3.0	Inlet and exhaust valves
Miscellaneous Parts										
High-chromium.....	<0.30	...	...	13.0	...	...	...	...	...	Pump shafts, experimental } Largely experimental where corrosion resistance is desired Tail skid shoe For non-magnetic properties
High-chromium.....	<0.12	...	...	13.0	...	...	...	...	...	
High-nickel-chromium.....	<0.12	...	8.0	20.0	...	...	...	...	...	
14 per cent manganese.....	2.0	14.0	...	...	...	...	...	...	...	
High-nickel-chromium.....	0.35	...	2.5	25.0	17.0	...	...	...	...	
*Same steel with 0.20 per cent carbon										

*Same steel with 0.30 per cent C used in bolts on plane construction.
†Some makers use 0.60 per cent Cr instead of about 1 per cent.

BORN in New York, H. J. French was graduated in 1915 from the School of Mines of Columbia University. From 1915 to 1918 he was successively a chemist in the Murray, Utah, plant of the American Smelting & Refining Co. and metallurgical engineer for the General Vehicle Co., Long Island City, N. Y. From 1918 to 1919 he was chief metallurgical inspector in the Philadelphia territory for the bureau of aircraft production, United States Army, and subsequently was transferred to supervise tubing work in the Pittsburgh district. He joined the metallurgical staff of the United States Bureau of Standards about 1920, and since that time has been engaged largely in metallurgical investigations relating to both the ferrous and non-ferrous metals industries.



widely, but fuselage and control surface construction is generally either of steel or duralumin, while the wing structure is most often made of wood or duralumin with steel fittings and wires. Steel is used for spars, especially in large units, but the wing ribs are usually of duralumin or wood. The landing gear and engine mounts are generally made of steel but aluminum alloy construction is also found.

Steel construction is generally based on seamless steel tubing with welded joints. Duralumin construction requires riveted joints in formed sheets or tubes, as it is impracticable to secure satisfactory welded joints, and hence requires much handwork. Composite construction ordinarily requires from 25 to 33 per cent of its weight of steel for fittings and wire.

Only a few steels have been generally adopted for stressed members of aircraft. These comprise mild carbon steels in the form of sheets, bars and tubing, medium-carbon steel for forgings and tubing, high-carbon steels for springs and tension wires, chromium-molybdenum steel sheets, bars and tubing. Typical compositions are shown in the table.

The popularity of chromium-molybdenum steel for welded structures is due to a combination of desirable properties. The steel may be readily cold drawn to small-size seamless tubes. Sound welds can readily be produced and, due to the air hardening properties of the steel, the strength of the welds without any subsequent heat treatment is nearly on a par with that of wrought steel. It decarburizes very rapidly and it is the practice to make the steel with somewhat higher carbon than that desired in the finished parts. For this reason difficulties have been encountered in securing the desired mechanical properties on heat treatment, due to excessive surface decarburization which lowers the average carbon content of the relatively thin sections. In light-gage sheets and tubes, as in many engine parts, a high degree of uniformity is necessary, if cracking is to be

avoided in built-up fittings which are now so widely used. Uniform mechanical properties parallel and, at right angles to the direction of rolling, are greatly desired.

Stainless steels have not yet been used extensively for aircraft construction but offer promising possibilities. For example, water-tight pontoon construction is difficult to obtain with duralumin, which tends to corrode at welded joints unless heat treated after fabrication. As heat treatment is generally impracticable, riveted and caulked joints are now used. Satisfactory joints have been obtained in experiments with soldered stainless steels, and this practice is simpler and cheaper than that required with the present aluminum alloys. A limited application of stainless steels is found in engine exhaust pipes and exhaust line valves.

Views of Different Commentators

RAPID expansion in demand for aircraft and the large number of small manufacturers now engaged in building them have been responsible for the diversity of metals and alloys demanded, in the opinion of John F. Hardecker, chief draftsman United States Naval Aircraft Factory, Philadelphia. He decried much of this, pointing out that it involved difficulties and extra expense in purchasing, stocking, and production. If each steel is carried in the range of sizes, shapes, and finishes used by several well-known models, the multiplicity approaches the impossible. Both the Army and Navy realized this situation some time ago and have led the way in reducing the number of different alloys used, without attempting to get ideal steel for every part. Cooperation of commercial builders is now necessary, even if only to standardize the methods of inspection and test to insure an "aircraft" grade of quality which will be suitable for the various uses.

E. C. Smith, assistant general superintendent, Central Alloy Steel Corporation, Canton, Ohio, emphasized that por-

Typical Steels Used for Fuselage Construction

		Chemical Composition—Per Cent					Remarks
Steel		C	Mn	Cr	V	Mo	
Sheets							
Chromium-vanadium		0.22	0.80	0.9	0.18	...	Being replaced by Cr-Mo Body steels—riveted and welded construction
Chromium-molybdenum		0.30	0.50	0.9	...	0.20	
Mild carbon		0.25	0.65	...	...	...	
Very low carbon		0.10	0.65	...	...	...	
Tubes							
Mild carbon		0.15	0.65	...	...	...	Body steels—riveted and welded construction Large amount supplied for body work
Mild carbon		0.25	0.65	...	...	...	
Chromium-molybdenum		0.30	0.50	0.9	...	0.20	
Wire							
Medium-carbon		0.45	0.65	...	...	...	Streamline wire
Carbon-manganese		0.45	1.0	...	...	...	Beading and general utility
High-carbon		0.95	0.30	...	...	...	Music wire for springs
Chromium-vanadium		0.50	0.70	0.9	0.18	...	Valve springs

tion of Mr. French's paper which showed that little more than half the metal in an airplane engine is steel. Whether this percentage is to grow or to diminish was, in his opinion, a matter of the relative ability of the steel and the non-ferrous industry to develop the required alloys for such specialized purposes. Consequently it is of the utmost importance that the steel supplied now be nothing but the very best, and capable of passing the rigid military requirements by a comfortable margin. The present steels used are little different from the grades supplied to automobile manufacturers; aircraft required more metal on the order of 200,000 lb. per sq. in. tensile strength. The new carbide tools would probably aid in solving the troublesome machine work on such hard, strong steels. He also felt that the austenitic stainless steel (described by Doctor Hatfield in the same meeting) would be very useful, because of its weldability.

Mr. Smith also gave a detailed discussion of the steel requirements for crankshafts of the multiple-throw and single-throw engines now being constructed. The former requires a longer and bigger forging, therefore a bigger billet and a higher starting temperature. The super-clean steels described by Mr. French, when used for such forg-

ings, must be heated under pyrometric control; otherwise the roller or hammer man would probably overheat them, especially should he rely upon the usual criterion: viz., ease with which the steel fills the roll pass or die.

Drawing a parallel with the electrical industry, Dr. Zay Jeffries, consulting engineer Aluminum Co. of America, said that undoubtedly aircraft will become one of the major influences on the steel industry. Fifty years ago, a prophet would have said that the steels consumed in electrical and magnetic equipment would not likely amount to a large percentage of the total; yet the iron consumed in manufacturing plants and equipment, in generating stations, substations, and transmission towers is a very respectable tonnage. Likewise Doctor Jeffries feels that the chief outlet for steel will be not so much in the aircraft and engines, which will probably favor light alloys, as in manufacturing plants, service stations, airways and landing fields.

He also pointed out that since it is worth about \$40 to save a pound in weight in a plane, the cost of the best steel is justified. Furthermore, since service failures are so liable to cause loss of life, the trend will be to design aircraft for a certain number of safe hours service, and junk them completely at the end of that period.

Rust, Acid and Heat-Resisting Steels

BY DR. W. H. HATFIELD

IN Britain and in Germany substantial progress has been made since the discovery of stainless steel for cutlery, 13 years ago by Brearley, and there are now available chromium and chromium-nickel steels of such mechanical and corrosion-resisting properties that a very wide range of requirements can be fulfilled. Six classes of steels as shown in the accompanying table are the ones now most widely used.

Chromium steels 1, 2 and 3 are of the same class, and if heated to a temperature of 1740 to 1830 deg. Fahr., they harden in proportion to the carbon content. In practice, they are hardened, and then can be subsequently softened by tempering to the requisite condition of mechanical strength desired. These are martensitic steels.

Chromium-nickel steels 4, 5 and 6 are in a separate class. If they are heated to a high temperature and quenched they do not thereby become hardened, but instead are put into a very ductile condition, i.e., they are austenitic steels.

The chromium-steel 2, which is used for general high tensile engineering purposes, is put into the mechanical condition indicated in the table by hardening followed by suitable tempering, in which form it is supplied. In the condition given, it may be machined with reasonable ease and is widely used with success for parts required to resist atmospheric corrosion, superheated steam and many other conditions. It is clear that the next mechanical condition of rustless steel required by the engineering and the industrial world was that in which it could easily be deformed

Physical Properties of Common European Steels

		Analysis							Tensile Properties							Physical Properties					
		C	Mn	Si	S	P	Cr	Ni	Limit of Proportionality, lb. per sq. in.	Yield Point, lb. per sq. in.	Maximum Stress, lb. per sq. in.	Elongation, per cent	Reduction of Area, per cent	Izod Impact Test, foot-pounds	Erichsen Deep Cupping Test, mm. (18-gage sheet)	Specific Gravity	Coefficient of Expansion, be- tween 20 and 200 deg. C., per deg. C.	Specific Heat, 0 to 100 deg. C., gm. calories per gm.	Thermal Conductivity, 20 to 100 deg. C., calories per sq. cm., deg. C. per cm.	Electrical Resistivity, microhms per cm. cube	Maximum Magnetic Permeability
1	Steel Stainless for cutlery Hardened 1760 deg. Fahr. Tempered 356 deg. Fahr.	0.30	0.30	0.20	0.015	0.015	13.0	0.30	.....	.....	237,400	...	...	...	...	7.76	0.0000097	0.115	0.043	65	75
2	Stainless for enginee- ring purposes Hardened 1760 deg. Fahr. Tempered 1382 deg. Fahr. Annealed 1562 deg. Fahr.	0.30	0.30	0.40	0.015	0.015	14.5	0.30	60,500	72,300	108,400	27.6	63.6	52	...	7.77	0.0000109	0.117	0.050	54	650
3	Stainless iron Hardened 1700 deg. Fahr. Tempered 1292 deg. Fahr.	...	...	...	...	...	...	...	29,100	35,600	67,400	40	75	96	9.7	7.73	0.0000110	0.115	0.046	56	500
4	Austenitic (a) fully softened	0.09	0.18	0.14	0.015	0.015	13.4	0.28	53,800	72,300	92,500	26.5	65.7	100	...	7.73	0.0000110	0.115	0.044	56	400
5	Austenitic (b) fully softened	0.15	0.28	0.29	0.016	0.017	14.8	10.9	24,600	29,500	83,500	66.5	68.0	110	15.5	7.99	0.0000180	0.117	0.032	74	1.01
6	Austenitic (c) fully softened	0.14	0.30	0.30	0.015	0.016	18.1	7.9	27,300	34,700	100,800	71.0	62.0	110	16.0	7.92	0.0000177	0.117	0.033	69	1.01
		0.28	0.30	0.16	0.02	0.02	21.0	5.8	33,600	47,000	116,500	55.0	58.0	84	13.0	7.87	0.000017	0.118	0.035	67	1.01

cold to shape, and the steel given as 3 indicates the degree of success attainable by lowering the carbon content.

However, it was found that the chromium-nickel austenitic steels 4, 5 and 6, fulfilled more completely this particular demand of the industrial world. The heatings sometimes necessary in manipulation do not lead to air-hardening difficulties.

From the mechanical testing point of view, the distinctive feature, apart from their high ductility, is their high impact value, which is generally in excess of 100 foot-pounds (Izod test, British standard conditions).

Particularly noticeable is also the increased coefficient of expansion, and the thermal conductivity; these factors must be taken into consideration where elevated temperatures are encountered. Another outstanding and marked characteristic is the nonmagnetic nature of such materials.

It is quite clear that the service conditions should be thoroughly explored with a view to determining whether the corroding influences at work are such that the steels can be reasonably expected to give a good account of themselves. In the first place the advisability of supplementing laboratory corrosive tests by actual works tests cannot be emphasized too strongly. This is necessary because, in manufacturing processes and under service conditions generally, it is only rarely that pure substances are used, and small amounts of impurities may make a big difference to the corrosion resistance of the steel. For example, in the manufacture of some organic acids, relatively small amounts of mineral acids are also present at times and this may quite easily lead to corrosion. It must not be imagined, however, that small or even large amounts of impurities are always harmful to the steel: they may even be beneficial. To illustrate this, copper sulphate or ferric sulphate when present in certain proportions has the power of preventing the solution of austenitic chromium-nickel steel in solutions of sulphuric acid. Such conditions exist in certain mine waters.

This point is also brought out by the corrosion of certain types of stainless chromium steel in acetic acid solution of the same strength as vinegar and in citric acid solution of the same strength as lemon juice, while remaining totally unaffected by actual vinegar and lemon juice, thus once more illustrating the modification in corrosion resistance brought about by small amounts of an impurity. Substances which may cause corrosion when boiling under normal pressure may be quite harmless if boiled under reduced pressure at a correspondingly lower temperature.

Correct heat treatment is very important. One of the things which has to be aimed at in producing a corrosion-resistant material is homogeneity and incorrect heat treatment may easily destroy this, with consequent setting up of electrolytic corrosion.

Heat-Resisting Steels

Demand is being made for steel of such a nature that its strength does not become impaired as the temperature rises. Ordinary steels have already lost a substantial proportion of their strength when they attain temperatures in excess of a black heat, *i.e.*, 500 to 600 deg. C. While alloys of nickel and chromium have been very successful both in America and Europe, it has been found that, by suitably modifying the composition, the weakening is postponed until very much higher temperatures. In a good heat-resisting steel, however, this maintenance of strength at higher temperatures must be accompanied by resistance to scaling.

In the Campbell Memorial Lecture given earlier in the month before the American Society for Steel Treating the author showed how both characteristics can be controlled. While high-chromium, chromium-nickel and chromium-silicon steels show the advantage from a scaling point of view, the strength at high temperatures is not particularly good, whereas in the case of nickel-chromium steels to which

tungsten or silicon has been added (particularly the former) great gain in strength is obtained without impairing the resistance to scaling.

Theory of Corrosion

Why does iron rust? May it not be that iron protects itself by immediately forming the protective film when brought in contact with certain oxidizing media, and that failure to resist, *i.e.*, progressive "oxidation," results from the puncturing and local destruction of this film through various causes, such as the presence of particles of foreign matter leading to damage through local electrolytic effects and from local concentration of corroding media in dew effects? Incidentally a continuous protective film presupposes a continuous metallic surface for it to form upon, and what with the dispersion of oxide or silicate inclusions of indeterminate composition, and the actual unsoundness of the bulk steel produced, it cannot be considered that such a condition is fulfilled. The author is of the opinion that even ordinary commercial steel can, in itself, be much improved as regards its resistance to corrosion by manufacturing materials free from oxides and gas holes.

In reheating and during rolling, the external oxide layer is formed upon the steel; and attention to the time-temperature effect, coupled with control of the nature of the furnace atmosphere, cannot be without influence upon the characteristics of the surface as regards resistance to attack.

It is difficult to be certain as to the cause of pitting corrosion in all cases, but it seems reasonable to assume that the two conditions required are, firstly, a medium which either does not, or which only just attacks the chief constituent of the metal when pure and under anaerobic conditions, and, secondly, some factor or factors leading to local acceleration of attack. If the first condition is not satisfied, any tendency to pitting will be more or less masked by general attack; and if the second does not apply, the attack will be even. It remains to fix the cause or causes of the local acceleration, and the following, in the light of present knowledge, are suggested as probable:

1. Small areas less accessible to oxygen than the surrounding material will become anodic to the rest of the material, and a condition favorable to pitting will exist. Small surface defects and extraneous foreign bodies may cause trouble in this way.
2. If a metal is normally covered by a protective oxide film, small defects in this film, however caused, may produce local decrease in resistance, leading to pitting.
3. Local concentration of corroding medium (moist crystals, etc.).
4. If a material has small areas differing in some way, either chemically or physically, from the mass of the material, then such areas may supply the accelerating force by electro-chemical means, if they are not so chemically resistant to the medium.

The influence of chromium is now believed to be that of producing the necessary resistance through the spontaneous creation of a satisfactory oxygen-containing passivity-producing film, thus bringing the resistance of these new steels into association with the old phenomenon of passivity, and it is the facility of the chromium of producing, by oxidation through atmospheric and like oxidizing influences, the protective film, which is the explanation of their excellent properties.

Magnetic Changes in Fatigue Specimens

M. F. Fischer reports his studies on the magnetic properties of steel during alternating stresses in the *Bureau of Standards Journal of Research* for November. While magnetic changes were observed, they appear to be due to relief of internal stress, and are of such magnitude as to obscure those magnetic changes directly resulting from a fatigue crack. He concludes, therefore, that a rapid method of determining the endurance limit by means of magnetic analysis cannot be expected.

Blooms Routed in Four Directions

Special Transfer Table Handles Large Quantities According to Analysis in New Tube Plant

QUANTITY production of alloy steels covering a wide variation in analyses involves several problems in the routing and treatment of material. Having once reached the bloom stage, different steels require different treatments before further processing. This gives rise to problems concerning the most economical method of routing large quantities of material, coming from a single source, to any one of several destinations.

For example, in the new plant of the Timken Steel & Tube Co., Canton, Ohio, blooms coming from the shear must be routed, according to analysis, directly to the next rolling operation in the 28-in. mill, to continuous reheating furnaces, to thermal conditioning pits, or to a point where they can be pickled and ground, or chipped, before reheating and rolling. In other words, large quantities of material

coming from one operation must be diverted to any one of four others, with as little possible obstruction to the production stream, either preceding, or subsequently.

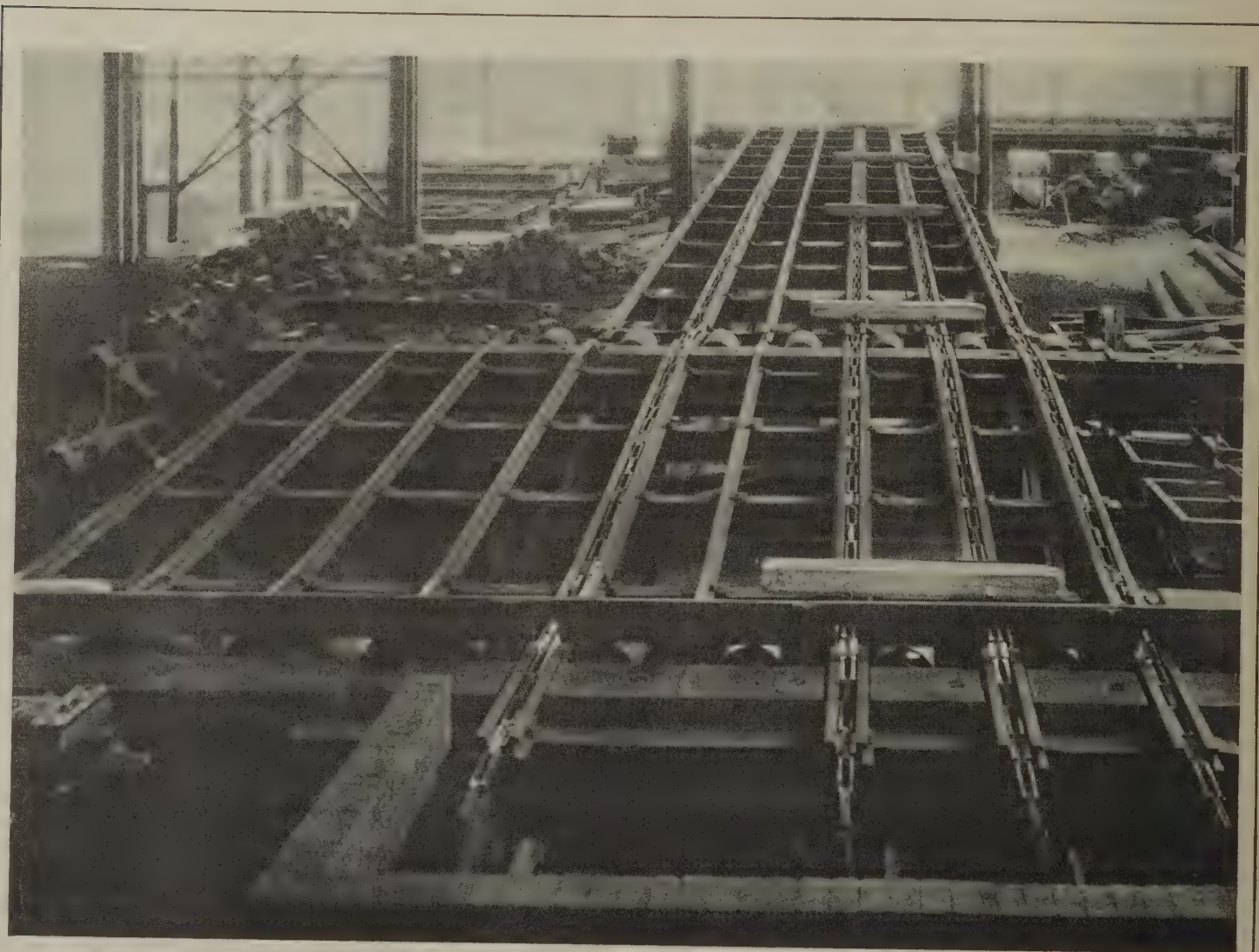
In this particular case the solution has been arrived at by means of a chain transfer table. The table, which has an overall length of 81 ft., and a width sufficient to accommodate either two rows of 9-ft. blooms, or a single row of 18-ft. blooms, was built with special regard to the service desired. It is located at right angles to the shear runout table, so that it can handle all blooms coming from the shear, regardless of their ultimate destination.

Table Is Simply Constructed

The construction of the table proper is simple. It consists of a series of heavy rails, acting as skids, supported by a structural steel framework con-

sisting of heavy transverse channel members about 6 ft. apart, which in turn are supported at the ends by structural uprights, which, for greater rigidity, are braced by cross members extending from the top of one column to the base of the adjacent ones on each side. Further rigidity is given to the individual supports by gusset plates at the joining angle of the transverse and upright members. The table has a total rise of 6 ft. from the charging to the discharge end, with a level point about 15 ft. from the end nearest the hot shear, where the runout table leading to the 28-in. mill is located. This arrangement gives the operator a clear view of the blooms on the table during the whole course of their travel over it, from his pulpit over the charging end.

Bloom travel is accomplished by four endless chains, provided with carrying dogs, which extend 4 in.



Transfer Table From the Operator's Control Station

above the surface of the skid rails. The chains are driven from four sprockets mounted on a common shaft at the delivery end of the table, and run over four spring sheave take-up sprockets at the shear table end. The drive consists of a 90-hp. 220-volt compound wound, mill type motor, which drives the sprocket shaft through a reduction unit which gives a chain speed of 150 ft. per min. The motor is provided with a solenoid brake to insure quick stopping when blooms are to be spotted on the run-out tables that deliver them to various destinations.

The four sprockets at the drive end are mounted on a common shaft, which is coupled directly to the main gear shaft of the reduction unit. The sprocket shaft in reality consists of two sections of about equal length, coupled together. Thus either section may be removed, if desired, without disturbing the rest of the assembly. The shaft is supported by five pillow blocks, so located as to give it the greatest possible rigidity. They are equipped with roller bearings. The

mountings are simple, the two bearing cones being pressed on the shaft, and the cups located by a shoulder on the inside of the plate which forms the outer closure, adjustment being obtained by means of shims. The pinion and gear shafts of the reduction unit are also mounted in roller bearings.

The mounting of the take-up sprocket bearings is quite different. The sprocket bearings are located inside the sprocket hub proper, the cups being pressed against shoulders inside the hub, and the cones given a light fit on the shaft. The cones are located by a sleeve which fits around the shaft inside the square sliding block, and are locked in place by nuts on the end of the shaft. The outer closure is formed by a collar on the shaft, that is held against the hub by the outer block.

Operation Is Controlled from One Point

The whole operation, not only of the transfer table, but of the two runout tables connected with it, is

controlled from one point near the juncture of the table with the shear runout table. Thus it is possible for one operator to route blooms coming from the shear to any one of three destinations, according to the treatment they require.

Those intended for rolling without treatment can be sent directly to the rolling mill by a live roll table which crosses the transfer table at a point about 15 ft. from its beginning. Those which require reheating travel to a second live roll table located at the extreme end of the transfer table, which carries them to the entrance of the reheating furnaces. And those which are to be thermally conditioned, or chipped, are carried over the end of the transfer table, and deposited in cradles in which they are carried by cranes to their ultimate destinations. The proper handling of blooms is facilitated by the fact that the operator has a clear view of the whole table from his control station, and can act immediately in accordance with the demands of any situation that may arise.

American Companies to Use Krupp Patent

Ludlum, Firth Sterling and Central Alloy Will Cooperate With German Company in Promoting Chrome Nickel Alloy

AN announcement has been made by representatives of the Krupp Steel Works, Essen, Germany, of the formation of the Krupp Nirosta Co., Inc., which will be the agent in the United States for the Krupp interests, in cooperation with the Ludlum Steel Co., the Firth Sterling Steel Co. and the Central Alloy Steel Corporation, in the production and promotion of chrome nickel alloy.

The announcement was made by Rudolf Preussing and Heinrich Artz, directors of the Krupp Steel Works, before they sailed for Germany on Nov. 1, following their attendance at the fall meeting of the American Iron and Steel Institute.

"The main object of the Krupp Nirosta Co., Inc.," a statement read, "is not to act simply as a patent holding company, but to be helpful as a service company and as a medium for the exchange of helpful ideas along the lines of development. Arrangements have been made so that the licensees, including the Central Alloy Steel Corporation of Massillon, Ohio; the Firth Sterling Steel Co. of McKeesport, Pa.; the Ludlum Steel Co. and others will have an important voice in the direction of its affairs."

The executive committee of the new company consists of J. M. Schlendorf, vice-president Central Alloy Steel Corporation; H. G. Batcheller, vice-president Ludlum Steel Co.; Richard Prosser and Otto van Schrenk. Edwin Corning, president of Ludlum Steel Co., will be chairman of the board and Mr. Batcheller will be president. The directorate will include F. J.

Griffiths, chairman Central Alloy Corporation; Henry E. Cooper, vice-president Equitable Trust Co., New York, and Harold O. Baker of the New York Stock Exchange firm of Jesup & Lamont.

Announcement was also made by the Krupp representatives of the arrangement made with the General Electric Co. for the manufacture in the United States of carbonyl.

H. G. Batcheller, president Krupp Nirosta Co., says that the Ludlum Steel Co. has taken an active part in the formation of the new company because of a belief that concerted action is necessary for the proper development of the chrome nickel alloy to which the Krupp laboratories have so largely contributed.

"For several years," he adds, "we have been interested in the production of the alloy steels, which for lack of a better term are usually described as 'stainless steel.' We have done a great deal of work with the alloys described by Brearley, Strauss, Armstrong and others. The more we study the corrosion resistant problem, the more we become convinced that there is need for great improvement in production methods and that the best results can only be secured by giving great attention to the selection of the proper alloy for each specific purpose. It has also been our experience that such selection must be based not only on complete laboratory tests, but in many instances on actual service tests.

"Several months ago we received an invitation from the Krupp company to send one of our metallurgists to in-

spect its plant and laboratories at Essen. We were much impressed by the remarkable development in Germany of the chrome nickel alloys in which the Krupps have specialized, and we also received many helpful suggestions regarding methods of production.

"Until the happy day arrives when the metallurgists discover an alloy that will cover the whole field of corrosion resistance, we believe that free exchange of ideas is necessary between the various mills producing the several alloys that have come into common use and we hope that the formation of the Krupp Nirosta Co. will represent an important step in this direction."

The Firth Sterling Steel Co. states that its cooperation in the formation of the Krupp Nirosta Co. will enable it to manufacture in this country a type of stainless steel similar to the "Staybrite" steel made for a number of years by Thomas Firth & Sons, Ltd., Sheffield, England.

"This 'Staybrite' type," says the Firth Sterling company, "is highly resistant to the corrosive effects of some of the agencies which affect to a greater or less extent our other stainless steels. The Krupp Nirosta Co.'s patents cover this type of material.

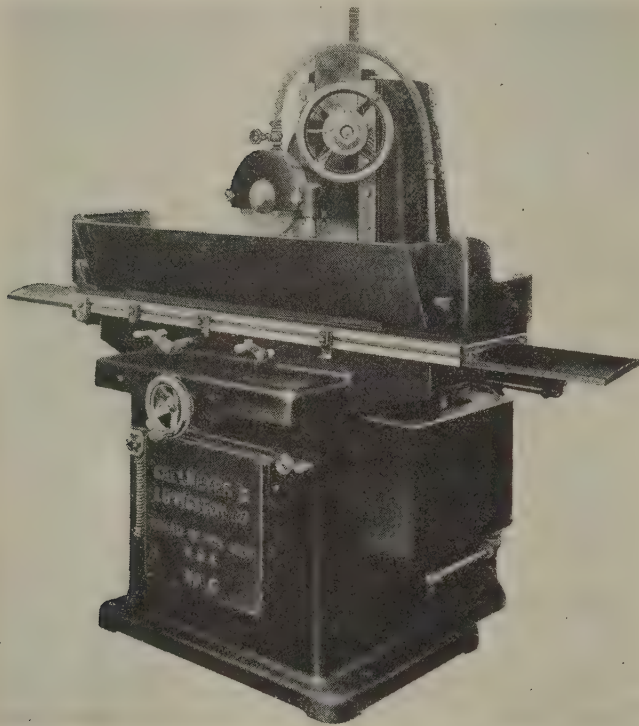
"The other arrangement made between Krupp's representatives and the General Electric Co. covers a new cutting material, and under the arrangement we shall now be able to put on the market our 'Dimondite,' which has a cutting capacity far in excess of any high-speed steel. We expect to announce shortly the details of this new development on which our laboratory has been working for some time, but the marketing of which has been delayed owing to the fact that basic patents were held by Krupps and the General Electric Co."

Surface Grinder Equipped with Oilgear Feed

GRAND RAPIDS No. 5 hydraulic feed surface grinder equipped with Oilgear feed has been designed by Gallmeyer & Livingston Co., Grand Rapids, Mich., to provide more rapid means of doing extremely accurate

movable pointer can be set for convenient readings.

When it is desired to get very accurate readings for grinding to close limits, the fine adjustment comes into play. Turning the smaller hand-wheel



***F**EEDS Up to 55 Ft. per Min. Are Obtainable by Turning a Handle at the Front of the Machine (at Left)*

***T**HIS Steel Frame Shear (at Right) Cuts 3-In. Angles and Weighs 93 Lb.*

work. As gearing of every nature has been eliminated in the movement of the saddle and table, the ground surface cannot show "gear tooth marks." The Oilgear mechanism makes possible practically any longitudinal table speed up to 55 ft. a minute. The feeds may be set so that the entire working surface of the table will be covered in $3\frac{1}{2}$ min.; on the other hand, they may be set so slow that it will take 9 hr. to cover the same surface.

Rigid foundation is provided by a one-piece base casting, which weighs over 1600 lb. The spindle head is a heavy casting fitted to the vertical ways and carrying an extra heavy spindle with a minimum of overhang for the wheel. The spindle runs in heavy bronze bearings, the front being 2 in. in diameter by 8 in. long and the rear $1\frac{1}{4}$ in. in diameter by 5 in. long.

The cross-feed engine may be set to operate at both ends of the reciprocating table stroke or at one end only. It may feed either in or out. The machine may be driven by belt with countershaft or by motor with self-contained drive. It may be arranged for either wet or dry grinding.

Aside from the method of operating the table, the most unique feature is in raising and lowering the wheel head. For rapid adjustment in raising or lowering a considerable distance a large hand-wheel is used. This gives direct action to the elevating screw through a worm and worm gear. The wheel is graduated to 0.00025 in. The

or knurled hand knob in the center of the large hand-wheel provides a back-gear action to the elevating mechanism. The graduated dial ring on the disk in the center of the hand-wheel can be set at zero with relation to the pointer. Both inner and outer wheels turn, but the graduations on the inner wheel read on this pointer with vernier effect. By this means, readings of adjustment may be made in tenths of a thousandth, successive graduation marks being over $\frac{1}{8}$ in. apart.

This size of machine has a table with working surface 10 x 36 in. The automatic table travel is 12 in. transverse and 38 in. longitudinal. Vertical movement of the wheel head is $13\frac{3}{4}$ in., while maximum distance from wheel to table varies from $12\frac{1}{4}$ in. under a 10-in. wheel to $13\frac{3}{4}$ in. under a 7-in. wheel—the minimum size recommended. A motor of 5 hp. is standard. The net weight of the machine with motor, but without accessories or liquid, is 4250 lb.

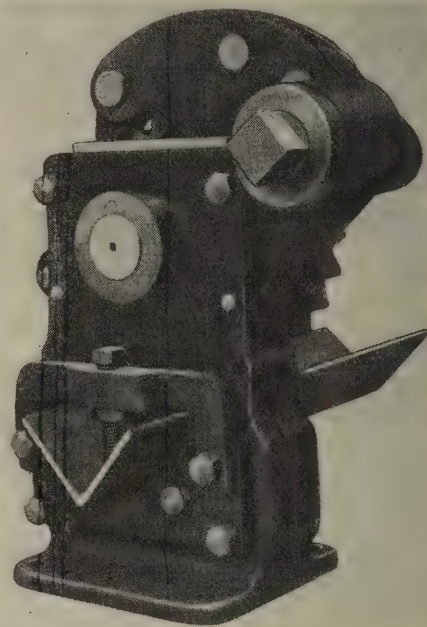
A code for testing water cooling equipment, such as cooling towers and spray installations, has been drafted by the committee on power test codes of the American Society of Mechanical Engineers and will be presented at a public hearing to be held at the headquarters of the society in New York, Dec. 4, at 2 p. m. Copy of the tentative code may be obtained from C. B. Le Page, 29 West Thirty-ninth Street, New York.

Angle Shear is Operated by Hand

HAND-OPERATED and made with a steel-frame, the angle shear here shown is designed to be light in weight. It is built by the Hendley & Whittemore Co., Beloit, Wis. It will shear angles up to $3 \times \frac{1}{4}$ -in. or $2\frac{1}{2} \times \frac{5}{8}$ -in. It is $14\frac{3}{4}$ -in. high, 15-in. wide, $7\frac{1}{2}$ -in. deep and it weighs 93 lb. without the operating lever.

The shear is provided with two eccentrics and it can be operated either directly, with the hand lever applied to the main eccentric, so that light angles are cut off in one stroke; or it can be operated through the compound leverage, so that heavy angles can be cut with minimum effort. The eccentrics are packed in grease. Shear blades and eccentrics are made of hardened tool steel.

When operated through the compound leverage the hand lever is worked up and down without being

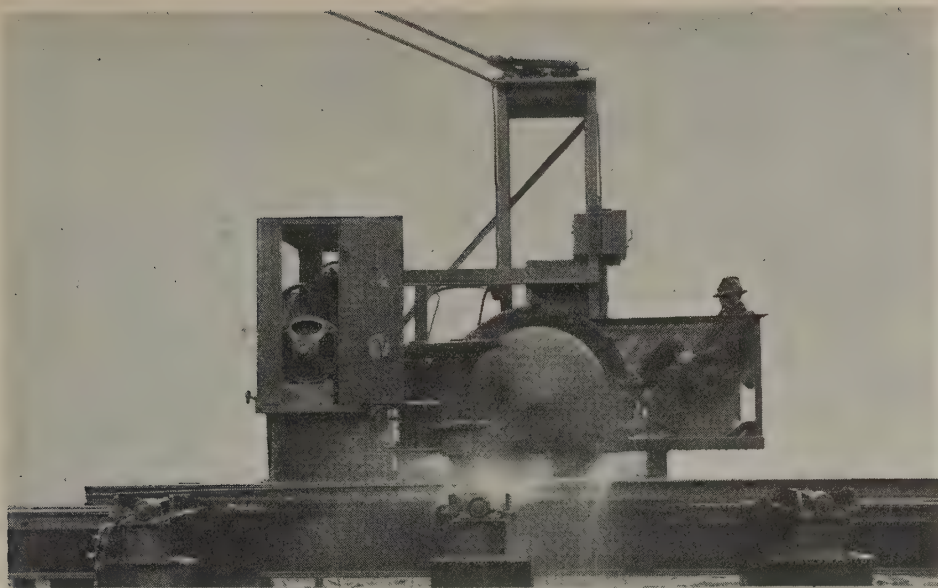


detached or moved from one socket to another. Dogs are provided to take up slack between each stroke and to hold all the cut gained by each stroke.

Paint for Zinc Coatings

A paint for galvanized iron known as "Gun Metal Liquid" is being marketed by Liquid Metal Products, Inc., 231 South La Salle Street, Chicago. It is said to bond instantly with newly galvanized metal, and produce a surface which is corrosion resistant in itself. At the same time it may serve as an undercoat for other paint. It may also be used on metal advertising signs, as paste adheres to it firmly.

A concession for chromium mines at Eski-Shehir and vicinity, Turkey, is being sought by Swedish interests. The ore runs 43 to 50 per cent metal and the bed is crossed by the Anatolian railroad, which is expected to help reduce the cost of mining.



Adapts Friction Saw for Longitudinal Cutting

IN making guard rails the Interborough Rapid Transit Co., New York, employs the special high-speed friction saw illustrated, which is arranged to cut a strip 33 ft. long from a portion of the base of discarded 100-lb. standard rails.

The machine was built by Joseph T. Ryerson & Son, Inc., Chicago. A 56-in. diameter, $\frac{1}{4}$ -in. thick, special steel friction saw blade is used, and cutting is at the rate of $4\frac{1}{2}$ to $6\frac{1}{2}$ ft. per min., depending upon the speed

of the feed motor employed. It is stated that a clean cut is made through the entire length of the rail in 5 to 7 min.

The machine has an arc welded steel frame and runway upon which the saw carriage travels. The carriage, also arc welded, carries the 100-hp. friction-saw motor and blade, as well as the 3-hp. motor and reduction unit for propelling the carriage back and forth on the runway. A 70-gal. pump driven by a $7\frac{1}{2}$ -hp. motor supplies

water at 150 lb. pressure for cooling the blade. As the machine moves back and forth on the runway, the pump picks up water from a trough at the side of the frame. Water from the saw blade is collected by a concrete installation and returned to the trough through a system of baffle plates.

The operating power, direct current varying from 550 to 650 volts, is taken from two overhead poles. Two trolley poles are employed so that the machine itself is not used as a return for the motor current. With this arrangement the motor bearings and other movable parts of the machine are not required to carry the current and the possibility of accident is avoided. The machine itself is grounded but a separate return wire from the motor carries the current back to the overhead trolley.

Rails to be cut are held by means of five individual air clamps which are arranged so that the rails can be pulled down into them from skids without the assistance of overhead crane equipment. Rollers are provided on the skids so that the rail can be moved forward or backward after the cut to remove it from the clamps. The clamps are powerful enough to straighten the rail during the cutting operation. The operator rides along on the carriage, from which he can watch the work conveniently. All controls are located within easy reach from the operating position.

Horizontal Boring, Drilling and Milling Machine

A NEW table type horizontal boring, drilling and milling machine, designated as the No. 50, of increased range and capacity, has been brought out by the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

The bed is of massive box-type construction, the weight of the standard bed being in excess of 15,000 lb. The ways are 13 in. wide, are relieved in the center, and measure 48 in. over the outer edges. The Giddings & Lewis method of bolting, tonguing and doweling the column to the bed unit has been employed on this machine, a large tongue being machined integral with the bed for this purpose. The column is of heavy box section, well ribbed in both directions.

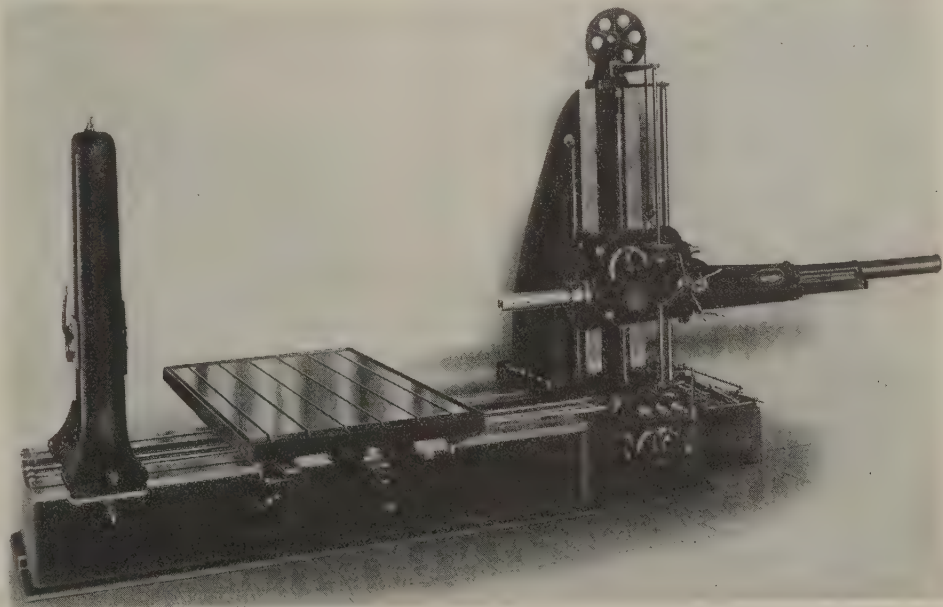
Although considerably heavier, the table and saddle unit is of the same general design as that of the company's No. 45 machine. For making adjustments between the table and the saddle two taper gibs are provided, one at each end. The screw for cross feed of the table is mounted on ball bearings and is arranged with adjustable graduated dials on each end. The Bowen system of lubrication is standard equipment for oiling the ways, gears and bearings of this unit. One stroke of the plunger supplies lubricant to all parts, regardless of the position of the table.

The spindle head is massively built and the main casting is of one piece to

furnish solid support for all moving parts. The head unit has been made compact to permit close observation of small work. This unit is automatically lubricated, a constant flow of oil being furnished to all parts by a positive-driven pump located in the head.

Speeds and feeds are obtained through sliding gears and jaw clutches

contained in separate units mounted on the bed and running in oil. Changes in speed and feed are accomplished through levers easily accessible from the normal operating positions. All gears are of chrome-nickel steel, case hardened, are of wide face and have the teeth rounded to facilitate meshing. Bevel gears in the speed train are of spiral tooth form. The main



Increased Range and Capacity Are Features of the New Machine

shafts of the speed box are mounted in ball bearings. Power is furnished to the machine through two "twin disk" friction clutches, which makes the machine adapted to tapping operations. A gear change quadrant is included in the feed gear train so positive leads can be had for tapping and threading. The machine can also be supplied with the G&L precision measuring device.

Some of the principal specifications are: Longitudinal travel of spindle,

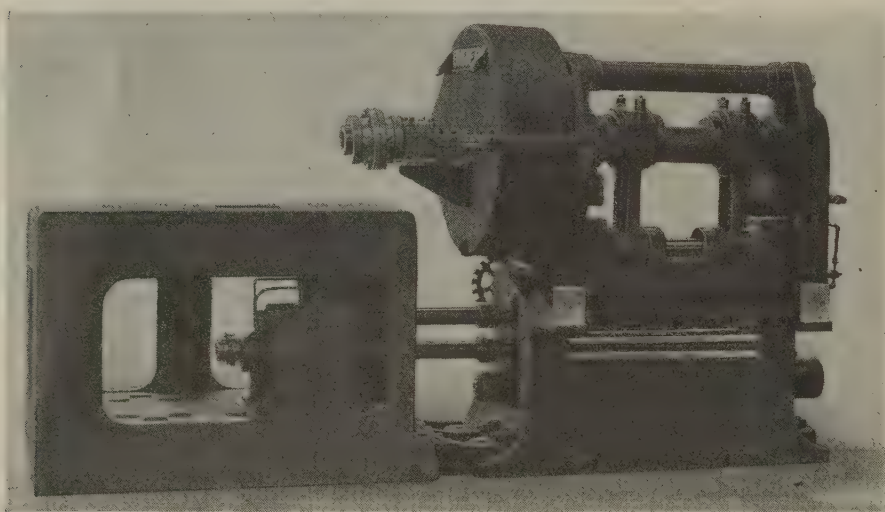
64 in.; vertical adjustment of the head on standard column, 64 in.; working surface of the table, 60 x 96 in.; maximum distance from face of spindle sleeve to end support with standard bed, 120 in.; and cross travel of 60 x 96-in. table, 86 in.

Spindle speeds, in either direction, number 24 and range from 5 to 245 r.p.m. The number of feeds per revolution of spindle is 18. The approximate net weight of machine is 45,500 lb.

Hot Strip Shear Makes 30 Cuts a Minute

A DIRECT-CONNECTED hot strip shear, which exerts a pressure of 250,000 lb. between the knives and is designed to cut a hot steel strip 48 in. wide by $\frac{1}{4}$ in. thick, is a late development of the United Engineering & Foundry Co., Pittsburgh. It has a

at the proper point in the cycle to stop the shear at the end of its return stroke. The top knife block, which is operated through an eccentric shaft and pitmans, has adjustable bronze shoes for taking up the wear in the housing slides. The drive, entirely in-



Each Cut on This Shear Is Made by Starting the Motor, Which Stops After the Cut Has Been Made

stroke of $3\frac{1}{2}$ in. and is geared to run at a speed of 30 cuts a minute. "Direct-connected" means that no clutch is used; the motor is connected by a flexible coupling direct to the drive, each cut being made by starting and stopping the motor.

This is done through an electrical control which, in the case of this shear, is said to work perfectly. The operator presses a push button to start the motor. A limit switch coupled to the eccentric shaft then controls the shear for the remainder of its stroke, throwing out the coils and allowing the friction brake to function

closed, is provided with continuous oiling.

Motor-driven pinch rolls, controlled by a solenoid, are placed on the entering side of the shear. The drive for these pinch rolls, also entirely inclosed and connected with the continuous oiling system, is beneath the main motor base, at the left of illustration. The pinch rolls are connected with the drive by spindles and couplings.

Neither motor is shown, as all electrical equipment for operating the shear is usually supplied by the purchaser.

Adds Small Machine to Line of Bending Rolls

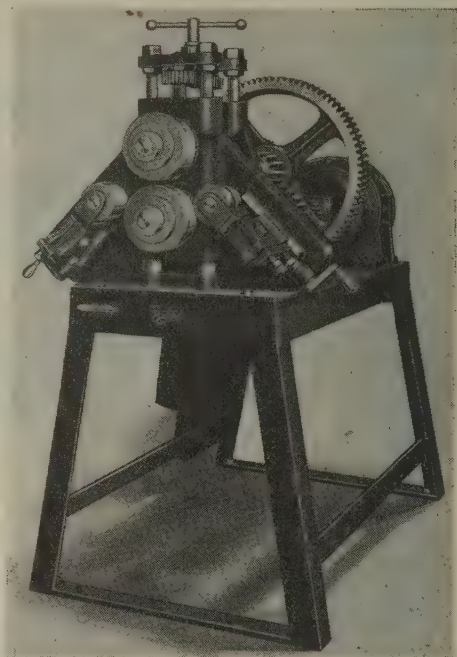
RAPID operation is a feature of a new vertical type bending roll which has been placed on the market by the Buffalo Forge Co., Buffalo. The machine is designated as the No. 0, and is the smallest of a line of similar machines made by the company.

The frame of the machine is a one-piece steel casting and the legs and table are of arc-welded steel construction. The rolls may be adjusted conveniently by means of three hand-

operated cranks, and the arrangement is such that they may be changed in a few seconds. Bronze bushings are employed throughout and lubrication is by means of the Zerk system. A quick-acting clutch facilitates operation. For motor drive a 2-hp. 1200-r.p.m. motor, with switch box and push-button control, is used. The machine can be arranged also for belt drive.

Capacities are as follows: Angles, leg out, $1\frac{1}{4}$ x $\frac{3}{16}$ in., minimum di-

ameter 7 in.; smallest angle, leg out, $\frac{1}{2}$ in. x $\frac{1}{8}$ in., minimum diameter 6 in.; flats, on edge, $1\frac{1}{2}$ x $\frac{3}{8}$ in., minimum diameter 7 in.; flats, on edge, 2 x $\frac{3}{8}$ in. to $2\frac{1}{2}$ x $\frac{1}{2}$ in., minimum diameter 6 in.; rounds, $\frac{7}{8}$ in.; squares,



The Frame Is a Steel Casting and the Legs and Table of Arc Welded Steel

$11/16$ in., minimum diameter 6 in.; copper tubes, No. 12 gage, 1 in.; copper tubes, No. 16 gage, $1\frac{1}{4}$ in.; standard pipe, $\frac{3}{4}$ in., minimum diameter 6 in.

The length of the machine is 3 ft. 10 in. and the width and height are 2 ft. 6 in. The weight is 75 lb.

Portable Grinder with $\frac{1}{2}$ -Hp. Motor

ONE-HALF horse-power portable grinders and buffers, equipped with ball bearing motor and Timken roller bearing grinding spindle, have been added to its line of electrical portable tools by the Hisey-Wolf Machine Co., Cincinnati. They are built for 110 and 220-volt current supplies,



Portable Grinder Carries 6-In Wheel

and for 1-phase or 2-phase currents as well as direct current. The size of wheel taken is 6 x $1\frac{1}{4}$ in., with a $\frac{3}{4}$ -in. hole.

Employment in the metals industry in the Middle West showed an increase, but employment on the whole showed little change for the period of Aug. 15 to Sept. 15, according to a report by the Federal Reserve Bank of Chicago. The metals group showed an increase of 1.9 per cent in the number of workers, whose earnings increased 1.2 per cent.

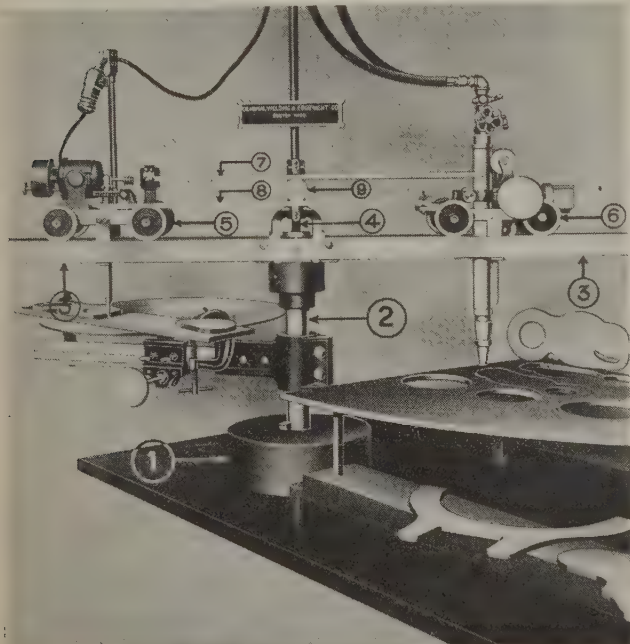
Two New Oxy-Acetylene Shape Cutters

TWO new devices for cutting irregular shapes in steel plate have recently been placed on the market. One is introduced by the Linde Air Products Co., New York, and known as the Oxweld shape-cutter. Speed ranges from 3 to 20 linear in. per min. depending on the thickness of the metal being cut; and it is said that accurate, smooth cuts requiring a minimum of machining can be made in slabs 12 in. thick. In this machine the cutting blowpipe is mounted on a carriage which is moved in any desired direction by means of an electric motor. For routine production it will operate automatically from templets made of strip metal. The driving mechanism is similar to one illustrated to greater scale in *THE IRON AGE*, Aug. 30, page 521. Where only a few parts are to be cut out, a hand tracing device can be attached and used to follow the outline of a full sized sketch or blueprint.

Another device which is designed to minimize lost motion in transmitting the required direction to the cut-

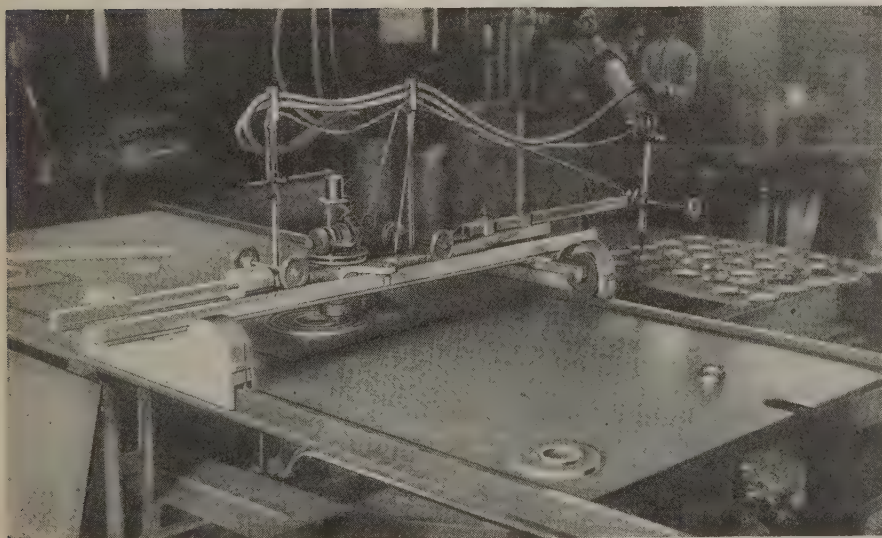
ting blowpipe has been recently developed by General Welding & Equipment Co., Boston. A substantial base 1 and a short column 2 support a well balanced track system 3. By means of a roller and ball bearing system it can easily turn around this column. On this track are mounted two carriages 5 and 6 of equal weight, one carrying in its center the tracing and driving element and the other the cutting torch. The carriage centers are set equidistant from the main center, and two racks 7 and 8 engaging a gearwheel 9 will always keep the carriages equidistant from center when moving in and out.

The combination of the straight movement of the carriages with the turning movement of the track system enables the tracer to follow any path, which in turn compels the tool to reproduce this same movement correctly. By running the long racks over two coupled gearwheels of different diameters, the machine can proportionally enlarge or reduce the pattern to any desired proportion.



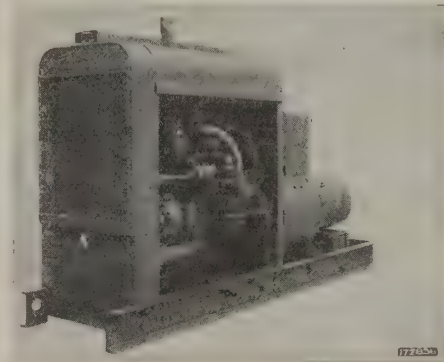
THE General Welding & Equipment Co. Cutting Machine Has a Rack and Pinion Drive

OXWELD Shape Cutter Automatically Drives Oxy-Acetylene Blowpipe Around Any Full Sized Pattern (Below)



Compact Welding Set for Isolated Service

A SELF-CONTAINED gas engine-driven arc welding set, designed particularly for pipe line construction, structural steel work, railroad con-



Welding Set Mounted on Skids, for Field Service

struction and general welding service in isolated places where electric power is not available, is a late Westinghouse development. Its overall dimensions are: length, 73 in.; width, 25 in.; height, 46½ in. The approximate net weight is 1700 lb.

The complete set consists of a model P-20 Continental gas engine, direct-connected with a new type Westinghouse 200-amp. arc welding generator, with direct-connected exciter overhung from the generator bracket. To provide greater compactness, the generator has a special bracket which fits into the engine housing. Protective covers over the generator, commutator and engine head make the complete equipment weather proof without a canopy. The engine and generator, complete with all controls, are mounted on an all-welded channel base. The equipment may be made suitable for either stationary or portable use.

The four-cylinder engine is rated at 24 b.hp. at 1450 r.p.m., the generator speed. A Zenith carburetor with friction-type choke is operated by a positive centrifugal-type governor. The lubricating system is pressure fed by a gear-type pump. A centrifugal water pump and liberal radiator capacity provide efficient cooling.

The generator is a special type S.K., constant current, differentially compound wound machine. It is rated at 200 amp., 1 hr., 50 deg. C. rise, on a resistance load at 25 volts, in accordance with N.E.M.A. standard practice. The field rheostat, ammeter and voltmeter are all mounted in a control cabinet on top of the generator frame. The welding range is from 60 to 300 amp.

For determining the condition of acid pickling tanks, an inexpensive device known as the H. K. chemical test set is being marketed by the Research Mfg. Co. of the Ellwood Ivins' Tube Works, Oak Lane Station, Philadelphia.

Harbison-Walker Make Plant Improvements

During the past year the Harbison-Walker Refractories Co. embarked upon an extensive building program which will require several years for completion. Three plants have been completely remodeled, the clay brick plants at Templeton and Clearfield and the silica brick works at East Chicago, Ind.

The last mentioned is of special significance, in that it has a tunnel kiln of German design that has been successfully used in burning silica brick at Düsseldorf, Germany. It is 550 ft. long, fired with producer gas, and is of the regenerative type. It was designed for a daily output of 30,000 9-in. bricks or the equivalent. A pyrometric system serves to secure accurate control of the temperatures in every part of the kiln. A large proportion of the brick in this plant is made in a machine especially designed for the molding of silica brick.

At the Templeton and Clearfield works there are two 444-ft. Dressler open-fire tunnel kilns at each plant, together with Boyd presses, remodeled grinding, screening and storage units and wet pans with a new type of disintegrators to prepare clay for the presses. The plants have been electrified, with speed reducers for elevators, conveyors and car pullers, and equipped with overhead monorail for handling coal and ashes, automatic stokers for firing coal, and vacuum cleaners for cleaning kiln cars.

To Build New Brass Plant in Cleveland

Chase Brass & Copper Co., Waterbury, Conn., will erect a brass and copper manufacturing plant in Cleveland to supply its mid-Western trade. This company produces brass pipe, sheets, rods, wire tubing and other brass and copper products and distributes these products through a system of warehouses, one of which is located in Cleveland.

Scrap Institute Continues Organizing Chapters

An international organization of scrap iron dealers was urged by Henry Rothschild, senior member of J. Adler, Jr., Inc., large German dealers, at a meeting of the New York chapter of the Institute of Scrap Iron and Steel, at the Hotel Astor, Oct. 30. Mr. Rothschild said that the scrap iron dealer of Germany was the first to resume business relations with the former enemy countries, because of the necessity of providing the basic material for the steel mills. He said that the Institute of Scrap Iron and Steel might be used as the basis of formation of such an international organization.

At a meeting of New Jersey scrap iron and steel dealers in Newark, N.

J., Oct. 29, a fifth chapter of the institute was organized with Michael V. Bonomo, Schiavone & Bonomo Brothers, Jersey City, president, and A. Isaac, Elizabeth, N. J., chairman of the executive committee.

Chase Company to Build Cleveland Mill

The Chase Brass & Copper Co., Waterbury, Conn., has selected Cleveland as the site of a brass and copper plant to serve the Midwestern territory, according to an announcement by F. S. Chase, president. Suitable location has been secured and the first buildings of a brass mill will be erected shortly. The Chase company acquired the U. T. Hungerford Brass & Copper Co. in 1927 and the Ohio Brass & Copper Co. a few months ago. New warehouses have been added from time to time and new Cleveland mill will be located to serve them more promptly with manufactured products.

To Vote Simplification for Welded Chain

A general conference of manufacturers, distributors and users of welded chain will be held at the Department of Commerce, Washington, Nov. 15, under the auspices of the Division of Simplified Practice, Bureau of Standards. Manufacturers representing a large percentage of production have formulated a program calling for a reduction of about one-third in the number of sizes and varieties now catalogued. The conference will be held to act upon the proposals and to adopt a simplified practice recommendation. R. L. Lockwood, of the Division of Simplified Practice, will represent the Department of Commerce.

Railroad Bearing Bronzes Studied by Standards

To simplify specifications for railroad bearing bronzes and to study the properties of those bearing bronzes, an investigation was undertaken at the Bureau of Standards of the wear and mechanical properties of the bronzes at various temperatures. Results show that no one of the selected laboratory tests, consisting of wear, tension, impact and pounding, can be expected to yield information that is adequate for general comparisons.

The bronzes tested fall into certain general classes as regards wearing and mechanical properties, and each group shows superiority for certain types of service. As far as can be judged, existing specifications can be simplified. This simplification, it is urged, should include a reduction in the number of types with more generous limits in some cases in chemical compositions.

Aluminum Cartel Continued for Three Years

The European aluminum cartel, formed in 1926 for a two-year period, has been prolonged for three years, implying endorsement of the organization and its advantages in price-fixing and production allocation, according to a report received by the Department of Commerce from W. T. Daugherty, trade commissioner at Berlin. The production, in metric tons, of member countries in 1927 and 1926 respectively is reported as follows: Germany, 27,400 and 29,600; Switzerland, 21,000 and 22,000; France, 25,000 and 24,000; Norway, 22,000 and 24,400; Great Britain, 7900 and 7300; Italy, 2000 and none.

Canadian Tariff Plea Is Modified

The Algoma Steel Corporation, Sault Ste. Marie, Ont., has amended and somewhat modified its application for tariff protection. It now asks on flat spring steel a preferential tariff of 10 per cent, and for intermediate and general tariffs, 17½ per cent. On structural steel, the duty per ton suggested is \$2 preferential, \$2.75 intermediate and \$3 general tariff; on pig iron, \$1.50 preferential, \$2.50 intermediate and \$2.50 general; on billets, blooms and slabs, the proposed tariff is \$3 preferential, \$4 intermediate and \$5 general. New items proposed for protection are iron in pigs and iron kentledge; the company seeks a \$2 preferential rate and \$3.50 per ton intermediate and general tariff on these.

Canadian Plate Mill to Be Operated

The Dominion Foundries & Steel, Hamilton, Ont., has announced that it will soon start up its large plate mill which was erected in the closing months of the war at a cost of \$1,000,000 but never operated. The mill has been completely renovated, and preparations for production on a large scale are nearly completed. The company plans to make the first delivery of plate on Nov. 15. The mill is one of the latest high-speed type. It is the only universal plate mill in Canada and is designed to roll also sheared plate and carbon or alloy blooms for re-rolling. Canadian users of steel spent \$5,000,000 in the United States for plates in the last fiscal year.

The Fort Pitt Spring & Mfg. Co., McKees Rocks, Pa., has been sold to interests headed by Ralph H. Tate, Pittsburgh, Henry S. Sherman, Cleveland, and C. H. Collins, New York. The name will be changed to Fort Pitt Spring Co. The new owners take over the plant Nov. 1, and William McBride, president, will retire on that date.

Metals Lead in New England Manufacture

Government Survey Shows That Such Lines Overshadowed Textiles in Values Added by Fabrication

INDUSTRIES in which metals are the principal material were of more significance to New England in 1925, as a source of income, than all the textile manufactures. The metals industries, including the various kinds of machinery, iron and steel, transportation equipment, nonferrous metals and jewelry, overshadowed textiles by \$138,353,000 in the value added by manufacture, and made up 31.9 per cent of the New England total. Omitting transportation equipment the difference is reduced to \$58,000,000.

This little recognized fact is pointed out in a survey of the New England marketing area which has just been completed and published by the Department of Commerce under the title of "New England Manufactures in the Nation's Commerce." The survey was initiated by and conducted with the cooperation of the New England Council.

The number of establishments in the metal and related industries is given as 3662, constituting 20.2 per cent of the total of the 18,173 New England establishments listed and exceeding any other line of industries. The cost of materials used by the metals industries was \$676,365,000, or 21 per cent of the total for New England. The value of products was \$1,613,126,000, or 26.2 per cent of the total, while the value added by manufacture was \$936,761,000, compared with \$798,408,000 added by manufacture in the textile industry whose cost of materials was \$1,212,488,000, or 37.6 per cent of the total. The value of textile products, which like the cost of the industry's materials, led all other values, was \$2,010,896,000, or 32.6 per cent of the total. The number of establishments in the textile industries was 2579.

Wage earners in the metals industries totaled 317,025 or 28.2 per cent of the total, while the payroll was \$427,183,000, or 31.9 per cent of the total. Wage earners in the textile industry exceeded those of any other industries, as did their aggregate income. The number was 412,544, or 36.8 per cent of the total, and the payroll amounted to \$435,736,000 or 32.5 per cent of the total.

Values Added by Manufacture in Metals Greater Than in Textiles

The figures on cost of materials disclose a conspicuous contrast between the metal industries and the textile group and bring out strikingly the difference in the expenditures for materials for fabricating the product in these two major groups. The total for metals was only slightly more than half the cost of the materials for the textile industries, yet the metals industries contributed considerably more to the New England in-

come from manufacturing than did the textiles. The value added by manufacture in the metal industries was considerably greater than its cost of materials, the latter representing about 42 per cent of the total product, while the value added in the process of manufacture was 58 per cent. With textiles the condition was reversed, the cost of materials being much greater than the value added by manufacture. Materials comprised about 60 per cent of the total value of the product, while the process of manufacture contributed only 40 per cent.

Director Julius Klein of the Bureau of Foreign and Domestic Commerce said that vigorous and intelligent application of greater precision and more scientific planning in business management will yield better profits for the producer, higher wages for the worker and an improved product for the consumer at a lower cost. Dr. Klein referred to what was termed the

Iron and Steel Meeting at Chicago

A national iron and steel meeting is to be held at the Palmer House, Chicago, Nov. 14 and 15, under the auspices of the Iron and Steel Division of the American Society of Mechanical Engineers, George T. Snyder, chief engineer National Tube Co. at Lorain, Ohio, chairman. The program, which includes visits to several plants of the Chicago district, covers in part the following papers:

"Heat Economy Progress in Steel Mills," by F. H. Willcox, vice-president, and Gordon Fox, electrical engineer, Freyn Engineering Co., Chicago.

"Sheet Rolling," by Leon Cammen, consulting engineer, New York.

"Powdered Coal Cupolas," by D. H. Meloche, executive officer, American Radiator Co., New York.

"Hot Blast Cupola," by F. K. Vial, vice-president and chief engineer, Griffin Wheel Co., Chicago.

"Manufacture of Nickel Steel Plate," by Charles McKnight, development and research department, International Nickel Co., New York.

"Non-Ferrous Bearing Metals," by L. E. Christopher, Buckeye Brass & Mfg. Co., Cleveland.

"Lubrication of Steel Mill Equipment," by L. P. Tyler Vacuum Oil Co., Pittsburgh.

There will be a banquet on Wednesday evening, Nov. 14. The speakers announced at this writing are Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh, who will speak to "Some Observations on European and American Steel Plants," and H. V. Coes, Ford, Bacon & Davis, consulting engineers, New York, whose topic is "Taking Care of Depreciation and Obsolescence." The presiding officers

staggering losses in the nation's business from inefficient distribution, a figure estimated at approximately \$8,000,000,000 annually, representing about 20 per cent of the net value of the total manufacturing production of the United States.

The declared purpose of the New England and other marketing studies being carried on by the department is to develop, for the first time, the vitally important basic facts with which the business community, with the aid of the Government, can eliminate some of this enormous and unnecessary waste.

The income of the people of New England from manufacturing activity in 1925 was approximately 11 per cent of the total national income from this source, the total value contributed by all its manufacturing processes, outside of the cost of materials, having been \$2,936,153,000. This net income is to be distinguished from the gross value of all products of New England manufacture, including the cost of materials, the value of products having been \$6,161,009,000, and comprised 9.8 per cent of the gross value for the entire United States.

for the three technical sessions are: John W. Shepherdson, chief engineer Morgan Construction Co., Worcester; J. Fred Mowat, chief engineer Joliet Works, Illinois Steel Co., Joliet, Ill., and A. J. Boynton, vice-president H. A. Brassert & Co., consulting engineers, Chicago.

To Direct the Institute of Weights and Measures

Nominations as follows have been made to fill eight vacancies on the council of the American Institute of Weights and Measures, 115 Broadway, New York, to serve until December, 1931:

C. R. Burt, vice-president, Pratt & Whitney Co., Hartford.

W. D. Faucette, American Railway Association and chief engineer, Seaboard Air Line Railway Co.

Fred A. Geier, president, Cincinnati Milling Machine Co.

Edwin M. Herr, president, Westinghouse Electric & Mfg. Co. and past president, American Manufacturers Export Association.

W. R. Ingalls, consulting mining engineer and past president, Mining and Metallurgical Society of America.

Henry M. Leland, past president, Society of Automotive Engineers.

Henry D. Sharpe, treasurer, Brown & Sharpe Mfg. Co.

H. Nelson Street, secretary, Retail Dry Goods Association of New York.

Twenty more cities within the past few weeks have announced their intention of establishing municipal airports, according to the Aeronautics Branch of the Department of Commerce.

Mechanical Engineers to Hold Large Meeting

WITH more than 25 technical sessions covering all departments of mechanical engineering, the annual meeting of the American Society of Mechanical Engineers, which will be held at the Engineering Societies Building, New York, Dec. 3-7, will be of wide scope. The program is well balanced, with a wealth of timely material for both the plant executive and the designing engineer.

Machine shop practice will have a prominent place. A session will be devoted to presentation and discussion of a paper on the "Principles of Jig and Fixture Practice," by Prof. J. W. Roe, and there will be a symposium on methods of motor application and control. At the latter, four papers, devoted to motor application and control on lathes, planers, precision grinders and special drilling and tapping machinery, respectively, will be discussed. The third session, on finishes in the machine shop, will have a paper on "Carbide and Tungsten Carbide Tools," by S. L. Hoyt, and another on "Mechanical Application of Chromium Plating," by W. Blum.

"Cooling and Lubrication of Cutting Tools," a report of the subcommittee of the A.S.M.E. special committee on cutting metals, will be one of three papers at a session on lubrication.

The progress report of the materials handling division of the society will be a feature of the first session under the auspices of that division. A second meeting, with six prepared papers, will be devoted to skid handling of interplant shipment.

Two management sessions will be held jointly with the American Management Association. "A Basis for Evaluating Manufacturing Operation," a paper by L. P. Alford and J. E. Hannum, will be a feature of one of these meetings, papers at the other being: "The Executive Function in Industry," by R. T. Kent; "Management Engineering in the Smaller Plant," by J. E. Dykstra; and "Outstanding Economic and Technical Factors Involved in Engineering of New Manufacturing Equipment," by J. R. Shea.

A paper on "Preliminary Findings of a Study of Intensive Types of Technical Education" will be presented by R. H. Spahr at a session devoted to education and training for the industries of non-college type.

Proper illumination will be discussed at a joint meeting of the A.S.M.E. and the Illuminating Engineering Society. Papers include: "Light as a Factor in Production," by C. C. Monroe and H. A. Cook; "Designing Buildings for Daylight," by H. H. Higbie and W. C. Randall; and "Artificial Lighting Provision in Building Design and Process Layout," by Ward Harrison.

An iron and steel session has been arranged by the iron and steel division of the society. In addition to a progress report of the work of the divi-

sion, a paper on "Heavy-Duty Anti-Friction Bearings," by S. G. Koon, will be discussed. "Effect of Alloying Elements Upon the Stability of Steel at Elevated Temperatures," by A. E. White and C. L. Clark, will be a feature of a meeting devoted to industrial power.

Two sessions will be held by the applied mechanics, hydraulic and railroad divisions, respectively. Other meetings will be devoted to mechanical springs, aeronautics, oil and gas power, fuels, central station power, boiler feed water studies, fluid meters, printing industries and wood industries. There will also be a joint meeting with the American Society of Refrigerating Engineers.

The business meeting, followed by open house, will be held on Monday evening, Dec. 3. The presidential reception and dance will be on Tuesday evening and the annual dinner, at the Hotel Astor, on the evening of Dec. 5. College reunions are scheduled for Thursday evening.

Automotive Production Meeting in Detroit

AN unusually full program has been arranged for the production meeting of the Society of Automotive Engineers, which will be held at the Book-Cadillac Hotel, Nov. 22 and 23. Thirteen papers and seven committee reports will be presented at five technical sessions. There will also be two luncheon conferences, devoted to the selection and utilizing of machine tools and maintenance, respectively, and a production dinner meeting of the Detroit section of the S.A.E.

Papers at the first session include: "How the Ford Motor Co. Gets Its Phenomenally Low Production Costs," by John Younger, Ohio State Uni-

versity; "Production from the Accounting Point of View," by L. A. Baron, Stutz Motor Car Corporation of America, and "The Relation of Time Study to Manufacturing," by L. W. Haskell, Dodge Brothers, Inc.

"The Barnes Gear Shaver Process," by H. D. Tanner, Pratt & Whitney Co.; "Integral Contact Gearing," by A. B. Cox; and "Honing Progress," by C. G. Williams, Barnes Drill Co., are among the papers planned for the second session. At the production dinner, to be held on the evening of Nov. 22, addresses will be made by K. T. Keller, vice-president in charge of manufacturing Chrysler Corporation, and E. P. Blanchard, Bullard Machine Tool Co.

Materials handling will be discussed at the opening meeting of the second day, Nov. 23. Papers include: "Assembly Plant Layout for Material Handling," by N. H. Preble, Mechanical Handling Systems, Inc.; "Selection of Conveyor Power Units," by C. E. Broome, Gears & Forgings, Inc.; and "Possibilities and Limitations of Conveyor Chain Curvature," by J. B. Webb, J. B. Webb Co.

"Power Transmission Engineering as Affecting Production and Cost," a paper by W. W. Nichols, D. P. Brown Co., will be presented at the afternoon meeting, Nov. 23. There will also be prepared discussion relating to chain and other types of drive and savings obtained by proper belting. At the final session of the meeting, Paul Geyser, General Motors Truck Co., will speak on the "Development of Production Engineers and Executives."

Subcommittee reports on process and equipment, production expense, time study, production standards, inspection methods, materials handling and production meetings will be presented at the various technical sessions.

Coming Meetings

November

American Management Association. Nov. 12 to 16. Fall meeting, Palmer House, Chicago. W. J. Donald, 20 Vesey Street, New York, managing director.

American Institute of Steel Construction. Nov. 13 to 17. Sixth annual meeting, Biloxi, Miss. Charles F. Abbott, 285 Madison Avenue, New York, executive secretary.

American Society of Mechanical Engineers. Nov. 14 and 15. Iron and steel division, Chicago. Thomas Wilson, 7 South Dearborn Street, Chicago, chairman local section.

International Acetylene Association. Nov. 14 to 16. Annual meeting, Congress Hotel, Chicago. A. Cressy Morrison, 30 East Forty-second Street, New York, secretary.

Open-Hearth Committee, American Institute of Mining and Metallurgical Engineers. Nov. 15 and 16. Pittsburgh.

Second International Conference on Bituminous Coal. Nov. 19 to 24. Carnegie Institute of Technology, Pittsburgh.

Society of Automotive Engineers. Nov. 22 and 23. Production meeting. Book Cadillac Hotel, Detroit. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

December

American Society of Mechanical Engineers. Week of Dec. 3. Annual meeting, 29 West Thirty-ninth Street, New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Week of Dec. 3. Seventh annual meeting, Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, manager.

German Steel Lockout Affects Market

Nearly Quarter-Million Men Out of Work—British Markets Dull—French Advance Prices—Russian Output Gains

(By Cablegram)

LONDON, ENGLAND, Nov. 5.

CLEVELAND pig iron markets are quiet, but as the present limited output is going directly to local steel works, any increase in demand probably would necessitate restarting additional furnaces. Export inquiry is improving and some small sales have been made to Italy and Norway. Hematite is active and stocks are low, but demand as yet is insufficient to raise prices. Foreign ore is quiet.

Finished steel markets generally are dull, especially as regards heavy material for shipbuilding. Clyde output in October represented 13 vessels launched, aggregating 70,000 tons gross register. New orders are in poor volume, hence the winter outlook is unfavorable.

The South Durham Steel & Iron Co., Ltd., Stockton-on-Tees, is amalgamating with the Cargo Fleet Iron Co., Ltd., Middlesbrough, by exchange of shares. The arrangement contemplates purchase of the Cargo Fleet company by the South Durham company, which will increase its capital obligations by issuing 600,000 new £1 shares, for the purpose. The combined assets of the two companies are about £5,000,000.

Tin plate is quiet and some makers are starting to work off immediately the restriction period agreed upon some time ago, shutting down their works for some weeks. Consumers

are buying only limited quantities, but it is believed that a revival of interest may develop, if the strength of the tin market is maintained.

Galvanized sheets are inactive, but prices are firm, on well filled order books. Black sheets, in general, are quiet.

On the Continent of Europe

Continental markets are under the influence of the German labor crisis. Already more than 210,000 men in northwestern Germany are locked out.

In consequence, business generally is suspended and prices are advancing.

French production in September was 821,000 (metric) tons of pig iron and 759,000 tons of steel (ingots and castings). Belgian output was 325,000 tons of pig iron and 322,000 tons of steel. Fifty-six Belgian blast furnaces were active on Sept. 30. Luxemburg output in September was 231,000 tons of pig iron and 209,000 tons of steel. Saar output was 158,000 tons of pig iron and 162,000 tons of steel.

French Advance Semi-Finished Steels

Prices of Billets and Blooms Adjusted to Higher Level of Finished Products—Export Pig Iron Higher

PARIS, FRANCE, Oct. 22.—Domestic business continues quite active and, with the shortage of skilled workmen still acute, the introduction of some foreign labor is contemplated. French metallurgical coke has been advanced 5 fr. (20c.) per ton to 135 fr. (\$5.27), and prices of semi-finished material have been raised 25 fr. (98c.) per ton. The increased cost of raw materials to rolling mills is viewed with some pessimism by certain producers, which believe that too rapid an advance may prevent the revival expected in the business of mills that buy their supplies in the open market.

Pig Iron.—Domestic consumption of phosphoric foundry iron has been

smaller in October than had been expected, so that at the recent meeting of producers it was decided to forego the proposed increase in price of 10 fr. (40c.) per ton, which was to be charged on an additional 6000 tons made available for October delivery. The increase has been applied, however, to iron for delivery in November and December, for which months 38,000 tons each has been set aside for domestic consumers. At the latest meeting of hematite iron makers it was agreed that the price should be increased on all grades by 10 fr. (40c.) per ton, effective Oct. 18. The new quotations are 575 fr. (\$22.43) per ton, f.o.b. Lille, for foundry grade

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17¾s.		\$4.31
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35 to \$5.48
Cleveland No. 1 foundry..	3 8½	to 3 9½	16.64 to 16.89
Cleveland No. 3 foundry..	3 6		16.04
Cleveland No. 4 foundry..	3 5		15.80
Cleveland No. 4 forge... 3 4½			15.68
Cleveland basic (nom.)..	3 5		15.80
East Coast mixed.....	3 10		17.01
East Coast hematite.....	3 10½		17.13
Rails, 60 lb. and up.....	7 15	to 8 5	37.66 to 40.10
Billets	6 5	to 6 10	30.37 to 31.59
Ferromanganese	13 15		66.83
Ferromanganese (export)	14 0		68.04
Sheet and tin plate bars, Welsh	6 0		29.16
Tin plate, base box.....	0 18	to 0 18½	4.37 to 4.40
Black sheets, Japanese specifications	13 7½		65.00
Ship plates	7 12½	to 8 2½	1.63 to 1.74
Boiler plates	9 0	to 10 10	1.92 to 2.25
Tees	8 2½	to 8 12½	1.74 to 1.84
Channels	7 7½	to 7 17½	1.58 to 1.69
Beams	7 2½	to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62 to 1.69
Steel hoops	9 0	to 10 0	1.92 to 2.14
Black sheets, 24 gage...	10 0		2.14
Galv. sheets, 24 gage...	13 10	to 13 15	2.93 to 2.98
Cold rolled steel strip, 20 gage, nom.	16 0		3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium	£3 3s.	to £3 5s.	\$15.31	to \$15.80	
France	3 3	to 3 5	15.31	to 15.80	
Luxemburg	3 3	to 3 5	15.31	to 15.80	
Basic pig iron (a):					
Belgium	3 3		15.31		
France	3 3		15.31		
Luxemburg	3 3		15.31		
Coke	0 18		4.37		
Billets:					
Belgium	5 0		24.30		
France	5 0		24.30		
Merchant bars:					
Belgium	6 5		1.38		
France	6 5		1.38		
Luxemburg	6 5		1.38		
Joists (beams):					
Belgium	5 5		1.16		
France	5 5		1.16		
Luxemburg	5 5		1.16		
Angles:					
Belgium	6 0		1.30		
¼-in. plate:					
Belgium (a).....	6 14		1.48		
Germany (a).....	6 14		1.48		
¾-in. ship plate:					
Belgium	6 9		1.42		
Luxemburg	6 9		1.42		
Sheets, heavy:					
Belgium	6 1		1.33		
Germany	6 1		1.33		

(a) Nominal.

and 530 fr. (\$20.67) per ton, f.o.b. Lille, for forge. The Bordeaux prices of these grades are 610 fr. (\$23.79) for foundry and 590 fr. (\$23) for forge. The entente of French, Belgian and Luxemburg producers, at its recent meeting, agreed to advance export prices on phosphoric foundry iron as follows: F.o.b. Basle, Switzerland, ex-duty, advanced from £3 19s. 3d. (\$19.26) per ton to £4 2s. (\$19.93) per ton; f.o.b. Thionville, for Italy, advanced from £3 0s. 6d. (\$14.70) to £3 2s. 6d. (\$15.18); f.o.b. Antwerp, for all overseas shipment, advanced from £3 5s. 6d. (\$15.92) per ton to £3 8s. (\$16.82) per ton. The price f.o.b. Antwerp for Great Britain is unchanged at £3 5s. 6d. (\$15.92), and the price f.o.b. Dutch frontier is unchanged at £3 7s. (\$16.04) per ton. The entente was renewed for another year.

Semi-Finished Material.—To adjust bloom and billet prices in the domestic market to the higher levels of finished products, an increase of 25 fr. (98c.)

per ton has been made, the first since May 15. The new prices are 560 fr. (\$21.84) per ton for blooms and 590 fr. (\$23) per ton for billets. Sheet bars are unchanged at 600 fr. (\$23.40) per ton. Demand for open-hearth material is heavy despite recent advances in prices of from 120 to 180 fr. (\$4.68 to \$7.02) per ton by most mills. One producer in the northeast is asking an advance of only 100 fr. (\$3.90) per ton on open-hearth grade.

Finished Material.—The sheet market continues quiet and prices are unchanged. Mills, however, are well booked with tonnage, and delays in delivery on medium-gage sheets range from three weeks to three months. Plate prices vary from 780 to 800 fr. per ton (1.38c. to 1.41c. per lb.), depending upon the location of the mill. There is an active demand for hoops, but the capacity is large and deliveries are good. The base price for hoops is 800 fr. per ton (1.41c. per lb.), but some mills are granting rebates for desirable business.

sales has increased from 32 per cent to 50 per cent of all sales, and as export business is at considerably lower than domestic prices, the mills have actually lost money, it is said.

These figures are in dispute. Should the decision of the arbitration court be rejected by either party, the Ministry of Industry has authority under a law of 1923 to declare the decision in force, thereby precluding a strike or a lockout.

German Lockout Affects Four-fifths of the Industry

(By Radiogram)

BERLIN, GERMANY, Nov. 5.

LOCKOUT of iron and steel employees, which began Nov. 1, continues, with 220,000 workers locked out. Works producing 80 per cent of all the German iron and steel output are closed down. The Steelworks Syndicate has refused to book any more domestic or foreign orders.

Stocks in producers' and traders' hands are sufficient to meet domestic demand for a short time, but increased imports are expected from the Saar district and from France. Until the conflict has been terminated Germany must withdraw entirely from the international market, as a result of which western European prices for iron and steel products are reported to be rising.

Exports to Far East Still Small

NEW YORK, Nov. 5.—Export trade in steel products is still limited to orders for small lots and specialties. Chinese merchants are inquiring for small tonnages of plate cuttings and second-hand material, but the recent advance in the scrap market here has resulted in higher prices than they are willing to pay. Recently Chinese buyers have been inquiring for wire shorts and, finding this material difficult to obtain because of lack of interest among mills and exporters, have advanced their offering prices to \$50 per ton, c.i.f. Chinese port. Much of this lack of interest by sellers is said to be the result of continued claims made by the Chinese buyers on shipments of wire shorts and the low prices offered in China.

Japanese buying is being done largely from British and Continental mills. Welsh tin plate mills are reported seeking tonnage for the rest of this year, although they are well filled with orders for delivery in the first quarter of 1929. Recent quotations on tin plate by American mills have ranged from \$5.15 to \$5.20 per base box, c.i.f. Japanese port. Sheet prices are unchanged at \$76 per ton, c.i.f. Japan, which is too high to permit business, as the Japanese domestic market set by the quotations of the Kawasaki Dockyard Co., Kobe, the leading domestic maker, is \$72.50 per ton.

Russia Near Pre-War Steel Output

Pig Iron Production Still Lags—Steel Shortage Foreseen With Large Machinery Building Program

MOSCOW, RUSSIA, Oct. 20.—Production of iron and steel in the Government business year, which ended Sept. 30, was close to the pre-war output in steel and rolled products, but considerably smaller than the production of 1913 in pig iron. Output of pig iron for the year 1927-1928 was 3,282,000 metric tons, compared with 4,207,000 metric tons in 1913. Production represented 96 per cent of the program for the business year just closed. Steel ingot production exceeded the year's program by 4 per cent, reaching 4,143,000 metric tons, compared with a pre-war output of 4,247,000 tons. Production of rolling mill products was 3,286,000 metric tons, compared with 3,509,000 tons in 1913.

The program for pig iron, output in the year 1928-1929 calls for 3,884,000 metric tons, which is 602,000 tons more than this year's production and 323,000 tons less than the pre-war output. Serious shortage of iron, steel and rolled products is predicted in official circles for the new year. While the production program of iron and steel has been increased by about 12 per cent, the output of general machinery is to be increased 24 per cent, agricultural machinery 28 per cent, and shipbuilding 33 per cent. It is expected that the Government railroads will receive only 87 per cent of their requirements. There is a decided shortage in supplies of bar iron, structural material and sheets for roofing.

To remedy this scarcity of iron and steel, the Council of Economy has called for a census of all available iron and steel scrap in the country, and the holders of this material are to be required to make sales to the Ore and Metal Board. It is expected that

about 900,000 tons of scrap will have been delivered to the board by October, 1929.

Of 1,979,000,000 rubles to be invested by the Government in industrial construction and extensions to existing plants, the heavy iron and steel industry is to receive 248,000,000 rubles, compared with 201,000,000 rubles in the past year. The Council of Economy has ordered more rapid construction of the Telbesse Smelting Works in Siberia, which will cost, together with another large plant at Magnitogorsk, about 300,000,000 rubles. The Telbesse works is in a coal region, and local ore will be sufficient for 20 years on the basis of an annual pig iron output of 640,000 tons. Official consideration is being given to the establishment of a bridge building corporation to be known as the Moststroï.

German Wage Dispute Is Before Arbitration Court

BERLIN, GERMANY, Oct. 23.—The wage dispute in the Rhenish-Westphalian steel industry has been brought before an arbitration court. Meanwhile the employees continue to demand a wage increase of 15 pf. an hour, and the mills claim that the average profit from sales has not increased this year, so that no wage advance is justified.

According to the syndicate controlling semi-finished material, railroad and structural steel and reports of the Bar Iron Syndicate, the average return has been 3.17 per cent lower than in October, 1927. Although prices have been advanced, the proportion of direct and indirect export

This Issue in Brief

Business peak will be reached in 1929, forecaster declares. After reaching the peak, business will decline until some time in 1930, depending on how long commercial money rates continue their present upward general trend, Simonds forecasting line indicates.—Page 1153.

* * *

Correct heat treatment of rust-resisting steels is very important, says Dr. Hatfield. Incorrect heat treatment may destroy homogeneity, with consequent setting up of electrolytic corrosion.—Page 1165.

* * *

Proportion of arc welds and acetylene welds has decreased during past 14 years in automobile welded body construction, while spot and flash welds have increased. Reduction in arc welds is due to change in methods.—Page 1154.

* * *

Doubles turnover of plating department by mechanical handling. All material to be plated in cash register plant is conveyed to a central overhead receiving station in charge of one man, who routes it by gravity conveyors to various stations. The same central overhead station receives plated parts and routes them by conveyors to departments performing the next operations.—Page 1152.

* * *

For localized carbonizing and hardening, the most convenient and least expensive method is to copper-plate parts in bulk. Then parts are machined at the places where they are to be hardened. The copper-plating protects the surfaces which are not to be hardened.—Page 1153.

* * *

Aircraft builders will use one million dollars' worth of steel in 1929, according to estimate. Though estimated quantity (4650 tons) is not large, its value is relatively high, as alloy steel is used almost exclusively.—Page 1161.

Do not depend entirely on laboratory tests when using rust-resisting steels, warns British metallurgist. Make frequent shop tests, because in manufacturing processes it is rare that pure substances are used, and small amounts of impurities may make a big difference in corrosion resistance.—Page 1165.

* * *

Barrel-plating superior to still tank-plating, for copper-plating parts to be carbonized and hardened at certain points, cash register manufacturer finds. Attributes this to the dense, compact plate obtained by the burnishing effect of the parts rolling over each other in the barrel.—Page 1153.

* * *

Portable spot welder cuts cost of welding difficult assemblies. Where it was formerly necessary to jig the sub-units with many loose toggle clamps, portable spot welders are now used to fasten the parts into one rigid assembly and the piece is removed for final welding.—Page 1155.

* * *

Speeds up production of special bolts by mounting three dies on header of drop-in die-forging machine. Thus three operations can be done in one heat. Dies are mounted one above the other. Grooves in side of frame in front of header are opposite the dies. Operator pushes heated bar against the header and, as the header goes back for second stroke, he drops his rod to second position and thence to third.—Page 1157.

* * *

Cadmium-plating in cash register plant is wholly automatic. Parts are loaded on metal racks covered with rubber, and carried by plating conveyor through nine operations, returning to the loading station.—Page 1152.

Corrosion resistance of ordinary commercial steel can be much increased, says Dr. Hatfield, by making it free from oxides and gas holes. He suggests that rust is a protective film, and that progressive oxidation may result from puncturing and local destruction of the film through various causes, such as the presence of foreign matter, leading to local electrolytic effects.—Page 1165.

* * *

Spot welding accomplished without surface markings. In automobile body plant, lower welding die is insulated and carries away no current. The current flows out through terminal clamped to inner frame of automobile door.—Page 1155.

* * *

Strength at elevated temperatures, without impaired resistance to scaling, is found in nickel-chromium steels to which tungsten or silicon has been added, says Dr. Hatfield. Ordinary steels lose a substantial proportion of their strength when they attain temperatures in excess of black heat.—Page 1165.

* * *

October daily pig iron production averaged 6.6 per cent over September. Output of 108,832 tons a day during October was highest daily rate since May, 1927.—Page 1182.

* * *

Solves problem of diverting blooms promptly to any of four destinations, without obstructing production stream. Chain transfer table in new Timken tube mill is located at right angles to shear runout table, so that all blooms can be handled, regardless of their ultimate destination. One operator controls not only the transfer table, but also the two runout tables connected with it.—Page 1166.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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A Stock Market Appraisal

ON other occasions this year we have referred optimistically to the boiling stock market and have rejected bearish prophecy, discerning much that was explanatory of the general rise. We must admit, however, that as things keep on we find much that is increasingly difficult to understand, and not a few other observers are now expressing themselves to the same effect.

The last two years have seen an immense writing up of the market value of the aggregate of corporate stocks listed on the New York Stock Exchange, and the same is true of the listings on all other exchanges. Meanwhile neither earnings nor dividend distributions of these corporations have increased commensurately. Broadly, this indicates that investors have become satisfied with a smaller return. After all, if the transportation industry, the steel industry and other great industries yield only 5 per cent on the investments in them, why should any one be allowed to do more? If indeed any one is doing better there will be a rush to participate in it and it, too, will be brought down to the economic level.

Look down the list of the securities of the New York Stock Exchange, however, and it will be rare that anything sound yields as much as 6 per cent, and it is uncommon to find 5 per cent. On the contrary, most figurings will come to 4 per cent, 3 per cent, 2 per cent or nothing at all. This obviously implies the belief that earnings are already in excess of dividends or that they are going to be; in other words, that sooner or later dividends will be increased to a rate of 5 or 6 per cent. This naturally raises the question whether earnings are always what they are supposed to be.

There are some industries in which well managed companies are doing new things wherein the estimates and expectations are well founded, without any doubt. On the other hand are some industries wherein the forecasting and discounting are severely straining the imagination. Investors in them may come out all right eventually; but they may have to wait a long time, and at the end of 10 years they may figure that they would have done better had they lent their money at 5 per cent. Speculative pools, taking advantage of the popular psychology of the day, have boosted some stocks far beyond their value upon any basis of reckoning, even with the exercise of the imagination of a Colonel Sellers.

Plainly, the speculative buyers of a good many stocks, as was the case with buyers of Florida lots, are going to see their high-priced acquisitions shrink, for there is a top for everything. The time is bound to come when there are more sellers than buyers and

many will learn that they have overstayed their market; for the pools that are voluble in their recommendations to purchase are going to be silent in respect to any advice about selling. Our own advice to everybody in this juncture is not to gamble, neither for bull account nor for bear. The speculative investor who buys on the basis of a 5 to 6 per cent dividend yield, already in realization or in early prospect, convinced by good knowledge of industrial conditions and special corporate affairs, is warranted in doing so, but not even such a one should be a borrower of money for the purpose.

Progress in Steel Merchandising

WHEN the calendar year's financial results in steel manufacture come to be counted up a fair amount of progress will be shown in the direction of getting prices commensurate with production costs. It is just a year now since a fresh spirit spread over the steel producing trade in this matter and it is a fitting time to cast up the results.

Shipments of bars, shapes, plates and wire are at substantially better prices than one year ago. Sheets and strips on the whole are not. One might think that this is a chance alinement, but perhaps it is not. The products in the first group are all old and well established. There is only occasional chance for any cost reduction, even a small one. Sheet production is not nearly so old and strips are quite a new commodity. Producers of both seem to have reduced their costs by no negligible amount in a year's time. However, some of the bare returns may be misleading, since there has been a large increase in production, and mills in both lines feel amply justified in seeking higher prices for the first quarter of the new year.

Though it appears from the bare figures of prices that not a great deal has been accomplished this year, it must be considered that for about four years the general trend of steel prices had been downward. Of course it was absolutely essential to arrest that decline, but just the same it was a definite achievement to do so.

On account of a large increase in tonnage there were much better earnings in the first quarter of this year than in the last quarter of the old year and not much significance, as to realized prices, attached to the returns. From the first to the second quarter there was practically no change in the tonnage of steel shipped from mills, and there was a substantial increase in total earnings. That was to be ascribed almost wholly to higher realized prices. These third quarter reports do not show a corresponding increase in earnings. One large independent showed a decrease from second quarter. Another showed a very small gain compared

with that of its second quarter. The need of still more careful merchandising is indicated.

The steel industry has accomplished more than it fully realizes in the direction of holding its prices to a relation with total cost, for with the great increase in mechanization the overhead is a much larger proportion of total cost than formerly. There was a time when the bare out-of-pocket cost was the chief consideration. That conception has been formally abandoned but it would bob up if given a chance, and it is the duty of the seller to keep it entirely out of the conscious or unconscious mind.

The Germ of Future Prosperity

EVERYONE knows the intimate connection between advertising and present-day journalism. The relationship between advertising revenue and the success of a publication is so close that some people find it difficult to realize that the editor's first duty is toward his reading patrons, his "circulation." This fact does not prevent the editor as a publicist from appreciating clearly the value of consistent advertising. Quite the opposite, for of course what the advertiser buys from the publisher is an opportunity to tell his story to a carefully selected audience. That audience the editor must maintain. It is therefore no accident that various preachments have appeared in these pages upholding the proposition that publicity pays, even should the whole steel industry engage in it.

In this connection a very definite problem must be met by a small unit of such an industry, making, let us say, a group of special steels, making them well, and getting a fair proportion of the business. No great amount of money is available for sales promotion. A part is to be used for publicity and advertising—a little, certainly not enough to run a campaign in a popular weekly of general circulation; not much more than enough to get good space in one or two of the trade journals. How best to disburse this modest appropriation is indeed a problem.

Strong arguments will be advanced by the proponents of "direct mail" advertising that here is a clear job for them. The advertiser's output is specialized; the market is limited and fairly well known. "Put your own story to your own customers personally through the mails; do not get lost among a hundred other advertising pages," they may advise. But the fly in the ointment is this: Many other direct-by-mail advertisers are also competing for the attention of the prospective purchaser; so much material comes to each business man or householder that only a fraction of it is read, even opened, before it goes to the waste basket.

Consideration of the mass of direct-by-mail advertising and numerous "house organs" indicates that at least four elements are necessary for success; and the combination is so difficult that it is no wonder there are dozens of failures for every successful effort:

1. Adequate resources of information and illustration.
2. Consistent editorial direction.
3. Outstanding quality in the printed matter.
4. An excellent mailing list.

Even though men and materials for the first three may be available (and they are not cheap), lack of the last essential will be their undoing.

Of course, a mailing list can start with the present

and past customers of the firm. But if the ledger is the sole source of names, the advertiser is hedged in a small and diminishing area. Old customers drift away, consolidate, go out of business. Where can they be replaced?

Here, it seems, is the first aid the technical press can give to even the closest adherent of direct-by-mail advertising. How else but by advertising in the trade press can such a manufacturer of basic supplies or equipment as we are visualizing get his story so cheaply or so effectively before the new men who are continually entering the field? How better can he impress these newcomers with the progressiveness, the responsibility and the reliability of his firm than by consistent and attractive advertising? Originally, as prospective customers, their purchasing power is doubtless small; nevertheless the little fellows of today are the big boys of tomorrow. If a vendor can establish cordial relations with a small business, he has the inside track to the real sales later on. Even though a specialty of specialties is being handled, and interest maintained adequately by direct mail, the trade press is and always will be necessary to reach the great outside unknown market which holds the germ of future prosperity.

Making Competition Fair

WHEN the Sherman law was passed it was the common idea that the head and front of possible offending by business was such restraint of trade as resulted in extortionate prices. Latterly much more emphasis is put on forms of unfair competition that demoralize relations between competitors and thus cripple industry and trade. No tendency is so marked in business today as the giving way of individualism to group action. The cooperative spirit is taking hold of business men and is making them willing to subordinate individual advantage to the interest of the group. As it is put by Charles F. Abbott elsewhere in this issue, he who resorts to unfair competitive methods "scuttles the ship in which he himself is afloat."

The latter-day movement to regulate competition does not aim to fix prices but rather to get rid of unethical practices. Some of these latter are listed by Mr. Abbott. It is felt that, when the views of a given industrial group on practices that should be banned are crystallized in a code, competition can be lifted to a higher plane. Professional ethics have long been a powerful influence in medicine, though obviously unenforceable by law.

Competitive attacks are commonly defended on the ground of retaliation. Yet reprisals are often based on nothing more than distrust. Cooperation in adopting a selling code, it is argued, would do much to promote mutual confidence and dispel suspicion.

The Federal Trade Commission has cooperated with various industries in formulating codes of practice and has branded violations as "unfair methods of competition," presumably punishable by law. That the Trade Commission can do much in encouraging the adoption of codes is conceded, but it is an open question—still undecided by the courts—whether enforcement by law is possible or advisable. Unfair competition can manifest itself in such devious ways as to make its ferreting out in all the labyrinths of modern trade a stupendous

task. The most effective remedy lies in cultivating a spirit of self-respect and of loyalty in industrial and commercial groups rather than inviting further invasion of business by the Government.

Studying for Leisure

BOUT a fortnight ago two thousand admirers gathered to do honor to nine "Pioneers of American Industry." While some of the nine might be more properly thought of as organizers and executives than as "pioneers," no one would begrudge the wealth and honors heaped upon them for great achievements. This is the roll:

Cyrus H. K. Curtis, publishing.
Glenn H. Curtiss, aircraft.
George Eastman, photography.
Thomas A. Edison, invention.
Harvey S. Firestone, rubber.

Henry Ford, automobiles.
Julius Rosenwald, merchandising.
Charles M. Schwab, iron and steel.
Orville Wright, aviation.

One point is worth mentioning: Not a single one of them had a university education. Mr. Schwab wittily referred to this fact and sounded a warning. "Many graduates come from college with an education that exceeds their intelligence," he said.

Dr. Nicholas M. Butler, president of Columbia University, rejoined with the remark that such men as the honor guests were giving the human race so many mechanical aids that the problem of the near future would be to teach men and women how to use their leisure time to best advantage, rather than to prepare them for an "occupation." In other words, the swing of the pendulum brings us back to the earlier ideal of going to college to become a cultured citizen, rather than to learn a profession.



Selling Code Is Prime Need

Industries Must Set Up Standards to Check Unfair Competition—Remedy for Short-Sighted Selling Lies in Cooperation, Not Laws

BY CHARLES F. ABBOTT*

"The individual who refuses to cooperate with his competitors scuttles the ship in which he himself is afloat."—Charles F. Abbott.

WE are now face to face with the problem of distribution, of scientific marketing and selling. Most men will agree that, even with business activity at a high pitch, prices have been unsatisfactory, profits have been disappointing and competition has been more difficult to meet.

Short-sighted selfishness is the root of most selling troubles. Until it gives way to a spirit of justice and fairness and a sense of duty to one's industry, we cannot expect real relief. It is only through sincere cooperation and fair play that a way can be found to dissipate unenlightened competitive practices.

No cure for this malady can be obtained through any legal process; the only hope rests in spreading the spirit of fair dealing and industry-consciousness. To this end the best available plan is the setting up of ethical standards and then striving for their general adoption.

Moses gave the world the Ten Commandments, the first of all ethical codes. Murders are still being committed, but crime has been sharply reduced throughout civilized countries and most of the people everywhere are at least trying to live up to the code of living set forth in the decalogue.

Only Unskilled Amateurs Break the Rules to Win

In business many of our unfair practices are blamed on the buyer. But we must not forget that most of the unfair tactics used by the buyer were taught him by the over-anxious seller, who is now being confounded by tricks of his own creation.

Who can deny that it is unfair for a seller to submit a second and lower price when the order rightfully belongs

to a competitor? Or that it is improper for a manufacturer to solicit business from jobbers and then go directly to the jobbers' customers with prices as low or lower than those established for the jobbing trade?

The acceptance of a standard selling code is essential. Eventually this need will be recognized. Little men think themselves wise when they take an hour to figure out how they can beat out a competitor. Big men are continuously searching for ideas that will build up their business. Herbert Casson once stated that in business as in golf it is only the unskilled amateurs who have to break the rules to win; and in both golf and business they are soon found out.

Making Each Sale Stand on Its Own Bottom

In the past sales executives have devoted too much attention to volume instead of profits. Hard pressed to obtain business and keep it away from competitors, they have been driven into a state of volume-mindedness. Today, this attitude is being changed by the campaign to increase net profits now being pushed by far-sighted commercial executives.

Sales totals are being "broken down" to determine selling costs. By finding the percentage of selling expenses to the sales of each sales representative attention is being focused on the net profit from each sale. Sales organizations are becoming "profit conscious," and this calls for a radical change in personnel and policies. The day of the volume seeker is passing.

Production Must Be in Keeping with Demand

Industry must understand and accept the theory of stabilized production. It must recognize the folly of attempting 100 per cent output with a 50 per cent demand. It must recognize the spirit of live and let live and avoid prac-

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tices that invite reprisals and lead to price demoralization. It must add a profit to total cost in fixing selling prices. It must learn that a million times nothing is still nothing. Failure to adhere to a one-price policy invites price wars. The one-price policy is a basic fundamental of sound salesmanship. Without it, a selling program is at the mercy of the buyers.

Fair dealing calls for a price structure that is in keeping with a reasonable profit. If concessions are to be made, they should be based on cost reduction instead of cutting into the margin of profit.

Refusal to Cooperate Injures Entire Industry

The obvious advantages of doing business on a stable and equitable price basis accounts for the growing interest in a standard selling code. Such a code is still regarded as visionary by some, but certainly nothing is to be lost in cultivating the sense of fair play innate in every man and encouraging habits of cooperation. Few factors do more to retard the natural progress of a business or a movement than the lack of intelligent cooperation.

The individual who refuses to cooperate with his competitors, and who insists upon ruthless price cutting as a means of obtaining business, is worse than a criminal. He is a fool. He not only pulls down the standing of his company; he not only pulls down his competitors; he pulls down himself and his whole trade. He scuttles the ship in which he himself is afloat.

Codes of Selling Practice Now in Effect

Practical codes of selling practice have been prepared and adopted by many organizations with splendid results. Among those that have done so are the Better Business Bureau, the International Advertising Association, the National Association of Purchasing Agents, the American Society of Civil Engineers, the American Institute of Architects, the Chamber of Commerce of the United States and the National Association of Credit Men. Industries that are profiting by the use of codes of practice include the Associated General Contractors, the American Face Brick Association, the Electric Power Club, the National Slate Association, the American Electric Railway Association, the National American Wholesale Lumber Association, the Motion Picture Theater Owners of America and the National Retail Hardware Association.

There is a distinction between so-called codes of standard practice and those that deal exclusively with ethics. Some five years ago the American Institute of Steel Construction prepared and adopted a Code of Standard Practice. This code includes rules that control all contractual relations between the buyer and the seller. Written in a positive form, it clearly specifies just what each party may expect. Its use has eliminated the misunderstandings and controversies that previously existed. Many economies have followed its general acceptance and the public has benefited to a large extent.

Selling Practices That Are Harmful

Codes of selling practice deal with the ethics involved in sales relations between manufacturers, jobbers, retailers and consumers and between each other within these groups.

The jobbing industry extends an invaluable service to the public in being able to supply small orders promptly. Its overhead expenses and other items, added to the cost of its stock plus a reasonable profit, go to make up its sales prices. Unless the manufacturers are willing to recognize the value of this service, and refrain from quoting prices directly to the customer that fail to include the distributor's charges, then the warehouse industry cannot possibly continue. Its elimination would inflict a handicap upon the public in taking away a service that no producer is equipped to extend.

There are manufacturers who produce raw materials

that are sold to industries for fabrication into various products and resold by them to jobbers, retailers or consumers. If the original producer were to set up a fabricating plant of its own, supply the raw material at production costs and operate the plant as a means of increasing the output of the producing unit without regard to profits in the rehandling, and sell the output directly to jobbers, retailers or consumers at prices lower than the fabricating industry could possibly quote, then such a policy would naturally be held unfair and unethical. Dissatisfaction would follow, and conditions would force the intermediate industry to seek another source of supply.

An unethical practice that should be universally condemned is for a buyer to lead the seller to believe that his prices are high when he is actually the low bidder. It never pays to jeopardize an important source of supply and, unless all transactions can be concluded on a basis of reasonable profit, then substitutions follow with serious impairment in quality and service.

Commercial bribery is another unethical practice which dissipates sound salesmanship and stamps all parties addicted to it as irresponsible and dishonest.

Failure to apply a fixed price policy is an unethical practice. To submit a price as a "practice shot" with five or six lower ones held in reserve is an unfair policy. The buyer suffers from the lack of stabilized prices, while the seller loses if he makes successive price cuts when his first quotation may have been the lowest. A salesman without courage is like a ship without a rudder. He is continually being blown about in different directions by the winds of fear, doubt and uncertainty.

A manufacturer who depends on the jobber as his logical distributor engages in an unethical practice whenever he sells the financially irresponsible or those without equipment or recognition in the industry, and at prices as low or lower than those scheduled for the jobber.

The following subjects could well be covered in a code of selling practice:

1. A one-price policy.
2. Commercial bribery.
3. Attitude toward competitors.
4. Misrepresentation.
5. Secret rebates.
6. Unfairness of selling at or below cost.
7. Preferential allowances.
8. Price discrimination.
9. Arbitration.
10. An agreement to uphold the standards as established by the industry and avoid substitution or impairment of quality or workmanship.

How Federal Commission Can Aid in Enforcing Codes

The Federal Trade Commission is now prepared to supervise trade practice conferences whenever its assistance is solicited by a representative majority of the group interested. Forty of these conferences have already taken place and about 30 applications are pending.

The commission holds that a clandestine violation of a trade practice conference rule by one who has openly subscribed to that rule is an unfair method of competition within the meaning of the Federal Trade Act.

Industry is awakening to a realization that its competitive methods must be adjusted upon a basis that will permit fair profits. Failure to do so may invite Government regulation to protect the public, which eventually suffers when business exists on an unprofitable basis. Rancor, hatred and jealousy must give way to just relationships based upon codes of ethical practice.

Business men on the average are growing better. They are becoming more intelligent and better educated. This makes for legitimate advancement and prosperity. The secret of better business is to climb up from retaliation to reciprocity. Codes of selling practice will speed up that evolution.

October Iron Output Very Large

Daily Rate Gained 6755 Tons or 6.6 Per Cent Over September—

Largest October Since 1918—No Gain or Loss in Furnaces

ACTUAL data covering pig iron production for October correspond quite closely with the estimates published in THE IRON AGE, Nov. 1, and collected by wire on Oct. 30. The October daily rate was 108,832 gross tons per day; the estimated figure as published was 108,800 tons.

Total October coke pig iron output was 3,373,806 tons or 108,832 tons per day for the 31 days as against 3,062,314 tons or 102,077 tons per day for the 30 days in September. This is an increase for October of 6755 tons per day or 6.6 per cent. In September the increase was 0.88 per cent with the August increase 2.1 per cent. The October daily rate last year was 89,810 tons. The daily rate

last month was the largest in 17 months or since May, 1927, when it was 109,385 tons per day. The October rate this year is also the largest for that month since 1918; in fact there have been but two October daily rates exceeding that of this year—in 1918 and in 1916.

Operating Rate Active on Nov. 1

On Nov. 1 there were 197 furnaces active, having an estimated operating rate of 108,800 tons per day. This compares with 106,755 tons per day as the operating rate for the 197 furnaces active on Oct. 1, eleven furnaces having been blown in and 11 shut down during October. The higher operating rate for the same

number of furnaces is explained by the greater effort to increase output, usual in October.

Of the 11 furnaces blown in during October five were Steel Corporation stacks and six belonged to independent steel companies. There were four Steel Corporation furnaces and four independent steel company stacks shut down besides three merchant furnaces. Thus there was a net gain of three steel-making furnaces and a net loss of three merchant furnaces.

Steel and Merchant Iron

Steel-making iron last month was made at the rate of 88,051 tons per day, a gain of 5461 tons over the

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,978	95,199	99,091
Aug.	60,375	87,241	103,241	95,073	101,180
Sept.	68,442	90,873	104,543	92,498	102,077
Oct.	79,907	97,528	107,553	89,810	108,832
Nov.	83,656	100,767	107,890	88,279	.....
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107,043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	October (31 days)	September (30 days)	August (31 days)	July (31 days)
New York and Mass....	213,614	183,557	188,399	192,126
Lehigh Valley	96,912	78,272	72,648	64,921
Schuylkill Valley.....	53,864	51,116	52,231	53,855
Lower Susq. and Lebanon Valleys.....	31,084	30,680	33,153	30,079
Pittsburgh district....	741,363	622,023	628,471	586,923
Shenango Valley.....	101,787	86,136	86,691	88,366
Western Pennsylvania...	146,988	138,021	138,253	120,389
Maryland, Va. and Ky..	111,543	113,108	112,555	111,741
Wheeling district.....	141,727	149,813	157,507	154,636
Mahoning Valley.....	347,118	309,512	307,547	287,688
Central and North'n Ohio	332,966	328,382	376,706	379,277
Southern Ohio.....	46,074	45,363	46,367	44,339
Illinois and Indiana....	655,022	609,891	625,452	636,961
Mich., Minn., Mo., Wis., Colo. and Utah.....	125,979	112,030	113,737	122,875
Alabama	222,142	197,367	188,896	189,383
Tennessee	6,123	7,043	7,957	8,265
Total	3,373,806	3,062,314	3,136,570	3,071,824

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
October, 1927	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,860
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931
June	81,630	21,103	102,733
July	79,513	19,578	99,091
August	82,642	18,538	101,180
September	82,590	19,487	102,077
October	88,051	20,781	108,832

*Includes pig iron made for the market by steel companies.

Operating Rate of Coke Furnaces in Blast

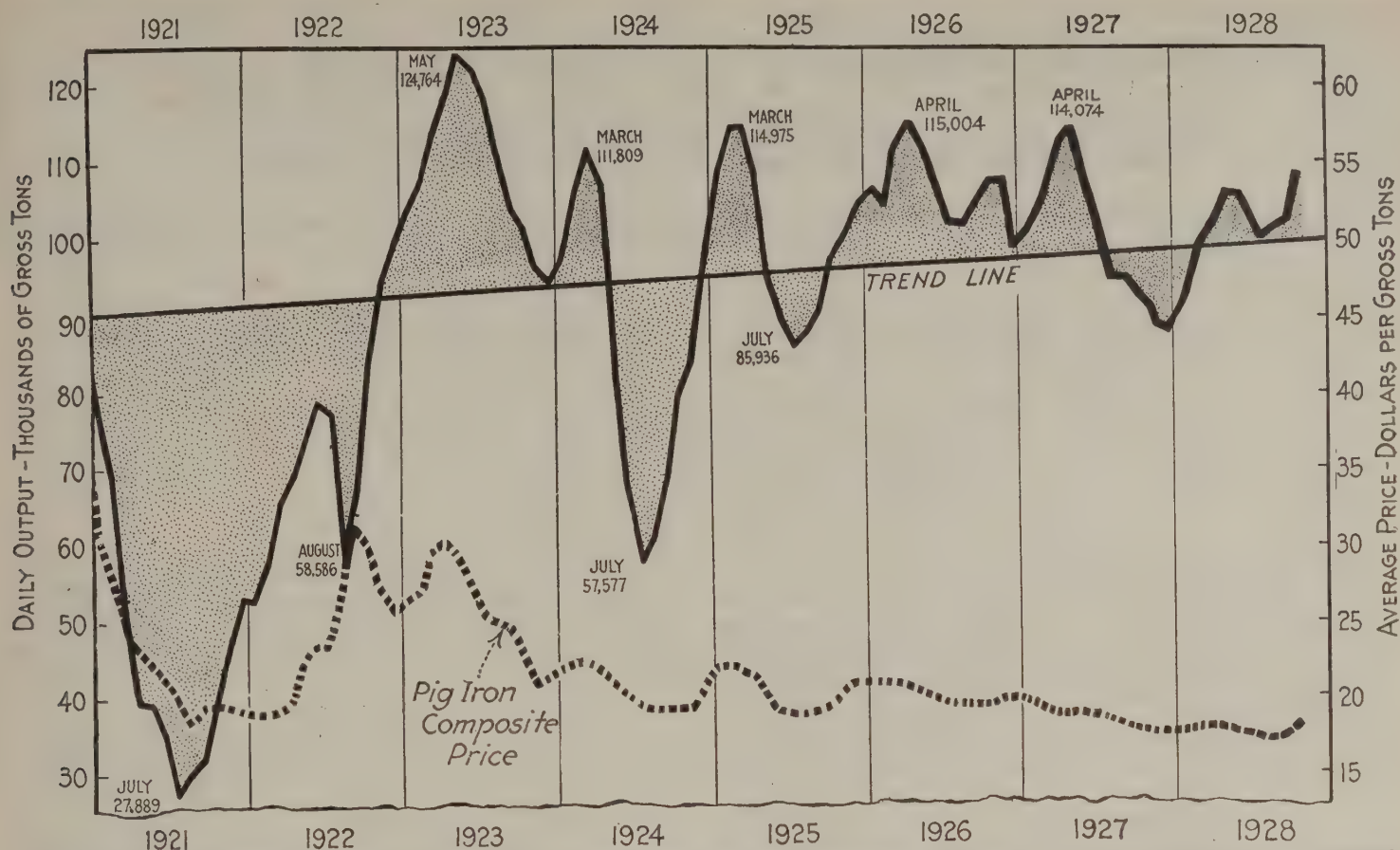
	Nov. 1		Oct. 1	
	Number in Blast	Gross Tons per Day	Number in Blast	Gross Tons per Day
New York:				
Buffalo	12	5,900	11	5,640
Other N. Y. and Mass....	2	940	2	880
New Jersey.....	0	.....	0	.....
Pennsylvania:				
Lehigh Valley.....	7	3,120*	6	2,600*
Schuylkill Valley.....	4	1,710	5	2,000
Susquehanna Valley.....	2	920	2	940
Ferromanganese	0	.....	0	.....
Lebanon Valley.....	0	.....	0	.....
Ferromanganese	1	80	1	80
Pittsburgh District.....	39	24,600	35	22,100
Ferromanganese	2	320	2	320
Shenango Valley.....	6	3,270	6	3,300
Western Pennsylvania...	9	4,340	9	4,400
Ferromanganese	1	210	1	180
Maryland	5	2,740	5	2,770
Wheeling District.....	7	4,570	8	4,990
Ohio:				
Mahoning Valley.....	18	10,750	18	10,400
Central and Northern....	18	10,740	18	10,945
Southern	3	1,370	4	1,540
Illinois and Indiana.....	29	20,760	30	20,960
Mich., Wis. and Minn....	6	2,700	5	2,200
Colo., Mo. and Utah.....	4	1,650	4	1,600
The South:				
Virginia	0	.....	1	145
Ferromanganese	1	90	0	.....
Kentucky	2	760	2	760
Alabama	17	7,000	19	7,700
Ferromanganese	1	70	1	70
Tennessee	1	190	2	235
Total	197	108,800	197	106,755

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	3,082,000
½ year	19,848,461	19,430,678	18,520,921
July	3,223,338	2,951,160	3,071,824
Aug.	3,200,479	2,947,276	3,136,570
Sept.	3,136,293	2,774,949	3,062,314
Oct.	3,334,132	2,784,112	3,373,806
Nov.	3,236,707	2,648,376	.....
Dec.	3,091,060	2,695,755	.....
Year*	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in October Was 6.6 Per Cent More Than in September; Composite Prices Substantially Unchanged
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

82,590 tons per day in September. The daily rate for merchant iron also increased to 20,781 tons as against 19,487 tons—a gain of 1294 tons per day for October.

Furnaces Blown In and Out

During October the following furnaces were blown in: One Lackawanna stack of the Bethlehem Steel Co. in the Buffalo district; one Bethlehem stack of the Bethlehem Steel Co. in the Lehigh Valley; one Swede furnace of the Alan Wood Iron & Steel Co. in the Schuylkill Valley; one Eliza furnace of the Jones & Laughlin Steel Corporation and two Edgar Thomson, one Duquesne and one Carrie furnace of the Carnegie

Steel Co. in the Pittsburgh district; one Cambria stack of the Bethlehem Steel Co. in western Pennsylvania; one South Chicago furnace of the Illinois Steel Co. in the Chicago district, and one furnace of the Ford Motor Co. in Michigan.

The following furnaces were blown out or banked last month: One Swede furnace of the Alan Wood Iron & Steel Co. and the Keystone furnace of the Reading Iron Co. in the Schuylkill Valley; one Clairton stack of the Carnegie Steel Co. in the Pittsburgh district; one Cambria stack of the Bethlehem Steel Co. in western Pennsylvania; the Martins Ferry furnace of the Wheeling Steel Corporation in the Wheeling district; the furnace of

the Jackson Iron & Steel Co. in southern Ohio; one South Chicago stack of the Illinois Steel Co. and one Madeline furnace of the Inland Steel Co. in the Chicago district; one Bessemer and one Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama, and the Rockdale furnace of the Tennessee Products Corporation in Tennessee.

Possibly Active Stacks Reduced

The two Warwick furnaces of the Warwick Iron & Steel Co., Pottstown, Pa., have been sold and will be dismantled. This reduces the number of possibly active stacks in the United States from 339 to 337.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1926	1927	1928	1926	1927	1928
Jan.	2,599,876	2,343,881	2,155,133	29,129	31,844	22,298
Feb.	2,272,150	2,256,651	2,274,880	22,309	24,560	19,320
Mar.	2,661,092	2,675,417	2,588,158	24,064	27,834	27,912
Apr.	2,677,094	2,637,919	2,555,500	24,134	24,735	18,405
May	2,687,138	2,619,078	2,652,872	23,159	23,734	29,940
June	2,465,583	2,343,409	2,448,905	25,378	29,232	32,088
½ year.	15,362,933	14,876,355	14,675,448	148,173	166,939	149,963
July	2,461,161	2,163,101	2,464,896	26,877	26,394	32,909
Aug.	2,424,687	2,213,815	2,561,904	23,557	21,279	24,583
Sept.	2,436,733	2,090,200	2,477,695	25,218	20,675	22,278
Oct.	2,578,830	2,076,722	2,729,589	28,473	17,710	23,939
Nov.	2,484,620	1,938,043	.....	31,903	17,351	.....
Dec.	2,322,180	1,987,652	.....	31,627	20,992	.....
Year	30,071,144	27,345,888	.....	315,828	291,840	.....

*Includes output of merchant furnaces.

Slight Reduction in Power Output

Production of electric power by public utility power plants in the United States in September is reported by the Geological Survey at 7270 millions of kwhr. This is a reduction of more than 3 per cent from the August total of 7505, but is nearly 2 per cent ahead of the July total of 7143. Less of the September power was produced by hydraulic plants, the reported amount being 2785, which is about 38 per cent of total power production. This compares with 3044 in August, about 40½ per cent; and with 3075 in July, about 43 per cent.

Iron and Steel Markets

Pig Iron Prices Still Rising

Fresh Advances at Chicago, Cleveland and St. Louis—

Rail Orders Total Nearly 300,000 Tons—

Scrap Down Again at Pittsburgh

WITH prices still swinging upward, the pig iron market shows vitality suggestive of boom conditions. The finished steel market is also strong, with an advance of \$2 to \$3 a ton on sheets an early probability, but mill backlogs continue to taper, following exceptionally heavy shipments in the past month.

Unfilled tonnage, however, has been reduced so little that production is not materially affected, and fresh demands springing up from the railroads and other sources are of promising size.

The one index that seems to point to a less active market situation is scrap. Heavy melting steel at Pittsburgh has declined 25c. a ton for the second time in two weeks, and at Philadelphia it has dropped 50c. a ton.

With the large shipments of finished steel in October, it will be surprising if ingot statistics for that month do not show an output at least equal to the tonnage for March, the previous high month of the year. November steel production points to a gradual recession, activity now ranging from 85 to 90 per cent. The average for Steel Corporation plants has declined to 85 per cent, partly because of the shutting down of the Gary rail mills, bringing the rate of the Chicago subsidiary down to 75 per cent.

That the setback in the Chicago district is only temporary is indicated by sales of the week, which were the highest so far this year and with one exception the largest in three years. Orders for 185,000 tons of rails formed an important part of the total. Rail bookings for the country exceeded 290,000 tons, of which the New York Central accounted for 191,550 tons—70 per cent for immediate specification and the remainder on option. Other orders included 48,000 tons placed by the St. Paul and 5000 tons purchased by the Monon.

Pending railroad equipment business, swelled by a Wabash inquiry for 2000 box cars, now calls for a total of nearly 10,000 cars, requiring 140,000 tons of steel. The Santa Fe is expected to enter the market for 6000 cars and the Illinois Central for 2500.

Demand for steel from the automobile industry has declined from its recent peak, but heavy buying is expected to set in again by Dec. 1. Meanwhile, Ford output has increased to 6000 cars a day, and the Chevrolet company has released steel specifications for 125,000 cars of its new model, on which production will start shortly.

Line pipe business, which has been an important tonnage item this year, promises to make further heavy drafts on the mills. Figures are being taken on a gas line from Louisiana to St. Louis, calling for 115,000

tons, and another from Louisiana to Birmingham, requiring 40,000 tons. Gas lines in prospect, but not definitely before the trade, include one for the Texas Corporation from Tulsa, Okla., to Lockport, Ill., involving 60,000 tons, and a 350-mile line for the Western Natural Gas Co. from Wyoming to Salt Lake City.

Shipbuilding continues to react to the stimulus of the Merchant Marine act. Bids have been opened in New York on four freight vessels, calling for 13,000 tons of steel, mainly plates.

Pig iron prices have advanced 50c. a ton at Chicago for the second time in two weeks, and equal increases have been registered at Cleveland and St. Louis. Prices for foundry and malleable pig iron at Cleveland are now \$2 to \$2.50 a ton higher than in midsummer.

Sales at Cleveland totaled 69,000 tons and at St. Louis, 45,000 tons, in large part for first quarter delivery. At Chicago, pig iron shipments in October were heavier than for any previous month in 1928, and shipments for the year are expected to set a new record.

Despite the pressing demand for pig iron, complete blast furnace returns for October show a loss of three active merchant stacks during the month. This was canceled by a net gain of three steel works furnaces, the total number of active stacks Nov. 1, at 197, being exactly the same as on Oct. 1. The average operating rate, however, increased from 106,755 tons on Oct. 1 to 108,800 tons a day on Nov. 1.

The tin plate price for 1929 will probably be announced between Nov. 15 and Nov. 20. If an advance is made it is not expected to exceed \$2 a ton.

The new base prices on hot-rolled strip, recently announced, do not govern cooperage stock, as was first supposed. The base on this product, as quoted by some makers, is 2.10c. per lb., Pittsburgh, or \$2 a ton above the base on narrow strips.

Cold-rolled strips are now definitely established at 2.85c. a lb., Pittsburgh or Cleveland, or \$2 a ton above the recent minimum price. Consumers covered liberally before the advance.

Several manufacturers of wire nails have adopted a plan under which jobbers will be given a differential of 10c. per 100 lb. under prices charged other classes of carload buyers.

The locking out of 220,000 steel workers in Germany on Nov. 1 has closed plants representing 80 per cent of the iron and steel capacity of that country.

Making the eighth advance in 11 weeks, from a low of \$17.04 in August, THE IRON AGE composite price for pig iron has reached \$18.34 a gross ton, compared with \$18.25 last week. The finished steel composite remains at 2.369c. for a second week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Nov. 5, 1928	Oct. 30, 1928	Oct. 9, 1928	Nov. 7, 1927
No. 2 foundry, Philadelphia...	\$20.76	\$20.76	\$20.76	\$19.76
No. 2, Valley furnace.....	17.50	17.50	17.00	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	19.69
No. 2, Birmingham.....	16.25	16.25	16.25	16.00
No. 2 foundry, Chicago*	20.00	19.50	18.50	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.00	20.00
Basic, Valley furnace.....	17.50	17.50	17.00	17.00
Valley Bessemer, del'd P'gh...	19.76	19.76	19.26	19.76
Malleable, Chicago*	20.00	19.50	18.50	18.50
Malleable, Valley.....	18.00	18.00	17.50	17.50
Gray forge, Pittsburgh.....	18.76	18.76	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:	Nov. 5, 1928	Oct. 30, 1928	Oct. 9, 1928	Nov. 7, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.75

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, Pittsburgh.....	1.95	1.95	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, New York.....	2.29	2.29	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.22½	2.22½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.19½	2.19½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 6c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Nov. 5, 1928	Oct. 30, 1928	Oct. 9, 1928	Nov. 7, 1927
	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.80
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.85	2.75	3.00
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.70
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.85
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.25
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Nov. 5, 1928	Oct. 30, 1928	Oct. 9, 1928	Nov. 7, 1927
Heavy melting steel, P'gh.....	\$17.50	\$17.75	\$17.50	\$14.00
Heavy melting steel, Phila....	15.50	16.00	16.00	14.00
Heavy melting steel, Ch'go....	14.50	14.50	14.00	11.50
Carwheels, Chicago.....	14.25	14.25	13.75	13.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.50	15.00	14.25
No. 1 cast, Philadelphia.....	16.75	17.50	17.00	16.00
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	13.50
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)..	13.25	12.75	12.75	9.50

Coke, Connellsville, Per Net Ton at Oven:	Nov. 5, 1928	Oct. 30, 1928	Oct. 9, 1928	Nov. 7, 1927
Furnace coke, prompt.....	\$2.90	\$2.90	\$2.75	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.25	15.25	13.37½
Electrolytic copper, refinery...	15.75	15.75	15.00	13.25
Zinc, St. Louis.....	6.25	6.25	6.25	5.65
Zinc, New York.....	6.60	6.60	6.60	6.00
Lead, St. Louis.....	6.32½	6.32½	6.32½	6.00
Lead, New York.....	6.50	6.50	6.50	6.25
Tin (Straits), New York.....	49.25	49.25	48.50	56.62½
Antimony (Asiatic), N. Y.....	10.50	10.50	11.50	11.00

Pittsburgh

Steel Backlogs Declining and Deliveries Are Less Extended —Pig Iron Makers Seek Still Higher Prices

PITTSBURGH, Nov. 5.—In point of mill engagement, the steel market is quite as active as it has been at any time recently, but the contraction in new commitments, which began in the second week of October, continues. With completed orders exceeding fresh bookings, backlogs are growing slimmer. Makers of sheets still profess inability to make shipments of the common finishes in less than two weeks without deferring deliveries on prior specifications, and the promise on full-finished sheets is four to five weeks. Strip makers are well obligated on probable production this month, but in bars and shapes makers have caught up with their orders to an extent that they now are promising reasonably prompt deliveries on new purchases.

The mills have at no time in the recent rush of business been seriously backward in deliveries of plates, wire products or tin plate, while the principal backlog business in pipe has been in that for oil and gas lines. A considerable tonnage of the latter is embraced in inquiries and projects now being discussed. One inquiry calls for 60,000 to 70,000 tons and two other projects nearing the inquiry stage will take fully 100,000 tons.

Rail orders for 1929 delivery are flowing steadily to the mills, and, with the election out of the way, it is be-

lieved that a large number of railroad cars and a goodly number of locomotives will come up for bids.

Taken as a whole, less steel is moving to the motor car builders than was true recently, and structural steel lettings to local fabricators remain very small. October was such a good month in shipments of finished steel products that it will occasion surprise if steel ingot production figures, when announced, do not show that October equaled the previous high record for the year in April. Given an order book such as the industry started with

last month, plus the urgency of shipments there was during that month, and pretty nearly all the available productive capacity is required. The maintenance of the October rate at present is due to the momentum of last month, but the general report as to business is that it has merely receded from the abnormal to the normal.

Prices still are very firm. The comment is heard that there could not have been as much of an advance in invoice prices as in quotations from the second to the third quarter of the year or earnings for the latter period would have made a better showing, seeing that high mill operations must have made for low producing costs.

Wire makers are considering a change in nails that will impose an extra of 10c. per 100 lb. on the carload buyer other than wholesale distributors.

The new base prices on hot-rolled flats do not include, as was at first supposed, cooperage stock, on which a new base of 2.10c. or \$2 a ton above the base on narrow strips, has been announced by some makers.

Producers of pig iron continue to seek higher prices, but have not yet

been successful in realizing the latest advances. Steel works scrap has gone down another 25c. per ton. Some melters who were expected to buy, and for delivery to whose plants dealers bought in advance of actual orders, have been able to get along without purchases, and pressure to sell the speculative shipments is largely responsible for the decline. The market also is weakened by the fact that some dealers, believing the upswing to be over, are selling short when they find a mill willing to pay \$17.50 for heavy melting steel.

Ferroalloys.—The contract price of spiegeleisen for the first half of next year will be the same as that for the past year, or \$30, furnace, for 19 to 21 per cent material. Current prices of all of the commonly used ferroalloys are to carry over into next year. There is a rather brisk spot demand for spiegeleisen, with sales of single carloads at \$33, furnace. Requirements of other alloys are being met largely through specifications on existing contracts. There is no rush by consumers to sign contracts for next year.

Pig Iron.—Producers are seeking higher prices, several having announced an advance of 50c. a ton on foundry iron to \$18, Valley furnace, for No. 2 grade, while for the malleable grade most makers want \$18.50, and on Bessemer as much as \$19 is asked. The common quotation on basic iron is \$18, Valley furnace, but the most recent sale, 4000 tons for December-January delivery to a Pittsburgh district steel company, was at \$17.50 and that was for an iron of somewhat special analysis. Similarly with other grades, the advanced quotations are yet to be realized. A few small sales of foundry iron have been made at \$18, base, Valley furnace, but a considerably larger tonnage is under quotation at \$17.50. To a large extent, quotations of \$18 for basic and \$19 for Bessemer merely indicate that the producers making them have none of these grades for sale at present. Interest in the market on the part of melters is not especially active, as most of them have sufficient iron under contract or in stock to see them

through the remainder of the year. The movement of iron on old orders is much heavier than strictly new business. W. P. Snyder & Co. make the average price of Bessemer iron at Valley furnaces in October \$17.53, compared with \$17.20 in September and \$18 in October last year, and of basic \$17.28, compared with \$16.50 one month ago and \$17 one year ago.

Prices per gross ton, f.o.b. Valley furnace:

Basic	.....	\$17.50 to \$18.00
Bessemer	.....	18.00 to 19.00
Gray forge	.....	17.00 to 17.50
No. 2 foundry	.....	17.50 to 18.00
No. 3 foundry	.....	17.00 to 17.50
Malleable	.....	18.00 to 18.50
Low phos., copper free	.....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Wire Products.—Some manufacturers have announced and others are considering adoption of a plan whereby jobbers shall be asked to pay one price for carload lots of nails and all other carload buyers an advance of 10c. per 100 lb. extra. The matter still is more or less in a state of flux. Nail and wire business is not holding up to its October gait, but is making a fairly good showing compared with this time last year. Prices are steady.

Sheets.—Except that makers are able to promise more prompt delivery on new orders than they could a few weeks ago, the situation shows no particular change. On black and galvanized sheets, bookings are sufficient to provide full engagement of capacity for two to three weeks and in blue annealed there is at least two weeks' business in sight. On automobile body sheets, leading makers are well sold up for the next four weeks. Incoming business is falling behind shipments, but there has been no let-down in mill operations, which remain at practically full physical capacity. Prices are firm.

Fluorspar.—Leading domestic producers have announced a price of \$18 per net ton, at mines, for gravel spar analyzing 85 per cent or more calcium fluoride and not over 5 per cent silica. It is figured that the recent increase in the duty on imported spar of \$2.50 per net ton will produce a price of \$18, Atlantic seaboard, for the imported material; on that basis foreign spar still can be delivered in this district

for less than the American product at \$18, mines, delivered by rail, but the latter will get the call on the score of more uniform quality and the fact that consumers may get supplies at shorter notice and will not be obliged to buy a cargo at a time. The freight charge on foreign spar from the seaboard to this district ranges from \$3.13 to \$3.48 per ton, while the rail rate from domestic mines is \$5.25, but much tonnage is brought to local consumers by river at a total charge of about \$3.50 per ton.

Tin Plate.—New business in packers' can sizes of tin plate waits on an announcement of the prices for the first half of next year. The fact that some container manufacturers will carry over stocks for which there was no use on account of the abrupt ending of the growing season this past fall is another reason for light forward interest. Much tin plate, however, is being moved to take care of the salmon pack of next spring, and export demands are of sizable proportions. Much interest is observed locally in a reopening of the case of the all-rail rate on tin plate to the Pacific Coast. A hearing will take place soon upon a plea of the Youngstown Sheet & Tube Co. for a reduction in the Chicago rate from 75c. per box to 65c. from its Chicago district plant to counterbalance the reduction of four months ago in the Pittsburgh rate to 75c. The Western railroads are opposing a reduction in the Chicago rate, and it is said an effort is being made to overcome the demand for a lower Chicago rate by lifting the Pittsburgh rate.

Hot-Rolled Flats.—Makers in this district expect this month to be good in strip production and shipments, since the common experience was that last month's shipments, which were of record size from most mills, were closely approximated by incoming business. Makers have firm price ideas on new business for early delivery because they do not need new business very badly. Application of the new base prices and the recently adopted card of extras appears to be more of a first quarter than a current matter. A separate base price for

THE IRON AGE Composite Prices

Finished Steel

Nov. 5, 1928, 2.369c. a Lb.

One week ago	.....	2.369c.
One month ago	.....	2.362c.
One year ago	.....	2.293c.
10-year pre-war average	.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low
1928	2.369c., Oct. 30;	1928	2.314c., Jan. 3
1927	2.453c., Jan. 4;	1927	2.293c., Oct. 25
1926	2.453c., Jan. 5;	1926	2.403c., May 18
1925	2.560c., Jan. 6;	1925	2.396c., Aug. 18
1924	2.789c., Jan. 15;	1924	2.460c., Oct. 14
1923	2.824c., Apr. 24;	1923	2.446c., Jan. 2

Pig Iron

Nov. 5, 1928, \$18.34 a Gross Ton

One week ago	.....	\$18.25
One month ago	.....	17.84
One year ago	.....	17.54
10-year pre-war average	.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.34, Nov. 5;	1928	\$17.04, July 24
1927	19.71, Jan. 4;	1927	17.54, Nov. 1
1926	21.54, Jan. 5;	1926	19.46, July 13
1925	22.50, Jan. 13;	1925	18.96, July 7
1924	22.88, Feb. 26;	1924	19.21, Nov. 3
1923	30.86, Mar. 20;	1923	20.77, Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill.....	1.95c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.27c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

Narrower than 6 in., P'gh.....	2.00c.
6 in. and wider, P'gh.....	1.90c.
Narrower than 6 in., Chicago.....	2.10c.
6 in. and wider, Chicago.....	2.00c.

* Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shaffing, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.85c.
Strips, Cleveland.....	2.85c.
Strips, del'd Chicago.....	3.15c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Gal'd wire, No. 9.....	3.00
Barbed wire, gal'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c.
Nos. 9 and 10, del'd Cleveland.....	2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.\$11.20	25-lb. coating I.C.\$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.80
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
Rounds and squares.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel		Butt Weld		Iron	
Inches	Black	Galv.	Inches	Black	Galv.
1½.....	45	19½	1½ to 2½.....	+11	+39
1½ to 2½.....	51	25½	2½.....	22	2
2½.....	56	42½	3½.....	28	11
3½.....	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			
Lap Weld					
2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	25	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	53	40½			

Butt Weld, extra strong, plain ends

1½.....	41	24½	1½ to 2½.....	+19	+54
1½ to 2½.....	47	30½	2½.....	21	17
2½.....	53	42½	3½.....	25	12
3½.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	23	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh Iron

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 3 in.....	37
3 in.....	40
3½ to 4 in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	+18
1½ to 1¾ in.....	+8
2 to 2½ in.....	-2
2½ to 3 in.....	-7
3½ to 4½ in.....	-9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	1 Ten
	2 Tens
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
1 in.	3 in.	3½ in.	4 in.
1 in.....	63	3½ to 3½ in.....	50
1½ to 1½ in.....	55	4 in.....	53
1½ in.....	39	4½, 5 and 6 in.....	45
2 to 2½ in.....	34		
2½ to 2½ in.....	42		

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

cooperage stock has been announced by some makers of this line, which embraces widths from ½ in. to 1¾ in. in gages No. 17, 18 and 19, of 2.10c., base Pittsburgh, plus the extras in the recently announced card. Most users are under contract for the remainder of this year and the new base will find more general application on first quarter contracts. Some makers of 3-in. strips also have a separate base on that width of 2.10c.

Cold-Rolled Strips.—Makers here start the new month with good backlogs, and on ordinary current business are demanding 2.85c., base Pittsburgh, or \$2 a ton over the price at which the bulk of current shipments are invoiced.

Semi-Finished Steel.—There has been no letdown in sheet and strip mill operations, and a good movement of billets, slabs and sheet bars on contracts naturally results. Spot demands, however, do not amount to much, and while a premium of \$1 a ton for prompt shipments of billets was paid a short time ago, no such cases have recently come to light. Wire rods are steady at \$42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—Incoming business in these products continues to lag behind shipments on older orders, and it is largely because producers had larger bookings than could be rolled and shipped last month that there has been no material reduction in mill operations. The common asking price for all three products is 2c., base Pittsburgh, but actual business at that price seems to be in single carloads for small buyers or for earlier shipment than most mills like to promise. The ordinary tonnage price—and most of the current inquiries are of the ordinary tonnage variety—is 1.95c. The large-lot or preferred buyer is drawing against contracts carrying 1.90c. or less, and the market is not now subject to the test of large in-

quiries. The cost of producing plates is as much of a factor of price and maintenance as the size of the demand.

Rails and Track Supplies.—The Carnegie Steel Co. was awarded 13,310 tons of the 191,550 tons of rails placed by the New York Central Lines, and now has a good backlog. Light-section rails are slow. Demand for track fastenings is light by comparison with the orders for standard-section rails.

Tubular Goods.—The Western Natural Gas Co., having completed organization, is expected to inquire soon for 350 miles of 20-in. pipe for a gas line to run from two gas producing fields in Wyoming to Salt Lake City. Line pipe furnishes most of the backlogs that the mills have, although there is a fairly good demand for seamless oil well pipe and a rather well sustained demand for butt welded pipe. Lap welded pipe for other than pipe lines is not very active.

Cold-Finished Steel Bars and Shafting.—October shipments were very heavy with makers in this district, but did not tax productive capacity. Third quarter contracts were well worked off in the heavy movement of last month. The advance of \$2 a ton is now well established by liberal specifications on fourth quarter contracts. Some doubt exists that another advance will be made for first quarter, although it is contended that the spread between hot-rolled and cold-finished bars is too narrow for fair profits.

Coke and Coal.—Spot furnace coke prices are unchanged, but as the supply situation is somewhat easier, sales at more than \$2.90 per net ton at ovens are becoming fewer. A local steel company which recently put on a blast furnace solved the problem of additional coke supplies by starting some of its old type ovens. Two blast furnaces and possibly a third now operating on Connellsville coke or coke made from Connellsville coal are likely to go out soon for relining and it will be a month at least before the Struthers furnace begins to take coke. Absorption of released coke should make for an easier market unless there is a corresponding reduction in output. Spot foundry coke is moving steadily at firm prices. There is no strength worthy of note in the coal market, because supplies are so plentiful in relation to requirements.

Old Material.—Dealers are finding it difficult to interest steel companies in new purchases of heavy melting steel. Some dealers had bought this grade for shipment to certain points in anticipation of mill purchases, but the mill orders did not materialize, and the dealers have forced the material on the market. The result has been a further decline of 25c. a ton. This grade now is offered at \$17.75 and even at \$17.50, with no takers. Few dealers have needs sufficiently pressing to pay more than \$17.25 to cover their sales. Two companies which were expected to buy scrap in the open market escaped the neces-

sity of doing so by purchases of billet and bloom crops, of which another steel company had a considerable accumulation. One company took 25,000 tons and the other, which secured a supply from still another steel company, bought 10,000 tons. Except for the offerings of scrap which have resulted from bad guessing on the part of some dealers, the supply is not materially greater than it has been. It is probable that the course of prices over the remainder of the year will be governed by the rate of steel works engagement. While incoming business in finished steel is somewhat less than shipments on orders, little recession in ingot production has developed. Continued high ingot output would force additional scrap buying, but the common belief is that there will be some falling off between now and the end of the year and that the mills will try to get along with their stocks and the material they have contracted for. About half of the heavy melting steel in this month's Pennsylvania Railroad list, it is reported, went to Youngstown at about \$18.80 and the remainder to this district at a price lower to the extent of the difference in the freight rates. About 2000 tons of heavy melting steel offered by this road in a special list recently was sold at more than \$19, delivered Youngstown. The November list of the Norfolk & Western contains 4911 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$17.25 to	\$17.75
Scrap rails	17.00 to	17.50
Compressed sheet steel....	17.25 to	17.75
Bundled sheets, sides and ends	16.00 to	16.50
Cast iron carwheels.....	15.25 to	15.75
Sheet bar crops, ordinary..	17.50 to	18.00
Heavy breakable cast.....	14.00 to	14.50
No. 2 railroad wrought....	17.50 to	18.00
Heavy steel axle turnings..	15.00 to	15.50
Machine shop turnings....	11.50 to	12.00
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	19.00 to	19.50
Railr. coil and leaf springs	19.00 to	19.50
Rolled steel wheels.....	19.00 to	19.50
Low phos. billet and bloom ends	20.50 to	21.00
Low phos., mill plates....	19.00 to	19.50
Low phos., light grade....	18.00 to	18.50
Low phos., sheet bar crops	19.00 to	19.50
Hvy. steel axle turnings..	15.00 to	15.50
Electric Furnace Grades:		
Low phos. punchings.....	18.50 to	19.00
Hvy. steel axle turnings..	15.00 to	15.50
Blast Furnace Grades:		
Short shoveling steel turnings	12.25 to	12.50
Short mixed borings and turnings	12.25 to	12.50
Cast iron borings.....	12.25 to	12.50
No. 2 busheling.....	11.25 to	11.75
Rolling Mill Grades:		
Steel car axles.....	21.50 to	22.50
No. 1 railroad wrought....	13.50 to	14.00
Sheet bar crops.....	18.00 to	18.50
Cupola Grades:		
No. 1 cast.....	15.50 to	16.00
Rails 3 ft. and under.....	18.00 to	18.50

Guarantee Specialty Mfg. Co., 5100 Superior Avenue, Cleveland, manufacturer of sheet metal stampings, has purchased a new site at the New York Central Railroad and East Ninety-sixth Street. Two factory buildings located on the property will be enlarged. Richard H. Wright is president and Albert C. Earhart is secretary. Additional press equipment will be required.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and over.....	*\$33.00
Rerolling, under 4-in. to and including 1½-in.	34.00
Forging	38.00

Sheet Bars

Per Gross Ton

Open-hearth or Bessemer.....	\$33.00
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*Cleveland mill base on large billets, slabs and sheet bars is \$33.

Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	34.00

Skelp

Per Lb.

Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

Per Gross Ton

*Common soft, base.....	\$42.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$43. Cleveland mill base, \$42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....10.00c.

Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.

Manganese ore, washed, 52% manganese, from the Caucasus.....\$38.

Manganese ore, Brazilian, African or Indian, basic 50%37c. to 38c.

Tungsten ore, high grade, per unit, in 60% concentrates\$10.90 to \$11.25

Per Gross Ton

Chrome ore, 45 to 50% Cr₂O₃, crude, c.i.f. Atlantic seaboard\$22.00 to \$24.00

Per Lb.

Molybdenum ore, 85% concentrates of MoS₂, delivered50c. to 55c.

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.90 to \$3.00
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens.	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to 1.10

Ferromanganese

Per Gross Ton

Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....	\$30.00 to \$33.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$83.50
75%	130.00

Per Gross Ton

Per Gross Ton

10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton

Per Gross Ton

10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton

Per Gross Ton

6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	\$5.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	\$5.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00
Standard size	45.00

Chrome Brick

Per Net Ton

Standard size	\$45.00
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Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2½
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

Base Per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Sales Again Reach a High Point—Pig Iron Advanced Second Time in Two Weeks

CHICAGO, Nov. 5.—Added needs of miscellaneous steel users, plus heavy purchases of standard-section rails, have brought sales in this district to the highest point of the year and, with one exception, to the highest point in three years. Specifications are fully equal to shipments, which represent ingot output at a shade above 85 per cent of capacity. Forward buying is more active, though 30 to 60 days' requirements is still representative of the average buyer's order. Ingot output is now about 17 per cent higher than a year ago. In September, 1927, both backlogs and shipments began to diminish and little or no improvement occurred in October. This year, ingot output has gradually increased during the fall weeks, and the first week of November finds local mills well entrenched, with the outlook favorable for a sustained rate of shipments. Prices for plates, shapes and bars are stronger, as quotations tend to narrow to a range of 2.05c. to 2.10c. per lb., Chicago.

The railroad equipment market remains active, with inquiries for 9620 cars now pending and considerably more in prospect. Structural awards are not keeping pace with other steel activities, but shops remain well engaged on orders taken in the late summer and early fall.

Pig iron prices, after remaining for a few days at \$19.50 a ton, Chicago furnace, have been advanced another 50c. to \$20 a ton. Liberal purchases have been made at the higher quotations. The scrap market, though recently affected by weakness in the East, has again been strengthened by heavy sales locally.

Pig Iron.—Northern No. 2 iron, after holding a short time at \$19.50 a ton, local furnace, has been advanced to \$20. Numerous sales in large and small lots establish prices at the higher level. A user in Wisconsin will buy 3000 to 5000 tons for first quarter delivery and three nearby foundries will take a total of 3000 tons for delivery over the remainder of the year. Shipments in October were the heaviest in any month so far this year; producers, in analyzing shipping orders on hand, estimate that deliveries from local furnaces in 1928 will establish a record for all time. Sales of Southern iron are frequent at \$22.26 a ton, delivered Chicago. This iron reaches many points of consumption in this territory at a disadvantage in price of not over 50c. a ton. Quotations at \$16.25 a ton, Birmingham, are strong. Demand for charcoal iron is insistent and furnace stocks are smaller and unbalanced. Prices are steady at \$24 a ton, furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	22.26
Low phos., sil. 1 to 2, copper free	\$29.00 to 29.50
Silvery, sil. 8 per cent.	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Contracting for 1929 in ferrosilicon is practically complete, and the bulk of users of ferromanganese have also stated their needs for the coming year. All told, not less

than 12,000 tons of ferromanganese has been added to sellers' books. Carload sales of spiegeleisen in the 19 to 21 per cent grade are being made at \$33, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—Active inquiry for railroad cars now in this market totals not less than 9620 cars, which will require about 140,000 tons of steel. The most recent request for prices comes from the Wabash, which will buy 2000 box cars. It is believed by the local trade that part of the steel needed for 3300 cars to be purchased by Canadian carriers will be furnished by Chicago mills. A check made by Western steel producers leads them to believe that not less than 40,000 cars will be in the market before the end of the year and that about one-half of that number will have been placed by Jan. 1. Reports here are that the Santa Fe inquiry will be for 6000 cars, and the Illinois Central is expected to call for bids on 2500 cars. Users of plates expect that deferred deliveries will result from the probable requirements of car builders, and new buying is for more distant needs. Plate mills are now engaged at 80 per cent of capacity. The Texas Corporation is in the market for 2800 tons and the Roxana Petroleum Corporation will buy 2000 tons for tanks. Oil storage tank construction programs are being rushed, and orders placed at mills are usually for immediate shipment. Deliveries on the more common widths of plates range from two to five weeks. Prices in this market are strengthening, and quotations of 2c. per lb., Chicago, are no longer obtainable except on the most desirable business. A more frequent quotation is 2.05c., while 2.10c. is more common than a week ago.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Orders for mild steel bars are unabated. Automobile parts makers appear to have hit a uniform stride and specifications from that source have not diminished in the last 10 days. Several new models which are to make their appearance this month will call for increased quantities of steel at an early date. Orders

for heavy forgings are well sustained and shops hold close to capacity output. Farm implement manufacturers are swinging into production for spring delivery, and their steel requirements are measurably larger. Prices for mild steel bars are stronger at 2.05c., Chicago, which is rapidly taking the place of 2c. for all but the most attractive business. The iron bar market is without feature. Demand for alloy steel bars is steady and prices are unchanged. Specifications in October for rail steel bars were fully equal to production, which compared favorably with the best months so far this year. New orders are in good total volume, but are individually small and do not afford economical operation. Improved demand is noted from the bed trade, and shipments to barn equipment manufacturers are in good volume. Prices are firm at 1.95c. a lb., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Cast Iron Pipe.—Three makers of cast iron pipe participated in a contractor's job at Waukegan, Ill. The orders totaled 300 tons and they were taken at \$45.50 a ton, delivered, or \$37, Birmingham. Current orders by railroads seldom reach car lot proportions. Contractors in the North Central States are active on old jobs and the bulk of pipe purchased late in the summer has been delivered.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20; 4-in., \$49.20; Class A and gas pipe, \$4 extra.

Structural Material.—Preliminary estimates of the steel needed by the Youngstown Sheet & Tube Co. for extensions to its Indiana Harbor, Ind., plant are placed at 8000 tons, but it is believed that this may be increased by at least 1000 tons. Bridge work, both highway and railroad, is unusually active. Contracts for two highway bridges in Wisconsin call for 2500 tons and a like tonnage will be needed for a bridge at Liberty Bend, Mo. The Northern Pacific will buy 1200 tons for miscellaneous bridge work. A Chicago architect is preparing plans for a warehouse that will require about 10,000 tons. Fabricating shops are busy for this time of the year, but most operations are being sustained by work taken earlier in the year. The pending list is large, but contracting is slow except in small tonnage business. An increase is noted in inquiry for jobs requiring less than 100 tons each. Prices obtained by fabricators are low and no strengthening influence is in sight.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Reinforcing Bars.—Transactions in this market in the past week were confined largely to orders of less than 100 tons each. The pending list is formidable, and there is now fully as much tonnage on which estimates have been made as there was in the first week of November, 1927. Awards in October were not as heavy as in the corresponding month of 1927. A substantial volume of business in late

summer brought October deliveries to a higher level than a year ago.

Wire Products.—Demand for nails has improved, but lags behind shipments. Manufacturers continue to take liberal quantities of wire. The jobbing trade is spotty, though some improvement is shown in orders from the Northwest and the South. Jobbers continue to buy at close range. Prompt delivery is expected, and producers are forced to carry large and well balanced stocks. Spring terms on woven wire fencing are announced for Nov. 5.

Rails and Track Supplies.—Local mills have taken orders for 185,000 tons of rails. This figure includes the allotments by the New York Central, which placed a total of 191,550 tons, of which 70 per cent is for immediate specification and the remainder is taken on option. The distribution is as follows: Bethlehem Steel Co., 82,030 tons; Dominion Iron & Steel Corporation, 11,690 tons; Carnegie Steel Co., 13,310 tons; Illinois Steel Co., 69,140 tons, and Inland Steel Co., 15,380 tons. The Chicago & North Western inquiry for 30,000 tons is still open. Total inquiry now before local sellers is for 150,000 tons. Although rail buying started earlier than last year, it has not progressed as rapidly as it did in the fall of 1927. Accessory purchases in the week reached 3500 tons for immediate needs and 10,000 tons for future delivery. Fresh inquiry totals 20,000 tons. Prices for tie plates are steady at \$43 a ton. Rail mill output averages a shade above 50 per cent of capacity.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—A Chicago mill has closed for 25,000 tons of heavy melting steel at \$15 a gross ton, delivered. Dealers are trading in this grade at \$14.85 to \$15.10 a gross ton, delivered. Lower prices in the East shook confidence a trifle, but after a temporary halting of sales the Chicago market again became active and a number of grades have been sold at

higher prices. Scrap is moving rapidly and unloading tracks are congested at several consuming points. Large shipments of heavy melting steel are moving to Gary mills. The cast iron borings market is strong. Sales have been heavy, and brokers are busy covering their obligations. A producer is asking \$12.75 a ton for November delivery and 25c. higher for shipments in December. Inquiry by malleable and gray iron foundries is unusually active, but individual sales are small, as users decline to carry stocks larger than immediate needs dictate. In some cases buyers are offering stiff resistance to current prices.

Prices deliv'd Chicago district consumers: Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	12.50 to 13.00
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'd steel carwheels	17.75 to 18.25
Railr'd tires, charg. box size	17.50 to 18.00
Railr'd leaf spring cut apart	17.25 to 17.75

Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.25 to 18.75

Electric Furnace Grades:	
Axle turnings	14.00 to 14.50
Low phos. punchings.....	16.00 to 16.50
Low phos. plate, 12 in. and under	15.50 to 16.00

Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Short shoveling turnings..	12.00 to 12.50
Machine shop turnings....	7.50 to 8.00

Rolling Mill Grades:	
Iron rails	15.00 to 15.50
Rerolling rails	17.00 to 17.50

Cupola Grades:	
Steel rails less than 3 ft..	17.50 to 18.00
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	14.25 to 14.50

Malleable Grades:	
Railroad	15.75 to 16.25
Agricultural	12.50 to 13.00

Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	26.50 to 27.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought...	13.25 to 13.75
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00

Cupola Grades:	
No. 1 machinery cast....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast....	14.00 to 14.50
Stove plate	11.75 to 12.25
Grate bars	12.50 to 13.00
Brake shoes	11.75 to 12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Prices are firm, and deliveries average not better than four weeks, with hot mills engaged at 85 per cent of capacity. Light tank manufacturers are taking liberal quantities, but the roofing trade continues to lag behind its usual seasonal activity. Jobbers are distributing a heavy tonnage, but they hold stocks low and depend on mill deliveries to meet current requirements. Backlogs are growing small and in the past few

days specifications have totaled less than production. Spot sales are few in number and of small individual size.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.65c.; No. 10 blue ann'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Coke.—Shipments remain heavy and all ovens in this district are lighted. Quotations for by-product foundry coke are firm at \$8 a ton, local ovens.

Bolts, Nuts and Rivets.—The upturn in specifications noticed a week ago did not hold its ground under the influence of a marked decrease in demand from railroads. Agricultural implement manufacturers, however, are taking liberal quantities. Prices for these commodities are firm.

Ryerson Company Offers Securities to Public

Joseph T. Ryerson & Son, Chicago, on Nov. 2 ceased to be a closed family institution with the offering for public subscription of \$5,000,000 in debentures and 100,000 shares of capital stock. A new corporation known as Joseph T. Ryerson & Son, Inc., has been formed and the financing arises out of the sale of a portion of the Ryerson family holdings. The management of this corporation will remain unchanged. The debentures will be offered at 96 and interest to yield over 5½ per cent, and the stock will be offered at \$39 a share.

The Ryerson business heretofore has not made public its earning statement, due to private ownership. In connection with the financing, net earnings for this year based on operations to Sept. 30 are estimated at \$2,102,000 before Federal taxes. For 1927, net was \$1,669,360. The business was started in 1842 with capital of \$10,000.

Factory Earnings Near a Record

Average weekly earnings in representative factories in New York State are reported by the State Industrial Commissioner to have been \$29.72 in September. This is the second highest figure ever reached, having been exceeded only by the \$29.78 of March, 1927. The gain over August was 34c., while the September figure was 15c. higher than a year earlier. All employees, including both shop and office, are covered in the returns.

Lamson & Sessions Co., Cleveland, will build a bolt and nut manufacturing plant at Birmingham to supply its Southern and Southwestern trade. An 8-acre site has been acquired in North Birmingham and the erection of a moderate sized plant will be started shortly for the manufacture of a complete line of bolts and nuts.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'd wire, per 100 lb.	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c'd nails, base per keg.....	3.10

New York

Gas Line to Take 60,000 Tons of Pipe—Pig Iron Prices Still Show Rising Tendency

NEW YORK, Nov. 5.—Pig iron demand is well sustained. Although purchases for first quarter are on the increase, orders are still predominantly for early delivery. Sales in this district during the week totaled more than 14,000 tons. In the main, prices still show a rising tendency. Buffalo foundry iron is firm at \$17.50, base furnace, and a leading producer has announced an advance of 50c. to \$18, effective immediately. Eastern Pennsylvania makers have advanced foundry iron to \$21, base furnace, for first quarter. Quotations on current business, however, have not been entirely uniform. A sale in New Jersey last week brought out a price that figured back to less than \$20, base eastern Pennsylvania furnace. The New York Air Brake Co. is inquiring for 500 tons of malleable, 100 tons of low phosphorus, 100 tons of high manganese and 50 tons of silvery for its Watertown, N. Y., plant. The American Locomotive Co. is in the market for 200 tons of foundry for its Schenectady, N. Y., works. A Connecticut melter wants 1000 tons of foundry iron for delivery in the current quarter. Abendroth Brothers, Port Chester, N. Y., have closed for 250 tons each of No. 2X and No. 1X, and the Foran Foundry & Mfg. Co., Flemington, N. J., has bought 500 tons each of No. 2 plain and No. 2X.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$22.41
*Buf. No. 2, del'd east. N. J.		20.78
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	21.89 to 23.02
East. Pa. No. 1X fdy., sil.	2.75 to 3.25	22.39 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—The Export Steamship Co., 25 Broadway, New York, opened bids Monday on four 10,000-ton freight boats to be built under the loan provisions of the recently enacted Merchant Marine Bill. An award to a shipbuilding company probably will be made within a few days. The four boats will take 13,000 tons of steel, mostly plates. Other boats of larger tonnage are to be submitted for bids by the same company within a short time. The demand for plates, shapes and bars is steady. Structural steel lettings of the week were in fair aggregate volume, though no individual awards of outstanding size were included. The common price for plates is 2.27½c., New York, but large buyers are being supplied at \$1 a ton less and small buyers are paying \$1 a ton more. The minimum on shapes is 2.19½c., New York, some buyers paying \$1 or \$2 a ton additional. The steel bar price

is strong at 2c., Pittsburgh, for current small lots not covered by contract. Contract customers are being supplied at 1.90c. and 1.95c., Pittsburgh.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Pipe.—The Texas Corporation has inquired for 530 miles of 12¼-in. o.d.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10

	Per Cent Off List
Carriage bolts, cut thread:	
¾ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to 50 and 10

	Per 100 Ft.
Coach screws:	
½ x 6 in. and smaller	.60
1 x 16 in. and smaller	.50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe		
Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12

Wrought Iron—		
	Prime	Seconds
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)		
	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)		
	Prime	Seconds
IC—20-lb. coating	\$10.00 to \$11.00	
IC—30-lb. coating	12.00 to 13.00	
IC—40-lb. coating	13.75 to 14.25	

Sheets, Box Annealed—Black, C. R.		
	One Pass	Per Lb.

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized		Per Lb.
No. 14		4.15c. to 4.35c.
No. 16		4.00c. to 4.20c.
No. 18		4.15c. to 4.35c.
No. 20		4.30c. to 4.50c.
No. 22		4.35c. to 4.55c.
No. 24		4.50c. to 4.70c.
No. 26		4.75c. to 4.95c.
No. 28*		5.00c. to 5.20c.
No. 30		5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

pipe for a gas pipe line to connect Tulsa, Okla., with Lockport, Ill., amounting to 60,000 to 70,000 tons, but the award is understood to be dependent on the outcome of negotiations for the marketing of the gas. Two or three other gas lines, which will take upward of 100,000 tons of pipe, are also in a tentative stage.

Sheets.—A good many consumers whose specifications in September were believed to be sufficiently heavy to cover a considerable part of their fourth quarter requirements have come into the market for additional supplies, and their orders have been booked at the current prices, which are higher in the case of black and galvanized sheets than the invoice prices of recent shipments. Although mills have made no announcement regarding first quarter prices, an advance of \$2 a ton on some grades seems to be expected. The volume of current business is very satisfactory in view of the heavy commitments still to be discharged from mill books. Prices are firm at Pittsburgh bases of 2.75c. for black, 3.50c. for galvanized and 2c. to 2.10c. for blue annealed, depending on width.

Reinforcing Bars.—Business has been rather quiet in the last week, the majority of the jobs placed having called for less than 100 tons. No action has been taken on the Delaware, Lackawanna & Western Railroad terminal at Jersey City, calling for 8500 tons. No new projects of outstanding size have come before the trade recently, but the tonnage in pending jobs bulks large for this time of year. Prices are unchanged.

Cast Iron Pipe.—The market is very quiet, but improvement in municipal lettings is expected after the election, involving projects to be voted upon by the electorate. Warwick, R. I., has not yet awarded 14,000 tons, on which the New York agent for the French maker is low bidder, and action may be postponed for some time. Hartford, Conn., has awarded 80 tons of 6 to 12-in. pipe and fittings to an unnamed maker, and R. D. Wood & Co. are low bidders on a small tonnage of 12-in. pipe for New Brunswick, N. J. Prices are unchanged, with Northern foundries continuing to quote a wide range on competitive jobs.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$40.60 to \$41.60; 3-in., \$50.60 to \$51.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Demand for foundry coke continues rather brisk, with prices unchanged at \$3.50 to \$3.75 per net ton, Connellsville. The standard furnace grade is firm at \$2.85 to \$3.05, Connellsville, but the market is very quiet, largely on account of the continuing warm weather. Standard brands are unchanged at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44, to New York or Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Warehouse Business.—Jobbers report continued activity and less weakness in prices. Black sheets are quite firm and galvanized sheet prices are being maintained better than for several months, although concessions are still obtainable. Business in structural material and bars is good and some substantial orders have been taken in the past week.

Old Material.—Buying prices have developed a downward movement in the past week, with most grades of scrap 25c. to 50c. a ton lower. A broker shipping No. 1 heavy melting steel to Bethlehem, Pa., is offering \$14.50 per ton, delivered, 50c. less than the previous buying price. Practically no buying is being done for shipment to other eastern Pennsylvania consumers of No. 1 steel. Yard grade is quoted at \$12 per ton, Pottsville, Pa., a reduction of 50c. a ton, but a broker acting as buying agent for a Phoenixville consumer is still paying up to \$13 per ton, delivered. It is difficult to determine the price of heavy breakable cast as the two leading consumers at Harrisburg, Pa., and Florence, N. J., are not accepting shipments. Blast furnace

scrap is quoted at \$9.50 per ton, delivered Bethlehem, Pa., and machine shop turnings at \$11.50 per ton, delivered Phoenixville, Pa. Specification pipe for a Lebanon, Pa., consumer has been reduced 50c. a ton to \$14.50 per ton, delivered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$11.75 to \$12.25
Heavy melting steel (yard)	8.25 to 9.50
No. 1 hvy. breakable cast.	11.25 to 11.75
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	9.25 to 10.25
Machine shop turnings	7.50 to 8.00
Short shoveling turnings	7.50 to 8.00
Cast borings (blast furn. or steel works)	6.50 to 7.00
Mixed borings and turnings	6.25 to 6.75
Steel car axles	18.00 to 18.50
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.25 to 12.75
No. 1 yard wrot, long	11.25 to 11.75
Rails for rolling	13.50 to 14.00
Cast iron carwheels	13.00 to 13.50
Stove plate (foundry)	9.50
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

and some producers have about cleaned out the large stock piles they had a few months ago. Pickands, Mather & Co. on Monday blew in a furnace in Toledo, which had been out for relining.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	22.25
Malleable	19.50
Ohio silvery, 8 per cent.	28.00
Basic Valley furnace	\$17.50 to 18.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—An exceedingly tight market has developed through the scarcity of vessel tonnage. Ore firms could easily supply all the additional ore that might be needed were they able to ship it before navigation closes. The scarcity of basic pig iron and the advance in pig iron prices have caused the Struthers Furnace Co., Struthers, Ohio, to decide to blow in its stack about Dec. 1, but this furnace had considerable difficulty in finding ore that can be delivered this year. Ore firms have their vessels scheduled for ore cargoes until the close of the navigation season, although at present rates they would find it more profitable to divert some of their boats to the grain trade. Much of the wild tonnage of vessel companies interested only in transportation is now handling grain. The Struthers company has succeeded in securing several lots aggregating 100,000 tons and expects to line up enough ore to carry it through the spring. Heavy ore shipments in October brought the total movement for the season ahead of the corresponding period last year. Water shipments during October were 8,453,952 tons, an increase of 1,731,195 tons over the corresponding period last year. The total movement by water until Nov. 1 was 49,719,931 tons, a gain of 613,217 tons over the same period last year.

Fluorspar.—The domestic fluorspar price, which developed a firmer tone previous to the 50 per cent advance in the duty on foreign fluorspar, has been definitely established at \$18 a ton for gravel material, or \$1 a ton advance. One 500-ton lot and several small lots have been sold at the advance. Producers have not yet announced their price for next year.

Coke.—Some of the makers of premium grades of Connellsville foundry coke have opened their books for the first half at present prices and have

Cleveland

Steel Demand From Automobile Industry Takes a Spurt— Pig Iron Advanced 50c. by Lake Furnaces

CLEVELAND, Nov. 5.—The demand for finished steel continues fairly heavy. Specifications received by some of the mills which experienced a lull during part of October showed a gain the past week. The automotive industry is taking a heavy tonnage of steel bars and is crowding the mills for delivery. The demand for structural shapes is well sustained, but plates are only moderately active. Demand from the automotive industry, which has shown some seasonal decline, has taken a spurt with the release of specifications from the Chevrolet Motor Car Co. for steel for 125,000 cars for its new models, the production of which it will start shortly. The quantity released in sheets and strip steel is estimated at 25,000 to 30,000 tons.

New inquiry in the building field is not as active as recently. Considerable repair work is in prospect in the Lake shipbuilding industry, but, with the exception of two car ferries, no new boats are in prospect.

The market has a firm tone. Steel bars are holding to 1.95c., Pittsburgh, and to 1.90c. to 2.05c., Cleveland. Plates and structural shapes range from 1.90c. to 1.95c., Pittsburgh. Cold-rolled strip appears to have been definitely established at 2.85c., Cleveland and Pittsburgh.

The pig iron buying movement for the first quarter has increased in volume and another price advance of 50c. a ton has been made on foundry and malleable grades by Lake district furnaces.

Pig Iron.—Buying has increased in volume and a further price advance of 50c. a ton on foundry and malleable grades has been made by Cleveland and other Lake furnaces. The advance does not appear to check buying, as producers report sales at the new prices. Prices now are \$2 to \$2.50 a ton higher than those prevailing in the summer, when foundries

covered for the last half. An Ohio steel maker has purchased 15,000 tons of basic iron at \$17.50, furnace. This will be shipped from the same producing point to the same consuming point as a 10,000-ton lot, the sale of which at the same price, was reported a week ago. The freight rate is \$1.65, compared with a \$1.26 Valley rate, making the price equivalent to \$17.89, Valley furnace. Sales of foundry and malleable iron by Cleveland interests totaled 69,000 tons the past week. While most of the iron was for the first quarter, there were quite a few prompt shipment orders. Cleveland furnaces now quote foundry and malleable iron at \$18.50 for outside shipment and at \$19, furnace, for local delivery. Other Lake furnaces serving central and western Ohio and Indiana quote \$19. In Michigan, there is a price range of from \$19.50 to \$20. Some of the Valley furnaces have marked up their price to \$18 for foundry and to \$18.50 for malleable. Low phosphorus iron has not yet moved up with other grades, some small-lot business having been taken at \$26.50. Shipments continue heavy,

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.35c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

taken a few contracts. Foundries are running well in this territory. Specifications are good, although there is not much new business. Prices are unchanged. Ohio by-product foundry coke is quoted at \$7.75, Painesville.

Bolts, Nuts and Rivets.—The volume of bolt and nut business in October showed a gain of from 5 per cent to 10 per cent over that of the previous month, and business in November has started out well. Orders are good from the automotive industry, and makers report a steady demand from the railroads. Rivet business also shows quite an improvement; a leading local manufacturer reports that its October volume was the best of any month this year.

Sheets.—While new business fell off in this territory the past week, mills are getting heavy specifications from the automotive industry and tonnage entered is holding up to shipments. Buyers are experiencing difficulties in finding mills that can make shipments as soon as desired, as the best deliveries are two weeks on galvanized and three to five weeks on other grades. The market generally has a firm tone, although price cutting has not entirely disappeared.

Strip Steel.—Specifications are heavy for both hot and cold-rolled strip. Some hot-strip business in small lots has been taken at the new prices and based on the new card of extras. Two producers of cold-rolled strip in this territory have followed other mills in marking up their price to 2.85c., Pittsburgh and Cleveland, which is now generally in effect. Consumers covered heavily before the advance.

Semi-Finished Steel.—Some small lot inquiries are coming out, but a local producer is unable to quote on these, being sold up for the remainder of the year. Sheet bar consumers are pressing for deliveries.

Reinforcing Bars.—A \$2 a ton price advance on rail steel bars to 1.95c., mill, has been made by a western Pennsylvania mill. It is stated that the advance has been necessitated by a \$4 a ton increase in the price of rerolling rails. New billet steel bars are still available at 1.85c., Cleve-

land. Inquiry is confined to small lots.

Wire Products.—Nails show a firmer tone, although occasional shading is reported. The demand is moderate. Wire is active and firm.

Old Material.—Indications of an easier tone, which appeared more than a week ago, have become more pronounced, and prices have declined 50c. to 75c. a ton in some sections. The weakness is mostly on steel making grades. Locally, the weakening effect so far has been only sentimental, as prices here had not advanced to the extent that they did in the Pittsburgh and Youngstown districts. The demand is less active than it was, as some of the mills are now regulating shipments, and brokers are being offered more scrap than they need. In spite of the easier situation on other grades, blast furnace scrap has strengthened in the Cleveland market, selling as high as \$11.50 to dealers. In the Valley district, \$17.50 seems to have become the ruling mill price for No. 1 heavy melting steel, but dealers are offering only \$16.75 to \$17 for Youngstown delivery. In Detroit, dealers are offering 50c. to 75c. a ton less for scrap than a few days ago.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.50 to \$15.00
No. 2 heavy melting steel.	14.00 to 14.50
Compressed sheet steel.	14.00 to 14.50
Light bundled sheet	
stamp'gs	12.00 to 12.50
Drop forge flashings.	12.25 to 12.75
Machine shop turnings.	9.50 to 10.00
No. 1 railroad wrought.	12.75 to 13.00
No. 2 railroad wrought.	14.50 to 15.00
No. 1 busheling	13.00 to 13.50
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.	16.00 to 16.50
Low phos., billet, bloom	
and slab crops.	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap.	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings.	11.00 to 11.50
Mixed bor'gs and short	
turn'gs	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
Cupola Grades	
No. 1 cast.	16.50 to 17.00
Railroad grate bars.	11.00 to 12.00
Stove plate.	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

this quarter and at \$20.50 per ton for next quarter, prior to the advance, but sellers did not, in most cases, offer the usual opportunity to consumers to cover at the old price. At present, buying is small, but the principal consumers are said to be showing more interest in covering for the first quarter. Basic iron is strong, eastern Pennsylvania furnaces quoting on a basis of \$19.50 per ton, furnace. About 20,000 tons of basic for a Coatesville, Pa., consumer has not yet been closed. Demand for low phosphorus continues good, sellers reporting active buying by wire rod producers and manufacturers of rolls. The New York State producer of low phosphorus iron reports its stocks considerably reduced, but does not expect to blow in its furnace until next year.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to	
2.25 sil.	\$20.76 to \$21.76
East. Pa. No. 2X, 2.25 to	
2.75 sil.	21.26 to 22.26
East. Pa. No. 1X.	21.76 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.00
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b.	
N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b.	
furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to	
2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—New business is small, but most mills are engaged in filling a good backlog of orders. Prices are being maintained at 2c., Pittsburgh, or 2.32c., Philadelphia, except for occasional transactions at \$1 a ton less to preferred buyers.

Shapes.—Prices are fairly steady at 2.05c., f.o.b. nearest mill to consumer, or 2.11c., Philadelphia, using Pencoyd, Pa., as a basing point for this district. Deliveries range from a week on certain sizes to three weeks on others. Mills are quoting on sizable tonnages of shapes for fabricators and shipbuilders.

Plates.—Quotations on new business are unchanged at 2.05c. to 2.15c., Coatesville, or 2.37c. to 2.47c., Philadelphia, the higher price for small

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron	
bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½	
x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and	
deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats.	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅜-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.00c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Pig Iron Advanced 50c. a Ton—Scrap Prices Decline—Easier Tone in Steel Market

PHILADELPHIA, Nov. 5.—A decrease in the volume of new steel business is evident. Mills continue a good rate of operation, but deliveries are less extended on most products.

Foundry iron prices have been advanced by eastern Pennsylvania furnaces to \$20.50, furnace, for the rest of this year and to \$21, furnace, for first quarter delivery. Iron and steel scrap is decidedly weaker, recent sales showing reductions in price of about 50c. a ton, and sellers are freely offering to sell other grades at lower levels.

Ferromanganese.—Large consumers are not all covered for next year. Contracting for British ferromanganese is reported to have been rather small. For delivery throughout 1929, the quotation is \$105 per ton, seaboard.

Pig Iron.—Eastern Pennsylvania furnaces have advanced foundry iron to \$20.50 per ton for delivery to the end of this year and to \$21 per ton, base, for first quarter contracts. Some tonnage was closed at \$20 per ton for

lots. Deliveries range from about 10 days to three weeks. Bids for the building of four vessels, requiring 13,500 tons of plates, for the Export Steamship Co., New York, were opened today. The Department of Water Supply, Philadelphia, opens bids this week on a fabricated pipe line at Lardner's Point, for which about 9000 tons of plates will be required. Diamond pattern floor plates have been advanced \$2 a ton to 3.65c. per lb., Pittsburgh.

Sheets.—Occasional concessions of \$1 a ton from 2.75c., Pittsburgh, on black sheets continue to be reported, but the market on galvanized is firm at 3.50c., Pittsburgh, or 3.82c., Philadelphia. Blue annealed sheets are unchanged at 2c. and 2.10c., Pittsburgh, or 2.32c. and 2.42c., Philadelphia. There are reports of business taken at less than 2c., Pittsburgh, for blue annealed sheets narrower than 45 in., but sheet producers believe that these refer to sales of continuous mill sheets. Local consumers are specifying freely on their contracts and buying some additional tonnage.

Warehouse Business.—With some jobbers, October was the best month of the year and in most cases it is reported as considerably ahead of September. This month shows a continuation of active buying, and prices are being maintained with less shading than usual.

Imports.—In the week ended Nov. 3, 6935 tons of iron ore arrived at this port, of which 6700 tons was from Algeria and 235 tons from Spain. A total of 612 tons of chrome ore arrived from Portuguese Africa. Pig iron imports were 2100 tons from the United Kingdom and 152 tons from the Netherlands. Steel arrivals were as follows: From Sweden, 31 tons of steel billets and 42 tons of steel bars; from the United Kingdom, 15 tons of steel hoops, 8 tons of strip steel and 15 tons of steel scrap; from Germany,

57 tons of structural shapes, 16 tons of steel bars and 10 tons of steel scrap; from France, 10 tons of structural shapes and 501 tons of skelp.

Old Material.—Based on recent sales and the prices at which dealers are freely offering to sell most grades of scrap, the market is off about 50c. a ton. It is generally conceded that the maximum price of No. 1 heavy melting steel today is \$16 per ton, delivered, and a small tonnage has been sold to an eastern Pennsylvania mill at \$15.50. No. 2 grade has been bought by a Harrisburg consumer at \$12.50 per ton, delivered, and by a Pottsville, Pa., mill at \$12.75, delivered. Heavy breakable cast has declined to \$16 per ton on a recent sale to a Pottsville, Pa., consumer. One broker has sold 1000 tons of cast iron carwheels at \$16.50 per ton, delivered. Although transactions are not reported in other grades, brokers are offering to accept orders at about 50c. a ton less than the recent price peak.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$15.50 to \$16.00
Scrap T rails.....	15.00 to 15.50
No. 2 heavy melting steel.	12.50 to 12.75
No. 1 railroad wrought...	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)...	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars.....	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., hvy., 0.04% and under.....	19.00 to 20.00
Couplers and knuckles...	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
No. 1 blast f'nace scrap...	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00 to 15.50
Shafting	19.00 to 20.00
Steel axles	22.00
No. 1 forge fire.....	12.50 to 13.00
Cast iron carwheels.....	16.50
No. 1 cast.....	16.75 to 17.00
Cast borings (for chem. plant)	15.00 to 15.50
Steel rails for rolling....	15.50 to 16.00

above last year's 93,949 tons. A decline of 14 per cent in shipments from India and almost complete stoppage of those from Germany have been more than offset by an increase of over 24,000 tons coming from the United Kingdom, which holds first position this year, against third position last year.

Automobile Output Passes 4,068,000 in 10 Months

Production of cars and trucks during the first 10 months this year reached 4,068,727, surpassing all previous marks for a corresponding period, according to reports to the National Automobile Chamber of Commerce. The previous high mark for the first 10 months was in 1926, when 4,062,110 cars and trucks were turned out.

October output was estimated at 397,000 motor vehicles, compared with 434,915 in September, and 227,510 in October last year. October was 75 per cent greater than October, 1927, but 8 per cent under September, this year.

Reports indicated that more than 800,000 American cars and trucks would be sold outside of the United States this year. During the first nine months more than 627,000 vehicles were shipped to 107 countries. This foreign demand exceeds last year's high mark of 643,634 vehicles.

Spanish-English editions of standard specifications of the American Society for Testing Materials, published by the Superintendent of Documents, Government Printing Office, Washington, for sale at 5c. per copy, have now appeared for carbon steel and alloy steel axles and other forgings for railroad use and for welded and seamless steel pipe.

Van Norman Machine Tool Co., Springfield, Mass., on Oct. 1 took over the sale of its products for garage and automotive trade, such as valve grinders, etc., which have been marketed through the Van Dorn Electric Tool Co., Cleveland. The Van Norman company will also market electric tools made by Stanley Rule & Level Division, Stanley Works, New Britain, Conn., including electric drills and other small tools, to automobile and garage trade. Distribution will be through jobbers. Leo F. Hunderup has been appointed sales manager.

A new Prest-O-Lite gas plant has commenced operations in Birmingham, Ala., to supply the local demand for dissolved acetylene used in oxy-acetylene welding and cutting. With this addition, the Prest-O-Lite chain now numbers 34 acetylene producing plants situated in industrial centers throughout the country.

Decline in Pig Iron Imports in September

Imports of pig iron in September are reported by the Department of Commerce at 10,437 gross tons. This is a reduction of 20 per cent from the August incoming movement of 12,990 tons, but is much higher than the 6055 tons for July. A marked change has taken place in the origin of pig iron, compared with August. The

Netherlands supplied 40 per cent of the September total, followed by British India with 36 per cent and the United Kingdom in third position. In the preceding month British India supplied almost 60 per cent and shipments from the Netherlands were below those from Great Britain. Imports in September almost balanced the exports of 10,228 tons.

For the first nine months the total of 104,777 tons is about 11 per cent

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT (In Gross Tons)				
	September		Nine Months Ended September	
	1928	1927	1928	1927
United Kingdom	2,225	90	39,552	15,025
British India	3,758	6,242	38,027	44,142
Germany		500	95	8,871
Netherlands	4,159	1,319	21,832	20,787
Canada			378	689
France		1,000	300	2,500
Belgium			202	699
Norway	263		675	
All others	32	18	3,716	1,236
Total	10,437	9,169	104,777	93,949

Pacific Coast

Oil Storage Tanks Take Upward of 4000 Tons of Plates— Steel Demand Less Active

SAN FRANCISCO, Nov. 3 (*By Air Mail*).—Featuring the Pacific Coast iron and steel markets this week was the award of a number of oil storage tanks, calling for more than 4000 tons of plates, to the Western Pipe & Steel Co. Demand, generally, is by no means active.

Pig Iron.—This market is quiet. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil.	2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—The only award in excess of 100 tons this week called for 350 tons for highway work in Ventura County, and was placed with S. Pearson of Santa Monica, Cal. Inquiries include 188 tons for a bridge near Benham, Cal.; 129 tons for a bridge in Orange County, Cal., and 114 tons for a bridge near Wolf Point, Mont., across the Missouri River. Quotations on out-of-stock material, both in Los Angeles and San Francisco, are about 1.80c., base. On merchant bar steel, 2.35c., c.i.f., appears firm both at San Francisco and Los Angeles.

Plates.—Improvement in demand for plates is noted. Outstanding awards were 1800 tons for six 118,000-bbl. tanks for the Texas Co., Los Angeles; 1650 tons for three 170,000-bbl. tanks for the Wilshire Oil Co., and 565 tons for one 80,000 and three 10,000-bbl. tanks for the Hancock Oil Co., Los Angeles, all placed with the Western Pipe & Steel Co. Opening of bids on 231 tons of 24-in. riveted pipe for Seattle has been postponed until Nov. 2. Bids were opened this week on 185 tons of 20-in. shore pipe for the United States Engineer Office, San Francisco. Prices continue to range from 2.20c. to 2.25c., c.i.f. Coast ports.

Shapes.—Only one award exceeding 100 tons was reported in the week. This was 175 tons for a telephone building at San Bernardino, Cal., and was booked by the Union Iron Works. An award is expected within a few days on 2300 tons for the Methodist Book Concern Building in San Francisco, on which the McClintic-Mar-

shall Co. is low. Inquiries of the week include 300 tons for two apartments on Broadway, San Francisco; 170 tons for a bridge near Benham, Cal., and 667 tons for a bridge over the Missouri River near Wolf Point, Mont. On the latter project, the Missouri River Valley Bridge & Iron Co. is low bidder. Plain domestic material continues firm at 2.35c., c.i.f.

St. Louis

Pig Iron Sales of 45,000 Tons Include 33,000 Tons of Basic— Steel Demand Continues Active

ST. LOUIS, Nov. 5.—Heavy sales again featured the pig iron market, with the demand for basic in the lead. Of total sales of 45,000 tons by the St. Louis Gas & Coke Corporation, the basic total was 33,000 tons, divided into lots of 15,000 tons, 10,000 tons, 6000 tons and 2000 tons, the second and last-named orders for delivery this year, and the remainder for first quarter of next year. All of the basic sales were to melters in the St. Louis industrial district. Buying has been largely by makers of steel underframes for railroad cars. Of 11,450 tons of foundry iron, all for first quarter, 7800 tons was sold to radiator manufacturers in lots of 3500 tons, 3100 tons and 1200 tons, and 3650 tons in lots of 100 to 500 tons, much of which will go to stove manufacturers, who are enjoying an unexpectedly large reorder business. The local maker has advanced its price 50c. a ton to \$20 to \$20.50. The leading Southern maker sold 1000 tons, principally for prompt shipments, to stove manufacturers. Southern interests have not opened their books for first quarter.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.
Granite City, Ill.	 \$20.00 to \$20.50
N't'n No. 2 fdy., deliv'd St. Louis.	21.66
Southern No. 2 fdy., deliv'd	20.67
Northern malleable, deliv'd	21.66
Northern basic, deliv'd	21.66

Freight rates: 81c. Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Shipments of domestic grades of coke have been heavy from by-product ovens to out-of-town dealers as a result of colder weather. Dealers in St. Louis, proper, however, continue to buy in small quantities, permitting the ovens to carry stocks for them. The heavier melt has brought increased buying of metallurgical grades.

Rails and Track Supplies.—The Missouri Pacific has issued an inquiry for 4,000,000 tie plates, 2,000,000 of which are to be copper bearing. Inquiries for rails for 1929 are expected to be issued shortly by the lines centering here.

Cast Iron Pipe.—H. E. Conner, Redwood City, Cal., took 144 tons of 4 and 6-in. Class B pipe for the improvement of E Street, Tulare, Cal. Bids on 1284 tons of 24-in. Class B pipe for Seattle were held over until Nov. 2. For this project alternate bids are also being taken on riveted steel pipe. Lewiston, Idaho, has opened bids on 109 tons of 2 to 8-in. Class B pipe.

Steel Pipe.—The Hancock Oil Co., Los Angeles, has awarded a contract for 10 miles of 4-in. and 10 miles of 6-in. line pipe, requiring about 800 tons, to Allen Brothers, Inc. Oil country goods continue to move well in the southern part of the State.

Finished Iron and Steel.—October was a very satisfactory month, with bookings not quite so heavy as in September, although sufficiently large to insure 100 per cent operations, according to the Granite City Steel Co. The demand for all grades of sheets, including galvanized, black and blue annealed, continues unabated, with prices firmer than they have been for many months. The demand for plates in the district is not exceptionally heavy, although sufficient to operate this department of the Granite City Steel Co. almost at capacity. Warehouse business in October ran from 10 to 15 per cent ahead of the preceding month and October, 1927.

Old Material.—The market for old material continues strong. Although heavy melting and heavy shoveling steel are unchanged, other price advances are recorded. Miscellaneous standard-section rails, railroad springs, No. 1 busheling, cast iron borings, rails for rerolling and steel angle bars are 25c. a ton higher, while No. 1 railroad wrought is up 50c. a ton. Wrought iron bars and transoms, in which there has been no activity until this week, jumped \$1.75 a ton, and railroad malleable advanced \$1. The fact that large car orders are expected in the district has added

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	 3.15c.
Soft steel bars	 3.15c.
Small angles, ½-in. and over	 3.15c.
Small angles, under ½-in.	 3.55c.
Small channels and tees, ¾-in. to 2 ¾-in.	 3.75c.
Spring steel, ¼-in. and thicker	 5.00c.
Black sheets (No. 24)	 5.00c.
Blue ann'l'd sheets (No. 10)	 4.00c.
Galv. sheets (No. 24)	 5.40c.
Struc. rivets, ½-in. and larger	 5.65c.
Com. wire nails, base per keg	 \$3.40
Cement c't'd nails, 100 lb. keg	 3.40

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	 3.25c.
Bars, soft steel or iron	 3.15c.
Cold-fin. rounds, shafting, screw stock	 3.75c.
Black sheets (No. 24)	 4.10c.
Galv. sheets (No. 24)	 4.95c.
Blue ann'l'd sheets (No. 10)	 3.45c.
Black corrug. sheets (No. 24)	 4.15c.
Galv. corrug. sheets	 5.00c.
Structural rivets	 3.75c.
Boiler rivets	 3.75c.
	Per Cent Off List
Tank rivets, ¾-in. and smaller, 100 lb. or more	 65
Less than 100 lb.	 60
Machine bolts	 60
Carriage bolts	 60
Lag screws	 60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50

considerable to the strength of the market. Shipments of old material from the country are increasing. Railroad lists include: Pennsylvania Lines, 50,830 tons; Baltimore & Ohio, 9819 tons; St. Louis-San Francisco, 14 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel	.....	12.25 to 12.75
No. 1 locomotive tires	.....	14.50 to 15.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	.....	14.75 to 15.25
Railroad springs	.....	15.75 to 16.25
Bundled sheets	.....	9.50 to 10.00
No. 2 railroad wrought	.....	13.25 to 13.75
No. 1 busheling	.....	9.50 to 9.75
Cast iron borings	.....	8.75 to 9.25
Iron rails	.....	13.00 to 13.50
Rails for rolling	.....	15.25 to 15.75
Machine shop turnings	.....	9.00 to 9.50
Steel car axles	.....	18.50 to 19.00
Iron car axles	.....	27.00 to 27.50
Wrot. iron bars and trans.	.....	22.00 to 22.50
No. 1 railroad wrought	.....	12.00 to 12.50
Steel rails, less than 3 ft.	.....	17.00 to 17.50
Steel angle bars	.....	14.25 to 14.75
Cast iron carwheels	.....	13.75 to 14.25
No. 1 machinery cast	.....	15.00 to 15.50
Railroad malleable	.....	14.75 to 15.00
No. 1 railroad cast	.....	14.00 to 14.50
Stove plate	.....	12.50 to 13.00
Agricult. malleable	.....	11.50 to 12.00
Relay. rails, 60 lb. and under	.....	20.50 to 23.50
Relay. rails, 70 lb. and over	.....	26.50 to 29.00

Detroit

Automobile Production Ahead of a Year Ago

DETROIT, Nov. 5.—Automobile production for October, estimated at 397,000 units, is approximately an 8 per cent decline from the production of the previous month, and is reflected in the employment barometer of the Employers' Association of Detroit, which has shown a total decrease of 11,600 during October. A total of 285,936 individuals on the combined payrolls of representative firms employing two-thirds of the city's industrial population is 3648 less than that of the week previous, but is 93,525 ahead of the same period a year ago.

The Ford Motor Co. has in the past week surpassed all employment records, with a total of 186,313 individuals on the payroll. The two large local plants are now employing 125,000 men. The production rate on the model A cars has reached 6000 daily, with a total of 615,000 units of that line in service. A special body style is being planned by the Ford company, which will be priced about \$100 higher than the regular line. Production on the deluxe model will be begun about the first of the year.

The Willys-Overland Co. has reduced its production, and is preparing to get under way on the new Whippet model before the first of the year.

An increase of about 50 per cent is being planned for the plant of the Wire Wheel Corporation of America, which is now turning out about 52,000 wheels a month.

The J. W. Brown Mfg. Co., now working on 10-hr. shift, expects to add a night shift in the next three weeks. This company has received a large order from the Ford Motor Co.

In the structural market, firmness

of structural shapes, bars and plates has succeeded in bringing out a substantial amount of industrial work in small jobs. Speed of erection is an important factor, and the number of bidders on any one job is inclined to be low. The small shops for the past six or eight weeks have been busy and

at the present time have approximately three weeks' work ahead. The large shops are practically filled up for the remainder of the year.

Bids are being taken on the National City Bank of Battle Creek, which will include about 400 tons of structural steel.

Boston

Price Advance by Buffalo Furnaces Not Fully Established by Sales of the Week

BOSTON, Nov. 6.—The recent advance to \$17.50, base furnace, on Buffalo pig iron has not been adhered to in all of the transactions of the past week. The new prices are being obtained in some instances, however. Buffalo furnaces have solicited car lots at \$17 per ton, furnace base, and furnaces east of Buffalo have made cuts on sizable tonnages. A furnace took 1000 tons of No. 2X iron at less than \$22 a ton, delivered, the actual figure being at or close to \$21.50, according to the purchaser. About two-thirds of the 8000 tons sold by furnace representatives here the past week is to be delivered this year, the rest early in 1929. Sales included 1000 tons of No. 2X to a Massachusetts foundry, 1000 tons No. 2X and No. 1X to another New England consumer, 1000 tons No. 2 plain and No. 2X to a New Jersey melter and many smaller tonnages.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.41
*Buffalo, sil. 2.25 to 2.75..	22.91
†Buffalo, sil. 1.75 to 2.25..	21.28
†Buffalo, sil. 2.25 to 2.75..	21.78
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	\$23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	 3.365c.
Structural shapes—	
Angles and beams	 3.365c.
Tees	 3.365c.
Zees	 3.465c.
Soft steel bars, small shapes	 3.265c.
Flats, hot-rolled	 4.15c.
Reinforcing bars	 3.265c. to 3.54c.
Iron bars—	
Refined	 3.265c.
Best refined	 4.60c.
Norway rounds	 6.60c.
Norway, squares and flats	 7.10c.
Spring steel—	
Open-hearth	 5.00c. to 10.00c.
Crucible	 12.00c.
Tie steel	 4.50c. to 4.75c.
Bands	 4.015c. to 5.00c.
Hoop steel	 5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.	 *3.55c. to 5.55c.
Squares and flats	 *4.05c. to 7.05c.
Toe calk steel	 6.00c.
Rivets, structural or boiler	 4.50c.
Machine bolts	 50 and 5
Carriage bolts	 50 and 5
Lag screws	 50 and 5
Hot-pressed nuts	 50 and 5
Cold-punched nuts	 50 and 5
Stove bolts	 70 and 10

*Including quantity differentials.

Cast Iron Pipe.—Prices on small pipe have been advanced \$1.50 to \$2 a ton. For 4-in. stock, \$46.10 a ton, delivered common Boston freight rate points, is the prevailing price, and for 6 to 12-in. stock, \$41.10. The market for 16 in. and larger pipe is openly \$40.10 a ton, but concessions undoubtedly can be obtained on desirable tonnages. Salem, Mass., will close bids Nov. 6 on 100 tons of 6-in. pipe. Private business is exceptionally good for this time of the year.

Old Material.—Shipments of old material out of New England are holding up well, and there seems to be a somewhat better demand for machinery cast from New England foundries. Brokers report that material is coming out more freely, probably because of a feeling among owners that the advance in values has been checked. On the surface there appears to be a little easier market for heavy melting steel, yet all transactions reported in this territory the past week have continued within a range of \$11.50 to \$12 a ton, on cars, shipping point. The export market is at a standstill, presumably because of the inability of shippers to secure vessel space at desired rates.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$11.50 to \$12.00
Scrap T rails	 11.00 to 11.50
Scrap girder rails	 10.50 to 11.00
No. 1 railroad wrought	 11.50 to 12.00
No. 1 yard wrought	 9.50 to 10.00
Machine shop turnings	 7.00 to 7.50
Cast iron borings (steel works and rolling mill)	 6.25 to 6.60
Bundled skeleton, long	 9.00 to 9.50
Forge flashings	 9.50 to 10.00
Blast furnace borings and turnings	 6.25 to 6.60
Forged scrap	 7.00 to 7.50
Shafting	 14.50 to 15.00
Steel car axles	 16.50 to 16.75
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.00 to 10.50
Rails for rolling	 11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	 \$14.00 to \$14.50
No. 1 machinery cast	 15.50 to 16.00
No. 2 machinery cast	 13.50 to 14.00
Stove plate	 11.00 to 11.50
Railroad malleable	 15.00 to 15.50

Coke.—The New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., have announced that no change will be made in the contract price of foundry coke of \$11 a ton, delivered within a \$3.10 freight rate zone. That price has

been in effect for at least six months. Both companies have opened their books for first half contracts.

Fabricated Steel.—Bids have been asked on 4000 tons of fabricated steel for the United Shoe Machinery Cor-

poration's Boston office building. In addition, there are many small inquiries. Fabricators, however, are sadly in need of tonnages, and some low prices are being made even on small jobs.

Birmingham

Heavy Demand for Finished Steel Continues But Pig Iron Buying Is Light

BIRMINGHAM, Nov. 5.—The pig iron market has been unusually quiet in the past two weeks, only a few small-lot sales being reported. Nearly all melters are covered for the year and they have shown little interest in first quarter iron. Shipments are slightly greater than production. The base price remains at \$16.25 for deliveries during November and December. The Tennessee company has changed its Ensley No. 2 and 4 furnaces from foundry to basic iron. The No. 2 furnace of the Republic Iron & Steel Co., blown out last June for relining, is now ready for operating. Eighteen furnaces are in blast, of which 13 are on foundry, four on basic and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—No evidence appears of a letup in the heavy buying of the past several weeks. Bars, plates and shapes are doing better than at any time in the past several seasons. Mills are adhering closely to quotations. Rail inquiries are increasing, and the Tennessee company is expected to announce the reopening of its Ensley rail mill by the middle of this month. Structural steel lettings have been light during the week, but some good tonnages are up for figures. Reinforcing bar manufacturers are securing enough tonnage in small orders to maintain backlogs. Structural plate works report a good run of inquiries. The Tennessee company is now operating five open-hearths at Ensley, an increase of two during the

week. Seven remain in operation at Fairfield, and the Gulf States Steel Co. is working four at Alabama City.

Cast Iron Pipe.—The market is quieter than it has been in some time. Recent inquiries have involved small tonnages. Plants are operating at 60 to 70 per cent of capacity, and even at this rate backlogs are being reduced considerably. Makers are holding closely to the quotations of \$36 to \$37 on 6-in. and larger sizes, and it is reported that an advance of \$1 a ton on the smaller orders will be made shortly.

Coke.—New sales continue light. Most foundries are well covered through the first quarter. The Woodward Iron Co. placed 22 additional ovens in operation last week and is now operating 222 of its 230 ovens. Other operations in the district are the same. Prices are unchanged, quotations being \$5 for both spot and foundry coke.

Old Material.—A gradual easing up in the market has developed during the past two weeks. Orders are lighter. No price changes have been made. There has been a decided drop in shipments during the last 10 days.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Buffalo

Pig Iron Buying at New Prices Emphasizes Strength of Market—Steel Mills Continue High Operations

BUFFALO, Nov. 7.—Buying of pig iron at the new prices has not been heavy, but it has been in sufficient volume to indicate that the new prices

are firm. Furnace stocks are low and shipments against old orders are steady. The melt is apparently heavy. A sizable amount of buying for the first quarter has been done, but considerable requirements are not covered. Inquiry includes several lots, both malleable and foundry, up to 500 and 1000 tons. A fair volume of recent business at the new prices is for delivery in this last quarter, but some will run into the first quarter. An indication of the strength of the market is that a lot of 5000 to 10,000 tons of foundry purchased in this dis-

trict by an outside speculative interest has been taken by a furnace.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$17.50 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.00 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.00 to 20.00
Malleable sil. up to 2.25..	18.00 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal...	27.28

Finished Iron and Steel.—The operation of local mills continues at top notch. Capacity of all of them is being pushed to get out tonnage. Prices of bars, plates, shapes and sheets continue firm. Wire demand is strong, though seasonal products like road building mesh, etc., show a decline. Reinforcing bar demand is fair, and the price firm at 2.515c., warehouse. The Teachers' College job at Buffalo will require about 300 tons of reinforcing steel. A large volume of metal lath is being sold.

Old Material.—After a slight reactionary tendency caused principally by the action of a large consumer in regulating shipments, the market has again developed strength. The regulatory order is still in effect, but is not quite so rigidly enforced. The strength of the local market is being maintained in part by a heavy demand from outside districts. The Youngstown district is taking heavy shipments of No. 1 heavy melting steel, No. 2 heavy melting steel and hydraulic compressed sheets, while turnings and borings are being sent into Pittsburgh district from Buffalo. The stove plate market has dropped off somewhat, as the principal consumer is out of the market, possibly for the rest of the year. Some small sales of knuckles and couplers and rolled steel wheels have been made at \$17.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades

No. 1 heavy melting steel.	\$15.75 to \$17.00
No. 2 heavy melting steel.	14.25
Scrap rails	15.50 to 16.00
Hydraulic comp. sheets....	14.25
Hand bundled sheets.....	12.00 to 12.50
Drop forge flashings.....	13.50 to 14.00
No. 1 busheling	14.75 to 16.00
Hvy. steel axle turnings...	13.50 to 14.00
Machine shop turnings....	8.00 to 8.50
No. 1 railroad wrought...	14.50 to 15.00

Acid Open-Hearth Grades

Knuckles and couplers....	17.00 to 17.50
Coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50

Electric Furnace Grades

Short shov. steel turnings.	11.00 to 11.50
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Blast Furnace Grades

Short shov. steel turnings.	11.00 to 11.50
Short mixed borings and turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
No. 2 busheling	11.00 to 12.00

Rolling Mill Grades

Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00

Cupola Grades

No. 1 machinery cast.....	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars....	13.00 to 13.50
Steel rails, 3 ft. and under.	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50

Malleable Grades

Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

Cincinnati

Pig Iron Users Showing More Interest in First Quarter—Steel Demand Has Eased Slightly

CINCINNATI, Nov. 5.—With prices showing a further tendency to advance, pig iron users are showing greater interest in anticipating first quarter needs. Sales the past week amounted to about 7000 tons, including 1500 tons of Jackson County silvery iron for a Michigan consumer and a like tonnage of foundry iron for a central Ohio melter. A local dealer booked an order for 1000 tons of low phosphorus iron for delivery to an Ohio customer. The chief inquiry is for 2500 tons of foundry iron for a Springfield, Ohio, company. Northern Ohio foundry iron has gone up another 50c. a ton and now is quoted at \$18.50, base furnace, while a Tennessee furnace, which has been taking first quarter business at \$16.25, base Birmingham, has withdrawn that quotation for delivery after Dec. 31. Southern makers are reported to be contemplating an increase of 75c. a ton for the first quarter, although no announcement of the new schedule is expected for a week or two. The only seller at Ironton, Ohio, with stock on its yards, is quoting \$18, base furnace.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25.....\$19.89
Ala. fdy., sil. 1.75 to 2.25..... 19.94
Ala. fdy., sil. 2.25 to 2.75..... 20.44
Tenn. fdy., sil. 1.75 to 2.25..... 19.94
S'th'n Ohio silvery 8 per cent..... 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—A slight curtailment of buying by steel consumers is seen, although the lull is regarded as temporary. District sheet mills report October bookings were in excess of capacity, but decreased specifications the past week have brought the unfilled tonnage down to a point almost identical with that of a month ago. Production continues at 100 per cent of capacity, with the present scale of operations assured for two weeks. The volume of business has been maintained at a high level. Prices are steady at 4c., base Pittsburgh, for automobile body stock; 2c. for blue annealed; 2.75c. for black, and 3.50c. for galvanized. Recent advances in primary materials, as well as the

strong position of producers, make likely an increase in first quarter sheet prices, according to district mills. Demand for wire goods is sluggish and common wire nails are unchanged at \$2.69 per keg, delivered Cincinnati. Bars, shapes and plates are moving fairly well at 1.95c. to 2c., base Pittsburgh. A nearby maker of rail steel reinforcing bars has increased prices \$1 a ton to a minimum of 1.90c., base mill.

Coke.—A considerably lessened demand for by-product foundry coke the past week suggests the possibility that shipments this month will fall well behind those in October. However, the increased movement of domestic grades is expected to offset partially the slump in foundry coke. By-product coke makers have announced an advance of 50c. and 25c. a ton in egg and walnut sizes respectively, the new schedule effective Nov. 1 being \$5, ovens, on egg and \$3.75 on walnut. Foundry coke is unchanged at \$7, ovens, or \$9.64, delivered Cin-

cinnati. Prices at Detroit also are undisturbed on both foundry and domestic grades.

Old Material.—Heavy melting steel is off 25c. a ton and scrap rails for melting have declined 50c., but other items are firm and unchanged. Since district mills are booking good orders and are likely to maintain operations at a satisfactory rate during the remainder of the year, dealers are not anticipating drastic shrinkage in prices. However, developments of the past week have made them more conservative in purchasing available material. Lists closing this week include the Norfolk & Western, 5000 tons, and Baltimore & Ohio, 9800 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:
Heavy melting steel.....\$13.25 to \$13.75
Scrap rails for melting..... 13.50 to 14.00
Loose sheet clippings..... 9.50 to 10.00
Bundled sheets 10.25 to 10.75
Cast iron borings..... 9.75 to 10.25
Machine shop turnings..... 9.25 to 9.75
No. 1 busheling..... 11.00 to 11.50
No. 2 busheling..... 6.50 to 7.00
Rails for rolling..... 14.00 to 14.50
No. 1 locomotive tires..... 14.00 to 14.50
No. 2 railroad wrought..... 13.50 to 14.00
Short rails 19.00 to 19.50
Cast iron carwheels..... 12.50 to 13.00
No. 1 machinery cast..... 18.50 to 19.00
No. 1 railroad cast..... 14.75 to 15.25
Burnt cast 10.50 to 11.00
Stove plate 10.50 to 11.00
Brake shoes 10.25 to 10.75
Railroad malleable 13.50 to 14.00
Agricultural malleable ... 13.00 to 13.50

Canada

Dominion Iron and Steel Business Continues on High Level—Prospective Building Construction Large

TORONTO, ONT., Nov. 5.—Canadian business is on an exceptionally high level. Of 10 indicators reported by the Dominion Bureau of Statistics for September, every one exceeded the figure for the previous year and in two cases gains of 75 per cent or more were recorded. While the figures deal with many phases of business, the iron and steel industry easily leads. With 1927 figures equaling 100, business in the pig iron industry in Canada was at 175 for the first nine months of 1928, and steel was at 185 for the same period. Employment advanced to 109; car loadings to 119; building permits, 148; imports, 116; exports, 113; coke, 129; coal, 104.

An indication of Canadian agricultural prosperity has been the extensive purchasing of farm machinery. More business has been done in the farm implement trade in western Canada during 1928 than in any one of the past 15 years, and a further illustration of the increasing purchasing power of the farmer is that most of the transactions have been for cash.

Pig Iron.—Spot sales in October reached a new high record, and the demand is being carried into November. Forward buying was not large in October, although a few small contracts were closed. While some inquiry is coming out for forward delivery, the bulk of new business is for spot shipment. Spot sales hold to a weekly average of about 1200 tons. Some belated water shipments are being made, but as Lake navigation

nears its close such shipments are falling off. Prices remain firm.

Prices per gross ton:

Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75.....\$23.60
No. 2 fdy., sil. 1.75 to 2.25..... 23.60
Malleable 23.60

Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75..... 25.00
No. 2 fdy., sil. 1.75 to 2.25..... 25.00
Malleable 25.00
Basic 24.00

Imported Iron, Montreal Warehouse
Summerlee 33.50
Carron 33.00

Structural Steel.—Current and prospective business is in large volume. It is estimated that approximately \$20,000,000 worth of structural steel work in Canada is pending. Included in this estimate are large buildings in eastern Canada and a good deal of bridge work for the railroads in western Canada and for the railroads and municipal governments in eastern Canada. Among pending awards are 500 tons for a new hotel at Orillia, Ont.; 350 tons for a garage at Bay and St. Albans Streets, Toronto, for Hyslop Brothers; 200 tons for plant addition for Hinde & Dauch Paper Co. of Canada, Toronto; 2000 tons for Hudson Bay Co. store at Calgary, Alta. Awards include: 100 tons to the Dominion Bridge Co. for club house on Pine Avenue, Montreal; 200 tons to the Sarnia Bridge Co. for General Hospital at Sarnia, Ont.; 150 tons to the Dominion Bridge Co., Redford Building, for addition to plant of Willys-Overland, Ltd., Toronto; 1500 tons to Manitoba Bridge & Iron

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reforc. bars.....	3.15c.
Rail steel reforc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.....	\$18.00
4-in.....	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.....	39.00

Works, Winnipeg, Man., for bridge at Miniota, Man., for the Canadian National Railways.

Old Material.—Hamilton and Toronto buyers continue to place good orders for heavy melting steel and turnings. Machinery cast, stove plate and malleable scrap are also moving freely to consumers throughout Ontario. Montreal dealers report a good demand for heavy melting steel, machinery cast, stove plate and wrought iron and steel axles.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast....	16.00	13.00
Stove plate	13.00	13.00
Standard carwheels.....	16.00	13.00
Malleable	13.00	13.00

Per Net Ton

No. 1 machinery cast....	15.00	.....
Stove plate	9.00	.....
Standard carwheels.....	13.00	.....
Malleable scrap	13.00	.....

Detroit Scrap and Pig Iron Strong

DETROIT, Nov. 5.—Prices of old material in this district continue to show strength. Sales are usually on the high side of the range. Shipments of pig iron promise to keep on the heavy basis of last month. Pig iron prices for spot and first quarter delivery are firm at \$19.50 to \$20, base.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets....	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	10.00 to 10.50
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

Pennsylvania Railroad to Electrify Its Lines

The Pennsylvania Railroad has announced that electrification of its entire service will be continued at a total cost of \$100,000,000. Approval of the plans by the board of directors was made public last week by W. W. Atterbury, president. The work of electrification will be spread over seven or eight years, and will be accomplished by sections.

At present the road is electrified from the Sunnyside yards, Long Island City, to Manhattan Transfer, and from Philadelphia to Wilmington. The latter section has just been completed. The next step will be the electrification of the line between Trenton, N. J., and Philadelphia, which will be completed about 1930. The Newark to New Brunswick section will then be done in about a year and a half, after which the New Brunswick to Trenton section will be undertaken. The next development

will be in and around Pittsburgh. Overhead construction will be used.

In five years the Pennsylvania will require between 250 and 300 electric locomotives. The Copper and Brass Research Association has estimated that the electrification project will call for about 55,000,000 lb. of copper.

Texas and Pacific Buys Machine Tools

The Missouri-Kansas-Texas Railway has bought the following machine tools for use in its shops at Smithville, Tex.: Putnam heavy-duty, motor-driven axle lathe, Putnam 48-in., heavy-duty carwheel borer and Oster motor-driven pipe shearing and cutting machine from Manning, Maxwell & Moore, and a Cincinnati 42-in. vertical boring and turning mill, two United States 18-in., motor-driven floor grinders, Sidney 24-in. lathe and Sidney 18-in. lathe from Huey & Phillips Machinery Co., Dallas, Tex.

Increase in Number of Steel Workers

Iron and steel plants to the number of 201 had 267,160 employees on the payroll in September, compared with 265,848 employees in the same plants in August. The increase was 1/2 per cent. There was, however, a reduction in the amount of payroll, which came to \$8,180,197 for one week in September, against \$8,296,664 for the corresponding week in August, a loss of 1.4 per cent.

Similarly, 981 identical plants turning out foundry and machine shop products showed 247,851 employees in September, a gain of 1.1 per cent over August, while the payroll for one week at \$7,346,854 in September showed a gain of 0.1 per cent over August. Machine tool plants to the number of 145 had 33,099 employees in September, a gain of 11.9 per cent over August. The payroll for one week in September was \$1,077,449, a gain of 12.4 per cent over August.

Imports of Iron Ore Decline

September iron ore imports are reported by the Department of Commerce at 211,494 gross tons, compared with 225,538 tons in August, which was the highest total since last February. The September figures, except for August, are the largest since April,

but are below those of September, 1927, when 224,524 tons came in.

Imports in the first nine months were 9 per cent below those for last year. The total of 1,887,201 tons included considerably more than 1,000,000 tons from Chile, which country accounted for 56 per cent of the aggregate imports. French Africa and Cuba remain respectively in second and third positions. Imports coming from Sweden within the first nine months were only one-tenth as great as last year, due mainly to the strike in the Swedish mines.

Railroad Equipment

Wabash to Buy 2000 Automobile Cars

INQUIRY from the Wabash for 2000 automobile cars was the outstanding development of the week. The Chicago & North Western has inquired for 325 freight cars in addition to the 400 last week and a Texas oil company expects to buy 200 tank cars. Details of the week's business follow:

Lehigh & New England is asking for bids on repairs to 200 50-ton gondola cars.

Richardson Refining Co., Fort Worth, Tex., expects to purchase 200 3000-gal. tank cars.

St. Louis-San Francisco has ordered underframes and parts for rebuilding 10 box cars from American Car & Foundry Co.

Rapid City, Black Hills & Western has ordered one 70-ton locomotive from Heisler Locomotive Works and is inquiring for three observation and two baggage and mail cars.

Central Railroad of New Jersey will rebuild 499 ice cars at its own shops.

Delaware, Lackawanna & Western has ordered two dining cars from Pullman Car & Mfg. Corporation.

New York, New Haven & Hartford is inquiring for 20 underframes for wood baggage cars.

Wabash Railway is in the market for 2000 automobile box cars.

Chicago, Rock Island & Pacific will buy five baggage cars.

Chicago & North Western will purchase 300 flat cars and 25 70-ton hopper cars.

In Germany there are 275 plants manufacturing agricultural machinery and employing 45,000 to 50,000 workers, as against 135, which employed about 25,000 workers in 1913, according to a report received by the Department of Commerce from Trade Commissioner James E. Wallis, Jr., Berlin.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Chile	130,800	131,000	1,079,100	1,044,600
Cuba	31,000	22,000	265,786	314,613
Spain	5,461	15,100	22,208	26,717
Sweden .....	.....	7,676	19,614	195,802
French Africa	27,525	31,849	362,130	370,822
Canada	167	1,962	45,359	16,235
Other countries	16,541	14,937	93,004	92,239
Total	211,494	224,524	1,887,201	2,061,028

Non-Ferrous Metal Markets

Copper Quiet and Firm, Tin Moderately Active and Steady, Lead and Zinc Without Change

NEW YORK, Nov. 5.

Copper.—Consumers have become decidedly less insistent in placing orders for copper and the runaway conditions, which were regarded as imminent a week ago, have given way to extreme quietness. Consumers both here and abroad have not bought much copper the past week. This has relieved the pressure on producers and left prices where they were. Electrolytic copper is firm at 16c., delivered in the Connecticut Valley, with the price to foreign consumers 16.25c., c.i.f. European ports, as the official quotation of Copper Exporters, Inc. Domestic consumers are fully covered for the rest of the year, and it is esti-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY					
	Nov. 5	Nov. 3	Nov. 2	Nov. 1	Oct. 31
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.25
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	49.25	49.25	49.62½	49.75	49.37½
Lead, New York.....	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.32½	6.32½	6.32½	6.32½	6.32½
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

mated that they have purchased 80 to 90 per cent of their January requirements, with some February metal contracted for. Foreign consumers must still buy some metal for this year and considerable for January and February. The entire aspect of the market has changed, however, in that buying for at least three months ahead has taken the place of hand-to-mouth purchases. Producers have assured consumers that there is copper enough to go around and the fear of a scarcity has practically disappeared. The Lake copper market is also very quiet at 16c. to 16.12½c., delivered.

Copper Averages.—The average price of Lake copper for October, based on daily quotations in THE IRON AGE, was 15.50c. The average price of electrolytic copper was 15.16c., refinery, or 15.41c., delivered in the Connecticut Valley.

Tin.—In the week ended Saturday,

Nov. 3, about 1200 tons changed hands in a quiet market. The business was about equally divided between consumers and dealers. The two most active days were Oct. 30 and Nov. 1, when the sales on each day were about 400 tons. This year's delivery was principally involved, with far futures neglected. Considerable tin was declared for delivery on Nov. 1 against November contracts. Deliveries into consumption in October were 6475 tons, with 4598 tons in stock and landing on Oct. 31. The market today is very quiet, preceding election, with spot tin quoted at 49.25c., New York. Under continued speculative conditions in London, prices today were again higher, with spot standard quoted at £229 7s. 6d., future standard at £224 15s. and spot Straits at £229 7s. 6d. The Singapore price today was £224 10s.

Lead.—Substantial buying by nearly

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	50.50c. to 51.50c.
Tin, bars	52.50c. to 53.50c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	55.50c.
Tin, bar	57.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig	7.00c. to 7.25c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	59.00c.
Solder, ½ and ½.....	33.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since the advances of Oct. 29. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled.....	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.

Rods—	
High brass	18.25c.
Naval brass	20.25c.

Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.25c.	11.25c.
No. 1 yel. brass turnings	9.25c.	9.75c.
No. 1 red brass or compos. turnings..	9.50c.	10.50c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	20.50c.	
Copper, hot rolled.....	25.00c.	
Copper, cold rolled, 14 oz. and heavier	27.25c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	26.87½c.	
Copper	27.87½c.	
Brass Rods	18.25c.	
Brazed Brass Tubes.....	28.50c.	

all classes of consumers is reported in a moderately active market. Orders are mostly for November delivery but some December contracts have been made. Prices are firm at 6.32½c., St. Louis, and 6.50c., New York, the latter being the contract quotation of the leading interest.

Zinc.—This market continues quiet, but producers report a fair amount of business nearly every day. The feature is the continued steadiness of prices at 6.25c., East St. Louis, or 6.60c., New York. The price of ore remains at \$40, Joplin, with production and sales last week again practically offsetting each other.

Antimony.—Chinese metal is unchanged in a very quiet market at 10.50c. for spot and 10.25c. for futures, duty paid, New York.

Nickel.—Ingot nickel in wholesale lots is unchanged at 35c., with shot

nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 5.—A substantial volume of spot business has been placed in this market and prices are stronger. The old metal market is active in small-lot sales and prices for the red metal grades are higher.

Prices, per lb., in carload lots: Lake copper, 16.75c.; tin, 50.25c.; lead, 6.40c.; zinc, 6.35c.; in-less-than-carload lots; antimony, 11c. On old metals, we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

MANSFIELD, OHIO, 800 tons, building for Mansfield Tire & Rubber Co.

CLEVELAND, 150 tons, crane runway for Bourne-Fuller Co.

CLEVELAND, 100 tons, hangar for United States Air Line.

BATTLE CREEK, MICH., 400 tons, National City Bank.

FORT WAYNE, IND., 1500 tons, bank building.

CHICAGO, 10,000 tons, warehouse; Zuckery Davis, architect.

MILWAUKEE, 900 tons, garage.

NORTHERN PACIFIC RAILROAD, 1200 tons, bridges.

LIBERTY BEND, MO., 2500 tons, highway bridge across Missouri River.

HELENA, MONT., 667 tons, bridge over Missouri River near Wolf Point; Missouri River Valley Bridge & Iron Co., low bidder.

LONGVIEW, WASH., 13,000 tons, Longview-Rainier bridge; reported to have been tentatively awarded to Bethlehem Steel Co.

SAN FRANCISCO, 300 tons, two apartment buildings, Broadway near Laguarda Street; bids being taken.

Fabricated Structural Steel

Chicago Warehouse Will Take 10,000 Tons— Awards of 26,500 Tons

WITH a warehouse at Chicago calling for 10,000 tons, and a bridge at Longview, Wash., for 13,000 tons, new projects which have come out in the last week totaled 37,500 tons. The following awards, amounting to 26,500 tons, include no jobs of outstanding size:

NEW YORK, 10,640 tons reported to the Structural Steel Board of Trade; 6500 tons in the following jobs not previously reported: Column cores for buildings at Varick and Carleton Streets and at Spring Street and Sixth Avenue, and apartment building at Forty-eighth Street and Third Avenue, to Levering & Garrigues Co.; apartment building at 420 Lexington Avenue, to Paterson Bridge Co.; Midtown Hospital at 309 East Forty-ninth Street and Wilson Publishing Building at 952 University Avenue, to A. E. Norton, Inc.; apartment building at Eighty-sixth Street and East End Avenue, to Lehigh Structural Steel Co.

BROOKLYN, 250 tons, building for Brooklyn Ash Removal Co., Inc., to Shoemaker Bridge Co.

NEW YORK CENTRAL RAILROAD, 800 tons, bridge at Rensselaer, N. Y., to Phoenix Bridge Co.

NEWARK, N. J., 920 tons, hotel at 15 Hill Street, to Hinkle Steel Construction Co.

HOLLAND, N. J., 2000 tons, power house, to Belmont Iron Works.

CUMBERLAND, MD., 1000 tons, plant for Celanese Corporation of America, to Pittsburgh Bridge & Iron Co.

PHILADELPHIA, 2800 tons, Atwater Kent Building, to Shoemaker Bridge Co.

McKEES ROCKS, PA., 225 tons, building for Pressed Steel Car Co., to Pittsburgh Bridge & Iron Co.

MERCER COUNTY, PA., 120 tons, bridge, to Pittsburgh-Des Moines Steel Co.

PITTSBURGH, 300 tons, Madison grade school, to J. E. Moss Iron Works.

PORT ARTHUR, TEX., 1500 tons, refinery for Texas Co., to Petroleum Iron Works.

SOUTHERN PACIFIC RAILROAD, 600 tons, bridges, to American Bridge Co.

BATTLE CREEK, MICH., 650 tons, building for Nichols & Shepard, to Indiana Bridge Co.

DETROIT, 350 tons, additions to plant of Hupmobile Motor Co., to Guibert Steel Co.

DETROIT, 510 tons, Cunningham Store, to Whitehead & Kales Co.

DETROIT, 120 tons, building for Fisher Body Corporation, to Mahon Structural Steel Co.

MILWAUKEE, 200 tons, building for Ladish Drop Forge Co., to Hackendahl & Schmidt, local.

MENOMINEE AND GREEN BAY, WIS., 2500 tons, bridges, to Wisconsin Bridge Co., Milwaukee.

INDIANA HARBOR, IND., 5000 tons, mill building for Youngstown Sheet & Tube Co., to Hansell Elcock Co., Chicago; previously reported as 3935 tons.

SAN BERNARDINO, CAL., 175 tons, telephone building, to Union Iron Works.

LOS ANGELES, 1800 tons, plates for six 118,000-bbl. tanks for Texas Co., to Western Pipe & Steel Co.

LOS ANGELES, 1650 tons, plates, three 170,000-bbl. tanks for Wilshire Oil Co., to Western Pipe & Steel Co.

LOS ANGELES, 565 tons, plates, one 80,000 and three 10,000-bbl. tanks for Hancock Oil Co., to Western Pipe & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 4000 tons, United Shoe Machinery Corporation office building.

NEW HAVEN, CONN., 500 tons, armory.

WHITE PLAINS, N. Y., 500 tons, Elks Club.

STANDARD OIL CO. OF NEW JERSEY, 500 tons, oil tanks in Texas.

DURHAM, N. C., 300 tons, dormitory for Duke University.

Reinforcing Steel

Illinois Highway Work Calls for 1000 Tons

AWARDS of less than 2700 tons reported during the last week were considerably under the recent average. New projects, calling for 2400 tons, included 1000 tons for highway work in Illinois. Awards follow:

BROOKLYN, 100 tons, building for Carl H. Schultz Corporation, to Concrete Steel Co.

BROOKLYN, 200 tons, Pizer Building, to Kalman Steel Co.

GLENS FALLS, N. Y., 100 tons, telephone building, to Kalman Steel Co.

PHILADELPHIA, 800 tons, building for Atwater Kent Mfg. Co., to Truscon Steel Co.

CHICAGO, 225 tons of rail and billet steel bars, apartment building at 2912 Commonwealth Avenue, to Concrete Engineering Co.

EVANSTON, ILL., 300 tons of rail steel bars, apartment building, to Calumet Steel Co.

MINNEAPOLIS, MINN., 500 tons of rail steel bars, Hodgson Building, to Inland Steel Co.

ST. LOUIS, 100 tons, garage at Ninth and Chestnut Streets, to Missouri Rolling Mills Corporation.

SACRAMENTO, CAL., 350 tons, highway work in Ventura County, to S. Pearson.

Reinforcing Bars Pending

BOSTON, Brighton district, 220 tons, high school.

BROOKLYN, 165 tons, building for National Lead Co.

BUFFALO, 300 tons, Teachers' College.

CHICAGO, 300 tons, apartment building on Independence Boulevard; A. L. Himelblau, architect.

SPRINGFIELD, ILL., 1000 tons, State highway work.

HELENA, MONT., 114 tons, bridge over Missouri River near Wolf Point; Missouri River Valley Bridge & Iron Co., low bidder.

SACRAMENTO, CAL., 188 tons, bridge over Southern Pacific tracks near Benham; bids Nov. 21.

SACRAMENTO, 129 tons, bridge in Orange County; bids opened.

PERSONAL

J. LESTER PERRY, whose appointment as Worcester, Mass., district manager for the American Steel & Wire Co. was mentioned in THE IRON AGE, Sept. 20, has been associated with the company since young manhood, when he entered the cost department at the Worcester works. He has always been engaged in the Worcester district, comprising plants

man of the rope mill at South works in 1917 and later was assigned to the main office as wire rope engineer. In 1919 he was transferred to the New Haven plant, becoming assistant superintendent in 1922 and superintendent in 1925.

FREDERICK B. RENTSCHLER, president Pratt & Whitney Aircraft Co.,

C. J. FREUND, supervisor of apprentices for the Falk Corporation, Milwaukee, spoke on "Apprentice Training in Foundries" at the regular monthly meeting of the Wisconsin Gray Iron Foundry Group, held at the Republican House, Milwaukee, Nov. 7. HAROLD S. FALK, vice-president and works manager of the Falk Corporation, led the discussion.

JOHN E. OLSON, for many years with the Chicago sales organization of the Niles-Bement-Pond Co., has joined the sales force of the E. C. Cummings Co., 545 West Lake Street, Chicago, representing a number of well known manufacturers of machine tools.

W. H. WILLIAMS, who as vice-president of the Delaware & Hudson Co. was also senior vice-president of its subsidiary companies, the Chateaugay Ore & Iron Co. and the Hudson Coal Co., has resigned and has been succeeded as senior vice-president of the Chateaugay and Hudson companies by F. W. LEAMY, who is also vice-president of the Delaware & Hudson Co. J. R. LINNEY has been appointed vice-president in charge of operations of the Chateaugay and Hudson companies. RALPH W. CLARK, formerly New York manager of Pilling & Co., is vice-president and general sales agent of the Hudson Coal Co. The sales of low phosphorus pig iron made by the Chateaugay Ore & Iron Co. will be handled as heretofore by Pilling & Co., Philadelphia and New York.

DWIGHT E. WOODBRIDGE, Duluth, whose long connection with Lake Superior iron mining has made him well known to IRON AGE readers, has been appointed as directing engineer of Fremont Grant, Inc., 165 Broadway, New York, and will have charge of operations at the company's gold properties in Mariposa County, Cal. Bought by Gen. John C. Fremont in 1843, this tract of 70 square miles was found to carry 14 miles, or about one-fifth, of the great Mother Lode. In all about \$30,000,000 in gold has been taken from the Grant, but for 20 years it has been idle. Active development will begin soon and Mr. Woodbridge will establish operating headquarters at Mt. Bullion, Cal.

JAMES A. FARRELL, president United States Steel Corporation, MYRON C. TAYLOR, chairman of its finance committee, JOHN HULST, vice-president and chief engineer and I. LAMONT HUGHES, vice-president in charge of operations, made a few days visit last week of corporation plants at Lorain, Cleveland and Youngstown.

JOHN A. MANLEY, for the past three years manager of sales development for Fairbanks, Morse & Co., Chicago, has been elected vice-president in charge of sales. He was graduated



M. W. REED



J. L. PERRY



C. F. HOOD

at Worcester, New Haven, Conn., and Trenton, N. J., and had been assistant district manager since 1925. He became assistant superintendent of the North works in 1916, superintendent of the South works in 1917 and superintendent of the North works in 1918, holding the latter position until his promotion in 1925. He succeeds CLINTON S. MARSHALL, who, after 50 years of service with the Steel & Wire company and its predecessor, the Washburn & Moen Mfg. Co., retires from the more strenuous duties of management to become district superintendent. In this position he will act in an advisory capacity.

CLIFFORD F. HOOD and MALCOLM W. REED, who have been named assistant district managers at Worcester, were previously superintendents at the South works and New Haven works, respectively. Mr. Hood was graduated in electrical engineering from the University of Illinois and has been continuously employed at the company's Worcester plants since leaving college except in 1917 and 1918. He began work in the cable department at South works and later served as superintendent of that division. He became assistant superintendent at South works in 1925 and superintendent in 1927. Mr. Reed is a graduate of the United States Naval Academy and served as an ensign in the navy before entering the wire rope department at the North works of the Steel & Wire company. He became fore-

Hartford, Conn., has been made a director of the newly formed Boeing Airplane & Transport Co.

GANO DUNN, president J. G. White Engineering Corporation, New York, has been made an alumni trustee of Columbia University, New York, to serve for six years. He was graduated from that university's School of Mines in 1891. Mr. Dunn is a former chairman of the Engineering Foundation, a former chairman of the National Research Council, and a past-president of the American Institute of Electrical Engineers.

CLIFFORD E. MESSINGER, vice-president Chain Belt Co., Milwaukee, has been elected a director of the Second Wisconsin National Bank, Milwaukee.

HORACE C. KNERR, consulting metallurgical engineer, Philadelphia, will address the Baltimore-Washington chapter of the American Society for Steel Treating at Baltimore on Friday evening, Nov. 16. His subject will be "The Use of Metals in Aircraft Construction."

HOWARD E. OBERG, for several years representative of the Billings & Spencer Co.'s machinery division at Detroit, has been called in to the main office at Hartford, Conn., to become sales manager of the machinery division.

from Northwestern University in 1911 and entered the sales department of the Republic Tire & Rubber Co. After four years with this organization he joined the advertising staff of one of the Chicago newspapers. Later for years he was connected with Hart, Schaffner & Marx, studying the problems of the retail merchants.

FRED C. P. DANIELS, formerly division superintendent of No. 1 open-hearth furnace, steel and roll foundries and shops at the Bethlehem, Pa., plant of the Bethlehem Steel Co., has been named vice-president in charge of operations of the Garrison and Midland plants of Mackintosh-Hemphill Co., Pittsburgh. In this position Mr. Daniels returns to his first field of endeavor, having entered the employ of Mackintosh-Hemphill Co. upon his graduation from Worcester Polytechnic Institute in 1904. In 1911 Mr. Daniels became connected with the Pittsburgh Iron & Steel Foundries Co., Midland, Pa., as assistant superintendent and metallurgist, being particularly interested in the development of and pioneering in alloy products for the rolling mill industry. From 1914 until 1923 he was employed by the Wheeling Mold & Foundry Co., having been intimately connected with the sale, manufacture and use of iron, steel and alloy rolls. From 1923 until 1928 he was connected with the Bethlehem Steel Co.

Visit America for Russian Tractor Plant

A commission of thirteen Soviet engineers engaged on the construction of the new \$17,500,000 Dzherzinsky tractor plant at Stalingrad has arrived in the United States to purchase equipment and arrange for engineering cooperation on the construction and layout. The delegation is headed by Mr. Tsentsipper, chief engineer on the construction work.

"The Dzherzinsky plant, on which work was recently begun, will have an annual capacity of 20,000 tractors and will be the largest tractor factory in the U. S. S. R.," stated Mr. Tsentsipper at the offices of the Amtorg Trading Corporation, New York. "We expect to complete the work by 1930 and to attain an output of 4000 tractors in 1932. The full capacity of the plant will be reached by 1935."

Tractors are also being produced in the U. S. S. R. in the Tractor Division of the Putilovetz Works in Leningrad, which has been producing 1500 tractors annually and is being enlarged to an annual capacity of 5000 tractors. During the current year it is expected to turn out 3000 tractors at the Putilovetz plant.

The Dzherzinsky commission will visit a number of American tractor plants and will arrange with a number of firms for special training of Soviet engineers in American production methods.

OBITUARY

EGBERT HABBERTON GOLD, president Vapor Car Heating Co., Chicago, died Nov. 3, at his home at Holland, Mich. Born at Cornwall, Conn., he went to Chicago in 1890 and was for 15 years manager and director of the Gold Car Heating Co., which was later reorganized as the Vapor Car Heating Co.

RICHARD DEVENS, for the last year associated with the Link-Belt Co., Chicago, as sales engineer for its line of crane products in the Eastern territory, with headquarters at 233 Broadway, New York, died at his home in that city on Nov. 3. He was born at Boston 63 years ago and was graduated from the Massachusetts Institute of Technology in 1888. Prior to his association with the Link-Belt Co., he was for 22 years manager of the New York office of the Brown Hoisting Machinery Co., Cleveland.

WALTER W. NOWAK, European manager for the Niles-Bement-Pond Co. and the Pratt & Whitney Co., died in Paris on Nov. 1. He had been with the affiliated companies since his graduation from Cornell University in 1905, representing them at first on the Pacific Coast and later in Chile, Argentina and Brazil. While in Chile, he secured the contract for the equipment of the central repair shops of the Chilean State Railways, at that time the finest installation of the kind in South America. For the last 10 years, he had been in entire charge of the European business of the companies with headquarters in London and Paris. He was one of the best known American machine tool representatives in Europe.

ALBERT P. PREYER, district manager of sales at Cincinnati for the American Rolling Mill Co., Middletown, Ohio, died Oct. 30 at Hendersonville, N. C., following an attack of pneumonia. He was 43 years of age and a graduate of Cornell University.

SHAFFER N. HOLSTEIN, superintendent of the blooming and bar mills of the American Rolling Mill Co., Middletown, Ohio, died suddenly of acute indigestion on Oct. 29. He was 64 years of age and had been associated with the company for 15 years.

ALFRED G. PLACE, chief electrical engineer for the Youngstown Sheet & Tube Co., Youngstown, whose death in that city on Oct. 25 was mentioned in THE IRON AGE last week, was born at Woburn, Mass., Sept. 27, 1887. He was graduated from the Massachusetts Institute of Technology in 1908. He went to the Sheet & Tube company in 1913 as an electrical engineer. At the time of his death he was vice-

president of the American Institute of Electrical Engineers.

BURTON S. GIER, founder of the Gier Pressed Steel Co., Lansing, Mich., and a director of the Motor Wheel Corporation, died Oct. 19, at Rochester, Minn., aged 61 years. He went to Lansing in 1905 and in 1908 formed a partnership with Elmer Dail, which was known as the Gier & Dail Mfg. Co., to manufacture light pressed metal work. Out of this company grew two manufacturing plants, the Dail Steel Products Co. and the Gier Pressed Steel Co., the latter now being a unit of the Motor Wheel Corporation. Mr. Gier was vice-president and treasurer of the Motor Wheel Corporation until January, 1928, when he resigned on account of ill health.

FREDERICK S. BLACKALL, vice-president and general manager of the Taft-Peirce Mfg. Co., Woonsocket, R. I., whose death occurred on Oct. 6, was widely known as a consulting engineer, contractor and manufacturer of automatic machines, precision tools and printing machinery. He was born in Brooklyn 63 years ago. From 1888 until 1903 he was president of Blackall & Baldwin, New York electrical contractors. At the time of his death, besides his association with the Woonsocket company, he was president of the Interchangeable Parts Co., vice-president and general manager of the Mott Haven Co. and a director of Parks & Parks, Inc. In recent years Mr. Blackall had been forced, on account of ill health, to remain comparatively inactive in the management of his affairs, his son, Frederick S. Blackall, Jr., having assumed many of his responsibilities.

ARTHUR E. PARSON, treasurer and general manager of the Brown-Lipe Gear Co., Syracuse, N. Y., died on Oct. 31, on a train en route from Cleveland to Syracuse, of heart disease. He was 61 years of age and his early work as a patent attorney brought him into close association with the founders of the gear company. He served as legal advisor to the firm for a number of years and in 1911 became actively identified with it.

W. H. SHOEMAKER, consulting superintendent of erection for the Phoenix Bridge Co., Phoenixville, Pa., died suddenly Nov. 3, at his home in Phoenixville. He was 64 years of age and had been with the Phoenix company for about 30 years, the past 17 of which he was superintendent of erection. In August he was appointed consulting superintendent of erection, ill health having forced his partial retirement from business activity.

Machinery Markets and News of the Works

Outlook Continues Favorable

Machine Tool Demand Expected to Maintain Present Pace Through November and Possibly to End of Year

ALTHOUGH sales of machine tools in the past week in some centers fell off slightly, generally attributed to the approach of election day, the volume of inquiry carried over from last month gives reasonable assurance that business in November will at least equal that of October. In fact, the outlook for the remainder of the year is considered favorable.

Automobile companies are reported to have their shop equipment well rounded out for the production of new models, but in general industrial lines there is a good demand for single tools.

Tractor manufacturers in the Chi-

cago territory are looked upon as one of the most promising sources of business, notwithstanding their already large purchases this year. The International Harvester Co. is preparing a large list for its Fort Wayne, Ind., plant, and the Allis-Chalmers Mfg. Co., Milwaukee, intends to make sizable additions to the equipment of its tractor plant at Springfield, Ill.

The White Motor Co., Cleveland, has bought a dozen or more machines for the manufacture of a new type of truck motor. The E. W. Bliss Co., Brooklyn, has continued its purchases of tools for the production of the Bliss Jupiter airplane engine.

New York

NEW YORK, Nov. 5.—A slight falling off in machine tool orders was generally attributed to the fact that it was pre-election week. A good deal of business is pending or in sight, and a continued good demand through the remainder of the year is expected, particularly if the outcome of the election is regarded favorably in business circles. The E. W. Bliss Co., Brooklyn, has placed additional orders for the manufacture of Bliss Jupiter airplane engines. Further expansion of facilities by the Wright Aeronautical Corporation may come within the next few months. Development of the aviation industry is one of the most promising signs for 1929.

Niles-Bement-Pond Co. has sold a 79-in. driving wheel lathe, four four-spindle drum-type milling machines, one eight-spindle drum-type milling machine, a 30-in. x 20-ft. Time-Saver lathe, a Niles-Acme 16-in. shaper, two Morris 3-ft. radial drills, Long & Alstatter I-beam punch, Marshalltown rotary shear, Burke tapping machine, Cincinnati high-speed bench tapping machine, Brown & Sharpe universal grinder, three Ransom grinders and a Cincinnati high-speed two-spindle drill. Pratt & Whitney division sold six No. 2 jig borers, 10 lathes of various types and sizes, No. 3 die sinker, two 6-in. vertical shapers and a No. 12 profiling machine.

Plans are being arranged by Montana Power Co., 25 Broadway, New York, for new hydroelectric power plant near Great

Falls, Mont., with initial capacity of 70,000 hp., to cost more than \$3,500,000 with transmission system.

Liquidometer Corporation has been organized with capital of 110,000 shares of stock, no par value, to take over and expand Liquidometer Co., Thompson Avenue, Long Island City, manufacturer of gasoline gages and other liquid measuring instruments. New company will develop output, including manufacture of seven new types of gages and instruments. A stock issue of \$750,000, is being sold, part of fund to be used for expansion. William S. Yerkes is president.

Kleinert & Klie, 250 Park Avenue, New York, architects, are completing revised plans for a six-story automobile service, repair and garage building at 798-804 Union Street, Brooklyn, to cost more than \$200,000 with equipment.

Crane Co., 836 South Michigan Avenue, Chicago, and 23 West Forty-fourth Street, New York, has purchased property on Dutch Kills Basin, Long Island City, totaling 77,000 sq. ft., for new factory branch and distributing plant, with pipe department, etc. Company has also acquired buildings and property at White Plains, N. Y., for a similar plant.

Hornl Signal Mfg. Corporation, 290 Hudson Street, New York, manufacturer of traffic signal equipment, brass and bronze signs, etc., has arranged for sale of stock, part of fund to be used for expansion in production.

Kent Garage Investing Corporation, 350 Madison Avenue, New York, has purchased property, 100 x 140 ft., at Sixty-first Street and Ninth Avenue, for multi-story automobile service, repair and gar-

age building, to cost more than \$1,500,000 with equipment.

Improved Cinder Co., 90 West Street, New York, has plans for a two-story metal reduction plant, 25 x 130 ft., at Brooklyn, to cost more than \$60,000 with equipment. Kleinert & Klie, 250 Park Avenue, New York, are architects.

Leslie W. Rolfe, 1718 Fifth Avenue, Troy, N. Y., and associates have organized Rolfe Pump & Machinery Corporation, and plans operation of local plant to manufacture pumping equipment, parts, etc. James W. Clark, 39 First Street, is interested in new company.

Western Electric Co., 195 Broadway, New York, has leased six-story building at Johnston Avenue and Pine Street, Jersey City, N. J., for new storage and distributing plant in conjunction with works at Kearny.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has purchased property on Raritan Bay, South Amboy, N. J., for new steam-operated electric generating plant, to have initial output of 50,000 kw. It is reported to cost more than \$4,500,000, instead of smaller amount previously noted.

Wright Aeronautical Corporation, Lewis Street, Paterson, N. J., has awarded contract to John W. Ferguson Co., 152 Market Street, for another plant unit, to cost about \$70,000.

Public Service Electric & Gas Corporation, Public Service Terminal, Newark, N. J., is completing plans for two-story power substation at Bloomfield, N. J., to cost over \$65,000 with equipment.

C. F. Pease Co., Chicago, maker of blue print machinery and drafting room supplies, has removed its New York sales room, formerly in Grand Central Terminal, to 12 East Forty-fourth Street where entire seventh floor will be occupied. T. K. Murney is Eastern sales manager.

Vandermark Mfg. Co., 510 Broadway, New York, has been organized to manufacture adjustable curtain rods. Alvah Vandermark is president.

Automatic Electric Steam Corporation, 1 East Forty-second Street, New York, has been organized as subsidiary of Ross Safety Switch Corporation to manufacture electrical equipment for electric steam radiation. Company is licensed under Ross patent rights and principal products are radiator control switches and electric immersion heating elements. All manufacturing is being done under contract.

New England

BOSTON, Nov. 5.—Business in high-production machinery was fairly active the past week. One local house sold a number of machines to Massachusetts manufacturers, but details are withheld. The trade looks for better business before the close of 1928, as there has been a noticeable increase in inquiries for various types of lathes, jig

The Crane Market

NEW inquiry for overhead cranes has been small in the past week, but there is some desirable business pending, and with election past increased business is expected. A number of inquiries for locomotive cranes are in the market from contractors, and two for export have been closed in the past week.

In the Pittsburgh district there is an inquiry for a 5-ton overhead crane from the Westinghouse Electric & Mfg. Co. for its East Pittsburgh, Pa., works. There is also an inquiry for a 5-ton, 44-ft. span crane for the Pottstown, Pa., plant of

McClintic-Marshall Co. and for a 5-ton, 57-ft. span crane for the Enameled Metals Co., Etna, Pa.

In the Chicago district the Western Electric Co., is inquiring for a 2-ton, 70-ft. span crane and a 7½-ton, reel handling crane. The Chicago Bridge & Iron Co., is in the market for a 10-ton electric crane.

Among recent purchases are:

Ulen Contracting Co., 120 Broadway, New York, 25-ton locomotive crane for export from Industrial-Brownhoist Corporation.

Asiatic Petroleum Co., 65 Broadway, New York, 15-ton crawl-tread locomotive crane from the Austin Co.

Carnegie Steel Co., two 15-ton, 37-ft. span, double drum, mill type cranes for the Duquesne works, from Alliance Machine Co.

Ladish Drop Forge Co., Cudahy, Wis., 10-ton, overhead electric crane from a Wisconsin builder.

International Harvester Co., Rock Island, Ill., 10-ton, 39-ft. span, 5-motor, gantry crane from Milwaukee Electric Crane & Mfg. Corporation.

boring machines, presses and drilling equipment.

Used tool dealers are doing practically no direct business with users, but are selling some equipment in single units to salesmen who resell to manufacturers at prices higher than asked by machinery dealers. Inquiries for used tools are few.

Small tools continue to move freely, and it is expected that sales in 1928 in all probability will be the largest for any year since the war.

General Electric Co., West Lynn, Mass., has started work on a two-story, 20 x 100 ft. power house addition.

Work has been started on a one-story addition, 44 x 149 ft., by the Providence Lithograph Co., Prairie Avenue, Providence, R. I. Miscellaneous electrical equipment will be used.

Westfield Boy's Trade School, Westfield, Mass., C. Derby, principal, is having plans prepared for a two-story and basement addition, 72 x 118 ft. Ralph M. Sizer, 12 Elm Street, Westfield, is architect.

Ovens, power equipment, conveying and other machinery will be installed in new one-story plant, 100 x 150 ft., to be built by Fraser Baking Co., 50 Cherry Street, Burlington, Vt., to cost over \$85,000.

Horace R. Whittier Co., Bristol, Conn., has broken ground in Pequabuck, Conn., for an enameling plant, one-story, 50 x 100 ft. It recently sold its Bristol plant to a gas making company. Used and new baking and miscellaneous equipment will be required.

Lynd-Farquhar Co., 419-425 Atlantic Avenue, Boston, machine tools, will move to larger quarters at 326-330 Congress Street, South Boston, about Dec. 1.

Plans have been filed by Pratt & Whitney Aircraft Corporation, 450 Capitol Avenue, Hartford, Conn., for a one-story sheet metal shop addition.

Enterprise Mfg. Co., 164 First Street, Boston, manufacturer of copper and metal specialties, will establish a new plant at Cambridge, where production will be concentrated in future.

Gillette Safety Razor Co., 15 West First Street, Boston, has authorized increase in capital from 2,000,000 to 3,000,000 shares of stock, no par value, part of proceeds to be used for expansion.

Stamford Gas & Electric Co., Stamford, Conn., has plans for a new artificial gas plant, 50 x 105 ft., to cost over \$175,000.

Green Mountain Power Co., operated by People's Hydro-Electric Vermont Corporation, Montpelier, Vt., is planning new hydroelectric power project in Vermont

early next year, to cost more than \$1,000,000 with transmission lines. Company has work under way on similar project at Middlesex, Vt., to have initial capacity of 5000 hp. Arrangements have been concluded for purchase of hydro-electric and steam power plants of Woodbury Granite Co., near Hardwick, Vt., to be improved for increased capacity. E. C. Deal is president.

Officials of Wetmore-Savage Automobile Equipment Co., 584 Commonwealth Avenue, Boston, have organized Wetmore-Savage Aircraft Corporation, with capital of \$105,000, to operate local manufacturing and distributing plant. Robert B. Wetmore is president, and Charles Hyde, treasurer.

Providence Brass & Aluminum Foundry Co., 219 Aborn Street, Providence, R. I., has been organized to manufacture brass, bronze and other metal castings. Company has plant at above address and is in market for additional furnace molding machine and ingot metals. Arsen G. Avedisian is proprietor.

Landers, Frary & Clark, New Britain, Conn., have awarded contract to Morton C. Tuttle Co., Boston, for one-story enameling building, 135 x 200 ft., and one-story storage building, 30 x 123 ft. Platforms and concrete roadway are included and estimated cost of entire operations is \$110,000.

South Atlantic

BALTIMORE, Nov. 5.—Western Electric Co., 195 Broadway, New York, has acquired 125 acres at River View Park, Baltimore, for new plant for which plans will be drawn at once. Initial unit is reported to cost more than \$5,000,000.

Virginia-Carolina Rubber Co., 3500 Lewis Street, Richmond, Va., manufacturer of automobile tires, etc., is arranging expansion program to cost more than \$400,000, including buildings and equipment. Department will be established for production of mechanical rubber goods in addition to present output. Company is arranging for sale of note and stock issues to total about \$500,000.

Board of District Commissioners, District Building, Washington, will receive bids until Nov. 15, for metal shop, wood shop, including 11 motor-driven wood-turning lathes, and foundry equipment for McKinley high school, until Nov. 19 for 3041 steel single tier lockers for public schools.

Virginia Public Service Co., Charlottesville, Va., is disposing of bond issue of \$3,000,000, part of proceeds to be used for extensions and improvements, including transmission line construction. Company is said to be planning hydroelectric

power plant on Big and Little Rivers, Rockbridge County, to cost about \$2,000,000.

Board of Education, Baltimore, is said to be planning installation of manual training equipment in new three-story Northeast junior high school to cost \$500,000, for which bids will soon be asked on general contract. William W. Emmaft, Union Trust Building, is architect; C. L. Reeder, 916 North Charles Street, is mechanical engineer.

Draper Mfg. Co., Hopedale, Mass., manufacturer of textile looms and other textile machinery, has taken options on property near Spartanburg, S. C., for new branch assembling plant, to cost more than \$65,000 with equipment.

Chamber of Commerce, Charleston, S. C., is at head of project to construct and operate municipal airport on 800 acres at Ten-Mile Station, to include hangars, repair and reconditioning shops and other units, to cost more than \$60,000.

Joseph E. Sperry, Calvert Building, Baltimore, architect, has filed plans for five-story automobile service, repair and garage building to cost about \$200,000 with equipment.

Albert Lewis, Greenville, S. C., and associates plan construction of one-story ice-manufacturing plant, 75 x 100 ft., to cost about \$70,000 with equipment.

Salem Quarries, Inc., Winston-Salem, N. C., is planning an expansion program, including installation of quarrying, crushing and other machinery, power equipment, etc.

Lorenson-Harbottle, Inc., Aberdeen, N. C., has been organized to engage in fabrication of sheet metal, plates and shapes, including such products as vegetable bins, waste baskets, radiator enclosures. Company will also specialize in repair and maintenance of motors and power equipment. Plant has been erected and machinery installed.

Philadelphia

PHILADELPHIA, Nov. 5.—Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has authorized electrification of its lines from New York to Philadelphia and thence to Wilmington, Del., about 325 miles, to be carried out over a period of seven to eight years at cost of about \$100,000,000, to be expended at rate of approximately \$15,000,000 per year; 60 per cent of cost will be for overhead transmission and catenary line construction, power substations, switching stations, etc., and 40 per cent for rolling stock. Initial work will cover electrification between Trenton and Philadelphia during coming year. Contracts

have been made with Philadelphia Electric Co. and Public Service Electric & Gas Co., Newark, N. J., for power supply and these utilities will expand generating and transmission facilities.

Lumber & Millwork Co., York Road, Philadelphia, will erect two-story addition to cost about \$50,000.

Publicker Commercial Alcohol Co., Snyder Avenue and McKean Street, Philadelphia, will rebuild plant destroyed by fire Oct. 28.

Keystone Brass & Rubber Co., 826 Arch Street, Philadelphia, has leased two floors in building at 117 North Third Street for expansion.

Philadelphia Nonferrous Foundry Co., Philadelphia, has been formed by Edward W. Taylor, Jr., 3030 Queen Lane, and associates, to operate a local plant for production of aluminum, brass, bronze and other metal castings. Andrew R. McCown, 814 Carpenter Street, is also interested in new organization.

New interests have become identified with Bellanca Aircraft Corporation, Wilmington, Del., and plans are being arranged for expansion. About \$2,000,000 will be added to company capital, considerable part of fund to be used for development work. Company has secured an initial order for 300 airplanes for an aviation service to be operated in West Virginia. Guiseppe M. Bellanca will continue as head of company.

School District of Upper Darby Township, Upper Darby, Pa., care of Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, architects, plans installation of manual training equipment in new two-story junior high school to cost \$750,000, for which bids are being asked on general contract until Nov. 15.

Vacuum Oil Co., 61 Broadway, New York, has plans for a three-story addition, 40 x 80 ft., to its lubricating oil plant at Paulsboro, N. J., to cost over \$50,000 with equipment. H. J. Wright is chief engineer.

Diamond Machine Co., 453 North Marshall Street, Philadelphia, has purchased local property for new one-story tool manufacturing plant and machine works, to cost over \$40,000,000 with equipment.

George Bendon, Philadelphia, has leased property at 118 East Cumberland Street for a machine and automobile repair shop.

E. Keeler Co., Williamsport, Pa., manufacturer of boilers, has removed its Philadelphia office from Rush Building to 711 Bulletin Building. George W. Crawford and H. L. Peel are sales engineers in charge.

Buffalo

BUFFALO, Nov. 5.—Contract has been let by Joseph A. Sanders, 115-17 Lathrop Street, Buffalo, manufacturer of sheet metal products, roofing, etc., to William A. Walker, 24 Vernon Place, for two-story addition to cost about \$50,000 with equipment. H. E. Plumer & Associates, 775 Main Street, are architects and engineers.

New York Central Railroad Co., Buffalo, and 466 Lexington Avenue, New York, is said to be arranging early call for bids for one and two-story car repair shops at East Buffalo yards, to cost over \$65,000. F. B. Freeman is chief engineer.

Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, has awarded general contract to Crooker & Carpenter, Crosby Building, for one-story addition, to cost about \$30,000 with equipment.

Officials of New York Car Wheel Co., Niagara Street and Forest Avenue, Buffalo, headed by Frederick B. Cooley, president, have acquired a substantial interest in Houde Engineering Corporation, 537 East Delavan Avenue, manufacturer of automobile shock absorbers. Houde company has work under way on addition to triple, approximately, present capacity.

Pratt & Letchworth Co., 189 Tonawanda Street, Buffalo, manufacturer of steel and malleable iron castings, has work under way on a one-story addition to power department, to cost about \$20,000.

Emil Steinhurst & Sons, Inc., 1158 Mohawk Street, Utica, N. Y., manufacturer of gas fired hot air furnaces, radiator shields and inclosures and other sheet metal products, is installing new power-driven machinery for production of heavy sheet metal shapes. Company will then be in position to manufacture steel stair raisers, road decks, metal shelving and other products.

Glor Brothers & Willis Mfg. Co., Attica, N. Y., maker of farm machinery and equipment, has been dissolved and business will be taken over by Hudson Mfg. Co., Hastings, Minn. Hudson company is said to be planning to spend \$100,000 in new buildings and equipment.

Cleveland

CLEVELAND, Nov. 5.—Machine tool inquiry is plentiful, but sales were not as large the past week as during the early part of the month. October business with most dealers showed a gain over September. The White Motor Co. has purchased a dozen or more machines required to manufacture a new type of truck motor. Orders from the automotive industry in the Michigan territory have declined following active buying, and it is believed that motor car companies now have their equipment well rounded out.

Wheeling & Lake Erie Railway has sent out an inquiry for estimating purposes for an 80-in. wheel press and horizontal punching machine. Plants of local machine tool builders are well filled with orders, and deliveries are slow. A manufacturer of drilling machinery reports that it has more orders on its books at present than at any previous time in its history.

Wheeler Radiator Mfg. Co., 1637 Colamer Road, Cleveland, is enlarging its plant by an addition to its office and extensions to its manufacturing department. Latter will include a chromium plating department.

Plans are being completed by Atlas Foundry Co., West Sixty-ninth Street, Cleveland, for one-story addition, 32 x 90 ft., to cost about \$38,000 with equipment. A. G. Simon, Hippodrome Building, is architect.

Gears & Forgings, Inc., 3010 Woodhill Road, Cleveland, has awarded general contract to Industrial Construction Co., 308 Euclid Avenue, for three-story and basement addition, 72 x 72 ft., to cost about \$50,000 with equipment.

City Council, Lorain, Ohio, has authorized purchase of steam turbine and auxiliary equipment for municipal pumping plant, to cost about \$28,000.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, is disposing of a preferred stock issue of \$2,400,000, part of proceeds to be used for expansion, including new ice-manufacturing plants. Plans are under way for new plant at

Willoughby, Ohio, to cost about \$200,000 with equipment.

Timken Roller Bearing Co., Canton, Ohio, plans new one-story manufacturing addition, 131 x 285 ft., to cost more than \$125,000 with equipment. An addition is also proposed for storage and distributing service.

Goodyear-Zeppelin Corporation, Akron, Ohio, a subsidiary of Goodyear Tire & Rubber Co., has approved purchase of site at Fulton Flying Field for construction of plant to manufacture two Zeppelin aircraft for Government, and similar units, consisting of main steel hangar, 360 x 1200 ft., and 200 ft. high, with machine and repair shops, metal-working shop, woodworking department, assembling buildings, and other units, to cost more than \$2,000,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects and engineers. Paul W. Litchfield is president.

Smith-Armstrong Forge, Inc., 1209 Marquette Road, Cleveland, has been organized to operate metal forge and machine shop. Building has been leased and contract let for remodeling. Equipment orders have been placed, and machinery will probably be installed and ready for operation Dec. 15. Company's product will include forgings for cam and crankshafts, spindles, gear blanks and pinions, bevel gears, die blocks and special parts for automobiles and machine tools. Stock of alloy steels, open-hearth, electric and tool steels and irons will be carried.

Chicago

CHICAGO, Nov. 5.—Inquiry for machine tools carried over from last month bulks large and fresh requests for prices indicate an unusually favorable outlook for November. Business is still quite widely scattered in this territory and in diversified industries. Purchases on a larger scale are indicated by agricultural machinery manufacturers.

International Harvester Co. is preparing a list for its Fort Wayne, Ind., works and Allis-Chalmers Mfg. Co., Milwaukee, plans sizable additions to its tractor plant at Springfield, Ill. It is probable that Emerson-Brantingham Co., Rockford, Ill., will place large orders concurrent with transfer of J. I. Case Threshing Machine Co.'s tractor plant from Racine, Wis., to Rockford. Nash Motors Co., Racine, Wis., is in market for two 16-in. lathes, and the Chicago Board of Education will buy a 16-in. back geared shaper.

Bids will soon be asked by Buda Co., Harvey, Ill., manufacturer of railroad equipment and appliances for one-story addition, to cost about \$70,000 with equipment. Perkins, Chatten & Hammond, 160 North LaSalle Street, Chicago, are architects.

Electric Household Utilities Corporation, South Fifth Avenue and Twenty-second Street, Chicago, will soon begin superstructure for one and two-story plant, 80 x 80 ft., and 80 x 400 ft., at Cicero, Ill., to manufacture electrically-operated domestic appliances, to cost more than \$100,000 with equipment. R. E. Pingrey, 134 North LaSalle Street, is architect.

Standard Oil Co. of Indiana, Inc., 910 South Michigan Avenue, Chicago, will soon begin construction of one-story storage and distributing plant at Mattoon, Ill., to cost about \$80,000 with equipment.

Andrews Wire & Iron Works, 1802 Preston Street, Rock Island, Ill., has awarded general building contract to

Holm-Page Co., 2117 Kishwaukee Street, for one-story addition, 100 x 125 ft., to cost more than \$80,000 with equipment.

Altorfer Brothers Co., Peoria, Ill., manufacturer of electric washing machines and parts, is disposing of a preferred stock issue of \$1,395,000, part of proceeds to be used for expansion. Company is planning one-story unit, 100 x 600 ft., to cost more than \$200,000 with equipment.

General Mills, Inc., Chamber of Commerce Building, Minneapolis, Minn., has awarded general contract to Pike & Cook Co., 416 South Fifth Street, for rebuilding part of flour mill recently destroyed by fire.

Federal Sign Co., 1215 Nicollet Avenue, Minneapolis, Minn., manufacturer of electric and other displays, has asked bids on general contract for new two-story plant to cost about \$35,000. Larson & McLaren, Baker Building, are architects.

Addison Cut Stone Co., 4424 Addison Street, Chicago, has acquired property 109 x 600 ft., for construction of new one-story stone-cutting and finishing plant, to cost more than \$70,000 with machinery.

Star Ornamental Iron Co., 2600 East Twenty-sixth Street, Minneapolis, has been organized to engage in ornamental iron work. Company has plant completely equipped but is in market for materials.

Moline Mfg. Co., Moline, Ill., which early this year succeeded Wilson Body Mfg. Co., is diversifying its line of products and discontinuing largely line of automobile bodies. It is also preparing to introduce line of playground equipment.

Kennedy-Van Saun Mfg. & Engineering Corporation, 2 Park Avenue, New York, manufacturer of crushing, mining and cement machinery and pulverized coal equipment, has established Kennedy-Van Saun Co. of Illinois, 120 South LaSalle Street, Chicago, to handle its business in that territory. T. J. Shearer is manager.

Pittsburgh

PITTSBURGH, Nov. 5.—Interest of the machine tool trade centers in the new Aston process iron plant of the A. M. Byers Co. at Harmony, Pa. No formal inquiry yet has appeared, but dealers are looking for one including the requirements for an entirely new machine shop. Westinghouse Electric & Mfg. Co. is buying in a moderate way against its fourth quarter list. Day to day orders are fairly numerous, and business on the whole is reasonably satisfactory.

Plans are being considered by Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, for two-story addition to branch plant at Crystal City, Mo., 100 x 1000 ft., to cost more than \$750,000 with equipment. Engineering department of company is in charge.

Waverly Oil Works, Inc., Thorn Street, Coraopolis, Pa., will rebuild portion of local lubricating oil plant destroyed by fire Oct. 28. Headquarters are at Fifty-fourth Street and Allegheny Valley Railroad, Pittsburgh.

New interests, headed by Henry S. Sherman and Ralph H. Tate, latter head of Ralph H. Tate Co., Inc., First National Bank Building, Pittsburgh, steel products, have purchased Fort Pitt Spring & Mfg. Co., Pittsburgh, with plant at McKees Rocks, Pa. Company name will be changed to Fort Pitt Spring Co. and expansion carried out. William McBride, heretofore president, has retired from that office.

Mackintosh-Hemphill Co., foot of

Twelfth Street, Pittsburgh, manufacturer of rolling mill machinery, etc., has asked bids on general contract for one-story branch plant at Wooster, Ohio, to cost about \$80,000 with equipment.

Wheeling Electric Co., Wheeling, W. Va., has acquired electric light and power properties of Wheeling Public Service Co., exclusive of traction system. Plans are under way for extensions, including power line construction.

Board of Education, Beaver Falls, Pa., is said to be planning installation of manual training equipment in new high school to cost \$250,000, for which plans will be drawn by Carlisle & Sharrer, Martin Building, Pittsburgh, architects.

Cincinnati

CINCINNATI, Nov. 5.—Machine-tool builders report that sales in October showed a gain over those of September and that the past three months have been the best period for new bookings since 1920. While much of the business has come from the automotive industry, the volume of buying in many lines has been surprisingly good. Geographically, purchases have been well distributed, even the Pacific Coast having contributed its share.

Just what turn demand will take in the next few weeks is puzzling some manufacturers, although the majority are of the opinion that activities will be well sustained at or near the present level. Even if there is a considerable drop in orders, which would be a somewhat unexpected development, there is enough business on the books of local companies to keep operations at a high point during the remainder of the year. This fact is evidenced by the extended deliveries quoted on many types of machines. Preference for small tools and for larger equipment designed for high production work is shown by most buyers.

To what extent automobile makers will come into the market for equipment in the next two months is a matter of speculation, but indications are that companies which already have made substantial purchases in connection with the production of new models will buy additional machines shortly when increased operating schedules have been decided upon. This particularly applies to some units of the General Motors Corporation.

Revised plans are being drawn for one-story addition, 165 x 485 ft., and boiler plant for Leland Electric Co., 222 North St. Clair Street, Dayton, Ohio, manufacturer of small motors, armatures, etc., to cost more than \$225,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Falls City Ice & Beverage Co., Broadway and Thirty-first Street, Louisville, is planning expansion program, including erection of two one-story mechanical shops, extensions in ice department and bottling division, with conveying and other handling equipment, to cost more than \$50,000.

Plans have been arranged for reorganization of American Hoist Co., Hamilton Bank Building, Chattanooga, Tenn., with change of name to American Automobile Appliance Co., capitalized at \$1,000,000. Expansion will be carried out, with extension in production to include automatic air brakes, axle type automobile elevators and kindred equipment.

Cincinnati Grinders, Inc., South Oakley, Cincinnati, has awarded general contract

to Austin Co. for one-story plant to cost about \$65,000, with equipment.

Hart, Freeman & Roberts, Independent Building, Nashville, Tenn., architect, have plans for new multi-story automobile service, repair and garage building, to cost more than \$150,000 with equipment.

St. Louis

ST. LOUIS, Nov. 5.—Contract has been let by Metalcraft Corporation, 4215-19 Clayton Avenue, St. Louis, to Schooley & Chamblin, 6038 Delmar Boulevard, for new one-story plant to cost about \$65,000 with equipment.

Laclede Steel Co., St. Louis, is inquiring for a 42-in. x 29-ft. geared head motor-driven lathe.

N. S. Sherman Machine & Iron Works, 18 East Main Street, Oklahoma City, Okla., is completing plans for one-story addition, 50 x 140 ft., to cost about \$35,000.

Parks Aircraft, Inc., Missouri Theatre Building, St. Louis, has awarded general contract to St. Louis Structural Steel Co., Fifty-seventh Street, for initial unit of aircraft manufacturing plant at East St. Louis, comprising parts and assembling departments, one-story, 100 x 550 ft., to cost more than \$150,000 with equipment. Company was organized recently by Russell E. Gardner, head of Gardner Motor Co., Main Street, and associates.

Superintendent, Sequoyah O. T. School, Tahlequah, Okla., is asking bids until Nov. 12 for one duplex power pump, capacity 100 gal. per min., and for one two-stage air compressor.

Atlas Tool & Mfg. Co., 5707 Manchester Street, St. Louis, will soon begin construction of new one-story plant, 60 x 100 ft., to cost about \$20,000 with equipment.

Oliver-Cadillac Co., 3222 Locust Boulevard, St. Louis, representative for Cadillac automobile, is having plans drawn for three-story service, repair and sales building, to cost about \$100,000 with equipment.

City Council, Trenton, Mo., is having plans drawn by Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., engineer, for extensions and improvements in municipal power plant, including additional equipment.

Detroit

DETROIT, Nov. 5.—Plans are being considered by Detroit Gear & Machine Co., 670 East Woodbridge Street, for four-story addition, 70 x 140 ft., to cost about \$80,000 with equipment.

Tri-Service Mill Building Supply Co., 269 Thirty-second Street, Battle Creek, Mich., is considering one-story addition, to cost more than \$30,000 with equipment.

Rich Tool Co., 1501 East Ferry Street, Detroit, recently organized to take over and operate company of same name, manufacturer of valves and other forged parts for automobile engines, etc., is disposing of stock issue to total about \$3,487,000, part of proceeds to be used for expansion.

Wood Hydraulic Hoist & Body Co., 7924 Riopelle Street, Detroit, has awarded general contract to Otto Randolph, Inc., 53 West Jackson Boulevard, Chicago, for one-story addition, 50 x 340 ft., to cost more than \$75,000 with equipment.

Weber & Pitcher, Fullerton Street, Detroit, manufacturers of chassis for small

trucks and other cars, are said to be planning early rebuilding of part of plant recently destroyed by fire.

Gliders, Inc., Detroit, recently organized with capital of \$37,500 by A. V. Verville, 3318 Tuxedo Street, and associates, plans early operation of local plant to manufacture motorless airplanes. W. J. Scripps, 8100 East Jefferson Street, is also interested in company.

Upton Machine Co., Edgewater Street, St. Joseph, Mich., is considering one-story addition to cost about \$25,000. L. C. Upton is head.

Oakland Motor Car Co., Pontiac, Mich., is having plans drawn for two-story addition, 50 x 100 ft., to cost about \$60,000. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Wilcox-Rich Corporation, Wilcox Products Division, Saginaw, Mich., manufacturer of automobile parts and equipment, plans one-story addition, 35 x 275 ft., to cost about \$60,000 with equipment.

Motor Wheel Corporation, Saginaw Street, Lansing, Mich., has awarded general contract to H. G. Christman Co., Lansing, for one-story addition, to cost about \$175,000 with equipment. Company is also considering two other one-story units for hub division and for die and tool department.

Szekely Automotive Parts Corporation, Holland, Mich., has been organized as subsidiary to O. E. Szekely Corporation to manufacture piston rings. Company later expects to widen its field to include other automotive parts and accessories

Gulf States

BIRMINGHAM, Nov. 5.—Plans have been filed by United States Cast Iron Pipe & Foundry Co., American Traders National Bank Building, Birmingham, for one-story plant addition, 80 x 255 ft., to cost close to \$40,000 with equipment.

Chamber of Commerce, Lubbock, Tex., is at head of project to construct and operate a municipal airport, including hangar, repair and reconditioning shop and other units, to cost approximately \$50,000.

Fleischmann Co., 327 South La Salle Street, Chicago, manufacturer of yeast, has plans for two-story addition to branch factory at Houston, Tex., 75 x 100 ft., to cost about \$70,000 with equipment.

City Commission, St. Petersburg, Fla., has authorized plans for a municipal airport in port district, to be known as Albert Whitted airport, with hangars, repair and reconditioning shops and other units.

De Soto Foundry & Machine Co., Mansfield, La., has arranged for bond issue of \$75,000, part of proceeds to be used for expansion in production facilities, particularly in steel castings.

Alabama Power Co., Birmingham, has work in progress on first unit of new steam-operated electric generating plant at Gorgas, Ala., and is scheduling completion in about six months. It is estimated to cost about \$5,000,000; complete project, with transmission lines, will cost approximately \$20,000,000.

Rome Wire Co., Bay Front, Mobile, Ala., has awarded general contract to Doulett & Ewin, Meaher Building, for one-story unit, to cost more than \$30,000 with equipment.

Pan-American Petroleum Corporation, Edwards Hotel Building, Jackson, Miss., has plans for new storage and distributing plant, with part to be equipped for barreling service, to cost about \$100,000.

R. J. Cummings, Bankers Mortgage Building, Houston, Tex., architect, is completing plans for multi-story automobile service, repair and garage building, 100 x 130 ft., at Corpus Christi, Tex., to cost about \$100,000 with equipment.

Tangipahoa Parish School Board, Amite, La., is said to be planning installation of manual training equipment in two-story high school at Independence, to cost \$160,000, for which bids will be asked about middle of November on general contract. Robert H. Goodman, Bank of Baton Rouge Building, Baton Rouge, La., is architect.

General Water Works & Electric Corporation, Fort Worth, Tex., operating Texas-Louisiana Power Co., Fort Worth, and other electric light and power utilities, has arranged for sale of preferred stock to total \$1,400,000, a portion of proceeds to be used for expansion, including transmission lines.

Stockham Pipe & Fitting Co., Birmingham, will erect two-story warehouse and shipping building, 104 x 251 ft., and laboratory, 60 x 95 ft. Contract has been placed with H. K. Ferguson Co., Cleveland. It is expected that plant will be finished by Jan. 1.

Pacific Coast

SAN FRANCISCO, Nov. 1.—Santa Fe Railway Co., Los Angeles, has plans for one-story ice-manufacturing and pre-cooling plant, 100 x 184 ft., at Bakersfield, Cal., to cost \$185,000 with machinery.

Hall-Scott Motor Co., Pine Street, Berkeley, Cal., has awarded general contract to Austin Co. of California, Ray Building, Oakland, for one-story factory unit to cost about \$35,000 with equipment.

Board of Regents, University of California, Berkeley, is said to be planning new central power plant on campus, to cost about \$400,000 with equipment.

Pacific Goodyear Co., Los Angeles, subsidiary of Goodyear Tire & Rubber Co., Akron, Ohio, will carry out an expansion program at local mill, to cost more than \$250,000 with machinery.

Pacific Aero Motive Corporation, 3417 Angeles Mesa Drive, Los Angeles, manufacturer of aircraft equipment, is completing plans for one-story addition, 50 x 120 ft. Harbin Hunter, Rives-Strong Building, is architect.

Edward Hines Western Pine Co., Burns, Ore., has plans for addition to mill to cost about \$75,000 with equipment. Peter Swan, Lewis Building, Portland, is engineer and will be in charge of machinery purchases.

Palin & Sons, Inc., Tacoma, Wash., will rebuild portion of oil refinery recently destroyed by fire.

Board of County Supervisors, Hall of Records, Los Angeles, is asking bids until Nov. 19 for deep well pumping machinery and accessory equipment for County farm property.

Bach Aircraft Co., Los Angeles, has asked bids on general contract for new plant at Metropolitan Airport, near North Hollywood, comprising two main units, 100 x 200 ft., and 50 x 65 ft., to cost approximately \$45,000 with equipment. Mark M. Falk, Washington Building, is architect.

St. Helens Pulp & Paper Co., St. Helens, Ore., has awarded general contract to A. Guthrie & Co., Sherlock Building, Portland, for new one-story

mill, 215 x 320 ft., to cost over \$150,000 with equipment.

Harbor Plywood Co., Aberdeen, Wash., is planning to rebuild part of mill destroyed by fire Oct. 22.

Indiana

INDIANAPOLIS, Nov. 5.—Plans are being completed by C. R. Wermuth, 1036 St. Marys Street, Fort Wayne, Ind., for one-story machine shop, 75 x 108 ft., to cost about \$21,000 with equipment. Pohlmeier & Pohlmeier, Central Building, are architects.

Richmond Casket Co., Sixteenth and F Streets, Richmond, has plans for four-story plant, to cost over \$50,000 with equipment. F. J. Hughes, Inc., U. B. Building, Dayton, Ohio, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to G. E. Dahm, 319 North Twenty-sixth Street, Lafayette, for one-story machine shop at Lafayette, to cost about \$50,000 with equipment.

Goble Gas Regulator Co., 233 Sycamore Street, Anderson, manufacturer of gas-burning apparatus, has plans for one-story addition, 25 x 80 ft., to cost about \$25,000. E. F. Miller, Farmers Trust Building, is architect.

Auburn Automobile Co., Auburn, has purchased adjoining property for addition for which plans will soon be drawn. New unit will be equipped in part for engineering and experimental work and will cost more than \$75,000. Company is completing expansion program at branch plant at Connersville, to include assembling department, enameling unit and final testing department, to cost about \$450,000 with equipment.

Part of plant of Advance Stove Works, Evansville, was recently damaged by fire.

Globe Gas Regulator Co., Anderson, is clearing ground for an addition, 24 x 80 ft., to be used as an assembly room.

Canada

TORONTO, Nov. 5.—October machine tool sales showed a slight increase over those for September, which was one of the best months this year. Both current and prospective demand is at a satisfactory level. It consists mostly of single tools for replacement, but several small lists have recently been received and are now being figured on. The automobile industry is showing more interest in the market, and lists are being prepared by the Chrysler Motor Co., at Walkerville, Ont., for equipment for a new plant. Other business of a like nature is in prospect. Demand for wood-working tools and equipment is also expanding.

Officials of Chrysler Motor Co., which recently purchased a 70-acre site at Walkerville, Ont., where it will start work immediately on erection of a \$1,500,000 plant, state that this will be first of three such units contemplated for company's expansion in Canada. Construction work on first unit will be started within a few weeks. Five-story block of new unit will be 100 x 1000 ft., and motor plant, 280 x 1000 ft.; a loading dock, 60 x 450 ft., will also be included in initial work.

Cozens Spring Service, 2 Wood Street, Toronto, has started work on a new manufacturing plant to cost \$55,000, for pro-

duction and repair of automobile springs, etc.

Mississippi Iron Works, Almonte, Ont., is moving its business to Hull, Que., where it is establishing a plant to manufacture agricultural implements. Company will in future be known as Hull Implement Co. A. K. MacLean, formerly with Massey-Harris Co., is managing director of Hull works.

Town of Capreol, Ont., contemplates spending \$150,000 on sewage disposal system, of which \$30,000 will be required for pump house and equipment. James, Proctor & Redfern, Ltd., Excelsior Life Building, Toronto, is engineer.

Fairchild Aviation Co., Grand Mere, Que., contemplates establishment of local plant to manufacture airplanes, etc., to cost \$500,000.

B. J. Coghlin Co., Ltd., 2050 Ontario Street East, Montreal, manufacturer of railroad and automobile springs, bumpers, etc., will start work at once on an addition to its plant. Dakin Construction Co., Ltd., 270 Beaumont Street, has general contract. Equipment not yet been purchased.

Rideau Power Co. will rebuild its plant at Merrickville, Ont., to replace power plant recently destroyed by fire.

Canadian Rail & Harbor Terminals, Ltd., foot of York Street, Toronto, contemplates erection of a grain elevator at Meaford, Ont., to cost \$500,000 and to have capacity of 1,000,000 bu. C. D. Howe & Co., Whalen Building, Port Arthur, Ont., are engineers.

Western Canada

Bids will be called soon by Victoria Cold Storage & Terminal Warehouse Co., Ltd., Victoria, B. C., for two buildings and power plant units, also for equipment for operating \$500,000 Ogden Point cold storage plant.

Western Steel Products, Ltd., St. Boniface, Man., contemplates building an addition, 100 x 100 ft., to its Regina, Sask., plant.

Poole Construction Co., Hamilton and Eighth Streets, Regina, Sask., have received contract for a \$200,000 factory at Lorne and Fourth Streets, for Canadian Industries, Ltd., head office, Toronto, Ont.

Municipal authorities, Chilliwack, B. C., are asking for prices and information on rock crushing equipment for road building.

Gillespie Grain Co., Edmonton, Alta., is contemplating building a local grain elevator to cost \$350,000.

Milwaukee

MILWAUKEE, Nov. 5.—The matter of production remains probably the most important problem confronting machine-tool builders. Skilled machinists are still very scarce and it is difficult in many instances, to make prompt deliveries. New business is of good proportions, although present demand is hardly as active as a month or two ago. Inquiry is also good and it is believed that sufficient new business will develop to sustain the high rate of production well into the new year. Many lines are represented in current bookings.

National Enameling & Stamping Co., 909 St. Paul Avenue, Milwaukee, is reconstructing a two-story building, 57 x 110 ft., into a manufacturing addition at an estimated cost of \$45,000, including equipment. Siebert & Kegler, 230 Wisconsin Avenue, local, are architects.

People's Ice & Fuel Co., Second and

Division Streets, LaCrosse, Wis., is having plans made for a new artificial ice plant and storage house with daily capacity of 150 tons. Work will begin shortly after Jan. 1. New ice and refrigerating machinery, engines, etc., will be required.

Gugler Lithographic Co., 687 Milwaukee Street, Milwaukee, has plans by Eric Gugler, architect, 101 Park Avenue, New York, for six additional stories, 60 x 123 ft., on two-story building. New press equipment, motors, two elevators are among requirements. Construction work will begin about Dec. 1.

Federal Rubber Co., Cudahy, has placed general contract with Thomas Siderits Construction Co., 306 North Avenue, Milwaukee, for a one-story manufacturing addition to cost about \$85,000.

Hicks Printing Co., Otter and State Streets, Oshkosh, Wis., publisher of *Daily Northwestern*, has engaged Euler & Jensen, local architects, to design its new plant to cost about \$135,000. It is expected to start work about Jan. 15. Oscar J. Hardy is president.

Edgar T. Ward's Sons Co. has completed a new warehouse at Milwaukee in West Allis manufacturing district. Fred O'Dell is in charge as branch manager.

Foreign

OFFICIALS of Allmanna Svenska Elektriska A. B., Vasteras, Sweden, manufacturer of electrical machinery,

have formed Svenska Elektrokonsessionen, a subsidiary, with capital of 10,000,000 krona (about \$2,500,000), to take over and expand a plant at Yaroslav, Russia, to manufacture electric equipment, to operate under an agreement between parent company and Soviet Russian Government.

Ilseder Steel Corporation (Ilseder Hutte), Berlin Germany, manufacturer of structural shapes and other steel products, is disposing of a bond issue of \$10,000,000 in United States, part of proceeds to be used for extensions and improvements. J. Fromme and Ewald Hecker are managing directors.

Department of Public Works, Lima, Peru, has approved construction of new railroad from Yurimaguas east to Pacific Ocean, to cost \$30,000,000 with car and locomotive shops, signal systems, rolling stock, etc.

Officials of Victor Talking Machine Co., Camden, N. J., have organized Victor Talking Machine Co. of Chile, Inc., a subsidiary, with capital of \$208,000, to construct and operate a new plant in Chile.

International Telephone & Telegraph Corporation, 67 Broad Street, New York, has secured a concession from Government of Chile for its recently formed subsidiary, Compania Internacional de Radio, to construct and operate radio receiving and broadcasting stations in that country and other plants and facilities for international wireless service, telegraph and telephone.

New Trade Publications

Nickel Steel.—International Nickel Co., New York. A 12-page pamphlet describing the use of nickel steel in the "Wasp" and "Hornet" aircraft engines built by the Pratt & Whitney Co., Hartford, Conn. Is fully illustrated.

Semi-Diesel Oil Engines.—Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. Bulletin 773 of 12 pages illustrates and describes a class of horizontal straight-line oil engines of 30 to 100 b.h.p. Details of construction are shown, and some sectional views.

Blowers and Gas Pumps.—Connersville Blower Co., Connersville, Ind. Bulletin 25 of six pages illustrates and describes rotary positive blowers with capacities from 400 to 15,000 cu. ft. a minute and pressures up to 12 lb. on the sq. in.

Wedge Nuts.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2114 of eight pages shows a method of attaching electrical and other fixtures by means of a wedge nut pulled tight by the action of the bolt.

Design of Welded Machine Parts.—Lincoln Electric Co., Cleveland. 32-page supplement to the booklet "Arc Welding" giving pointers on how to begin the application of welding in manufacturing machines and equipment.

Long-Distance Transmitting and Recording.—Bristol Co., Waterbury, Conn. Catalog 1900 of 24 pages is accompanied by price list of six pages. It illustrates and describes equipment for centralized control with electrical transmitting and recording equipment, depicting conditions at one or more

distant points. The system operates on the induction balance principle, which is explained in the catalog.

Seamless Steel Tubes.—Pittsburgh Steel Products Co., Pittsburgh. Booklet of 16 pages, "A Quarter Century of Progress," tells the story of steel tubes made by the seamless process to the extent of about 20,000 tons a month. The list of uses runs to about 140 in number.

Centrifugal Pumps.—Aldrich Pump Co., Allentown, Pa. Data No. 71 of 12 pages show a number of types of multi-stage single-suction centrifugal pumps, with performance curves and specifications. Both sectional and installation views are given.

Rolled Anodes.—Taunton-New Bedford Copper Co., Taunton, Mass. Four-page folder describing Eagle brand flat and curved anodes for a variety of purposes, and setting forth their advantages.

Handy Book of Silver Solder.—Handy & Harmon, 57 William Street, New York. 20-page booklet describing the properties of twelve commercial silver solders, their uses in fabricating copper, brass, monel, stainless, and sterling articles, and the technique of soldering.

Electric Heat in General Electric Factories.—General Electric Co., Schenectady, N. Y. A handsome 32-page booklet describing 25 different classes of furnaces, ovens and melting pots used in the manufacture of electrical machinery and devices, all using current for the heating medium. Perhaps the largest is a car-type annealing furnace 28 x 16 x 9 ft., and the smallest is a glue pot.

THE IRON AGE

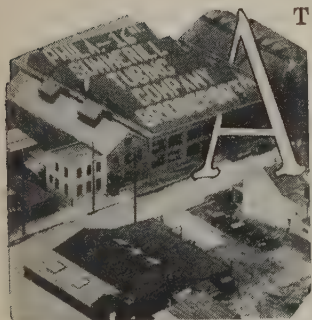
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Aircraft Industry In and Near Philadelphia

BY HORACE C. KNERR*



At the banquet of the American Society for Steel Treating held in connection with the National Metals Exposition in Philadelphia, the aircraft industry was prominently featured. This was of two-fold significance: first, that the construction of aircraft is rapidly becoming one of the foremost industries, and second, that it is becoming a metal working industry.

During the year 1927 the number of airplanes made in this country was less than 2000, including those for Army, United States Air Mail, Navy, and commercial requirements. It has been estimated that during the present year the production will be approximately 15,000 planes, an increase of seven and one-half times. While the tonnage of metal now used in airplanes and airships is small, and perhaps never will compare with that now used in automobiles, it is nevertheless important.

One prominent manufacturer of high-grade alloy steels estimates sales of about 5000 tons for aircraft consumption during the year. This, at the conservative figure of 10 cents per pound, represents business of \$1,000,000 for one company alone. Seamless steel tubing is today the principal material of construction for aircraft. One manufacturer of seamless tubing in the Philadelphia district is at the present time producing well over half a million feet per month for the aircraft industry, or about 7,000,000 ft.

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a year, and the plant is being enlarged to a 10,000,000-ft. capacity.

Two leading manufacturers are each turning out aircraft engines valued at from \$3,000 to \$8,000 apiece at the rate of 100 to 150 per month. This figures to approximately a million dollars monthly. The welding industry has also found a surprisingly large outlet to aircraft manufacturers, due principally to the development of the welded fuselage.

Large requirements of more ordinary tonnage steel, as distinguished in price and quality from that used in the actual flying machines, are found in shops, machinery and hangars, together with other such ground facilities as beacons and accessory landing field equipment.

Aluminum alloys of high strength, both cast and wrought (the latter of the duralumin type), had their original application in aircraft construction. Their field of usefulness has now extended to automobiles, railroads and other lines, totalling a considerable tonnage.

Philadelphia, long known as the "workshop of the world," has a prominent place in the aircraft industry. Its geographical position is approximately in line with both east-and-west and north-and-south air mail routes. There are 20 landing fields within 40 miles of the center of the city, about half of them being inside or close to the city limits. Several of these are located closer to the business section than in other large centers. The all-year-round weather conditions for both land and water flying, are better than in many aviation centers further west or north.

A flying field that will rival in size and accommodations the famous landing fields in Europe—such as Croydon of

London, Le Bourget of Paris or Tempelhofer of Berlin—is to be established within twelve minutes by automobile from City Hall, at the Camden terminal of the Delaware river bridge. This new field will be known as “Central Airport”. It will cover a site of 175 acres and will have four runways, each 2500 ft. in length.

At the Philadelphia Navy Yard is the famed naval aircraft factory which was the center of the Navy’s production of both heavier-than-air and lighter-than-air craft during the war. This great plant is now devoted to research, testing and development. Within a half hour’s flying distance is the naval air station at Lakehurst, the home of the Los Angeles and the journey’s end of the Graf Zeppelin. At Bristol, a few miles outside the city limits, are the works of the Keystone Aircraft Corporation, manufacturing large planes of the bomber type for the Army as well as many commercial craft.

On the city’s border at Bryn Athyn is also the factory and test field of the Pitcairn Aviation Co., part of whose plant is shown in the head piece of this article. This concern operates the air mail from New York to Alabama

preliminary training course in aviation. Graduates are in line to enter the regular naval flying courses and to become officers in the naval aviation reserve. Here also is the course in heat-treatment and metallography of steel conducted under the auspices of the Philadelphia chapter of the American Society for Steel Treating, many of whose students are employees of plants which are identified in one way or another with the aircraft industry. The high quality of this work was officially recognized by the national society at the recent convention when President Hughes awarded the “president’s bell” to the Philadelphia chapter for its energy in initiating and sponsoring this educational effort.

Mushet Steel Made the First Alloy Tools

A HIGH-CARBON manganese-tungsten steel was developed about 1868 by an Englishman, Robert F. Mushet. Whereas steels known before that time required rapid quenching from a high heat in order to become hard, Mushet’s steel was excessively hard after air cooling and



*H*ORACE C. KNERR was graduated in electrical engineering at University of Pennsylvania, 1910. After some routine laboratory work and steel inspection he joined the Naval Aircraft Factory staff early in 1916. From 1918 to 1925 he was chief metallurgist—a period during which the rigid airship Shenandoah was constructed. Since 1925 he has been practicing as consulting metallurgical and aeronautical engineer. He is an active member of the American Society for Steel Treating, and is largely responsible for the educational course jointly sponsored by the society and Temple University. (Photo Copyright by Bachrach)

and manufactures the planes for this service as well as those used on five other air mail lines, together with planes for commercial and private use.

A few miles from Philadelphia, near Wilmington, is the new factory of the Bellanca Aircraft Co., which is now undertaking a production program of 300 six-passenger planes for commercial purposes. Its flying field adjoins the Delaware River, covers more than 300 acres, and affords all necessary land and water landing facilities.

Various producers of materials, parts, accessories and service used in aircraft are located in and about Philadelphia. At Bridgeport, Pa., 16 miles from the city, is the plant of the Summerill Tubing Co., an entire section of whose mills has been devoted to the production of seamless tubing for aircraft, both in mild carbon steel and in chrome-molybdenum steel. To cope with the increasing demand (which exists in all lines of aircraft construction) a new mill is now being erected by this organization.

Steels and other alloys used in aircraft are necessarily of the highest type, requiring heat treatment under close technical control. The size and shape of many fabricated parts are such as to call for delicate manipulation. To provide such service Metallurgical Laboratories, Inc., has installed complete testing and laboratory facilities, and specially designed furnaces capable of heat-treating not only the numerous small parts and fittings of aircraft, but also engine parts of steel or aluminum alloys, axles, struts and the long wing beams, or spars of alloy steel tubing which are now used by leading aircraft manufacturers.

The Navy Department conducts at Temple University a

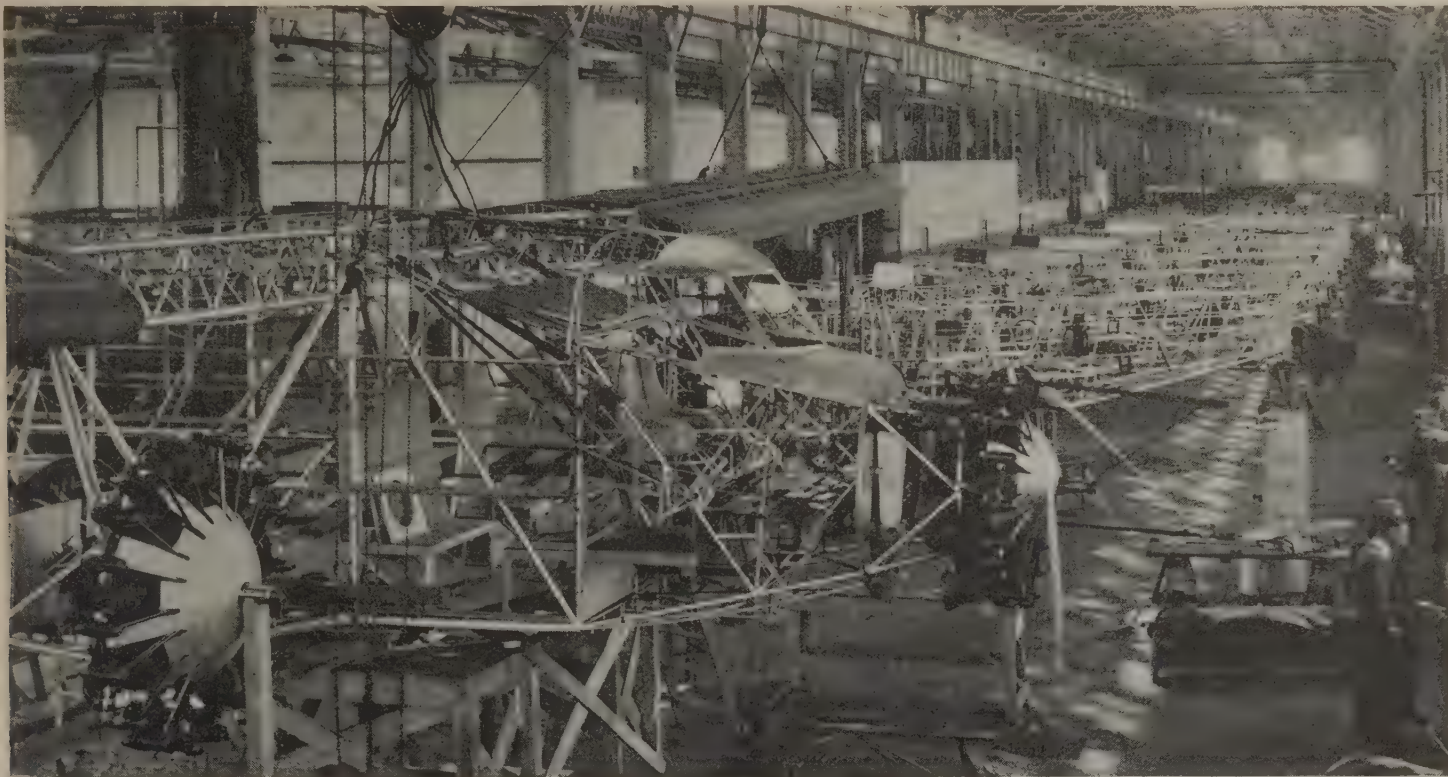
retained that hardness even after high tempering. For these reasons it was called “natural” or “air-hardening” or “self-hardening” steel, and in time came to be used for machine tools for cutting the harder steels and cast irons. Owing to the lack of uniform ferroalloys needed in the manufacture, these early high-alloy steels varied in chemical composition between the following approximate figures:

Carbon	1.85 to 2.15
Manganese	2.5 to 1.5
Tungsten	9.0 to 5.5

Other air-hardening tool steels introduced to compete with Mushet steel without infringement on the patent rights were lower in carbon, contained a few per cent of chromium, or substituted molybdenum for the tungsten. Such steels formed the basis of experimentation which led F. W. Taylor and Maunsel White to discover the distinctive heat treatment which induced the quality of red-hardness in tungsten-chromium steels. What is now known as “high-speed” steel is a later development.

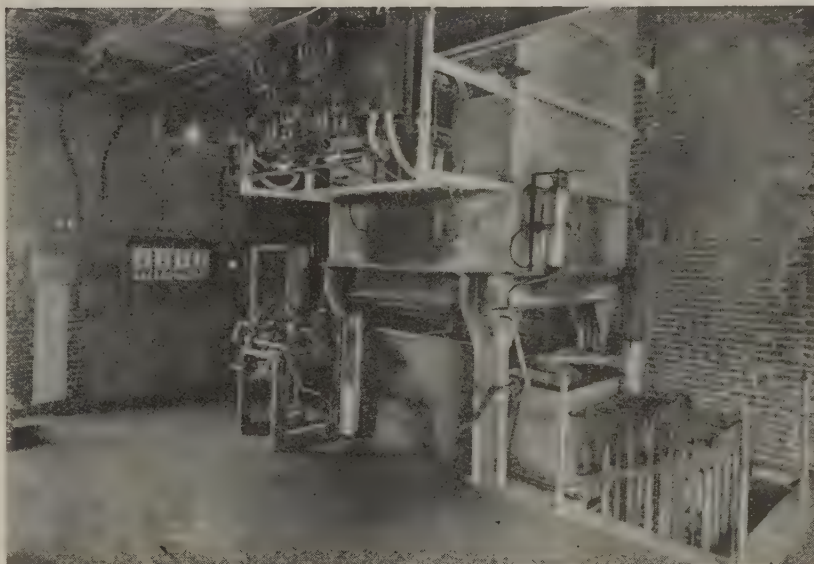
Present day representatives of Mushet steel are the “fast-finishing” steels, an inexpensive quality of tool steels for cutting hard metal. A typical analysis contains 1.25 per cent carbon, 0.30 manganese, 3.5 tungsten and 0.3 chromium.

Work benches in a number of plants in San Francisco are covered with ½-in. steel plate. The workmen may hammer on the top of the bench without denting the wood. At the plant of the Howard Automobile Co. the legs of the steel covered work benches are of cast iron.

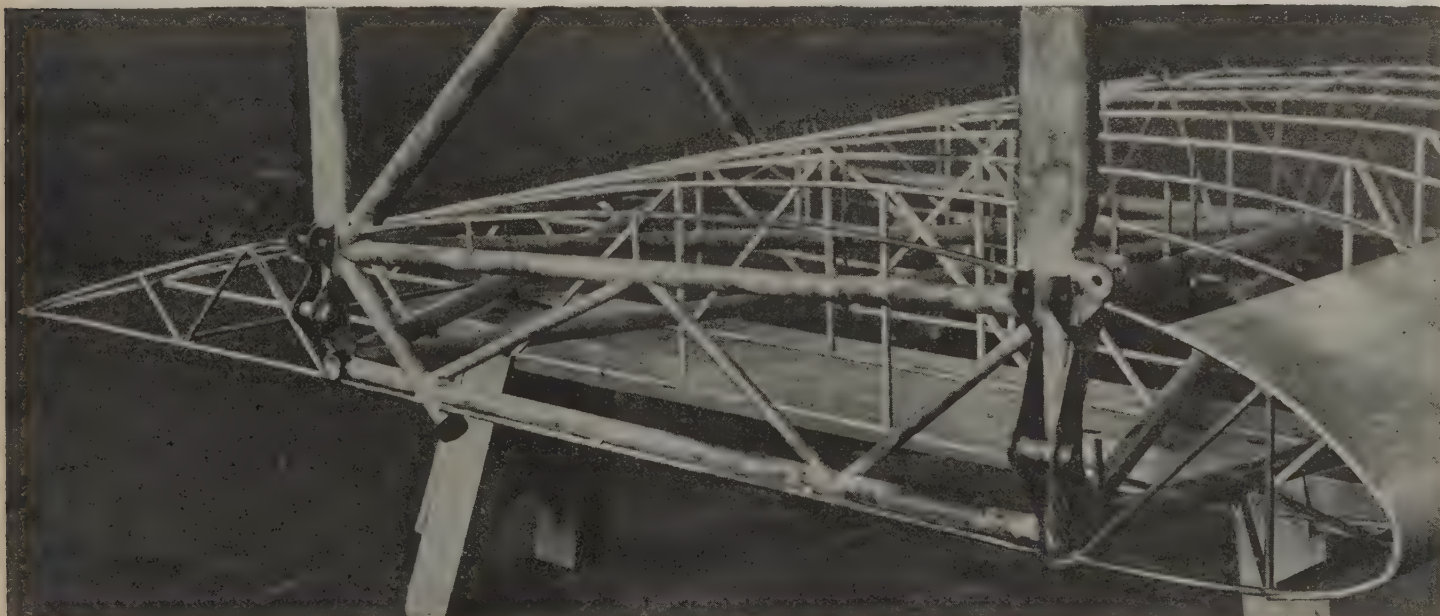


***L**INE of Bombers Under Construction at Keystone Aircraft Corporation, Bristol, Pa. In the foreground is tri-motored commercial plane for 20 passengers. All fuselage skeletons are of steel tubing, welded at the intersections*

***T**YPE of Electric Heat Treating Machine (at Right) Necessary for Certain Aircraft Parts. Inside dimensions are 3 ft. square and 10 to 25 ft. high*



***D**ETAIL of Wing Section (Below) and Attachments on Keystone Bomber. Made of steel tubing and duralumin sections*



Non-Destructive Detection of Flaws

Hidden Fissures in Rails Located and Measured by Electrical Methods—Process May Be Used on Track in Service

BY ELMER A. SPERRY*

TO cause a bar or rail by non-destructive methods to "cough up all the skeletons in its closet," or its internal physical condition, it must of necessity be subjected to intense energization. Both alternating current and magnetism are forced completely out, owing to their energization being confined to a skin effect. It is not possible to reach the interior of any structure by either of these methods.

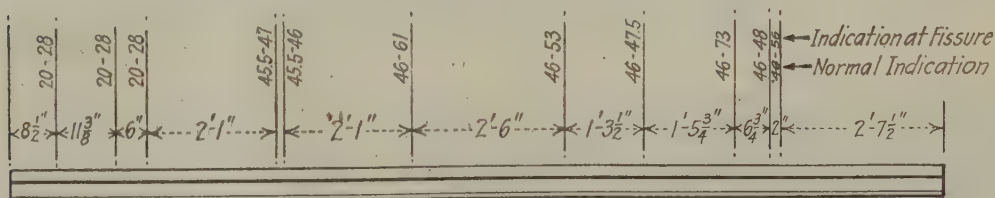
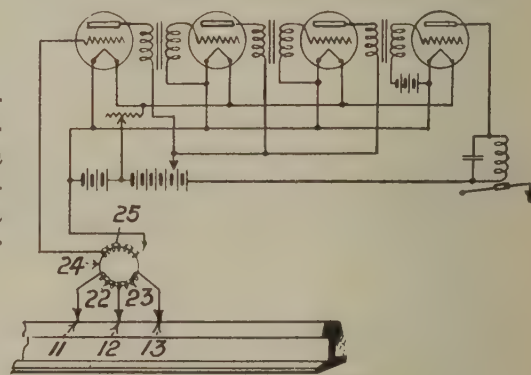
Direct magnetism or direct current are the only methods remaining. The rail user has compelled the rolling mills to produce rails progressively harder and harder until the present-day rail, of very high-carbon steel, is so hard that practically no tool of ordinary high-speed steel will effectively machine it. Permeability of steel always bears an inverse ratio to the hardness factor. Hard steel is thus of very low permeability and some heat-treated and quenched manganese steels even fall to practically zero magnetic permeability. Since for most purposes a heavy energization throughout the whole area is required, this at once puts these feeble magnetic flux densities out of the picture.

We are therefore left with only one of our four possible energizations—direct current. This has the great advantage of not being limited by any law of saturation, simply obeying Ohm's law. Hence there is no practical limit to the amount of current that can be put through the conductor, especially in the short time necessary to make the inspection. This has another advantage, allowing us to secure any character of result required. Through varying the energization it is possible to make a wide range of determi-

tions. So the plan developed incorporated means to this end, completely neutralizing all such variations, regardless of their magnitude, and preventing them from reaching the interpretive portion of the equipment. Thereby the exploration method itself was confined to exact conformity with the interior characteristics. This was found comparatively easy to accomplish, and may be illustrated by one method.

The main primary energizing current is made to traverse the rail, or a section thereof, as by main brushes in contact with the track. Intermediate between these brushes are three searching brushes 11, 12 and 13, shown in diagram. These are connected to two opposite primary coils 22 and 23, constituting the primary of a transformer 24. These coils are oppositely wound and produce opposite magnetic excitation of the transformer. All variations in the primary current will be picked up by the two outer

Method of Relaying Indications from Rail to Instruments, Through Transformer 24



Eleven Fissures Were Located in This 105-Lb. Rail, as Indicated. The numbers tell, by the extent of their divergence, the approximate size of flaw

nations, including the different molecular characteristics of the specimen as well as the soundness of the steel as to cracks, flaws, inclusions and other physical imperfections. This of course extends to all non-magnetic conductors as well.

Uniform distribution of the primary energization throughout the mass is completely secured by using direct current, so that, no matter where the flaw or irregularity exists in the interior of the structure, it is reached completely and its detection made possible.

Avoiding Extraneous Disturbing Elements

One difficulty immediately foreseen was that of neutralizing inevitable variations, large or small, in the primary or energizing current, and thereby preventing false indica-

brushes and thus be completely neutralized as to their influence on the secondary 25.

But, in passing along the track, when a fissure occurs between one end brush and the middle brush, the first coil 22 will become excited to a greater extent than the other. The transformer will become active and in the secondary will be induced half, say the positive side, of a sine wave curve. In the next instant the fissure passes between the middle and the rear brushes, giving an opposite excitation to the secondary, completing the alternating wave by adding the negative side. We now have a true alternating wave. This wave then passes to the amplifiers and may be examined as to both its magnitude and characteristics.

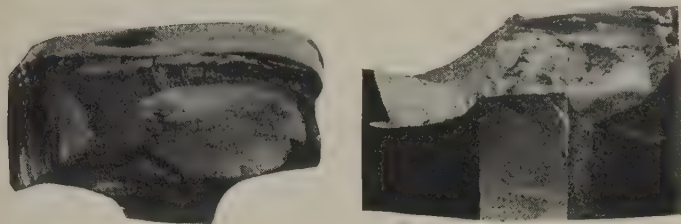
A call was sent out for pieces of rail that had broken in service. Three rails came, two from one road and one from another, where the transverse fissures had grown until the rails had broken in service. When 2000 amperes was put through these rails it was found that one piece

*President Sperry Gyroscope Co., Brooklyn, and President-elect of the American Society of Mechanical Engineers. This is an abstract of a paper delivered by Mr. Sperry on Oct. 26, at New York, before the American Iron and Steel Institute.

was entirely free from even minute hidden flaws. The second had one large flaw—transverse fissure—which had not come to the surface and was completely hidden. The

rails showed absolute soundness and freedom from any internal imperfections.

As the railroad officials, not satisfied with this finding, felt that they were correct in their assumption of fissures in this group, certain rails were selected, the webs burned off and the heads completely broken up into small pieces with a steam hammer. The breaking was not shearing in any sense and was of such a character that, had there been any fissures, they would have located the break. Each fracture was examined carefully on both faces and the rails showed the finest possible steel structure with complete homogeneity.



First Transverse Fissure (Above) Ever Apprehended by the Electrical Method

Five of the Eleven Fissures Spotted by the Instrument in a 105-Lb. Rail

Horizontal Fissures Located by the Electrical Method (Lower Right)

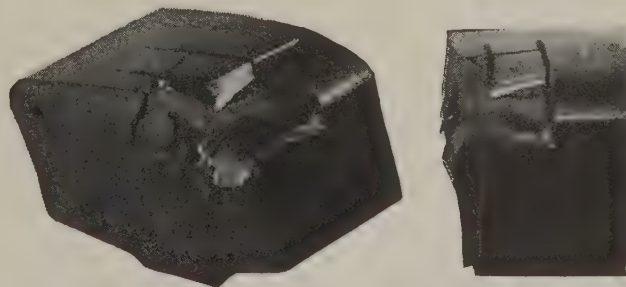


third piece of rail, some 15 ft. long, contained no less than 11 transverse fissures.

In ascertaining the importance of these fissures, we had a blue print made showing both their size and location in the rail. Then the Rail Committee came to the laboratory, whereupon we broke these rails up and with 100 per cent results. One illustration shows the first transverse fissure ever apprehended by the electrical method, which may some day be of historic importance. A sketch shows the exact locations determined for these 11 fissures. Another view shows the appearance of five of the 11 fissures found in the rail. The smallest one, at *D*, was only 1.37 per cent of the area of the head of the rail

Since that time the method has been used on about 80 rails furnished to the laboratory from various roads in the United States. Many of these were perfectly sound and gave not the slightest indication of anything but the finest continuous and homogeneous structure throughout. But in the others about 40 fissures were located. Upon breaking these rails the flaws were found exactly where the apparatus indicated, and none of these gave the slightest superficial indication as to either their size or location, with the exception of two only, which had come to the surface.

On one shipment of 15 rails, all of which had broken in service, the railroad was sure that a number of other fissures existed. Upon examination they were found perfectly homogeneous and without even the smallest fissure or flaw being indicated. The process was intensified so as to apprehend easily a flaw equal to $\frac{1}{2}$ per cent, but the



We have had no trouble in locating some horizontal fissures such, for instance, as one illustrated.

Can Tell Size as Well as Place

Positive indication is afforded not only of the exact location of the fissure but also its size. The uniformity of potential drop which exists at all other points of the rail is interrupted at a fissure. Although the disturbance is minute, through the amplification it is brought up to usable magnitudes to operate indicators or recorders, paint spray, etc.

In a sound rail the direction of current flow is axial unless disturbed. The slightest disturbance changes this alinement of flow and means have been found to utilize this deviation, both as to angle and magnitude of the mean axial departure, for giving an accurate interpretation of the cause, especially when all elements are magnified to be recognizable. Thus the size, characteristic and exact loca-

tion of the fissure or other flaw are accurately determined. This latter method has an advantage over the first, as the indications and determinations are all realized without physical contact with the surface of the rail or other metallic conductor being investigated.

Testing 1000 Rails at Mill

In the laboratory it was found possible so to increase the sensitivity and responsiveness of this last-named method as to get an accurate record of the soundness of



Brush Arrangement Under Car. The paint gun shows in center. Just left of it is a set of copper brushes; another set is at right of center

the rail down to a flaw or defect representing less than 0.1 per cent of the area of the head of the rail. It is important that this is found equally true with non-ferrous metals. A complete set of apparatus was devised and taken to one of the largest rail mills and there set up and employed in investigating 1000 39-ft. rails varying from 90 to 130 lb. section. These rails had passed a most rigid inspection before being submitted to the process.

Rail after rail was passed through the process, showing a perfectly straight line and complete soundness of structure. The entire batch of rails was remarkably free from defects, but such defects as existed were invariably picked up and recorded by the process, both as to magnitude and position in the rail. Many of these proved to be surface abrasions and defects which were not looked upon by the inspectors as objectionable, but the interesting feature is that all were located and recorded. Many "roll-ins" and head seams or surface cracks were found, which had escaped the inspectors' observation but were invariably located and recorded; thus and thus only were they brought under the observation of an inspector.

Although the rails had been handled repeatedly by a magnetic lifter, and although this had been greatly accentuated in some rails, to ascertain the result, the accuracy of the inspection process was not affected thereby. It was found that heat-treated rails could be searched as well as normal rails. A high-manganese rail that had been heat treated and was non-magnetic was put through the process, with a high degree of accuracy.

Rails developing fissures after being only a short time in service are in the majority of instances found associated with shatter zones. Now that these zones can be so completely located and recorded by the non-destructive method, it might be wise to eliminate rails containing such defects from main track, especially where the traffic is dense, and utilize them in less important positions.

Finding Fissures in Busy Tracks

Referring now to the inspection of rails in track, the car as it is now operated on the roads of members of the American Railway Engineering Association consists of a standard track maintenance trailer car upon which is built

an inclosure containing the power plant, radio apparatus and recording mechanism. A motor car is required for towing purposes; the operating speed is 5 miles an hour or more. The power plant placed on the forward end of the platform includes a 25-hp. gas engine with necessary starter and auxiliaries, directly connected to a 4000-ampere, 2-volt generator operating at 900 r.p.m.

One illustration shows the contact brushes which go on the top surface of the rail, and between which flows the energizing current. Each contact assembly consists of eight individual copper brushes, pressed against the rail head by springs. These brushes are mounted in a rigid frame which is raised and lowered by a lever in the car. There are two sets of eight brushes in contact with each line of rails.

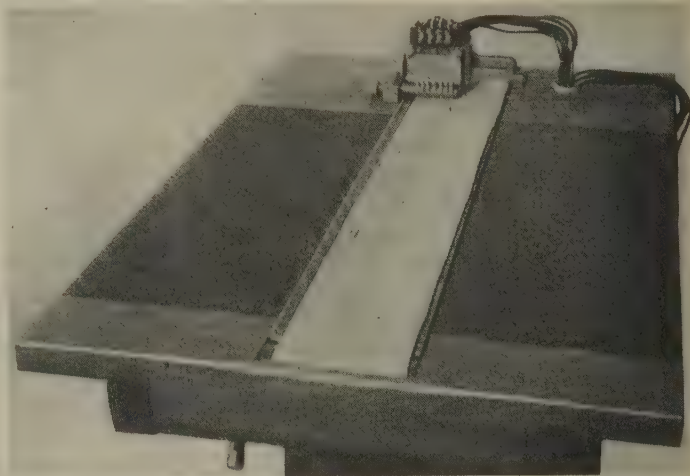
Small potential brushes, or equivalent searching equipment, are mounted between the brushes and form the mechanism for picking up the difference in potential from the resistance effect of the air gap at the internal break in the rail head. This micro-voltage is carried to a set of four radio tubes which step it up 200,000 to 300,000 times.

Near the center of the cut the paint spraying device can be seen. A relay controls the release of a spray of paint against the side of the rail whenever a defect is found at any point in its length.

How the Permanent Records Are Made

Above the table containing the necessary batteries for the tubes is shown the suspended aluminum case containing the amplifiers. On the table are the relays, ten being required for various purposes. On top of the recording table travels a friction-driven moving strip of paper. In contact with the paper are seven pens which are actuated by the relays in circuit with the tubes.

Fissures located in one line of rails are indicated on the paper by three pens, and a similar set of pens for the opposite line of rails. The center pen records location of joints. The relays are so adjusted that a short transverse line is drawn by one pen if the internal break is of small area; two pens operate if the break is of intermediate size



Recording Table, Showing Seven Pen-Drawn Lines at Left and Rail Numbers at Right. Nicks on the lines tell conditions in the rails

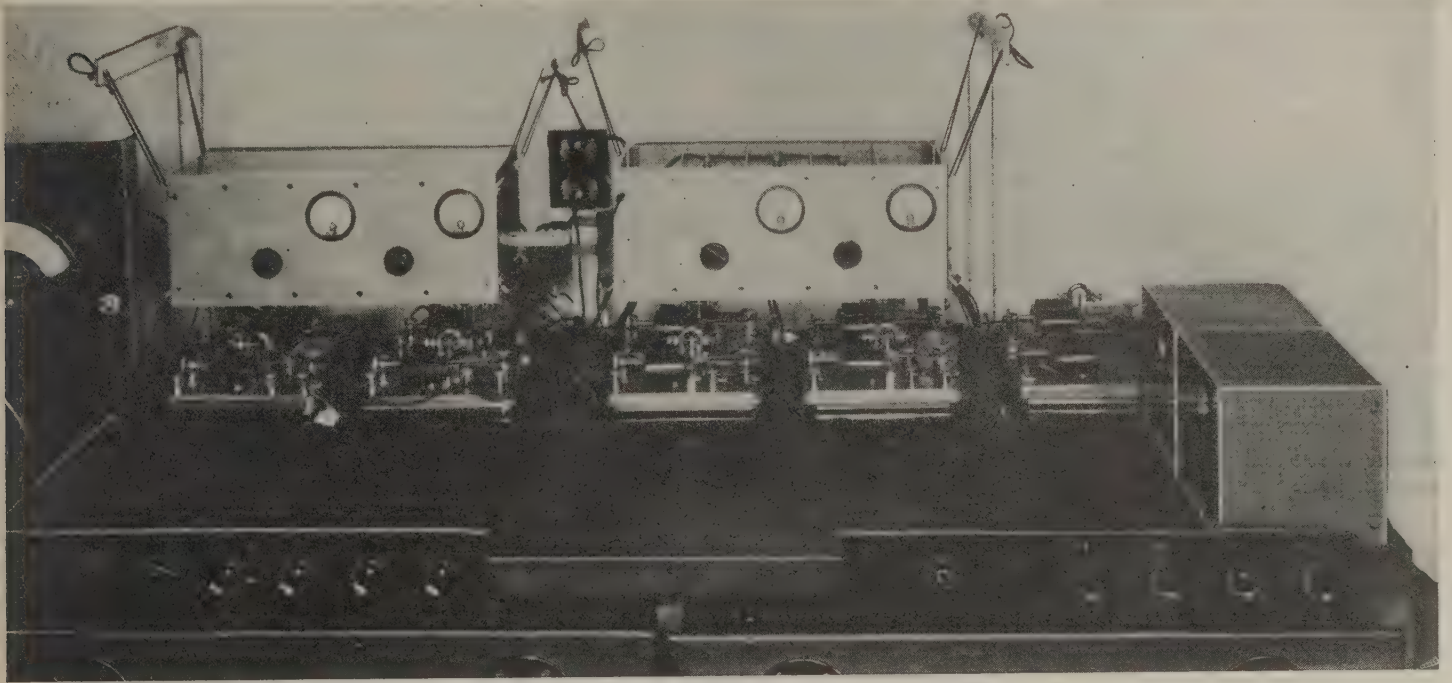
and all three pens if of large area. The fissure pens are automatically thrown out of circuit when the pen for location of joints operates.

The three lines to the left record defects in the left-hand rail; the middle line locates the joints; the three right-hand lines indicate defects in the right-hand line of rails. The short transverse lines thus permanently record the location of internal breaks and their size or area. A numbering machine also conveniently identifies each rail on the record, while the paint spray notifies the trackmen of the existence and location of defective rails.

Rotary scratch brushes, not illustrated, are set ahead of the front contact brushes and remove rust or foreign material from the running surface of the rail to insure good contact for the contact brushes. A buzzer or horn placed in the car operates by a relay to notify the operator, and as a further check on the proper functioning of the apparatus.

Instruments Sensitive But Under Control

It is found possible to bring the apparatus easily into such adjustment that, unless discontinuities exist in the rail head, there is not the slightest indication by either the indicator or recording pens, showing that the rails are structurally sound and normal. The apparatus is also found susceptible of such adjustments as will bring in other characteristics outside of discontinuities, in cases where such indications are found desirable.



Ten Relay Sets on Table, with Amplifiers in the Suspended Aluminum Cases. The batteries for energizing the tubes are placed beneath the table

Comparing this method with the old destructive method of discovering hidden fissures or discontinuities, experience has shown that defects, especially of this class, are revealed much more accurately and more reliably by the electrical method. The following incident illustrates this very clearly: Record was made of a hidden fault constituting a fissure or crack of some considerable magnitude. On repeated searchings in the same region of this rail the records were absolutely consistent, both as to magnitude and location.

This piece of rail was cut out and the regular standard destructive method was proceeded with at a well established laboratory, but grinding and etching failed to reveal anything photographically or by the microscope. The sample was finally virtually abandoned by the laboratory as containing no flaw. However, knowing by our electric process that a definite and quite serious fault actually existed at this point, we urged that the sample be re-etched by using the strongest possible re-agents procurable. This was done, whereupon the microscope revealed a transverse crack or crevice about $1\frac{1}{4}$ in. long exactly at the point electrically indicated.

Seasoning Rails by Electricity

A by-product of the electrical method has an interesting bearing on improving the quality of the rail. There have been instances in mills where "aging" or "seasoning" was necessary to bring the rails up to the point where they

would fulfill specified test requirements. We have noticed that, under our standard current densities, the temperature of the rails has always risen. This temperature rise comes from within, in contrast with the usual method of heating from without. Also the electrical saturation is invariably accompanied by a phenomenon which is nothing short of a positive and most striking molecular realignment and readjustment, constituting vigorous magnetic radiations from the innermost portions outwardly. It therefore cannot but have a beneficial aging and positive strain-releasing influence.

Thus an effect equivalent to the aging of weeks and even months may be concentrated into minutes or seconds, bringing the rails up to a higher standard of test qualification and general usefulness by this artificial internal molecular release and adjustment. We have already in hand sufficient data to state positively that an important

gain of this character is definitely secured as a by-product of this electrical inspection process.

With the detector car it becomes possible to sweep tracks free from the aggravating menace of transverse fissures. About 5000 rails were broken last year, through fissures having grown to the extent of causing the failure of the rails in service. The present practice is to remove the entire heat, at heavy cost, from the road where these fissures are repeated, this being mandatory in some States. Our experience up to the present in searching a large number of rails, and ascertaining about the percentage of fissures existing, indicates that the lifting of these heats is altogether too radical a demand. Probably between 90 and 95 per cent of the rails so lifted are perfectly sound and should be untouched and remain in the roadbed, thus making possible a definite saving to the railroads by the use of the car.

The value of the recovery of eight non-ferrous metals from secondary sources in 1927 was \$256,352,000 as against \$274,540,900 in 1926, reflecting a decrease of \$18,188,900, according to reports made to the Bureau of Mines. J. P. Dunlop, who compiled the figures, said the decrease in total value was due to a lower yearly average price of all the metals covered in the report, other than nickel, for the total recoveries were about 11,000 tons more than in 1926. The metals included in the report are copper, brass, lead, zinc, tin, antimony, aluminum and nickel.

Several Methods of Gating Molds

Multiple Pencil Gates for Thin Castings—Explanation of Use of Equalizing Gates

BY PAUL R. RAMP*

TO the discussion of many of the simpler forms of gates in molds, covered in *THE IRON AGE* of Oct. 18 and Nov. 1, a description of other special types of gates is here added. In particular, the use of pencil gates, in considerable numbers to the mold, is taken up, and their utility and limitations are shown. Equalizing gates, for intricate castings, are found to overcome previous troubles and to be very much worth while.

Pencil Gates on Cylindrical Castings

IN making cylindrical castings that must be particularly clean, such as paper rolls, pump plungers and many other articles, it is advisable to pour these castings on end. One illustration is a cross-section of a cylinder mold. At the right are shown the drag mold, cheek mold, cope mold and the pouring and runner basin, all in a vertical section. The plan of the pouring and runner basin shows the small pencil gates, indicated by *LLL*. A partial cross-section of this mold shows it partly filled with metal, the metal falling into the mold being indicated by the arrows marked *L*.

Referring again to the vertical section, the metal is poured from the ladle into the pouring basin *A*, and immediately fills the runner basin, which must be kept full until pouring is completed. The metal flows from the bottom of the runner basin through the small pencil gates and enters the mold at *C-C*, dropping to the bottom of the mold at *E*. This pouring is continued until the mold is full.

To provide for a riser or feeding head on a casting of this character, the mold is extended several inches at the end of the casting proper, which in this case is shown at the flange indicated by *D*. The depth of this riser must vary according to the volume of metal required to fill the mold and the length of the casting. The excess metal required to form the riser or feeding head can be cut off in the machine shop.

Another illustration of how the metal enters the pouring basin *A* and flows into the runner and into the pencil gates *L* is afforded by the plan. The view at the lower left

shows why a pencil gate is more effective than a bottom gate for a casting of this kind.

When a mold is being filled with metal, any impurities that may find their way into the mold, or may already be there, float on the top with rising metal. They continue to rise with the metal unless they come in contact with the walls of the mold. In such a case they cease to flow upward with the metal and cling to the mold surface, regardless of how much metal flows by, unless some agitation is produced to dislodge them.

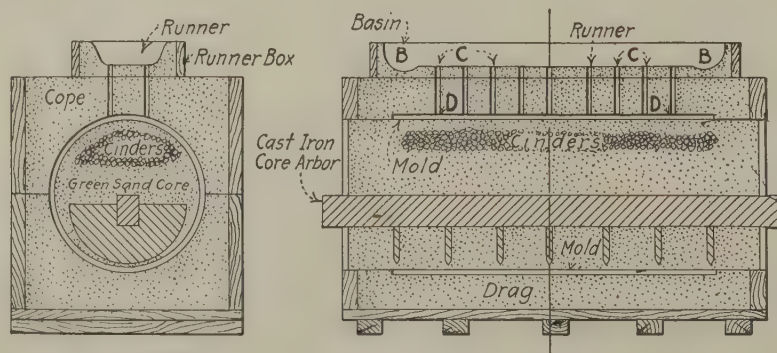
This plan of pouring dislodges any impurities that may cling to the side of the mold, and continues to dislodge them, regardless of how many times in their upward movement they may come in contact with the mold surface. This is accomplished by action of the metal dropping through the pencil gates, where each stream of metal strikes the body of metal that has preceded it, and an unusual agitation is created. The illustration is an attempt to show visually the effect of these numerous streams of metal on the body of metal in the lower part of the mold. The continual agitation on the surface of the metal persists until the mold is filled, thus automatically dislodging any impurities inclined to cling to the mold surface. This makes it possible for them to be carried to the top of the mold, into the feeding head section, where they will do no harm.

Pencil Gates on Pipe Castings

PENCIL gates on cylindrical castings are such important devices that a method of using them on pipe castings will be described. These castings are pipes 20 in. in diameter and $\frac{1}{4}$ in. thick. To prevent the casting from cracking, a green sand core is used; if a dry sand core were used the casting would crack in cooling. This pipe cannot be poured on end, as shown in the other case, because then the pressure at the lower end would be too great on a green sand core. As a result, instead of being $\frac{1}{4}$ in. thick, it might be three times that, owing to the fact that the green sand core could not withstand this pressure.

If the green sand core were to be rammed hard enough to retain its original shape, the metal would not lay to it,

*Superintendent of foundry and pattern shop, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.



Use of Pencil Gates C D on Thin Pipe Cast Horizontally, Two Rows of Gates Being Used, Fed from a Common Runner

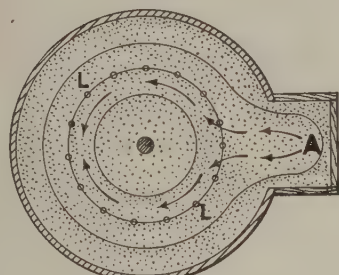
but would cut the core badly and produce sand holes as well as blow holes. For this reason the pipe is molded in a horizontal position and gated with two rows of pencil gates, along the upper surface of the mold. The pencil gates used in a case of this kind are as small as possible, but, of course, must be large enough to prevent the metal from chilling in its journey from the runner to the mold.

Pencil gates are shown in both views. The metal is poured into the two basins indicated by *BB* as quickly as possible, so as to fill the basin before any impurities can find their way into the pencil gates at the points indicated by *CCC*.

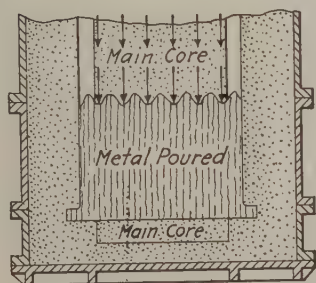
It is usual practice to use two ladles that will carry enough metal to fill the runner, and to make the runner large enough to hold sufficient metal to fill the mold. When this is done the pouring operation is simply a question of dumping both ladles into the basin as quickly as possible, and letting the metal flow through the pencil gates into the

An example of the use of an equalizing gate is shown in the cross-section of a locomotive cylinder mold. This sketch is not taken from any definite blueprint, but is drawn from memory to illustrate the use of the equalizing gate.

In this case the metal, poured into the runner basin at *A*, flows through the down gate and into the mold at *C*. From this point it flows around the exhaust core and fills the saddle portion of the mold *JJ*. When the saddle is filled the metal rises to level *DD* and, if no equalizing gate is used, when the metal reaches the point in the mold indicated by *H* it does not travel upward any more, but remains stationary until enough metal has flown over this high point of the mold to fill the piston valve section up to *DDD*. After this, all of the metal in the mold begins to rise until the mold is filled. Although the metal may be very hot, and comes up in the risers in a very satisfactory condition, there is grave danger of a cold shut being produced around

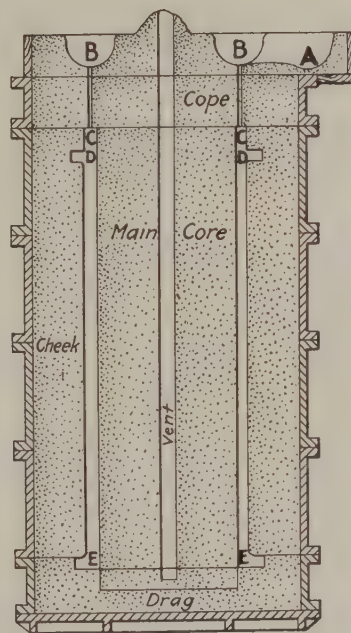


Plan of Runner Basin

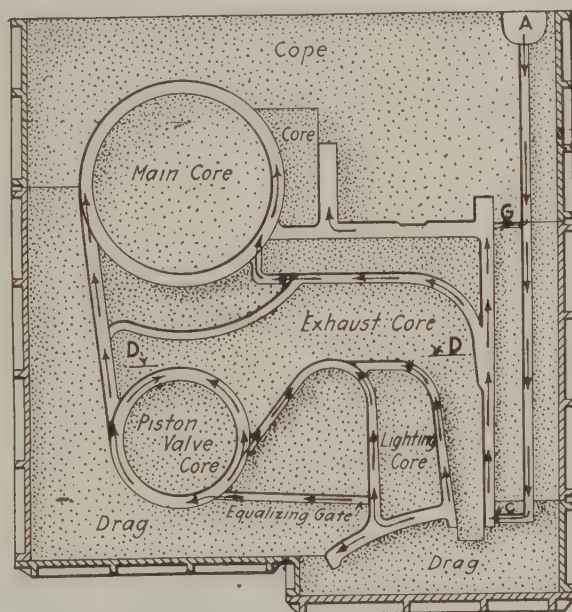


Cross Section of Mold Partly Poured

Pencil Gates *L L* Around Periphery of Cylindrical Castings Cast Vertically. Metal from basin *A* fills runner *B B* and goes down the multiple gates



Cross-Section of Cylinder Mold



Equalizing Gate at *G* Used on a Complicated Locomotive Cylinder Casting to Avoid a Cold Shut at Level of *D D*

mold at *DDD*. Two rows of pencil gates should be used on a mold of this kind.

This plan of gating a very thin casting is superior to trying to gate it on the joint of the mold, as gravity assists the flow of the metal from the time it enters the mold until the cavity is full, and the hottest metal is always on top.

In using gates of this kind in a green sand core the upper portion of the core can rightly be termed a part of the gate arrangement, as the core at this point must be carefully vented with a cinder bed or otherwise, and the proper sand mixture used, and very often surface-nailed at the point where the metal strikes it, or there will be danger of a cut or scab.

Equalizing Gates

AFTER the proper gate is provided for leading the metal to the mold, it is sometimes necessary, owing to the shape of the mold, to consider further how the metal is going to fill the cavity. In many cases what is termed an equalizing gate is necessary, to prevent cold shuts in large, intricate castings.

the exhaust pipes, live steam pipes and other sections at *DD*, because the time this metal remains inactive while the piston valve section is being filled is long enough to allow a crust of cold metal to form over its surface at *DD*. When all of the metal has reached the height indicated by *D*, and once more starts upward, it does not carry this crust with it, and in very few cases does it fuse it, but flows around it. In consequence a cold shut or division of metal is produced in the casting at this point, and the result is a leaky steam passage.

The remedy for this is the equalizing gate shown at *F*. When the metal enters the mold at *C*, and as soon as the saddle portion of the mold has been filled, it flows through the equalizing gate into the piston valve section of the mold, and upward as indicated by the arrows. And while the metal will rise slower when the entire mold is being filled, by the use of the equalizing gate it will be continually in motion, traveling upward. Thus the danger of a crust forming over the portion of the metal that remains at a standstill for a short time is eliminated.

There are many molds of this character where the metal is stopped in its upward journey while some lower portion

is being filled. This action invariably creates a cold shut, and an equalizing gate such as described here should be used wherever possible. Many large castings have been found defective because the proper equalizing gates were not provided. In gating a mold of this character, it is good practice to add an additional inlet gate nearer to the upper portion of the mold. This suggested inlet gate, shown at G, is for the purpose of providing hot metal direct to the upper portion of the mold.

General Considerations

There are many more kinds of gates, but the object of this article is merely to give a general idea of the importance of gating molds and a few suggestions of how to make the gates.

In production work there are many special skim gates, and gates in cores, that will be more effective than the hand-made gates described here. But in the foundry jobbing business it is impossible to provide special set gates or core gates for the great variation of work made from

day to day in small lots. Consequently a molder must be competent to make his own gates for each mold he is called upon to produce.

Finally, the important things to observe at all times in gating a mold are:

1—Gates should always be clean and free from loose sand.

2—Gates must be soft enough to keep the metal from cutting into the surface and producing dirt.

3—Gates must not be so soft as to allow the metal to strain into them or cut or wash. In making these gates soft they must be pressed down to the right hardness with the finger or hand on all green sand work, and not slicked with a tool. A slicked surface on a gate for a green sand mold will scale off when the iron flows through it.

4—Gates must be brushed clean with a camel hair brush, and the surface directly over the gate in the cope must be slicked to prevent the loose parting sand adhering to the cope surface of the mold from being washed into the mold by the gate under it.

Aluminum in the Mold Makes Abnormal Steel

SEVERAL automobile manufacturers, led by E. W. Upham of the Chrysler Corporation, united in requesting the Bureau of Standards to investigate the problem of "abnormal" steel, as indicated by the McQuaid-Ehn carburizing test. By reason of the facilities extended by Central Alloy Steel Corporation and Trumbull Steel Co., S. Epstein and H. S. Rawdon of the bureau have been able to reach the conclusion that abnormality is largely due to the method of finishing a heat of steel. Their studies are described in the 44-page Research Paper No. 14, Bureau of Standards, Washington.

The paper starts with a statement of the authenticated properties of normal and abnormal steel. Thus, a normal steel cannot be changed into an abnormal one by cold work or any commercial heat treatment. Hardening in water from salt baths does not prevent soft spots in abnormal steels but quenching in brine does. Normal low manganese carburizing steels do not develop soft spots even after oil quenching.

Results of the McQuaid-Ehn Test

	Normal	Abnormal
Microstructure of case		
Grain size	Usually large	Small
Excess cementite	Well defined network	Coalesced in ferrite
Pearlite	Lamellar	Tends toward spheroidal
Thickness of case	Deeper	Shallow
Izod impact strength		
Normalized	71	79
Coarsened	27	69

That the McQuaid-Ehn test does indicate relative hardenability is proved by tests on 88 pairs of samples quenched in various manners. In only one pair did the abnormal sample show a lower index number of soft spots, as determined by hardness explorations of carburized and quenched samples.

Killed steel can be either normal or abnormal; so can effervescent steel.

Chemical analysis fails to show any connection between the ordinarily reported elements and abnormality. Ehn's opinion was that abnormal steel contains an undue amount of submicroscopic oxides. Not all oxides are potent, as is indicated by tests made from open-hearth metal at various stages during refining. Some heats are abnormal at all times and in the ingot; others are normal at all times and in the ingot; still others are abnormal only until deoxidized.

Spectroscopic analysis shows, however, that if the aluminum content exceeds 0.010 per cent the steel will almost surely be abnormal. Oxygen analyses are not conclusive, because the methods in use do not break up aluminum oxides; Al_2O_3 determined in the residue from abnormal steels is high. It was therefore concluded that aluminum

may be the culprit and some tests were made during the refining and pouring stages in a steel plant. It was found that aluminum or ferrovanadium added to the ingot produced abnormality in both killed and effervescent steel. However, enough aluminum added to the ladle to kill a normal effervescent steel did not produce abnormalities. Ferrosilicon either in ladle or mold does not produce abnormality.

On the basis of these studies, Messrs. Epstein and Rawdon draw the following practical conclusions:

Soft spots in case-hardened articles can be overcome by increasing the quenching rate or by using another type of steel. In any particular plant the trouble can be handled according to the practice, equipment, quality, cost and the personal preference of the metallurgist.

One solution which appears to be a general trend is the use of the alloy carburizing steels which harden uniformly on water quenching, for example, the nickel molybdenum steel used for roller bearings. The special manganese carburizing steels also belong in this class. The former has been called "fine-grained normal" and is preferred to coarse-grained normal steel for the obvious reason that coarse grain is conducive to brittleness. With the "fine-grained normal" steels the "regenerative quench" or "core-refining heat" is often omitted.

When plain carbon steel is still wanted, the metallurgist may specify normal steel to avoid soft spots. Besides being more likely to harden uniformly it has the advantage that it carburizes somewhat faster. A more uniform material may thus be obtained. The use of normal steel is not the only recourse, however. Another metallurgist may decide to depend on more drastic quenching by pressure spray or brine to get uniform hardness. He may even prefer abnormal steel with its fine grain, for the same reasons that the "fine-grained normal" alloy steels are preferred. If tap water is used for quenching, there is danger of getting soft spots in normal steel as well as in abnormal steel, but with brine or other drastic quenching, both types of steel will harden uniformly.

"Normal" and "abnormal" should not be taken as synonymous with "good" and "bad." Even as each type of alloy steel therefore has its particular field and advantages, so also normal and abnormal steel may be preferred, each according to the special conditions in a plant.

The tests indicate that the steel maker ought to be able to produce normal and abnormal steel at will, subject, of course, to the limitations of chemical composition. (It would be hard to produce a coarse-grained vanadium steel, for instance.) Fine grain would be preferable.

Making Electric Heating Appliances

How, for Different Uses, Filled Tubular Elements Are
Annealed or Calorized or Made Part of a Casting

ILLUSTRATIVE of modern practice in the protection against oxidation of tubular forms of electric heating elements is the method developed by the Edison Electric Appliance Co. in the manufacture of electrically heated waffle irons, curling irons, flat irons, toasters, percolators, soldering irons, etc. The wire coils of the resistors are inserted in steel or copper tubes into which is packed magnesium oxide. In the case of flat irons or hot plates for cooking ranges this element is placed in the mold in the foundry and becomes an integral part of the casting. Some of the details of the processes are shown by the accompanying illustrations taken in one of the two Chicago plants of the company, which also has a plant at Ontario, Cal., and which is the outgrowth of a merger of the Hotpoint company, the Hughes company and the appliance division of the General Electric Co. some ten years ago.

The tubes, which range from $\frac{3}{8}$ to $\frac{1}{2}$ in. in diameter, are cut to length in cold cut saws and are counterbored at both ends in centering machines to permit the crimping in of washers to hold the coil inside in suspension. The coils are of nichrome wire, which is formed by winding the wire on motor driven spindles at high speed. They are cut to the proper lengths, which range from 4 to 16 in., according to the type of appliance in which they are to be used.

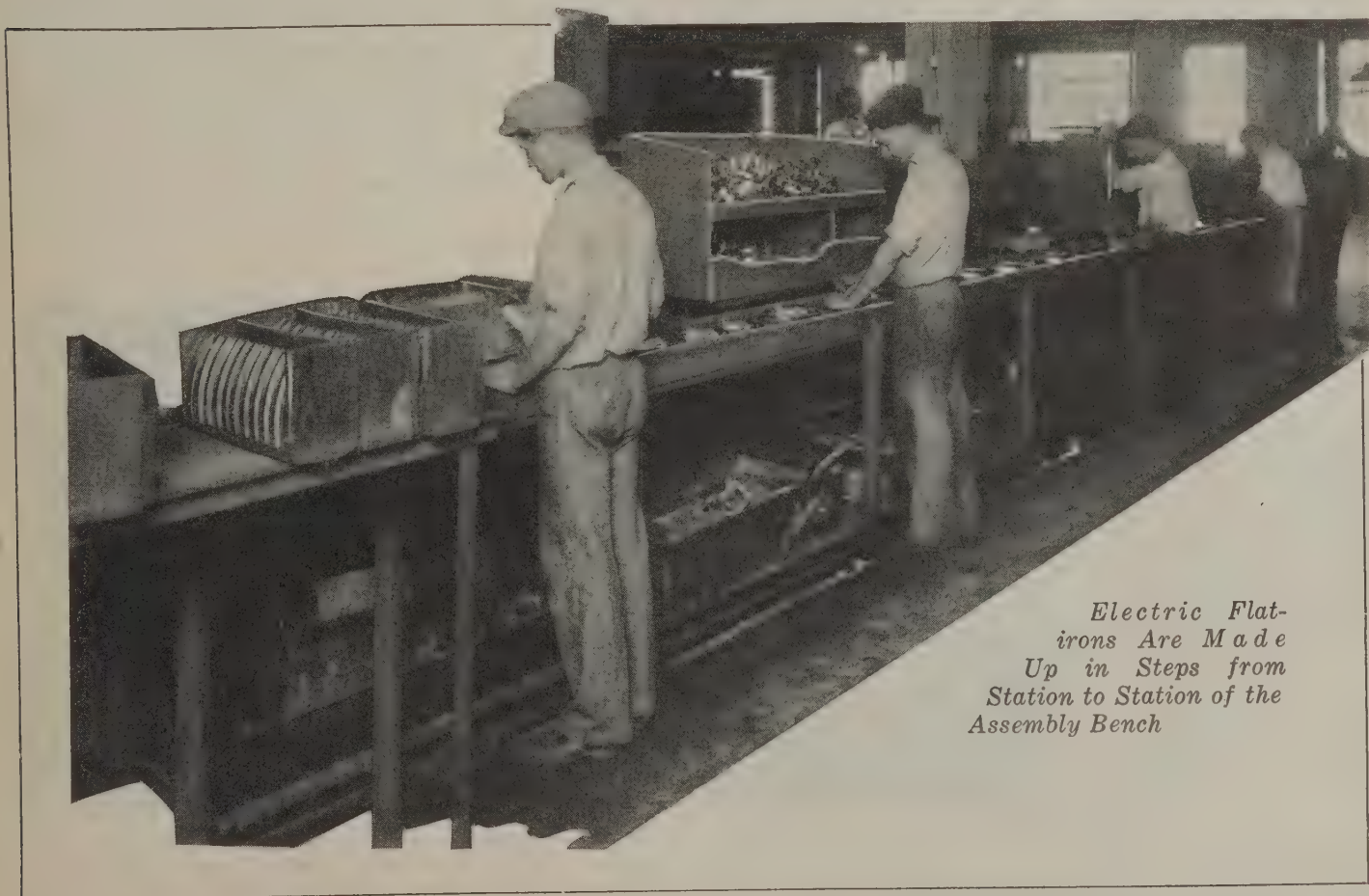
When a coil is inserted in a tube, a washer is put in one end and a yoke shaped washer slipped into the other to hold the coil in tension and then the assembly is taken to the filler room. Here the assemblies are put into racks hold-

ing 20 at a time with hoppers above and tubes running from the hoppers to the upper ends of the assemblies. These racks are made to vibrate at a high rate by motors and cams which cause the magnesium powder to pack in tightly as it runs in from the hoppers. Full washers are then put in both ends and crimped into place by hand. The magnesium oxide is packed in still more tightly by swaging the tubes in swaging machines which reduces the diameter $\frac{1}{64}$ in.

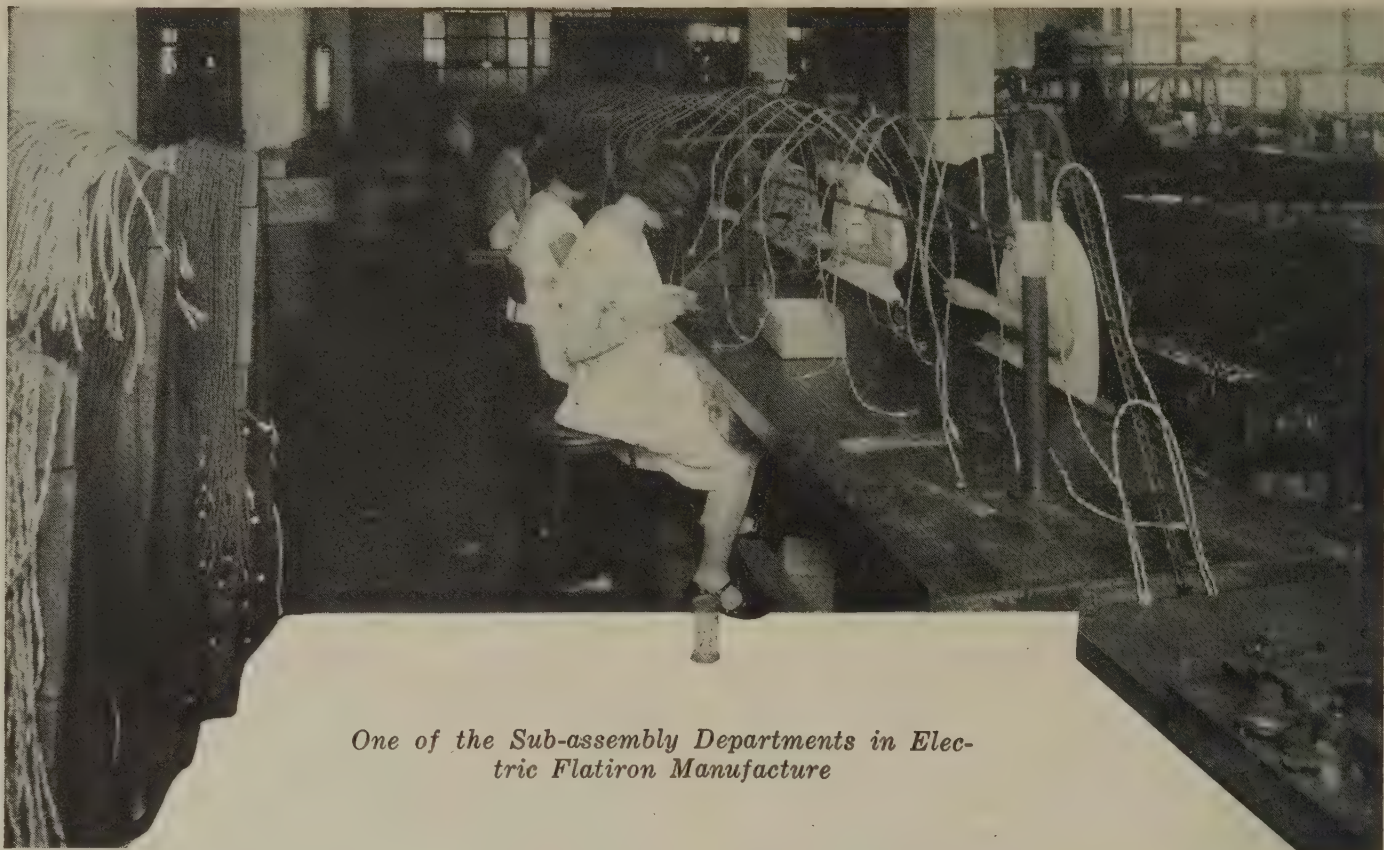
These units are then annealed in a gas-fired furnace, which is 10 ft. long, 4 ft. wide and 5 ft. high. Built of brick suitably insulated and steel encased this furnace has running through it three nichrome steel tubes about 4 in. in diameter. They extend about 7 ft. beyond one end for a cooling zone. The tubes are plugged at both ends while the work is inside and city gas is forced in, passing through a water seal at a point close to the discharge end to insure a neutral atmosphere. Formerly nitrogen was used. The work is pushed through in bundles, one bundle pushing the preceding one.

Heat is supplied through two gas burners, equipped with inspirators, underfiring the work through one end of the furnace. The gas is supplied at 6 lb. pressure and inspirates the air in the proportion to maintain complete combustion. Only the steel tubes are annealed here and the temperature range is 1400 to 1500 deg. Fahr. The furnace was manufactured by the Surface Combustion Co., Toledo, Ohio.

The waste heat from this furnace is utilized in a drying oven, 10 ft. long and 3 ft. square in cross section.



*Electric Flat-
irons Are Made
Up in Steps from
Station to Station of the
Assembly Bench*



One of the Sub-assembly Departments in Electric Flatiron Manufacture

Prior to assembling the tubes and coils, the former are pickled and then dried in this oven. After annealing the tubes are again cold swaged and reduced another 1/64 in. in diameter. An in-and-out type of furnace is used to anneal miscellaneous stampings, punch press products, etc. This unit is 6 ft. wide, 5 ft. high and 4 ft. deep. It is fired with a burner and inspirator on each side.

The electric heating units are now formed into various shapes for different applications. Some of them are rolled to give a square shape to the tube. For the heavy duty broiler of oven plate a tube about 9 ft. in length is coiled spirally. This type unit is calorized. Those coming in contact with hot water are tinned and the others are incorporated into various appliances without any treatment.

Calorizing in this case consists of dipping into molten tin and then into molten aluminum. For this process two cast

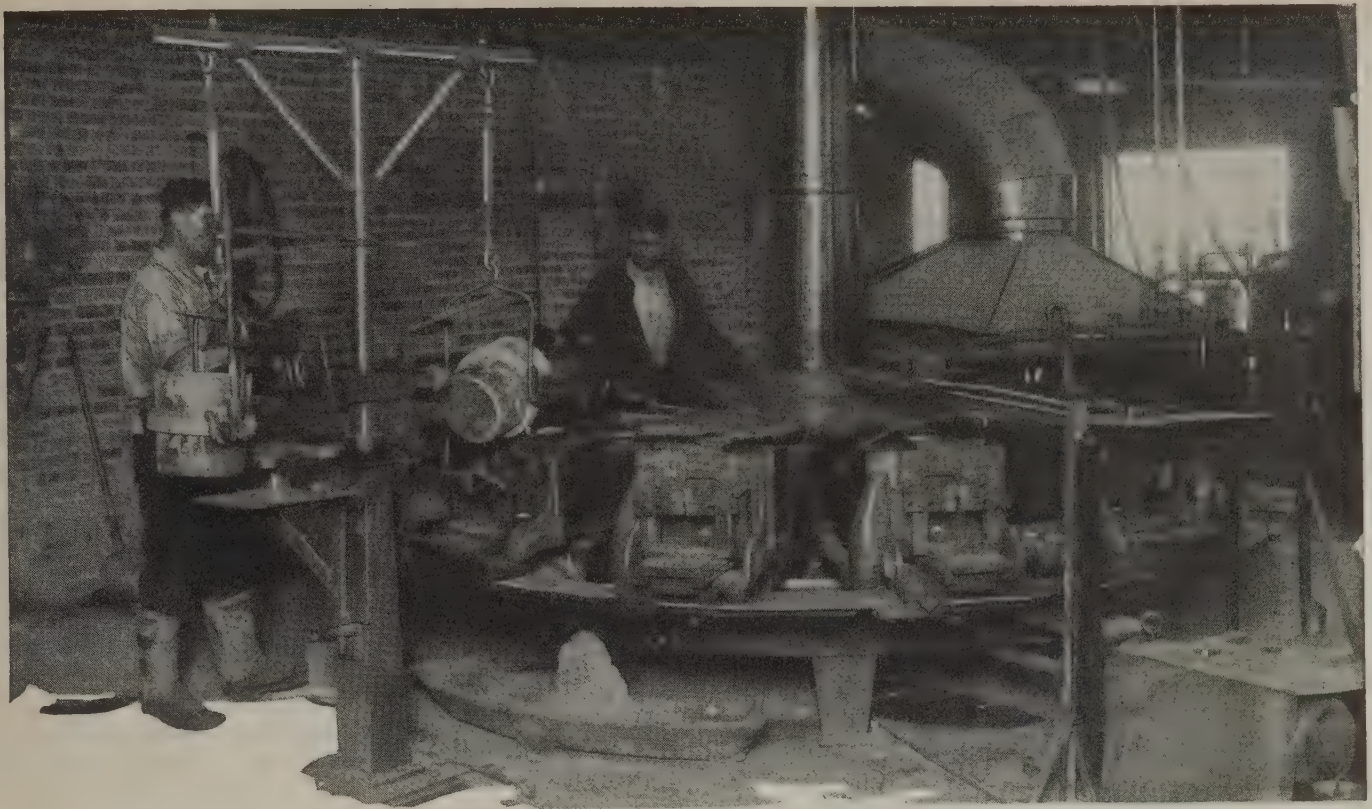
iron pots are supplied, held in place by a brick structure, which has a furnace underneath. This structure is 12 ft. long, 9 ft. wide and 4 ft. deep. The pots are 33 in. long and 30 in. deep, while they taper in width from 12 in. at the top to 4 in. at the bottom. Heat is supplied by four gas burners for each pot, two firing at each end and the flames impinging.

Inspirators are supplied to control the atmosphere for the prolongation of the life of the pots and to supply air to the gas-air mixture in the right proportion to insure perfect combustion and minimize fuel consumption. The elements to be calorized are first dipped in the tin and then into the aluminum. The first is carried at 600 deg. Fahr. and the latter at 1600 deg. This furnace was also designed and built by the Surface Combustion Co.

The calorized elements are now sent to the terminal as-

The Swaged Tubes Containing the Resistance Wires Are Annealed by Passage Through This Tubular Furnace





Permanent Molds, Mounted on a Rotating Fixture, Are Used in Casting the Flatirons

sembly department, where the ends of the tubes are cut off for about a quarter of an inch, leaving the ends of the terminals protruding. Leads are then brazed on, using mica washers to insulate from the tubing. After testing electrically for short circuits, the elements are sent to the stockroom to be drawn for assembly in the various appliances as needed.

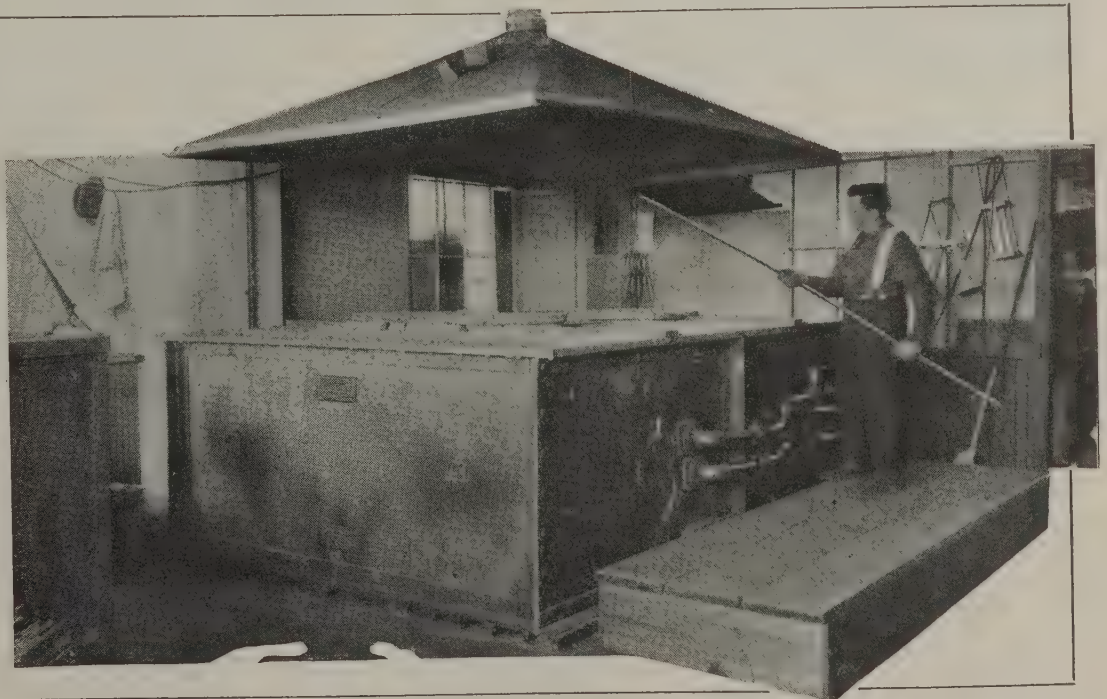
As previously stated, these elements are inserted in the foundry molds when, as in flat irons and hot plates, they become a part of the casting. The foundry of this plant is equipped with continuous molding machines which consist of circular frames, about 10 ft. in diameter, mounted horizontally with the floor and rotated by motor. Brackets to

hold the molds are placed on these frames at short intervals.

The molds or dies are in two parts, one stationary and the other movable, to close or open the mold. This opening or closing of the mold is accomplished by cams which operate as the frame rotates. As the molds pass one station they are opened and an operator inserts the elements; they are then closed and the molten iron is poured in at the next station and then they are opened again for the casting to drop out. The iron consists of two castings, the pressure plate and the sole plate, which are later bolted together.

The hot plates are cast on the pouring floor in flasks consisting of a cast iron drag and a sand cope. All elements are preheated before inserting in the molds.

*The Calorizing
Furnace Uses
City Illuminat-
ing Gas for
Heating*



Business Building Has Welded Frame

Designed for Arc-Welded Steel Construction," Upper Carnegie Building in Cleveland Presents Some Unusual Features

WITHOUT a rivet or bolt in its steel framework, the Upper Carnegie Building, Cleveland, is the first commercial store and office building erected by the arc-welding process. In "shop" fabrication and in field erection the members of the structure were fused together at joints by the use of the electric arc. The steel framework is, therefore, actually a one-piece structure.

The building was designed and built by its owners, the Austin Co., Cleveland. The Welding Engineering & Construction Co., Cleveland, acted as consultant and welding

being milled, the columns were set upright on their base plates and attached by welding a continuous bead along the outside edges of the column flanges. Plates were used instead of angles as beam stiffeners. These were welded between the flanges of the continuous beams, where the columns joined the beams. The stiffeners carried the lines of the column flanges through the beams. Where the column flanges were parallel to the webs of the beams, Tee stiffeners were used.

Lattice girders in the front bay of the building carry



Upper Carnegie Building, Cleveland, the First Commercial Store and Office Building of Arc-Welded Steel Construction

Stiffeners Were Welded Between the Flanges of the Continuous Beams at the Column Connections. They carried the lines of the column flanges through the beams. Angles and blocks welded to the bottom of the beams located the flanges and webs of the supporting columns



inspector. The welding was done by the Lincoln Electric Co., Cleveland.

A four-story structure of modern architecture, the building is 60 ft. wide and 119 ft. long. The ground floor is divided into stores, the three upper stories containing offices.

Designed for arc welding, the structure contains unique features of construction which resulted in a saving, in structural steel tonnage, it is stated, of about 15 per cent. The framework exclusive of the welded bar joists contains 115 tons of steel. The most economical riveted design, it was figured, would have required over 130 tons.

All fabrication was done outdoors in the yard of the Bliss Road fabricating plant of the Austin Co. Five welding operators were employed. Five Lincoln "stable-arc" welders of the motor-generator type supplied the welding current. Machines of 300-ampere capacity were used generally, with the 200-ampere size for some work.

In joining the H-columns to their base plates no connecting angles were required. The ends of the columns

the first floor partitions and the store-front bulkhead beams. Such girders permitted installation of concealed piping. With a span of 18 ft. 1 in. and depth of 18 in., they are composed almost entirely of angles, only the verticals at the ends being plates. The members were laid out, held in place by C-clamps and then welded.

As no field bolts were used to hold the members of the structure in place until welded, a novel method of shoring was required. A square frame was bolted around the columns, to provide means for connecting the braces. The column shoring connection, or frame, consisted of two 2 x 2

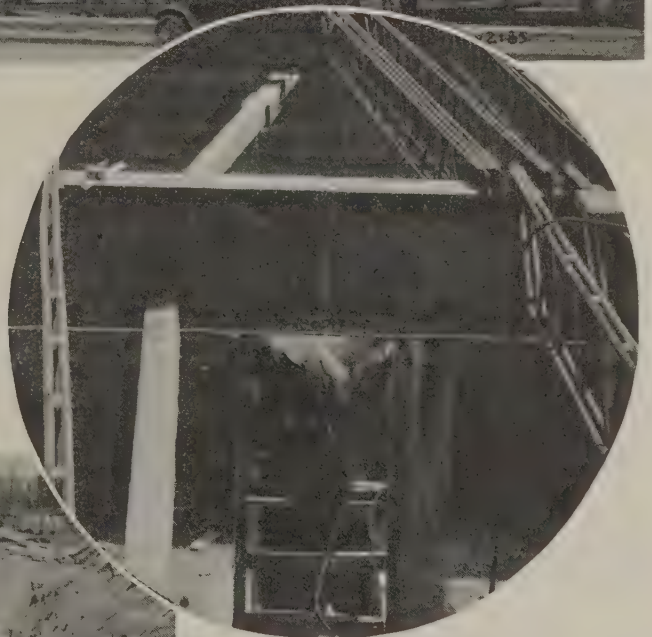


*DETAIL of First Floor
Continuous Beam at
Column Connection
(Above)*

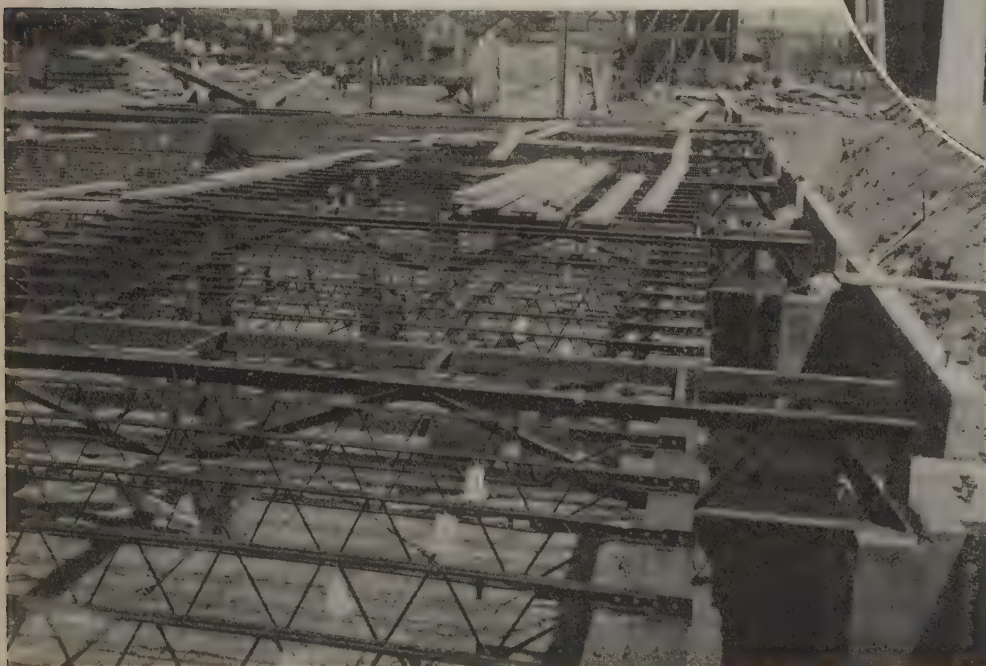
*Some of the Methods Used in
Erecting the First Welded Steel-
Frame Building for Commercial
Use Are Shown Here. Several
Unusual "Gadgets" Were Em-
ployed for Specific Purposes*



*USE of Continuous Beams (Upper Right) Allowed
a Reduction in the Size of Both Beams and
Columns from Those Required by a Riveted Design,
Without Decreasing the Strength or Rigidity. The
36-in. girder beam across the front spans six 17-ft.
bays and is made continuous by one weld at center*



*BUTT Welding of Two Beams
End to End Results in One
Continuous Beam of Same Sec-
tion and Strength for Entire
Length*



*LATTICE Girders Carry the
Store Front Bulkhead
Beams and Permit Concealment
of Piping. The bar joists are
welded in place and bridged by
welding a transverse rod to
their bottom chords*

in. wood blocks held on opposite sides of the column by two bolts connecting them and forming a square. These bolts also held to the wood members angles whose free legs were punched, and through which long bolts were passed. Thus the frame had bolts on four sides, permitting the bracing (2 x 4's and 4 x 4's), which had strap iron hooks at the ends, to hook on to the columns. This hooking arrangement on the braces greatly facilitated the shoring of the free structural members during erection.

As the structure was so designed that every alternate column in the front of the stores can be removed, either 17-ft. or 34-ft. wide store fronts are available at any time along the front of the building. This was made possible by using 36-in. Bethlehem girder beams over the store fronts—one of the first uses of this new size girder beam. The continuous girder over the store fronts was erected in two sections, which were welded together after erection,

in the same manner as were the other continuous beams.

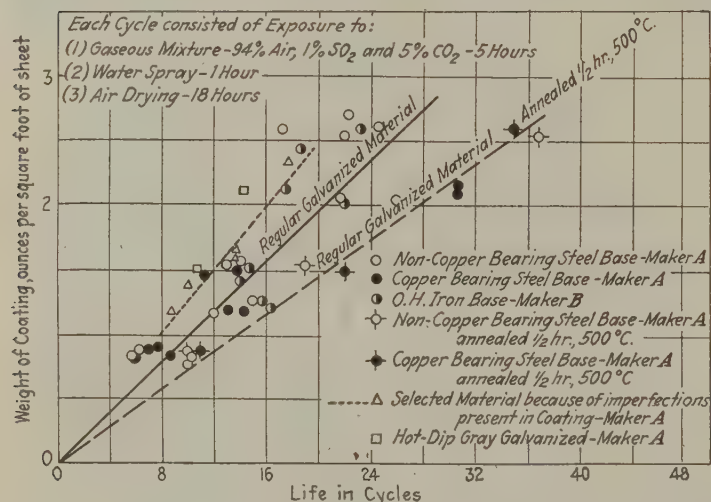
Welded bar joists, used to carry the 2-in. concrete floor and roof slabs, were welded in place to their supporting beams. To give the joists increased lateral stiffness, two 5/8-in. rods, equally spaced in each bay, were laid across the bottom chords of the joists and tack welded to each joist. This increased the rigidity of the joists to a far greater extent than if they were bridged in the usual way with wire.

Where partitions occurred the joists were stiffened by welding a plate the full length of their top chords. The bottom chords of these joists were also continued to the member supporting the joists. This was done by welding angles along the bottom chords and welding the free ends of the angles to the beams. Requirements of clearance rather than structural design dictated this method of stiffening the joists.

Tests for Durability of Zinc Coatings

A RAPID method for appraising the life of zinc-coated materials in industrial atmospheres is described by Edward C. Groesbeck and William A. Tucker in *Bureau of Standards Journal of Research*, August. The well-known salt spray test is, in their opinion, too slow; furthermore, the coating breaks down in a manner which does not correspond to the observed failures in service.

A preferred method is the "simulated atmospheric corrosion test," wherein the specimens are exposed for five hours to an atmosphere containing 94 parts air, 5 parts CO₂, and one part SO₂, saturated with water vapor at 120 deg. Fahr. Thereafter for one hour it is exposed to a spray of clear water, and dried in the open air for at least 18 hr.



Results of Simulated Atmospheric Corrosion Tests. Each point plotted in the diagram is the average value of three determinations

Then a second cycle starts. After several days failure of the zinc coating is clearly shown by red-brown spots of iron rust.

Results of this test for various weights of coatings are shown in the figure. It will be observed that the life increases in a fairly uniform proportion with the thickness of the zinc coating. In all cases the pure zinc at the very surface was removed after a very few cycles, but the underlying layers of iron-zinc compounds proved very resistant to corrosion. Hence a heat treatment which diffused these compounds to the surface increased the life of the coating by approximately 35 per cent (as shown by the dashed line). Imperfect coatings, such as those containing blisters, very small spangles known as "gray galvanized," irregular sized spangles, and stringy coatings have decreased life, as shown by the results plotted by small

triangles and the dotted line. No improvement in life was noted in the galvanized coatings placed on copper bearing steel sheets.

While this new test is not recommended as a substitute for the well-known stripping test for determining the weight and uniformity of the coating, nor the "life" tests designed to expose pinhole or other defects, it is thought by the authors to have promise as a means of appraising quickly for coated articles the relative life which may be expected in industrial localities.

Practical Value of Rockwell Hardness Tester

In a paper on the "Rockwell Hardness Test" before the (British) Institute of Metals, early in September, J. E. Malam, the author, discussed the subject of hardness testing on a purely theoretical basis. His contribution was of interest largely to physicists, and it is now appreciated that a brief extract which was furnished by the institute and published in *THE IRON AGE*, Oct. 25, page 1021, was likely to leave a wrong impression in the light of the scope of the paper. Mr. Malam, as disclosed by a copy of the paper in full, says in part:

"No one will be inclined to underrate the practical value of the Rockwell test. It can be carried out in a fraction of the time occupied by the Brinell test, while such data as are available indicate that, from the point of view of reproducibility of results, it is not inferior to the Brinell test."

New German Coke Car

A new type of coke car is now used for heavy-duty carriage in the Ruhr district by the German Railroad Co. (Deutsche Reichsbahn Gesellschaft), according to the Department of Commerce. These cars are of the automatic side-hopper unloading type, specially designed for carrying coke, and were developed by increasing the length of the standard coal car constructed by the Krupp Works from 10 to 12 meters (32.8 to 39.4 ft.).

These coke cars, constructed of silicon steel, have a carrying capacity of 92 cubic meters, or 55 metric tons (121,250 lb.), weighing when empty 21 metric tons (46,300 lb.). The wheels, equipped with roller bearings, have a diameter of 940 mm. (37 in.). Particular attention was paid to the springs, which are constructed of high-grade steel, to prevent unnecessary wear to tracks and car. The 16 brake blocks on each car are controlled by compressed air, the pressure of each block being automatically balanced by an adjustment device in the brake rods. The cars also have automatic couplers, and haulage friction is reduced by special shock absorbing springs in the bumpers.

Business Analysis and Forecast

Steel Demand Is Sustained

No More Than a Seasonal Let-Up in Consumption Indicated—
No Signs of Overproduction of Steel

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

NO let-up of more than a seasonal character in the country's steel requirements is indicated by the statistics. The composite demand line continues at a high level and well above the current production of steel. Of course, buying may fall off temporarily if consumers have anticipated their requirements, but activity in consuming industries is well sustained and potential current requirements are unabated.

In September, the following consuming lines gained in activity: building, automobile production, mining, machine tools. Railroad freight traffic, manufacturing (other than automobiles and iron and steel) and exports decreased. The net result was a practically unchanged level for the composite demand line. The indications are that October showed a further rise, as railroad traffic and building activity increased considerably last month, and probably more than offset the decline in automobile production.

As steel production, after allowing for seasonal variation and normal growth, held only about level with September, there is no indication of overproduction at present.

As to the future, railroad business seems to be a little better. October freight traffic increased more than

usual, and both crops and industrial output are in large volume. In spite of unsatisfactory rates and high wages, the carriers are likely to show gains in earnings and may be able to make up for some of their postponed maintenance.

As to building activity, the trend of permits and contemplated new construction continues downward, forecasting an ultimate decline in contracts. October contracts, however, gained more than usual for the season, and actual construction promises to continue in good volume for some time. Bookings of structural steel fell off rather sharply in September, and October trade reports indicate the lowest weekly average in several months, but building operations will require a large quantity of steel during the next few months.

Automobile production is rounding off. Some let-up in the consumption of steel by automobile manufacturers is probable. General manufacturing activity, however, continues large and promises well sustained demand for miscellaneous steel products.

The oil industry is doing a little better. It is not really good and is still threatened by overproduction, but earnings have improved and demand for steel from this quarter will

be at least as good as it has been recently.

Farm purchasing power appears to be slightly lower. The total value of the chief crops is about 7 per cent less than a year ago, and lower hog prices are an unfavorable factor.

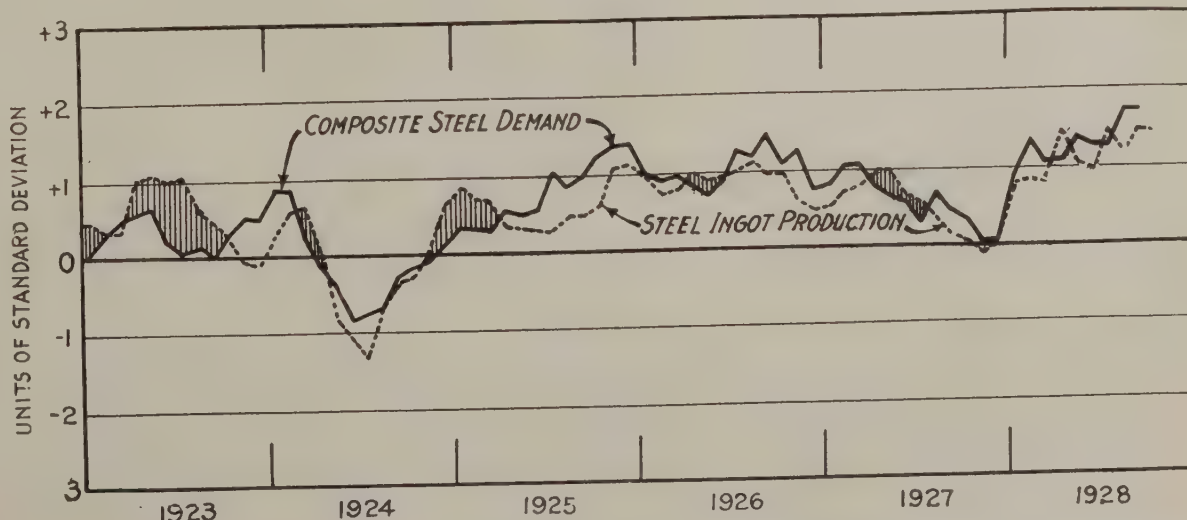
The net result should be a fairly well sustained demand for steel.

Steel Bookings in Record Volume

ORDERS and sales covering the chief items of finished steel have continued their upward trend. Probably they were the highest in September ever recorded for that month, exceeding even the volume in September, 1926. The third quarter total exceeded even the fourth quarters of 1924 and 1925, and the nine-month total apparently sets a new high record.

A fair seasonal gain occurred in September in the sales of sheets, though the total was much under that for September, 1926. Structural steel sales declined a little more than usual for the month, but were above any recent September figure. Sales of steel castings show notable improvement and made the first September increase since 1924. Sales of castings exceeded

Steel Ingot Production (Adjusted) Showed a Slight Decline in October. Composite demand remained virtually unchanged in September and probably gained in October



production for the first time in several months. Sales of fabricated steel plates showed a decline, but that is usual in September and the amount of decrease was rather less than average.

Our adjusted index of steel ingot production, based on the average daily output, registered 118.8 in October, which compares with 119.2 in September and 89.1 a year ago. This means that steel production was 18.8 per cent above estimated normal and was slightly lower than in September. It is to be remembered that the average

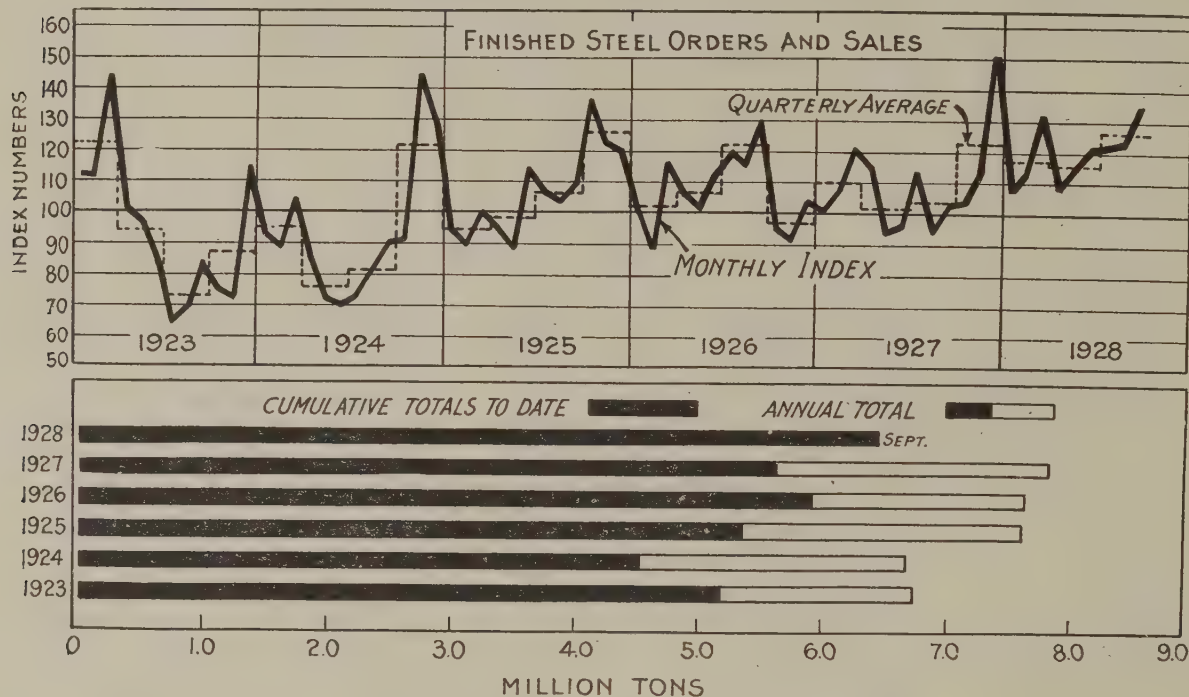
daily ingot output normally increases between 3 and 4 per cent in October.

Allowing for seasonal conditions, the unfilled orders of the Steel Corporation decreased slightly last month, the actual increase of 52,662 tons being a little less than usual. They have thus held about level for four months, considering the season, and are about 13.8 per cent below the average of the years 1923-1927.

The average price of finished steel in October, according to THE IRON AGE figures, was 2.364c. a lb., against 2.351c. in September and 2.314c. in

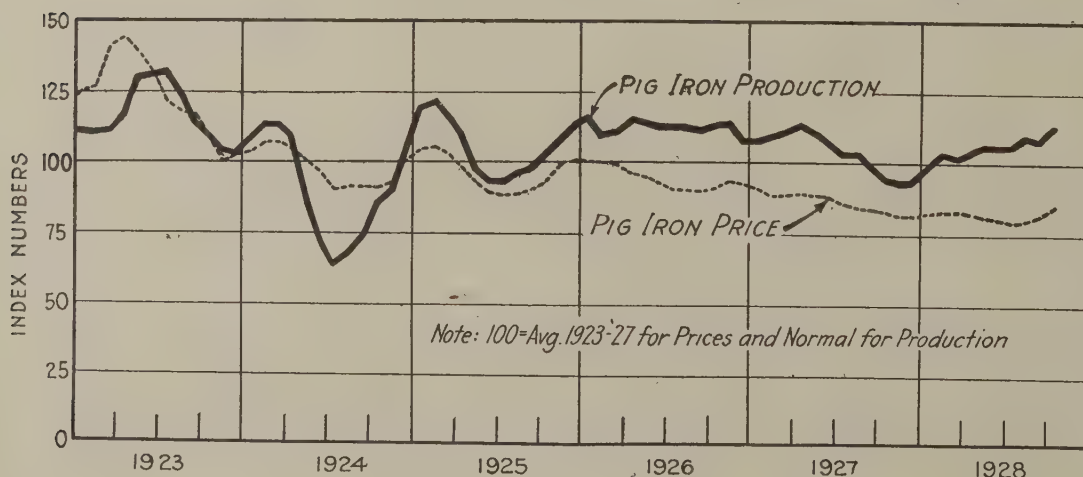
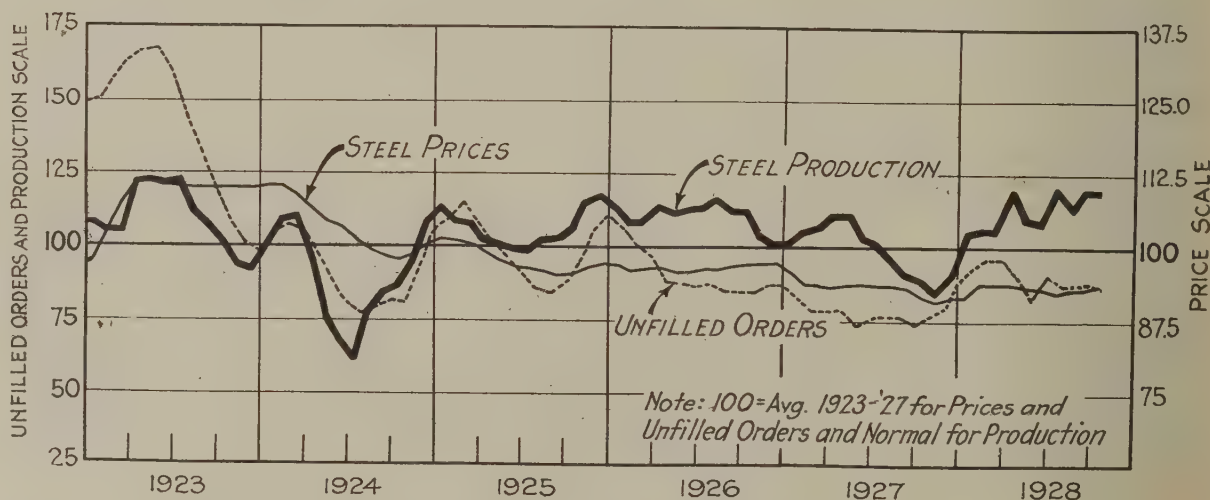
October, 1927. This is 93.7 per cent of the average for 1923-1927.

We conclude that prices and unfilled orders have tended to increase very slightly and gradually. The two are in normal adjustment, one representing the trend of new business with relation to shipments, the other the market balance between demand and supply. Production of steel is very large, though justified by above-normal demand, and is ample for all requirements. The situation resembles that found in the middle of 1926. Now, as then, a gradual increase in the



Buying of Finished Steel Reached Highest Volume for Any September. Nine-month total also set a new record

Unfilled Orders (Adjusted) and Steel Ingot Output (Adjusted) Both Showed a Slight Decline in October. Gradual upward movement of steel prices expected to continue in November and December



Pig Iron Production (Adjusted) and Prices Continue to Advance. A still higher market is looked for

strength of steel prices is logical. There is no more reason, however, for a runaway market than then. It looks as though there will be no more than a seasonal rounding off of production in November and December, with but little change in unfilled orders, and with prices slightly higher.

Further Strength in Pig Iron Prices Looked For

PIG iron production, even allowing for seasonal variation and the normal growth of the country's requirements, increased sharply in October. Our adjusted index is 113.9 per cent of normal, against 108.5 in September and 99.4 a year ago.

This rate of production is one which in the past has been too large to be maintained for more than a few months, and at which pig iron prices have soon terminated an advance. At present, however, steel production is so high that a large output of pig iron is required. It is also true that pig iron is still low in comparison with steel scrap, so that it can be said that pig iron is relatively cheap.

It therefore seems probable that further strength will develop in the pig iron market during the remainder of the year. Probably overproduction will ultimately occur, and prices will become too high in comparison with steel scrap. In such an event, the pig iron market will decline. This event, however, is not yet in sight and is probably at least three months away. Its coming depends largely on the extent to which steel demand is sustained and on the course of the scrap market.

In general the price structure in the iron and steel industry is in fair balance, the chief maladjustments being the fact that scrap is too high and that finished steel averages a little low, particularly in the case of sheets and nails.

Scrap Prices Near Peak

STUDY of the price structure indicates the following conclusions to be justified by the statistical position, although of course no allowance can be made for business sentiment. Steel scrap prices are near a peak, and it still seems likely that they will decline before the end of the year, even though some recovery from the recent setback may occur. Pig iron prices are pointed upward and are likely to run higher during the next two or three months before reacting. The price of billets is now about right and is not likely to change in the near future. Steel bars are a little low in price and seem likely to advance. Nails, too, are low in price, but their

market is held down by poor demand and it is a question whether an advance can occur. The spread between sheet prices and the prices of raw and semi-finished materials is low. Here again, however, the demand appears

to be rounding off somewhat, and the future of the sheet market appears uncertain. Perhaps the statistical indications are that sheets are likely to advance a little further and then react.

Steel Construction Making Marked Gains

W.M.Wood, President Mississippi Valley Structural Steel Co., Predicts Greater Building Volume Next Year

WHILE 1928 has been profitable to the steel fabricators of the United States and Canada, the coming year promises to be still more so, according to W. M. Wood, president Mississippi Valley Structural Steel Co., Decatur, Ill., in a statement issued at Biloxi, Miss., prior to the opening of the sixth annual convention of the American Institute of Steel Construction, of which he is president.

"Construction work," said Mr. Wood, "is the one sure measure of prosperity in the United States. It is this measure which has afforded the truest appraisal of the condition of employment and of industrial activity. So far this year, new building contracts have been running at a consistently higher level than in 1927 and will apparently be about 7 per cent in excess of last year. Orders for structural steel during the first few months of 1928 were sufficient to keep fabricating plants operating at about 85 per cent of capacity. The increase in orders brought the plants up to about 95 per cent of capacity before the autumn. The Department of Commerce in Washington estimates that the bookings of fabricated structural steel increased about 25 per cent during the first eight months of 1928 over 1927, whereas shipments of the same material increased about 18 per cent.

"It is obvious to anyone who has studied the situation that, as we approach the time when the housing shortage is overcome and new buildings reach a point where only replacements and normal growth is essential, the proportion of structural steel used to the total building program should further increase. This results from the fact that steel-frame construction is the more economical in first cost, is less subject to obsolescence, is more enduring, and has a higher salvage value than any other type. From this time on, therefore, we confidently expect to see steel construction forge rapidly ahead.

"The total mileage of bridges of all types built in 1928 represented an increase of at least 25 per cent over the year previous, and the mileage of bridges under contract to be built

during the next year will be 50 per cent greater than during 1927. Records of the Bureau of Public Roads will show this. The tremendous increase has resulted primarily from the spread of motor traffic and the insistence of the public demand for better highways. Today we are building longer, wider and more substantial bridges. Engineering experience is demanding that these, to an increasing extent, be built of steel, as that is the only material known which will give the results essential to such structures.

"In the bridge and the skyscraper, steel construction has found a productive field, yet during the past year just closing we fabricators have found new opportunities opening to us. Housing at the thousand airports now building in the United States offers a new and engrossing field for our activities. It is probable that a thousand additional airports will be opened in 1929. The building of hangars is a developing art which the steel fabricator can successfully solve."

Smith Corporation Books 40,000-Ton Pipe Order

A. O. Smith Corporation, Milwaukee, which is executing large orders for electrically welded steel pipe for the Southwestern gas and oil regions, has booked a new order calling for 40,000 tons of 10-in. pipe for the Shell Pipe Line Co., a subsidiary of the Royal Dutch Shell Oil Co. The Smith works is operating at peak production, employing three 8-hr. shifts in its three main departments, namely, automobile frames, welded pipe and gasoline cracking stills.

Officials of International Nickel Co., 67 Wall Street, New York, with main plant at Huntington, W. Va., have organized International Nickel Co. of Delaware, Inc., with capital of \$5,000,000, to take over and operate different properties in United States. Plans are said to be maturing for merger of parent company with Mond Nickel Co. of Canada.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Nov. 29—Activity in Steel Consuming Industries; Dec. 20—Position of Iron and Steel Producers.

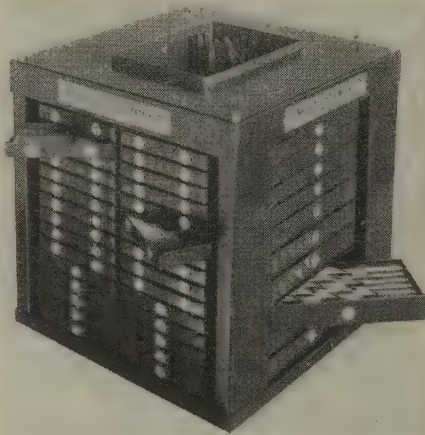
Drill Case for Tool Room and Shop Use

A COMPACT sheet steel drill case that rotates on a substantial base and has swinging drawers that cannot spill has been placed on the market by the Union Twist Drill Co., Athol, Mass.

In the tool room the case serves to keep the drills in order and in good condition. Every drawer is plainly numbered, which minimizes delay and error in giving out drills. In the shop, the case may be kept convenient to the drilling job, which saves time, and with the drawers marked, the chance of using the wrong size drill is reduced. The case is less than 14 in. high and the sides are 12 in. wide. All surfaces, inside and out, are finished in durable olive green lacquer.

With the drawers arranged to swing on one corner they can be pulled out so that the contents can be seen, but the drawers cannot be dropped nor put back in the wrong place. The corners of the drawers are slightly rounded to prevent small drills from being caught in the corners. Two sides of the case have drawers for wire size drills from Nos. 1 to 80, inclusive, jobbers' drills from 1/32 to 1/2 in., by sixty-fourths, being kept on the other two sides. Bit stock drills may be kept in the top of the case. A non-corroding two-color metal plate design-

ates the contents of each drawer. The drawers holding the wire size drills are arranged so that odd-numbered drills are in one vertical column and



Two Sides of the Case Are for Wire Size Drills and the Other Two Sides for Jobbers' Drills. Bit stock drills are kept in the top

even-numbered drills in the other, which facilitates putting the drills in the drawers. The bit stock drills are kept in the top of the case and covered with a lid, the various sizes being designated by large tags.

Auxiliary Rack for Use with Hand Trucks

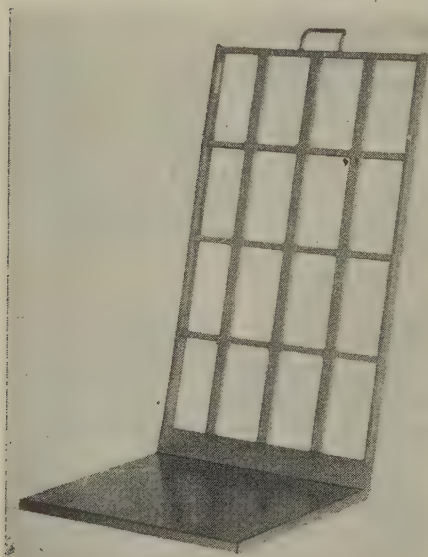
A TRUCK, provided with wheels, is functioning when it is on the move; time lost in loading and unloading is unproductive. The American Pulley Co., Philadelphia, is building a rack or carrier which gives to ordinary hand truck equipment a flexi-

delay at either end of the journey. Temporary storage in warehouse or on freight platform can be arranged in orderly rows without confusion and with a minimum of loss or congestion. This not alone saves time and extra handling, but is a means of improving or installing checking systems.

Truk-Paks permit loading to capacity of miscellaneous parcels that do not lend themselves to stacking on conventional trucks. Bags, cartons and other light packages have a smooth, flat surface to rest upon. As a result, containers are less likely to be broken, ripped, torn or punctured.

The Truk-Pak is built entirely of pressed steel. The deck is a steel plate welded to two steel forgings. These are bent upward and are welded to the inside of channels which form the back or upright. A structure of unusual rigidity is assured by the individual design of the members and by the fact that electric welding at each joint and intersection makes possible a boltless, rivetless unit. Cross bars are of channel section and the longitudinal straps are flanged to impart greater stiffness. The deck is raised far enough above the floor to make room for the truck nose to enter without lifting or disturbing the load.

Dimensions are 28 in. wide by 48 in. high. The Truk-Paks are proportioned so as to stand upright, either loaded or empty, and to be nested in stacks when not in use.



The Rack Increases the Flexibility of Ordinary Hand Truck Equipment

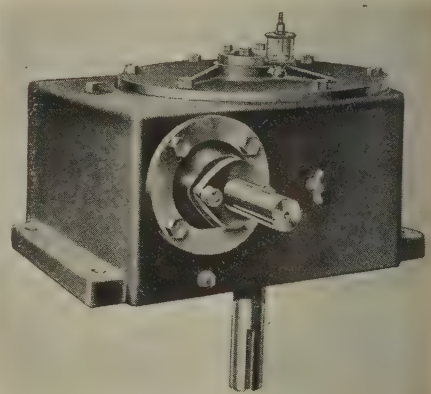
bility comparable with that supplied by trailers, lift trucks and skids.

With the aid of Truk-Paks, as the racks are called, the load is ready to be transported and deposited, without

Vertical-Type Worm Gear Speed Reducer

HEAVY-DUTY worm gear speed reducers arranged to permit vertical driving, with the drive shaft projecting either from the top or bottom, have been placed on the market by the D. O. James Mfg. Co., 1120 West Monroe Street, Chicago.

The housing, of gray iron, is of ample size and has a large oil cooling and heat radiating chamber. The gear shaft is carried in Timken bearings and the worm shaft is mounted in double Timken bearings on one side and Norman-Hoffmann roller bearings on the other side. This bearing arrangement is emphasized as assuring absorption of radial and thrust loads, eliminating excessive heating and reducing wear of both the worm and the gear. Gear shafts are of carbon steel, oversize and are ground to size. Worms are integral with the worm shafts; they are of chrome-nickel steel, heat-treated and ground and fully relieved. Worm gears are of

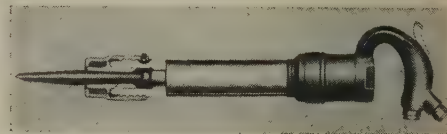


The Drive Shaft May Be Arranged to Project from Top or Bottom

phosphor-bronze and in the larger sizes are made up of a bronze ring, shrunk and keyed to a cast-iron spider. All gears are of ample face width and the pressure angle of the teeth is 20 to 30 deg., depending upon the number of teeth in the worm and gear.

Pneumatic Tool for Cutting Rivet Heads

A NEW rivet buster, designated as size No. 999, for cutting or busting off rivet heads up to 3/4 in., and for knocking the rivets out, has been



The Capacity Is for Cutting Rivet Heads Up to 3/4 In.

added to the line of the Ingersoll-Rand Co., 11 Broadway, New York. The machine, which can be handled by one man, employs light weight cut-

ting tools that are securely held in the hammer.

The nozzle end is finished with a heavy square-section thread for the retainer nut. This nut takes the hammer blow through a rubber buffer when the hammer is operated with the cutting tool held away from the work. Effectiveness of the retainer device is said to be due to a heavy knob on the upper end of the taper shank tools employed. It is stated that this knob permits the use of light weight tools and, in eliminating notches or grooves, the shank is not

weakened. It provides a shoulder for transmitting the blow through a split nozzle to the rubber buffer and on to the retainer nut, when the hammer is operated without the chisel held against the work, and it is stated that the chisel cannot be shot out of the tool.

Three different tools are available for use with the hammer, a cutting chisel, a shearing chisel and a knock-out punch. The cutting chisel is recommended for general rivet busting, especially for loose rivets, and shearing chisel is for use on tight rivets.

as high as 60 hp., in practically any reduction from unity to 7 to 1, for immediate delivery by distributors in the principal cities of the United States.

The "drives from stock" plan does not affect the range of horsepower available in the silent chain engineering drives, which the company furnishes to industry in general, in drives up to 1000 hp. and over. The company's production of silent chain drives is entirely concentrated in one plant—the Dodge Works, Indianapolis.

New Water Sand Blast Room

A NEW sand blast method using water instead of air is the latest addition to the foundry equipment developed by the Whiting Corporation, Harvey, Ill. The water sand blast, which is now operating in the Whiting Corporation's own foundry, is the culmination of a four-year search for equipment that would do a better job, in shorter time, at lower cost. A stream of sand and water, under pressure, is directed on to the castings to be cleaned. This system has proved particularly effective in removing cores.

In introducing water in place of air, the Whiting engineers, early in the investigation, discovered two prerequisites of successful operation. First, continuous operation must be assured; second, to operate economically, the water must be used over and over.

Continuous and uniform operation is assured by two pressure feed tanks, which are filled and discharged alternately. Automatic valves cut off the empty tank, allowing it to fill up with sand while the other is being used. When the water is drained from the casting it enters a series of settling tanks, which removes all sand and other solids. The water is then used again in the blast. The effectiveness of this system, it is said, is shown by the fact that the pump shows no sign of wear after three or four months—which would not be the case if any sand remained in the water. The sand is removed from the settling tanks, and nails, chips, etc., are removed by magnets. In this way the sand may be saved for core making and other foundry purposes.

The castings are supported on a turntable in the center of the room, which is provided with a removable top to allow the use of cranes in handling. The operator stands outside of the room, controlling the position of the casting and direction of the stream by mechanical means, and watching its operation through a window.

The Whiting Corporation invites foundrymen to inspect the installation, which has been in operation in its own plant for some time, showing a material saving in cleaning time, it is said, and reduction of machine shop costs.

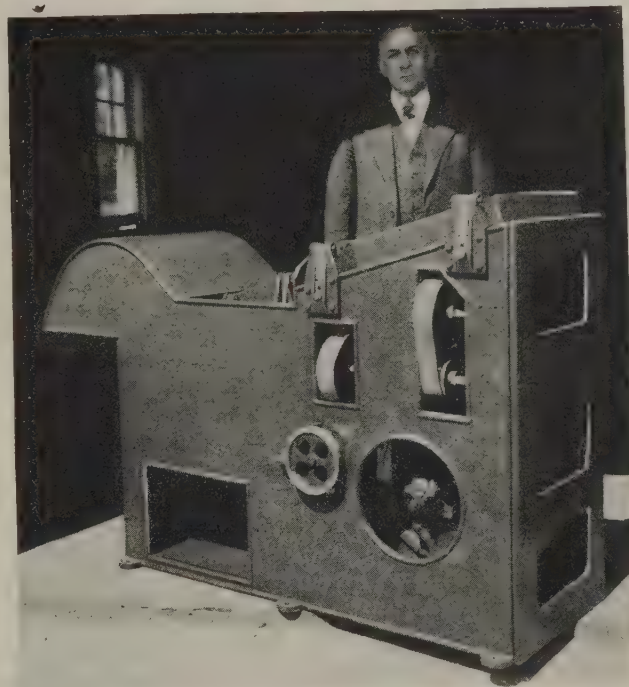
Machine Separates Screw Products from Chips

LOWER construction, to facilitate loading, and automatic feeding of material into the vibrator are improved features of a new model screw machine production and chip separation

are discharged from a chute at the side to a receptacle provided.

Both the vibrator and self feeder are hung on swing brackets and are mounted on heavier shafts than be-

Finished Screw Machine Products Are Separated From Long or Short Chips After the Oil Has Been Extracted. Wood screws, nuts, bolts and other pieces can also be handled. Feeding of the material into the vibrator is automatic



rator, which is being marketed by the McKenzie Engineering Co., New Rochelle, N. Y.

The machine separates the finished parts from long or short chips after the oil has been extracted. The capacity is for parts ranging from $\frac{1}{8}$ to $2\frac{1}{2}$ in. in diameter, up to $4\frac{1}{4}$ in. long, and it is claimed that it takes less than a minute to separate a bushel of the usual run of screw machine products. The machine is adapted also for separating wood screws, nuts, bolts and cartridges.

In operating the machine the operator takes the pan from the oil extractor, empties it into the receiving box, and regulates the air blast by means of a handwheel. The machine feeds the material into the vibrator, spreads it, shakes the parts loose, and blows the chips into a box or other container at the rear. The finished screw machine parts fall directly into a box in the base of the machine, or

fore. The vibrator is of $\frac{1}{8}$ -in. material and the self feeder is of 3/16-in. sheet steel. The blast gate is combined with the blower, and the hood of the machine is now integral with the frame, to minimize vibration.

Link-Belt Silent Chain Drives from Stock

SILENT chain drives from stock, up to 60 hp., are offered by Link-Belt Co., 910 South Michigan Avenue, Chicago. Four years ago the company inaugurated the plan of furnishing silent chain drives from stock, of $\frac{1}{2}$ to 10 hp., as a joint result of standardization and quantity production. In 1926 the range of horsepower was increased to 15.

According to the latest Link-Belt silent chain publication, Book No. 725, it will be possible to obtain drives

National Publicity for Steel Urged

Better Marketing Calls for Group Action—Development of New Uses and New Markets Advocated as a Primary Object

BY CHARLES H. MACDONALD*

IN a book I recently read the author refers to the cow as an excellent example of placidity. He further states that sometimes great success in business unconsciously develops in an individual or an industry a feeling of assurance and satisfaction which almost approaches bovine placidity.

Recalling many comments and articles from within and without the industry, I wondered if the great vision and spirit which has made steel a world synonym for foresight, progress and leadership has been lagging.

Some comments have intimated that our pastures have been broad, the grass has been plentiful; we have for years browsed contentedly on the food under our nose, and lain down in the shade until our capacity indicated room for more. Meanwhile, the more active and energetic sheep and goats of other industries entered the field of steel. They long ago ceased to be content with our leavings. They are now very frequently first in the new pastures, while steel has been placidly taking whatever comes to it without too much effort.

Marketing Problems Not Solved

That is not a flattering picture; but whether it is true or merely an exaggeration, we as manufacturers, users and distributors of steel have some facts to face, and, until we are prepared to recognize them as such, all the brains of our development and production engineers and all the hundreds of millions of dollars poured into plant equipment will continue to be ineffective toward solving our real problem.

There is something larger and perhaps more important than the active competition of one steel manufacturer or fabricator with another to secure orders for the established products of his plant.

I am thinking of the character of this competition and its effect on steel; of the possibilities for turning some of the ability which has made steel great from a manufacturing standpoint toward engineering and sales effort that will strengthen its position with relation to outside competition and broaden its uses in fields not yet developed.

Contrary to the good book which

says all men are liars, it is admitted that most business men are moderately truthful, and yet we rarely like the truth as applied to our own affairs. On the third day out the mate of a sailing ship observed an entry in the log which read: "The mate was drunk yesterday." He went to the skipper and said, "Captain, you can't leave that entry in the log." "Well," said the captain, "It's true, isn't it?" "Yes,

but I've never been drunk on duty before, and never will be again. That record will cause me to lose my berth, and I'll have a hard job to get another." "Well, the entry is true and it stays," said the captain. The following week the mate kept the log and one morning the skipper was horrified to read, "The captain was sober yesterday." Both entries were correct, but neither man liked the truth.

Says Mr. Schwab Points the Way

MR. SCHWAB has been saying a lot of things about the steel industry in the past year or so. He has frequently called attention to our production accomplishments and the rust on our selling machinery. Because it is generally conceded that Mr. Schwab ought to know something about steel and particularly about the selling and distribution of steel, his published remarks have greatly interested the business world generally, and bankers and competitive industries specifically. He has sometimes been referred to as "a cheerful optimist," but I have never heard him called a "Pollyana," probably because his brand of optimism has always represented the difference between meeting problems with a backbone instead of a wishbone.

After his address before the National Distribution Conference in New York last June, someone said: "Mr. Schwab, if you mean 50 per cent of what you have just said and we can put 25 per cent of it into effect, it will mean a rebirth of the steel industry." He replied, "I am thoroughly sincere in my remarks. Ministers of the Gospel are not always holy men, neither do their families or congregations always follow their preachments, yet if they ceased to continually expound the truth interest in spiritual matters would soon wane."

Meaning that it's up to us all as individuals to pick up the ball and carry it forward.

Men in the Ranks Should Help

Some big executive of some great corporation here or there is mysteriously supposed to take the lead or set the pace in all these matters. There is too often, however, a very apparent reluctance on the part of subordinate officers, sales managers or field men to state the truth frankly

and argue the facts with their top executives. We are inclined to forget that we all look pretty much alike in pajamas or just after we've dubbed a golf shot, and with all due respect for titles they do not alter the outlook or attitude of real men. It behooves us all, as organizations, firms, and particularly as individuals, to determine what we stand for and then to do our utmost to put the policy into effect. The power of this massed opinion and action will soon become so great that no one responsible for operation or management can deny its force or will care to ignore it.

I am not inferring that the higher executives in this industry are either blind, incompetent, or drunk with the desire for conquest. It would seem, however, that too many of them are handicapped because they do not get close enough to the fundamental conditions affecting our industry. The men in the field talk with dealers, fabricators, consumers and competitive salesmen. They discuss their various problems freely, such as lack of organized steel publicity and propaganda by the industry, advertising, distribution generally, price cutting, the effect resulting from the pernicious habit of the mills competing directly, and often upon a most unfair and unbusinesslike basis, with the trades to which they look for a bulk of their business. No president of any corporation likes to be called a horse trader. It hurts his pride. Neither does the sales manager nor the salesman. He has some pride, too; but he also has a quota to make, and if in effect he is told to get business no matter how, but *get* it, that's what he does. This is all destructive competition within the industry.

An employer talking seriously to one of his colored workers said, "Sam, I suppose you save at least half of

*Manager of Market Research Department, Colorado Fuel & Iron Co., Denver, who addressed the convention of American Institute of Steel Construction at Biloxi, Miss.

all you earn?" Sam replied, "Naw sah, boss, Ah don't get it."

We earn it in the steel industry; that is, part of the industry at least earns it, but we don't get it. Quoting a prominent steel executive in a recent address:

"It's a sad commentary on the world's greatest and most important industry that it does not earn 5 per cent upon its invested capital. The forty-four million tons of steel produced in the United States represents 45 per cent of the total world production."

Steel Distribution Problems Unsolved

We admit that we have the world beaten on quantity, cost and production methods. When it comes to the even more important factor of distribution, however, the milkman, the florist, the baker and the laundryman is daily demonstrating to the steel industry the value of group industrial organization, and the how and why of producing something vital it has long since failed to show—a satisfactory statement of earnings.

I will not dwell upon what the cement, lumber, brick and some of the other large industries are doing along this line of group effort, in the way of publicity, distributor support, consumer education and good will, nor upon the results accruing to them from such practical organization methods. The interesting and important feature of this situation is that the millions of dollars spent by these organized industries do not represent an added expense upon the industry, but have in every instance increased both volume and profit for the individual concern and the industry as a whole. The steel industry, however, placidly continues to blink the fact that this is the road toward more successful distribution and increased profits in big business.

This group industrial work has, as a matter of course, also created a better feeling between competitors in each industry, just as the work of the

American Institute of Steel Construction has succeeded in bringing about better business relations between firms and individuals who once regarded each other with antagonism. I believe that the American Institute of Steel Construction has accomplished more for the fabricators of structural steel and for the steel industry during the past few years than any individual or organized effort in existence. I have heard this opinion expressed by more than one prominent man in the steel industry and outside of it.

The steel industry has in the American Iron and Steel Institute the vehicle or framework for a structure which can quickly be made effective

along some such lines. Indications seem to warrant the hope that this organization will become more active in matters of policy which so vitally affect the steel industry. The institute cannot do these things alone, but if the executives of the various steel companies believe, as many of them have indicated, the precepts so generally expressed are right and sound, it requires only the adoption and organized support of these principles to place the steel industry on a basis, where like several others, it will realize more of the returns to which it is entitled. [Mr. Macdonald made a number of definite suggestions to the steel industry, which appear in a box.]

Should Seek and Foster New Markets

IT is said that the development of steel ships and railroad coaches and the material requirements of the automobile received very little attention from the steel industry in the early stages of their development. Should a few bold visionaries be obliged to work for years unaided to create the demand for a million or more additional tons of steel to be used in steel frame dwellings, more artistic steel highway bridges, steel roadbase for the highways and railroad beds of the future, and for many other projects considered practical by competent authority, but as yet unproven commercially?

Who shall say with finality that these things are more visionary than steel ships, steel railroad coaches and all-steel airplanes were thought to be within the memory of us all?

In THE IRON AGE of Sept. 1 and Dec. 22, 1927, two articles were published on the subject of steel railroad ties. It was shown that 50 per cent of the annual tie replacement business of the railroads in the United States would represent an approximate increase of 2,500,000 tons of steel a year. It was suggested that research and study by the steel indus-

try along this line might reasonably develop radical and advantageous changes in railroad construction. A hornet's nest was immediately stirred up by these articles. Trade papers, magazines, the daily press here and abroad, defended, attacked and commented neutrally. There was no interest exhibited by the steel industry, however, to and for which the articles were written.

Meanwhile, the *Railway Age* printed an article on Jan. 14, 1928, describing an experimental roadbed job which the Pere Marquette Railroad had quietly done at its own expense, and which may disprove most of the theories assuming wood ties to be necessary or more desirable. A very large proportion of steel is used in conjunction with concrete in this experiment, but the title of the article published again in the July *Scientific American* reads: "Is concrete better than cross ties?" The Concrete Association was on the job all the time, working closely with the Pere Marquette, supplying data, taking progress photographs and otherwise assisting in this practical development work.

Naturally, they are not advertising steel; but if you will read the article

Mr. Macdonald's Suggestions to the Steel Industry for Better Marketing

THE public should be educated, through a well planned national campaign of publicity, to the value of steel and its greater use in all requirements large and small.

For example: A tax of only one cent per ton on American steel production would represent a fund of more than \$400,000 a year for publicity, sales promotion and development work.

A marketing policy should be established and clearly defined to the trade.

There should be developed in every manufacturer, distributor and user of steel a realization of his opportunities and responsibilities in and to the steel industry.

More effort and money should be devoted

to neglected markets for the established and logical use of steel.

A fund should be created for the development of new uses for steel.

We should be in position to offer through an organized bureau, to any industry using or contemplating the use of steel, all the facilities of the entire steel industry to more rapid and satisfactory development of any practical new product, instead of leaving the customer or some individual steel manufacturer to work out at an undue expenditure of time and money, products which ultimately bring business to the entire industry.

More attention and study should be

given to the problems of individual fabricators and users of structural steel and steel products of every kind, for the purpose of helping them to increase profits by diversification, reduction of shop overhead and selling expense, and by enabling them to operate, uniformly more hours per year.

Concerted action should be taken, following the lead of other organized industries in protecting themselves against proposed unfavorable legislation and unitedly working for the revision or revocation of existing laws or statutes that may be obsolete or out of line with changed conditions, but that are causing unreasonable and unintended difficulties for the manufacturers and users of steel.

last mentioned you will conclude that steel is an important factor in this construction, and you will probably wonder just how much concrete may be ultimately required with the steel to get the best result.

Group Action and Its Results

This is a fair example of thousands of similar happenings which prove the value of the Concrete Association's work in sales research, sales promotion, material and mechanical research, etc., to the benefit of the entire cement industry.

I can step off the train at a water station in Maine, or New Mexico and tell the clerk in any little flower shop that I want a dozen yellow rosebuds delivered at any given address in Paris at 2 o'clock tomorrow afternoon. He consults a little book and says "All right, seven dollars, please," and I know the flowers will be there. That's organized industry. They make you send flowers to mother on Mother's Day which they created, and you wear flowers on Father's Day if you're a dutiful father whether you like to wear flowers or not. Flowers and steel are a long way apart, but the same fundamental principles of marketing apply.

New mergers and consolidations are being continually effected. These may only proceed to a certain point before running counter to the law. No court in the world, however, can or will try to interfere with the legitimate grouping or massed effort of any industry to the purpose of more successfully promoting the use and sale of its products. As a matter of fact, the efforts of the United States Department of Commerce are directed along this very line, recognizing it as a movement of national economic importance.

We have heard several remarks to the effect that the steel industry cannot be organized. Competition is too keen; too much feeling over imagined or real territorial encroachments; too much ambition on the part of one company to gain ascendancy over another; too much capacity, and not enough business. In other words, we are expected to believe that in the industry where the greatest opportunities lie there is no possibility of harmony.

Very likely there were some bad actors in the lumber, cement, brick and all the other industries now enjoying the benefits of organized action. The idea was probably not adopted unanimously in any industry until the results became apparent.

In the interest of self preservation several industries, some of them representing a large percentage of steel consumption, have adopted the principle of united action and organized effort, and they have proved its value beyond question. I refer particularly to the bolt, nut and rivet industry, the fabricators of structural steel and the sheet steel industry.

If organized industrial operation is good for large units of the steel in-

dustry, why should it not be good for the industry as a whole?

Present Policy Benefiting No One

We spend a million or a hundred million dollars to reduce the cost of steel, and then we reduce the selling price still further, consequently forcing down competitors who can even less afford to take the greater loss. As a result, we are wasting money, benefiting no one, not even the consumer. We are intensifying the battle between fabricators of all our products and minimizing their profits; we are developing a situation which will inevitably result in a lowered wage scale, and in following this general procedure, we are running counter to every law of business economics.

Research Offers Greatest Hope to Industry

The importance of scientific research was emphasized by Charles M. Schwab in an address at a dinner tendered the "Pioneers of American Industry" at Hotel Astor, New York, Oct. 24. He said, in part:

"The pioneering work of the future is to be done very differently from that of the past. We saw in the Great War that the era of individual heroes, and even of individual generals capable of daring deeds in battle, was replaced by vast organizations moving over wide fronts. Will it not be so in the future development of industry and material progress?"

"Society is today improving by organization and cooperation among its members. The greatest work that is being done for the improvement of industry is in the laboratory of the research worker. The most active of our modern industries are those which are founded on recent scientific research. Industries themselves organize research on a large scale.

"Consider the case of shipbuilding, for instance. The hull of a ship reminds us of the wealth of research that has been expended in metallurgical laboratories on the qualities of steel. Inside the hull the engines, whether they be turbines, reciprocating or internal combustion, Diesel, or otherwise, exemplify a range of study into almost every phase of physical and chemical science, requiring the use of every stage of instruments, the development of which is a craft by itself.

"And then the screw of the ship, with its unique design, causes us to think of the curious and efficient thrust block by which the force of the screw exerts its influence upon the ship, a plan based on Michell's study into the physical properties of liquids.

"We look up and see the wireless device, also an offspring of the physical laboratory. The sounding apparatus is based on the designs of Lord Kelvin. A study of the laws of acoustics have enabled ships to utilize apparatus for establishing the depth of

This subject has been and is being much discussed and written about. It has reached a point where it becomes of vital interest to every man directly or indirectly connected with the industry.

The answer lies not in better mill practice or production methods; not alone in better sales management; but in a combination of forces for better and more modern distribution methods. This must be reflected all the way from the executives of individual steel companies down to the salesmen in the field, and from the industry as a whole down through its fabricators and dealers, to the consuming public.

A legitimate association or alliance for better business to the benefit of an industry and every customer it serves!

water by echo. The ships carry refrigerating apparatus, recalling the investigations into the production of cold, again by students of science. You might go through the whole ship and you will find that it is linked by innumerable ties to research in the laboratories.

"The same is to be said for the motor industry. The problems of the internal combustion engine and the various metallurgical difficulties have been, and are still being, solved by the patient study of innumerable scientists.

"The same is to be said of the aeroplane, the chemical industry, the electrical industry. New applications of scientific knowledge, new ideas, new process, new machines, must always be in preparation. Off with the old, on with the new, is the battle cry of industry!

"The essential point is that in the future pioneering will be done by great groups of trained men utilizing each other's scientific knowledge, rather than so much by the individual, as has been the case in the past, when so often an invention was the result of a lucky chance or a happy idea."

Committee on Heavy-Duty Anti-Friction Bearings

George T. Snyder, chairman of the iron and steel division of the American Society of Mechanical Engineers, New York, has announced the appointment of a division subcommittee on heavy-duty anti-friction bearings. The personnel of this committee is as follows: Lane Johnson, chief engineer United Engineering & Foundry Co., Pittsburgh; Charles H. Hunt, chief engineer Weirton Steel Co., Weirton, W. Va.; R. C. Stiefel, engineer, Ellwood City, Pa.; H. E. Brunner, chief engineer SKF Industries, New York; G. C. Farkell, superintendent rolling mills, National Tube Co., Lorain, Ohio; William Messinger, Hydraulic Tool Works, D Street, Philadelphia; Sidney G. Koon, secretary, associate editor THE IRON AGE, New York.

Steel Fabricators Meet at Biloxi

Business and Technical Problems Relating to Structural Work Discussed—National Advertising Campaign for Whole Industry Suggested

THE American Institute of Steel Construction is meeting this week at Biloxi, Miss., devoting the first few days of the week to business sessions and the latter part of the week to golf and other entertainment. Charles M. Schwab, chairman Bethlehem Steel Corporation, is to be one of the speakers at the banquet Thursday evening.

One of the outstanding addresses of the convention was that delivered by Charles H. Macdonald, manager market research department Colorado Fuel & Iron Co., Denver, published fully on another page of this issue. Mr. Macdonald made a plea for more complete organization of the steel industry to the end that a comprehensive and coordinated effort may be made in a national advertising campaign selling the value of steel. Cultivation of neglected markets and the development of new uses of steel were other suggested aims of a national publicity campaign.

Adjustment to New Conditions Necessary

W. M. Wood, president Mississippi Valley Structural Steel Co., in his address as president of the institute, argued for more extended industrial cooperation.

"We are in a period calling for adjustment to new conditions," said Mr. Wood, "and he is indeed wise who, realizing that fact, attends to that adjustment promptly. In spite of this, there are those who are unwilling to give up the traditions of the past and who therefore see nothing but evil in the new order of things.

"We live in an age without parallel in the history of the world and in a country the envy of the civilized world. We have greater wealth than has ever fallen to the lot of any nation to hold and this wealth is not in the hands of a few, but distributed among the many. Progress and improvement in art, in industry, in science and in all things for good are evident upon every hand. Whatever our environment is, we want to make it better and, as a nation, we have the means to do so."

Mr. Wood recommended that the work already started to improve the conditions between the industry and the rolling mills, the public and the competitors of structural steel be extended and carried further.

"The steel industry," continued Mr. Wood, "is looked upon as an essential industry and as such its leaders have

for years felt that no action for the development of the industry need be taken; that little, if any, effort need be exerted by them for the development of the industry with the exception of that taken along mechanical lines. In the vital problems of sales and distribution and publicity, the industry as a whole has seemed to be where it was a generation ago, and until recently this fact seems to have been no cause for concern."

Code of Selling Ethics Recommended

Charles F. Abbott, executive director, in his annual report to the convention, stated that the association of steel fabricators had made notable progress during the past year. This was shown in the increase in membership, increase in income for cooperative work, and the widespread use of the standards in specifications and trade practices promulgated under the auspices of the institute. More than 170 cities are now permitting buildings to be constructed in accordance with the standard specification of the institute.

During the past six months the institute has had the service of 10 field engineers whose sales efforts on behalf of steel construction have shown practical results.

Mr. Abbott recommended the re-inauguration of an advertising program on the part of the steel fabricators. He also recommended the preparation of a code of selling ethics for the industry.

He called attention to the Sherman anti-trust law, which, he stated, contains "some obsolete features and many doubtful elements," and this law is probably "responsible for some of the business man's worries. A modification of this law, with intelligent interpretations, would undoubtedly offer relief, but by no means is it alone responsible for the new conditions now confronting our business activities, nor would its appeal remove the principal present day problems."

Public Not Yet "Sold" on Steel

F. H. Frankland, in charge of the technical service of the institute explained the practical results obtained through the services of district engineers. The engineers have been operating only five months, Mr. Frankland pointed out, yet they have proved of definite value in promoting steel construction throughout the country.

"The work of the district engineers," said Mr. Frankland, "is fundamentally promotional, and must eventually be measured in the broad aspects of the education of the public, the engineering and architectural professions and the building industry, to the facts and truths of steel construction."

Experience during this brief time has shown the need of a well-planned advertising program, Mr. Frankland said. All the district engineers have become convinced that their labors are greatly hampered by the fact that the public has not been "sold" on steel, and it is essential that a "steel consciousness" be inculcated in the minds of the architect, the engineer and the builder through a comprehensive national advertising campaign.

Government Has Large Building Program

J. Edward Cassidy, consulting engineer of Washington, D. C., called attention to the increase in building work under the auspices of the Government. Appropriations for \$250,000,000 have been authorized, and new buildings on the Mall in Washington alone will cost in excess of \$200,000,000. An appropriation of \$65,000,000 has been made for Army housing. The Navy and other branches of the Government are also planning extensive structures.

Aside from the direct Government building program, Mr. Cassidy called attention to the great amount of work that will result from the establishment of the new aviation fields. These activities, Mr. Cassidy said, make it necessary that the steel fabricators be represented in Washington for the purpose of acquainting the branches of the Government with the latest and most modern engineering ideas regarding steel construction.

"In the next 10 years," said Mr. Cassidy, "expenditures by the Federal Government on these various construction programs will undoubtedly aggregate a billion dollars, and it is certain that the structural industry has more than a passing interest in such a construction program, and that the effort and money required to promote the use of structural steel, will be time and money well spent."

A Defense of the Purchasing Agent

L. F. Boffey, editor of the *Purchasing Agent*, defended the purchasing agent and declared he is not respon-

sible for the demoralized condition in the marketing of products.

"It is quite true," said Mr. Boffey, "that all purchasing agents characteristically seek to buy at the lowest price at which a producer is willing to furnish the required material. That is an essential aim in purchasing. In typical industries, expenditure for materials represents 60 per cent of the total production cost. An over-liberal or careless purchasing policy, resulting in an increase of 5 per cent in the cost of materials in the course of a year, will reduce by 3 per cent the amount of profit which the company will earn in the same period. Actually, the saving from proficient buying, as compared with haphazard or rule-of-thumb methods, is more likely to approximate 10 per cent according to studies made in Government and industry.

"Every dollar wasted in the purchasing department is the equivalent of the profit on a \$10 sale, based on average profit returns. A wastage of 5 per cent on a purchase budget of a million dollars eats up the profits on half a million dollars of sales. In the face of these statistics, it is futile to argue that the purchasing agent should pay a higher price for any commodity than he is required to pay by economic conditions and the desire of producers for his business. To do so would be to endanger the interests of his own company and to play into the hands of the company's competitors. There is no problem of ethics in this situation; it is purely a question of economics. The fact is that the real profits of industry today are the reward of careful buying, and many concerns which bewail their own profitless condition might find a solution for their ills in wiser purchase and better utilization of materials."

Progress in Steel Welding

Fred T. Llewellyn, president American Welding Society, in discussing welding as a fabricating tool, pointed out that experiments demonstrate conclusively that welding has a place in steel construction work. Wherever it is necessary to eliminate noise as much as possible, as in the case of additions to hospitals and similar structures, welding has been used with success. It remains now to demonstrate the possible economies.

Mr. Llewellyn said that experiments have produced the following conclusions:

Standard grades of structural steel can be satisfactorily welded.

The welding operation does not adversely affect standard structural grades of base metal.

Methods of making welds by different processes have been standardized to a considerable extent.

The unit values for the strength of welded joints can be readily determined.

The practical soundness of a welded joint can be insured without destructive tests.

The economic advantage of welding varies with different classes of work.

Mr. Llewellyn expresses the opinion that whereas welded structures seem

to be feasible the relative costs are not yet on a plane with riveted steel, nor has the skilled workmanship necessary proved available.

Flame Cutting of Structural Steel Declared Economical

Flame cutting of structural steel has been found to be practical and economical, according to J. R. Dawson, metallurgical engineer of the Union Carbide & Carbon Corporation, in a paper read before the convention. The paper was prepared by S. W. Miller and J. R. Dawson, and was illustrated and demonstrated by the use of apparatus set up for this occasion.

"In many instances," said Mr. Dawson, "cutting structural steel with the oxy-acetylene blowpipe saves time and money. The demands of economy have enlarged its use to such an extent that general interest has been aroused among those concerned with steel construction. Numerous theories, both favorable and adverse, about the effect of the flame cutting, have been advanced to support the opinions of those interested in the matter."

Many tests were described and illustrated from which Mr. Dawson concluded:

"All flame cuts should be made as smoothly as possible.

"Structural steel is not injured by smooth flame cuts such as are produced with a shape cutting machine or other apparatus for getting steady travel of the cutting blowpipe and such as can be secured by experienced operators.

"Hand cut structural steel is not damaged in the material itself, but depending on the extent of the irregularity of the cut, the elongation obtained in bending the rough surface is less by a small amount than the elongation with milled or machine cut specimens."

Use of Steel Joists as Floor Fillers

Frank Burton, consulting engineer of Detroit, made a defense of steel joists, and described their application to structural steel buildings. He told how the first joists were made of sheet steel in 1855, to be used in a building in the city of New York. He also narrated the development of steel joists from that date. "The great variation in the capacities of joists manufactured by different companies," said Mr. Burton, "had made it difficult to design with steel joists, and one of the great needs of the industry of today is the standardization of joists."

New data and studies on fire resistive materials, etc., are bringing to light new evidence regarding the work that the steel joist must do.

"While it is natural to expect steel joists to be used in fire resisting structures these joists," said Mr. Burton, "have also been used to a considerable extent where fire resistive construction is not required."

He concluded: "The use of steel joists as floor fillers in steel-frame buildings is a subject that deserves the serious attention of every steel fabricator. The use of structural

steel can be increased, while builders can obtain better and more economical buildings by the intelligent combination of these two building materials."

All-Steel Floors Reduce Dead Load

Lee H. Miller, chief engineer American Institute of Steel Construction, in his annual report recommended a further study of floor design. He advanced the idea that an all-steel floor, according to all present available data, seems to be the best for building construction.

"We have almost innumerable types of floor construction," stated Mr. Miller, "but practically all of them have very definite handicaps. My belief is that it will be possible to develop an all-steel floor construction which can be properly protected from fire on the ceiling side, and reduce the dead load of the floor construction by 20 lb. or more per sq. ft."

Mr. Miller called attention to the conferences during the past year with highway and railway bridge engineers for the purpose of standardizing specifications for those structures. These and other studies are bringing to light points at which the standard specifications adopted by the steel fabricators should be extended. Flame cutting has been definitely established as practical and safe. There is need, however, of further defining the standards in regard to riveting, Mr. Miller said.

"It must be recognized," he said, "that before any uniform practice on the determination and design of multiple story structures to resist wind stresses is established, it will be necessary to fix the working stresses of rivets in tension under certain conditions. The engineering profession is not, in my opinion, ready to accept the unrestricted application of tension stresses to rivets, and the revisions in the institute's specification clearly define the limiting conditions under which rivets may be used to carry tension stresses."

Gray Iron Institute Names Membership Committee

The Gray Iron Institute, Terminal Tower Building, Cleveland, has appointed a membership committee with Fred S. Erb, Erb-Joyce Foundry Co., Detroit, as general chairman and including all the 75 members of the institute. The following nine vice-chairmen will assist Mr. Erb in various foundry centers: W. F. Bornfleth, Cream City Foundry Co., Milwaukee; A. E. Clarke, Des Plaines Foundry Co., Des Plaines, Ill.; Horace R. Culling, Carondelet Foundry Co., St. Louis; Chester A. Peebles, Stedman's Foundry & Machine Works, Aurora, Ind.; H. P. Messlor, John E. Thropp's Sons, Inc., Trenton, N. J.; D. L. Sacks, Louis Sacks Foundry, Inc., Newark, N. J.; R. R. Simonton, Ensign Foundry Co., Toledo, Ohio; H. E. Smith, Woodward Iron Co., Woodward, Ala.; Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass.

Change Is Keynote of New Industries

Success, Says E. W. McCullough, May Depend on Readiness to Scrap Today's Methods and Equipment

PROGRESSIVE obsolescence, the arteriosclerosis of industry, was portrayed as the most formidable threat of broadening competition by E. W. McCullough, manager department of manufacture, Chamber of Commerce of the United States, in an address Tuesday before the Lima Chamber of Commerce, Lima, Ohio.

"Communities," he said, "which are intent upon industrial expansion will, if they are wise, take into consideration the many general factors upon which industrial success depends. The pace of the present day is terrific. Scientific discovery, developments in management, the evolution of new methods and the adaptation of new commodities to old uses are changing our methods of production more rapidly than ever before. The successful industry of today has no assurance that it will be successful, by following the same methods, tomorrow.

"Production in many lines of industry has reached its peak, at least until larger markets and better distributing methods are established. Consequently, to build more plants and to create more capacity for production in those lines is little short of folly. There are exceptions, of course. One of them is where a market is found for the commodity and the factory is so located as to be able to take advantage of it, provided other manufacturing requirements are also fulfilled. Another exception is found in the new factory built to utilize the latest processes and equipment and therefore able to compete more than successfully with older units of the industry that are retarded by an obsolescence problem.

Progressive Obsolescence Guiding Principle in Newer Industries

"What is progressive obsolescence? The best answer consists in simply pointing to two outstanding examples, the automobile industry and the radio industry. It has been the guiding principle in these two industries since shortly after their inception, and we are so used to it there that we scarcely think of it in other fields except possibly in connection with style commodities, such as clothing. Nine or ten years ago crystal radio sets were the rule. These were scrapped for one-tube sets, and these in turn for two-, three-, four-, five-, up to nine-tube sets as fast as science made them available. The modernistic trend in furniture is also attracting the attention of the furniture industry. This will prove to be an interesting experiment to watch. Many of us are educated to standard types of furniture and frequently use what we have purchased for some time after the period of greatest usefulness has passed.

"The parallel holds true as well in the production of goods. The indus-

trial world supremacy of America is based on the application of the principle of progressive obsolescence in both factory and office. Andrew Carnegie secured for this country supremacy in steel by building and tearing down one steel mill after another as metallurgical science indicated the way. His scrapping policy revolutionized the industrial world and marked the beginning of that period in which we now are—a period marked by intense competition and a rapidity of change unparalleled in the history of the world.

"In developing any program of industrial expansion we are then confronted by the operation of the principle of progressive obsolescence in two different directions, either one or both of which can become the source of much industrial grief if not carefully evaluated before definite commitments are made. If a community is about to obtain a new industry, it is well first to ascertain the degree to which its principal product is either coming into use, or going out of use, together with all important modifications that will eventually have to be faced. We are often prone to think of competition only in terms of that which we encounter from other manufacturers in the same line of industry. Instead, whole industries today

are competing with each other for the supplying of the same demand through different media. And the newest one in the field can never be certain very long that something still newer will not soon be forthcoming.

Obsolescence a Legitimate Production Cost

"Again, if a community is about to obtain a new industry, it must in addition assure itself that the proposed process and equipment are sufficiently modern in type to permit the new plant to compete successfully with the latest developments in its particular field. On every side we hear much today of the excess manufacturing capacity that exists in many lines. Not so frequently, however, do we hear the corollary to that old story, namely, that anywhere from 25 per cent to 75 per cent of that excess capacity in any one particular line might be in such a stage of obsolescence as to make its early extinction an act of economic justice. But in these days of microscopic or invisible margins of profit manufacturers are prone to ask how they can afford to carry out extensive scrapping policies. The answer is found in subscription to the newer idea that obsolescence of plant is a legitimate element in the cost of production—a sort of advance charge that must be deducted from profits in order to insure the creation of a fund sufficiently soon to buy new equipment when it has been demonstrated that existing equipment is no longer in position to compete."

Machinery Industries Consider Problems

Second of Series of Conferences Focuses on Measures to Curb Unfair Trade Practices

WASHINGTON, Nov. 13.—Plans for solution of common problems in the machinery and equipment industries were discussed at a meeting at the Chamber of Commerce of the United States here on Thursday of last week, with an attendance of 36, made up of representatives of trade associations, the Government and the chamber. It was determined to attempt to work out the problems through a series of conferences, the next to be held early in February at the United States Chamber of Commerce Building. The first conference was held at Montauk Point, N. Y., Sept. 29.

Under a motion adopted at the Washington meeting, the interested trade associations will submit individual suggestions to Philip P. Gott of the Chamber of Commerce's Trade Association Department, which, acting as a clearing house, will send them to the other associations. It will be determined which of these suggestions are the most important for discussion at the next conference, to be followed by others until the industry finds the best means of solving its problems. Unfair trade practices, cost accounting, credit terms, obsolescence and other subjects will be dealt with in

the hope that greater uniformity of practices can be adopted by the industry as a whole.

Suggestion has been made of the possibility of organizing a body similar in many respects to the German Machinery Manufacturers' Association, which, with 103 subsidiary organizations, represents 93 per cent of the entire machinery and equipment industry of Germany. But these and other ideas so far have not gone beyond the stage of informal discussion. There was a consensus of opinion at the meeting, however, that the industry should take some concerted action looking toward closer contact, unified effort and establishment of confidence.

In opening the meeting, Chairman E. F. DuBrul, general manager National Machine Tool Builders' Association, pointed out that it had been called to see if the industry could continue cooperation along the lines discussed at the Montauk Point conference. Reference was made to the contact that the German industry had built up through the German Machinery Manufacturers' Association with its splendid influence in unifying the industry of that country.

The first effort of any unit of the

industry to eliminate unfair trade practices was disclosed through the announcement of Fred A. Collinge, manager Association of Manufacturers of Woodworking Machinery, that the association has proposed a tentative list of rules which will be discussed with T. M. Flannery of the Federal Trade Commission trade practice submittal division at a meeting in Chicago about the middle of December. This program, it was intimated, might develop general action among the other units of the industry in taking similar action so that uniformity of trade practices would be set up in the industry.

Dr. Hugh P. Baker, manager of the Trade Association Department, United States Chamber of Commerce, said that there is an interesting trend toward the federation of trade associations representing entire industries, but warned against dangers in organizing too effectively along vertical lines, from the raw material to the finished product, and the elimination of independent action by individual groups. He also said that the matter of expense is important and that consideration should be given to better organized effort at lower cost.

Speaking of the machinery and equipment industry as a super-key industry, Walter H. Rastall, chief Industrial Machinery Division, Department of Commerce, declared that it requires better organization. While the American industry produces 57 per cent of the world output of machinery and equipment, Mr. Rastall said, it has only about 35 per cent of the world's market. He held that this was disproportionate to its capacity and should be raised to its deserved level. He urged representatives of the industry to organize with this end in view. He also discussed obsolescence of machinery and pointed to this as a field which should be cultivated for the purpose of building up increased domestic markets.

Methods of operation of the trade practice submittals of the Federal Trade Commission were explained by Henry P. Fowler, Research Department United States Chamber of Commerce. He pointed out that the initiative for holding conferences on the subject with the commission was always taken by the interested industries.

Those present at the conference included the following:

- R. J. Walker, Lieutenant Commander, United States Navy.
- S. M. Williams, manager Engineering Construction Division, Associated General Contractors.
- Gorton James, chief Domestic Commerce Division, Bureau of Foreign and Domestic Commerce.
- A. P. Robinson, chairman Mixer Manufacturers Bureau, Associated General Contractors of America, Washington.
- C. S. Embrev, secretary Mixer Manufacturers Bureau, Associated General Contractors of America, Washington.
- Ray M. Hudson, assistant director Bureau of Standards.
- Malcolm Baird, secretary Screw Machine Products Association, field secretary-treasurer Pressed Metal Institute, Buffalo.
- C. H. Rohrbach, Compressed Air Society, New York.
- C. B. Andrews, Manufacturers Division, National Crushed Stone Association.

- J. R. Boyd, manager National Crushed Stone Association, Washington.
- Verne E. Minich, representative Foundry Equipment Manufacturers Association, president American Foundry Equipment Co.
- H. Cole Estep, secretary-treasurer Foundry Equipment Manufacturers Association, Cleveland.
- Fred A. Collinge, manager Association of Manufacturers of Woodworking Machinery.
- Henry Buker, president National Machine Tool Builders' Association, Providence, R. I.
- John W. Ogren, commissioner Elevator Manufacturers' Association of the United States.
- E. W. McCullough, manager department of manufactures United States Chamber of Commerce.
- E. P. Essley, secretary Associated Machine Tool Dealers, Chicago.
- C. E. Breece, Dairy and Ice Cream Machinery and Supplies Association.
- D. N. Benedict, delegate from Refrigerating Machinery Association, treasurer Frick Co., Waynesboro, Pa.
- Richard M. McClure, secretary National Laundry Allied Trades Association; Flour Mill Machinery Manufacturers Association.

- W. H. Rastall, chief Industrial Machinery Division, Bureau of Foreign and Domestic Commerce.
- A. R. Taylor, American Tar Products Co., Pittsburgh.
- P. L. Griffiths, Manufacturers' Division American Road Builders' Association, American Tar Products Co., Pittsburgh.
- Charles M. Upham, American Road Builders' Association.
- F. B. Curran, Automotive Division (Highways), Bureau of Foreign and Domestic Commerce.
- C. W. Conner, American Road Builders' Association.
- E. F. DuBrul, general manager National Machine Tool Builders' Association.
- H. C. Dunn, Domestic Commerce Division Department of Commerce.
- Henry P. Fowler, Research Department United States Chamber of Commerce.
- Philip P. Gott, Trade Association Department United States Chamber of Commerce.
- Hugh P. Baker, manager Trade Association Department United States Chamber of Commerce.
- Harry Botsford, secretary Society for the Development of Internal Combustion Power.
- D. A. Skinner, secretary Chamber of Commerce of the United States.

Simplified Schedules Affirmed for Several Items

WASHINGTON, Nov. 9.—Announcement has been made by the Division of Simplified Practice that a simplification program for eaves trough and conductor pipe has been reaffirmed, without change, for another year. A survey indicates that 94 per cent of the annual production of this commodity is in conformity with the simplified schedule. This simplified practice recommendation, as originally adopted by industry, reduced the varieties of the commodity from 21 to 16.

Reaffirmation of the simplified practice recommendation regarding roofing ternes has been announced, also. Adherence to this recommendation has been 95 per cent. It reduced the varieties of the commodity from nine to seven.

Simplified practice recommendation No. 47, on cut tacks and small cut nails, is now in effect, it has been announced by the division. This simplification, recently revised by the industry, originally reduced the variety of sizes from 421 to 182 and packing weights from 423 to 121.

Standardization of Tools and Machine Elements

The sectional committee on standardization of small tools and machine tool elements, which is organized under the procedure of the American Standards Association and sponsored by the American Society of Mechanical Engineers, the Society of Automotive Engineers and the National Machine Tool Builders Association, will hold its sixth annual meeting at the Engineering Societies Building, New York, Dec. 6, during the annual meeting of the A. S. M. E.

The work of the sectional committee is shared by 12 technical committees and includes the following standardization projects: Tee slots, their bolts, nuts and cutters; tool

holder shanks and tool posts; taper shanks and sockets for machine tools; spindle noses and collets for machine tools; milling cutters; and designations and working ranges for machine tools. Also, drill sizes; drill bushings; punch and die holders; circular form tools and holders; chucks and chuck jaws; and cut and ground taps.

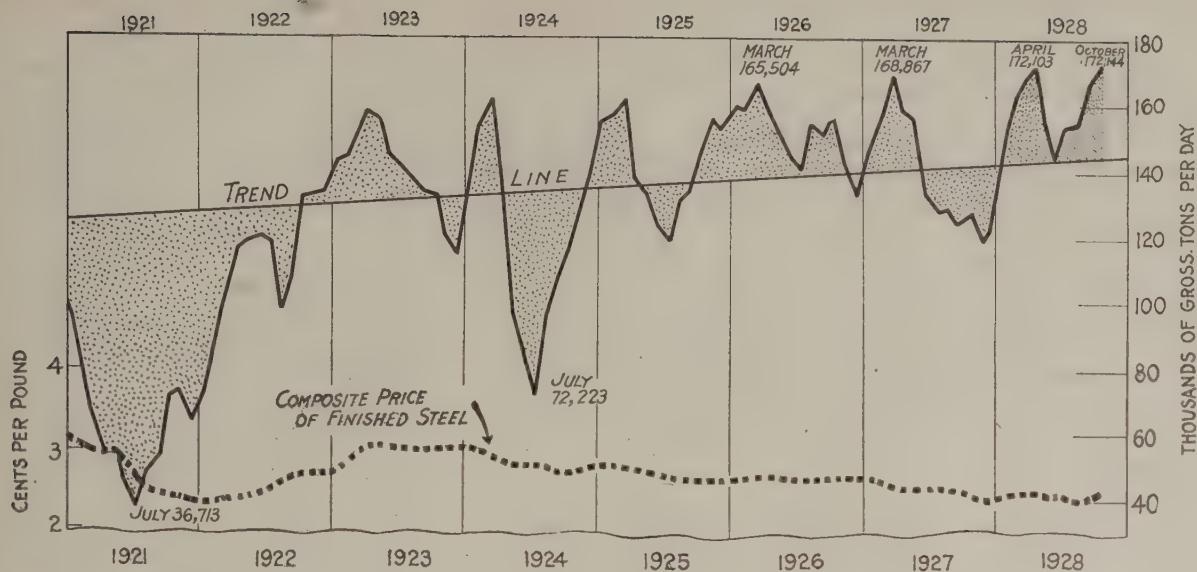
Members of the executive committee are: H. E. Harris, consulting engineer, Bridgeport, chairman; F. O. Hoagland, Pratt & Whitney Co., Hartford, vice-chairman; J. A. Anglada, Anglada Motor Corporation, New York, secretary; C. W. Machon, Brown & Sharpe Mfg. Co., Providence; and C. W. Spicer, Spicer Mfg. Corporation, South Plainfield, N. J.

High Canadian Machinery Output in 1927

The output of the Canadian machinery industry reached its highest point in history during 1927 with a production valued at \$44,602,000, according to statistics which have just been made available by the Dominion Government, says a statement prepared by S. R. March, Industrial Machinery Division, Department of Commerce. This volume represents an increase of 16 per cent over the output value of \$38,380,000 in 1926, and 10 per cent over the previous record of \$40,535,000 established in 1920. Pulp and paper mill machinery led all the industrial machinery items.

General American Tank Buys Buffalo Steel Car Co.

General American Tank Car Corporation has acquired the plant and property of the Buffalo Steel Car Co., Buffalo. This plant is fully equipped for the building of modern steel cars and for the repair of general railroad equipment. The acquisition of the Buffalo plant will not require additional financing.



Record - Breaking Ingot Production Was Recorded in October. On the basis of daily averages, as well as total output, new high figures were made. Prices were fractionally better than at midyear

Highest Record in Steel Ingot Production

October Output Largest for Any Month—Total for Ten Months
Makes a New Record

PRODUCTION in October of open-hearth and Bessemer steel ingots in the United States, as reported by the American Iron and Steel Institute, established a new monthly record. The calculated output, at 4,647,891 gross tons, displaced the previous high record of 4,535,272 tons, made in March of last year. Only one other month, March, 1928, has exceeded 4,500,000 tons.

Not only was the aggregate larger than any previous total, but the daily output also reached a new high mark, in spite of the fact that there were 27 working days in the month. The figure is given as 172,144 tons daily, compared with the previous record of 172,103 tons, made in the 25 working days of last April. The daily rate has shown a steady increase, month by month, since 143,960 tons was registered in June. The gain since that time has been approximately 20 per cent.

For the 10 elapsed months of

the year, calculated production has reached 41,578,411 tons. This is the largest total for the first 10 months of any year. The largest previous total was reached in 1926, with 39,763,695 tons. The excess of 1,815,000 tons represents more than 4½ per cent. Inasmuch as the earlier figure included crucible and electric steel ingots, production of which in the first 10 months of this year may be estimated roughly at 340,000 tons, the real excess becomes about 5½ per cent. Compared with last year, an excess of about 12 per cent has been recorded for the first 10 months.

Open-hearth steel made another new record in October, with 3,802,396 tons reported by companies which made 94.68 per cent of the total open-hearth and Bessemer production last year. This would represent close to 4,000,000 tons on complete returns. The previous high record for open-hearth steel was made in March, 1927, when the reporting companies made

3,702,660 tons, and was closely approached in March of this year, on a report of 3,700,411 tons. Each of these last figures might be increased by 200,000 tons on complete returns. Bessemer output made the largest total of the past two years but, of course, was considerably lower than was achieved in the hey-day of the Bessemer process.

Total ingot production, including crucible and electric steel ingots, which no longer are reported monthly, would show a daily output for October of about 173,000 tons. With the same inclusions of crucible and electric steel ingots, the total October production would be about 4,675,000 tons and the 10-month production about 41,920,000 tons. Details of the first 10 months of 1927 and 1928 are covered in the table.

The 10,000th airplane number has been issued by the aeronautic branch of the Department of Commerce.

TEN MONTHS' PRODUCTION OF STEEL INGOTS (GROSS TONS)

1927					1928				
Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output	No. of Working Days	Approximate Daily Output	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output	No. of Working Days	Approximate Daily Output
Open-Hearth	Bessemer	All Companies		All Companies	Open-Hearth	Bessemer	All Companies		All Companies
3,042,133	545,596	3,789,874	26	145,764	3,280,247	498,746	3,991,332	26	153,513
3,043,492	565,226	3,812,046	24	158,835	3,308,728	521,366	4,045,304	25	161,812
3,702,660	590,709	4,535,272	27	167,973	3,700,411	567,309	4,507,520	27	166,945
3,341,750	565,440	4,127,335	26	158,744	3,509,637	564,039	4,302,573	25	172,103
3,273,593	557,785	4,047,251	26	155,663	3,397,631	581,949	4,203,190	27	155,674
2,823,107	436,053	3,495,609	26	134,446	3,016,487	527,351	3,742,964	26	143,960
2,596,349	436,883	3,204,135	25	128,165	3,075,247	533,550	3,811,573	25	152,463
2,806,347	505,596	3,498,549	27	129,576	3,386,750	569,436	4,178,481	27	154,759
2,622,977	471,548	3,268,881	26	125,726	3,381,917	545,015	4,147,583	25	165,903
2,643,562	495,845	3,316,292	26	127,550	3,802,396	598,227	4,647,891	27	172,144
29,895,970	5,220,681	37,095,244	259	143,225	33,859,451	5,506,988	41,578,411	260	159,917
10 Months					10 Months				

Progressive Administration Looked For

Hoover Faculty for Getting Things Done Expected to Benefit Business, Agriculture and Labor

WASHINGTON, Nov. 13.—The election of **Herbert Hoover** to the Presidency, aside from being interpreted as a favorable omen for business, has aroused interest in the specific policies that are likely to characterize his administration. It is expected that generally the Coolidge program will be followed, though with additional activities along economic lines and possibly with further reorganization of Government bureaus.

Mr. Hoover's past record discloses his sympathetic attitude toward agriculture and business, and the same may be said with regard to labor. The President-elect has a background that perhaps excels that of any of his predecessors in the White House when it comes to comprehensive understanding of domestic business and labor problems, as well as international issues.

That there will be a minimum of interference by the Government with legitimate business probably goes without saying. On the other hand, it would be a serious mistake if the view were entertained that a man of the type of Mr. Hoover would tolerate business that is not conducted on the high standards that he has always insisted it should maintain.

In aiding not only business, but agriculture, labor and other interests, indications are that Mr. Hoover will extend economic and statistical research well beyond his accomplishments in this direction as Secretary of Commerce, which really only followed lines that he had applied previously as food administrator, as an engineer and in other capacities. Assistance to business through cooperation with approved trade associations, through building up domestic and export trade, through standardization and simplification and through other avenues is held to give an index to expanded activities of this kind. The same may be said with regard to aid given to labor through plans he initiated for reducing unemployment and straightening out the business cycle. As President he will be in a position to increase such activities and at the same time give greater attention to other problems.

Indicative of this is his announced purpose of calling an extra session of Congress for the purpose of enacting legislation to aid agriculture, provided such legislation is not passed at the next regular session, which is held to be improbable. Mr. Hoover opposes Government price fixing of agricultural products, but would have the farmers themselves handle surpluses and achieve stabilization through a Federal Farm Board controlled by them.

There is a question as to whether the extra session, should it be called, would dispose of any other than agricultural legislation. Pressure might be brought to bear to have tariff and other legislation enacted, but it is believed such bills would be held over until the next regular session. It is the general opinion that Mr. Hoover will take up tariff legislation, not by piecemeal, but by means of an omnibus bill. This does not signify, however, that there will be a general marked revision of the present Repub-

lican tariff act. Instead it is thought that there will be a leveling out of inequitable features of the tariff duties and their administration. The steel schedule, for instance, probably would not be changed a great deal, though certain provisions may be changed in order to reconcile them with other provisions. Manufacturers of barbed wire, for example, are unable to understand why as a matter of justice this finished product should be carried on the free list when other products, including raw materials, are made dutiable. Of course, the explanation is that barbed wire was made free of duty as a sop to the farmers, but this is held to be no justification.

Believed to Oppose Flexible Provision of Tariff

Mr. Hoover, in the opinion of many, favors the elimination of the flexible provision of the tariff act under which the President, after investigation, may increase or reduce import rates of duty. It is the view that Mr. Hoover would like to see the power to make and change rates restored to Congress entirely and Congress evidently is in sympathy with that idea. Moreover, the new Congress will have an effective working majority favorable to the Hoover administration. Mr. Hoover is understood to favor retention of the Tariff Commission, but, it is said, he would confine its authority to fact-finding for the purpose of reporting to Congress only.

While there are those who think Mr. Hoover will eliminate a number of independent branches of the Government as being unnecessary, serious doubt is entertained by many that this will be done, though he is expected to effect reorganizations that will do away with overlapping and duplication of work. The Federal Trade Commission is expected to receive the support of Mr. Hoover, as are the Shipping Board, the Federal Oil Conservation Board and other independent branches, but it may be expected that such organizations as the Shipping Board will be relieved of certain administrative powers. The Federal Trade Commission at present is of an entirely different character than it was originally, and has become helpful, on the whole, to business, rather than being an irritant. For this reason it will probably not be disturbed

by Mr. Hoover unless he curbs some activities taken on its own initiative. The Federal Reserve system has operated so satisfactorily that no great changes are expected to be made in it. Regarding railroad legislation, Mr. Hoover is known to be favorable to consolidation within certain limits.

Hoover Responsible for 8-Hr. Day in Steel Industry

The support given to Mr. Hoover by many prominent leaders of organized labor during his campaign would indicate that labor generally is well disposed toward him. His aid to labor in working out plans to relieve unemployment has been an element in this direction. Mr. Hoover was unquestionably the moving spirit in the Harding administration who brought about the 8-hr. day in the iron and steel industry, not through legislation, but through cooperation with leaders of the industry. This fact also is well known to labor and remembered favorably. Mr. Hoover looked upon that accomplishment not only as being economically sound, but also as being altogether desirable socially and as a precedent for other industries. His efforts to solve problems in the coal industry developed a sympathetic attitude toward him generally on the part of both operators and miners. It is also true that his stand for restricted immigration has gained him warm support.

Efforts toward getting liberalized revision of anti-trust laws are expected to be made and it is conceivable that Mr. Hoover may favor such efforts to a limited degree. Organized labor itself is in favor of revised anti-trust legislation insofar as it would restrict judicial use of the power of injunction, and for this reason there are some who feel that if revised anti-trust legislation were attempted it would, while developing one side they favor, also develop another side that they do not favor. Because of this they have been hesitant about opening up the subject.

Speculative as present forecasts of the course of Mr. Hoover's administration are, it may be set down definitely that all important action taken will be upon his own initiative, for Mr. Hoover has well earned the reputation of being a strong character who takes personal responsibility for what is done under his authority. He will be President in fact, as well as in name, though freely seeking advice and cooperation. His cabinet is expected to be made up of men selected from fields that will fit them for their respective duties, well qualified to handle the domestic and international problems with which they will be faced.

Construction costs rose slightly in September to an index of 201, based upon 100 in 1913, according to figures of the Associated General Contractors of America. This is equal to the highest position the index has held in the last three or four years. It was at the same level a year ago.

This Issue in Brief

If parts are to be carburized, tell steel maker you want *normal* steel, for it carburizes faster than abnormal steel, metallurgists declare. In addition, soft spots will be avoided, and hardening will be more uniform.—Page 1220.

* * *

Flaws in steel rails located unerringly by direct-current device. Size as well as position of flaw is indicated by variation in current flow. Mounted on a car, the device detects flaws in installed rails.—Page 1214.

* * *

Cleaner cylindrical castings are obtained if pencil gates are used instead of bottom gate. The pencil gate keeps the metal agitated, thus forcing impurities to the top, instead of permitting them to cling to the side of the mold.—Page 1218.

* * *

Predicts slightly higher steel prices. Though Doctor Haney does not expect a "runaway market," he looks for a gradual increase in strength of steel prices.—Page 1228.

* * *

Life of galvanized articles is considerably increased by heat-treating, metallurgists find. Tests reveal that corrosion resistance of heat-treated materials, due to formation of iron-zinc compounds, created by heating $\frac{1}{2}$ hr. at 500 deg. C., is about 35 per cent higher, under the "simulated atmospheric test," than for untreated materials.—Page 1226.

* * *

Purchasing agent endangers interests of his own company and plays into hands of competitors if he pays a higher price than required, says convention speaker. Buying at lowest price is essential aim of purchasing. Ethics do not enter the situation; it is purely a matter of economics.—Page 1236.

Metal parts cleaned by use of trichlorethylene. When using this chemical solvent for degreasing, cleaning is done in three trays, one heated, next intermediate, and final for rinsing.—Page 1226.

* * *

Welded building is said to save 15 per cent of steel. Bolts were not used even to hold members in place for welding, in first retail store and office building to be welded completely. A square wood frame, bolted around the columns, provided means for attaching the braces.—Page 1224.

* * *

New durability test for galvanized coatings said to be faster and superior to salt spray test. In "simulated atmospheric corrosion test" specimens are exposed to an atmosphere of air, CO₂ and SO₂, saturated with water vapor at 120 deg. Fahr. Failure of coating is clearly shown within a few days.—Page 1226.

* * *

Cold shuts in large, intricate castings can often be avoided by using an equalizing gate. This keeps the metal in motion, preventing the formation of a crust in portions of the metal which would otherwise be at a standstill for a short time.—Page 1219.

* * *

No slackening other than seasonal in sight in the steel consuming industries, says Dr. Haney. Steel composite demand line continues at a high level and well above current output of steel.—Page 1227.

* * *

Welded structures are not yet on a price par with riveted, says Welding Society head. Nor has necessary skilled workmanship for welding structures proved available, he declares.—Page 1236.

New record established in steel ingot output. Calculated production in October was 4,647,891 gross tons, exceeding the previous record (March, 1928) by more than 100,000 tons. Output for first 10 months is over 41.5 million tons, $5\frac{1}{2}$ per cent above the 1926 record.—Page 1239.

* * *

Is abnormal steel caused by aluminum? If aluminum content is above 0.010 per cent the steel is almost certain to be abnormal, tests reveal.—Page 1220.

* * *

Steel scrap prices are near a peak, forecaster believes. "It seems likely that they will decline before the end of the year, even though some recovery from the recent setback may occur," says Dr. Haney.—Page 1229.

* * *

Steel fabricating industry's prospects are excellent, says Construction Institute head. New building contracts for 1928 will run about 7 per cent above those of 1927, and 1929 is expected to be better than 1928.—Page 1229.

* * *

Protects electric heating elements against oxidation by placing resistor coil inside a steel or copper tube in which is packed magnesium oxide. Tubes are swaged to pack the magnesium more tightly, and units are annealed, again swaged, and then formed to desired shape.—Page 1221.

* * *

Pig iron prices are likely to run higher during next two or three months before reacting, Dr. Haney says. High steel production warrants present rate of pig iron output, and as iron prices are low in comparison with steel scrap, he looks for further strength in pig iron market.—Page 1229.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Ten Years After

Nov. 11 passes into history as the world's Independence Day. Whatever other days may be made historic by the formal conclusion of treaties, the date of the ending of the World War marks the beginning of a new era. . . . Today government in Europe is in the making and in what form it will come out of the present chaos is beyond prediction. On all hands is the spontaneous expression that the first business of the United States is to relieve so far as possible the distress of the millions in Europe who are today on the verge of starvation.

SUCH was the beginning and ending of a brief armistice salutatory printed in *THE IRON AGE* ten years ago (Nov. 14, 1918). With what calmness may we now ponder things as we could hardly have done at any of the intervening anniversaries of the day.

When, in August, 1914, war crashed in Europe while we were yet clinging to the belief it could not be, the first reaction here was that a conflict was in progress that would be short but so disastrous for the nations involved, particularly the Central Powers, that the neutral world, cut off probably for some time from established contacts in international trade, would have to look to us in the interim. Industry thought then only in terms of peace time pursuits. No one was articulate to point out the resourcefulness and tenacity of nations in a struggle of supreme intensity. No one ventured to say how the whole world would shortly become an arena.

How different was the position of American industry thirty-two months later. Let us quote from *THE IRON AGE* of April 5, 1917:

The declaration by Congress finds the country able and willing to back the President with money without limit. Of metals there is no lack and will be none, but time alone can make ships and guns and munitions measure up to the need. The steel and metal-working industries may be depended on to respond to every call. . . . The Government's hand will be laid upon manufacturing and commerce, upon fuel and food supply, upon all the nation's activities in a way little dreamed of as the people have gone on in the even tenor of peace. Not only is the aloofness of the United States from old world political problems at an end, but a new day has come in the commercial and all other relations of this country.

And on April 12, 1917:

The country has entered upon the most momentous enterprise in its history. It knows little more today than that after a long period of rest from war it is now setting in motion its accumulated power in men, in money and in all the enginery of material resources. . . . No man can tell to what end the forces thus mobilized will come or when they will turn again to the pursuits of peace. The

people of the United States have grim business in hand, with social, economic, industrial, political and spiritual consequences beyond the power of any mind to measure.

Memory still is vivid of the truths of these words when the Armistice was signed. Immediately there came the need of a complete reversal of national effort as told by the quotation at the head of this summary.

There followed the years of gruelling readjustment, with bitter labor troubles in many directions, the strike of buyers against high prices and the distressing slump of 1921. Meanwhile, we have furnished much of the capital needed to put Europe on its feet. And now in November, 1928, we have back of us four consecutive years of virtually uninterrupted progress, a labor situation in the iron and steel trades and the metal-working industries that never was so good and an outlook without an ominous cloud. The ten years' record is highly creditable in every way.

Steering by Statistics

INDUSTRIAL statistical science received its impetus, if not its inspiration, from conditions arising during the great war. In the United States we are living today in an atmosphere of economic and industrial statistics. There should be no belittling of this development, which is perhaps the one great thing we got out of the war. As Mr. Hoover aptly illustrated in one of his official reports, our industrial statistics are analogous to weather reports and forecasts and enable adjustments to be made by individual action. Without any doubt, the work of the large number of industrial organizations, promptly revealing production, deliveries and stocks, has tempered fluctuations and has produced stability of markets and employment of labor as never before. This has been beneficial to everybody.

Industrial statisticians are the shock troops in the front line. Behind their line the general staffs of industry are necessarily engaged with analysis, coordination and consideration of the broader economic conditions. The latter have a natural tendency to lose sight of the fact that they are working in a new field, with new agencies, and with what are after all only fragmentary data. There is constant speculation, therefore, as regards the accuracy of many of the findings that are being reported, and the proofs of the deductions being made from them. Some of these certainly do not hold water.

With all its great strides since the war, the science is still too immature to afford sound basis for economic prophecy. Perhaps accurate forecasting will never be possible, for at any time human nature may play as great a part in determining future events as does the

balance sheet. It would have been, for example, beyond the power of economic science to prophesy a few years ago that the women of the world were going to curtail their clothing and thus cripple the textile industry.

We do not deprecate efforts to progress in interpretation and forecasting, but there is need for much more of fundamental data than exist at present before it will be safe to venture in that direction. We have no means as yet of knowing, uncontroversially, the approximate amount of our national income. We know even less as to our annual savings, and still less of our annual change in wealth. Either an individual or a corporation would need to have such information before doing any forecasting; and likewise must it be in respect to a national economy, i.e., the affairs of a whole people.

Study and research of such broad nature is not the business of the trade associations. Their functions are rather to make a statistical composite of all the factors in an industry and enable its several managers, individually and independently, to arrange for proper government. This is to say, it should not be expected that a constant survey of conditions will indicate a boom or a slump, but it may show whether an industry is overbuilt or underbuilt and whether it is producing too much or too little. In so doing the trade associations supply much valuable data that can be put together. Probably they can do a good deal more than at present. They might enter into such matters as plant capacity, employment of labor, etc. For assembling and interpreting such data there is need obviously for a coordinating and reviewing body. In the present state of the science, however, we are skeptical of the practicability of such an idea.

The President-Elect Travels

WE learn with great satisfaction of Mr. Hoover's intended trip to the principal South American States. It sets a precedent which may well be followed. Obviously as President he could ill afford the time for such a journey, important though it would be. As the president-elect, he will be just as welcome, and his visit as a distinguished citizen should have all the advantages with none of the disadvantages of an ostentatious state function.

In the future such a trip may well be imitated by President Hoover's successors. It will not only acquaint our chief executive intimately with the problems of our southern neighbors but will also give their leaders a first-hand appraisal of what manner of man we elect for our chief. This personal acquaintanceship will prevent many misunderstandings from arising, and help iron out differences of opinion which do crop up in international relations.

The opinion has been expressed many times in these columns that the future prosperity of our huge and expanding manufacturing industry rests in our ability to develop all the markets in the Western Hemisphere as well as we have cultivated the one at home. A good start has already been made by active international corporations, and by heavy investments in public bonds and South American stocks. It can continually be increased by greater good will between these nations and us. Such neighborliness will be mightily helped by international air mail and a "Pittsburgh to Patagonia" highway—both things we hope of the near future. For the present, we are sure that Mr. Hoover, in a swing

across the southern countries, will do even more than did Colonel Lindbergh to increase the friendly feeling which must ever be the first care of statesmen and business men.

Measuring Trade by Iron

IT used to be said that iron is the barometer of general trade. Nowadays, when mills are expected to be able to ship steel exactly when needed and there is no occasion for consumers to buy ahead or build up stocks, iron naturally is not barometric. It may still be thermometric by indicating what is going on, instead of giving warning of what is coming.

Is iron a measure of general trade activity? Doubtless it is at short range quite a measure. Beyond question if steel shipments run 10 per cent heavier or lighter than three months previous some decided changes have occurred at least in important parts of the things that make up general trade.

But how about the long range? This use of iron, including steel as a form of iron, as a barometer or thermometer is necessarily confined to those outside the iron and steel trade. Those within take what they have. They would not reason out to general trade and then reason from general trade back to their own business. Now it is a fact that these outsiders sometimes take "pig iron" as their measure and sometimes they take "steel" and the steel figure they take is that of steel ingots. Well, from 1913 to 1928 the production of pig iron has increased about 23 per cent while the production of steel ingots has increased about 63 per cent. Which measures general trade? Of course, neither.

There is a great deal more in it than that. We are only making a beginning when we pass from these raw or intermediate products to the really merchantable forms of iron, or steel, and summarize, as in the table below, which includes some official statistics and some estimates, only rough in the case of iron castings but reasonably comparative because they are proportioned to the production of foundry and malleable pig iron.

Merchantable Iron Products—Gross Tons

	1913	1928
Iron castings	9,000,000	9,000,000
Steel castings	1,020,744	1,100,000
Rolled iron	1,678,257	500,000
Rolled steel	23,112,986	36,000,000
Total	34,812,000	46,600,000

Here we have an increase of 34 per cent, which is quite different from the 23 per cent of pig iron or the 63 per cent of steel ingots. There is a greater increase in merchantable products than in pig iron because we are using a larger proportion of scrap than formerly, for two reasons, because more old material is coming out and because both in the steel mill and in the factories that work up steel into wares for final consumption a larger proportion of scrap is made. There is a smaller increase in merchantable products than in steel ingots alone because castings have not increased, because rolled iron has decreased, and because the proportion of rolled steel to ingots has decreased. In 1913 rolled steel was 76½ per cent of the ingot tonnage. Last year it was 74 per cent and for this year we estimate it at 73 per cent.

This 34 per cent is merely the correct measure if one wants to use tons at all. Trade activity has increased much more because there is much more activity

per ton. A ton of rolled steel consumed means much more activity than a ton of iron castings, and in rolled steel itself there has been a great change in the distribution among products. Steel rails have decreased, instead of increasing at all, but the railroads have 42 per cent more ton-mileage of freight this year than in 1913. It is true their passenger-miles have decreased about 5 per cent, but motoring has enormously increased, more than making up the difference as a representation of activity.

CORRESPONDENCE

Structural Steel for Residences

To the Editor: Steel is thought of by architects and engineers as the supporting element for great structures, but little thought is given to the possibilities of structural shapes for residences. However, there are several firms who are waking up to the fact that there is an opportunity to use thousands of tons of this metal annually in the homes and are producing for this purpose what is known as steel lumber. It has often been stated that in designing steel frame work for an office building to use an excess would be waste, while too little would prove a disaster. It seems that the present tendency of the steel lumber manufacturers is to avoid waste rather than have excess strength.

When we come to realize the vast life and property loss which occurs from such storms as the one at Miami two years ago and the Palm Beach storm recently, or the Santa Barbara earthquake and other disasters too numerous to mention, would it not be wise to consider structural steel as the proper framing material for residences?

It has been repeatedly demonstrated that a properly constructed steel frame building will withstand a wind pressure which would totally destroy any other form of construction. With these facts before us, it would not be considered waste, but rather sound business economy to use a liberal amount of structural shapes in cottages, especially where high winds are common.

The writer has in mind hundreds of cottages which were built in the storm stricken path of Florida five years ago at an average cost of \$3,000. These cottages have in many cases been completely wrecked or so nearly wrecked that rebuilding is the only recourse. The idea of using 20 tons of structural shapes in these cottages five years ago would have been considered absurd, as it would have added \$1,500 cost regarded unnecessary. Yet this cost would have been offset by saving approximately \$500 in other material displaced by the steel frame.

The total cost of the steel frame residence would have been \$4,000 instead of \$3,000. To rebuild the cottages demands another outlay of \$3,000, which means that each building has cost \$6,000 within five years, to say nothing of the loss of contents.

A somewhat radical departure from the conventional type of residence construction was recently designed, having a steel frame supporting reinforced concrete walls with a concrete slab roof waterproofed and finished in ornamental stone. The walls were finished in stucco, plaster or brick veneer to suit individual taste. Such buildings would have many points in their favor, being fireproof, cool in summer, warm in winter, without noise from wind, rain or hail and with practically no upkeep expense and capable of withstanding very high winds.

It would be an easy matter to adopt standardization in

Plates, shapes, merchant bars and pipe have increased less than the average in rolled steel. Seamless tubing, sheets and strips have increased much more than the average, and ton for ton they represent much more trade activity than the heavy products just mentioned. Even from 1926 to 1928, the two biggest years in steel, the detailed figures will indicate a greater increase in trade activity than the mere total of rolled steel, for even in two years the tonnage is running more to the finer products.

the fabricated steel frame work for various types of homes, and with the rapid progress in welding the problem of construction would be much simplified. With the ever increasing cost of lumber, the steel producer can do much toward increasing the sale of his products and benefiting humanity by inaugurating an advertising campaign for better homes of structural steel.

SAMUEL H. KENNEDY, Engineer.

Samuel H. Kennedy Co., Tunnel Hill, Ga., Nov. 5.

Loose Use of Export Terms Causes Complaint Abroad

Although most American exporters are precise and uniform in their interpretation of trade terms, prudence dictates amplification of those terms to avoid reasonable misunderstanding of them and resultant disputes with their foreign customers, says a statement issued by the transportation division, Department of Commerce. Attention has been called recently to cases regarding the loose use of export terms, which have caused importers abroad to complain that unlooked-for items are included in bills they receive.

For example, it was pointed out, an exporter quotes a price on a less-than-carload lot "f.o.b. New York," meaning free on board cars, New York. His foreign customer, however, interprets the term as meaning free on board steamer. Hence, later, when he receives a bill for the transfer of the goods at New York and perhaps for their storage there, he disputes its validity. This, it was stated, he does in good faith, for the term f.o.b. named port has no other significance abroad than free on board steamer. It is never understood there as meaning free on board cars, although it may be so understood in this country if the word "steamer" is not added.

"These differences with foreign customers manifestly tend to strain business relations rather than to promote them," said the statement. "Hence it is important to avoid them, and much can be accomplished in this direction through explicit language in dealings with foreign customers."

Strain Markings a Surface Effect

Henry S. Rawdon, senior metallurgist United States Bureau of Standards, has investigated the so-called Luders lines occurring in mild steel (*Journal of Research*, September, 1928). He finds that they appear on polished tension specimens when the metal starts to yield, and are a good indication of the proportional limit. The bands acquire a rippled surface which is responsible for the matt finish of the strain markings on the otherwise smooth specimen. Luders lines first appear near the fillets and gradually extend from the ends toward the center; no increase in the elastic properties by "overstrain" can occur until this has been accomplished. The hardness is increased about 5 per cent. X-ray and microscopic examination failed to show any significant difference between the crystals in the marked and unmarked metal.

Reinforcing Steel

Awards Amount to More Than 5300 Tons

AWARDS reported during the last week totaled slightly more than 5300 tons, but included no jobs requiring more than 750 tons. New projects, calling for only 1100 tons, were the lowest in several weeks. Awards follow:

BRIDGEPORT, CONN., 250 tons, warehouse for McKesson & Robbins, Inc., to Truscon Steel Co.
NEW YORK, 200 tons, addition to Union Trust Co. building at 66 Broadway, to Carroll-McCreary Co., Inc.
NEW YORK, 100 tons, building for Mosaic Tile Co. at 443 West Forty-first Street, to Kalman Steel Co.
JAMESTOWN, N. Y., 100 tons, Y. M. C. A. building, to a Buffalo maker.
GRAND RAPIDS, MICH., 190 tons, cold storage building for Pere Marquette Railroad, to two bidders.
STATE OF MICHIGAN, 100 tons, road work, to Concrete Engineering Co.
CHICAGO, 100 tons, Illinois State Ear, Eye, Nose and Throat Hospital, to Concrete Engineering Co.
CHICAGO, 700 tons, building for Olson Rug Co., to an unnamed bidder.
CHICAGO, 300 tons, building for Studebaker Corporation, to an unnamed bidder.
EVANSTON, ILL., 150 tons, building for Studebaker Corporation, to Inland Steel Co.
WAUKEGAN, ILL., 200 tons, apartment building, to Concrete Steel Co.
CHICAGO, 350 tons of rail steel bars, apartment building on Goethe and Dearborn Streets, to Inland Steel Co.
LOS ANGELES, 145 tons, laundry, South San Pedro Street, to unnamed interest.
LOS ANGELES, 200 tons, warehouse in Central Manufacturing District, to unnamed interest.

Industrial Activity Rising in Ohio

Employment in the iron and steel industries of Ohio during October gained slightly over September, the index standing at 102 with an average month in 1923 taken as 100, according to the current bulletin of the bureau of business research of Ohio State University. The increase from October, 1927, amounted to 16 per cent, while average employment in the first 10 months of 1928 was 1 per cent greater than in the corresponding months last year.

In the foundries and drop forgings group the October index of 87 is 3 per cent higher than the September index and 17 per cent higher than the October, 1927, index. The number of wage earners in the sheet metal works group was slightly less than in September, but 22 per cent greater than in October, 1927. The October employment index of 95 in the screw machine products and hardware group was 1 per cent more than the September index and 19 per cent more than the index for October, 1927. Employment in the machinery industries during October reached its highest point since June, 1927. The October index of 109 was 1 per cent higher than in September and 4 per cent higher than

SAN FRANCISCO, 140 tons, hotel, Geary and Maggie Streets, to Pacific Coast Steel Co.
OAKLAND, CAL., 140 tons, office building, Fourteenth and Franklin Streets, to Gunn, Carle & Co.
SEATTLE, 100 tons, office building, Fourth Street and Union Avenue, to Pacific Coast Steel Co.
SEATTLE, 130 tons, apartment building on Olive Way, to Northwest Steel Rolling Mills.
SEATTLE, 115 tons, hospital, Summit and University Avenues, to Northwest Steel Rolling Mills.
SEATTLE, 100 tons, bag plant for Pacific Coast Cement Co., to Northwest Steel Rolling Mills.
PORT TOWNSEND, WASH., 750 tons, second unit Zellerbach Paper Co. plant, to Pacific Coast Steel Co.
HOQUIAM, WASH., 750 tons, second unit Zellerbach Paper Co. plant, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BROOKLYN, 200 tons, Lincoln High School.
LACKAWANNA, N. Y., 100 tons, school; bids in.
CLEVELAND, 100 tons, Neal Fireproof Storage Co.
CHICAGO, 100 tons, Goldberg store on Milwaukee Avenue.
CHICAGO, tonnage not stated, two sewer projects.
CHICAGO, 300 tons, Board of Trade Building; Holabird & Root, architects.
WALLA WALLA, WASH., 100 tons, Veterans' Hospital; general contract to N. P. Severin, Chicago.
HELENA, MONT., 114 tons, bridge over Missouri River near Wolf Point; bids rejected.
SACRAMENTO, CAL., 206 tons, highway work in San Diego County; bids opened.

in October, 1927. The increase from September was shared by 63 of the 104 reporting companies.

For machine tool manufacturers the October employment index of 111 was 4 per cent greater than in September and 42 per cent greater than in October, 1927. Industrial employment in general in Ohio during October continued its upward trend, which started last January.

National Founders to Meet Nov. 21 and 22

The National Founders Association will hold its thirty-second annual convention at the Hotel Astor, New York, Nov. 21 and 22. At the afternoon session on Nov. 21 Virgil Jordan, chief economist, National Industrial Conference Board, will speak on "Business Prosperity and the Basic Industries," and Charles F. Abbott, executive director American Institute of Steel Construction, on "New Forces in Business." H. V. Crawford, General Electric Co., Schenectady, N. Y., will give an illustrated address on "The Automatic Blast Gate Control for Cupolas." On the program for the second day are a discussion of foundry salesmanship, by C. H. Hoffstetter, Odin Stove Mfg. Co., Erie,

Pa.; a paper on "What Foremen Should Think About," by L. P. Hartley, the association's director of industrial education, and a paper on "Melting Practice," by H. M. Lane, foundry engineer, Detroit. J. M. Taylor, 29 South LaSalle Street, Chicago, is secretary of the association.

European Cartel Quota May Be Increased

WASHINGTON, Nov. 13.—That the Continental Steel Entente will increase its present raw steel production quota of 29,287,000 metric tons annually, or 7,321,750 tons quarterly, is held to be probable by J. Joseph W. Palmer, Iron and Steel Division, Department of Commerce, in an article analyzing operations of the entente since it was organized 25 months ago. The view is expressed that the increased quotas will be provided beginning with the next quarter or the one immediately following. It is pointed out that the same quota has been in effect continuously since the opening of the third quarter of 1927, despite an apparent increase in the world demand for steel as shown by the greater margin by which the production quota of the entente is being exceeded, even in the face of penalties for overproduction.

Automobile Output Near Low Point for Year

NEW YORK, Nov. 13.—Automotive Industries this week will say:

"Output at the automobile factories is approaching the low point of the year, a renewed upward movement being scheduled to begin late this month or early in December, as plants now engaged in changes again come into operation. Due to Ford's activity, as well as that of several other large companies that are remaining in production, the current recession has not brought the level of operations below the best marks of previous years at this season.

"Truck production is declining in sympathy with the trend in car output, but the recession is proportionately much less, and sustained activity in trucks will help combined motor vehicle production in the two final months of the year to make a particularly good showing."

Coal Output Heavier

Production of bituminous coal in the week ended Nov. 3 is reported by the United States Bureau of Mines at 11,166,000 tons, and 11,248,000 tons was raised in the preceding week. These totals are 3 or 4 per cent higher than in the weeks just before and average 19 per cent above the corresponding two weeks of last year. Total production for the calendar year, through Nov. 3, was 408,533,000 tons, a drop of nearly 8 per cent from 1927.

Iron and Steel Markets

Steel Production Declines

November Fails to Maintain Record-Breaking Rate of
October—Sheets Marked Up \$2 a Ton—Further
Advances in Pig Iron—Scrap Weaker

STEEL production, although still heavy, has receded from the record-breaking rate of October. The reduced raw material needs of steel works have tended to relieve the tension in the pig iron market, notably in the Valleys, and have been reflected in another decline in heavy melting scrap at Pittsburgh—the third drop of 25c. a ton in three consecutive weeks.

Pig iron prices in territories where surplus stocks of steel company blast furnaces are not an important market factor continue to gain in strength. Advances of 50c. a ton have been made by producers in Buffalo, eastern Pennsylvania, southern Ohio and Michigan.

Steel prices, likewise, remain buoyant. Several independent mills have announced increases of \$2 a ton on sheets and \$1 a ton on sheet bars, which are likely to win general adoption. Bars, plates and shapes are expected to be marked up to 2c., Pittsburgh, or \$1 to \$2 a ton above current prices. With consumers well covered on their requirements through the rest of the year, the new quotations will apply principally to contracts for first quarter. While some inquiry for that period has appeared, especially sheet tonnage, inventory considerations and the volume of demand between now and the year end may affect the success of the advances.

The decline in steel output since October has not been sharp. In the Greater Pittsburgh district ingot production now averages 85 per cent, compared with a recent rate of over 90 per cent. Steel Corporation subsidiaries are operating at 80 per cent of capacity, against 85 per cent last week. Making liberal allowance for possible further recessions in output, total production for the year will be close to 50,000,000 tons, a gain of more than 6 per cent over the previous record, made in 1926.

November thus far has seen a gradual reduction in mill backlogs. The unfilled tonnage statement of the Steel Corporation for October, however, indicates that producers are well fortified for a less active market. Despite record-breaking output, the Corporation's unfilled orders on Oct. 31 showed a gain for the month of nearly 53,000 tons and also stood 67,000 tons higher than on the same date in 1926.

Further curtailment in the operations of the automobile industry has been a major factor in influencing the current trend of steel specifications and production, but some recovery is looked for in the motor car field next month, and generous first quarter inquiries for sheets and strip steel point to heavy automotive requirements next year.

Meanwhile, the outlook in other steel consuming lines is distinctly favorable. Railroad equipment purchases, totaling 6800 freight cars, mostly for Canadian roads, were the heaviest in many weeks. Structural steel awards, at 55,000 tons, were also unusually large. The rail buying movement brought out an order for 19,500 tons from the Burlington. Farm equipment makers, road machinery manufacturers and a wide miscellany of consumers continue to take steel at a virtually unchanged rate.

A gas line from Tulsa, Okla., to Lockport, Ill., requiring 60,000 tons of pipe, is reported placed with a Youngstown mill. A pipe line in Philadelphia will take 10,000 tons of plates, on which bids have been taken. Improvement in the oil industry is expected to result in a heavier demand for drill pipe and casing.

The rising trend of pig iron prices has brought out further buying for first quarter, as well as for current needs. Sales at St. Louis, at 46,000 tons, bring the total for the past two weeks to over 90,000 tons. A large part of this pig iron was basic grade for melters catering to the railroads. Bookings by Cleveland furnaces, at 55,000 tons, compare with 69,000 tons in the previous week.

Proposed advances in finished steel prices include an increase of \$2 a ton on wire products for first quarter delivery. Greater strength in cold-rolled strip is evidenced by the fact that the recent advance of \$2 a ton is holding and small tonnages are commanding 2.95c., Cleveland or Pittsburgh, a further increase of \$2 a ton. On the other hand, a softer situation in alloy steel bars is indicated by reports of 2.65c., base mill, a concession of \$2 a ton from recent quotations.

Steel ingot production in October established new records for both total output and production per day. The figure for the 31 days, 4,647,891 tons, compares with 4,535,272 tons in March, 1927, the previous record. The daily average, 172,144 tons, surpassed the rate of 172,103 tons of April, 1928, the former peak.

The lockout of German steel workers has been reflected in higher quotations on Continental steel by New York importers.

Another rise in THE IRON AGE pig iron composite price—the ninth in three months—has pushed it up to \$18.50 a ton, the highest figure since July, 1927. Last week it was \$18.34. Finished steel remains at 2.369c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Nov. 13, 1928	Nov. 5, 1928	Oct. 16, 1928	Nov. 15, 1927
No. 2 foundry, Philadelphia...	\$21.26	\$20.76	\$20.76	\$19.76
No. 2, Valley furnace.....	17.50	17.50	17.00	17.50
No. 2, Southern, Cin'ti.....	19.94	19.94	19.94	19.69
No. 2, Birmingham.....	16.25	16.25	16.25	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	18.50	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.50
Basic, Valley furnace.....	17.50	17.50	17.00	17.00
Valley Bessemer, del'd P'gh...	20.01	19.76	19.26	19.76
Malleable, Chicago*.....	20.00	20.00	18.50	18.50
Malleable, Valley.....	18.25	18.00	17.50	17.50
Gray forge, Pittsburgh.....	18.76	18.76	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:

O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	37.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	41.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.75

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.07
Iron bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, Pittsburgh.....	1.95	1.95	1.90	1.75
Steel bars, Chicago.....	2.00	2.00	2.00	1.85
Steel bars, New York.....	2.29	2.29	2.24	2.09
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.75
Tank plates, Chicago.....	2.00	2.00	2.00	1.85
Tank plates, New York.....	2.22½	2.22½	2.22½	2.09
Beams, Pittsburgh.....	1.90	1.90	1.90	1.75
Beams, Chicago.....	2.00	2.00	2.00	1.85
Beams, New York.....	2.19½	2.19½	2.19½	2.09
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Nov. 13, 1928	Nov. 5, 1928	Oct. 16, 1928	Nov. 15, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.80
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.66
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.80
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.20
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$17.25	\$17.50	\$17.75	\$14.00
Heavy melting steel, Phila.....	15.50	15.50	16.00	14.00
Heavy melting steel, Ch'go....	14.50	14.50	14.00	11.50
Carwheels, Chicago.....	14.25	14.25	13.75	13.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia.....	16.25	16.75	17.00	16.00
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	13.50
No. 1 RR. wrot, Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot, Ch'go (net)...	13.00	13.25	12.75	9.50

Coke, Connellsville, Per Net Ton at Oven

Furnace coke, prompt.....	\$2.85	\$2.90	\$2.85	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	15.25	13.55
Electrolytic copper, refinery...	15.75	15.75	15.00	13.25
Zinc, St. Louis.....	6.25	6.25	6.25	5.67½
Zinc, New York.....	6.60	6.60	6.60	6.02½
Lead, St. Louis.....	6.20	6.32½	6.32½	6.00
Lead, New York.....	6.35	6.50	6.50	6.25
Tin (Straits), New York.....	50.12½	49.25	48.50	57.00
Antimony (Asiatic), N. Y.	10.37½	10.50	11.00	10.75

Pittsburgh

Demand for Steel Slows Up—Operations Slightly Reduced —Advances in Sheets and Some Grades of Pig Iron

PITTSBURGH, Nov. 13.—The heavy movement of steel against late September specifications and orders, which taxed the capacity of the industry in October, appears to have supplied a great many needs, and buyers are ordering with closer regard for definite requirements. In the Youngstown district steel output has dropped rather sharply. A month ago all facilities were fully engaged, while now the operation is about 80 per cent. In other sections of the Greater Pittsburgh district the drop has not been so great, but the general average is brought down by the loss in the Youngstown district. November and December are usually months of reduced consumption, and there is the further fact that inventory considerations come into play toward the end of the year.

Looking ahead, few see occasion for concern over the lull in specifications, orders and plant operations. Prospects are encouraging in a number of lines, among them the oil industry. Added to the expectation of additional tonnage for pipe lines is the possibility that the improvement in the oil situation will bring a better demand for drill pipe and casing soon after the turn of the year. The outlook for rolling stock orders is regarded cheerfully, and some business of that kind has already developed following a pe-

riod of pronounced inactivity. The agricultural implement industry has had one of the best years in its history, and there is nothing to suggest a lessened demand for steel from this source next year. As to motor car prospects, there rarely is a lack of optimism. Structural steel consumption this year has been running contrary to the idea that the country may have caught up with its requirements of offices, apartments, hotels, public buildings and bridges.

The general tendency of steel prices

is toward higher levels. Makers of bars, plates and shapes hope to see the market at a minimum of 2c., base Pittsburgh, and wire manufacturers are mentioning the possibility of an advance of \$2 a ton on first quarter contracts, while sheet makers have announced a horizontal advance of \$2 a ton.

Much of the recent buoyancy has gone out of the primary materials. It is noted that all steel companies are not now refraining from offering basic pig iron. That is a reflection of the fact that the urgency for deliveries of finished steel has abated sufficiently to bring about a lower rate of ingot production, which also has affected the scrap market. Heavy melting steel, which a few weeks ago was at \$18, has been sold at \$17 within the past few days and \$17.50 has become the top of the market. A lessened demand for spot coke for blast furnace use has brought an easier market.

Pig Iron.—Price ideas of producers still are somewhat above those of consumers, and business consequently is rather light and confined closely to actual and pressing needs. While a number of sales of foundry iron, some of them as much as 300 and 400 tons,

have been made at \$18, Valley furnace, these have been largely for immediate shipment, and the market remains untested both on sizable tonnages and for future delivery. Producers generally are quoting \$18, Valley furnace, for No. 2 grade for both prompt and first quarter shipment, but no considerable amount of first quarter business has been placed, and the price finds its principal basis in small-lot sales. There is therefore a prompt market of \$18, with the forward price yet to be determined. Although the common quotation on basic iron is \$18, Valley furnace, there is no clear-cut evidence that more than \$17.50 has been paid, and the market on this grade appears a shade weaker in that some steel company iron now is offered at that price. Recently all of the steel companies were unwilling to part with any of their surplus. Sales of malleable and Bessemer iron have been made up to \$18.50, Valley furnace, and offerings of these grades are so scant that it is doubtful if large tonnages now can be had at less than \$18.25.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50 to \$18.00
Bessemer	18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Wire Products.—This is usually a period of light demand, reflecting the tendency to keep stocks within bounds as the inventory season approaches. Prices are holding firmly, and there is talk of an advance of \$2 a ton on first quarter contracts.

Semi-Finished Steel.—Local and Youngstown makers of sheet bars have announced an advance of \$1 a ton on sheet bars, effective at once, and the quotation on this form now is uniformly \$34, f.o.b. Pittsburgh or Youngstown. As no change has been made in the base sizes of billets and slabs, which remain at \$33, sheet bars again are at a premium of \$1 a ton, as they were early in the year and for some time prior to that. The increase in sheet bar prices, coincident with one of \$2 a ton on all finishes of sheets, announced by a large inde-

pendent maker late last week, is expected to be followed by all other producers. It is evidently the purpose of producers to aid the finished sheet price advance by higher sheet bar prices. Higher sheet and sheet bar prices will find more application on first quarter business than upon tonnage to move over the remainder of this year, since the great majority of buyers are covered by contracts for this quarter. Movement of billets, slabs and sheet bars, while still good, reflects the fact that some of the urgency has gone out of the demand for the finished products in the past few weeks. Wire rods are steady at \$42, base Pittsburgh or Cleveland, and are moving well, notably to bolt and rivet makers.

Bars, Plates and Shapes.—Interest centers in the probable action of producers with regard to first quarter prices. Most of them have in mind a minimum of 2c., base Pittsburgh, which would be an advance of \$2 a ton over the price at which the bulk of the contract tonnage for this quarter was written. Much fourth quarter contract tonnage remains to be specified, because no small part of the movement of last month was on third quarter commitments or orders taken late in September for October delivery, but the clause in contracts calling for specifications by Dec. 10 is expected to be effective in ridding makers' books of these obligations by the end of the year. A considerable contraction in specifications has marked this month compared with October, the falling off being particularly notable in bars for cold-finishing. Local structural lettings are low in relation to those of the country as a whole. Pipe lines and barges in prospect suggest a broader market for plates a little later. The Mississippi River Commission will double next year its existing fleet of 150 barges, while the Inland Waterways Co. (Federal Barge Line) is expected to spend \$4,000,000 on new barges, and some of the private towing companies have plans for enlarging their fleets to be in shape to take advantage of the completion of the canalization of the Ohio River, which is expected during 1929.

Rails and Track Supplies.—Track fastenings continue to lag behind standards-section rails in sales. Some irregularity exists in spike prices, and while the open quotation remains at \$2.80, base, per 100 lb., sales at less are reported. Light-section rails are only moderately active and small spikes to go along with them are very slow.

Tubular Goods.—It is reported that the Texas Co. has closed for the 530 miles of 12¼-in. pipe for a gas line from Tulsa, Okla., to Lockport, Ill., and that the pipe will be furnished by Youngstown mills. Other oil and gas pipe line projects which have been discussed are not looked upon as likely to reach the mills this year, although all makers would welcome the business as a winter mill backlog. Tubular goods business as a whole is fairly active, although not particularly good in lapwelded oil country pipe, while inventory taking in the automotive industry has reduced the demand for mechanical tubing. Next year is expected to be decidedly better than this year in oil country pipe; oil prices are growing stronger and the statistical position of oil has improved sufficiently to create the belief that there will be an expansion in drilling in 1929.

Cold-Finished Steel Bars and Shafting.—A fairly good movement of screw stock bars still is reported on contracts, but new business is light. The heavy movement of October and the fact that inventories still are in progress among automobile companies account for the lack of large current purchases. Prices are steady at 2.20c., base Pittsburgh.

Hot-Rolled Flats.—Business in strips has not suffered much from the fact that the motor car builders are taking inventories or curtailing production preparatory to introducing new models. The new base prices and the new extras have not been seriously tested by demand, as most important consumers were under cover for this quarter when they were announced. The market, however, is firm, as few producers need business badly enough to sacrifice profits to get it. The quotable market is 1.90c., base Pitts-

THE IRON AGE Composite Prices

Finished Steel

Nov. 13, 1928, 2.369c. a Lb.

One week ago.....	2.369c.
One month ago.....	2.362c.
One year ago.....	2.293c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.369c.	Oct. 30;	2.314c.	Jan. 3
1927	2.453c.	Jan. 4;	2.293c.	Oct. 25
1926	2.453c.	Jan. 5;	2.403c.	May 18
1925	2.560c.	Jan. 6;	2.396c.	Aug. 18
1924	2.789c.	Jan. 15;	2.460c.	Oct. 14
1923	2.824c.	Apr. 24;	2.446c.	Jan. 2

Pig Iron

Nov. 13, 1928, \$18.50 a Gross Ton

One week ago.....	\$18.34
One month ago.....	17.84
One year ago.....	17.63
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$18.50.	Nov. 13;	\$17.04.	July 24
1927	19.71.	Jan. 4;	17.54.	Nov. 1
1926	21.54.	Jan. 5;	19.46.	July 13
1925	22.50.	Jan. 13;	18.96.	July 7
1924	22.88.	Feb. 26;	19.21.	Nov. 3
1923	30.86.	Mar. 20;	20.77.	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.27c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.50c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.10c.
Cooperage stock, Chicago.....	2.20c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.85c.
Strips, Cleveland.....	2.85c. to 2.95c.
Strips, del'd Chicago.....	3.15c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.19c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c. to 2.95c.
No. 24, del'd Cleveland.....	2.94c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.90c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c. to 4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
Rounds and squares.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base Per 100 Lb

Spikes, ⅝ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.86
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.76
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Black	Galv.
1½.....	45	19½	1½ to 2.....	22	2
2.....	51	25½	2½.....	23	11
2½.....	56	42½	3.....	28	11
3.....	60	48½	3½.....	30	13
3½.....	62	50½			

Lap Weld

2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	48½	3 to 6.....	28	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	58	40½			

Butt Weld, extra strong, plain ends

1½.....	41	24½	1½ to 2.....	19	+54
2.....	47	30½	2½.....	21	17
2½.....	53	42½	3.....	28	12
3.....	58	47½	3½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	58	42½	2.....	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	46	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 8 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 2¾ in.....	37
3 in.....	40
3½ to 3¾ in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	+18
1¾ to 1½ in.....	+8
2 to 2½ in.....	-2
2½ to 3 in.....	-7
3½ to 4½ in.....	-9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	45
1¼ to 1½ in.....	55	3½ to 3¾ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	45
2½ to 3 in.....	42		

Hot Rolled

2 and 2½ in.....	40	3½ to 3¾ in.....	56
2½ and 2¾ in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

burgh, for widths of more than 6 in.; 2c., base, for widths 6 in. and under, and 2.10c., base, for cut hoops of cooperation stock, embracing widths ½ in. to 1¼ in. in gages Nos. 17, 18 and 19.

Cold-Rolled Strips.—Makers still report business as good, but with less urgency for deliveries than in October. On current new business, 2.85c., base Pittsburgh, is the ruling price, and on small lots of steel of difficult specification 2.95c., base, is being asked and obtained.

Sheets.—Several but not all of the independent makers have adopted an advance of \$2 a ton on all finishes of sheets announced late last week by one producer. The leading interest is among the companies which has not yet formally announced a change in prices, but the companies which have not acted are not taking first quarter business below the new price and the impression is that the advance will become general before the week is over. Nothing has been said about prices of tin mill black plate, and the open quotation on long ternes remains at 4c., base, or 4.10c. for all primes. The latter price, however, represents a slight advance, the open prices, it develops, having been subject to shading. Business has fallen off considerably in all finishes of sheets in the past week, and this is reflected in a lower rate of mill engagement.

Tin Plate.—The price for the first quarter and first half of next year has not been formally announced, but the trade generally accepts the idea that the present price will be continued and that the cash discount will be brought into line with that on sheets and most other finished steel products, or to one-half of 1 per cent for cash in 10 days. Business is quiet, but no quieter than usual at this season. Mill operations are about 70 to 75 per cent of capacity.

Coke and Coal.—Some abatement in the demand for supplies of spot furnace coke to supplement contract shipments, together with a slight in-

Warehouse Prices, f.o.b. Pittsburgh	
	Base per Lb.
Plates	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large.....	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.....	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

crease in production, has produced an oversupply and slightly lower prices. While some sales of beehive oven coke have been made at \$2.90 per net ton at ovens, the more common price is \$2.85. Spot foundry coke is in less demand, but prices are not changed. The coal market is very dull and prices are largely in the hands of buyers. A few large producers here and, according to reports, in other districts are finding an outlet for most of their outputs, but a great many operators have to work hard to dispose of coal even at low and probably unprofitable prices.

Old Material.—The market continues to yield on the steel works grades; on heavy melting steel, \$17.50 now is the top of the market and it is available for delivery to some points in the district at \$17. Dealers are not offering more than \$17 to cover short sales at any point and in some instances are bidding only \$16.50. The open market on this grade is 25c. a ton lower than a week ago and 75c. below its level of three weeks ago. On the other hand, it is reported that the steel and long rails in the November list of the Baltimore & Ohio Railroad went direct to a Pittsburgh district mill at \$18.25. The bid on this scrap, it is believed, was influenced by a desire to prevent it from going to Youngstown, where a somewhat strained situation exists, due to the fact that a large melter placed too much dependence upon deliveries on low-priced contracts and suddenly found deliveries so small that heavy purchases for very prompt shipment were necessary. The general scrap price list is not much changed except in the open-hearth grades, but the general tendency is down, as it becomes evident that the steel makers will not have to buy much more scrap for this year's delivery.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$17.00 to \$17.50
Scrap rails	17.00 to 17.50
Compressed sheet steel.....	17.00 to 17.50
Bundled sheets, sides and ends	16.00 to 16.50
Cast iron carwheels.....	15.25 to 15.75
Sheet bar crops, ordinary.....	17.50 to 18.00
Heavy breakable cast.....	14.00 to 14.50
No. 2 railroad wrought.....	17.50 to 18.00
Heavy steel axle turnings.....	15.00 to 15.50
Machine shop turnings.....	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers.....	19.00 to 19.50
Railr. coil and leaf springs.....	19.00 to 19.50
Rolled steel wheels.....	19.00 to 19.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates.....	19.00 to 19.50
Low phos., light grade.....	18.00 to 18.50
Low phos., sheet bar crops.....	19.00 to 19.50
Hvy. steel axle turnings.....	15.00 to 15.50
Electric Furnace Grades:	
Low phos. punchings.....	18.50 to 19.00
Hvy. steel axle turnings.....	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.25 to 12.50
Short mixed borings and turnings	12.25 to 12.50
Cast iron borings.....	12.25 to 12.50
No. 2 busheling.....	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles.....	21.50 to 22.50
No. 1 railroad wrought.....	13.50 to 14.00
Sheet bar crops.....	18.00 to 18.50
Cupola Grades:	
No. 1 cast.....	15.50 to 16.00
Rails 3 ft. and under.....	18.00 to 18.50

Chambers of Commerce Promote Foreign Trade

Speaking to secretaries representing 680 chambers of commerce throughout the United States at their annual convention in Nashville, Tenn., W. H. Mahoney, manager foreign trade bureau of the Merchants' Association of New York, declared that the growth of business in every section of the country is calling for more alert service and wider information on foreign trade.

"Under present-day conditions," he said, "technical information on foreign credits, banking, advertising, sales markets and legal conditions are as well organized and easily available for American business men as is the corresponding information on domestic business, provided they know where to obtain it. There are now 65 chambers of commerce that are fully able to tell them through a local foreign trade bureau; and each month, as new chambers see the light, there are several more."

New Tube Mills in Operation

The tube mills of the British American Tube Division, National Electric Products Corporation, which have been under construction on tidewater at Bayway, N. J., are now completed, and production of Blackskin condenser tubes and Bulldog brass pipe has begun. These mills replace those of the British American Metals Co., Inc., at Plainfield, N. J., which were destroyed by fire the early part of this year. The new mills have been designed to handle a capacity about two to three times greater than the mills that were destroyed, and equipment includes modern machinery, all of which is electrically operated.

Hollow Metal Doors, Frames and Trim

Simplified practice recommendation R82-28 of the United States Department of Commerce deals with hollow-metal, single-acting swing doors, and frames and trim for them. The pamphlet dealing with the matter is of 20 pages and copies may be obtained at 5c. each from the Government Printing Office, Washington.

Door sizes are listed from 2 ft. to 4 ft. in width, and 7 ft. in height, by variations of 3 in. in width. This makes a total of nine sizes, and of course the doorway openings, when the doors are used in pairs, would be double the widths of single doors. Clearances, gages of materials, template butts, mortise details, transom dimensions, as well as buck, jamb, casing and trim dimensions, are specified in the recommendation. This follows unanimous action, at a general conference Jan. 25 last, on the part of representative producers, architects, contractors and engineers interested.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms	
	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	34.00 to 35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars	
	(Open hearth or Bessemer)
	Per Gross Ton
Pittsburgh	\$33.00 to \$34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00
Slabs	
	(8 in. x 2 in. and under 10 in. x 10 in.)
	Per Gross Ton
Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	\$33.00 to 34.00

Skelp	
	(F.o.b. Pittsburgh or Youngstown)
	Per Lb.
Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Wire Rods	
	(Common soft, base)
	Per Gross Ton
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.25 to \$11.50
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$30.00 to \$33.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	120.00
Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$30.00
11%	32.00
12%	\$34.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys	
Ferrotungsten, per lb., contained metal del'd	98c. to \$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay		
	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00
Standard size	45.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2½
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets	
	(½-In. and Larger)
	Base Per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets	
	(⅞-In. and Smaller)
	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws	
	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)
	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Chicago

Steel Market Characterized by Steady Flow of Orders— Some Buyers Showing Interest in First Quarter

CHICAGO, Nov. 13.—The Chicago iron and steel market is characterized by a uniform steadiness in flow of new orders and specifications. Recessions in demand from some industries are offset by heavier releases in other directions, with the net result that specifications for finished materials are a shade heavier than a week ago and new sales total only slightly less than shipments. A few buyers are showing interest in first quarter requirements and some tonnage has been placed for that period. Although industry as a whole is well engaged, most buyers are looking to the future with conservatism, which leads them to take steel in such quantities that stocks are not accumulated except to assure supplies against slower mill deliveries.

Prices remain firm, with advances noted on some commodities. Sheets are marked up \$2 a ton and a stronger tone is apparent in the wire market. Scattered sales of pig iron have been made at 50c. above the general level of the market.

Noteworthy among rail purchases is 19,500 tons for immediate delivery. Chicago mills have taken 5000 tons from the Chicago, Indianapolis & Louisville and 50,000 tons from the Chicago, Milwaukee, St. Paul & Pacific. The Rock Island is seeking permission to extend its Missouri lines 85 miles. Fresh railroad equipment inquiries include 600 underframes, 850 freight cars and 67 locomotives.

Pig Iron.—November shipments of Northern pig iron are holding to the rate of October, which was the best month in more than two years. Sales remain active at \$20 a ton, furnace, except for carlots where close analysis and prompt delivery are wanted. For business of this kind several sellers are asking \$20.50. Many users have already specified fourth quarter contracts in full and are now buying fair tonnages to meet needs for the remainder of this year. Additional tonnages have been sold for delivery in the first quarter. Sellers are not anxious to quote for shipment beyond that time. Prices for silvery are strong and tonnages for immediate delivery and shipment in the first quarter are taken subject to confirmation. The position of charcoal furnaces is strengthened as shipments and sales are fully equal, to production. Southern iron quotations are strong at \$16.25 a ton, Birmingham.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.26
Low phos., sil. 1 to 2, copper free	\$29.00 to 29.50
Silvery, sil. 8 per cent.....	29.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market remains moderately active in sales. Most users of ferrosilicon and ferromanganese are covered for 1929. Scattered sales of spiegeleisen are reported at \$33, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Plates.—The railroad equipment market remains active, and deliveries on plates, especially in the narrow widths, are extending. Wide plates may be had in two to four weeks, but in the week several car shops have started on the production of new car programs and their specifications at the mills have pushed ahead deliveries on narrow plates to three to five weeks. A Pittsburgh car builder and Canadian shops have benefited by orders for cars from the Canadian National and Canadian Pacific. An order for 1000 refrigerator cars will take about 11,000 tons of steel. Among fresh inquiries is one for 600 underframes for the Pacific Fruit Express. Miscellaneous buyers of plates are using liberal quantities, though they still prefer to place orders for as nearby as deliveries will permit. The Empire Gas & Fuel Co. and the Texas Corporation have organized the Texas-Empire Pipe Line Co., which intends to build a 600-mile line from the mid-Continent fields to Chicago. The line, which is to be of 12-in. pipe, will be ready for operation by the middle of 1929. Fresh oil storage tank inquiry from the Southwest totals over 6000 tons. Chicago prices for plates remain strong in the range of 2c. to 2.10c. However, competition in the Southwest is keen and prices named for delivery in that direction are below the local market.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Demand for mild steel bars remains large, though several industries are in need of smaller quantities. Forgers, following the lead set by the automobile builders, are issuing smaller specifications. On the other hand, farm implement manufacturers' requirements are a shade larger and releases by car shops are tending to offset the loss resulting from curtailment of automobile output. Road machinery builders are fully engaged and find that at this time of the year, when they usually produce against a possible spring demand, they have unfilled orders that in at least several instances will provide work for eight or nine months. Deliveries of mild steel bars are a trifle easier, the range now being three to five weeks.

Prices remain firm over the spread of 2c. to 2.10c. per lb., Chicago. The iron bar market is quiet; prices range from 2c. to 2.10c., Chicago. Demand for alloy steel bars is steady, representing output at about 75 per cent of local mill capacity. First quarter books have been opened at base prices that range from 2.65c. to 2.75c. per lb., maker's mill, depending on the size and character of the order. Barn equipment manufacturers are operating at capacity and are pressing for deliveries of rail steel bars. The bed industry, now in the midst of its annual exposition, is finding larger specifications necessary to meet current requirements. Both Chicago Heights mills remain on double turn and deliveries range from two to four weeks. Prices for hard steel bars are firm at 1.95c., local mill.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Cast Iron Pipe.—For the most part, bond issues survived the recent election and sellers of cast iron pipe are looking forward with confidence that spring pipe laying programs will be large. Purchases by railroads are more liberal, several running as high as four carloads each. Contractors in this district are finding use for additional pipe and orders from this source total more than 1000 tons. Dayton, Ohio, is said to have divided 300 tons of cast iron pipe between the American Cast Iron Pipe Co. and the United States Cast Iron Pipe & Foundry Co. Prices are strong, and sellers are asking \$38 a ton, Birmingham, on small orders for diameters 6 in. and larger.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Structural Material.—Structural awards for the week total about 1800 tons. Of these, the largest was 700 tons for a steel mill building near Chicago. Several months following the announcement that the Chicago Board of Trade would build, plans are now out and the original estimate of the steel tonnage needed is revised upward to 15,000 tons. Fresh inquiries are lagging, but the pending list is imposing, and fabricators report that they are getting an unusually large number of calls from architects who have numerous projects that are getting under way. Numerous small lettings plus several large ones have filled in the gaps in shop schedules and it is evident that fabricators in this district face the approach of the winter months with a fair degree of confidence and with shops as well filled as at any time this year. Of special note is the increased activity in awards and plans for mill type buildings. It is probable that a contract for 800 tons for a garage in Milwaukee will be let this week. Prices for fabricated materials remain low on all classes of work except that which calls for small tonnages.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Wire Products.—Little change has taken place in this market in the week. Producers continue to hold stocks in good balance and shipments are fully up to current mill output, which stands at 65 per cent of capacity. The jobbing trade now is up to expectations at this time of the year. This is not due, however, to a quickening of demand, but rather to a steady flow of orders which did not swing upward, as is customary in October, but which now match well with the volume of business in the corresponding months of previous years. The announcement of spring terms on woven wire fencing has stimulated orders for this commodity, especially in the Central West and in the Northwest. Specifications from the manufacturing trade are well sustained except from manufacturers of automobiles and makers of parts. Prices for wire and wire products remain steady. It is probable that first quarter books will be opened about Nov. 20.

Rails and Track Supplies.—The Burlington has ordered 19,500 tons of standard-section rails for immediate delivery. The order was split as follows: Inland Steel Co., 4500 tons; Illinois Steel Co., 9500 tons, and the Colorado Fuel & Iron Co., 5500 tons. Outstanding inquiry for rails which will come to Western mills totals not less than 100,000 tons. Track accessory inquiries are heavy, aggregating fully 30,000 tons. Purchases of track supplies total 7000 tons, including 1000 tons of iron tie plates. Output of Chicago rail mills is unchanged. Orders for light rails are in carlots only.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—This market is quiet, with spot sales bringing full market prices. Specifications are equal to output at 65 per cent of capacity.

Wire Rods.—Shipments of this commodity are steady, and prices are firm at \$43, Chicago mill.

Old Material.—The Chicago scrap market is held in check by recent heavy purchases and the influence of lower prices to the East. Dealers' opinions as to the tendencies of the market are mixed, though it is not uncommon to hear the statement that the top has been reached. Buyers are resisting present quotations and railroads are taking lower prices for items on their lists. Mills are inspecting shipments more closely and the number of rejected cars is more numerous. Prices for cast iron borings are lower, following a 5000-ton purchase at \$12 a gross ton, delivered. Cast iron carwheels are being taken only in single carloads by small users, but a more rapid movement of this grade is expected as the railroad equipment market becomes more active. A favorable condition in this market is the sustained rate at which users of scrap are operating. Lists are being offered this week by the Wabash, Pere Marquette and the Chesapeake & Ohio.

*Prices deliv'd Chicago district consumers
Per Gross Ton*

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	12.50 to 13.00
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to 18.25
Railr'd tires, charg. box size	17.50 to 18.00
Railr'd leaf spring cut apart	17.25 to 17.75

Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.25 to 18.75

Electric Furnace Grades:	
Axle turnings	14.00 to 14.50
Low phos. punchings.....	16.25 to 16.75
Low phos. plate, 12 in. and under	16.00 to 16.50

Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings.....	11.50 to 12.00
Short shoveling turnings...	11.50 to 12.00
Machine shop turnings...	7.50 to 8.00

Rolling Mill Grades:	
Iron rails	15.00 to 15.50
Rerolling rails	16.50 to 17.00

Cupola Grades:	
Steel rails less than 3 ft..	17.50 to 18.00
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	14.25 to 14.50

Malleable Grades:	
Railroad	15.75 to 16.25
Agricultural	12.50 to 13.00

Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and trans- oms	20.50 to 21.00
Iron car axles	26.50 to 27.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought...	13.00 to 13.50
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00

Cupola Grades:	
No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast.....	14.00 to 14.50
Stove plate	11.75 to 12.25
Grate bars	12.50 to 13.00
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Tin Plate.—With the contract period close at hand and prices firm, there are further reports of a probable advance in prices. Inquiry on the Pacific Coast is heavy for delivery this year.

Coke.—First quarter books for by-product foundry coke are open at \$8, local furnace, and at \$8.75 a ton, delivered in Chicago. Shipments are heavy. All ovens in this district are lighted.

Sheets.—Chicago producers of sheets have advanced prices \$2 a ton. The new prices apply on orders for immediate specification. First quarter books have not been opened. Most of the old contracts have been taken out, but the flow of new orders is large and steady and hot mill output is well sustained at 85 per cent of capacity. Deliveries range from three to four weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Shipments from local shops are heavy and, in the absence of sizable new awards, output appears to be destined for sharp curtailment before the end of the month. Two sewer projects for the west side of Chicago may bring a round tonnage of reinforcing bars into the market. The 700 tons recently reported on inquiry for the Cook County Hospital nurses' home is postponed because a bond issue failed to pass at the recent election. Efforts by sellers to raise prices are meeting with no success because of keen competition to take the few current awards. A fair number of small tonnage orders have been placed during the week. A new rail steel bar mill soon will be put in operation in Chicago by a local reinforcing bar dealer.

Reading Electrification to Be Begun in Spring

As a first step in a program of electrification of the Reading Railroad lines to New York, Bethlehem and through the Schuylkill Valley, the Reading Co. announces that it will immediately begin electrification of its system in metropolitan Philadelphia. Sanction has been given by the board of directors for immediate work on the lines from the Reading Terminal in Philadelphia to Lansdale, from Glenside to Hatboro, from Jenkintown to Langhorne and the Chestnut Hill branch, at a cost of about \$20,000,000. Weather permitting, work will be begun in March and will require about three years for completion of the metropolitan section. At Wayne Junction a large coach storage yard and electrical repair shop will be erected and at Chestnut Hill a storage yard will be provided.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting— Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Philadelphia

Advance of \$2 on Sheets—Plates for Local Pipe Line May Be Furnished by Pittsburgh Mills

PHILADELPHIA, Nov. 12.—New steel business is rather small, but shipments on contracts are in good volume and prices continue firm, with sheet mills in this district preparing to follow the action of Youngstown producers in advancing prices \$2 a ton on black, galvanized and blue annealed for prompt shipment and first quarter contracts. Some substantial plate business is in the market, but with the prospect of the fabrication being awarded to contractors in other districts not much of this tonnage is expected to come to eastern Pennsylvania mills.

The pig iron market is strong, but consumers have not yet begun to cover first quarter requirements of foundry iron, with the exception of the American Radiator Co., which has bought a tonnage for its Gloucester, N. J., plant. The iron and steel scrap market is inactive and prices show a continued downward tendency.

Pig Iron.—Eastern Pennsylvania producers are maintaining prices on foundry iron for delivery over the remainder of the year at \$20.50 per ton, furnace, and at \$21 for first quarter. Some small tonnages have been sold for next year's delivery at \$21, but the price has not yet been tested on a large tonnage, except for a purchase by the American Radiator Co. of about 4000 tons for its Gloucester, N. J., plant, placed with an eastern Pennsylvania furnace. In a number of instances, consumers have not yet estimated their requirements for the next quarter, as at present rates of consumption their contracts will carry them over the turn of the year. Basic iron is quiet; about 20,000 tons inquired for by a Coatesville, Pa., mill has not been placed. Demand for low phosphorus is fairly active in other districts, but nearby consumers are not operating at a very high rate.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	.....	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	.....	21.76 to 22.26
East. Pa. No. 1X.	.....	22.26 to 22.76
Basic (del'd east. Pa.)	.....	19.75 to 20.00
Gray forge	.....	20.00 to 20.50
Malleable	.....	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	.....	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	.....	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	.....	24.54
Va. No. 2X, 2.25 to 2.75 sil.	.....	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Some large consumers have not covered their requirements for next year. Producers report that most of the contracts written are for delivery over the entire year, only a few buyers limiting their purchases to the first half. Quotations are \$105 per ton, seaboard, by both domestic and British producers.

Bars.—Shipments on contracts are good, but new buying is for the most part of carload lots or less. A small tonnage of bars for a Grace Line ship was placed by the New York Shipbuilding Corporation, Camden, N. J., with the Bethlehem Steel Co. Prices are unchanged at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia.

Shapes.—New buying is small, but

prices are firm at 2.05c. per lb., f.o.b. nearest mill to consumer, or 2.11c., Philadelphia, with Pencoyd, Pa., as the base for this district. About 1300 tons of shapes required for a Grace Line ship being built by the New York Shipbuilding Corporation, Camden, N. J., has been placed with the Bethlehem Steel Co. The low bidder on four ships for the Export Steamship Corporation, New York, requiring about 4000 tons of shapes, was the Spear Shipbuilding Co., Newport News, Va., with the next lowest bid by the Sun Ship Building Co., Chester, Pa.

Plates.—Substantial tonnages required for shipbuilding and pipe fabrication may not go to eastern Pennsylvania mills. About 13,500 tons of plates will be needed for four ships, on which the Spear Shipbuilding Co., Newport News, Va., was low bidder. The lowest bid for the pipe line at Lardner's Point, requiring about 10,000 tons of plates, was submitted by Peter & A. J. Ellis, Inc., Philadelphia, reported as using fabricated quotations of the Witt Humphrey Steel Co., Greensburg, Pa. Shipments against fourth quarter contracts are good, and prices continue at 2.05c. to 2.15c., Coatesville, or 2.15c. to 2.25c., Philadelphia.

Sheets.—Mills in this district have not yet followed the advance of \$2 a

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅝-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.00c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

ton on sheets for the rest of this year and first quarter, made by Youngstown makers, but are expected to take action in a few days. This would bring quotations to 2.85c., Pittsburgh, or 3.17c., Philadelphia, on black; 3.60c., Pittsburgh, or 3.92c., Philadelphia, on galvanized, and 2.10c., Pittsburgh, or 2.42c., Philadelphia, on blue annealed. It is apparently the intention of most producers of blue annealed to eliminate the extra 10c. per 100 lb. for 45-in. and wider, although no announcement to this effect has been made by the mills. New business in sheets is small, but shipments on contracts are large.

Warehouse Business.—Buying has been decidedly smaller than last month. Prices, however, are being maintained.

Imports.—In the week ended Nov. 10, 1501 tons of pig iron was received at this port from British India. Steel arrivals consisted of 431 tons of structural shapes from Belgium and 78 tons from France, 40 tons of steel bars from Belgium and 98 tons from Germany, 6 tons of steel bands from Belgium, 28 tons of steel scrap from the United Kingdom and 6 tons from Germany.

Old Material.—Eastern Pennsylvania consumers are buying little scrap, and prices continue their downward trend. A Harrisburg mill is offering \$12.50 per ton as a maximum for yard grade of heavy melting steel and stove plate. A buying agent for a Phoenixville mill is paying \$11 to \$11.25 per ton for machine shop turnings and \$12.50 per ton for yard grade of heavy melting steel. No. 1 cast scrap has been bought by an eastern Pennsylvania user at \$16.25 per ton, delivered, a decline of 50c. a ton from the price at which a sale was made a week or so ago. Specification pipe and chemical borings are freely offered by dealers at \$15 per ton; delivered. A tonnage of blast furnace scrap is reported to have been closed at \$11 per ton, delivered to a Coatesville, Pa., consumer. No. 1 heavy melting steel is inactive, following purchase of a small tonnage a week ago at \$15.50 per ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	15.50 to 16.00

Cleveland

Slight Slowing Down in Demand for Steel—Sheets Advanced \$2 a Ton—Pig Iron Higher

CLEVELAND, Nov. 13.—Specifications for finished steel declined the past week and the volume of orders so far this month is somewhat below that of the corresponding period of October. Some of the mills have caught up a little on deliveries, but others report no improvement in that respect. Orders from the automotive industry show quite a decrease. Some of the motor car companies have slowed down production to take inventories and bring out new models and others evidently have cut production because of the seasonal decline in the demand for cars. Renewed buying from this source is looked for late this month and early in December. Unable to get steel as promptly as recently, the automotive industry is already showing an interest in first quarter contracts. Some inquiries have come out from that source for sheets and strip steel for the coming quarter.

Inquiry in the structural field includes 6500 tons for a hangar for the Good-year Zeppelin Corporation, Akron. The Manitowoc Shipbuilding Co. is inquiring for 400 tons of plates for ship repair work.

Interest in the price situation is centered in a \$2 a ton advance by some makers of sheets and the naming of the recently advanced price on cold-rolled strip for the first quarter. Steel bars, plates and structural material are holding rather firmly at 1.95c., Pittsburgh. Outside mills using a Cleveland base are quoting steel bars at 1.95c. to 2.05c., Cleveland, and are able to take much of the small-lot business at the higher price. The local mill price on steel bars is 1.90c., Cleveland.

Pig Iron.—Buying for the first quarter continues heavy and a further price advance to \$19, furnace, has been made on foundry and malleable grades by a Lake furnace interest for western Ohio and Indiana shipment. In Michigan, where a week ago there was a range of \$19.50 to \$20, the market has firmed up to the higher price and furnaces are now endeavoring to get 50c. a ton additional for malleable, which has been selling in that State at the same price as foundry iron. The Cleveland furnace price is unchanged, being \$18.50 for outside shipment and \$19 for local delivery. Several good-sized lots were sold at these prices during the week. Sales by Cleveland furnaces included a 2000 ton lot taken by an Indiana melter. Sales by Cleveland interests totaled 55,000 tons the past week. No activity is reported in basic iron. The American Steel Foundries is inquiring for 3000 to 5000 tons of basic for its Alliance, Ohio, plant for the first quarter. On basic iron, \$18 is the common Valley furnace quotation. The Trumbull Cliff furnace, Warren, Ohio, which has been out about two weeks for repairs, will be relighted this week. The stack of the Struthers Furnace Co. is scheduled to go in blast about Dec. 15. Shipments continue heavy.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	22.25
Malleable	19.50
Ohio silvery, 8 per cent.	28.00
Basic Valley furnace	\$17.50 to 18.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Shipments of Lake Superior ore by water this year will be close to 54,000,000 tons, or nearly 3,000,000 tons more than last year, when the movement was 51,107,136 tons. Shipments in November are expected to amount to at least 4,000,000 tons. Shipments to Nov. 1 were 49,719,931 tons. Several of the ore firms will ship their last cargoes this week, but others will not clean up until the end of the month. The amount of ore on docks Nov. 1 was 6,472,840 tons, compared with 7,211,474 tons on the corresponding date last year. Receipts at Lake Erie docks during October were 6,002,275 tons and for the season 33,343,785 tons. October shipments from these docks amounted to 4,046,055 tons and for the season until Nov. 1 23,526,093 tons. Receipts at other than Lake Erie ports, mostly Lake Michigan ports, were 2,580,050 tons during October and 14,900,813 tons for the season up to Nov. 1.

Semi-Finished Steel.—A \$1 a ton price advance to \$34, Cleveland and Youngstown, has been made on sheet bars, billets and slabs by the Corrigan, McKinney Steel Co. The advance will apply to very little business during the remainder of the year, as most consumers are under contract and the Cleveland mill will have only odd lots to sell during the remainder of the year. However, the advance indicates that consumers will have to pay a higher price during the first quarter. There has been no letup in the heavy volume of specifications.

Sheets.—A price advance by some mills of \$2 a ton is to apply on current orders and on first quarter con-

tracts. The advance is expected to be generally adopted. With the advance the \$2 a ton extra for blue annealed sheets 45 in. wide and over is withdrawn. The advance will not apply to much last quarter business, as most consumers are covered for the remainder of the year. The new prices are 2.85c., Pittsburgh, for black, 2.10c. for blue annealed, 3.60c. for galvanized and 4.10c. for automobile body sheets. Specifications from the automotive industry show a falling off, and some of the mills can make better deliveries than recently. However, deliveries are still quite extended, and some mills are filled up with full finished sheets until the latter part of December. Considerable inquiry for the first quarter has come out and there is a fair current demand, buyers wanting quick shipments.

Strip Steel.—The current prices on hot-rolled strip of 2c., Pittsburgh, for widths to 6-in., inclusive, and 1.90c. for wider material, with the new card of extras, have been adopted by some of the mills for the first quarter and others are expected to fall in line. Some producers have announced a range of from 2.85c. to 2.95c., Cleveland and Pittsburgh, on cold-rolled strip for the next quarter, the lower price being for round lots. Consumers covered for the present quarter at 2.75c., but the price was recently advanced \$2 a ton and some of the mills have been charging 2.95c. for small lots. While specifications are not as heavy as recently, mills still have good backlogs.

Cold-Finished Steel.—Specifications have declined somewhat as a result of a slowing down in the automotive industry. There is talk of a \$2 price advance for the first quarter.

Reinforcing Bars.—On attractive orders 1.85c., Cleveland, is still being quoted. Inquiry is rather slow. Following its advance to 1.90c., mill, for rail steel bars, one producer has established a new 2c. base for ¼-in. and 5/16-in. sizes.

Warehouse Business.—Steel bars, plates and structural material are moving in good volume. Jobbers are getting orders for larger lots than recently, evidently because of slow mill deliveries. Sheet orders have fallen off. Prices are firm.

Wire Products.—The nail market has a firmer tone, and those manufacturers who have adhered to the \$2.55 per keg price, Cleveland and Pittsburgh, are having less difficulty in making sales at that price than recently. Some are now adhering to the 10c. differential or \$2.65 per keg for car lots to others than jobbers. For some time this differential has been quite generally ignored. Wire is firm.

Coke.—Foundry coke shipments against contracts are fair, but there is little new business. Prices are unchanged at \$3.75 to \$4.85, ovens, for Connellsville coke and \$7.75, Painesville, for Ohio by-product coke. By-product coke for domestic use is active and firm at \$4.50, Ohio ovens, for egg size and \$6, delivered Cleveland.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.35c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Old Material.—While a decline in prices in the Youngstown and Pittsburgh districts has had a sentimental effect on the local market, Cleveland prices so far have not receded from the recent levels. The apparent reason for this is that these prices did not advance to the extent they did in Pittsburgh and Youngstown. Local dealers paid during the week the range of prices previously and now quoted for scrap to fill outstanding orders for Cleveland delivery. For Valley shipment, they are paying \$16.50 to \$17 for heavy melting steel, a reduction of 50c. a ton. Scrap offerings are more liberal and some of the mills are again regulating shipments. Mills are showing little interest in the market, although a local consumer purchased a small tonnage of heavy melting steel the past week. Reflecting the strength of the pig iron market, cast scrap is very firm.

New York

Pig Iron Prices Show Added Strength—Bridge to Take 26,500 Tons of Steel

NEW YORK, Nov. 12.—Pig iron buying continues at a good rate, and prices show added strength. Foundry iron sold on a Buffalo base is now commonly bringing \$18, or 50c. a ton above the recent minimum. The movement of iron by barge from Buffalo has virtually ceased, and producers that established yards at New Jersey ports have failed to accumulate any appreciable stock in excess of present obligations. Supplementary purchases of pig iron for this quarter are still in good volume, and buying for first quarter is on the increase. Sales in this district for the week totaled over 13,000 tons. The New York Air Brake Co. has closed against its inquiry for 750 tons for Watertown, N. Y. The American Radiator Co. has bought 4000 tons for its Gloucester, N. J., works, and is in the market for the first quarter requirements of other plants. The Worthington Pump & Machinery Corporation is inquiring for 2605 tons for delivery through the next five months. Included in the total are 450 tons of foundry and 50 tons of Bessemer for Elmwood Place, Ohio; 275 tons of foundry and 350 tons of Bessemer for Harrison, N. J.; 580 tons of foundry and 150 tons of Bessemer for Holyoke, Mass., and 750 tons of foundry for Buffalo. A Connecticut melter wants 1500 tons of foundry for first quarter shipment. The Thatcher Co., Newark, N. J., is sounding out the market for considerable tonnage. Following a sale in this district of 300 tons of Dutch foundry for next quarter, quotations on that iron were advanced 50c. a ton to \$22, duty paid, port of entry, for No. 1X and lower grades. The American Radiator Co. expects to blow in its

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.50 to \$15.00
No. 2 heavy melting steel.	14.00 to 14.50
Compressed sheet steel.	14.00 to 14.50
Light bundled sheet	
stamp'gs	12.00 to 12.50
Drop forge flashings.	12.25 to 12.75
Machine shop turnings.	9.50 to 10.00
No. 1 railroad wrought.	12.75 to 13.00
No. 2 railroad wrought.	14.50 to 15.00
No. 1 busheling	13.00 to 13.50
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.	16.00 to 16.50
Low phos., billet, bloom and slab crops.	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap.	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings.	11.00 to 11.50
Mixed bor'gs and short turn'gs	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
Cupola Grades	
No. 1 cast.	16.50 to 17.00
Railroad grate bars.	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

furnace at North Tonawanda, N. Y., about Dec. 1.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25		\$22.91
*Buf. No. 2, del'd east.		
N. J.		21.28
East. Pa. No. 2 fdy., sil.		
1.75 to 2.25	\$21.39 to	22.52
East. Pa. No. 2X fdy., sil		
2.25 to 2.75	21.89 to	23.02
East. Pa. No. 1X fdy., sil.		
2.75 to 3.25	22.39 to	23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—Contracts for ferromanganese for delivery through 1929 are reported by some dealers to be coming in quite liberally. The price is firm at \$105, seaboard. There is some business in carload and small lots at the same price for delivery this year. Very little is heard of contracting for spiegeleisen for any part of next year's delivery, and business at present is confined to carload and small lots at unchanged prices.

Reinforcing Bars.—The Delaware, Lackawanna & Western Railroad Co. has not yet purchased the 8500 tons of bars required for its terminal warehouse at Jersey City, but action is expected soon. Another large tonnage may be placed shortly as a result of the formal award of the contract on the water tunnel in Manhattan for the New York Board of Water Supply to Patrick McGovern, Inc. The job calls for 2850 tons. Lettings in the past week have been small and the volume of new work coming out for bids is seasonably light. Prices show considerable strength. This was evidenced recently when a buyer requiring a carload of bars in odd lengths was un-

able to purchase them out of mill warehouse for less than 2.25c., Pittsburgh, and finally revised specifications to call for standard mill lengths of 40, 50 and 60 ft., which were available at 2c., Pittsburgh. Out of New York warehouse, distributors are quoting 2.80c. per lb. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons, and 3.24c. for less than 2 tons, all delivered at job.

Plates, Shapes and Bars.—Specifications against contracts make up the bulk of current business, but these are at a fairly good rate. Eastern structural and plate mills continue at a

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.	3.30c.
Soft steel bars, small shapes.	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal.	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.	3.50c.
Flats and squares.	4.00c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel.	12.00c.
Wire, black annealed.	4.50c.
Wire, galv. annealed.	5.15c.
Tire steel, 1½ x ½ in. and larger.	3.30c.
Smooth finish, 1 to 2½ x ½ in.	
and larger	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	
Per Cent Off List	
Machine bolts, cut thread:	
¾ x 6 in. and smaller.	60
1 x 30 in. and smaller.	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.	60
¾ x 20 in. and smaller.	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.	60
1 x 16 in. and smaller.	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe		
Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12

Wrought Iron—		
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)		
	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20

Charcoal, per Box—		
	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)		
IC—20-lb. coating	\$10.00 to	\$11.00
IC—30-lb. coating	12.00 to	13.00
IC—40-lb. coating	13.75 to	14.25

Sheets, Box Annealed—Black, C. R.		
	One Pass	Per Lb.
Nos. 18 to 20	3.60c. to	3.80c.
No. 22	3.75c. to	3.95c.
No. 24	3.80c. to	4.00c.
No. 26	3.90c. to	4.10c.
No. 28*	4.05c. to	4.25c.
No. 30	4.30c. to	4.50c.

Sheets, Galvanized		
		Per Lb.
No. 14	4.15c. to	4.35c.
No. 16	4.00c. to	4.20c.
No. 18	4.15c. to	4.35c.
No. 20	4.30c. to	4.50c.
No. 22	4.35c. to	4.55c.
No. 24	4.50c. to	4.70c.
No. 26	4.75c. to	4.95c.
No. 28*	5.00c. to	5.20c.
No. 30	5.40c. to	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

high rate of operations, though demands are less insistent, except perhaps in the case of structural steel for work now under construction, than they were a month or so ago. An advance in prices on these products is predicted for first quarter, and the general opinion of the trade is that 2c., Pittsburgh, and 15c. per 100 lb. higher at Eastern basing points, will be named as a minimum. No official announcements have been made, however. Bids will be taken Nov. 19 on 26,500 tons of fabricated steel for a bridge to connect Staten Island and New Jersey and bids will be received this week on a subway section calling for 3670 tons. Steel for the Chrysler Building, Lexington Avenue and Forty-second Street, is reported to have been let to the American Bridge Co., the final plans calling for 15,600 tons. The Structural Steel Board of Trade of New York reports that 50,300 tons, exclusive of bridges, subways, etc., was placed under contract in the metropolitan district in October, a sharp increase over the 39,000 tons of September, and comparing with 29,000 tons in October, 1927.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Sheets.—Local sales offices of some of the independent mills have received notices of an advance in prices of \$2 a ton on all grades of sheets, making black sheets 2.85c., Pittsburgh, galvanized 3.60c., blue annealed, 2.10c., and automobile body sheets, 4.10c. These prices are to take effect at once, but will apply particularly on first quarter orders.

Warehouse Business.—With a sizable tonnage of material being shipped from warehouse stocks, this month will apparently compare favorably with October. Occasional concessions still appear in sales of black and galvanized sheets. Demand for structural steel and bars continues large.

Cast Iron Pipe.—Northern makers of pressure pipe have advanced their quotations \$2 a ton and more on recent business. Southern foundries have also announced an increase to \$37 to \$38 per ton, Birmingham. Large buying of gas pipe by privately owned utility companies is expected soon, one of the leading gas companies having entered the market for about 15,000 tons of gas pipe for winter delivery. The New York Power & Light Co. is inquiring for about 3000 tons of gas pipe for use at Syracuse, Utica and other central New York cities. Albany, N. Y., is planning a water project which will require 40,000 to 50,000 tons of cast iron or concrete pipe, and has been obtaining estimates; an inquiry for a section of the project will probably be issued before the end of the year. An export inquiry from the Amoy Water Co., Amoy, China, calls for about 1000 tons of 4, 8 and 12-in. water pipe and a tonnage of fittings, bids being acceptable from British, French or

American makers. About 15,000 tons of water pipe for Warwick, R. I., has been awarded to the low bidder, the Herbert Kennedy Co., representing the Pont-a-Mousson works in France.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Many consumers of by-product foundry coke in this district have contracted for their requirements over the first half of next year. Prices of standard Connellsville coke are unchanged at \$2.85 to \$3.05 per net ton, Connellsville, for furnace grade and \$3.50 to \$3.75 per ton, Connellsville, for foundry. Special brands of foundry coke are unchanged at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44, to New York or Brooklyn. By-product foundry coke prices are \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn. The West Virginia producer of by-product foundry coke expects to open its books soon for first half contracts.

Old Material.—Most grades of iron and steel scrap continue to decline, with brokers obtaining a good supply of material at reductions in their buying prices of 25c. to 50c. a ton. No. 1 heavy melting steel is quoted at \$15 to \$15.50 per ton, delivered eastern Pennsylvania mills, except to Bethlehem, for which \$14.50 per ton is offered. On the basis of a recent sale of blast furnace scrap to a Coatesville, Pa., consumer at \$11 per ton, the buying prices of brokers show a slight advance. Machine shop turnings are quoted at \$11 to \$11.25 per ton, delivered Phoenixville, Pa., and yard grade of heavy melting steel at \$12 to \$12.50 per ton, delivered to Phoenixville and Pottsville, Pa. New contracts by consumers in eastern Pennsylvania are limited in number and are for small tonnages.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.75 to \$12.00
Heavy melting steel (yard)	8.25 to 9.00
No. 1 hvy. breakable cast.	11.25 to 11.75
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars....	8.75 to 9.25
Machine shop turnings....	7.25 to 7.75
Short shoveling turnings..	7.25 to 7.75
Cast borings (blast furn. or steel works).....	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles.....	17.50 to 18.00
Iron car axles.....	25.25 to 26.25

Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought...	12.25 to 12.75
No. 1 yard wrot., long....	11.25 to 11.75
Rails for rolling.....	13.50 to 14.00
Cast iron carwheels.....	12.50
Stove plate (foundry)....	9.50
Malleable cast (railroad)...	10.00 to 10.50
Cast borings (chemical)...	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Detroit Scrap Easier, But Two Items Are Up

DETROIT, Nov. 13.—Despite the fact that long turnings and No. 1 busheling have advanced 50c. per ton, the general tone of the market is not quite so strong as two weeks ago. Pressure for deliveries has been relieved somewhat.

Shipments of pig iron are about at the October level, with first quarter tonnage being bought at \$20 from furnaces serving the district.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets....	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling.....	10.50 to 11.00
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

Buys Buffalo Steel Car Co.

General American Tank Car Corporation, 230 South Clark Street, Chicago, has concluded arrangement for purchase of plant and property of the Buffalo Steel Car Co., East Walden Avenue, Buffalo, and will take immediate possession. The Buffalo plant will be continued and expanded and will be used primarily as a repair and maintenance works for tank cars of the purchasing company and similar railroad-owned rolling stock.

Italy's Scrap Imports in 1927 Were 631,684 Tons

WASHINGTON, Nov. 13.—Imports of iron and steel scrap from all sources through Genoa in 1927 totaled 115,941 metric tons, against a total for all ports of Italy of 631,684 tons. All phases of this trade and the factors making for the importance of Genoa in the Italian import trade are discussed in a report by Vice-Consul Julian C. Dorr, Genoa, which the Iron and Steel Division, Department of Commerce, announces may be borrowed for examination by interested American exporters. In addition, there is available a list of importers and consumers of scrap in the Genoa consular district compiled by Consular Clerk Ivan Lavretsky. The list is available to firms on the Exporters' Index of the Bureau of Foreign and Domestic Commerce.

Further Reduction in Trackwork

October shipments of trackwork for T-rail track 60 lb. and heavier, 9493 tons, made the smallest total since January, according to the American Iron and Steel Institute. There has been a steady drop since May, when 14,141 tons was shipped. In September the amount was 10,767 tons; in October, 1927, it was 9914 tons. Only twice in the past three years has a smaller tonnage been shipped than last month.

Pacific Coast

Longview Bridge, Taking 14,000 Tons, Awarded—Plates \$1 a Ton Higher—Oil Country Demand Good

SAN FRANCISCO, Nov. 10 (*By Air Mail*).—Increased interest in the plate market, with more awards and inquiries, and the award of 14,000 tons of structural steel for a bridge over the Columbia River at Longview, Wash., to the Wallace Bridge & Structural Steel Co., were among the important developments in the Pacific Coast iron and steel markets. Plates are \$1 a ton higher.

While building operations in Los Angeles during the past month fell off considerably from the total for October, 1927, Seattle and San Francisco permits showed a substantial increase. In Los Angeles the estimated valuation of permits was \$7,655,526, compared with \$10,388,098 for October a year ago. For the first 10 months of the year, permits aggregated \$85,046,447, against \$98,932,409 for the corresponding period in 1927. October permits at Seattle were the highest on record, as is the total for the first 10 months of the year. Permits in October totaled \$3,113,030, compared with \$1,296,255 in October a year ago. For the first 10 months, the total was \$32,495,705, exceeding the former high mark by \$4,000,000. San Francisco permits totaled \$5,687,396 and Oakland permits, \$1,162,272.

Pig Iron.—The largest inquiry for pig iron before the trade calls for 300 tons of No. 2 foundry iron for the Quartermaster Supply Officer at Fort Mason, San Francisco, bids on which are to be opened Nov. 13. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel awards this week were the heaviest in over three months, exceeding 2500 tons. Included among the more important lots were 750 tons each for the second units of the Zellerbach Paper Co. plants at Hoquiam and Port Townsend, Wash., booked by the Pacific Coast Steel Co. The latter company also will furnish 140 tons for a hotel in San Francisco. Bids were rejected on a bridge over the Missouri River

Warehouse Prices, f.o.b. San Francisco

Base per Lb.	
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100 lb. keg....	3.40

near Wolf Point, Mont., calling for 114 tons. The largest pending inquiry involves 1800 tons for the Life Science Building at Berkeley, Cal. Out-of-stock prices continue weak at about 1.80c., base, both in the Los Angeles and San Francisco districts. Merchant bar steel is firm at 2.35c., c.i.f. Los Angeles and San Francisco. Demand, however, is spotty and both sales and inquiries are confined to unimportant lots.

Plates.—Prices on plates are stronger, and 2.25c. c.i.f. Coast ports now appears to be the minimum, with 2.30c. applying on small lots. The former minimum of 2.20c. was in force for several months. Awards include 3200 tons for 10 80,000-bbl. tanks for the Shell Oil Co. at Dominguez, Cal., booked by Lacy Mfg. Co., 600 tons for boilers for the Great Northern at Seattle and 750 tons for boilers for the Zellerbach Paper Co. at Port Townsend, Wash., placed with the Puget Sound Machinery Depot. The Moore Dry Dock Co. took 200 tons for a ferry boat at San Diego. Bids were opened this week on 231 tons for a 24-in. riveted pipe line at Seattle. The Shell Oil Co., San Francisco, has an inquiry out for 1200 tons for four 82,000-bbl. tanks at Martinez. The Llewellyn Iron Works is low bidder on 370 tons for a 40-in. welded pipe line for Los Angeles.

Shapes.—The outstanding structural award of the year has been placed with the Wallace Bridge & Structural Steel Co. and calls for 14,000 tons for the Longview bridge, Longview, Wash. The Judson-Pacific Co. booked 450 tons for a department store for Magnin's in San Francisco. About 580 tons for transmission towers for the Southern California Edison Co. and the San Joaquin Light & Power Co. has been placed with the Pacific Coast Steel Co. No new inquiries of importance have developed. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe is slow. Awards placed during the week called for lots of less than 100 tons. Watson & Sutton were low bidders on 106 tons of 4 to 10-in. Class B pipe for the improvement of Turquoise Street, San Diego, Cal. Bids have been opened on 1284 tons of 24-in. Class B pipe for Seattle, alternate bids having been taken on riveted steel pipe. The only new inquiry of importance calls for 111 tons of 12-in. Class B pipe for Aberdeen, Wash., bids on which are to be opened Nov. 14.

Steel Pipe.—Movement of oil country goods, especially in southern California, continues unabated. Demand for standard steel pipe has shown signs of improvement, stocks in distributors' hands having become depleted in some sizes. The Puget Sound Machinery Depot, Seattle, has placed an order for 300 tons of boiler tubes for 10 locomotives for the Great Northern. Los Angeles will open bids on Nov. 15 for 102 tons of $\frac{3}{4}$ and 1-in. galvanized pipe.

St. Louis

Heavy Pig Iron Sales Establish Record Volume for Two Weeks—Steel Demand Fairly Steady

ST. LOUIS, Nov. 13.—The sale of 46,000 tons of pig iron, combined with previous week's total of 45,000 tons, brought the sales of the St. Louis Gas & Coke Corporation for the two weeks up to the record volume of 91,000 tons. This included 32,000 tons of basic last week and 33,000 tons the preceding week, a total of 65,000 tons of basic for the two weeks, another record. Of the past week's basic sales, 15,000 tons to a St. Louis melter, 10,000 tons to one East Side consumer and 5000 to another were for first quarter shipment, and 2000 tons to a West Side melter was for delivery during the remainder of this year. The basic iron is largely for melters catering to needs of the railroads. Of the past week's sales of 12,500 tons of foundry iron, all for first quarter, 7800 went to radiator manufacturers in lots of 3500 tons, 3100 tons and 1200 tons, respectively, 1000 tons to stove manufacturers, who are enjoying a good re-order business, and 2350 tons to various implement manufacturers. Malleable orders for the week totaled

2000 tons. Shipments of the Granite City maker for November promise to equal those of October, which were the heaviest in the history of the company, although one of its two furnaces has been down for several

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, $\frac{3}{8}$ -in. and smaller, 100 lb. or more	65
Less than 100 lb.....	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

months. Southern makers have not opened their books for first quarter business. The market continues firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.
Granite City, Ill.	\$20.00
Malleable, f.o.b. Granite City	 20.50
N'th'n No. 2 fdy., deliv'd St. Louis	 22.16
Southern No. 2 fdy., deliv'd	 20.67
Northern malleable, deliv'd	 22.16
Northern basic, deliv'd	 22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Colder weather has brought heavier shipments of by-product domestic coke to dealers outside the city. In St. Louis, the hand-to-mouth buying of dealers continues, but with an increasing movement. The larger melt has substantially increased the takings against contracts for foundry grades.

Finished Iron and Steel.—While there has been a falling off in new sheet business, due to consumers and jobbers taking a breathing spell after unusually heavy specifications, the backlog of orders of the Granite City Steel Co. is sufficiently large to continue the operation of all sheet units at capacity. From the reports the Granite City company has received, it is apparent that distributors and fabricators of sheets have not increased their stocks, although they have bought heavily during the last 60 days, indicating that they have been turning over their raw materials as fast as they have received them. Plates continue to lag, although there seems to be sufficient business to hold prices steady. Sheet prices are firmer than they have been in months, and higher levels are expected in the near future. Warehouse business for November thus far is about on a level with this time last year. Structural steel business is quiet, although fabricators are reported to be in fairly

good condition, largely through the number of small orders.

Old Material.—Dealers are declining old material business at prices consumers have expressed their willingness to pay, which are prices prevailing on preceding purchases. The market is strong, and dealers feel that consumers' stocks are so low as to force them into the market. The only price changes this week are advances of 50c. a ton on iron rails, steel car axles, steel rails less than 3 ft. and No. 1 machinery cast, and 25c. on cast iron carwheels. Railroad lists include: Louisville & Nashville, 11,690 tons; Atchison, Topeka & Santa Fe, 6075 tons; Chesapeake & Ohio, 5027 tons; Wabash, 3800 tons; Texas & Pacific, 3174 tons; Missouri-Kansas-Texas, 1700 tons; Ann Arbor, 377 tons; Manistique & Lake Superior, 105 tons; Chicago, Rock Island & Pacific, 55 carloads; Chicago & Eastern Illinois, 17 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel	 12.25 to 12.75
No. 1 locomotive tires	 14.50 to 15.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	 14.75 to 15.25
Railroad springs	 15.75 to 16.25
Bundled sheets	 9.50 to 10.00
No. 2 railroad wrought	 13.25 to 13.75
No. 1 busheling	 9.50 to 9.75
Cast iron borings	 8.75 to 9.25
Iron rails	 13.50 to 14.00
Rails for rolling	 15.25 to 15.75
Machine shop turnings	 9.00 to 9.50
Steel car axles	 19.00 to 19.50
Iron car axles	 27.00 to 27.50
Wrot. iron bars and trans.	 22.00 to 22.50
No. 1 railroad wrought	 12.00 to 12.50
Steel rails, less than 3 ft.	 17.50 to 18.00
Steel angle bars	 14.25 to 14.75
Cast iron carwheels	 14.00 to 14.50
No. 1 machinery cast	 15.50 to 16.00
Railroad malleable	 14.75 to 15.00
No. 1 railroad cast	 14.00 to 14.50
Stove plate	 12.50 to 13.00
Agricult. malleable	 11.50 to 12.00
Relay. rails, 60 lb. and under	 20.50 to 23.50
Relay. rails, 70 lb. and over	 26.50 to 29.00

ness comes up for negotiation. Full establishment of sheet bars at \$34, would be helpful to the proposed advance in sheets, according to one view, but another is that unless sheets can be advanced it will be very difficult, if not impossible, to obtain an advance on sheet bars.

In a general way, the steel industry in this area is feeling the contraction in demand incident to the approach of the end of the year and the effort of consumers to cut, rather than add to, inventories. Plant engagement reflects that development. As against practically full occupation of steel works and rolling mills a month ago, the independent company average of ingot production is as low as 80 per cent in some cases and there has been a corresponding recession in rolling mill operations, notably in bar mill activities. The automotive parts makers have become very sparing buyers of cold-finished steel bars lately, and that is felt by the hot-rolled bar makers who supply cold-finished bar producers. Nothing has come out as to first quarter bar prices; currently, the market is quotable at 1.95c. to 2c., base, but a considerable tonnage contracted for at 1.90c., base, for this quarter remains to be specified. The fear is expressed that the mills may need orders a little more urgently than buyers need supplies and this may prevent any advance over the present quarter's price.

Orders for strips appear to be very little less in the aggregate than they were a month ago and makers, not being in need of fresh business to sustain economical mill operations, have firm ideas as to prices. On cold-rolled strips, 2.85c., base Pittsburgh, is the ruling price on new business, while quotations on hot-rolled are made on current business for early delivery with an eye to helping the full establishment on first quarter tonnages of the recently adopted base prices and the new card of extras.

Pipe business is good in line pipe and fairly satisfactory in other classes. The common expectation among pipe makers is that much line pipe will come out this winter and that next spring will bring a very decided increase in the demand for oil well pipe, on account of the improvement in the oil market, both as to its statistical and price positions.

Although steel works operations are down from where they were a month ago, it is said there has been no relaxation in the insistence of the steel makers for deliveries of scrap. It is observed, however, that while dealers report the consumer prices of heavy melting steel at from \$18 to \$18.50, they are not bidding more than \$17.50, and the difference suggests that the recent pinch in supplies has been pretty well corrected. It develops that the sharp upswing in local scrap prices was due to the fact that local melters figured on getting some supplies of Detroit scrap as the end of the Lake shipping season approached and delayed purchases. In the mean-

Youngstown

Mills Want More for Sheets and Sheet Bars—Operations at About 80 Per Cent

YOUNGSTOWN, Nov. 13.—Advances of \$2 a ton on sheets and \$1 a ton on sheet bars are the important developments of the week. Both advances are effective immediately and put sheet bars to \$34 at Youngstown or Pittsburgh and sheets at 2.85c., base Pittsburgh, for black, 3.60c. base, for galvanized, 2.10c., base, for blue annealed and 4.10c., base, for automobile body sheets. While not so stated, the new prices are likely to find greater application on first quarter business than on tonnage for shipment over the remainder of this year, since non-integrated sheet makers are covered against their requirements for this quarter and that also is the position of sheet buyers, or at least a majority of them. Local mills still are quoting 4 x 4-in., but under 10 x 10-in., billets and the equivalent area in slabs at \$33, Youngstown or Pitts-

burgh, which means that forms less than 4 x 4-in. down to and including 1½ in. x 1½ in. command \$34, while a card announced by manufacturers last August also provides extras on sizes 10 x 10 in. and larger.

For the third and fourth quarters, there has been a single price of \$33 for the base sizes of billets and slabs and for sheet bars. Previously, sheet bars commanded a premium of \$1 a ton on 4 x 4-in. and over to, but not including, 10 x 10-in. billets and slabs, and the latest price revision merely re-establishes that relationship. A Cleveland producer, however, has announced \$34, base Cleveland, for billets and slabs and sheet bars. Whether the general market will settle to a single price for these forms or to one price for sheet bars and a lower one for billets and slabs will be determined when first quarter busi-

time, strength at Pittsburgh and other markets made it hard for Youngstown dealers to get supplies and, with consumption heavy, a pinch was the result. Recent sales of railroad heavy melting steel at over \$19, delivered this district, find explanation in the necessity of consumers for speedy deliveries. Compressed sheets have sold into consumption at \$18 to \$18.50, but dealers now are trying to buy them at \$17. Dealers are bidding \$11 to

\$11.50 for machine shop turnings. Producers of pig iron are asking higher prices than melters are prepared to pay, and actual business does not reach very large proportions. On basic and No. 2 foundry, \$18, furnace, is asked, on malleable \$18.50 and on Bessemer \$19. The Struthers Furnace Co. has begun to receive ore shipments and expects to have the relining and repairs of the furnace completed in time to blow in by Dec. 10.

ment of Public Works; 150 tons to Frankel Brothers, Eastern Avenue, for Toronto Bible College, Spadina Avenue, Toronto; 250 tons to the Hamilton Bridge Co., Hamilton, Ont., for factory at New Toronto, Ont., for Ritchie Cut Stone Co.

Old Material.—General market conditions show little or no change. Prices are firm. The demand for most lines of scrap is brisk in the Toronto and Montreal markets. Consumers are showing interest in heavy melting steel and machinery cast, and the bulk of orders taken by local dealers during the week were for these grades. Montreal buyers are favoring wrought iron and steel axles as well as heavy melting steel and turnings. The export demand in the Montreal district is still a feature and dealers there report a good outlet in the United States for surplus holdings.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel....	\$9.50	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron....	16.00	22.00
No. 1 machinery cast....	....	16.00
Stove plate .....	....	13.00
Standard carwheels....	....	16.00
Malleable .....	....	13.00
Per Net Ton		
No. 1 machinery cast....	15.00	....
Stove plate	9.00	....
Standard carwheels....	13.00	....
Malleable scrap	13.00	....

Canada

Railroads Place Large Orders for Rolling Stock—Structural Steel Demand Also Features Dominion Business

TORONTO, ONT., Nov. 13.—Extensive rolling stock purchases by Canadian railroads were outstanding in the business of the week. Orders from the Canadian National totaled approximately \$14,000,000, while the Canadian Pacific placed about \$10,000,000 worth of business. Canadian car and locomotive building concerns now have large orders on their books. Steel mills are also receiving some new business. Rail orders have not yet been placed, but a large volume of new tonnage of a diversified character has been forthcoming and other large orders are in prospect.

Pig Iron.—Weekly sales continue in good volume. Current demand is confined to immediate needs of consumers. The majority of hand-to-mouth buyers have limited supplies and are coming into the market at frequent intervals. Releases against contracts are responsible for a large movement of foundry and malleable iron. Of the seven active blast furnaces, three are making foundry and malleable iron. While both active stacks of the Dominion Iron & Steel Co., Sydney, N. S., are now running on basic, the company has enough foundry iron piled to take care of all present needs. The Steel Co. of Canada, Ltd., the Algoma Steel Corporation and the Canadian Furnace Co. also have large stocks of foundry and malleable iron. Producers who have continued to sell at the former level of \$23.10 have now advanced their prices 50c. per ton in the Toronto market, with the result that all Canadian producers are quoting No. 1 foundry iron at \$23.60, Toronto, and \$25, Montreal.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Fabricators of structural steel continue to close large tonnages each week, and in many instances plants are greatly exceeding their former estimated peak produc-

tion. In connection with the proposed \$6,000,000 extension program of the Steel Co. of Canada, Ltd., Hamilton, Ont., about 5000 tons of steel is pending; for an office building in Toronto for the Canadian Bank of Commerce, approximately 8000 tons will be required. Other business in prospect includes 2000 tons for factory building on Girouard Street, St. Hyacinthe, Que., for Penmans, Ltd.; 2500 tons for building on University Avenue, Toronto, for the Bell Telephone Co. of Canada. Contracts awarded during the week include one for 2500 tons to the Dominion Bridge Co., Lachine, Que., for building on Wellington Street, Ottawa, for Dominion Depart-

Boston

Pig Iron Prices Stronger—Cast Iron Pipe Higher—Scrap Goes to Lower Levels

BOSTON, Nov. 13.—Pig iron sales in this territory the past week totaled 8000 tons, mostly Mystic and Buffalo iron. Buffalo No. 2 plain is now generally \$18 a ton, furnace, No. 2X \$18.50, and No. 1X \$19.50, although some business the past week was put through on a \$17.50, furnace, base. The Mystic Iron Works has taken business at \$20 a ton, furnace, base, which is 50c. to \$1 a ton up. New York State and Virginia irons are firmly held at regular price schedules. No open inquiries of importance are noted. Indian iron is well sold up for this year's delivery, and prices are largely nominal at \$21.50 to \$22 a ton on dock here, duty paid, for No. 2X. These prices are 25c. to 50c. a ton higher than those of a month ago.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.91
*Buffalo, sil. 2.25 to 2.75..	23.41
†Buffalo, sil. 1.75 to 2.25..	21.78
†Buffalo, sil. 2.25 to 2.75..	22.28
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	\$23.16 to 25.02
Ala., sil. 2.25 to 2.75.....	23.66 to 25.52

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Importations.—October importations of pig iron at this port comprised 420 tons of Indian iron, which compares with 1278 tons in September, and 1384 tons in October last year. Pig iron importations for the

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot-pressed nuts	.50 and 5
Cold-punched nuts	.50 and 5
Stove bolts	.70 and 10

*Including quantity differentials.

10 months ended with October were 9520 tons, contrasted with 22,199 tons for the like period last year, 54,253 tons for the like period of 1926, and 79,719 tons for the like period of 1925. While there has been a marked shrinkage of importations this year, receipts of Indian iron have held up much better than those from Holland and other countries. October ore importations were 8950 tons, against 10,030 tons in September, and 23,447 tons in October last year. Importations for the 10 months ended with October were 99,266 tons, against 185,585 tons last year. The disparity between this and last year's figures is largely accounted for by the fact that the Mystic Iron Works is using larger quantities of domestic ores.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. report a strong demand for by-product foundry coke. Specifications against last half contracts are largely for current foundry needs, not more than four or five of the largest melters having covered their winter requirements. Foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone.

Cast Iron Pipe.—Despite the fact that pipe makers located north of Alabama are meeting stiff competition from Alabama and foreign foundries for New England business, they have marked up prices \$2 a ton on the average. Their position is based on a sold-up condition on small and medium dimension pipe and on the rising cost of pig iron. The local market on pipe made north of Alabama is now 4-in., \$48.10 a ton, delivered common Boston freight rate points; 6 to 16-in., \$43.10. The usual \$5 a ton differential is asked on Class A and gas pipe. Concessions of \$1 a ton or more, depending on the tonnage in-

volved, can be obtained on larger than 16-in. pipe. The National Cast Iron Pipe Co. was low bidder on 100 tons of 6-in. pipe for Salem, Mass. No award has been made. Foreign pipe interests were approximately \$100,000 under some domestic pipe makers on bids recently opened by Warwick, R. I., for 14,000 tons. That town is in the market for a \$400,000 loan for its water works project.

Old Material.—Scrap prices are weaker. New business has dropped to small proportions, but there is a fair amount of activity on old contracts. No. 1 heavy melting steel is \$1 a ton below its price of a week ago, and steel turnings are down as much, while scrap rails, railroad wrought and forged scrap are 50c. a ton lower, and most other kinds of material are off about 25c. The export market is still inactive owing to inability of shippers to secure vessel space. New England foundries are curtailing purchases of textile and machinery cast.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$10.50 to \$11.00
Scrap T rails.	10.50 to 11.00
Scrap girder rails.	10.00 to 10.50
No. 1 railroad wrought.	11.00 to 11.50
No. 1 yard wrought.	9.00 to 9.50
Machine shop turnings.	6.00 to 6.50
Cast iron borings (steel works and rolling mill).	6.00 to 6.50
Bundled skeleton, long.	9.00 to 9.25
Forge flashings	9.50 to 9.75
Blast furnace borings and turnings	6.00 to 6.50
Forge scrap	6.50 to 7.00
Shafting	14.50 to 14.75
Steel car axles.	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.00 to 10.25
Rails for rolling.	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.	15.00 to 15.50
No. 2 machinery cast.	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

Buffalo maker will furnish 100 tons for a Y. M. C. A. building at Jamestown, N. Y., and an inquiry is out for 100 tons for a school at Lackawanna, N. Y. Warehouse business is exceptionally good. Wire mills report a seasonal slackening. Business in their other lines is keeping up.

Old Material.—Little new selling has been done during the past week, but the mills continue heavy operations and a great deal of scrap is being consumed. One of the larger plants continues to restrict shipments, but this regulation is not quite as stringent as it was. Consumption of scrap generally is the heaviest in years. Some lots of borings and turnings have been sold at \$11 to \$11.50 and some machine shop turnings have been sold at \$7.50 to \$8. There have been occasional car lot sales of low phosphorus, knuckles and couplers and short rails at the quoted prices. Outside districts are taking considerable tonnage of heavy melting steel and hydraulic compressed sheets from this district.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$15.75 to \$17.00
No. 2 heavy melting steel.	14.25
Scrap rails	15.50 to 16.00
Hydraulic comp. sheets.	14.25
Hand bundled sheets.	12.00 to 12.50
Drop forge flashings.	13.50 to 14.00
No. 1 busheling	14.75 to 16.00
Hvy. steel axle turnings.	13.50 to 14.00
Machine shop turnings.	7.50 to 8.00
No. 1 railroad wrought.	14.50 to 15.00

Acid Open-Hearth Grades	
Knuckles and couplers.	17.00 to 17.50
Coil and leaf springs.	17.50 to 18.00
Rolled steel wheels.	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50

Electric Furnace Grades	
Short shov. steel turnings.	11.00 to 11.50

Blast Furnace Grades	
Short shov. steel turnings.	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	11.00 to 12.00

Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00

Cupola Grades	
No. 1 machinery cast.	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars.	13.00 to 13.50
Steel rails, 3 ft. and under.	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50

Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Buffalo

Furnaces Again Advance Pig Iron for Outside Shipment—Steel Mills Maintain Large Production

BUFFALO, Nov. 13.—Buffalo furnaces have again advanced prices on malleable and foundry grades. The district base of \$18.50 remains, but for outside shipment quotations have been moved up to \$18 for No. 2 foundry, 1.75 to 2.25 per cent silicon, and to \$18.50 for malleable up to 2.25 per cent. While this new Eastern base has been shaded 50c., in the main it has held, and considerable iron has been sold at \$18, Buffalo, for Eastern

delivery. Pig iron makers say that first quarter iron is yet to be purchased. Salesmen bring word to home offices of a sustained heavy melt throughout the State. Full differentials are being obtained on the quoted bases. There are few sizable inquiries. The Donner Steel Co. has put out its No. 1 furnace, which has been making foundry iron. It will be down for repairs until Jan. 1.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25.	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal.	27.28

Finished Iron and Steel.—Operation is being maintained by Buffalo mills at the same high rate, and specifications are liberal. Bar and shape inquiry is sustained and sheets are moving well. Reinforcing bar business shows a seasonal tapering. A

"Chromium Plating and General Research" was the subject of a paper read by Dr. William Blum, assistant director of the United States Bureau of Standards, Washington, before the November meeting of the Detroit branch of the American Electroplaters Society at Hotel Statler, Detroit, Nov. 2. More than 1000 members of the society are expected to attend the seventeenth annual convention which will be held at Hotel Statler, Detroit, July 8 to 11, 1929.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.	3.40c.
Soft steel bars.	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold rolled strip steel.	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg.	\$3.60
Black wire, base per 100 lb.	3.75

Birmingham

First Quarter Pig Iron Inquiries Appear—Furnaces May Advance Prices—Cast Iron Pipe \$1 Higher

BIRMINGHAM, Nov. 13.—Several good inquiries have been received in the last few days on first quarter pig iron, but makers have not opened books for that period. The base price of \$16.25 for No. 2 foundry is being maintained. Considerable more firmness is noted, and it is generally expected that prices will be advanced when books are opened for the next quarter. Some iron is being sold from day to day, but the liberal bookings for the present quarter keep the total volume of new sales low. Shipments last week were hardly up to the weekly average for October, and were a little below production. There have been no changes in furnace operations during the past two weeks. Of the 18 furnaces in blast, 13 are on foundry, four on basic and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.25
No. 1 fdy., 2.25 to 2.75 sil.....	16.75
Basic	16.25

Finished Steel.—Rail buying has improved during the past week and the accumulated tonnage of the Tennessee company will probably warrant the reopening of the Ensley rail mill within the next few days. Buying in other lines continues favorable. There is a larger unfilled tonnage in the more important lines than at any other time in the past several seasons. The market has a firm tone at the prices that have prevailed for the past several weeks. Bookings by fabricated structural steel plants have been light during the past week, but the pending tonnage is the largest for the year. Plant operations are unchanged; the Tennessee company is operating seven open-hearths at Fairfield and five at Ensley, and the Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—Pressure pipe plants are now quoting \$37 to \$38 on 6-in. and larger sizes, an advance of \$1 a ton. The market continues dull. Unless there is an improvement in new business the plants will about complete forward bookings by the early part of December. Only occasional inquiries are developing. The Central Foundry Co. has an order for 1490 tons for Dallas, Tex.; the United States Cast Iron Pipe & Foundry Co., 1300 tons for San Francisco, and the American Cast Iron Pipe Co., 850 tons for Los Angeles.

Coke.—Foundry coke is doing little better than holding its own. Increased demand is noted for domestic sizes, especially from the North and Middle West. Shipments are being maintained at a fairly good rate. Some coke has been shipped for the Pacific Coast by way of Mobile. Prices continue steady at \$5 for both spot and foundry.

Old Material.—The past week made the third week that shipments have been light. Consumers are confining orders to immediate needs, but inquiries have improved in the last two or three days and dealers are expecting better conditions beginning with this week. There has been no change in prices for some time.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Cincinnati

Pig Iron Buying Light, but Prices Show Strength

CINCINNATI, Nov. 13.—Pig iron sales the past week totaled less than 5000 tons. Aside from 2300 tons of foundry for an Ohio melter and 500 tons for another consumer, orders were for small miscellaneous lots. Inquiries are scarce; most of the current business is being closed quietly. Prices are showing strength, with northern Ohio foundry at \$18.50, base furnace, and Southern iron at \$16.25, base Birmingham. Southern Ohio foundry iron is quoted nominally at \$18.50, base Ironton.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25.....	\$20.39
Ala. fdy., sil. 1.75 to 2.25.....	19.94
Ala. fdy., sil. 2.25 to 2.75.....	20.44
Tenn. fdy., sil. 1.75 to 2.25.....	19.94
S'th'n Ohio silvery 8 per cent.....	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Specifications and orders for bars, structural shapes and plates have fallen off slightly in the past week, although bookings this

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinf. bars.....	3.15c.
Rail steel reinf. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg..	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

month have reached fairly good proportions. Fabricators are moderately busy on numerous small projects, but the number of large jobs is meager. Agricultural implement makers continue to take liberal tonnages of bars to meet production requirements for next spring. Prices of heavy steel products are firm at 1.90c. to 2c., base Pittsburgh, and the schedule for first quarter is likely to name 2c. as the minimum. Interest in the sheet steel market centers in prices for next year. Companies in this district are considering the advisability of raising quotations at least \$2 a ton, the advance in primary materials having made necessary some action in revising schedules upward. Meanwhile, quotations are steady and unchanged. Sheet mill operations have not varied from the recent rate of 100 per cent of capacity, and this production program may carry through the remainder of the month. Backlogs are fairly satisfactory and a good volume of business from diversified sources has been placed in the past week. The demand for wire goods is rather dull. Common wire nails are quoted at \$2.69 per keg, delivered Cincinnati, or \$2.55, Ironton.

Coke.—Shipments of by-product foundry coke have declined somewhat from the high level maintained during October, but have been in fairly good volume. Sales of domestic grades have taken a seasonal upward turn. Movement of beehive foundry coke from the New River and Wise County districts has been moderate. Prices are firm.

Old Material.—Prices are firm in the face of a more conservative buying policy on the part of dealers. Steel plants are operating at full capacity and are accepting substantial tonnages on current contracts, but are not buying for forward delivery.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.25 to \$13.75
Scrap rails for melting....	13.50 to 14.00
Loose sheet clippings.....	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings.....	9.75 to 10.25
Machine shop turnings....	9.25 to 9.75
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling.....	6.50 to 7.00
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought....	13.50 to 14.00
Short rails	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	14.75 to 15.25
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.25 to 10.75
Railroad malleable	13.50 to 14.00
Agricultural malleable ...	13.00 to 13.50

Youngstown Sheet & Tube Co. Advances Sheet Prices

YOUNGSTOWN, Nov. 12. — The Youngstown Sheet & Tube Co. today announced a new price schedule on steel sheets, as follows: Blue annealed, 2.10c. per lb.; black, 2.85c.; galvanized, 3.60c., and full finished, 4.10c. Chicago prices are 10c. per 100 lb. higher. The new list represents an advance of \$2 per ton, and will apply on first quarter shipments. Other independents will also advance prices.

Non-Ferrous Metal Markets

Copper Quiet and Firm, Tin Moderately Active and Steady, Lead Declines, Zinc Unchanged

NEW YORK, Nov. 13.

Copper.—October statistics, made public today, reveal the prosperity and the strong position of the copper market. The feature was the record breaking domestic shipments of over 100,300 tons, an increase of 13 per cent over those of September. Total foreign and domestic shipments exceeded 155,300 tons, breaking the previous record in August this year by more than 11,000 tons, or 8 per cent. There was also a decrease in refined stocks of more than 6100 tons, the blister stocks increasing 1800 tons, leaving a net decrease of copper above ground of about 4300 tons. Mine production increased 8700 tons over that of September and the re-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	51.00c. to 52.00c.
Tin, bar	53.00c. to 54.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	55.50c.
Tin, bar	57.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig.....	6.85c. to 7.10c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	59.00c.
Solder, ½ and ½.....	33.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9),	10.00c. to 10.50c.
casks	11.00c. to 11.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 13	Nov. 12	Nov. 10	Nov. 9	Nov. 8	Nov. 7
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	50.12½	49.87½	....	49.75	49.80	49.70
Lead, New York.....	6.35	6.35	6.35	6.50	6.50	6.50
Lead, St. Louis.....	6.20	6.20	6.20	6.32½	6.32½	6.32½
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

finery output about 250 tons a day. Just what effect these statistics will have on the market is conjectural. If buyers realize that the increased production will provide for their needs, excessive purchasing, followed by a possible increase in prices, is not likely to result. The market in the last week has been quiet and very firm, with electrolytic copper quoted at 16c., delivered in the Connecticut Valley, and 16.25c., c.i.f. European ports. Moderate sales have been made to domestic consumers for delivery through January and February, and to foreign consumers through December and January. Lake copper is very quiet but firm at 16.12½c., delivered.

Tin.—Sales for the week ended Nov. 10 were about 1000 tons, mostly spot, November and December delivery. Business was about equally divided between consumers and dealers, with interest centered chiefly in

this year's metal. In general, the trade is afraid of the market because of manipulations in London and various unsubstantiated rumors affecting prices. The situation is so confusing that dealers are doing little and consumers are afraid to commit themselves. One responsible opinion is that if the market were left to itself prices would be lower. Spot Straits tin today was quoted at 50.12½c., New York, with about 300 tons sold in a moderately active market. London prices were higher than a week ago with spot standard quoted at £230, future standard at £225, and spot Straits at £230 5s. The Singapore price today was £237. Arrivals thus far this month have been 670 tons, with 6615 tons reported afloat.

Lead.—Late Friday, Nov. 9, the American Smelting & Refining Co. reduced its contract price from 6.50c. to 6.35c., New York. This was

Non-Ferrous Rolled Products

Mill prices on brass and copper products are still quoted at the advances of Oct. 29. Zinc sheets have been steady at 9.75c. per lb., base, since July 30, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled.....	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.00c. to 10.25c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.

Rods—	
High brass	18.25c.
Naval brass	20.25c.

Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.	
Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.25c.	11.25c.
No. 1 yel. brass turnings	9.25c.	9.875c.
No. 1 red brass or compos. turnings..	9.50c.	10.50c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)	
Sheets—	Base per Lb.
High brass	20.50c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	18.25c.
Brazed Brass Tubes.....	28.50c.

caused largely by lower prices in London and the possibility of imports of Mexican lead. The market here has been moderately active, particularly today, with sales at 6.35c., New York, or 6.20c., St. Louis. Sales embrace November and some December delivery with the buying fairly broad.

Zinc.—Statistics for October were quite favorable in that they showed a decrease in refined stocks of about 1800 tons and a large reduction in the number of active retorts at the end of the month, the total being the lowest for any month since 1920. Deliveries into consumption were over 52,100 tons, which were the third largest for any month this year and well above the average of 48,200 tons. The ore situation was also improved, statistics for last week showing production somewhat smaller, with the price unchanged at \$40, Joplin. Prices for prime Western for delivery through January are 6.25c., East St. Louis, or 6.60c., New York, with buying the past week in moderate volume.

Antimony.—Fairly active buying has featured the market the last few

days, but prices are a little lower at 10.37½c. for spot and 10.25c. for futures, duty paid, New York.

Nickel.—Ingot nickel in wholesale lots is unchanged at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Nov. 13.—Prices for tin are higher and quotations on lead are lower than a week ago. Spot sales are moderately active. The old metal market is active in small sales and prices are steady.

Prices, per lb., in carload lots: Lake copper, 16.75c.; tin, 50.50c.; lead, 6.30c., zinc, 6.35c.; in less-than-carload lots; antimony, 11c. On old metals, we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

boilers for Great Northern, to Puget Sound Machinery Depot.

SEATTLE, 14,000 tons, Longview bridge over Columbia River, to Wallace Bridge & Structural Steel Co.

PORT TOWNSEND, WASH., 750 tons plates, 15 boilers for Zellerbach Paper Co., to Puget Sound Machinery Depot.

SAN DIEGO, CAL., 200 tons plates, ferry boat to Moore Dry Dock Co.

EXCHEQUER, CAL., 150 tons, transmission towers for San Joaquin Light & Power Co., to Pacific Coast Steel Co.

SAN FRANCISCO, 450 tons, Magnin's department store, to Judson-Pacific Co.

SAN FRANCISCO, 200 tons, apartment building, Jackson and Baker Streets, to Golden Gate Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, 340 tons, Providence Institute of Savings bank.

BOSTON, 250 tons, New York, New Haven & Hartford Railroad freight shed.

NEW YORK, 1000 tons, apartment building at 623 Park Avenue; Starrett Brothers, general contractor.

NEW YORK, 3670 tons, section of subway; bids Nov. 13.

BUFFALO, 500 tons, building for New York Central Railroad.

JERSEY CITY, 1600 tons, column cores for Delaware, Lackawanna & Western terminal; Levering & Garrigues Co., low bidder.

PHILADELPHIA 700 tons, junior high school at Upper Darby.

PHILADELPHIA, 1000 tons, city hospital, Kober Construction Co., Philadelphia, low bidder on general contract.

PHILADELPHIA 2200 tons, plant for United States Gypsum Co., general contract to Morton G. Tuttle, Boston.

AKRON, OHIO, 6500 tons, hangar for Goodyear Zeppelin Co.

MILWAUKEE, 1200 tons, tractor plant for Allis-Chalmers Mfg. Co.

SOUTH CHICAGO, 500 tons, building for International Harvester Co.

CHICAGO, 1000 tons, naval armory; Zackery Davis, architect.

HELENA, MONT., 667 tons, bridge over Missouri River near Wolf Point; bids rejected.

LOS ANGELES, 370 tons plates, 40-in. pipe for city; Llewellyn Iron Works, low bidder.

SAN FRANCISCO, 1200 tons plates, four 82,000-bbl. tanks for Shell Oil Co.; bids being taken.

Fabricated Structural Steel

New York Office Building Takes 15,600 Tons and Seattle Bridge 14,000 Tons of 54,800 Tons Awarded

WITH an office building at New York requiring 15,600 tons and a bridge over the Columbia River near Seattle, Wash., 14,000 tons, awards reported during the last week totaled about 54,800 tons. New projects, amounting to 18,800 tons, included a hangar at Akron, Ohio, which will take 6500 tons. Awards follow:

NEW YORK, 15,600 tons, Chrysler Building at Lexington Avenue and Forty-second Street, to American Bridge Co.

NEW YORK, 1200 tons, office building at Thirteenth Street and Verona Avenue, Long Island City, apartment building at 75 Central Park West and amusement building at Archer Avenue and 143rd Street, Jamaica, to George A. Just Co.

PHILADELPHIA, 850 tons, Psychopathic Hospital, to Belmont Iron Works.

BUFFALO, 2000 tons, manufacturing building for Curtiss Aeroplane & Motor Co., to Lackawanna Steel Construction Co.

WAYNESBORO, VA., 500 tons, power plant for Du Pont Engineering Co., to Virginia Bridge & Iron Co.

RICHMOND, VA., 600 tons, power plant for DuPont company, to McClintic-Marshall Co.

CHARLOTTE, N. C., 145 tons, Alexander Graham School, to Carolina Bridge & Iron Co.

CHARLOTTE, 120 tons, Cutter store, to Carolina Bridge & Iron Co.

LOUISVILLE & NASHVILLE RAILROAD, 1300 tons, bridge work, to American Bridge Co.

STATE OF TENNESSEE, 1800 tons, highway bridges; 1100 tons to American Bridge Co., and 700 tons to Nashville Bridge Co.

HARMONY, PA., 7000 tons, Aston iron plant for A. M. Byers Co., to Fort Pitt Bridge Works.

TOLEDO, OHIO, 200 tons, building for Industrial Steel Casting Co., to Donovan Iron & Wire Co.

CLEVELAND, 500 tons, building for St.

Luke's Hospital, to T. H. Brooks & Co. MANSFIELD, OHIO, 725 tons, building for Mansfield Tire & Rubber Co., to Berger Iron Works.

STATE OF OHIO, 175 tons, highway bridge at Dead Man's Crossing, Montgomery County, to Massillon Bridge & Structural Co.

STATE OF INDIANA, 100 tons, bridge No. 2 in Portage County, to Massillon Bridge & Structural Co.

CANTON, ILL., 150 tons, manufacturing building for International Harvester Co., to Massillon Bridge & Structural Co.

CHICAGO, 700 tons, mill building for Acme Steel Co., to McClintic-Marshall Co.

EVANSTON, ILL., 100 tons, addition to Oakton School, to Midland Structural Steel Co., Chicago.

EVANSTON, 425 tons, Young Men's Christian Association building, to Midland Structural Steel Co.

AURORA, ILL., 168 tons, store and loft building, to Midland Structural Steel Co.

FOREST PARK, ILL., 143 tons, building for Borden's Farm Products Co., to Midland Structural Steel Co.

DES PLAINES, ILL., 100 tons, First Congregational Church, to Midland Structural Steel Co.

ELMHURST, ILL., 180 tons, high school, to Midland Structural Steel Co.

LOS ANGELES, 430 tons, transmission towers for Southern California Edison Co., to Pacific Coast Steel Co.

LOS ANGELES, 3200 tons plates, 10 80,000-bbl. tanks for Shell Oil Co., to Lacy Mfg. Co.

SEATTLE, 600 tons plates, 10 locomotive

Purdue Conference on Welding, Dec. 12 to 14

Purdue University's fourth annual conference on welding will be held at Lafayette, Ind., Dec. 12-14, under the direction of the engineering extension department and the department of practical mechanics, with the school of chemical engineering and the manufacturers of welding equipment cooperating. The conference will be devoted to the applications of electric, oxy-acetylene and thermit welding to manufacturing and repair operations, and provisions will be made for exhibits and demonstrations. Programs will be ready for distribution about Dec. 1, and may be obtained from the engineering extension department, Purdue University, Lafayette, Ind. W. A. Knapp is the professor in charge.

PERSONAL

S. P. KINNEY, metallurgist of the Bureau of Mines, has resigned to become associated with H. A. Brassert & Co., consulting engineers, Chicago. He was graduated in chemical engineering from the University of Utah in 1915, and the following year was engaged in the operation of mining



S. P. KINNEY

properties in Utah and Nevada. In 1917 he entered the army and was assigned to the Chemical Warfare Division and later commissioned second lieutenant. He worked in the laboratories of the War Department throughout the war and in 1919 became associated with the Bureau of Mines. He has been a leading participant in the investigations of the Bureau with regard to the iron blast furnace. In 1926 Mr. Kinney received the J. E. Johnson, Jr., Award for blast furnace research from the American Institute of Mining and Metallurgical Engineers.

R. J. HEISSERMAN, manager engineering and sales for the foundry equipment department, Link-Belt Co., Philadelphia, will address the monthly meeting of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, Monday evening, Nov. 19. His subject will be "Modern Conveyor Methods in the Foundry."

DR. W. H. HATFIELD, director of the Brown-Firth Research Laboratories, Sheffield, England, was a guest of the Boston chapter of the American Society for Steel Treating at the Massachusetts Institute of Technology on Nov. 9. He gave an address on cast iron, placing special stress on recent developments of rust and acid resisting metals.

WALTER J. KOHLER, president Kohler Co., Kohler, Wis., manufacturer of bathtubs, farm lighting plants, etc., was elected governor of Wisconsin on Nov. 6 by plurality of approximately 150,000.

FREDERICK S. BLACKALL, JR., has been appointed general manager of the Taft-Peirce Mfg. Co., Woonsocket, R. I., succeeding his father, the late FREDERICK S. BLACKALL. The younger Mr. Blackall is also assistant secretary and a director of the company. He is a graduate of Yale University and the Massachusetts Institute of Technology and has been active in the management of the company's affairs for the past six years. He is a member of the American Gage Design Committee and of the American Society for Steel Treating.

FRANK M. SMITH, formerly superintendent constructor of aircraft for the United States Navy, is second vice-president and general factory manager for the Moth Aircraft Corporation, Graybar Building, New York, which is soon to begin the manufacture of de Havilland Gypsy Moth airplanes in its plant at Lowell, Mass. J. E. Morrow, formerly vice-president in charge of production for the Willis-Morrow Co., Elmira, N. Y., manufacturer of airplane motors, is production manager for the Moth company. Minton M. Warren, for many years associated with Curtis & Sanger, Boston and New York, is president of the company, and Earl L. House, who introduced the Moth plant to America, is vice-president.

LEONARD J. BUCK has established an office at 74 Trinity Place, New York, to act as agent in the United States for foreign supplies of ores and other raw materials for the iron and steel industry. Among the companies he will represent are Manganexport G. M. B. H., Georgian manganese ores; Skelleftea Gruvaktiebolaget, arsenic and gold ores; Luossavaara-Kiirunavaara Akt., Swedish iron ore, and the Broken Hill Proprietary Co., Ltd., Australian manganiferous iron ores.

C. H. MACDONALD, who has been manager of the market research department, Colorado Fuel & Iron Co., Denver, Colo., has been appointed director of sales of that company. In his new capacity Mr. Macdonald will have general charge of the sales department as well as the market research department and will report to the executive vice-president.

F. H. LOOMIS, who was general manager of sales Trumbull Steel Co., at the time of its acquisition by Republic Iron & Steel Co., and since has been head of the strip steel division, has been appointed assistant general manager of sales, succeeding A. E. WALKER, now general manager of sales of the company.

W. S. LIPPINCOTT, of the Bethlehem Steel Co., Philadelphia, was presented with a silver trophy for the Philadel-

phia Steel Club golf championship this season, at a regular meeting of the club, Nov. 12.

JAMES R. STUART has resigned as superintendent open-hearth department, Colorado Fuel & Iron Co., Pueblo, Colo. The resignation is effective Nov. 15, after which Mr. Stuart will be located at 1701 Lake Avenue, Pueblo.

J. A. HART, purchasing agent Baldwin Locomotive Works, Eddystone, Pa., has been appointed general purchasing agent, succeeding W. A. RUSSELL, vice-president in charge of purchasing.

A. S. HAWKS, formerly chief engineer of the Busch-Sulzer Diesel Engine Co., St. Louis, has been made assistant works manager at the Buffalo plant of the Worthington Pump & Machinery Corporation. Prior to his St. Louis connection he was in the gas engine departments of the Bethlehem Steel Co. and the Allis-Chalmers Mfg. Co.

ISHAM KEITH, who has been with the Niles-Bement-Pond Co. in its New York sales department, has been appointed sales agent in the Syracuse, N. Y., territory.

DR. WOLFGANG KRÜGER, foreign secretary of the Vereinigung der Deutschen Arbeitgeberverbände, with headquarters at 2 Burggrafenstr., Berlin W., Germany, is now in the United States studying the economic position of the major industries of this country, including the labor situation. His organization is the confederation of German employers' organizations. He sails for Germany on Nov. 22 on the Dresden but, meanwhile, may be reached in care of the Industrial Relations Counselors, Inc., 165 Broadway, New York.

G. H. HEDRICK, who has been in charge of the Chicago office of the Thomas Spacing Machine Co., has been elected vice-president and transferred to the main office at Pittsburgh, and E. C. Thomas, who has been in the Pittsburgh sales office, has been transferred to Chicago to succeed Mr. Hedrick.

C. W. MARWEDEL, 76 First Street, San Francisco, has been appointed agent in that district for William Jessop & Sons, Ltd., Sheffield, England, steel manufacturer and exporter.

J. G. GROSS, for the last 12 years in charge of steel pipe sales for J. K. Larkin & Co., Inc., 253 Broadway, New York, has been elected secretary of that company.

FRANK J. WACHTER, for a number of years in the sales department of Landers, Frary & Clark, New Britain, Conn., has been made sales manager of the Union Mfg. Co., New Britain.

SAMUEL M. PHILLIPS has resigned as general manager of the Stewart Furnace Co., Sharon, Pa., to become vice-president in charge of operations for the Valley Mould & Iron Corporation, Hubbard, Ohio.

STRICKLAND KNEASS, JR., general manager and chief engineer Costello Engineering Co., Pittsburgh, on Nov. 15 becomes chief engineer of the A. M. Byers Co., Pittsburgh. He was graduated from Rensselaer Polytechnic Institute, Troy, N. Y., in 1911, and after a year in the steam engineering department at the Duquesne Works, Carnegie Steel Co., he became steam engineer for the Youngstown Sheet & Tube Co., Youngstown. He went with

the Costello company in 1925. In his new connection he will be in charge of the construction of the Byers new process iron plant at Harmony, Pa. His successor with the Costello company is W. N. McCUTCHEON, who has been with the Linde Air Products Co.

MARCEL PAUL, chairman of the board and managing director Societe Anonyme des Hauts-Fourneaux et Fonderies de Pont-a-Mousson, Nancy, France, one of the large European makers of cast iron pipe, arrived in New York, Nov. 13, on the Ile de France. He is accompanied by E. ROY, chief technical adviser of the Pont-a-Mousson associated companies.

OBITUARY

LOUIS W. WILLIARD, for the past six years in the structural steel sales department of the Carnegie Steel Co., Pittsburgh, died in that city on Nov. 6, aged 38 years. Previously Mr. Williard was in the Washington office of the Carnegie company. A brother, A. R. Williard, is assistant manager of the Cleveland office of the Carnegie Steel Co.

JAMES B. PIERCE, one of the pioneer blast furnace men in the Shenango Valley, and who, during his connection with the production of pig iron, participated in the transition from furnaces built of stone to those of steel, died recently at his home at Sharpsville, Pa. Mr. Pierce's father started the iron industry in the Shenango Valley and his sons followed him in the business. James B. Pierce was born at Mount Hickory, near Sharpsville, Sept. 2, 1856. He attended Buchtel College, Akron, Ohio, from which he was graduated in 1873 with degree of bachelor of science. He then entered Stevens Institute of Technology, Hoboken, N. J., receiving the M. E. degree in 1877. Upon his return to Sharpsville he operated the Mount Hickory furnaces for several years. Later the old stone stack of the Sharpsville Furnace Co. was rebuilt and he operated it until 1906 when it was sold to Alec Thompson and his associates. He was a member of the Bessemer Pig Iron Association, a group of independent furnaces in the Shenango and Mahoning Valleys. He had been a member of the American Institute of Mining and Metallurgical Engineers since 1886.

THOMAS A. DEVILBISS, president Devilbiss Co., Toledo, Ohio, died November 9, age 50 years. He had been in poor health for the past two years. He was well known as a manufacturer of spray painting equipment.

LAWRENCE A. BARRETT, mechanical engineer for the Oilgear Co., Milwaukee, died Oct. 31. He was a graduate of Marquette University, Milwaukee, and had taken out a number of patents relating to the application of oilgear transmission to machine tools.

RICHARD C. DRINKER, for 14 years consulting metallurgist of the Bethlehem Steel Co., and chief metallurgist for the Emergency Fleet Corporation during the World War, died Nov. 6, at his home in Quincy, Mass.

FREDERICK KENT COPELAND, president Sullivan Machinery Co., Chicago, since its organization in 1905, died suddenly on Nov. 10 in the Claremont, N. H., General Hospital, following an operation for appendicitis. He was born at Lexington, Mass., in 1855, and was graduated in civil engineering from the Massachusetts Institute of Technology in 1876. After leaving college he spent two years in the operating department of the Chicago, Burlington & Quincy Railroad and later was engaged in mining engineering work in the West. In 1884 he organized the Diamond Prospecting Co. which was later merged with the Sullivan company. He was president of the National Metal Trades Association in 1908 and 1909 and was also a member of the American Society of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the Western Society of Engineers. A son, FREDERICK W. COPELAND, is at present a vice-president of the Sullivan company.

JOHN B. MURPHY, vice-president Kohler Co., Kohler, Wis., manufacturer of plumbing supplies, died Nov. 12. Mr. Murphy was born 74 years ago at Avoca, Wis., and was for 20 years associated with the Kohler Co.

Railroad Equipment

Freight Cars Ordered Total 6800

PLACING of orders for more than 6800 freight cars, principally by two Canadian roads, was the feature of this market in the past week. Outstanding orders were 4680 by the Canadian National, 1125 by the Canadian Pacific and 1000 by the American Refrigerator Transit Co., subsidiary of the Missouri Pacific. Several Western and Southern roads are inquiring for a total of 67 locomotives, and freight car inquiries include 200 gondolas for the Great Northern, 300 tank for the Chicago, Rock Island & Pacific and 250 automobile, 50 flat and 50 tank cars for the Western Pacific. Details of the week's business follow:

Canadian National has ordered 1000 automobile cars from Pressed Steel Car Co. and has distributed 3680 freight and 65 passenger cars as follows among Canadian builders: 1600 box, 30 tank, 30 sleeping and 10 buffet parlor cars with Canadian Car & Foundry Co.; 750 box and 300 flat cars and 25 first class coaches with National Steel Car Co., Ltd., and 500 refrigerator and 500 ballast cars with Eastern Car Co.

Canadian Pacific has placed orders for 1125 freight cars and 59 passenger car frames among following Canadian builders: 250 freight refrigerator cars and 15 dining car and 15 first class passenger coach frames with National Steel Car Co., Ltd.; 275 ballast cars and 29 sleeping car frames with Canadian Car & Foundry Co., and 300 flat and 300 coal cars with Eastern Car Co.

Denver & Rio Grande Western has ordered 10 2-8-4 type locomotives from Baldwin Locomotive Works. This road is also inquiring for two baggage and mail and three observation cars.

Pacific Fruit Express is in market for 600 underframes for refrigerator cars.

Great Northern expects to purchase six 4-8-4 type locomotives. This road is also inquiring for 200 50-ton steel gondola cars, but has reduced its inquiry for ore cars from 1000 to 300.

St. Louis-San Francisco is inquiring for 12 2-8-4 type locomotives.

Chicago, Burlington & Quincy is inquiring for six 2-10-4 type locomotives.

American Refrigerator Transit Co. has ordered 1000 refrigerator cars from Pressed Steel Car Co.

Atchison, Topeka & Santa Fe is in market for 50 special type sleeping cars.

Chicago, South Shore & South Bend has ordered 10 steel passenger cars from Standard Steel Car Co.

Buffalo, Rochester & Pittsburgh has ordered repairs to 500 steel hopper cars, divided equally between American Car & Foundry Co. and Pressed Steel Car Co.

Chicago, Rock Island & Pacific is in market for 300 tank cars.

Western Pacific is asking for prices on 250 automobile, 50 tank and 50 flat cars. This road also expects to purchase 10 2-10-4 type locomotives.

Kentucky & Indiana Terminal will buy nine eight-wheel switching locomotives.

Louisville & Nashville will soon come into market for 24 2-8-4 type locomotives.

German Lockout Aids British Trade

Continental Buyers Seek British Material—Belgian Exports to Far East Improve—German Exports Increasing

(By Cable)

LONDON, ENGLAND, Nov. 12.

CLEVELAND pig iron is still quiet in the domestic market, but export inquiry is improving as a result of the German lockout. Current output is being absorbed by local steel works, so that increased production is expected if demand is stimulated.

The hematite market is moderately active and furnaces are asking 1s. (24c.) per ton advance for early 1929 delivery. One furnace has been blown in at Normandy and two will go into blast at Ayresome about the end of the year. Foreign ore continues quiet.

Finished iron and steel business is dull in heavy material, but makers are expecting increased Continental demand if the German lockout is prolonged. Semi-finished material and small sizes of finished products are fairly active.

Tin plate is quiet and some works have closed their mills because of scarcity of prompt shipment specifications. Most plants are well sold for delivery early next year.

Galvanized sheets are moderately active with a fair volume of small lot buying, but substantial demand is lacking. Many mills are well placed for the rest of this year, but others are in need of specifications for prompt shipment. Black sheets are quiet.

October exports of pig iron were

36,000 tons, of which the United States took 7300 tons. The total iron and steel exports for October were 377,000 tons.

Continental mills are in a strong position, because of the German situa-

tion, and sellers are generally reluctant to enter into commitments at present prices. British users are acting cautiously, with active export demand reported coming direct from Continental traders.

British Hematite Furnaces Active, but Steel Trade Is Quiet

LONDON, ENGLAND, Oct. 28.—Conditions in the iron and steel trade continue dull, and with winter approaching the outlook is rather unfavorable. At the end of September only 131 furnaces were in blast throughout the country, and employment statistics compiled by the *Labour Gazette* reveal the poor state of business. In the pig iron industry at the end of September the percentage of unemployed was 18.4, a decrease from August of 0.5 per cent, but an increase compared with a year ago of 3.2 per cent. In iron and steel mills, the percentage of unemployed was 20.9, a decrease from August of 2.3 per cent, but an increase compared with a year ago of 3.3 per cent. These recent decreases in unemployment are attributed almost entirely to the reduction in foreign competition caused by the rise in Continental selling prices. This is most marked in semi-finished material, for which demand

has been strong from bar, structural and sheet mills.

Pig iron continues quiet, but Cleveland producers are maintaining prices, as output has been considerably restricted. Most sales are to local associated steel works, and export demand continues negligible. Hematite iron shows some improvement. The large stocks have been almost entirely absorbed. Both domestic and Continental users have taken fair tonnages, so that more furnaces may go into blast on the Northeast coast, but probably not until after the Christmas holidays.

In finished material, the building trade and engineering plants still aid in maintaining fair operation of mills, but the mills rolling heavy plates and shapes for the shipbuilding trade, continue depressed.

According to *Lloyd's Register*, the tonnage of vessels under construction in the United Kingdom and Ireland

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.31	
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35	to \$5.48
Cleveland No. 1 foundry..	3 8½	to 3 9½	16.64	to 16.89
Cleveland No. 3 foundry..	3 6		16.04	
Cleveland No. 4 foundry..	3 5		15.80	
Cleveland No. 4 forge....	3 4½		15.68	
Cleveland basic (nom.)...	3 5		15.80	
East Coast mixed.....	3 10	to 3 11	17.01	to 17.25
East Coast hematite.....	3 10½	to 3 11½	17.13	to 17.37
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to 40.10
Billets	6 5	to 6 10	30.37	to 31.59
Ferromanganese	13 15		66.83	
Ferromanganese (export)	14 0		68.04	
Sheet and tin plate bars,				
Welsh	6 0		29.16	
Tin plate, base box.....	0 18	to 0 18½	4.37	to 4.40
Black sheets, Japanese				
specifications	13 7½		65.00	
C. per Lb.				
Ship plates.....	7 12½	to 8 2½	1.63	to 1.74
Boiler plates.....	9 0	to 10 10	1.92	to 2.25
Tees	8 2½	to 8 12½	1.74	to 1.84
Channels	7 7½	to 7 17½	1.58	to 1.69
Beams	7 2½	to 7 12½	1.53	to 1.63
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62	to 1.69
Steel hoops	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage....	10 0		2.14	
Galv. sheets, 24 gage....	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage, nom.	16 0		3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.	to £3 5s.	\$15.31	to \$15.80
France	3 3	to 3 5	15.31	to 15.80
Luxemburg	3 3	to 3 5	15.31	to 15.80
Basic pig iron (a):				
Belgium	3 3		15.31	
France	3 3		15.31	
Luxemburg	3 3		15.31	
Coke	0 18		4.37	
Billets:				
Belgium	5 3		25.03	
France	5 3		25.03	
Merchant bars:				
Belgium	6 6		1.39	
France	6 6		1.39	
Luxemburg	6 6		1.39	
Joists (beams):				
Belgium	5 5		1.16	
France	5 5		1.16	
Luxemburg	5 5		1.16	
Angles:				
Belgium	6 2½		1.35	
½-in. plate:				
Belgium (a).....	6 14		1.48	
Germany (a).....	6 14		1.48	
⅜-in. ship plate:				
Belgium	6 9		1.42	
Luxemburg	6 9		1.42	
Sheets, heavy:				
Belgium	6 1		1.33	
Germany	6 1		1.33	

(a) Nominal.

at the end of September was 1,089,760 tons, a reduction from the previous quarter of 112,850 tons, and from September, 1927, of 446,656 tons. Tonnage under construction abroad is 1,431,582 tons, a decrease from the end of the second quarter of 26,270 tons. The total world tonnage is, therefore, 2,521,342 tons, of which

43.2 per cent is being constructed in this country and Ireland.

Tin plate makers, while assured of plenty of work during the early months of next year, need specifications for the next two months, and have found it necessary to restrict output further for the next three months.

Belgian Export Trade Improves

Good Buying by China, India and South America—Prices Are Firm and Deliveries Extended

ANTWERP, BELGIUM, Oct. 26.—Demand is active both in the domestic and export markets, and prices are quite stable. Export trade has shown considerable improvement, with large orders booked for shipment to South America, China and India and some small business entered for delivery in the United States. Mills appear satisfied that the present level of export prices is not too high to permit some good business, as world requirements of steel are still large.

Deliveries are becoming more extended. Mills are quoting January and February shipment on certain products, with March the earliest delivery on small sizes of steel bars. French competition is not regarded as serious at present, and the lockout in Germany is expected to bring some good tonnage to Belgian mills.

Pig Iron.—Most furnaces have a good backlog of business and demand has begun to increase. Phosphoric foundry iron for export is quoted at about £3 5s. (\$15.84) per ton, f.o.b. Antwerp, with no concessions reported. Costs of production continue high, with scrap still scarce and blast furnace material bringing 105 Belgas (\$15.08) per ton. In the domestic market some concessions on foundry iron have been made to meet the competition of British and Dutch iron.

Semi-Finished Material.—Improve-

ment in demand for finished products has reduced available supplies of billets, blooms and sheet bars, so that prices are quite firm. Billets range from £4 18s. (\$23.81) per ton for 3-in. to £5 2s. (\$24.79) per ton for 2-in. Blooms are quoted at £4 8s. (\$21.38) per ton for 8-in. and larger, £4 10s. (\$21.87) per ton for 6-in., and 4-in. blooms are not available. Sheet bars are firm, following heavy buying by domestic sheet mills, and prices range from £5 1s. to £5 1s. 6d. (\$24.54 to \$24.66) per ton, f.o.b. Antwerp.

Finished Material.—Prices are firm and the market appears to be stabilizing at the present level, despite efforts of consumers to obtain concessions. The minimum quotation on steel bars is £6 2s. per ton (1.35c. per lb.), f.o.b. Antwerp, and small lots bring as much as £6 4s. per ton (1.37c. per lb.). Certain small sizes cannot be delivered by mills before March, and January-February is the usual delivery offered on other sizes. Beams are firmer at £5 2s. 6d. per ton (1.13c. per lb.), and medium-sized angles are quoted at £5 17s. 6d. per ton (1.30c. per lb.). Corrugated steel bars are quoted at £6 6s. 6d. per ton (1.39c. per lb.), and hot-rolled hoops are firm at £6 5s. per ton (1.38c. per lb.). Heavy-gage sheets are in good demand, but the light gages are encountering British competition.

cranes, hoists and equipment for blast furnace plants, steel works and rolling mills. Manufacturers of scales, pumps and compressors reported a favorable tendency. For the most part the activity of manufacturers of crushing machinery was unsatisfactory.

"The slowing up of business, which has been noticeable for some time in Germany," the report said, "has fortunately not yet given any signs of leading to a real crisis, and industry in general has been making every effort to prevent such an occurrence. German manufacturers are being warned against increased production costs. When one compares the German Statistical Office's index of machinery prices with the cost figures of the association of German Machinery Manufacturers, it is noted that the increase in machinery prices since the beginning of this year has been only about 54 per cent of the increase in production costs. From this it can be seen that the relation of production costs to profits has become steadily worse since the first of the year. This situation is a source of concern to the German machinery industry, especially in view of the keen competition experienced from foreign manufacturers."

Reparations Deliveries in German Exports

HAMBURG, GERMANY, Oct. 29.—Heavy deliveries of material on reparations account are a feature of German export trade that does not appear in the monthly statistics showing the trade balance. Since 1925, deliveries of steel for reparations have about trebled and, with a total of 12,800,000 m. (\$3,076,400) shipped in September, reparations deliveries were 105 per cent greater than in the same month of 1927.

Japan has been a heavy buyer of steel from Germany against reparations account, taking sheets, machinery, structural material and hardware. It is receiving about 1,200,000 m. (\$285,600) per month in steel products on reparations, which would otherwise be purchased in the open market.

German Machinery Makers Not Prospering

Costs of Production Advancing Twice as Fast as Prices—Keen Competition from Abroad

WASHINGTON, Nov. 9.—Further decline in domestic German machinery business is evident from figures for September issued by the German Machinery Manufacturers' Association (Verein Deutscher Maschinenbau-Anstalten), says a report received by the industrial machinery division, Department of Commerce. The number of firms reporting an unsatisfactory number of inquiries increased by about 15 per cent as compared with August. Domestic orders also decreased, though to a smaller degree. Export business was not maintained at the August level, a much smaller number of foreign inquiries and orders being reported. Plant activity,

measured by the number of working hours, remained at 75 per cent of normal.

The number of inquiries received by the material-working machinery manufacturers was reported satisfactory with regard to both domestic and foreign markets. Business in the textile machinery industry remained quiet, although a seasonal upward trend had been expected. Seasonal influences, coupled with an exceptionally good harvest, favored the domestic market for power-generating machinery, but export business in this line did not develop so favorably. Unfavorable business was reported by firms specializing in construction of

German Aluminum Price May Be Further Reduced

HAMBURG, GERMANY, Oct. 29.—It is believed certain that the aluminum cartel will shortly reduce the price of aluminum by £5 6s. per ton (1.16c. per lb.), from the present level of £95 per ton (20.94c. per lb.). Members of the cartel are understood to consider recent increases in the price of copper as offering an opportunity for them to expand the market for aluminum. Since 1927, German consumption of aluminum alloys serving as copper substitutes, such as silumin, lautal and alumin, has been increased about 350 per cent.

German Export Trade Good

Prices Show Tendency to Decline—Mills Will Seek Larger Quota in Reorganized International Cartel

BERLIN, GERMANY, Oct. 28.—Export prices of steel, reflecting the weakness in Belgium, have declined 2 to 4 m. (48c. to 95c.) per ton since September, but are still at a higher level than a year ago. While the high tide of export activity, which set in near the end of 1927, seems to have been passed, recovery is expected next year, with crops generally satisfactory and a good outlook for building construction in the spring. In the third quarter of this year, German mills exported 922,753 metric tons, only slightly exceeding their export quota of 900,000 tons fixed by the International Steel Cartel.

On the eve of the lockout in the steel industry, affecting about 200,000, the domestic market has been but little affected. Demand for semi-finished material is rather limited, and the market on bars and bands is weaker, with deliveries reduced to about two weeks. Sales of tubes and sheets have also declined, and production schedules of wire rod makers are smaller. However, a good volume of export business has been booked by German mills in the past three months. Foreign sales of wire and wire products have developed to satisfactory proportions, but the capacity of German works is about double the pre-war output.

The International Wire Rod Cartel

will be prolonged until the end of 1929, and the West European Pig Iron Association has been renewed until Jan. 31, 1929, to permit reorganization. Negotiations are to be begun early in 1929 with the object of prolonging, or reorganizing, the International Steel Cartel, following the termination of the existing agreement at the beginning of the second quarter. It is claimed that German mills require better terms in the new, or reorganized, steel cartel, especially in the export quota, to offset a declining domestic market.

The agency for selling Georgian manganese ore has been awarded to the Rawack und Grünfeld A. G., Berlin, by the Mangan Export G. m. b. H., which was established by the Russian Government to direct the sale of Georgian and Nikopol manganese ore and Krivoi Rog iron ore. This agreement comes as a result of liquidation of the Harriman concession and is not unexpected, as the Rawack und Grünfeld A. G. has been the European selling agent for Nikopol manganese ore and Krivoi Rog iron ore since 1924. The new agency covers selling rights in a number of important European consuming countries, but does not include the United States. Operation of the Georgian mines has been taken over by the Russian Government.

last fiscal year than in the year before, amounting to \$102,000,000. And a once minor item, that of machine-made office specialties, such as typewriters, adding machines, cash registers and the like, gained 20 per cent in value of export trade during the fiscal year and established a sales total of over \$44,000,000, making a place for the first time as one of our 20 leading exports.

Electrical machinery and apparatus of all kinds represents another substantial advance in our sales abroad during recent months. Electrical manufacturers sold abroad \$87,000,000 worth of their products during the past fiscal year, an increase of 5 per cent over the year preceding.

Even the item of manufactured cotton, whose position in our export trade has been subjected to intense foreign competition recently, made a substantial advance during the past fiscal year. Its growth of \$12,000,000 was 9 per cent over the preceding year, its sales amounting to over \$135,000,000.

More than one-half of all our exports, or about 54.5 per cent, during the calendar year 1927, were bought by the purchasers of Canada, the United Kingdom, Germany, Japan and France, which are generally classed as our five principal competitors. During the same period these nations also supplied us with 38.4 per cent of our imports.

Our imports for the fiscal year just past were \$627,000,000 less than our exports, or \$4,146,000,000. They show a reduction of about \$319,000,000 from the preceding fiscal year, chiefly owing to price recessions on important raw products such as rubber, tin and silk.

Our imports of manufactured goods have increased by \$680,000,000 during the past six years, while the increase in our exports of manufactures is almost 50 per cent greater than that amount, of \$985,000,000.

Exports This Year in Record Volume

Manufactured Goods, at Nearly Three-Quarters of Total, Highest Proportion Ever Attained

AMERICAN export trade, on the basis of the first nine months' figures for this year, is larger in volume than in any previous year and larger in value than in any year since 1921, says the National Foreign Trade Council in a report on 1928 foreign trade.

Of the \$3,563,000,000 worth of exports reported up to the end of September about 73 per cent, the highest proportion on record, the council points out, represents goods wholly or partly manufactured. About one-fifth of these manufactured goods go to Latin America, where we are now selling more than our three leading competitors—England, France and Germany—combined, and where we are now the leading supplier to every one of the 20 republics south of the Rio Grande.

American manufactured exports, valued at more than \$2,600,000,000, which have been sold abroad during the first nine months of this year, exceed by more than \$50,000,000 our entire exports for the year 1913 of raw

and manufactured goods combined, and exceed the exports of all commodities from any other nation except Great Britain for the whole of 1927.

They represent a substantial gain over recent years for many important American industries. The automotive industry notably has increased its sales abroad, and now contributes 14 per cent, the largest proportion of American export trade in manufactures it has ever had. During the fiscal year just closed \$425,000,000 worth of automotive manufactures of all kinds were exported, or 16 per cent greater than for the preceding year.

Other notable increases in this field of export for the fiscal year include a 10 per cent increase in industrial machinery. The chief items are mining, oil, construction and metal-working machinery, engines and locomotives. They comprised about 6 per cent of our manufactured exports and amounted in value during the past fiscal year to \$210,000,000.

We also sold abroad 25 per cent more agricultural machinery in the

German Steel Activity Drops in September

WASHINGTON, Nov. 10.—Both exports and imports in the German iron and steel trade showed declines in September when compared with August, according to a radiogram received by the Iron and Steel Division, Department of Commerce, from Trade Commissioner James E. Wallis, Jr., Berlin. Production also showed a loss. Exports dropped to 407,563 metric tons from 433,707 tons, while imports decreased to 156,596 tons, as compared with 177,526 tons.

Pig iron output declined to 985,413 tons as against 1,030,837 tons, and open-hearth production fell to 1,189,521 from 1,329,345 tons. The September returns were somewhat surprising in view of the fact that Germany only recently succeeded in having its export quota raised from 275,000 to 300,000 tons a month.

German Bureau Increases Steel Use

New Manufactures Developed in Past Year—Relations Established with American Organizations

THE Steel Trade Extension Bureau of the Stahlwerksverband, Düsseldorf, Germany, established a little more than a year ago, has been quite successful, according to Kurt Orbanowski, director of the bureau, who is at present in New York. Mr. Orbanowski organized the bureau and has succeeded in introducing a number of new lines of manufacture in Germany, one of the most important of which was steel office furniture of the high quality that has been produced in the United States for a number of years. Among other steel products which his bureau has aided in popularizing in Germany are silos, metal roofing, kitchen and bedroom furniture, metal partitions, window frames and sheet metal tiles. At present he is studying the possibility of introducing into Germany steel containers for shipment in freight cars of less than carload lots of material. He is also gathering information on the use in the United States of steel frames in small and medium sized buildings.

Steel silos have apparently met with the approval of the German farmer and Mr. Orbanowski has been investigating their use in the United States. Germany has only about 2000

silos on the farms of the country and of these about 15 per cent are of steel, the greater part of concrete and tile and a few of wood construction. In the United States, he received an estimate from the Department of Commerce that there are 560,000 silos, of which only about 2.5 per cent are of steel construction, 25 per cent of concrete and the remainder of wood.

The steel silo, as used in Germany, is constructed of pressed steel sheets, usually copper bearing, or of "Armco" iron. The sheets are delivered to the farmer already bent with a flange turned to the inside, punched and ready to bolt together. No. 16 gage sheets are generally used on the lower part of the silo, No. 14 gage midway and No. 16 gage at the top.

The Steel Trade Extension Bureau in Germany has established contact with similar organizations in the United States, such as the American Institute of Steel Construction and the Sheet Trade Extension Committee of the Association of Flat Rolled Steel Manufacturers. Information on new uses of steel is exchanged and cooperation is expected to contribute to increased use of steel throughout the world.

Prices of Imported Steel Advance

German Lockout Results in Higher Quotations by European Mills—American Black Sheets for Japan Higher

NEW YORK, Nov. 13.—The lockout in the German heavy steel industry has been reflected in the export prices of French, Belgian and Luxemburg mills, which have been advanced in the past week from 2s. to 3s. (49c. to 73c.) per ton. Importers representing, or dealing with, German mills have received cabled advices that no offers can be made at present on bars and structural material. Sheet and strip mills, however, are still operating and selling for export, although, should the lockout be protracted, they will be forced to suspend because of a shortage of semi-finished material. Meanwhile, sellers in New York are not perturbed, as demand for structural material and bars is decidedly small and buying for spring delivery is not expected to develop for another month or more.

A decision is expected about the end of this month from the Customs Court of Appeals on the appeal of the Government against the decision of the United States Customs Court that reinforcing bars are dutiable as construction material at 20c. per 100 lb. instead of as bars at 30c. per 100 lb. No action is yet reported on the question of marking foreign steel with the country of origin, but importers believe that suit will be instituted

before long by an American steel company against several importers to test the present ruling of the Treasury Department that billets, blooms, plates, shapes and bars are not subject to marking.

Export steel business is small. Chinese merchants continue to inquire for wire shorts, but mills here show no interest in offering material, even at the present high prices quoted by Chinese buyers. Japanese merchants are small buyers of tin plate, on which the price is unchanged for export at \$5.15 to \$5.20 per base box, c.i.f. Japanese port. Light-gage black sheets have been advanced about \$1 a ton by American mills, which are quoting about \$77 per ton, c.i.f. Japan, although the British price and the market in Japan, as established by the Kawasaki Dockyard Co., the local maker, is about \$72.50 per ton.

Exports of iron and steel from the United States to Japan have been unusually small recently. Outstanding purchases of steel have been in scrap and tin plate. In September, a total of 11,279 gross tons of steel scrap and 6888 gross tons of tin andterne plate went to Japan. Black sheet exports totaled only 2137 gross tons. Even this small tonnage of black sheets is accounted for at pres-

ent high prices of the American product by the fact that certain Japanese galvanizing plants have established brands of galvanized sheets, for which they are known to use certain American makes of black sheets. An interesting item in the September exports to Japan is 7246 gross tons of pig iron. As Japanese consumers receive their pig iron requirements from domestic sources or from China or India and seldom buy in the United States, this is believed by Japanese traders to be a distress tonnage of iron.

Germany to Build Russian Cement Plant

HAMBURG, GERMANY, Oct. 29.—A contract for a cement plant with an annual capacity of 400,000 tons, to be built near Novorosiska in the Ukraine, has been awarded by the Russian Government to the Friedrich Krupp A. G. The Hanomagworks at Hanover, Germany, has booked an order for 12 locomotives for the Bengal & Northwestern Railways, and the Skoda Works in Czechoslovakia has received a contract for 120 heavy tank cars from the Burma Railways in India.

Although Russian steel production is gradually increasing to the pre-war level, a large percentage of the present output is reported to be off-grade and suitable only for scrap. Officials at the Dzershinski works at Dnepropetrowsk report that as much as 20 per cent of the total steel output is scrapped following inspection at the plant.

French Shipyards and Locomotive Shops Busy

PARIS, FRANCE, Oct. 22.—Domestic business continues large. Shipyards are obtaining desirable contracts as a result of the availability of credits for ship construction. Competition from Dutch and British shipbuilders is keen. Builders of railroad rolling stock are well occupied with contracts. The Algerian State Railroads have recently placed 10 locomotives with the Creusot Works, 10 with the Ateliers de Construction du Nord de la France, 15 with the Société Lorraine at Lunéville and a number of passenger coaches with the Compagnie Française de Material des Chemins de Fer.

British consumption of copper, tin and zinc during the first six months of 1928 increased over that for 1927, but the total increase for the three metals was almost balanced by a decline in the consumption of lead, according to the Department of Commerce. The London Metal Exchange reports that during this period the apparent consumption of copper increased 5 per cent, tin 6 per cent and zinc 3 per cent, while the use of lead declined 8 per cent.

Sheet-Metal Ware Shipments Continue Large

Shipments of enameled sheet-metal ware in September are reported by the Department of Commerce at 352,484 dozens valued at \$1,372,242. This compares with 358,811 dozens in August valued at \$1,354,316 and with 310,823 dozens in September, 1927, valued at \$1,285,854. September shipments of galvanized sheet-metal ware were 189,789 dozens valued at \$742,188. This compares with 186,864 dozens in August valued at \$746,580 and with 172,382 dozens in September, 1927, valued at \$695,077.

Shipments of enameled sheet-metal ware in nine months have reached 3,123,160 dozens valued at \$11,776,715. This shows an increase of 4 per cent in number and over 9 per cent in value compared with the first nine months of 1927. Both white ware and gray ware showed decreases from last year in both quantity and value. The gain was wholly in colored ware, which advanced in nine months from 168,767 dozens valued at \$696,075 to 556,474 dozens valued at \$2,757,256. The nine-month totals in colored goods this year are more than double the 12 months of last year.

Galvanized sheet-metal ware shipments in nine months have amounted to 1,774,297 dozens valued at \$6,827,933, a moderate gain from last year's 1,690,734 dozens valued at \$6,374,034.

Larger Shipments of Electric Trucks and Tractors

October shipments of electric industrial trucks and tractors are reported by the Department of Commerce at 134, compared with 118 in September and with 109 a year ago. The October total comes within two units of equaling the highest record of more than a year—that of last April. Exports amounted to 20 units, which is the largest total since June of last year. Of the domestic shipments, five units were tractors and 109 other types. The number of tractors has not been lower in 14 months and only once in two years.

October Lake Ore Shipments Increased

Iron ore shipments from the Lake Superior region in October were 8,453,952 tons. This compares with 6,722,757 tons in October, 1927, the increase this year being 1,731,195 tons or 25.76 per cent. For the season the

shipments to Nov. 1, this year, have been 49,719,931 tons, an increase of 613,217 tons or 1.25 per cent for this year. The table gives the shipments for October and for the season in 1928 and 1927 in tons.

Highest October Building Construction on Record

Building construction in the 37 States east of the Rocky Mountains in October is reported by F. W. Dodge Corporation at \$597,104,000. This is about 3 per cent ahead of September and is 6 per cent ahead of October last year. It represents the largest total for any October, and covers about 91 per cent of the country's total construction. The month's figure brought the aggregate for 10 months to \$5,724,048,000, a gain of 7 per cent over \$5,359,298,000 for the corresponding period last year.

October building construction included \$239,692,000 for residential buildings, this being 40 per cent of all, in line with many months past. Public works and utilities absorbed \$148,697,000, commercial buildings \$67,330,000 and industrial projects \$62,259,000.

Both the district covering New York State and northern New Jersey and the Middle Atlantic States group showed the largest October construction volumes on record. New York and northern New Jersey account for \$187,782,000 of the total, while the Middle Atlantic States show \$77,785,000. These two together make up nearly half of all the construction reported.

Increase in Industrial Stocks of Coal

Stocks of anthracite and bituminous coal in the hands of industries in the United States and Canada on Oct. 1 are estimated by the National Association of Purchasing Agents at 40,778,000 net tons. This compares with 40,090,000 tons on Sept. 1 and represents the second gain in the figure in a year. The total on Oct. 1, 1927, 60,154,000 tons, was subjected to a continuous decrease until Aug. 1, when stocks aggregated 39,415,000 tons.

It is estimated that on Oct. 1 the steel mills had a 31-day supply, the railroads a 31-day supply, by-product coke plants, 22 days; electric utilities and coal gas plants, 52 days; and other industries, 36 days, making the average for the country 35 days.

Total coal production for October

is estimated by the Bureau of Mines of the Department of Commerce at 50,267,000 net tons for bituminous coal and 8,621,000 tons for anthracite. These figures represent increases of 22 per cent for bituminous coal and more than 42 per cent for anthracite, compared with September, and 15 per cent for bituminous coal and nearly 18 per cent for anthracite, compared with October, 1927.

Steel Corporation's Orders Increased in October

Unfilled orders of the United States Steel Corporation increased in October for the third month in succession. The total on Oct. 31 was 3,751,030 tons compared with 3,698,368 tons on Sept. 30, an increase of 52,662 tons. In September the increase was 74,325 tons and in August it was 53,116 tons. The decrease in July was 66,082 tons. A year ago, on Oct. 31, the unfilled orders were 409,990 tons less than this year. The table gives the reported figures for the last 22 months.

		1928	1927
Jan.	31	4,275,947	3,800,177
Feb.	28	4,398,189	3,597,119
Mar.	31	4,335,206	3,553,140
April	30	3,872,133	3,456,132
May	31	3,416,822	3,050,941
June	30	3,637,009	3,053,246
July	31	3,570,927	3,142,014
Aug.	31	3,624,043	3,196,037
Sept.	30	3,698,368	3,148,113
Oct.	31	3,751,030	3,341,040
Nov.	30		3,454,444
Dec.	31		3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Immigration Shows Further Decreases

WASHINGTON, Nov. 13—Immigrants to the number of 29,317 were admitted to the United States in September, according to the Bureau of Immigration. Of this total 14,300 were males. The total immigration during the first three months of the current fiscal year showed a decrease of 8210 or 9.9 per cent as compared with the corresponding period of last year. The decrease was largely confined to the Western Hemisphere, both Canadian and Mexican immigration dropping.

Luxemburg Output Close to 1927 Figures

Statistics covering the production of pig iron and raw steel in Luxemburg indicate the industry this year is maintaining the output level of last year, says a report received from Vice Consul James E. Parks, Luxemburg. The average monthly production of pig iron for nine months of the current year is 230,018 tons as against 226,926 tons monthly for all of 1927, while the output of steel is 213,130 tons so far this year and 204,870 tons in 1927.

MOVEMENT OF LAKE SUPERIOR ORE

Port	October, 1928	October, 1927	To Nov. 1	
			1928	1927
Escanaba	853,655	851,766	4,935,719	5,443,204
Marquette	533,377	549,744	3,101,732	3,049,106
Ashland	997,488	784,790	5,955,715	6,022,052
Superior	2,514,506	1,951,814	14,293,683	13,923,988
Duluth	2,624,179	1,836,463	16,093,816	15,130,486
Two Harbors	925,747	748,180	5,339,266	5,537,878
Total	8,453,952	6,722,757	49,719,931	49,106,714
Increase	1,731,195		613,217	

Machinery Markets and News of the Works

Business Volume Declines

Machine Tool Orders Not Quite Up to Those of October,
Though Still at a High Level

A SLIGHT shrinkage in the volume of machine tool orders is reported from several important centers, but business is holding to a fairly high level. The quantity of pending inquiry is large, and, with business men taking an optimistic view of the election result, no obstacle appears to stand in the way of a sustained demand during the remainder of the year, at least.

The machine tool trade entertains sanguine expectations of increasing demands from the aviation industry. The development of this industry is particularly promising in the East. The Wright Aeronautical Corporation, Paterson, N. J., is expected to buy another large list of tools for plant expansion not later than January, while the Curtiss Aeroplane & Motor Co., Buffalo, has recently been placing orders and has more shop equipment to buy. The Moth Aircraft Corporation and the Chamberlin Aeronautical Corporation have taken over

idle plants which will be converted to the manufacture of airplanes. Indications are that the aviation industry will have a large development in 1929.

The automobile industry and companies supplying parts to automobile makers continue to buy tools. Among their purchases in the past week was an order totaling \$50,000 for high production lathes, while two other companies each took five lathes and a piston ring manufacturer bought several.

Agricultural implement and tractor manufacturers have bought miscellaneous lots of tools. The railroads are taking a more active interest in new shop equipment.

The Industrial Rayon Co., which recently put out a machine tool list for its new plant at Covington, Ky., has bought three pipe machines for use in construction work.

An outstanding export inquiry is for 12 tools for a railroad in South America.

New York

NEW YORK, Nov. 13.—Developments in the manufacture of airplanes and airplane motors promise an expanding demand for machinery for this growing industry. Some sellers of machine tools in this district look to aviation as a source of considerable business during 1929. Two companies which have been through the development stage have taken plants for the manufacture of airplanes; the Chamberlin Aeronautical Corporation will occupy the former plant of the Clark Thread Co. in Jersey City, and the Moth Aircraft Corporation, Graybar Building, New York, has bought the former U. S. Cartridge Co. plant at Lowell, Mass. Both companies, it is expected, will be buyers of shop equipment. A further expansion of facilities by the Wright Aeronautical Corporation, Paterson,

N. J., is in prospect, and it is expected that a large list of tools will be bought not later than January. The Curtiss Aeroplane & Motor Co., Buffalo, has bought a number of tools and will probably add further to its equipment. Machine tool buying during the past week has held at a fairly high figure, although some sellers report that inquiries have fallen off. A good deal of buying is still in prospect, however, and the outlook continues promising.

Sales of Pratt & Whitney division, Niles-Bement-Pond Co., last week included 10 lathes, four die sinkers, a jig borer, profiling machine, bench hand miller, drilling machine and a vertical surface grinder. Niles company sold a 42-in. double rotary planer.

John Ullman has leased space in building at 313 East Twenty-second Street, for manufacture of wrought iron specialties.

Board of Education, 500 Park Avenue, New York, is said to be planning installation of manual training equipment in new Lincoln high school at Ocean Parkway and West Second Street, Brooklyn, to cost about \$2,500,000, for which bids have been asked on general contract. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Officials of Henry Klein & Co., 300 Broome Street, New York, manufacturers of display fixtures and equipment, have organized Henry Klein & Co., Inc., to take over and consolidate former company with Improved Office Partition Co., 11 East Thirty-seventh Street, with plant at Elmhurst, L. I., and Driwood Corporation, also with works at Elmhurst. New organization will expand production of display, office and store fixtures and equipment.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for a six-story automobile service, repair and garage building on East Eighty-fifth Street, 80 x 100 ft., to cost approximately \$100,000 with equipment.

Officials of H. F. Holbrook-Henry Brewster Corporation, 420 Lexington Avenue, New York, manufacturer of automobile bodies, have organized H. F. Holbrook Body Corporation, with capital of 500,000 shares of stock, no par value, to take over and expand present company.

Interborough News Co., 244 West Forty-second Street, New York, has asked bids on general contract for six-story automobile garage at 525 West Fifty-second Street, for company motor trucks and cars, to include machine and repair shop, paint shop and other departments, to cost \$180,000. Russell G. Cory, 30 Church Street, is architect and engineer.

Acoustic Products Co., 50 West Fifty-seventh Street, New York, operating Sonora Phonograph Co., Inc., manufacturer of talking machines, has plans for expansion, to include production of automatic resynchronizing sound equipment for talking motion pictures, parts, etc. Company has secured patent rights to World Bristolphone, held by William H. Bristol Talking Picture Corporation, Waterbury, Conn. A new company will be formed to carry out program, combining names of Bristolphone and Sonora organizations.

National Lead Co., 111 Broadway, New York, has plans for new one-story plant, 120 x 175 ft., Brooklyn, to cost about \$200,000 with equipment. William Higginson, 101 Park Avenue, New York, is architect and engineer.

American Gas Accumulator Co., Newark Avenue, Elizabeth, N. J., manufacturer of gas machinery, has awarded general contract to Wilhelms Construction Co., 119 Division Street, for one-story addition, 59 x 140 ft., including improvements in present factory, to cost about \$45,000. William L. Finne, 91 Broad Street, is architect.

Kroydon Co., Burnett Avenue, Maplewood, N. J., manufacturer of golf sticks,

The Crane Market

NEW business in overhead cranes has been small recently, but some substantial inquiries are in the market, such as the list of 5-ton gantry cranes for the Waterfront Service Co., Brooklyn, and a number of bucket handling cranes for the Brooklyn Garbage Removal Co., Brooklyn. A manufacturer in this district has closed on a 5-ton and 12-ton, 33-ft. 8¾-in. span electric cranes with the Niles Crane Corporation and the same maker has received award of a

25-ton, 42-ft. 7-in. span crane. Contractors and industrial users of locomotive cranes have but few outstanding inquiries at present, but the railroads are reported showing increased interest in buying. The New England railroads are understood to be preparing inquiries for steam shovels and ditchers and the Southern Railway has asked for prices on a special type crane to be mounted on a car for track laying. Missouri Pacific is inquiring for three gantry cranes.

Among recent purchases are:

New York Edison Co., New York, three 2-ton hand power cranes, from Manning, Maxwell & Moore, Inc.

New York Central Railroad, New York, 5-ton hand power crane for Harmon, N. Y., from unnamed seller.

Carnegie Steel Co., four 125-ton, with 40-ton auxiliary hoists, 50-ft. 4-in. span, 7-motor, 4-girder double trolley ladle cranes for Clairton works, from Alliance Machine Co.

irons, etc., has asked bids on general contract for one-story addition, to cost about \$30,000 with equipment. D. A. Hopper, 22 Ridgewood Avenue, Irvington, N. J., is architect.

Art Metal Works, Inc., 7 Mulberry Street, Newark, manufacturer of metal novelties, will soon begin work on one and two-story addition, to cost close to \$40,000 with equipment. Henry Baechlin, 665 Broad Street, is architect.

Liberty Auto Radiator Co., 3218 Hudson Boulevard, Jersey City, N. J., will soon award contract for two-story and basement plant unit, to cost about \$30,000 with equipment. Flagg & Stades, 665 Newark Avenue, are architects.

H. E. Salzberg & Co., Inc., 225 Broadway, New York, electrical machinery, has leased factory to be built at Clarke Avenue and Water Street, Jersey City, N. J., totaling about 17,000 sq. ft. floor space, for a machinery rebuilding and repair works.

Warren Engineering Corporation, 117 Liberty Street, New York, has been formed to act as marine agent in United States, exclusive of Pacific Coast and Great Lakes districts, for Warren Steam Pump Co., Inc., Warren, Mass. Through associated organization, L. Katzenstein & Co., company is operating machine repair shop and also manufactures specialties, such as metallic packings for stuffing boxes and slip joints, and handles sale of various types of vibration and speed indicating instruments.

Electric Air Tool Corporation, National Bank Building, Forty-second Street and Madison Avenue, New York, has been organized to manufacture electric air hammers. Tools will be manufactured under contract by Peco Mfg. Co., Philadelphia, and sales will be handled by Gifford Brown Sales Co., 1 Broadway, New York.

Splitdorf-Bethlehem Electrical Co., 392 High Street, Newark, N. J., has organized Splitdorf Rol-Iron Co., a subsidiary, to merchandise Splitdorf rol-iron.

National Flue Cleaner Co., Inc., Groveville, N. J., maker of soot blowers for return tubular boilers, has appointed following sales representatives: Craun-Liebing Co., Cleveland; Dennis Engineering Co., Columbus, Ohio; Bishop Engineering Co., Cincinnati; Power Plant Efficiency Co., Indianapolis, and Rathburn Co., El Paso, Tex.

Knickerbocker, Cram & Co., Inc., 7 East Forty-second Street, New York, has been appointed agent in New York territory for line of lathes manufactured by Boye & Emmes Machine Tool Co., Cincinnati.

Philadelphia

PHILADELPHIA, Nov. 12.—Contract has been let by Railway Track-Work Co., East Thompson and Clementon Streets, Philadelphia, to W. F. Chapman, Jenkintown, for one-story machine shop, 56 x 100 ft., to cost about \$40,000 with equipment.

Diamond Machine Co., 453 North Marshall Street, Philadelphia, has awarded general contract to William Linker Co., 735 Cherry Street, for one-story tool manufacturing plant and machine works on site lately acquired, to cost approximately \$40,000 with equipment. (Corrects typographical error regarding cost of work in this column last week).

Henry A. Hitner's Sons Co., 4501 Richmond Street, Philadelphia, manufacturer of tanks and other iron and steel products, has filed plans for a one-story shop and crane runway.

General Steel Castings Co., Philadelphia, has been formed with capital of \$50,000 by J. P. Murray, 4813 Springfield Avenue, and associates, to operate a local foundry. George E. Chambers, Jenkintown, Pa., and F. Stanley Saurman, Churchville, Pa., are also interested in company.

Atlantic Gypsum Products Co., 40 Central Avenue, Boston, has purchased Pennsylvania Gypsum Co., Chester, Pa., and will continue operations as branch plant. Pennsylvania company will carry out expansion program recently announced, including new pier on Delaware River. It has heretofore been under control of Canada Cement Co., Ltd., which has contracted with Atlantic company for entire supply of gypsum rock for cement mills in future, last-noted company to operate such properties in Nova Scotia. Raw material will also come from this source for Chester mill.

Union Dental Instrument Mfg. Co., 831 Cherry Street, Philadelphia, has awarded general contract to Charles Rose, 260 South Fifteenth Street, for four-story plant, to cost more than \$100,000 with equipment.

Marvel Gear Co., Philadelphia, has been formed by Paul G. Basehore, 14 North Ardmore Avenue, Lansdowne, Pa., and associates, to operate local plant for manufacture of gears, starting devices and equipment. Patrick J. Kilcullen, 3335 West Penn Street, is also interested in new company.

Philadelphia Storage Battery Co., Ontario and C Streets, Philadelphia, has purchased former plant of Saxonia Worsted Mills, totaling 80,000 sq. ft. floor space, and will use for expansion.

L. R. Hillyard, West Chester, Pa., and associates, have acquired plant and busi-

ness of R. S. Newbold & Son Co., Norristown, Pa., manufacturer of rolling mill machinery, steel plate products, etc. New owners will continue operations under present name and will carry out an expansion program.

International Mfg. Co., Pottsville, Pa., has leased space in local building to manufacture metal toys, ventilators and other metal products.

Whiskette Mfg. Co., Terre Hill, Pa., has been organized to manufacture steel wool products consisting of brushes, buffing wheels, rotary brushes, wheel brushes and small devices for domestic cleaning purposes. Company is installing machinery and operations will begin shortly.

United States Sand Paper Co., manufacturer of abrasive papers and cloths, has purchased assets, good will, formulae, etc., of Federal Abrasive Works, Inc., Westfield, Mass., and Standard Abrasive Co., Inc., Garfield, N. J. Business of two companies will be consolidated and administered under name of Standard Abrasive Co., Inc., with office and factory at Garfield, N. J.

New England

BOSTON, Nov. 12.—The past week was the best experienced by local machine-tool dealers in several months, the increased business being shared also by Providence and Connecticut centers. Among the new tools sold were several high-production tools by a Boston firm, two 16-in. x 8-ft. engine lathes, four high-speed lathes, all under 20 in., presses, shapers, planers, radial drills, and light drilling tools, as well as a fair amount of bench equipment. Used tool sales included a 20-in. heavy-duty shaper, 20-in. engine lathe, several drill presses, four power presses, radial drill, planer, and a fair list of small lathes. Most of the buying, both of new and used equipment, was by Massachusetts companies. November gives promise of better sales than September and October combined. Active inquiry for new and used tools has come out the past week. The largest new tool inquiry is from the Atlantic Works, East Boston, Bethlehem Shipbuilding Corporation, Ltd., for 11 tools, in addition to considerable wood-working equipment.

Small tool sales are holding up well. November bids fair to outstrip all previous months this year and is likely to be the biggest month since the war.

Light hammer manufacturers are doing the largest business in their history. The Pneumatic Drop Hammer Co., Boston,

has recently taken two orders for single hammers from a Detroit company, five hammers have just been placed in Indiana, two Ohio cities are taking five hammers, two New York State cities have ordered five, two Massachusetts towns are taking three, and Rhode Island firms, mostly jewelry manufacturers, have ordered six hammers.

American Tube & Stamping Co., Bridgeport, Conn., will build a manufacturing plant. Plans are private.

Lockwood, Greene & Co., Inc., 24 Federal Street, Boston, is preparing plans for a machine shop extension for New Departure Mfg. Co., Bristol, Conn.

O'Connell & Shaw, 134 Newbury Street, Boston, architect, will close bids Nov. 15 for a Boston, Bennett district, high school, with vocational shops, to cost, with equipment, about \$1,539,000.

Holland & Kenyon Machine Co., North Street, Fitchburg, Mass., is taking bids on a one-story plant, 32 x 40 ft.

Eureka Flint & Spar Co., Lewis Street, Trenton, N. J., has plans for a plant at Rockingham, Vt. Miscellaneous handling equipment will be required.

Associated Gas & Electric System, 61 Broadway, New York, has started work on a coal gas plant on Quinsigamond Avenue, Worcester, Mass.

Moth Aircraft Corporation, New York, maker of DH-Moth light airplanes, will shortly be established in plant formerly occupied by United States Cartridge Co., Lowell, Mass. About 400 employees will be taken on for initial operations.

Plant of Vermont Machine Co., Bellows Falls, Vt., formerly owned by Vermont Farm Machinery Corporation, has been taken over by Standard Steel Co., a Connecticut company, which plans improvements.

Wilcox, Crittenden & Co., Inc., 3 South Main Street, Middletown, Conn., manufacturer of marine hardware products, is said to have engaged Lockwood, Greene & Co., 24 Federal Street, Boston, to prepare plans for one-story foundry to cost more than \$45,000 with equipment.

Standard Oil Co. of New York, 26 Broadway, New York, has plans for a storage and distributing plant, with garage and repair shop, at Peabody, Mass., to cost about \$50,000; also for a similar plant at Derby, Conn.

Blanchard Machine Co., 64 State Street, Cambridge, Mass., is having plans drawn for new one-story unit, 90 x 100 ft., to cost about \$35,000 with equipment. Charles T. Main, 201 Devonshire Street, Boston, is architect and engineer.

Southern New England Electric Co., Waterbury, Conn., will take bids at once for new one-story equipment storage and distributing plant, 50 x 100 ft., to cost about \$30,000. Westcott & Mapes, 139 Orange Street, New Haven, Conn., are architects and engineers.

Atlas Mfg. Co., 125 Water Street, New Haven, Conn., manufacturer of hardware specialties, wire goods, etc., has taken over factory on Grant Street for new plant. Plans are under way for extensions, including two one-story additions, 35 x 45 ft., and 20 x 32 ft. It is understood that works of Ansonia Novelty Co., Ansonia, Conn., manufacturer of metal specialties, recently acquired, will be removed to Grant Street factory.

Gustavo Preston, 113 Broad Street, Boston, has been appointed sales representative in that city for Pennsylvania Pump & Compressor Co., Easton, Pa., maker of air compressors and vacuum, centrifugal and air lift pumps.

Lynd-Farquhar Co., 419 Atlantic Avenue, Boston, will move to 326-330 Congress Street, about Dec. 1.

Chicago

CHICAGO, Nov. 12.—Total sales of machine tools so far in November are fully equal to the average in October, and dealers are of the opinion that this month will prove as satisfactory as any so far this year. Fresh inquiry bulks large and pending business is being closed with surprising degree of regularity. There is active demand for used machine tools and prices obtained are high, but the supply of desirable equipment of this kind is limited.

The St. Paul Railroad has ordered a new style 72-in. King mill. The J. I. Case Threshing Machine Co., Racine, Wis., and the Nash Motors Co. are studying requirements for plant additions.

Illinois Steel Co., South Chicago, Ill., will build a one-story extension to its electric power station, to cost \$175,000.

Federal Pipe & Supply Co., 900 South Campbell Avenue, Chicago, has purchased property for erection of a new building to cost \$250,000.

W. B. Wood and James M. Glenn, officers of Central Foundry Co., Marshalltown, Iowa, whose plant was destroyed by fire several months ago, head a syndicate which plans to erect new foundry, 110 x 125 ft., on site of former building.

Klondike Incubator Co., 2425 Dean Avenue, Des Moines, Iowa, has been reorganized to increase production and extend manufacture to include poultry supplies and sundries. Additional equipment and materials will be purchased later.

Frank Foundries Corporation, Moline, Ill., plans immediate enlargement by erection of two buildings on adjoining property, recently acquired, to cost \$100,000. One structure, 100 x 160 ft., will be known as East foundry and a second building 70 x 100 ft., which will house shipping department, will be equipped with electric lift trucks and other loading apparatus. A three-story building will be remodeled for maintenance department, workshop and storage. Construction contract has been let to Axel Carlson Co., Moline.

Dreis & Krump Mfg. Co., 7400 Loomis Street, Chicago, manufacturer of machinery and parts, has awarded general contract to Abell-Howe Co., 53 West Jackson Boulevard, for one and two-story addition, to cost about \$50,000 with equipment.

Sunbeam Aircraft Co., Missouri Theater Building, St. Louis, H. P. Mammen, president will soon begin construction of one-story airplane manufacturing plant at Cahokia, Ill., consisting of parts and assembling units, to cost about \$200,000 with equipment.

International Harvester Co. 606 South Michigan Avenue, Chicago, has asked bids on general contract for three-story plant unit at Great Falls, Mont., 125 x 325 ft., to cost about \$130,000 with equipment. W. D. Price is superintendent of construction, in charge.

Poor & Co., 80 East Jackson Boulevard, Chicago, manufacturers of railroad equipment and supplies, malleable castings, etc., are disposing of stock issue to total \$4,165,000, part of fund to be used for consolidation of several companies and for expansion. Company will take over P. & M. Co. Chicago, and its subsidiary, P. & M. Co., Ltd., Montreal; Maintenance Equipment Co. Chicago; Vermilion Malleable Iron Co, Hoopeston, Ill., and Canton Forge & Axle Co., Canton, Ohio. Fred A. Poor is president.

Studebaker Co. of Illinois, Inc., 2036 South Michigan Avenue, Chicago, is taking bids on general contract for two-story automobile service repair and sales building at Evanston, Ill., to cost about \$235,000 with equipment. Loewenberg & Loewenberg, 111 West Monroe Street, Chicago, are architects.

Board of Utility Commissioners 310 North Broadway, Rochester, Minn., has approved plans for extensions in municipal electric light and power plant to cost about \$30,000. H. N. Crawford, Dental Building, is architect.

Minneapolis Gas Light Co., 16 South Seventh Street, Minneapolis, Minn., is considering three-story meter building, with service and repair departments, to cost about \$75,000 with equipment.

Beuchner & Orth, Shubert Building, St. Paul, Minn., architects, will soon take bids on general contract for one-story automobile service, repair and garage building, to cost about \$115,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in new one-story plant, 120 x 150 ft., to be built by Colonial Baking Co., 1500 Fifth Avenue East, Cedar Rapids, Iowa, to cost \$160,000 with equipment.

Cleveland

CLEVELAND, Nov. 12.—Machine-tool sales by dealers fell off some the past week, but single tool inquiry is holding up to recent volume, the bulk coming from the automotive field. No new inquiries of any size came out. Demand for turret lathes in single machines is holding up to recent good volume. The Industrial Rayon Co., Cleveland, which recently sent out a machine-tool list for its new plant at Covington, Va., has purchased three pipe machines for plant construction work. Not much activity is reported in the Detroit territory.

Plans are under way by Standard Electric Stove Co., Twelfth and Smith Streets, Toledo, Ohio, for one-story addition, totaling about 40,000 sq. ft. floor space, to cost more than \$85,000 with equipment. Company engineering department in charge.

Allen Sogg, 3030 Euclid Avenue, Cleveland, architect, has plans for three-story automobile service, repair and garage building, 80 x 130 ft., to cost about \$130,000 with equipment.

Libby-Owens Sheet Glass Co., Toledo, Ohio, is arranging for increase in capital from 400,000 to 1,000,000 shares of stock, no par value, considerable portion of proceeds to be used for expansion.

Defiance Screw Machine Products Co., Defiance, Ohio, has awarded general contract to Baker & Shindler, Defiance, for one-story addition, 40 x 100 ft., to cost about \$30,000 with equipment.

Alliance Aircraft Corporation, Alliance, Ohio, W. E. Trump, president, has awarded general contract to Alliance Structural Steel Co. for one-story airplane manufacturing works, including parts and assembling departments, 60 x 300 ft., to cost about \$50,000 with equipment.

White Sewing Machine Corporation, Main and Elm Streets, Cleveland, manufacturer of electrically operated sewing machines and parts, has arranged for a bond issue of \$2,500,000, a portion of proceeds to be used for expansion.

Max Weis, Union Building, Cleveland, architect, has plans for four-story auto-

mobile service, repair and garage building, to cost about \$110,000 with equipment.

City Council, Galion, Ohio, has authorized call for bids for extensions in municipal electric light and power plant, including additional equipment, for which fund of \$100,000 recently was authorized.

Cincinnati

CINCINNATI, Nov. 12.—Machine-tool bookings since the first of the month have been in somewhat lessened volume than in October, but nevertheless have held to a high level. That the automobile industry and companies supplying automobile parts continue actively to purchase equipment is indicated by the fact that among orders placed with local builders the past week were special high-production lathes, valued at \$50,000, by a Detroit company, five large lathes by an automobile maker in Michigan, five lathes by a company manufacturing automobile parts, and several lathes by a piston ring company. While fully 50 per cent of the business of some machine tool companies has originated in the automotive industry, others report a well diversified demand from all classes of buyers.

Agricultural implement and tractor manufacturers have bought small miscellaneous lots of equipment. Railroads are becoming more active participants in the market. The Chicago, Milwaukee, St. Paul & Pacific is reported to have contracted for several engine lathes and the New York Central has taken a single machine. Both the Louisville & Nashville and the New York Central are contemplating the purchase of engine lathes. Almost without exception, the machine-tool plants which are busy are those making high-production tools, whereas those devoted to building large standard machines, such as planers, are operating on lighter schedules. The outlook for the remainder of the year is regarded by local executives as favorable. While sales probably will not stay at the peak maintained in August, September and October, they should be of liberal volume. Incidentally, several local builders, in checking over their October performance, have found that bookings were the largest of any month since early in 1920.

Board of Trustees, Wilberforce University, Wilberforce, Ohio, is having plans drawn for one-story power plant at institution, 50 x 85 ft., to cost about \$60,000 with equipment. H. B. Briggs, Ohio Hartman Building, Columbus, is architect.

Fleischman Yeast Co., 419 Plum Street, Cincinnati, is considering construction of two-story automobile service, repair and garage building for company motor trucks and cars, to cost over \$80,000 with equipment.

Louis Block, an official of Donoff Brothers & Block, 115 South St. Clair Street, Dayton, Ohio, commission merchants, has purchased property at 441-447 West Fifth Street, as site for multi-story cold storage and refrigerating plant, 50 x 100 ft., to cost more than \$75,000 with equipment.

Dixie Mineral Products Co., Chattanooga, Tenn., W. H. Meachem, 1515 Duncan Avenue, president, will proceed with installation of clay mining and refining plant, to cost approximately \$75,000 including machinery.

Rainbow Light, Inc., Thirteenth Street,

Long Island City, N. Y., manufacturer of electric tube lighting apparatus, has purchased plant and business of Mercury Electric Sign Co., 1717 Magazine Street, Louisville. It is understood that branch factory will be operated at Louisville.

George D. Waller, Independent Life Building, Nashville, Tenn., architect, has revised plans for two-story automobile service repair and garage building, 100 x 150 ft., to cost about \$90,000 with equipment.

Kentucky Cement Corporation, recently organized by F. B. Drew, McAlester, Okla., and associates, has opened offices in Farmers' Bank Building, Frankfort, Ky., and will soon proceed with foundations for initial units for cement mill near Frankfort, to cost over \$2,000,000 with machinery. Hunt Engineering Co., New York Life Building, Kansas City, Mo., is engineer.

City Council, C. O. Sherrill, city manager City Hall, Cincinnati, is completing plans for municipal equipment storage and distributing plant, with automobile service, repair and garage building for city-owned cars, to cost about \$100,000.

City Council, Columbus, Ohio, has been authorized to arrange bond issue of \$850,000 to purchase tract of 1000 acres for establishment of municipal airport.

Pottage Tankage Corporation, East Water Street, Troy, Ohio, is considering rebuilding part of plant recently destroyed by fire.

South Atlantic

BALTIMORE, Nov. 12.—Rock Hall Marine Railway, Inc., Rock Hall, Md., recently organized by Ellsworth Leary, Rock Hall, and associates, is planning for local shipyard and boat-building plant. Property has been acquired on Chesapeake Bay waterfront. George Coleman and Andrew Stevens, both of Rock Hall, will be active in new company.

Ovens, power equipment, conveying and other machinery will be installed in new two-story plant to be constructed by General Baking Co., 420 Lexington Avenue, New York, at Washington, to cost \$200,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Twin City Boiler Works, Inc., Bristol, Va., is planning installation of additional equipment, including angle bending rolls, angle shear, etc.

Glenn L. Martin, 9717 Lake Shore Boulevard, Cleveland, head of Glenn L. Martin Co., manufacturer of aircraft, whose plant on St. Clair Avenue was acquired recently by Great Lakes Aircraft Corporation, is said to be concluding negotiations with City Council, Baltimore, for new airplane manufacturing plant in Dundalk section, where city has offered tract of 100 acres. Proposed to have hangars, construction and repair shops, and other units constructed by Baltimore Port Commission, and occupied by Martin company under long lease. Project is reported to cost more than \$450,000.

Simmons Co., Kenosha, Wis., manufacturer of metal bedsteads, springs, mattresses, etc., is reported considering new branch plant at Richmond, Va.

Superior Pine Products Co., Fargo, Ga., is considering installation of locomotive crane, steam or gasoline operated.

A. Weiskittel & Son Co., Twelfth and East Lombard Streets, Baltimore, manufacturer of stoves, ranges, etc., is said

to be planning a one-story addition, 80 x 110 ft., to cost about \$25,000 with equipment.

J. E. Sperry, Calvert Building, Baltimore, architect, has plans for six-story automobile service, repair and garage building, to cost about \$450,000 with equipment. H. E. Doeleman, 516 North Charles Street, is engineer.

Detroit

DETROIT, Nov. 12.—Plans are being prepared by Murray Corporation of America, Inc., 1424 Aberle Street, Detroit, manufacturer of automobile bodies, for a new six-story plant, to cost over \$175,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has plans for a two-story addition, 130 x 375 ft., to cost about \$150,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

General Foundry & Machine Co., Flint, Mich., has been organized to take over and consolidate General Foundries, Inc., Flint Foundry Co., and Flint Malleable Castings Co., all operating local plants. Foundries of the Flint Foundry Co., at Flint and Marshall, Mich., will be continued, while plants of two other noted units will be combined at present foundry of General Foundries, which will be extended for enlarged output. Consolidated company will have assets of about \$600,000; J. M. Barringer is president, and E. W. Atwood, treasurer.

Olds Motor Works, Lansing, Mich., has awarded general contract to Reniger Construction Co., 127 North Cedar Street, for two-story addition, to cost over \$50,000 with equipment.

Marshall Furnace Co., Marshall, Mich., has arranged for purchase of plant and business of Monitor Furnace Co., Cincinnati, which will be dismantled and removed to Marshall, where production will be increased and concentrated in future.

Jackson Motor Shaft Co., Tyson Street, Jackson, Mich., has awarded general contract to J. F. Braun, 414 South Gorham Street, for one-story addition, 50 x 275 ft., to cost about \$50,000 with equipment.

Ryerson & Haynes, Inc., 2307 East Ganson Street, Jackson, Mich., manufacturer of automotive assemblies, specializing in spark and throttle control mechanism, has recently taken over part of former Earl plant where it has increased facilities for broader lines of activity. Company was formerly known as O. C. Harrington Co., but has changed its name as Mr. Harrington is no longer connected with business.

Peerless Plating Plant, 522 Fort Street East, Detroit, has been organized to succeed Helmich Mfg. & Plating Co., and will operate general polishing and electroplating plant. Equipment has been purchased. Company plans further enlargement which may involve removal to larger factory.

Phoenix-Detroit Burner Corporation, 1917 First National Bank Building, Detroit, has been organized to manufacture heating equipment and supplies. Company has plant and equipment, but is in market for materials used in manufacture.

Lakey Foundry & Machine Co., Muskegon, Mich., manufacturer of engine castings, etc., for automotive industry, is carrying out an expansion program to cost about \$400,000. Additional equip-

ment will be installed to double present capacity.

Ajax Bolt & Screw Co., 6623 Gratiot Street, Detroit, is asking bids on general contract for rebuilding part of plant recently destroyed by fire.

Chromium Plating Corporation, Jackson, Mich., recently organized with capital of \$25,000, has taken over part of local plant of O. C. Harrington Co. for new plating works. George A. Barrow and Creighton Ryerson, both of Jackson, head new company.

Federal Mogul Corporation, 11031 Shoemaker Avenue, Detroit, manufacturer of metal bearings, is considering one-story addition, 120 x 175 ft., to cost about \$70,000 with equipment.

Board of Education, Ypsilanti, Mich., is considering installation of manual training equipment in addition to junior high school to cost \$700,000, for which plans will be drawn by R. S. Gerganoff, 206 North Washington Street, architect.

Detroit Edison Co., 1200 Second Boulevard, Detroit, is having plans drawn for new coal storage and distributing plant, to cost about \$400,000 with loading, conveying and other equipment. Engineering department of company is in charge.

Milwaukee

MILWAUKEE, Nov. 12.—With the national election out of the way, the machine-tool industry has settled down and expects that the good business which has prevailed for the past five or six months will continue for some time. Most plants experienced a demand in October equal to the September volume, and are so well provided with business that production schedules are being maintained at the high point of the year. Shortage of machinists, tool-makers and molders remains acute.

Walker Mfg. Co., Racine, Wis., manufacturer of lifting jacks, has started work on a one-story addition, 100 x 200 ft., total cost estimated at \$100,000.

Henszy De-Concentrator Co., Watertown, Wis., has been incorporated to manufacture a device used in connection with steam boilers to eliminate scale, corrosion, foaming and priming, invented and developed by R. O. Henszy, and in limited production for eight months. Device will continue to be built by Otto Biefeld Co., Watertown, but later new corporation intends to erect a plant. F. W. Goldsmith, 120 East Wisconsin Avenue, Milwaukee, is president and sales manager, and Arthur Kuenzi, 106 North Water Street, Watertown, is vice-president and production manager.

Esline Co., 610 Michigan Street, Milwaukee, manufacturer of portable cottages, garages and other sheet steel structures, has broken ground for a new plant, 150 x 175 ft., one-story, at Oconomowoc, Wis. Production until now has been concentrated at Barton, Wis., and this plant will be continued in operation. Present investment will be over \$65,000 including equipment.

E. R. Wagner Mfg. Co., Thirty-second Street and Adams Avenue, North Milwaukee, Wis., manufacturer of hardware specialties, stampings and plated ware, is building a two-story addition, 36 x 42 ft.

Village trustees, Whitefish Bay, suburb of Milwaukee, are preparing to ask bids for construction and equipment of a municipal garbage incinerating plant, for which a bond issue of \$55,000 has been authorized. T. H. Buckley is village engineer.

Zenith Mfg. Co., Racine, Wis., manufacturer of superpower cylinder head for Ford and Chevrolet passenger and commercial car engines, has acquired a site in North Milwaukee and expects to start work immediately on new plant. Arthur W. Sieglaff, president and general manager, has established general offices at Thirty-ninth Street and Villard Avenue, North Milwaukee.

Elmberg Co., Ladysmith, Wis., manufacturer of hardwood products, toys, etc., is starting work on two factory additions, 127 x 200 ft., and 34 x 90 ft., costing about \$75,000 with equipment.

McNally-Tollefson Foundry Co., Stoughton, Wis., is negotiating for purchase of plant it occupies and contemplates erection of two additions.

National Equipment Corporation, Milwaukee, has acquired Parsons Co., Newton, Iowa, manufacturer of power-trench excavators, and Insley Mfg. Co., Indianapolis, manufacturer of steel towers for hoisting and pouring concrete. Both companies will continue under present management as divisions of National Equipment Corporation. H. C. McCarell, president of Parsons Co., and W. H. Insley, president of Insley Manufacturing Co., become vice-presidents and directors of parent corporation.

Pittsburgh

PITTSBURGH, Nov. 12.—Bids will be asked at once by Whitaker Paper Co., 101 Ninth Street, Pittsburgh, for one-story storage and distributing plant, to cost about \$200,000 with handling and other equipment. R. Maurice Trimble, Commonwealth Annex, is architect.

Witherow Steel Corporation, Neville Island, Pittsburgh, manufacturer of automobile axles and other steel products under die-rolling process, is said to be planning additional unit, to cost about \$100,000 with machinery.

Pennsylvania Rubber & Supply Co., 2819 Prospect Avenue, Cleveland, is having plans drawn for new factory branch, storage and distributing plant at Oil City, Pa., one story, to cost about \$40,000 with equipment. George S. Rider Co., Century Building, Cleveland, is architect and engineer.

Monongahela-West Penn Public Service Co., Fairmont, W. Va., is planning construction of steel tower transmission line from Rivesville to Parkersburg, W. Va., and vicinity, about 90 miles, with 15,000-kw. power substation at latter place for industrial service, project to cost more than \$200,000.

Pillsbury Flour Mills, Inc., Minneapolis, Minn., is concluding negotiations for purchase of plant and business of Harvey Paper Co., Wellsburg, W. Va., manufacturer of heavy paper stocks. New owner plans expansion, with installation of new unit for production of bags and containers, to cost more than \$200,000 with machinery.

Robertshaw Mfg. Co., Youngwood, Pa., manufacturer of plumbing equipment, heat-regulating devices, etc., has awarded general contract to Austin Co., Pittsburgh, for one-story addition, 75 x 140 ft., to cost about \$35,000 with equipment.

J. F. Rodgers, 726 Oliver Building, Pittsburgh, has been appointed representative in that city for Pennsylvania Pump & Compressor Co., Easton, Pa., maker of air compressors, vacuum, centrifugal and air lift pumps.

Buffalo

BUFFALO, Nov. 12.—Plans are under consideration by Simmons Machine Tool Corporation, 86 Exchange Street, Buffalo, for one-story addition to cost more than \$30,000. Joseph M. O'Connell is manager.

Williams Gold Refining Co., 2978 Main Street, Buffalo, has acquired two-story plant of National Grinding Wheel Co., on adjoining site, for expansion. National company has work in progress on new plant at North Tonawanda, N. Y., to cost more than \$50,000 and will remove to that location for increased output.

Fitzgibbons Boiler Works, Inc., Oswego, N. Y., is said to have plans under way for one-story addition to cost about \$40,000, including equipment. A. G. Lockett is general manager.

Continental Can Co., Syracuse, N. Y., and 1 Pershing Square, New York, is having plans drawn for new two-story plant, 300 x 600 ft., at Los Angeles, to cost more than \$300,000 with equipment; crane runway will be installed. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers. Continental company has acquired can-making plant and business of Hardesty Mfg. Co., Denver, Colo., which will be continued as new branch.

Commissioner of Public Works, Municipal Building, Buffalo, will receive bids until Nov. 21 for wire fencing and gates for Houghton Park.

Fire, Nov. 6, damaged portion of plant of Kast Copper & Sheet Iron Co., 91 Main Street, Buffalo. It will be rebuilt. Same fire also destroyed two blocks of industrial property, including warehouse and distributing plant of Detroit & Cleveland Navigation Co., and W. A. Case & Son Mfg. Co., 31 Main Street, manufacturer of sanitary ware, etc., both of which will be rebuilt.

Benedict Mfg. Co., East Syracuse, N. Y., is inquiring for a second-hand uniflow steam engine, either Nordberg or Skinner, 100-125 lb., 75 to 112½ kva.

St. Louis

ST. LOUIS, Nov. 12.—Bids are being asked by Board of Public Service, St. Louis, until Nov. 20, for one 10-ton electric, box girder, crane and hoist, for installation in fire department repair shop, contract 3472. O. D. Tillay is secretary.

Morrow-Kidder Mfg. Co., Carthage, Mo., has plans for addition to wood-working plant, to cost \$70,000 with equipment.

Board of Works, Tulsa, Okla., plans call for bids early in December for complete purification plant for municipal waterworks, with rating of 24-million gal. per day. Black & Veatch, Mutual Building, Kansas City, Mo., are engineers.

Robertson Aircraft Corporation, St. Louis, care of McDonald & Condie, 502 North Taylor Street, architects, has awarded general contract to J. S. Alberici, Boatmen's Bank Building, for airplane plant at Lambert-St. Louis Field, Anglum, consisting of hangar, 100 x 120 ft., repair shop and other units, to cost more than \$85,000.

Standard Steel Works, Inc., Sixteenth and Howell Streets, North Kansas City, Mo., is completing plans for one-story addition for storage and distributing service, to cost about \$25,000. I. L. Bornstein is company architect.

Wall-Ragalsky Elevator Co., McPherson,

son, Kan., will soon take bids for new grain elevator with capacity of 150,000 bu., including conveying, screening and other equipment, to cost about \$50,000. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Everhart Rubber Co., Grand Island, Neb., Merrill Lewis, president, has leased building to be erected at Third and Elm Streets, one story, 130 x 132 ft., for new plant, to cost about \$80,000 with equipment.

Board of Education, Excelsior Springs, Mo., is said to be planning installation of manual training equipment in new two-story high school to cost about \$200,000, for which plans will be drawn by Saylor & Payson, Interstate Building, Kansas City, Mo.

Little Rock Refining Co., Little Rock, Ark., recently formed by C. N. Faubel, 4101 Woodlawn Street, and associates, with capital of \$250,000, is planning construction of oil refinery near city, to handle 1000 bbl. crude oil daily. E. L. Warden, 2124 East Third Street, is also interested in company.

Midwest Chandelier Co., 1403 Chestnut Street, North Kansas City, Mo., has work under way on one-story and basement plant, 115 x 135 ft., to cost over \$75,000 with equipment. Victor J. DeFoe, 114 West Tenth Street, is architect.

Board of Education, North Little Rock School District, Little Rock, Ark., plans installation of manual training equipment in five-story and basement high school to cost \$400,000, for which bids will be asked on revised plans at once. Mann, Wanger & King, New Donaghey Building, are architects.

Gulf States

BIRMINGHAM, Nov. 12.—Plans have been approved by Wyatt Metal & Boiler Works, Dallas, Tex., for new one-story branch plant at Houston, Tex., totaling 75,000 sq. ft. floor space, for steel fabricating and heavy plate work for oil refinery products, to cost over \$100,000.

City Council, Coleman, Tex., plans extensions and improvements in municipal electric light and power plant, including 750-kw. engine-generator and auxiliary equipment.

Board of Education, Houston Independent School District, Houston, Tex., is said to be planning installation of manual training equipment in addition to Jefferson Davis senior high school, to cost over \$175,000, for which bids have been asked on general contract. Hedrick & Gottlieb, Post-Dispatch Building, are architects.

Louisville & Nashville Railroad Co., Louisville, has awarded general contract to H. Horace Williams Co., 821 Howard Street, New Orleans, for new shops at Mobile, Ala., to cost over \$500,000 with equipment. W. H. Courteney is chief engineer.

National Portland Cement Co., Houston, Tex., recently organized with capital of \$250,000, has succeeded to plant and business of Gates Chemical Co., Mary and North San Jacinto Streets, and will convert plant for production of special white cement. H. J. Harris, 4425 Normandy Street, is president.

Richardson Refining Co., Big Springs, Tex., has begun work on new oil refinery for handling 5000 bbl. crude oil per day, to cost \$550,000 with machinery.

City Council, St. Petersburg, Fla., has authorized construction of municipal airport, to be known as Albert Whitted

airport, including hangar, repair shop and other buildings, entire project to cost \$85,000. James Luchini, city engineer, is in charge.

Sears, Roebuck & Co., Arthington Avenue and Homan Street, Chicago, has acquired tract of 3½ acres at Houston, Tex., for new eight-story storage, distributing and sales building, to cost about \$1,000,000 with equipment.

General Motors Corporation, Detroit, has plans for new two-story service, repair and sales building at New Orleans, to cost about \$100,000 with equipment. Bids will be asked in about 30 days. Albert Kahn, Marquette Building, Detroit, is architect and engineer.

Buick Motor Co., Flint, Mich., has begun construction of three-story factory branch, storage and distributing plant at Dallas, Tex., to cost over \$400,000 with equipment. Coburn & Fowler, Dallas, are architects.

Common Council, Mer Rouge, La., is planning early purchase of 50,000-gal. steel tank and tower for municipal water system.

Missouri-Kansas-Texas Railroad Co., St. Louis, has awarded general contract to T. H. Johnson, 522 North Texas Street, Dallas, Tex., for new locomotive repair shops at Smithville, Tex., comprising one-story machine shop, 80 x 84 ft., and other units, to cost about \$125,000 with equipment. A. L. Sparks, Railway Exchange Building, is company architect.

Louisiana Public Utilities Co., Lafayette, La., has plans for rebuilding local electric generating station and ice plant recently destroyed by fire. Gannett, Seelye & Fleming, Inc., 600 North Second Street, Harrisburg, Pa., is engineer, in charge.

Kelley Stove & Range Co., Leeds, Ala., has been formed to manufacture stoves, ranges and heaters for Southern trade.

Indiana

INDIANAPOLIS, Nov. 12.—Bids have been asked on general contract by John Deere Plow Co., 216 South Senate Avenue, Indianapolis, for a four-story factory branch and distributing plant at Fort Wayne, to cost about \$125,000 with equipment. O. A. Eckerman is company architect at main plant, Moline, Ill.

J. D. Adams & Co., 217 South Belmont Avenue, Indianapolis, manufacturers of road building machinery, have awarded general contract to Hall Construction Co., Board of Trade Building, for one-story addition, 110 x 175 ft., to cost about \$50,000 with equipment.

Board of Directors, Indiana Soldiers and Sailors Orphans' Home, Knightstown, is considering new power plant at institution to cost more than \$150,000 with equipment. L. A. Cortner is superintendent.

Public School Extension Association, Central High School Building, Muncie, A. H. Kruse, president, is completing construction of one-story and basement vocational school, 200 x 200 ft., to cost \$150,000, and plans early installation of equipment. Houck & Smenner, 108 East Washington Street, are architects.

Chrysler Motor Corporation, Detroit, is planning construction of one-story machine shop at motor truck plant at Evansville, to cost about \$250,000 with equipment. Other units are also contemplated.

Truck Engineering Co., East Pontiac Street, Fort Wayne, has awarded general contract to Buesching & Hagerman Co.,

402 East Superior Street, for one-story addition at motor truck manufacturing plant. Guy Mahurin, Standard Building, is architect.

Indiana General Service Co., Muncie, plans construction of steel tower transmission line to Anderson, Ind., with power substation for industrial plant service at last-noted place, entire project reported to cost more than \$500,000.

Gary Screen & Door Co., 1041 Jefferson Street, Gary, has been organized to manufacture screen doors and windows, storm doors, storm sash and combination doors. Plant is fully equipped with machinery, but company is in market for lumber, hardware and wire.

Pacific Coast

SAN FRANCISCO, Nov. 8.—Plans are being drawn by Boiler, Tank & Pipe Co., 4061 Hollis Street, Piedmont, Cal., for new one-story boiler and plate shop on 3-acre site at East Oakland, to cost approximately \$65,000 with equipment. A crane runway 60 ft. wide and 350 ft. long will be installed.

Krumm Mfg. Co., Mentone, Cal., manufacturer of commercial fertilizers, is planning extensions and improvements in mill to cost about \$150,000, including equipment.

United Concrete Pipe & Tile Co., Chamber of Commerce Building, Los Angeles, has purchased tract of 15 acres at Torrance, near present plant, and is contemplating new works to cost over \$100,000 with equipment.

Pacific Public Service Co., Santa Cruz, Cal., operating Coast Counties Gas & Electric Co., is disposing of note issue of \$3,400,000, part of proceeds to be used for extensions and improvements, including transmission lines.

School District of Multnomah County, Administration Building, Portland, is said to be planning installation of manual training equipment in new Clinton Kelly high school to cost \$750,000, for which bids are being asked on general contract. George H. Jones, address noted, is architect.

Boeing Airplane & Transport Corporation, Seattle, recently organized to take over Boeing Airplane Co. and Boeing Air Transport Co., is disposing of a stock issue to total \$5,310,000, a considerable part of proceeds to be used for expansion. Company will develop increased plant facilities for production of aircraft for military and commercial service, as well as heavy tri-motor planes for transcontinental air service.

Municipal Light Department, Seattle, has plans for municipal hydroelectric power plant at Reflector Bar, near Diablo dam, to more than double present output of city-owned stations. Work will be carried out as part of Skagit River hydroelectric power development, to cost about \$3,000,000 with transmission lines. W. D. Barkhuff is city engineer, in charge.

Los Angeles Period Furniture Mfg. Co., 1300 East Jefferson Street, Los Angeles, has plans for two additions, two stories, 40 x 130 ft., and one story, 40 x 134 ft., to cost about \$45,000 with equipment. Feenstra & Son, 3920 Avalon Boulevard, are architects.

Board of Education, Los Angeles, has authorized plans for addition to Bell high school, including one-story vocational shop unit, to cost about \$105,000 with equipment. Train & Cressey, Western Mutual Life Building, are architects.

Henry Disston & Sons, Inc., Philadelphia, will establish a factory at Sixteenth and Irving Streets, Portland, Ore., to enlarge its service in Northwest. Manufacturing and repairing saws, knives, files and other products will be carried on. Operations will begin about Jan. 1.

Canada

TORONTO, Nov. 12.—Machine tool sales of a diversified nature continue in good volume. Large railroad equipment orders have been placed recently and the automotive industry continues a leading factor in tool purchases with considerable business in prospect for early closing. Mining equipment is moving in large volume. Stronger demand is reported for wood-working tools. Small tools are active.

Hinde & Dauch Co., Ltd., Toronto, has taken out a permit for erection of a factory to cost \$250,000. Company manufactures corrugated paper, boxes, etc.

Massey-Harris Co., Toronto, has applied for a permit for erection of an addition to cost \$60,000.

Anaconda American Brass, Ltd., New Toronto, plans a construction program extending over a three-year period in connection with plant recently acquired.

William I. Bishop, Ltd., Montreal, has been awarded general contract for construction of a hydroelectric power development plant on Lievre River for James MacLaren Co., Buckingham, Que., and will start construction work soon.

Hull Iron & Steel Foundries, Ltd., Hull, Que., will build an addition to its plant to cost \$250,000. A. H. Coplan, 7 Clemor Avenue, Ottawa, Ont., is general manager.

Dominion Steel Foundries, Ltd., Hamilton, Ont., has awarded contract to Poag & Kemp, Ltd., Westinghouse Avenue, for alterations and extensions to plating mill, to cost \$10,000.

Canada Wire & Iron Goods, Ltd., 180 King William Street, Hamilton, Ont., will start work immediately on an addition to its plant.

Ritchie Cut Stone Co., Ltd., 191 Grant Street, Hamilton, Ont., has awarded contract to Mitchell & Riddell, 46 Head Street, Hamilton, for a factory and office building at New Toronto, to cost \$200,000.

Sangamo Electric Co. of Canada, Ltd., 183 George Street, Toronto, has awarded contract to R. G. Kirby, 539 Yonge Street, for two-story addition, 40 x 110 ft., to its plant, to cost \$40,000. Chapman & Oxley, Northern Ontario Building, are architects.

Mundet Cork & Insulation, Ltd., 51 St. Lawrence Street, Toronto, has awarded contract to H. A. Wickett Co., Ltd., 156 Front Street East, for one- and two-story factory, 100 x 150 ft. H. G. Macklin, Triller Avenue, is architect.

Bids are being received by M. L. Dyke, town clerk, Bling River, Ont., until Nov. 21, for one 1200-Imperial gal. per min. engine-driven fire pump with accessories. Frederick A. Dallyn & Co., 71 King Street West, Toronto, is consulting engineer.

Western Canada

East Kootenay Power Co., East Trail, B. C., contemplates building a 15,000-hp. hydroelectric plant at Phillips Canyon, on Elk River.

West Kootenay Power Co., subsidiary of Consolidated Mining & Smelting Co., Trail, B. C., will soon begin construction

of a power plant to cost \$4,000,000 and to develop 80,000 hp.

Vancouver Kraft Co., Ltd., Vancouver, B. C., will start work immediately on a \$2,000,000 pulp and paper plant at Port Mellon, about 20 miles from Vancouver, to cost \$2,000,000. Company also will build a lumber mill with capacity of 200,000 ft. per day.

Canadian National Railways have awarded contract to Hamilton Construction Co., Regina, Sask., for additions to machine erecting shops, at Winnipeg, Man.

Foreign

PROGRAM is being arranged by Moscow Department of Public Works, Moscow, Russia, for extensions and improvements in municipal utilities to cost \$126,000,000 over a five-year period. Of this fund, about \$35,000,000 will be used for waterworks, about \$15,000,000 for transit system, \$22,000,000 for sewage systems, \$875,000 for municipal gas works. Other expenditures will be made for slaughter houses, cold storage plants and miscellaneous projects. Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Russian Government, has information regarding project.

Department of Government Railways, Wellington, New Zealand, will receive bids until Jan. 9, 1929, for pneumatic

tools, as per Specification 270, on file at office noted.

United Dutch-Indian & German Glass Factories, Sourabaya, East Java, Netherland East Indies, recently formed with capital of 6,000,000 florins (about \$2,500,000), has plans for construction of glass manufacturing plant, to cost considerable part of capitalization.

Radio Corporation of America, Woolworth Building, New York, has closed contract with Nanking Government, Shanghai, China, for construction of local high power radio station for world-wide service, to cost \$170,000; completion is scheduled in 12 months.

Civil Bureau of Aeronautics, Mexico City, Mexico, is planning construction of municipal airport near present Valbuena military field, to include hangars, repair and reconditioning shops and other mechanical units. Government has granted permission.

South Durham Steel & Iron Co., Ltd., South Durham, England, is concluding arrangements for acquisition of Cargo Fleet Iron Co., Ltd., London, and will consolidate under first-noted name. Combined company will have capital of £1,650,000 (\$8,250,000), and plans expansion.

Ercole Marelli Electric Mfg. Co. (Ercole Marelli & C., Societa Anonima), Milan, Italy, manufacturer of generators, motors, fans and other electrical machinery, is disposing of bond issue of \$2,500,000 in United States, part of fund to be used for extensions.

New Trade Publications

Tumbling, Washing and Burnishing Metal Parts.—Ideal Industrial Machinery Co., Winton Place, Cincinnati. Well illustrated booklet of 32 pages showing installations of equipment for a considerable variety of uses, mainly in connection with metal parts in process of manufacture. The machinery is almost all of the rotary type, much of it being automatic in its application.

Copper-Alloy Steel Sheets.—Inland Steel Co., Chicago. An illustrated booklet on Inland copper-alloy steel sheets, which includes data on results of tests conducted by a committee of the American Society for Testing Materials.

Steel Factory and Office Equipment.—Angle Steel Stool Co., Plainwell, Mich. Illustrated catalog of 112 pages giving complete information on stock-built items of factory and office equipment made of steel. Steel shelving, cabinets, stools and trucks are among prominent lines of manufacture.

Flash Butt-Welders.—Federal Machine & Welder Co., Warren, Ohio. Bulletins 80 and 82 describe machines for making rings of bent bars, for wheel rims, brake bands, felloes and the like. The smaller will make 500 wheel rims per hour of 4 1/2 by 5/32-in. steel. The larger size has a capacity of 200 per hour working on 6 1/4 by 3/16-in. irregular steel bar having an area of 1.6 sq. in.

Unit Heaters.—American Blower Corporation, Detroit. Bulletin 7418 of 32 pages and cover illustrates and describes the Sirocco unit heater, made in both the vertical floor type and the horizontal ceiling type. The standard heating element is of staggered copper tubes. Tubes of steel will be furnished if required. A considerable amount of data will be found in the bulletin.

Industrial Portable Lighting Equipment.—Bart Mfg. Co., 6001 South Talman Avenue, Chicago. Booklet of 16 small pages illustrating and describing a number of patented devices for lighting equipment adapted to workshop use.

Fittings for Overhead Track.—Hoist & Crane Engineering Co., 114 Liberty Street, New York. Loose-leaf sheets, eight pages, illustrating and briefly describing conductor supports, insulators and clamps, strain insulators and other fittings, for overhead material-handling tracks.

Monorail Conveying Systems.—Reading Chain & Block Corporation, Reading, Pa. Catalog 56 of 60 pages illustrates and describes overhead conveying systems, including rails and supports, switches and various types of carriers to run on the rail, featuring chains and electric hoists, etc. Drawings show clearances and other dimensions.

Factory Forms.—McCaskey Register Co., Alliance, Ohio. Folder carrying a variety of forms for factory use, most of which are of the multiplying type, with carbon on the back of each form except the last. The forms are in a multiplicity of arrangements, which are mainly suggestive.

Cold-Drawn and Miscellaneous Steel Products.—Moltrup Steel Products Co., Beaver Falls, Pa. Catalog No. 2 of 100 pages describes a wide variety of sections of steels produced by the company, including a number of alloy steels embodying nickel, chromium and vanadium, either singly or in combinations. The catalog illustrates many sections, not only of rolled and drawn material but of special shapes, such as machine keys and the like, giving list prices and specifications. Steel gear racks form a feature.

THE IRON AGE

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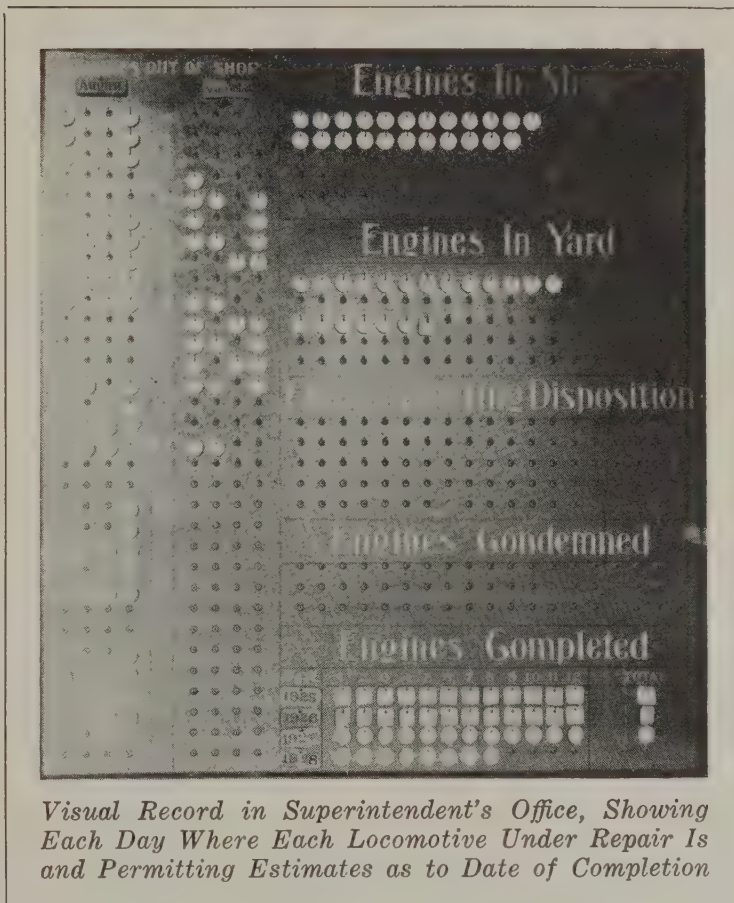
Repairing Locomotives on Schedule

How the "Spot" System of Operation Is Applied
at Readville—Definite Program
and Control Employed

ADVANCING of units in process of assembly in such manner that their speed of movement serves to maintain a proper supply of work waiting at each operating station has long been standard practice in many plants. But the application of this system, or one patterned upon it, to repairing of such complex organisms as locomotives has not made the same measure of progress. This is largely because of the wide dissimilarity between the work required to be done upon one locomotive and that which the next one demands. For this reason the methods now in vogue at the railroad shops at Readville, Mass., will prove of special interest.

Many schemes have been evolved to reduce the average number of shop hours per locomotive necessary to complete the work of general overhauling upon this important unit of railroad machinery. Among the latest of them is the "spot" system recently adopted by several large roads. This system contemplates establishment of a schedule, covering a stated period in advance, to list the individual engines to be overhauled, show the dates upon which they are to be delivered to the shop by the transportation department, indicate the nature and extent of the work to be done upon them and the approximate number of hours which will be required to complete it, and to allot to each engine a definite space in the yard and shop where it may be found upon any given date as the work progresses.

To carry out successfully the details of the system close cooperation among the heads of all mechanical subdivisions is essential. To secure this cooperation meetings of these



officials are arranged at stated intervals—usually once a month—at which meetings the future known requirements of each subdivision in the way of locomotive repair are discussed, the nature and approximate amount of work to be done upon each engine is decided upon and the order of precedence is determined. From the data thus provided the advance schedule is prepared.

Work Apportioned Months Ahead

Advance schedules prepared and approved at each monthly meeting of the mechanical executives cover five months; one month being stricken from the list (assuming that all work for the period is completed) and a new month added. At the same time, any minor changes which may be made necessary by the exigencies of

road service are noted in the duplicated four-months and the schedule is corrected for the entire period.

The locomotive shop is operated 16 hr. daily, with two gangs, the second shift force being much smaller than the first, thus providing sufficient flexibility to smooth out any irregularities that may occur by reason of emergency jobs or of repairs which may require more than the estimated time to complete, and to maintain an even rate of production according to schedule. At the same time, the knowledge that every engine is scheduled for delivery on a certain date is an incentive to the men to get their parts of the work done within the allotted time.

Survey of the advance schedule, a copy of which is in the hands of all executives responsible for production, shows not only the serial numbers of the engines to be

overhauled during the ensuing five months, and the date of delivery, but indicates what new parts, if any, are to be provided, as well as the time and place where they must be delivered to meet the specific engine at a given location as it progresses through the shop.

Elaboration of the schedule in the form of a work sheet is made up daily and delivered each morning to all foremen, so that every one may know just what repairs and replacements must be delivered to specific locations throughout the shop at specified times.

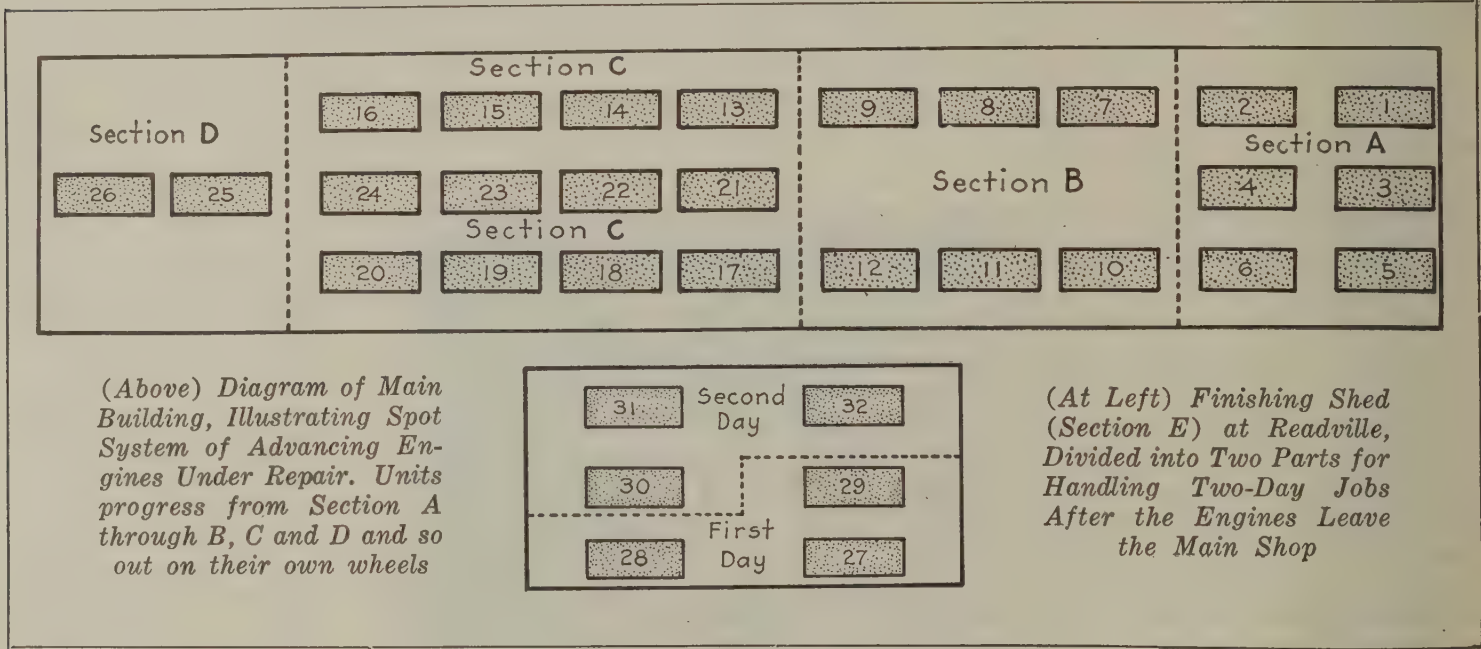
Numbered distribution tracks in the yard receive the locomotives, as they are delivered from the various subdivisions of the road, in their order of precedence. Engines are immediately dumped, boilers drained, tenders detached and dummy couplers applied to the rear drawbar pockets, so that the locomotives may be coupled at either end to a switching engine for transference. The tenders are placed upon the coal track, where the coal and water remaining in

may have been disclosed by the removal of dirt and grease in the sand-blasting operation.

Method of Progression Used

Application of the spot system in the locomotive shop may be seen in Fig. 1, which is a partial diagram of the floor in that part of the building usually called the "erecting" shop; in this case shorn of its regular designation by the fact that the assembly, or "erection," is progressive, and the engine remains in one place for but a limited time. Engines enter from the right.

The space in this part of the shop is divided into four sections, lettered A, B, C and D respectively, but separated only by painted posts and lines. Section A is devoted to heavy repairs, including frames, cylinder replacements and major boiler repairs. In this section are six "spots," or positions, numbered 1 to 6, inclusive, to which engines are delivered, minus their wheels, from the adjacent unwheel-



them may be taken out, and they are then headed in upon a track leading to the tender repair shop.

Upon the day scheduled for work to begin, usually the day of receipt or the day following—the selected engine is set off upon a track leading to the stripping sheds. Here it is carefully gone over by inspectors, who mark it with chalked hieroglyphics, intelligible to railroad men, according to the nature and extent of the repairs to be made. It is then moved forward to the stripping sheds to be dismantled.

By having the work of stripping done in a separate building, adjacent to the cleaning house, much of the dirt and grease incident to a long period of road service is kept out of the locomotive shop and one of the disagreeable features of locomotive repair thereby eliminated. Work in the stripping sheds includes the removal of such boiler and firebox parts as are known to need renewal, but does not involve unwheeling.

The stripped parts are conveyed in baskets or individually, according to their size and weight, to the potash vats in the nearby cleaning house, and from thence distributed—clean and free from grease—to the several repair departments of the locomotive shop. The engine itself goes forward upon its own wheels, still on the same track to another building wherein the cylinders, all remaining running gear, the smoke arch and the interior of the boiler are cleaned by sand-blasting. Upon issuing from the sand-blast house the engine is again inspected for possible defects that

ing pits. Here they remain from three to eight days, in accordance with the amount of work to be done upon them. There are no tracks in sections A, B or C, the engines being moved when necessary by the overhead cranes.

Section B also provides six positions, arranged somewhat differently to allow more working space around the engines, and numbered 7 to 12, inclusive. Here are conducted some of the lighter operations upon boilers, frames and cylinders. Engines may remain in this section from three to six days. When the work upon any engine in section A or section B has advanced to a point from which it can be completed in four days, it is advanced to spot 13 or 17 in section C for the remainder of the work.

In section C, unlike sections A and B, the engines are moved forward from one position to the next each calendar day. As there are in this section two lines of four positions each, upon which two engines are undergoing the same stage of repair coincidentally, this means that no given engine may remain in the section for a longer period than four days, and that two engines are transferred to section D every day. All moves are made at the beginning of the night shift, by a gang of men specially trained to this job.

Section C is supplied with engines from section A or section B, the work upon which has advanced to within four days of completion; or direct from the unwheeling pits, with engines which require not longer than four days to make the entire repair.

The first move each night is to run two engines from

spots 25 and 26, section *D*—now upon their own wheels—cut into the yard to be taken to the finishing shed. The switching engine handles this job. Engines upon spots 23 and 24 are advanced to the vacated places and those upon spots 21 and 22 are moved forward correspondingly. This move leaves spots 21 and 22 uncovered, and upon them is immediately assembled the running gear of the engines occupying spots 16 and 20 of section *C*.

Engines upon spots 16 and 20 are now lifted by the cranes and deposited upon their wheels on spots 21 and 22; those upon spots 15 and 19 are advanced to 16 and 20, respectively, and all other engines in section *C* are moved forward correspondingly to leave spots 13 and 17 uncovered for the reception of engines from the preceding sections or from the unwheeling pits, as previously noted.

Engines Unwheeled Before Entering

Two unwheeling pits are located immediately to the right of section *A*, at the entering end of the shop. To them two engines are delivered each day from the track leading from the sand-blast house. A gang of men starts at once upon the work of preparing them to be lifted from their wheels, so that, by the time the moves within the several sections have been made, these two engines are ready to be deposited in the finally vacated positions, which may be in any one of the three sections, according to the nature of the repairs to be made upon the incoming locomotives.

The two engines hauled away from positions 25 and 26, section *D*, are coaled and watered in the yard, after which the switching engine takes them to the finishing shed, Fig. 2, for minor adjustments preparatory to road service. Here they are fired, and for the first time move under their own power. As in the locomotive shop, they advance progressively from one position to another, and in the final position they are spray painted.

An outstanding advantage claimed for the progressive assembly method as applied to locomotive repair is that each part of the work is performed in a definite place. The several parts repair departments of the shop may be located adjacent to the positions where the parts are to be applied to the engine, and thus much long-distance trucking is avoided. Operations requiring steam, air, gas or water can be performed close to the source of supply and the promiscuous distribution of these commodities by long lines of hose, with attendant difficulties when such lines of hose are inadvertently cut, is forestalled.

Portable tools and their accessories are always at hand when needed; never at the other end of a shop a quarter of a mile long. Last, but by no means least, each job is handled by gangs of men who are trained to that job, who are not widely separated, and who have all the appliances necessary to their respective trades ready to their hands.

All newly overhauled engines are given a running test of about two hours' duration over what is called a "slip" track in the yard. The track is about half a mile in length and has a pronounced hump about midway of its length. The rails of the track are well greased, and this condition is maintained by allowing grease to drip from two small tanks secured temporarily to the pilot of the engine under test.

An engine starting from either end of this track is faced with a considerable grade, up which it climbs quite slowly, though the machinery may be running at a rate of 50 or more miles an hour. Passing over the hump, the engine is reversed and the locomotive slides slowly down the descending grade, often with its wheels running at equal speed in reverse direction.

This manner of testing allows the inspectors to ride upon exposed parts, or even to walk beside a locomotive which is running at normal road speed, yet advancing so slowly that they may observe clearly the action of the machinery under the equivalent of actual road conditions.

Visual Record in Superintendent's Office

To enable the general superintendent of shops to keep in close touch with the work in progress, the board shown in Fig. 3 is affixed to the wall of his office, in a position where it may readily be observed from his desk. Round tags, each bearing the number of an engine in the shops or yards, are hung upon convenient hooks on the board, to show where each engine may be found.

Rapid progression of the work involves the shifting of these tags from one position to another every day, as the engine itself moves through the shops. As all the moving is done at night, it becomes an easy matter for the official having the work in direct charge to change the tags each morning to correspond with the actual moves already made. The superintendent is thus prepared at a glance to answer any question that may come in from the various divisions of the road as to the progress of work upon any given engine, and the date upon which that engine may be delivered to service.

Beautifying a Factory Entrance in Illinois

THE entrance to the plant of the Whiting Corporation, Harvey, Ill., was recently awarded the second prize in a contest conducted by the "Illinois Journal of Commerce" to determine the most attractive factory dooryard in the State. The competition was carried on in an effort to arouse interest in better factory surroundings



Anti-Trust Law Repeal Unnecessary

Trade Commission, Under Broader Interpretation of Its Powers, Can Help Industries Stamp out Competitive Excesses

BY ABRAM F. MYERS*

A CHARGE frequently hurled at the anti-trust laws is that they make competition a fetish; that competition has been exalted over all considerations of economy and efficiency. These flights are, for the most part, purely rhetorical. The competition that the anti-trust laws would preserve is not the jungle competition that the critics of those laws imagine. The anti-trust laws recognize that not all competition is good, and that unrestrained competition is bad. They have been as often invoked for excesses of competition as for the suppression of competition.

The test of the legality of a corporate combination is not the amount of inter-company competition that is suppressed, but whether the competition it affords is fair or oppressive. And the Federal Trade Commission Act has for its main purpose the prevention of unfair methods of competition in interstate trade and commerce.

Sees Wider Field of Usefulness for Commission

It is on the proper interpretation of the words "unfair methods of competition" that the ultimate reconciliation of the proper needs and aspirations of business with the law depends. The commission has, and was intended to have, a wider field of usefulness than the mere prosecution of individuals and concerns for the use of unfair competition. Also it is clear that the language of the statute is not to be limited to common law definitions. It is the formula whereunder the commission may and does cooperate with industry, through the trade practice conference procedure, in writing codes of ethics that are bringing about that degree of proper and desirable stabilization compatible with American institutions and ideals. In this way the commission is making good the prediction of the late Senator Cummins in a speech in the Senate on Sept. 7, 1914:

I predict that in the days to come the Federal Trade Commission and its enforcement of the section with regard to unfair competition will be found an anchor for honest business. I believe it will introduce a stability in business that hitherto has been unknown. I believe it will restore confidence among those who are conducting their affairs honestly and uprightly. I believe it will be found to be the most efficient protection to the people of the United States that Congress has ever given the people by way of a regulation of commerce, and that it will rank in future years with the anti-trust law; and I was about to say that it would be found still more efficient in the creation of a code of business ethics and the establishment of the proper sentiments with regard to business morals.

How Commission Enforces Ethical Codes

A trade practice conference is authorized by the commission on the application of a substantial part of an industry, usually made through their trade association. The industry is thereby enabled to write its own code of ethical and economic practice, subject to approval or rejection by the commission in the public interest.

Resolutions aimed at practices illegal per se are placed

in Group I, and the commission undertakes to enforce compliance therewith by proceeding against all violators, whether they have subscribed thereto or not, under Section 5 of the Trade Commission Act. Resolutions placed in Group II are aimed at practices that have not heretofore been held unlawful by the commission or the courts. The secret violation of such a resolution by one who has openly subscribed thereto, and has led his competitors to believe that he will observe it, will result in a proceeding by the commission on the ground that such secret violation is in and of itself an unfair method of competition.

Thus these codes for the strengthening and uplifting of American industry are made enforceable in every particular save one. The commission has not yet undertaken to enforce resolutions of the character included in Group II against a recalcitrant minority who will not subscribe thereto.

The absence of means for the enforcement of Group II resolutions against non-subscribers has proved a serious stumbling block to the efforts of many industries at self-regulation. Thus the manufacturers of knit underwear at a recent conference declined to adopt resolutions fixing standards for the wool content of "part wool" garments because they could not be assured of protection against the competition of the low-content manufacturers. Thus a grave question is presented as to whether codes of ethics for American business are to be written by a progressive majority, or by a reactionary minority. For it often happens that a recalcitrant 15 or even 10 per cent of an industry, seeking and obtaining a competitive advantage by persisting in practices which the majority have proscribed, eventually brings all down to its level, and in this way praiseworthy efforts to elevate the standards of an entire industry may be defeated. In this fashion the minority effectively imposes its will upon the majority.

Commission Cannot Originate Code

The remedy for this, if any there be, lies in the gradual expansion of the commission's powers under existing law, rather than in new legislation. It is doubtful if the building up of a new code of business practice will lend itself to Congressional definition. Certainly any attempt by Congress to decree by law that the minority in an industry shall conform to the wishes of the majority in respect to practices never heretofore regarded as unlawful would meet with determined opposition and would give rise to grave questions of constitutional right. In any such proposal provision would have to be made for an umpire to guard the minority against oppression and the public against extortion.

The courts at a time when the Federal Trade Commission was regarded as a none-too-constructive agency gave to the words "unfair methods of competition" a somewhat narrow interpretation. They held that the words did not apply to practices not characterized by fraud, deceit, bad faith or oppression, or which did not tend to restraint of trade or monopoly. But this definition was given in cases

*Federal Trade Commissioner. From address before American Institute of Steel Construction at Biloxi, Miss., Nov. 15.

in which the commission had attempted to apply the law to practices of which it did not approve, without regard to legal precedent and contrary to the customs and usages of trade. The courts put an end to the notion that the commission could evolve out of its inner consciousness a business code with the binding effect of law, and by way of emphasis went further than was necessary to achieve their purpose.

Code Should Be Sponsored by Clear Majority of Industry

What of a code of fair trade practices for each industry, written by the overwhelming majority thereof, with the Federal Trade Commission as arbiter? The language of the statute is not like a crystal, fixed and unchangeable; it is applicable and has been applied to many practices not specifically in the minds of the lawmakers when the act was passed. The question is simply one as to the extent to which the customs and needs of the preponderant part of an industry may be taken into account by the commission and the courts in deciding what are, and what are not, unfair methods of competition. No case involving a practice formally condemned by a clear majority of the industry involved has been presented to the courts together with the fact of such condemnation.

Approached from this angle the element of coercion is greatly minimized and the grave constitutional questions largely disappear. It is not a case of galvanizing the will of the majority into law. The needs and customs of the majority are merely taken into account in applying the law now on the statute books. The plan contemplates an administrative and (if sought in individual cases) a judicial weighing of the relative merits and advantages of the proposals of all interests concerned. It further contemplates the rejection of any and all measures that would work undue hardship on any member or branch of the industry in question, or on the public. And it is founded on the conception that the minority has no greater right to impose its will on the majority and on the public, by standing in the way of important reforms in the public interest, than the majority has to impose its will on the minority by insistence on measures that would unduly prejudice the rights of such minority.

Outlawing Practices Admittedly Unlawful

On the question whether the experiment is worth making let us consider the possibilities of the procedure as indicated by more than 40 successful trade practice conferences already held. In the beginning the conferences were largely confined to outlawing practices admittedly unlawful. It is not to be inferred, however, that these conferences had no constructive value. They had the effect greatly to elevate the standard of ethics in the industries involved; to protect honest manufacturers and dealers against the unfair competition of their unscrupulous rivals; and to restore and increase public confidence in such industries. Certainly no one can question the benefit to all concerned from the wholesale elimination of such pernicious practices as short weights and measures, false advertising and misbranding.

Believing that the establishing of standards of quality in commodities was the greatest single reform that could be accomplished for the protection of the public, the commission widened the scope of its conferences to include content and quality definitions of furs, "Castile" soap, engraving and embossing, gold-filled watch cases, rayon, furniture, woven furniture, rebuilt typewriters, plate glass and hickory handles. The hickory handle conference is significant in its bearing on the future usefulness of the trade practice conference procedure, in that the standards of quality adopted at the conferences were those which had previously been worked out by representatives of the industry in cooperation with the division of simplified practice of the Department of Commerce. In other words, the subscribers

to the conference rules availed themselves of this means of translating the beneficent results of the helpful cooperation of the Department of Commerce into a binding agreement.

Scope of Trade Practice Conferences Broadening

In the past year the conferences have been even more constructive from the standpoint of the industries affected. Resolutions have been adopted providing for the publication of prices realized in actual transactions; condemning price discrimination in the language of Section 2 of the Clayton Act; declaring against the payment or allowance to buyers of commissions, bonuses, rebates or allowances of any kind; against the rendering of unusual services or the assumption of unusual charges without charging the customer therefor; against discrimination in price resulting from the allowance of quantity discounts on split shipments; against selling goods below cost; and against the dumping of considerable quantities of goods in territories outside of the subscriber's particular markets and selling such goods at prices below those prevailing in his own territory.

This brief review of recent accomplishments seems also to me to reflect the current trends of thought in Government and in industry. So far as possible the adjustment of the aspirations and needs of business with the law will be accomplished through conference and cooperation. Competition is to be preserved and the undue concentration of economic power avoided by encouraging and approving that degree of cooperation between independent businesses which will enable them to survive the competitive struggle and remain independent. Waste is to be eliminated and the public protected by the establishment of standards of grade and quality. And the extremes of overproduction and underproduction are to be avoided, and stability of employment promoted, by encouraging the dissemination and intelligent use of the essential facts of industry.

Firm Price Policy to Be Encouraged

Care in the pricing of products and the avoidance of secret departures from prices openly established will be favored to the end that industry may not be plunged into price wars to their impoverishment and demoralization. As in the past, the use of approved methods of cost accounting will be urged. The adoption of and adherence to a firm price policy will be encouraged. Such a policy is in keeping with Section 2 of the Clayton Act and is justified on other grounds as well. The products of one industry are the raw materials of another, and discrimination between competing concerns in the matter of prices on necessary materials, not based on differences in quality or quantity, will in the end give rise to the very evils that it is the purpose of the anti-trust laws to prevent.

At this stage we might well inquire what scope would be left to competitive effort under such a policy? What protection is afforded the public, and what becomes of the highly developed professional purchasing agent? I firmly believe that under such a system competition would continue to be the great regulator of our domestic economy. There would be no decrease, but a marked increase, in the steady march of progress. The struggle for greater efficiency, for the elimination of waste and for fixing standards of quality would continue with renewed vigor. Prices would be fixed not in concert, or by agreement, but by each industrial unit acting singly, and they would reflect the relative efficiency and individual policy of each concern. The striving for improvement in the quality of output would be unhampered by the temptation or need to lower standards in an effort to realize a profit in a chaotic market.

Rationalization Program Requires No Trust Law Tinkering

Under such a system the professional buyer would find ample opportunity for the legitimate employment of his talents. He could still shop for the lowest prices and the

best quality. But the lying buyer would be effectively stopped, because the price quoted him in each instance would be the best that the bidder could offer, having due regard to the situation in his company and the prosperity of his industry, and would not be shaved to meet supposedly lower prices by competitors which actually existed only in the imagination of the buyer.

With the prospect of such a policy of rationalization under enlightened leadership in industry and an administration committed to cooperation and engineering efficiency, what is to be gained by trust law tinkering at this time? That peculiar conditions in the coal and oil industries call for special attention is admitted. As a member of the committee of nine of the Oil Conservation Board I joined in a recommendation for a modification of the anti-trust laws to meet the peculiar needs of the oil industry, and that recommendation has been indorsed by the American Bar Association. Section 7 of the Clayton Act exists as a nuisance

law in that it is wholly ineffective to prevent mergers and only makes them more troublesome and expensive. But a proposal to repeal that provision might encounter as much sentiment in favor of preventing mergers as in allowing them, and no one can predict what the outcome would be. That there should be some rationalization of the law with respect to the maintenance of resale prices on competitive trade-marked goods is attested by the hopeless confusion into which this subject has been plunged by the conflicting and inconclusive decisions of the courts.

With these exceptions I can see no good end that can be served by the repeal or a general modification of the anti-trust laws. I do not believe that the country will ever abandon free and open competition as the keystone of its economic policy. An enlightened administrative policy will enable us to retain all the benefits of competition and to eliminate all that is bad. That the realization of these ideals is possible is attested by the accomplishments to date.

Central Welding Shop Leads to Economies

Modest Equipment and Resourceful Workmen Available for Repair,
Construction or Production in All Metals

BY T. C. FETHERSTON*

IT is frequently found that in plants which have had a cutting and welding outfit for a long time no clear idea is had of the maximum usefulness of the oxy-acetylene process. Thus a sheet metal company might purchase equipment to oxweld a particular lot of tanks and fail to realize, when a brake frame cracks, that there is already

Conditions of this sort are not conducive to true economy because all available resources are not being utilized. But, on the other hand, it would seldom pay to employ a man solely to look for places to use the cutting and welding blowpipes. The best procedure is to let new applications come to light naturally.

This is done quite readily by establishing a central welding department or shop. It is not necessary that all oxy-acetylene operations be carried on in a special building, but rather that they be organized and assigned definite headquarters. Then if the machine shop wants a foot treadle repaired there is a place to take it. Or if the men tearing down old equipment want some steel work cut away there is a definite place where they can locate a "cutter" with the necessary equipment.

A central welding shop accomplishes several things: Operators know where to find apparatus; shop foremen know where to go to have cutting and welding jobs done; a shop warrants a welding foreman of more than ordinary ability; and executives have a means of keeping welding costs.

When one considers the number of jobs and diversity of work which can be done by such a department it can readily be appreciated that the shop need never be without work of some kind, even though it is quite modest in size and equipment. If there is no production work, the operators can always reduce the plant's scrap pile either by reclaiming material or by cutting up worthless junk. A well managed central welding shop will prove a real boon to any plant. It can be a self-contained unit, always busy and always assisting in cutting down operating expenses.

Development of the use of steel as a building material for bridges is dealt with in a 20-page booklet just issued by the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York, entitled "Endurance and Beauty in Steel Bridges," by Charles Evan Fowler, consulting engineer. The booklet traces the uses of iron and steel in bridges from the last quarter of the eighteenth century down to the present time and discusses the advantages of the various types of steel spans now being constructed.



A Good Welding Shop Without Elaborate Equipment. At right is oxy-acetylene equipment on a hand truck; another set is at the welding table in center; on wall is welding rod rack and at left is lime bin for annealing castings. In foreground is a variety of work done on steel, iron and alloys

on hand a means of speedy and economical repair. Again, a manufacturing plant might buy an outfit solely for repair work, never realizing that the welders could take an important place in direct production. Or a company might use its outfits for both repair and production work without thinking that they could also be used to install pipe lines, or to cut up scrap.

*Technical Publicity Department, Linde Air Products Co., New York.

French Industry Active, Wages Low

High Output Contrasts with Lagging Production and Continued Unemployment in Britain—Buying Power of French Workman Small

BY EDWIN C. ECKEL*

PARIS, FRANCE, Oct. 25.—It has been necessary to spend the past two months in northern and northwestern France, mostly in mining and manufacturing districts, so that it has been possible to get at least a rough idea as to wages, living costs and other industrial conditions in France at the present time. An incidental stay of a week in England has furnished certain data and impressions that I am using here as convenient contrasts to French conditions. I say "contrasts," because as a matter of fact there are far more points of difference than of agreement in the present industrial and economic status of the two countries. Among the main points on which considerable differences now exist are wage scales, living costs, unemployment, tax and tariff policies, labor views, manufacturing costs and export possibilities. It will be seen that some of these are likely to touch our own interests rather closely.

French Industrial Output at New Peak

As offering perhaps the best general guide to the present status of French industry, the following official indexes of production, using 1913 as a base of 100, are of interest. From the entire mass of data available I have selected certain critical years and dates, and certain important industries.

Indexes of French Industrial Production, 1919 to 1928

Year	General Aver.	Metal-lurgy	Textiles	Auto-mobiles	Building	Paper	Leather	Rubber
1919	57	29	60	..	16	51	102	305
1920	62	41	66	..	27	65	88	233
1921	55	41	52	..	23	50	75	230
1922	78	61	84	..	37	60	94	359
1923	88	68	83	..	58	80	103	416
1924	108	94	85	..	74	77	110	538
1925	107	101	85	..	80	83	104	502
1926	124	113	94	..	102	90	128	599
1927	109	112	90	..	72	83	103	547
1928 (Jan.)	116	118	100	..	68	75	118	555
1928 (Mar.)	123	125	102	624	79	..	..	538
1928 (Aug.)	128	126	100	670	98	..	..	595

The table brings out very strikingly the two main facts as to the French industrial situation: First, that French industry regained its old levels very slowly, reaching on the average its 1913-1914 productivity not until 10 years later (1923-1924); that it then rose rather rapidly to a new high point in 1926; and after a notable but short relapse in early 1927 has now, in the latter part of 1928, reached an entirely new peak, even higher than its 1926 maximum. Second, that this advance is very irregular as between trades; the automobile and rubber factories show phenomenal gains over pre-war years, while the paper, textile and building trades are either worse off than 15 years ago or not above their 1913-1914 status.

As compared with this great increase in French industrial production we may note that, though the United States shows an even greater gain (155 in 1928 as against a base of 100 in 1913), Great Britain has never been able to regain its pre-war level, the British indexes standing at:

1913.....	100
1925.....	87
1926.....	67
1927.....	96
1928 (Feb.)	93.4

*Mining geologist, 1503 Decatur Street, Washington.

The sequel to this is, of course, that there is this year practically no unemployment anywhere in France, while there is a good deal of forced idleness in Great Britain. What struck me most in London, perhaps, was that there were able-bodied men begging on the streets—something that I don't recall having seen in Paris at any time in the last 10 years. Recalling that the British Government is pretty well committed to a permanent policy of pay for the unemployed, it is clear that the economic conditions there are at the moment less favorable than those in France.

For those who are fully employed, English wages are, of course, far higher than French, class for class, though also far lower than American. French wages are, as a matter of fact, pretty miserable, and do not in any case leave a reasonable margin of buying power for the laborer, above his strict necessities. And that fact reacts finally on the profits of the French manufacturer and shop-keeper, for you cannot expect to make much money in selling goods to poorly paid workmen. We all talk prettily at times about the French genius for economy; but there is nothing pleasant about a wage scale that does not permit anything but economy.

So far I have not been able to find any official data on French average wages—except for the coal miners, which I shall discuss later. But in my visits to various mine and mill centers I have put together the results of talks with managers and miners, and the general result is as follows:

The immediate Paris region is a region of relatively high pay for skilled mechanics, owing probably to the boom in motorcar and related industries. A skilled workman in a Paris factory or mill may make 5 to 6 fr. (20 to 24c.) an hour. On the usual 8-hr. Paris day his daily pay may therefore run from \$1.60 to \$1.92. But this is a very exceptional rate of pay for France, and its occurrence in a few favored industries in the Paris region does not affect the national average very seriously.

In mining regions and in the smaller industrial towns the pay of a miner, quarryman, mason, carpenter or other skilled worker does not ordinarily run above 4 fr. an hour at the best, and in some places averages nearer 3 or 3½ fr. an hour. At several large mine and quarry operations which I visited lately, employing together a good many thousand men, the average daily pay did not in any case rise above 24 fr.—say 95c. a day. In the Lorraine iron region it is higher—around \$1.28 a day for miners. In the north French coal mines exceptionally detailed and reliable figures happen to be available. These show that the underground miner averages from \$1.20 to \$1.28 daily in the three important Northern fields, while the surface worker in the same fields averages from \$1 to \$1.04 per day worked. Since some of the south French fields are on even lower pay scales, the final result is that the average French miner, underground and surface, in all French fields, received \$1.13 per day in 1926 and around \$1.24 last year.

In the mines I have seen, the piece-work scales are set so low that they rarely permit the piece-worker to earn

more than a common laborer on hourly pay—a condition that does not encourage the men to take over jobs on that basis. So one incentive to increased output is entirely lacking.

French Workers Have Limited Buying Power

Taking all the data into consideration, it seems probable that the French output of iron ore, coal, pig iron, steel and steel products, cement, clay products and all other heavy products is being made today on a wage scale that certainly

does not average over \$1.20 per day and more likely averages not much over \$1 daily. And, as I shall try to show later, a dollar does not go very far, even in France, in the way of buying food, clothing and shelter. As for the other things that our people have come to look upon as almost necessities, they are of course entirely out of the question. If Mr. Ford should try to market his car at \$100 in France, I do not think there are a hundred skilled laborers here who could afford to buy one.

Locomotive Frames Cast on Edge

New Method of Molding These Large Steel Castings Found to Give Notable Results—Mold Made Entirely of Cores

FOR many years the conventional method of molding locomotive engine frames was "on the flat" through the use of a one-piece pattern and a long two-piece built-up flask. The molds therefore were long, unwieldy, quite difficult to handle and were likely to warp during the mold drying operations, unless every precaution was taken to prevent this.

Although engine frames molded by the method just mentioned are usually cast flat, a few attempts have been made during the past few years to cast them on edge, with varying success. The accompanying illustrations show the method used by the American Steel Foundries at its Chester, Pa., foundry in molding frames so that they may be successfully cast on edge.

Steel Form Instead of Flask

Replacing the flask is a machined steel form shown in one of the illustrations upon which cores forming the mold are placed in an upright position. The form itself is a substantial affair in a fixed or permanent location, being solidly bolted to a concrete foundation.

The sand portion of the mold consists of two sets

of dry sand cores in section. The back sections, the first placed in the form, contain the impression. The front sections are usually straight faced slab or cover cores. When all cores have been carefully put in place, they are backed up with heavy steel plates rigidly clamped into position which prevent any movement during the pouring operation. The bare form and method of clamping is shown in another illustration.

Cores Do Not Require Long Drying

The box from which cores are made is the usual rectangular wood affair, with a section of the pattern formerly used for flask molding built in for the impression. The cores, which are rammed on a jarring machine or sand slinger, are of such size that they are readily handled and do not require the lengthy drying ovens necessary for flask molded frames.

The form method of molding not only permits edge pouring of the casting, but also allows the placing of the gate and risers at such points as to assist best in accomplishing the desired results, symbolized in the third illustration—a solid casting.

Tool Steels of the Chemical Analyses Shown Have Given Excellent Service

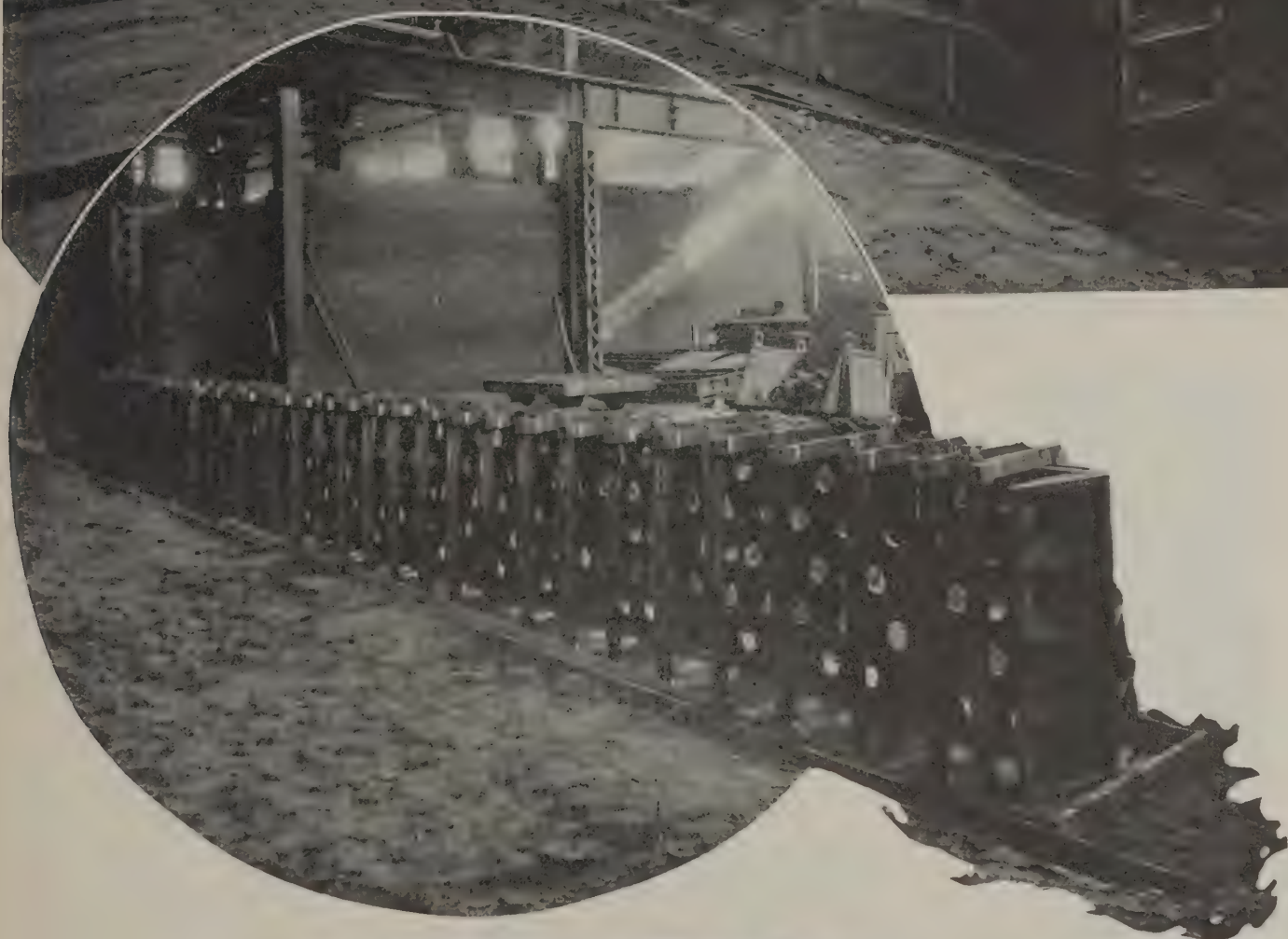
BY E. E. THUM

IN view of the fact that there are about 675 tool steel brands offered to American users by some 60 firms, the puzzled buyer may at times wonder which one is best for his purpose. If he wishes to judge by chemical composition, his problem is simplified somewhat. The adjoining table represents good practice—that is to say, fine steels

of the composition listed, when properly formed and heat treated, will give excellent service for the class of work indicated. It should be remembered, however, that there is one important ingredient in all tool steels which does not appear in the regular chemical analysis, and that is the craftsmanship of the steel maker.

Chemical Analyses of Excellent American Tool Steels

Plain Carbon Steels:	Carbon	Silicon	Manganese	Chromium	Tungsten	Vanadium
Sledges and hammers.....	0.60 to 0.70	0.25 to 0.30	0.25 to 0.35	All alloy metals (except perhaps vanadium) should be excluded		
Pneumatic tools.....	0.80 to 0.90	0.10 to 0.40	0.15 to 0.35			
Keen edged tools.....	1.1 to 1.3	0.10	0.10 to 0.20			
Non-deforming, oil-hardening steels for gages.....	0.80 to 0.95	0.30 max.	1.0 to 1.1	0.40 to 0.50	0.40 to 0.50	0 to 0.20
"Finishing steels".....	1.1 to 1.2	0.20 to 0.40	0.20 to 0.35	0.40 to 0.50	1.4 to 1.7	0.10 to 0.20
"Fast finishing steel" (Mushet).....	1.0 to 1.3	0.20 to 0.40	0.20 to 0.35	0.20 to 0.40	3.0 to 4.0	
Battering tools.....	0.35 to 0.55	0.30 max.	0.20 to 0.30	1.3 to 1.6	2.0 to 2.3	0.20 to 0.30
Hot-working dies.....	0.30 to 0.35	0.30 max.	0.20 max.	3.2 to 3.4	9.5 to 10.5	0.40 to 0.50
Cold-drawing dies.....	2.1 to 2.5	0.35 max.	0.50 max.	13.0 to 15.0		
High-speed steel (high-tungsten).....	0.65 to 0.70	0.25 to 0.30	0.25 to 0.30	4.0	18.0	0.80 min.
High-speed steel (low-tungsten).....	0.60 to 0.75	0.25	0.25	4.0 to 4.5	14.0	1.6 to 2.0
High-speed steel (cobalt-bearing).....	0.60 to 0.75	0.25	0.25	4.0	17.5	1.0.....
						{ Cobalt 4.0 to 5.0 Molybdenum 0 to 1.0



IN the Upper Picture One-Half of a Locomotive Engine Frame Mold, Using Built-Up Dry Sand Core Sections, Is Shown, So Arranged That the Frame May Be Cast on Edge. The central illustration shows the mold form with clamps and tie bars used to fasten in place the dry sand core sections which comprise the mold. The lower illustration reveals the final casting with gate and risers as it appears when removed from the built-up core section

Mills to Cooperate with Fabricators

Program Outlined at Biloxi Meeting to Increase Markets and Stabilize Structural Steel Business

DEFINITE accomplishments in the form of a better understanding of the mutual problems affecting structural steel fabricators and the rolling mills of the country came out of the sixth annual convention of the American Institute of Steel Construction, Inc., which was held at the Edgewater Gulf Hotel, near Biloxi, Miss., Nov. 13 to 17. A partial report of this meeting appeared in *THE IRON AGE* of Nov. 15, page 1235.

Representatives of steel producers, on the one hand, expressed appreciation of the constructive work being

markets and protect the present high measure of prosperity.

The necessity for the structural steel industry to sponsor a comprehensive national advertising program to inculcate a "steel consciousness" in the minds of the architect, the engineer and the builder also was stressed.

Outstanding on the program was the annual banquet at which Charles M. Schwab, president of the American Iron and Steel Institute; Right Honorable Arthur Meighen, former premier of Canada; and Lieutenant-Commander C. E. Rosendahl, commanding officer of the United States airship *Los Angeles*, were the speakers.

Assessments Increased to Pay for Promotion Work

That the members of the institute are desirous of expanding its promotion work was indicated by the agreement at the final session to increase the tonnage assessment of the members for the coming year so that the organization can assume full financial responsibility for its corps of district engineers. With the increased revenue accruing from this arrangement, it is probable that the number of district engineers will be increased from 10 to 14.

Mr. Schwab, in his address, stated that no plant of his would be allowed to compete with independent steel fabricators and that differences between the rolling mills and the fabricators should be settled by mutual cooperation. He reiterated his opinion that the major problem of the steel industry is to distribute its products

more intelligently and that in order to do this the so-called anti-trust laws should be amended to permit of wider latitude in achieving the desired results. He declared that a one-price policy, if generally adopted by steel mills, would go far toward stabilizing conditions in the industry.

The foremost problem confronting those engaged in the development of airships is the creation of mechanical facilities for handling craft on the ground, said Lieutenant-Commander Rosendahl. The storage of helium gas in underground cylinders and in tank cars, as well as the construction of



Charles N. Fitts, New England Structural Steel Co., Boston, New President



W. M. Wood, Mississippi Valley Structural Steel Co., Retiring President

done by the fabricators through the medium of the institute and voiced their desire to cooperate for the benefit of the industry as a whole. The fabricators, on the other hand, declared their satisfaction with the growing willingness of the rolling mills to assist in carrying on a program designed to increase markets and to stabilize conditions within the structural steel business.

Pertinent to this program was the declaration of Abram F. Myers, member of the Federal Trade Commission, Washington, that the Federal Government looks with favor on cooperative effort within an industry to bring about sounder economic conditions and that the anti-trust laws in nowise restrain cooperative action in that direction, provided that suppression of competition is not the motive. He advocated the extension of the powers of the commission to effect a "rationalization" of prices which will stabilize



F. H. Frankland, Now in Charge of the Technical Service of the Institute

hangars and of mooring masts, involves the use of steel.

Rolling Mills Urged to Cooperate

That the rolling mills as a group should cooperate with the institute in carrying a reasonable portion of its budget and that there is much in the present situation to encourage the belief that ultimately such assistance will be given was the opinion expressed by President W. M. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill., in his annual report. Mr. Wood discussed the relations of the fabricators with the mills, with the public and with their competitors, in the latter case pointing out that the joint activities of the members in the interest of a common cause have done much to break down old prejudices.

Mr. Wood further set down some of the factors which will bring profits to individual fabricators. He urged the

adoption of a cost accounting system and stated that unless an organization has a policy of adding a profit to its determined cost when submitting a bid it has no hope of success. He said that sales efficiency should be studied and developed far beyond the custom of most fabricating plants today and that a serious effort should be exerted to bring about a sane adjustment of supply to demand. Mr. Wood suggested that each fabricator make a comparison of his plant capacity with the tonnage which can reasonably be expected to come out of the territory in which he can operate most economically and then adjust his policies to conform to the situation. Some fabricators, finding their capacity greater than the business which they can reasonably obtain, have endeavored to improve their own position by reducing prices, thereby hoping to increase sales. However, the result has been that little, if any, more work has been obtained and, in addition, the jobs which would have shown a fair profit have been taken at a loss.

Declaring that fabricators should avoid scattering their sales effort, Mr. Wood proposed that they should develop a definite selling program and consistently adhere to it. In connection with this program each fabricator should make a careful study of the nature of the work which he can handle profitably, as well as of the classes and types of customers he can best serve. In concluding his report, Mr. Wood stated that the greatest need within the industry is sane and constructive leadership.

Uniform, Stable Prices Desired

CULTIVATION of friendly relationships with rolling mills, especially with those having fabricating departments, was recommended to the association members by the mills relations committee, of which H. A. Fitch, Kansas City Structural Steel Co., Kansas City, Kan., is chairman. This can be accomplished by each fabricator operating within his own province and having respect and consideration for the province of others. The committee stated that "this is not a mere theory. It has the elements of a practical and immediate solution of the rather unsatisfactory competitive condition now existing in the industry."

Independent fabricators should recognize the logical existence of the present fabricating departments of rolling mills, while the rolling mills, on the other hand, should recognize the necessity and value of the independent fabricating plants as an important medium for the distribution of their products and therefore should foster and protect them in that capacity.

So far as stable prices for plain material are concerned, the committee expressed the belief that "a uniform and stable price on rolling mill products applicable to all projects and all fabricators alike, with certain logical differentials, would be a potent factor in enabling our industry to stabilize the price of its product."

Since any fabricator with a reason-

able assurance of uniform operation at a fair uniform profit would be willing to maintain his plant at 60 to 70 per cent of normal capacity, the committee urged the members of the association to establish as a cardinal principle this thought: "Uniformity not volume, coupled with a constant concern for the uniform operation of your competitor's plant as well as your own."

Says Associations Should Combine for Publicity and Research

SPEAKING of the significance of local trade associations in the steel industry, Dr. Frank Parker, executive director of the Structural Steel Board of Trade of Philadelphia, declared that the local structural steel board of trade can improve the internal relations existing between local fabricators and can facilitate, expand and intensify the work of the institute in preparing and developing adequate printed publicity by aiding, through personal contacts previously established, district field engineers in every phase of their work and by creating new contacts for the institute, enabling it to extend the different phases of its national program.

Admitting that the problems of steel mills differ from those of the fabricators, Dr. Parker stated that nevertheless the essential economies which might be realized from a combination of trade association activities should be considered. He pointed out that more efficient results per dollar of expenditure for publicity and research could be achieved in the iron and steel industry by having the program of the various associations devised and controlled by a central administrative staff. To insist that the existence of individualistic problems automatically estops united effort can hardly be regarded as following the rule of rea-

son. Dr. Parker said that "in dealing with this aspect of trade association work what is needed is an unbiased attitude of mind in order that the merits and demerits of this suggested program may be given a fair hearing. The need for this impartial pondering of the facts becomes more evident when the history of the inauguration of some of our trade associations is scanned."

Dr. Parker expressed the opinion that the movement toward consolidations in business enterprises may tend to check further expansion of trade associations, but, on the other hand, individual enterprises banded together in existing associations may, by cooperative effort, put the association movement on a sound and permanent economic basis.

F. H. Frankland, in charge of the technical service of the institute, outlined the activities of the institute's field engineers, pointing out the valuable educational work they are doing to arouse a "steel consciousness" on the part of the public, of the engineering and architectural professions and of the building industry. However, he said that the district engineers are of the opinion that this task cannot be accomplished without the assistance of a comprehensive advertising and publicity campaign to acquaint the public with the merits of structural steel. Incidentally, it has been possible to trace to the district engineers the decisions of builders to construct steel structures requiring 43,250 tons of steel.

Technical Research Committee Studies Welded Joints

THE work of the committee on technical research has been confined to cooperation with the structural steel welding committee of the American Bureau of Welding, which was organ-



W. M. Wood, Retiring President of the Institute, Using a "Steel Carpenter," Which Makes It Possible to Cut a Steel Beam With a Blow Torch

ized to obtain reliable information upon which could be based safe unit working stresses in designing welded structures, stated Aubrey Weymouth, chairman, in his report to the convention. The committee studied all available literature giving the results of tests on welded joints from which unit working values could be deduced. To secure further data which would represent standardized conditions and which would give unit values applicable to the types of joint, thicknesses of material and sizes of weld most commonly encountered in structural steel work, a program was prepared covering 57 forms of joint in 191

tion, and each of these organizations will be asked to contribute by April 1, 1929, an amount similar to that donated in the past year to carry on the committee's work. The committee recommended that the institute appropriate its share of the money for this purpose.

Measuring Wind Strains on Steel Columns

A proposed investigation of measuring strains on the steel columns of the 48-story tower building of the American Insurance Union at Columbus, Ohio, was reported by the committee on wind bracing, of which



Charles M. Schwab, Who Was the Principal Speaker at the Banquet, Also Played Golf at the Institute Convention. This foursome (left to right) was J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind.; Mr. Schwab; Right Honorable Arthur Meighen, former premier of Canada, and C. M. Denise, McClintic-Marshall Co., Pittsburgh

sizes welded by the arc and gas processes. Specimens were of the elemental type and embraced fillet welds of lap and tee form, end and butt welds and special joints. Single and double lines of weld, normal parallel and diagonal to the direction of the stress, continuous and intermittent, were specified.

Commercial Uniformity

To determine what degree of uniformity may be expected in commercial practice, multiple specimens of each type and size were scheduled and are now being prepared by about 36 representative fabricating shops of the United States and Canada. Operations will be governed by uniform procedure and inspection regulations. An important part of the program will be the keeping of records as to the sufficiency of these regulations. Because of the magnitude of the undertaking, it was decided to give the proposed program a preliminary trial. A series of pilot tests has been made by Prof. Peter Gillespie of the University of Toronto, these tests having involved the preparation and testing of 342 specimens. The results of the tests will be embodied in Professor Gillespie's report soon to be published.

The committee has received funds from the institute, the International Acetylene Association and the National Electrical Manufacturers Association,

Aubrey Weymouth is chairman. The committee was created by the board of directors in March, 1928, as a result of a paper presented at the 1927 convention by Prof. Clyde T. Morris of Ohio State University, and the institute has established a fellowship in structural engineering at Ohio State University for the college year 1928-1929. The investigation is being made by a fellow under the supervision of Professor Morris.

Structural Steel Hangars Are Declared Most Satisfactory

Airports to be self-supporting or to make a profit must be operated by as few efficient mechanics as possible, said Maj. Frank M. Kennedy, Air Corps, United States Army, in discussing flying fields. Every foot of space saved in moving a plane reduces handling costs and therefore a hangar 110 ft. wide, 20 ft. high and 120 ft. long is the most economical. These dimensions conform to the established ratio between width and height, determined by the fact that planes are four and one-half to five times wider than they are high. Major Kennedy stated that hangars of the structural steel type have proved to be the most satisfactory. He predicted that in the near future modern airports, so far as the housing and repair of privately owned planes are concerned, will be operated like an efficient downtown city garage.

A resolution authorizing the preparation of a standard form for contract proposals and its adoption by members of the institute was unanimously approved.

Better Bridge Designs Proposed

J. Horace McFarland, chairman of the Art Commission of Pennsylvania, admonished the members of the American Institute of Steel Construction to build more beautiful bridges. "The delightful flexibility of the material you use," he said, "the ease with which steel and cast iron may be combined in effective ways, will suggest to you and to those with whom you will associate yourselves forms not always on the same old pattern, but running into new lines of beauty no less efficient, no more expensive, but infinitely more sightly and therefore more satisfactory."

Definite steps to improve the design of steel bridges were recommended in a report of the committee on the aesthetic design of steel bridges, of which Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa., was chairman. The committee recommended that an annual award be made to that bridge constructed during the year which would be chosen by a selected art jury as the most artistic in treatment. The bridge would be decorated with a plaque and complete engineering and architectural descriptions be published. In addition, the committee recommended that a report be compiled upon bridge design illustrated with some of the best examples extant, that the institute collect literature on artistic bridge design and that the problems of aesthetics in bridges be treated in lectures, etc.

Supplementing this work, it was proposed that a series of cash prizes be established to go to students in engineering and architecture, and others to practicing engineers and architects, for the best competitive bridge designs.

Charles N. Fitts New President

Charles N. Fitts, New England Structural Co., Boston, was elected president. Other new officers are C. M. Denise, McClintic-Marshall Co., Pittsburgh, first vice-president; Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa., second vice-president; George Pistor, Hay Foundry & Iron Works, New York, treasurer; L. L. Gadd, Levering & Garrigues Co., New York, assistant treasurer. J. E. Miller, Bellefontaine Bridge & Steel Co., Bellefontaine, Ohio, was named a director to succeed C. A. Schneider, General Iron Works Co., Cincinnati, while the following members of the board of directors were reelected: W. M. Wood; A. J. Dyer, Nashville Bridge Co., Nashville, Tenn.; Clyde MacCornack; G. E. Klingelhofer, Pittsburgh Bridge & Iron Works, Pittsburgh; and James T. Whitehead, Whitehead & Kales Co., Detroit.

The members decided to return to the Edgewater Gulf Hotel for their convention in 1929.

Managers Turn to Research

Necessary for Budgeting Industrial Activities, for Appraisal of Market Trends
and to Develop New Lines—Profit Sharing for Executives

RESEARCH and profit sharing by executives were two major topics considered by the American Management Association, meeting in Chicago, Nov. 12 to 16.

Research was defined broadly as any study, by Ralph H. Heberling, supervising engineer Business Research Corporation. Studies of this kind, however, require too much concentration and time for the manager to spare. He should therefore delegate them to an open-minded investigator who is competent to gather all the facts and analyze them. The conclusions are presented to the manager to act upon.

"Job analysis" falls within such a definition. Job analysis is the source of job specifications, which are as necessary for the employment department as are steel specifications to the purchasing agent. Mr. Heberling emphasized that thorough research is an essential preliminary to a satisfactory budget (defining "budget" broadly as a plan of what reasonably can be expected of an organization and of the ensuing profits). To construct such a budget requires a knowledge of the expected demand for the material produced, the capacity of the firm to supply that demand, and the revenue aspects of the transaction. Obviously research is necessary to determine the trend in the market and the causes thereof. Job analysis and equipment schedules are necessary to appraise the capacity of the organization to produce and sell. With such facts at hand the comptroller can make a reasonable forecast of costs, income, and profits.

It was pointed out in discussion that Mr. Heberling's program in its entirety would involve an immense amount of work, and that the manager's function would be to direct the research into those channels which would reveal pertinent facts on the most vital points. It was also mentioned that the principal difficulty a research director would find would be in the obstructive attitude of minor executives, who feel that research exists merely to criticize the existing order, rather than to help everyone do his job better and easier.

Edward P. Curtis, Eastman Kodak Co., Rochester, N. Y., emphasized the necessity of constant study to appraise the present and future market, since two million new people are added to the buying public yearly, and these youngsters are the ones who most eagerly adopt the novelties. This new purchasing power constitutes a threat to a stabilized product, and at

the same time the opportunity for a radical innovation in merchandise.

C. F. Hansen, director of research, W. T. Grant Co., New York, outlined how he is able to predict the profits of new chain stores to within 5 per cent. It is done by minute analysis of purchasing, advertising and sales costs, and comparing the various items for all stores grouped in various ways as to location, population, size, management, etc. New stores have their sales budgeted by the counterfoot according to his company's experience for that type of store, community, management and size, also giving due weight to related data from the trade association, and economic data about industrial conditions throughout the country generally.

Information from trade associations could be of great aid to such researches for budget making, in the opinion of Ernest F. DuBrul, general manager, National Machine Tool Builders' Association, Cincinnati. Unfortunately, too few of the members know the essential facts, and of those who do, many refuse to divulge them to the association. A complete statistical service by a trade association could be made into a most valuable measuring stick for the whole industry if these impediments could be surmounted.

Research Which Pays

A DISTINCTION between research (systematic creative work along older scientific lines) and development (study of management, sales and production) was made by Dr. Z. C. Dickinson, Department of Economics, University of Michigan, Ann Arbor, Mich. At present, however, no one seems to know how large a percentage of the gross receipts should be devoted to such work. It is even debatable whether such investigations should be done in a centralized independent group (as is most scientific research) or decentralized in the various departments (as is most developmental and analytical work). Dr. Dickinson doubted that research is a separate function, any more than labor control is, since all departments have both with them constantly. Nevertheless he seemed to lean toward the view that research and development should be under one head, just as the labor policy is ordinarily in the hands of one man.

That these organization plans would vary from company to company was indicated by C. S. Redding, vice-president, Leeds & Northrup Co., Philadelphia. This plant has a shop engineer-

ing department responsible to the factory superintendent which intensely studies manufacturing processes, one by one. It has returned a profit since the month it was organized. The "research department," which studies the scientific aspects of the product and develops new designs, was in existence seven years before it accumulated a credit balance from royalties on the discoveries. In these early years the cost of this work was 10 per cent of the annual sales, but this proportion has declined to about 3 per cent where it has remained for the last 10 years, even though the total research expenditures are constantly increasing. Since the imposing balance now to the credit of research is due principally to discoveries of the early years, it is evident that recent expenditures have not been large enough, or have been misdirected. In Mr. Redding's opinion, as much money should be spent on research to develop new products as the sales department is able to capitalize upon.

Profit Sharing for Executives

AN analysis of 65 profit sharing plans has been made by Dr. C. C. Balderston, assistant professor of industry, University of Pennsylvania, Philadelphia. He believes the general plan has been successful, for only four of the 65 concerns have abandoned the plan in five years. In all these plans only the executives participate in profit sharing, and the portion of net profits to be distributed is published a year in advance. Those who are eligible for a share are also notified at the beginning of the year, but the share is seldom fixed until the time of distribution. In about half the plans this share is related to the salary received; about as many others attempt to base it on estimated performance. Three quarters of the plans pay in cash; the rest are quite sure that payment in company stock is far preferable. In Dr. Balderston's opinion, honesty of purpose is of more importance than the method of administration. Such an aim will avoid many difficulties in selecting the list of participants and in apportioning the shares.

Profit sharing draws forth full efforts from executives, in the opinion of Dr. Ralph E. Heilman, dean School of Commerce, Northwestern University, Chicago, and therefore is a good managerial device. However, his observations show that it works best for the high men in small organizations, because in such circumstances the

greater responsibility gives a greater and more visible influence on profits and a better understanding of business vicissitudes and outside factors. Thus the participant understands fully what to expect in lean years. Dr. Heilman leans toward payment in

common stock, because then the executive shares losses as well as profits—i.e., his dividends on accumulated stock are small in lean years. He believes that salaries should be the basis for apportionment. If salaries are thought to be improper for this pur-

pose of figuring profit shares, then they are inequitable rewards for day by day achievements. However, Dr. Heilman believes the higher salaried officials should get a somewhat higher percentage bonus than the minor executives.

Acetylene Meeting Discusses Pipe Welds

Leakless Joints Said to Warrant Adoption Even at Increased Cost—
Improved Welding Rod Produces Non-Porous Welds
in Alpha Brass Pipe

At the twenty-ninth convention of the International Acetylene Association, held in Chicago Nov. 14 to 16, Herbert L. Whittemore of the United States Bureau of Standards was awarded the Morehead Medal for "outstanding research work in welding." This medal is named in honor of the discoverer of the electric furnace method of making calcium carbide, the fundamental process underlying the entire industry. Mr. Whittemore's contact with organized research into the properties of welded joints, and the safety of welded pressure vessels has continued for several years past. Previous recipients of the Morehead Medal include Noah Wagner, pioneer builder of welded pipe lines; Edmund Fouche, inventor of the blowpipe; and Augustine Davis, dean of the American acetylene equipment industry. Mr. Whittemore was also presented with honorary membership in the International Acetylene Association, together with E. J. Smith of Underwriters' Laboratory, H. E. Newell of National Board of Fire Underwriters, and A. D. Risteen of Travelers Insurance Co., Hartford, all for signal services to the acetylene industry.

New officers elected are president, L. F. Loutrel, Shawinigan Products Corporation, New York; vice-president, C. A. McCune, Page Steel & Wire Co., Bridgeport, Conn.; and secretary, A. C. Morrison, Union Carbide & Carbon Corporation, New York.

Expansion in Use of Acetylene

Much discussion centered about the present status of the industry. Professor J. D. Hoffman, head of the Department of Practical Mechanics,

Purdue University, Lafayette, Ind., presented the accompanying figures indicating the growth of the welding industry since war times.

The oxy-acetylene committee of the association presented a 106-page report outlining the status of welding in various industries, and as viewed from various angles. In the opinion of the committee this survey proves that repair welding is expanding rapidly. Production welding is mostly confined to thin metal (furniture, barrels, storage tanks, utensils, automobile bodies, aircraft) and to pipe work (long transportation lines and industrial piping). Heavier plate work seems to be confined, at least as far as production is concerned, largely to the manufacture of unfired pressure vessels and chemical equipment.

At a meeting held jointly with the Gas Products Association (an organization of oxygen producers) the problem of expanding these production applications, by education or advertising, was discussed at length. It was pointed out that the designer and production man of tomorrow is the engineering student of today, yet it is well known that scant consideration is given welding as a joining method in most courses of laboratory or lecture instruction. Feeling that this is largely due to lack of information in the hands of the faculty, the two associations proceeded to organize a joint committee to promote the "education of the educators."

R. Witherspoon, of Shawinigan Products Corporation, Shawinigan, Canada, described the use of acetylene for synthesizing chemicals. In the last seven years his company has expanded to where it uses over a million cubic feet of acetylene daily, mostly

to make glacial acetic acid for the artificial silk industry. This is about eight times as much acetylene as all Canada uses for cutting, welding and lighting. At the indicated rate of expansion, Mr. Witherspoon estimates the American chemical industry by 1938 will be absorbing 1000 tons of carbide daily, ten times the present amount.

Industrial and Refrigeration Piping

Three papers on this general subject were presented. A. F. Hoesel, chief engineer Peerless Ice Machine Co., Chicago, told how the manufacturers of refrigerating equipment and ice making machines had gradually expanded the use of welded joints. At first only ammonia receivers were welded, then headers for pipe coils, and finally practically all the joints in the ammonia system on both the high and low-pressure sides. Costs are sometimes higher than flanged joints, but the savings in refrigerant in a leakless cycle overbalance this in a short time.

This same economic consideration was urged by J. H. Zink, vice-president Heat & Power Corporation, Baltimore, who said that first cost of a welded pipe installation could be higher than a screw coupled and flanged job, and yet competitive bids could be placed, because the piping contractor using welding was thereby relieved of the necessity of repairing leaks in an installation during the guarantee period. Both Messrs. Hoesel and Zink said that in the five years their respective concerns have been utilizing welding as a manufacturing or erecting method there has never been a leaky weld reported. Mr. Zink is strongly of the opinion that the oxy-acetylene process will enable steam heating contractors to surmount many of their present obstacles when it is used to the maximum extent for pipe welding, bending, and the making of specials.

F. E. Sellman, Servel, Inc., New York, described the methods used to train welders for domestic refrigeration. The Servel unit is made almost entirely of seamless tubing, ranging from 5/16 to 3/4 in. in diameter, and

Production of Welding Gases

	1914	1919	1921	1923	1925
Dissolved Acetylene—					
Number of plants.....	40	49	49	58	69
Millions of cubic feet.....	120	320	300	525	730
Value, millions of dollars.....		7.1	7.5	13.1	13.5
Oxygen—					
Number of plants.....	57	94	94	121	141
Millions of cubic feet.....	140	1,170	1,060	2,050	2,075
Value, millions of dollars.....		16.6	14.0	23.4	22.6

wall thickness of 11 to 17 Birmingham wire gage. Manufacturing methods were described in *THE IRON AGE* for Feb. 2, page 321. In each unit 53 points are made, each of which must be tight against 900 lb. per sq. in. test pressure, and without interval "icicles." Twenty-one other welds make a total of 74 per unit, plus a considerable number on the metal cabinets and linings. It can be seen that the skilled labor to produce 250 such units daily represents a considerable problem.

Recently a plant of this capacity was constructed at Evansville, Ind. Profiting from previous experience, a welding school big enough for 50 students was immediately equipped; 50 girls were instructed on day shifts, 50 men on the night shift. Five instructors gave close attention to the work. The three principal steps in instruction are 1. Lay a bead on sheet metal. 2. Weld a flat seam in sheet metal. 3. Make welds in thin-walled pipe.

Apt students easily learn to make a neat weld, but it takes from three to six weeks to make one without internal icicles and which is tight against 900 lb. pressure. About half of those who start graduate. When put on production the new welders are still closely supervised; each joint as made is immediately tested under pressure, this practice continuing for weeks, and until the number of porous welds drops to less than one a day. Students are paid small wages during training; their rate is increased as ability in production is demonstrated. The Evanston plant is equipped with 184 welding stations.

Modern Swiss Welding Practices

A paper of the above title was presented by Prof. C. F. Keel, director of the Swiss Acetylene Association, Basel, Switzerland. His association is of semi-official character, being delegated with the authority to establish safety regulations and to make biannual inspections of all oxy-acetylene installations. In addition it conducts cooperative welding researches and a school for welders.

As a result of exhaustive tests, Swiss purchasers and engineers have removed all restrictions on the use of welding as a method of joining on boilers and pressure vessels, as long as the work is done in a plant known to utilize approved practices. Methods in use by Sulzer Brothers are typical, and have been described in *THE IRON AGE*, Sept. 6, page 567.

Welding technique as standardized in Switzerland is quite different from that accepted as best practice in America. Single vee butt welds are used, even on heavy plate, beveled to a 60-deg. opening. The blowpipe, producing a large flame having a considerable excess of oxygen, is held steadily at the very bottom of the vee, and the welding rod rubbed vigorously back and forth in the advancing puddle of molten metal. By such methods, Professor Keel says, good practice on

production in ½-in. plate will be as follows:

	Feet per Hour	Oxygen per Foot of Seam	Acetylene per Foot of Seam
Horizontal flat seam	4 to 5	12 cu. ft.	10 cu. ft.
Vertical side seam	5	9.6 cu. ft.	8 cu. ft.
Corner weld	10	7.2 cu. ft.	6 cu. ft.

Professor Keel said that since these revised practices and higher speeds had been attained, the amount of oxy-acetylene welding on heavy plate had doubled, at the expense of competitive processes.

American welding experts who commented on these figures, which are approximately twice as good as we are doing, were of the opinion that the Swiss welding technique makes joints with interior toughness when tested by bending so the bottom of the vee is stretched. Prof. Keel showed many slides of test pieces undoubtedly having high mechanical properties.

Bronze Welding Rod

It has been found by A. R. Lytle, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., that if 0.5 per cent silicon is added to best brass welding rod (of "Tobin bronze," which contains a little tin) the volatilization of zinc during welding is almost entirely prevented. Furthermore, such a rod when melted into a joint in alpha brass or admiralty brass pipe will check the boiling and zinc vaporization, and produce a strong union free from porosity. The silicon may protect the zinc by preferential oxidation and by forming a thin slag, and also by increasing the solubility of gases in the hot metal. Unreinforced welds in 60:40 brass were stronger than the base metal; Muntz metal broke at 39,000 lb. per sq. in. along the scarf, due to an accumulation of lead which boils out of the heated zone. Alpha brass pipe, welded with the silicon-bearing rod, broke some distance from the joint at an average of 34,500 lb. per sq. in.; screwed unions break at about 21,000 lb. per sq. in. by shear along the threads. The weld metal itself (melted welding rod) has an ultimate strength of 50,000 to 60,000 lb. per sq. in., and an elongation of 12 to 19 per cent in 2 in. The bond between bronze weld and steel or cast iron is also increased 10 to 15 per cent. An important practical advantage is that the silicon-bearing weld metal can be remelted without damage.

I. T. Hook, research department, American Brass Co., Ansonia, Conn., described some experiments on steel, welded with bronze while under internal stress. Strips of medium carbon steel, such as used for automobile frames, were bent slightly and while under known load were heated and bronze weld metal flowed over the stretched surface. It was found that incipient cracking frequently resulted when the stress amounted to 4000 lb. per sq. in., while at 6000 lb. per sq. in. the piece would be broken apart by this procedure. It appeared therefore

that the cracks frequently found in bronze-welded steel are due to a species of season cracking or corrosion cracking.

In the discussion it was pointed out that these results indicated that steel should not be bronze welded except in unimportant or non-stressed locations, as one could hardly guarantee internal stresses less than 4000 lb. per sq. in. except in annealed metal. It is also possible that the differential stresses set up between the hot weld and the cold metal adjacent would produce stresses in excess of the danger mark during the actual process of welding.

Coated Electrodes Make Sound Welds

At a meeting of the Pittsburgh section, American Welding Society, Oct. 31, P. R. Hawthorne, welding engineer Petroleum Iron Works Co., Sharon, Pa., argued the case for covered and coated electrodes for arc welding.

"In order to produce a weld which is free from oxygen and nitrogen," Mr. Hawthorne said, "the atmosphere must be prevented from coming in contact with either the arc, the metal as it is deposited, or the deposited metal until its temperature is below 1800 deg. Fahr. To protect the arc and metal vapor from open air by mechanical means would not be practical. The logical method is to liberate, by the heat of the arc, a gas which will form a sheath or envelope around the arc, of sufficient volume and density as to actually exclude or combine the harmful gases. This is most easily accomplished by using a chemical covering of the rod which will be consumed in direct proportion to its rate of melting.

"To protect the metal during the solidifying and cooling period, there must be provided a substance which will completely cover it. This also is easily provided by covering the rod with a chemical which will distribute itself over the deposited metal and exclude the air. This protective coating has the further advantage that it prevents too rapid cooling of the deposited metal. Finally, to produce a perfect weld which is greater in tensile strength than the electrode, it is necessary to introduce certain elements which will absorb completely the impurities in the welding rod and parent metal and cause them to rise to the surface of the weld."

Assurance that the acceptors really follow out the provisions of the simplified practice recommendations of the commercial standards group of the Bureau of Standards, both in buying and selling, is indicated in the reports of surveys made on seven projects. Based on factual surveys, 82.33 per cent of the output of the commodities covered by these seven projects were in conformity with the adopted simplified schedule.

Operation of Open-Hearth Furnaces

Practical Problems Covered at Superintendents' Meeting—Quality Control for Steel a Live Topic

ABOUT 70 men interested in open-hearth work, mainly from the operating end, gathered at the William Penn Hotel, Pittsburgh, on the morning of Nov. 15 to discuss problems coming up in their work. This was the fall meeting of the Open-Hearth Committee of the American Institute of Mining and Metallurgical Engineers. The meeting lasted through three sessions, adjourning on Friday noon to permit the members to make a visit to the Edgar Thomson works of the Carnegie Steel Co. at Braddock, Pa.

In opening the meeting, Leo F. Reinartz, chairman, brought up the question of the open-hearth question-

naire, and reported that only twelve plants had sent in specifications and six had sent in drawings. He thought it doubtful if it would pay to go ahead in the preparation of this work without a larger response. At the same time, the question was raised as to whether the minutes of the meetings should be printed and, if so, who should be entitled to receive copies.

As has been the practice for some time, there were no set papers. A list of topics on definite subjects was opened for general discussion. The three sessions were devoted to (1) construction of furnaces, (2) quality control and (3) furnace operation.

under these conditions. It is usually placed about 3 or 4 in. above the highest point at which slag cutting occurs. It is, of course, not needed with sloping backwalls.

Charging Equipment

Reports were made by one superintendent after another as to the number of locomotives, charging buggies, boxes or pans, charging machines, stock house cranes, hot metal cranes, etc., in use. This can best be expressed in tabular form as given in Table I.

Accounting for Repair Costs

Generally speaking, the larger repairs or rebuilding are taken care of on a job order and charged against a reserve set up for this purpose on the basis of past experience. Smaller repairs, which go on week in, and week out, are charged ordinarily to operating expense. In many cases, new portions of the equipment are put into capital account whenever they represent an actual addition to the capital value of the plant. This, of course, is not so in mere replacements, however extensive or expensive they may be.

Some discussion came up as to whether costs of heating up the furnace after a general repair should go into operation or maintenance charges. Some men reported one thing and some another. In some cases the criterion came on the question of whether gas was on the furnace or not. Usually operating costs were charged with all hot repairs.

Rebuilding costs as a function of furnace sizes were discussed briefly, it being the consensus of opinion that about 5c. to a ton of steel would represent the difference between furnaces

Elements in Construction of Furnaces

NINE topics were scheduled for consideration under the general heading of furnace construction. Owing to time limitations, however, three of the topics were not discussed. The six others follow in order of presentation before the meeting.

Water Cooling of Furnaces

Various members told of the practice in vogue in their plants with regard to cooling portions of the furnaces by means of water. Doors and frames, bulkheads, bridge walls, ports, valves, etc., were pretty generally listed as being subject to this practice. Opinions differed, however, with regard to cooling of skewbacks. Some plants had experimented with this, with indifferent success. The brickwork did not stand up well and the roof was cut, which was laid in one instance to suspicion of moisture from the cooling pipe.

In general, it was reported that cooling is practiced in places where the brick shows a tendency to cut away, the object being to save on repairs and on delays for this purpose. The recirculation of the water was reported by some plants, although most of them do not use the water twice.

Consumption of water per furnace in 24 hr. was reported at figures varying from 700,000 gal. to 1,000,000 gal. Water was used at initial temperatures varying from as low as 60 deg. to 115 deg. Fahr. Some plants reported trouble from poor water, whether from mud and silt or from scaling due to hard water. Strainers are not always able to keep out the silt.

One plant reported using a closed system in which the water is circulated through a spray pond and about 500,000 gal. are in circulation at all times. The daily make-up water runs about 375,000 gal.

Water cooling along slag lines was reported by some plants, one of which has been using this practice about five years. At first there was some difficulty in holding the magnesite against the water-cooled surfaces. This was found to be due to putting it in in too generous doses. It now is applied a little at a time and burned on hard before the next batch is placed and the trouble has disappeared. This practice was reported to give a good foundation for the jambs.

Saving of brickwork and extension of the life of the backwalls by 15 or 20 heats was reported as the principal reason for using coolers at this point. Bricklayers can make a much better job in laying up front and back walls

TABLE I—CHARGING EQUIPMENT OF OPEN-HEARTH PLANTS

Plant	Furnaces		Buggies		Locomotives		Stock Cranes	Hot-Metal Cranes	Charging Machines
	No.	Size	No.	Size	Boxes	tives			
A	11	150 to 300 t.	100	4-box	500	2	3	2	4
B	12	80 t.	...	....	...	2	3-10 t.	1(a)	3
C	4	75 t.	92	....	...	1	....	..	2
D	8	50 t.	(b)	....	...	(b)	....	..	2
E	12	75 to 85 t.	83	4-box	...	...	2-10 t.(c)	..	..
F	12	80 to 175 t.	190	3-box(d)	600	2	4	..	3
G	8	80 t.	52	4-box	...	1	1	..	..
H	12	100 t.	263(e)	....	...	2	....	..	4
J	12	....	100	....	1,200	2	....	..	3
K	6	100 t.	73	4-box	300	2	2-15 t.	..	2
L	6	....	...	3-box	...	1	3	..	2

(a) And one of 10 tons. (b) Included in C; both in same plant. (c) And three gantry cranes. (d) 60 of them are 4-box. (e) 90 in open-hearth department; others distributed in other departments, to gather their scrap.

of considerable variation in size. In some cases, however, this difference was expressed as being as high as 15c. Furnaces compared in this manner were 68-ton against 115-ton and 40-ton against 85-ton, each pair in the same plant.

Whether each furnace should be handled independently of the others in cost keeping occasioned considerable discussion. Several speakers advocated a sharp distinction, because in no other way can accurate determination be made of the effect of changes made experimentally on a furnace for the purpose of improving operating conditions or reducing operating costs. One man reported taking the average of the three previous years as a basis and setting that up as a bogey for the next year's operation. Year by year this bogey would change a little, but it would remain at about the same level.

Organization of Plant

Superintendents reported the number of men required for operating plants of varying sizes, with varying numbers and capacities of furnaces. These differed so markedly with the conditions in the plant that no general statement can be made regarding them. They are, however, covered briefly in Table II. The number of men per furnace is seen to vary all the way from 21 up to 40. In a few instances the plants are operating on 12-hr. shifts, and these naturally use a smaller number of men. These reports cover everything relating to operation, including engineers for the locomotives handling stock (and usually delivering steel to the blooming mill), mechanical men, electricians, ladle lining; even in one case the skull crackermen were included. All repair men except the brick gang came under this heading.

Lining of ladles was discussed at some length, particularly with regard to use of a gun to put clay against the refractory brick. One man reported using a gun for about 10 min. on each ladle after each heat, putting a thickness of 1/4 in. on a backing of 5 in. of brick. He reported getting 26 heats average out of the ladle before having to renew brick. Another man who put the material in by hand uses about 2 in. of ganister with enough clay for

a binder on the surface of the brick. In this case there are two layers of brick 2 1/2 and 4 in. in thickness, with 1 1/2 in. of clay mud against the steel shell.

Keeping Mud Out of Steel

On the question of whether the mud or ganister gets into the steel, one man reported mud-lined ladles running as many as 50 to 150 heats on a brick lining without any such trouble. He does, however, burn this mud lining on very hard by means of an oil flame.

Another man reported using ganister with a gun as coating for a hot-metal ladle of the Pugh type, and said that the skull obtained was very small, rarely reaching 0.2 per cent. Ladles of this type were reported as handling from 19,800 to 31,800 tons of metal before relining was necessary. Another speaker, however, stated that he had tried this kind of lining and found that it peeled off badly, so he had given it up.

Special checker brick of the Loftus type have been put into a number of furnaces, some of which were reported upon. In one case, a 20-ton acid-lined furnace, making steels mostly from 0.25 to 0.30 per cent carbon, and tapping as high as 2900 deg. Fahr., was redesigned from a gas-producer furnace into one burning fuel oil. Originally all the regenerators were equipped with 9-in. brick. After running for 9 months these straight brick were taken out of what had been the gas chambers and Loftus bricks were put in, without making any change in the air chambers.

Loftus Brick Keep Clean

This furnace has now been running 4 months under the new arrangement and the checkers appear to be clean from dust and show no cutting or deterioration. They are carrying most of the load, as the old air checkers have been found to be practically inoperative. Clay brick are used below, and silica on the top, the opening being 6 x 6 in. A new furnace, being installed in this plant, will be equipped entirely with Loftus checker brick.

Another superintendent reported having made the same sort of change from a gas-producer furnace to put in Loftus bricks. The checkers were re-

ported clean, most of the dirt having been washed down into the sewers. The throat between the checkers and the flues, however, was badly choked up. After 285 heats this roof had to be renewed and most of the checkers were taken out. They seemed to be about as good as new, but there was much dirt in the lower parts of the flues.

Another speaker reported that furnaces fitted with Loftus brick in the air chambers and regular 9-in. brick in the gas chambers, using producer-gas, are working faster and better than with 9-in. brick all around. This same story came from another source, in which it was said that after 120 heats the regular furnaces had to be shut down for cleaning flues, whereas under the new arrangement a much larger number of heats could be run without stopping. In this case the furnace was making steel faster to the extent of 0.8 ton an hour, and was using less oil by about one gallon a ton.

Stevens Open-Hearth Furnaces

Brief description was given of a 25-ton acid-lined furnace at Indiana Harbor, which has been operating nearly two years under the Stevens arrangement. The furnace is built largely of structural steel, is covered with steel plate to the floor line or above, and is insulated. The covering includes the regenerators and slag pockets. The chambers are under the hearth of the furnace and have 13 ft. depth of checker brick, with a top area 9 ft. 6 in. square. The top layers of the brick are silica and the lower portion clay. After 500 heats the furnace had to be shut down because the regenerators became clogged up, having only 3 1/2 x 3 1/2-in. openings. At the time of the report 1014 heats were out and the superintendent thought the furnace was good for 2000 heats. The slag pockets are cleaned occasionally and the roof is said to be in fine condition.

Air supply is by means of a fan, with the amount carefully proportioned. Control of this amount is by a Stevens valve. The stack draft is handled about as is usual on other furnaces.

Good operation on furnaces depends in large measure on uniformity of operation, and this was reported to be obtainable on furnaces without the Stevens control. It was claimed that as good fuel economy can be had in regular furnaces, by careful attention to uniform operation, as in the Stevens type. On a standard set-up open-hearth men have been operating their furnaces for specific purposes about as boiler men are said to operate their boilers.

These furnaces are scheduled, for foundry use, to tap their heats at certain hours, and it was said that they can come, usually, within 7 min. of the specified time. This is being done in shops having one, or two, or three furnaces; oil flow meters, indicating, recording and integrating, are used; there are differential draft gages and

TABLE II—OPERATING FORCES IN OPEN-HEARTH PLANTS

Plant	Furnaces		Total Men	Men per Furnace	Third Helpers	Dolomite Machine
	No.	Size				
I	4	85-ton	...	21	No	Used
II	11	80-ton	...	40	No	Used
III	5	...	...	29	1 for 2 feces.	Used
IV (a)	4	75-ton	...	30	Yes	...
V	12	...	...	30	...	...
VI	10	60-ton	...	33	...	...
VII	12	80-ton	...	37 (b)	...	...
VIII	7	100-ton	...	25	...	...
IX	11	150 to 300 t.	390	36	...	...
X	22	60 to 85 t.	...	37	...	...
XI	8	65 to 85 t.	217	27	...	Used
XII	8	80-ton	178	22	...	Used
XIII	5	40-ton	...	26	...	...
XIV (c)	6	60 to 90 t.	...	40	...	Used

(a) Runs 12-hr. turns. (b) Includes skull cracker labor. (c) All bottom-poured ingots; plant runs 12-hr. turns.

recording CO₂ meters between each furnace and the stack.

A letter was read from Carl W. Peirce, formerly superintendent of open-hearth, Mansfield Sheet & Tin Plate Co., stating that the Stevens furnace at Indiana Harbor was the best open-hearth job he ever saw, from the engineering standpoint. He even predicted that in three years the present method of operating open-hearth furnaces is likely to be obsolete. The new method takes the element of guesswork out of the subject of combustion. Just enough air is used for proper combustion. He reported very small accumulations of slag—only about 6 in. in each pocket—and about 1 in. of dirt on checker brick. The yield was said to be 2 per cent better, oxides in the slag less by one-third, pig iron in the charge less by one-third, and loss of castings cut in half.

Former fuel consumption of 44 to 56 gal. to the ton was reported to

years ago in England, and said that by 1900 the 50-ton furnace had become common. At that time, however, much doubt was expressed as to whether the size and depth of the bath could be greatly increased to advantage, and the question of taking care of enormous volumes of slag was held to be a governing condition. Excessive chilling of steel in a big ladle seemed to be a bugbear.

However, economically the value of the big furnace is found, both in operating cost and in maintenance of quality. Originally one plant had seven furnaces designed for 105 tons each. These were first operated eight years ago. Gradually these furnaces were charged more heavily, first up to 130 tons and then to 150 tons, at which point six of them are run today. Last year three new furnaces were installed, of 250 tons each, and one of the older furnaces was remodeled to take that same amount. Last April the first heat was poured from a new

metal and other materials on the charging floor, four ladle cranes and three pouring platforms, each capable of pouring two ladles at once. The 250-ton and 300-ton furnaces are emptied into two ladles at each tap through a Y-spout. As a result, all ladles of metal in this shop carry from 125 to 150 tons each.

A slightly greater yield was reported on the deeper bath, this being due, according to the speaker, to a smaller amount of oxidation, because there is less surface exposed for each ton of steel in the bath. The largest furnace produces 17.3 tons of steel an hour for each 1000 sq. ft. of hearth area. There is comparatively little bottom trouble. Coal, when the furnace is new, runs about 420 lb. to the ton of ingots, and reaches 480 lb. when the furnace is about ready to go off for repairs.

Another shop reported about the same sort of experience on large furnaces. In this case there is one furnace of 175 tons and one of 140 tons, whereas all the others in the shop are of 80 tons. Rebuilding and general costs for the larger furnaces are less per ton of steel. This speaker thought that 300 tons was about as large as a stationary furnace can well be operated. He believed, however, that some saving might be made by going to a 450-ton tilting furnace. He believed that it would be difficult to design a satisfactory spout for three ladles of 150 tons each.

At this point the chairman referred briefly to an article in *THE IRON AGE* of Sept. 20 last, page 693, in which Carl W. Peirce advocated the use of tilting furnaces, as an improvement over the stationary type.

TABLE III—BATH SIZES IN LARGE STATIONARY FURNACES

Number of Furnaces	Unit Size	Bath Area		Depth of Bath
		Length	Width	
Six	150 tons	40 ft.	16 ft.	2 ft. 6 in.
Four	250 tons	45 ft.	17 ft.	2 ft. 10 in.
One	300 tons	49 ft.	19 ft.	2 ft. 10 in.

have been reduced on the first 500 heats to 23.68 gal. This, however, was figured on the *net* ton of the *charge*, and not on the *gross* ton of ingot *production*. The saving on oil alone was said to be \$90 to \$100 a day. On this basis the cost of the change-over was figured as covered in 250 working days. Brick work results are as yet not ascertained, but it was said the saving here might reach 50 per cent.

One speaker credited Mr. Stevens with selecting in his furnace arrangement all the best principles of the open-hearth and eliminating all of the worst ones. When it comes to controlling a schedule for tapping heats, however, this speaker said that the beginning lies with the purchasing agent, and particularly with the type of material he buys to make up the charge. Then comes a proper segregation of the materials in the stockyard and good selection of those materials by the stock foreman in making up in the charge. This permits scheduling furnaces as much as two weeks ahead.

A brand new furnace of 100 tons capacity, on the Stevens principle, was reported going in at the plant of the Laclede Steel Co. In this case the regenerators will not be directly under the furnace, but will be a little off to one side.

Value of Large Furnaces

Considerable discussion centered around the ultimate size of open-hearth furnaces. In tracing the history of this subject one speaker referred to the 3-ton furnaces built 60

300-ton furnace. The hearth sizes and depth of bath of these furnaces (all of which are stationary) are shown in Table III.

To operate the shop containing these 11 furnaces there are four charging machines, two cranes handling hot

Controlling the Quality of Steel Produced

EIGHT topics were listed in the program under the general heading of "Quality Control." Seven of these were covered during the second session, while the other was taken up at the beginning of the third session. The first topic under the general heading was a résumé of two years of research work on the influence of iron oxide on metals, as well as the formation and identification of inclusions such as iron oxide, manganese oxide and silicates. This was presented by Dr. C. H. Herty, Jr., of the United States Bureau of Mines, Pittsburgh.

Generally speaking, heats will clean up from an excess of silicates in from 12 to 18 min. after an addition of ferrosilicon in the bath. These heats, of 0.10 per cent carbon steel, are ready to tap in from 10 to 25 min. more. With a higher carbon, however, around 0.18 per cent, the reboil is not over until 20 to 26 min. after the addition has been made. These conditions, as well as the increase of FeO, were illustrated by a number of charts shown to the meeting.

Holding the steel in the ladle for a short period, to get rid of inclusions by permitting them to rise to the surface, was advocated by the speaker.

If, on the other hand, the steel is teemed very quickly after it gets into the ladle, it will not clear up properly and the inclusions will be found in the ingots. Study of chipping costs, in cases where ingots were segregated as to time of pouring in the heat, showed these costs much higher for the last ingots teemed than for the earlier ones.

Methods of taking out a sample were discussed, some members questioning the ability of the sample taker to get clear steel without considerable slag in it. This point of view was disposed of by Dr. Herty by the statement that the slag is already solid on the spoon before the steel gets into the spoon, that it remains solid after the steel has been poured out cleanly from the spoon, and that the steel samples would clearly show the fact if there were slag inclusions in them.

Changes in operating conditions in the blast furnace were reported to increase the proportions of oxides in the iron. The same is true of silicates, whether the silicon in the blast furnace is going up or down. Only when conditions are about stable are low silicates to be expected.

When putting ferromanganese and

ferrosilicon into the bath, the speaker recommended putting the ferromanganese in first, and then adding the ferrosilicon as soon as the ferromanganese has melted. If this is not done, all the MnO will be worked out of the bath before there is opportunity to use it in handling the silicon and the work will have to be done all over again.

This report became the basis of a steady volley of questions and answers on various phases of the topic as reported.

Difficulty in Welding Skelp Steel

Nickel, copper, lead and tin in the charge, or remaining as residuals in the steel, were cited as elements which increase the difficulty of welding skelp steel. One man reported that, if the nickel is more than 0.05 per cent, there will be trouble. Another man makes every endeavor to keep the nickel under 0.08 per cent and copper under 0.12 per cent. In his plant he likes to keep the phosphorus rather higher than the 0.04 or 0.05 per cent recommended by other speakers, letting it go up to 0.07 or even 0.09 per cent.

In bottom casting of ingots trouble is experienced from the steel carrying part of the runner brick or slurry into the mold; hence, top casting is employed when the steel is to be made into skelp. In some plants which do not employ top pouring trouble was reported in the welding. A distinction was drawn here, however, regarding the type of welding. With gas and electric welds, copper content seems to make no difference, whereas with the customary welding in a pipe machine it is deleterious.

Reducing Pipe in Special Steels

Manufacture of steels containing 0.20 to 0.30 per cent carbon, 0.70 to 1 per cent manganese, and 0.10 to 0.15 per cent sulphur was discussed from the point of view of reducing what many makers find an excessive amount of pipe in the ingots.

Several speakers reported having a great deal of trouble from pipe with steel of this type, although most of the men present had had little experience with this particular specification. Keeping the tops of the ingots clean by means of thorough killing of the steel was recommended as a palliative. One superintendent reported that on this type of steel all he can count on getting in the shape of sound billets is 70 per cent of the ingot, whereas for the more usual steels he gets from 85 to 88 per cent in good product.

Cracking of Ingots in Rolling

It seemed to be the general opinion that ingots poured on the bottom cast principle rarely crack in the blooming mill. Only when rolling top cast steel is this trouble encountered, and one man expressed the view that most of the top cast ingots crack during rolling. The distinction between the two methods of pouring was brought

out in connection, particularly, with a 3-high 46-in. bloomer in which 19 x 22-in. ingots are reduced to 7½-in. blooms in nine passes.

Most of the open-hearth men admitted frankly that this trouble can be traced in very many instances to the open-hearth department. Part of this difficulty was ascribed to teeming the ingots at too high a temperature, resulting in surface blowholes or those very near the surface. Use of graphite wash in the molds was reported to assist the steelmaker here in avoiding cracks on low-carbon steel, but they show up just the same on rail steel.

Heating of the ingots in the soaking pits was blamed by some speakers for the tendency of ingots to crack. Pin-head blowholes near the surface of the ingot were said to be very sensitive to the soaking pit gases, and the ingot under these conditions will cut badly on the surface.

Heater Should Know Steel Condition

Ordinarily, the heater does not know what the condition of the steel is in this respect and can therefore do nothing to remedy the situation. One plant reported an attempt to keep the heater informed so that he could handle the steel to better advantage. It was the opinion that neither the mill drafts nor the speed of rolling could be held responsible for these cracks.

Uneven heating, slag inclusions and thin-skinned ingots were given as primary causes by one metallurgist. Another man thought that many of the vertical cracks are caused by insufficient radius in the corner of the mold. He reported changing this radius from 2½ to 4 in. and getting away from most of the trouble. Another speaker recommended getting the steel into the soaking pits hot, even before it is set, and letting the heater know what the condition is so that he can carry his gases in a way to avoid cracking. If, on the other hand, the steel is allowed to cool so that, when stripped, the corners show black, nothing the heater can do, in the opinion of this speaker, can help.

Molds Partly Responsible

Faulty mold design and occasional cracks from stickers in the mold were charged with a share of the responsibility. But the main cause was reported to be the way the steel is made, with temperature a very large factor. One man reported having gone to the use of corrugated molds, after which he got rid of the trouble. These are almost parallel sided, having only ¼ in. taper, and considerably less scrap is produced.

When the interior of an ingot, as shown by microscopic examination, is found to be clean, some of the same ingots occasionally show on the surface a residue of undetermined composition. This was ascribed by one speaker to dirt in the mold. Another man said that graphite mold wash, if the graphite happens to be high in ash

content, will mark the surface of the ingot.

Titanium gives a cleansing effect through quickly working gases through the molten steel. In plants where this is used some judgment is required as to quantities and an effort is here made to keep the aluminum additions down. One speaker, however, reported that additions of titanium show a tendency to produce a thin-skinned ingot and thus cause cracks in rolling.

Titanium and Aluminum in Rimming Steel

Another man reported using titanium, particularly on small ingots, but reported that aluminum was just as good a deoxidizer on the larger sizes. A plate mill man said that, when he reduced the amount of titanium previously used, the plant immediately got into trouble from seams in the steel. Still another man, who reported trying to get away from the use of titanium because of its cost, said that he had always had to go back to it, because of complaints on seams, received from the sheet mill.

Other speakers reported an advocacy of spiegeleisen as a deoxidizer and said that they were not using either titanium or aluminum at all. Spiegeleisen was reported to clean up rimming steel in good shape, about 1000 lb. being added in the furnace on an 80-ton heat, about 25 min. ahead of tapping time, when making steel of 0.08 to 0.12 per cent carbon.

Best Slag Conditions for Low-Carbon Steel

Discussing what silica content the slag should have when the open-hearth furnace is making steel of 0.08 to 0.11 per cent carbon, and the best content of FeO and Fe₂O₃ in the slag, Doctor Herty advocated 14 to 19 per cent silica in the slag, and 16 to 22 per cent iron oxide, without distinguishing between the two forms. This is for rimming steel, and it was said that, if these figures run too low, the steel will not rim well in the mold.

Slag samples should be taken from at least three doors, then mixed and crushed. Passing them over a magnet will remove the iron content and the slag is then ready for analysis. Generally speaking, it is found that a higher line content in the slag is associated with a higher Fe₂O₃ content, and vice-versa.

Determination of FeO was had by analyzing for total Fe and for Fe₂O₃, taking the difference as FeO.

Report on Isley Furnaces

Two open-hearth furnaces of 100 tons each in one plant have been fitted with a combustion control system, on the Isley principle. These units measure 15 ft. 6 in. by 38 ft. inside the brick at the bath level. Each is operated with the aid of two No. 90 Sturtevant fans, driven by 75-hp. d.c. motors. It is found necessary to maintain a nice control, or balance, between the effect of draft at one end of the

furnace and pressure at the other end. Otherwise it is very difficult to control the flame.

Comparing the operation of these two furnaces with the best working furnace in the shop, not fitted with this system, some decided improvements in operation have been observed. The steel made is mostly dead soft. The best furnace has been making 8.2 tons an hour, whereas the two Isley furnaces have averaged 9.18 tons an hour, thus showing an improvement of the order of 12 per cent. Each of these furnaces has had one rebuild, having turned out an average between them of 45,312 tons of ingots. This is 8 per cent more than the run of the best other furnace, which produced 41,834 tons. The roof life was reported to be about equivalent in the two cases. Fuel consumption to the ton of ingots was said to be $8\frac{1}{2}$ per cent better than for the best other furnace. Operating costs were estimated at 10 per cent better.

While the checkers were practically clogged up at the end of 320 heats, draft was still maintained in good condition by forcing the air or products of combustion through by means of the fans. Gas consumption for each ton of ingots on the Isley furnaces figured out at 5,812,000 B.t.u.

Obtaining Thick-Walled Ingots on Rimming Steel

Dropping of the steel in the mold a matter of 4 or 5 in. was reported by one speaker as making the blowholes very deep seated—sometimes as much as 4 or 5 in., inside the skin. These thick-skinned ingots, however, have to be heated a long time to obtain proper rolling conditions. One plant, which has a $2\frac{1}{2}$ -hr. minimum heating period, stretches this out another hour if for any reason it is felt that the steel needs it. The speaker was not certain whether a 3-in. skin is better than a skin of $\frac{1}{2}$ or $\frac{3}{4}$ in.—that is, $\frac{1}{2}$ or $\frac{3}{4}$ in. might be adequate for good rolling. On sheet bar the average in this plant was given as $2\frac{1}{2}$ in.

Slag conditions and the temperature of the bath are regarded as important factors by some operators. The use of fluorspar was advocated in creating a slag which would be suitable. This speaker considers $\frac{3}{4}$ -in. skin thickness adequate for good rolling and is satisfied in some cases with $\frac{1}{2}$ in.

Another man stated that the matter depends upon the temperature at which the heat is tapped, the temperature of the molds and the speed of teeming the heat. Bottom-pour ingots practically never crack in rolling, it was said, because they are poured so slowly that they naturally obtain a thicker skin than with hot pouring of the same steel.

Another report laid poor steel to improper action in the bath, resulting from the use of pig iron too low in silicon. In this plant iron is desired with 1.25 to 1.35 per cent silicon, rather than 0.75 per cent. This speaker

thinks that the proper place to produce good quality is in the open-hearth furnace. In his plants slab ingots are made in large numbers. He finds that the thicker ingots give better results than the thinner ones. For instance, an ingot 21 by 48 in. gave much poorer results than with the larger molds, measuring 30 by 70 in. or 40 by 90 in. This he attributed, in part, to the more rapid filling of the smaller in-

got, poured from the same nozzle and with the same quantity of steel to the minute. This factor was emphasized by his statement that most of the defects in the steel are found in the ingots first poured, because when the ladle stopper is first opened up the stream is faster on account of the greater head of metal over it.

(To be concluded)

Gray Iron Institute Now Has 83 Members

Some Results Already Achieved, Notably the Elimination of Unfair Practices, Say Reports at Annual Meeting

CONSIDERABLE work has been accomplished for the gray iron foundry industry since the organization of the Gray Iron Institute, according to the report of its president, Walter L. Seelbach, at the first annual meeting of the institute held at the Cleveland Chamber of Commerce, Cleveland, Nov. 14. He stated that the mere existence of the organization is having a good effect in that there are evidences that some unfair practices are being eliminated. Arthur J. Tuscany, manager, reported that 17 members had been enrolled since the starting of a membership campaign last month and that the institute now has a membership of 83.

Preliminary reports were made on the organization of a research committee by B. H. Johnson, Cresson-Morris Co., Philadelphia, vice-president; on a merchandising committee to study distribution problems by Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio; on a finance committee by Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill., and on plans for cooperation with existing organizations in other branches of the foundry industry by A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill. He pointed out that the formation of the institute offers opportunities for cost study. H. S. Chafee, Builders' Iron Foundry, Providence, R. I., gave a summary of the financial status of the institute.

An expression of appreciation of his cooperation in the organization of the institute was extended by the directors to Dan M. Avey, editor of *Foundry*, who served as organizing secretary previous to the completion of the formal organization. Mr. Avey was presented with a golf bag and set of golf clubs.

Thirteen of the old board of directors were reelected and two vacancies were left on the board. It is planned to fill these during the year by foundrymen located in districts not now represented on the board. Those reelected were: J. H. Bruce, Bowler Foundry Co., Cleveland; J. L. Carter, Barlow Foundry Co., Newark, N. J.; H. S. Chafee, Builders' Iron Foundry, Providence, R. I.; A. E. Clarke, Des Plaines Foundry Co., Des Plaines,

Ill.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.; Horace R. Culling, Carondelet Foundry Co., St. Louis; Fred Erb, Erb-Joyce Foundry Co., Detroit; W. J. Grede, Liberty Foundry Co., Milwaukee; A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.; B. H. Johnson, Cresson-Morris Co., Philadelphia; Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio; Walter L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland; Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

The old officers were reelected at a directors' meeting following the annual meeting. They are: Walter L. Seelbach, president; B. H. Johnson, vice-president; A. E. Hageboeck, vice-president, and H. S. Chafee, treasurer. These with J. L. Carter will now serve as the executive committee.

At a meeting of the new board formal action was taken authorizing the appointment of a cost committee, research committee, merchandising committee, trade practice committee and committee on statistics. These committees will be named by the executive committee.

Previous to the annual meeting the old board of directors was addressed by Dr. Hugh P. Baker, Washington, manager of the Trade Association Department of the Chamber of Commerce of the United States, who explained the lines of development possible to trade associations under present Government agencies.

New Alloy Casting Plant

Frederick L. Hewitt, formerly vice-president of the Hanson-VanWinkle-Manning Co., is chairman of the board of directors; John D. Scott, president; Claude L. Witter, president of the Provident Engineering Corporation, Philadelphia, vice-president; and Albert W. Gray, Hartford, Conn., treasurer and secretary of the Scott-Witter Steel Corporation, Hartford, Conn., a newly formed \$575,000 company to manufacture carbon and alloy steel castings at the former plant of the Connecticut Electric Steel Co., Flatbush Avenue, Hartford.

"Bootleg Loans" Upset Forecasting

Credit Expansion, Outside of Banking Channels, Prevents Old Sequences, Says
Colonel Ayres Before Harvard Economic Society

"LOANS to others" (called "bootleg" loans by some commentators) have upset old rules of forecasting, according to Col. Leonard P. Ayres, vice-president Cleveland Trust Co., Cleveland, who addressed the Harvard Economic Society on "The Business Prospect" at the annual dinner of that organization at Boston, Nov. 17.

In the past short-term money rates were the best indicator of the immediate business trend. When interest rates became too high to carry stocks on a margin, stock prices went down. Such a signal came in February, 1928, he said, but since that time stock prices have risen to new heights. A reliable indicator went wrong.

Formerly, when interest rates were low, municipalities and corporations issued securities to finance construction work and improvements, and when interest rates rose, they stopped floating such issues. In 1928 it seemed as if these old sequences would operate according to precedent, he said. Issues of securities did, in fact, turn down sharply, but after a short dip rebounded, with especially large new issues in October and November. Another good rule had gone wrong.

Construction used to vary inversely with money rates. When they became high, there was a temporary downturn in building activity. But in October, construction turned up to a new record level.

For 50 years, almost without exception, bond prices rose so long as they yielded more than commercial paper. When interest increased sharply this year, bond prices went down, as they were expected to, but they then recovered and went up again. Another old precedent broken.

In the past commodity prices went up when short-term money rates went down, and vice-versa. But not so this year.

One reason for the failure of old rules to work is that in the past business men felt that when interest rates went up, credit was going to be not only expensive but decidedly scarce. A new distinction, therefore, must be drawn between a rise in the cost of credit and a possible stringency in credit.

While this new attitude toward interest rates is important, it is not, in Colonel Ayres's opinion, important enough to account for the unusual economic developments of the past year.

What we are now experiencing, in his view, is gold inflation after the gold is gone (1928 has seen a loss of

about a half billion dollars in our monetary gold, about one-ninth of our total supply).

The high rate of industrial activity, the record rate of construction, the advances in commodity prices and the unprecedented stock market have meant the use of a far greater volume of credit in 1928 than in 1927. The increase in credit has come through loans to brokers from firms and individuals rather than from banks. Such loans this year increased a billion and a half dollars without any decrease in bank reserves. In the main, they reflect a new policy of corporations, although some of this credit represented loans of firms, as well as foreign money.

Corporation Cash Reserves Being Loaned on Call

Corporations, in the years of credit redundancy through which this country has passed, built up large cash reserves. These reserves are now being loaned for stock market speculation. The banks themselves are in part responsible for this development. Seeing the opportunity for commissions, they solicited the funds of corporations to put out on call. To overcome the conservatism of corporation treasurers they made such a strong case for the safety of call loans that in many instances companies not only put their spare funds out on call but withdrew virtually all their reserves from the banks for such use.

It is clear, said Colonel Ayres, that we have a new kind of credit instrumentality outside of the banking system, free from and beyond the control of the Federal Reserve system. Unchecked by any moral or legal restraints, it is possible that some time, but not now or soon, this form of credit will be regulated by legislation. It is also possible that there will some time be a reaction in the stock market that will chase out a large number of margin speculators. On the other hand, Colonel Ayres stated, this kind of loaning may continue until the country grows up to it and absorbs the credit in industry and trade.

While this supply of credit is not an inexhaustible reservoir, there is no way of telling how much more there is.

No Definite Forecast of Business Possible

Colonel Ayres said that he and one of his colleagues had worked out a general forecaster on a basis of multiple correlation, using factors that had proved dependable for 30

years. This forecaster shows business rising until the middle of 1929 and then dipping sharply. While the situation may work out that way, Colonel Ayres is disinclined to commit himself, in view of the new unknown factor—"loans to others." He said that he would not attempt to make a definite forecast for 1929. The present momentum of business, he thought, would probably carry over into the second quarter, and might even carry through all of next year, depending on developments that cannot be foreseen.

Purely Mechanical Forecaster Not Dependable

Another speaker at the dinner, Warren M. Persons, vice-president National Investors Corporation, New York, said that an accurate business forecast cannot be obtained from any mechanical medium. Moreover, business cycles do not come in one pattern, nor are they periodic. Some cycles are long, some are short.

Prices Declining in Europe

THIS country has been drawing gold from abroad since August, said Homer B. Vanderblue, Harvard Economic Society, at a session of the meeting on Saturday. This is causing pressure on credit and prices in Europe, as was the case in 1925. In fact, European commodity prices in the third quarter of this year declined, and there are indications that a similar trend is setting in in this country.

The stock market, according to Professor Vanderblue, is in a vulnerable position. When sentiment is all bullish, it can be quickly turned to the opposite view. So long as there is ample room for credit expansion (the Federal Reserve ratio is still relatively high), periods of readjustment will be transitory and temporary. A continuance of a selective stock market through 1929 seems likely. Building and instalment selling will probably be affected by tight money.

Active First Quarter in Automobiles Forecast

STOCKS of passenger automobiles in hands of dealers and at factories are subnormal, according to F. Leslie Hayford, economic statistician General Motors Corporation, New York, who spoke Friday evening, Nov. 16. This situation points to heavy automobile output in the first quarter, and probably the second quarter, of next year. A trend line prepared by Mr. Hayford indicates that in the past two years there has been a de-

ferment of buying amounting to 900,000 passenger cars. Production of such vehicles this year, at about 3,500,000, will be about 150,000 cars below the calculated normal. Estimated normal output in 1929 will be 3,800,000 passenger cars. Adding truck output, Canadian production, and exports, the total for next year should be 4,800,000 vehicles. Mr. Hayford, however, pointed out the shortcomings of mathematical calculation as a means of accurate forecasting.

Control of Production Influences Copper Market

THE Copper Institute was formed a year ago, said F. E. Richter, economic statistician American Telephone & Telegraph Co., New York, and no one thought at that time that it would function so effectively so soon. While prices have not been directly controlled, no doubt exists that they have been indirectly influenced through control of production. A short-term correlation exists between curves of prices and refinery stocks. Stocks in this country in October were equal to less than one-third of a month's output. Refinery stocks in the Western Hemisphere are at the lowest levels since 1922.

The present year promises to usher in a new era in production replacing the one that began in 1895, in which this country consistently accounted for more than half of the world output. This year United States production will fall short of 50 per cent of the world total.

World production has gone up this year, but consumption has apparently risen proportionately. The course of prices next year, however, will depend to a considerable extent on the production policy of the Copper Institute.

Rationalization Aids Oil Industry

TWO outstanding features of the oil industry in 1928, according to J. E. Pogue, consulting engineer, New York, were:

1. Progress toward improved economic control through rationalization of production here and cartelization of the industry abroad.

2. Betterment in the statistical position and price of gasoline.

It became necessary early in 1928 to stem the flood of oil. This movement was initiated by producing companies and supported by States through commissions on conservation. As a result, production of oil was held at 2,400,000 bbl. a day early in the year and at 2,500,000 bbl. since August. This action permitted demand to catch up with supply.

A remunerative price for gasoline appeared in mid-year, and it is probable that gasoline would have advanced even if no element of artificial control of crude oil output had entered.

The stabilized crude oil market resulted in a slight advance in oil, but most of the profits of the industry came as a result of the operation of the law of supply and demand in

gasoline. The situation in gasoline was aided, but not determined, by crude oil curtailment.

In 1929 there is likely to be a strug-

gle between rationalization and potential oversupply. Crude oil output will probably increase despite the restraints imposed.

Must Consider Buying Trends

Dr. Julius Klein Emphasizes in Annual Report the Necessity for Making Adjustments to Modern Conditions

WASHINGTON, Nov. 20.—During the past decade the country has changed from a seller's to a buyer's market, Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, says in his annual report. Consumers are declared to be no longer willing to accept commodities simply because they are offered. Distributors, it is pointed out, are finding that many articles which once moved rapidly are no longer in demand and cannot be handled at a profit.

"The manufacturer or distributor who fails to take into account buying trends, commodity preferences and consumer habits is failing to make adjustments to modern conditions, and one of the major undertakings of the domestic commerce division of the bureau is concerned with a series of surveys designed to throw light on these obscure phases of domestic commercial technique. For the purpose of these surveys the country has been divided into nine areas whose boundaries have been fixed partly by differences in economic and business conditions and partly by administrative convenience."

The report discloses the comprehensive character of the trade promotional activities of the Department of Commerce, both in foreign and domestic fields. During the past fiscal year, the report shows, 800 firms and individuals voluntarily reported known sales and savings directly traceable to the bureau's activities totaling \$15,000,000, or an average of \$18,000 per firm. The bureau currently serves about 22,000 firms. On 3,000,000 occasions during the fiscal year, or nearly 10,000 each business day, it is pointed out, the bureau rendered some specific service to the American public.

In the face of the most vigorous competition, the report says, American exports of finished manufactures have steadily advanced until last year they reached the total of \$2,061,000,000, an increase of 4 per cent over the previous year and fully 70 per cent over 1921-22. Of the output of American plants, 8 or 9 per cent is exported, it is stated, representing the production of not far from 1,000,000 industrial workers. Not including clerks and other salaried workers, the report says, there are employed 75,000 workers to produce the machinery exported; 24,000 to manufacture the iron and steel that goes to world markets; 47,000 to turn out automobiles and parts for overseas

buyers and 5500 in tool and cutlery works.

Statistical Standardization Needed

Listing problems facing American business, Dr. Klein mentions the need of simplification in the terms and phrases in which trade is conducted and of standardization of statistical methods. The movement for industrial combinations in the form of international cartels, Dr. Klein points out, has attracted a good deal of attention during the past few years and is likely to exercise considerable influence on American economic relations with foreign countries. A preliminary study of the subject has been undertaken by the bureau and it is believed by Dr. Klein that the importance of the movement would justify a wider investigation. There is need also, he says, for the bureau to further the effort of American industry to take speedy and effective action to protect itself against loss of good will in established and potential markets from effects of piracy of trademarks, misleading imitation and other means of "passing off" spurious merchandise.

Broader analytical studies which the bureau has made of the finances of foreign countries and which have proved of usefulness to American investors are urged, as well as studies concerning various problems surrounding the establishing of sales and distribution organizations in new areas abroad by American manufacturers. It is also declared that the adoption of uniform codes of customs regulations and port procedure would do much to lessen the perplexities of exporting. Producers and distributors, it is declared, feel that, if further study could be made within the department, and selected trade associations could be approached on the possibility of developing a system of certification by the trade association concerned that exported goods are in accord with given specifications, recognition of this certificate by customs authorities in foreign countries might then be sought.

Discussing the study undertaken of industrial equipment to give factory owners a clearer idea of losses suffered through the use of partially obsolete machinery, Dr. Klein says the worrisome question of when to scrap a machine and the proper methods of accounting for obsolescence as distinguished from depreciation cannot be solved until a better factual basis has been established.

Describe Progress in Sheet Rolling

Mechanical Engineers Also Discuss Other Iron and Steel Matters
at Meeting in Chicago Last Week

MECCHANICAL engineering matters in the iron and steel field were made the subject of a meeting last week in Chicago. The topics included heat economy progress in steel mills, sheet rolling, making nickel steel plate, depreciation and obsolescence, non-ferrous bearing metals, steel mill lubrication, hot blast cupolas and the position of the German iron and steel industry. The meeting was held under the direction of the iron and steel division of the American Society of Mechanical Engineers and under the auspices of the Chicago section of the society. The technical sessions took place at the Palmer House, Chicago, on Nov. 14 and 15, and simultaneous visits were arranged on the afternoon of Nov. 15 to the Gary Works and the South Chicago Works of the Illinois Steel Co., the Inland Steel Co. and the Acme Steel Co. The attendance was close to 200, many representing the Chicago district.

Those particularly responsible for the meeting, which served to typify the plans of the new division of the society to devote itself to iron and steel mechanical engineering, were George T. Snyder, chief engineer National Tube Co., Lorain, Ohio, and chairman of the division; Rogers A. Fiske, Western editor THE IRON AGE and chairman of the technical program, and P. T. Wetter of the staff of the society.

The technical contributions were presented at three day sessions and at a dinner on Wednesday evening. The presiding officers were John W. Shepherdson, chief engineer Morgan Construction Co., Worcester, Mass.; J. Fred Mowat, chief engineer, Joliet Works, Illinois Steel Co., Joliet, Ill.; A. J. Boynton, vice-president H. A. Brassert & Co., consulting engineers, Chicago, and Senator James E. MacMurray, chairman Acme Steel Co., Chicago, who officiated at the dinner. Owing to the limits of space, only the part of the report of the meeting that covers sheet rolling can be given in this issue, leaving the various other topics for subsequent numbers.

Pays Tribute to Sheet Steel Industry

SHEET rolling elicited several written discussions. The paper on the subject was an adverse criticism, by Leon Cammen of the staff of the society, of existing practice in this country and abroad. "An analysis of its present development," said he, "would give it [industry] a mentality of 12 years as applied to steel and probably around eight or nine years as applied to copper and brass." He termed the wide

strip mill as more or less a speculation, that "as it is the finishing of the sheet that constitutes the major part of the cost, it is perfectly possible that a new method of operation will be developed and that the wide strip mill will become obsolete before it [has] had a chance to pay for itself."

Mr. Shepherdson, chairman of the session, disagreed with the author's designation of the mentality equivalent of the sheet rolling industry. He is convinced, he added, that the hot rolling of thin gages in wide widths has been a problem and continues to be a problem to tax the wisest and most experienced rolling mill men. Any method of manufacturing a product, he continued, has its limitations. "For instance, the Garrett type of rod mill is limited to a small rod bundle around 180 lb. Any rod mill is ill adapted except under unusual circumstances to roll smaller than No. 5 rod. Beyond that point it is generally cheaper to cold draw.

"In the days of three-high sheet-bar mills, sheet bar was regarded the lightest section suitable for rolling on such mills. The continuous sheet bar mill installed at the plant of the Youngstown Sheet & Tube Co. some 23 years ago merely rolled this product for the first time from a whole 6500-lb. bloom direct from the ingot heat and fitted into the scheme of the then prevailing and, for that matter, now prevailing system of sheet rolling.

Finishing in Continuous Sheet Mill

"The transition now in course of evolution is to carry a semi-finished intermediate product down to lighter gages, at higher speeds, but up to the present no attempt is being made to do this from the initial heat of the ingot or in weight of slab corresponding to the whole ingot. The difficulties are well recognized: speed, high tonnage per minute, heavy torques mean power, and power beyond all previous concentration is being put into small rolls. New metal in the rolls is required of sufficient endurance to withstand the localized surface pressures. These new rolls could not come overnight. The American sheet mill industry, far from showing temerity, has plunged into a new process pretty much regardless of cost, allured by the potential advantages in sight. This was no twelve year old boy's job."

Daniel Eppelsheimer, vice-president American Rolling Mill Co., Middletown, Ohio, pointed out that in discussing the economic importance of the new process of rolling mention

should be made of the developments in the finishing department that must be followed. "It must be evident," said he, "that new and advanced modes of pickling, annealing, cold rolling and coating are of necessity employed in order to gain full benefit from the higher production of the continuous rolling."

He emphasized that the control of the shape of the rolls in successive stands of a tandem or continuous mill involves much more than the original turning of the rolls and heating of them by the piece. The shape between the rolls when the piece is being engaged is the critical thing and it must be appreciated that this is affected by a large number of factors ranging all the way from the rigidity of the mill housings to the character of lubrication of the roll necks or bearings.

"There are a number of problems other than those mentioned in the paper," added Mr. Eppelsheimer, "which required solution in order to substitute mechanical operation for the high degree of skill required by the hand rollers of the past. I believe that a full understanding of them would convince the members of this society that Mr. Cammen has underestimated the difficulty of replacing the particular manual operations involved by a series of mechanical devices."

He went on to say that in the Ashland process the shape of the rolls when in engagement with the piece is deformed from the truly cylindrical and the shape in each stand is less deformed than the preceding one. This process of rolling wide, thin metal, he added, is used not only at Ashland, but at Butler, Pa., and Middletown and by licensees of the American Rolling Mill Co. at Weirton and will be used shortly at Wheeling. It has, he suggested, a much wider application than the author of the paper apprehends.

"Those members of this society who visited Ashland," he continued, "will recall that the continuous pack rolling units of the mill installation are planned to operate in parallel with each other, as well as in series with the continuous roughing mill, and I may add that our experience indicates that it is fully practical to provide continuous or tandem finishing mills, operating always according to the deformation process, noted by the writer, for reducing sheet metal to any desired gage with large attendant economies."

The patent situation was discussed by the author, who said continuous sheet rolling, not a new art at all, is literally plastered with patents. Mr.

Eppelsheimer in referring to the subject said: "I have had personal connection with the development of the patent situation of the American Rolling Mill Co. and have attempted to keep informed on the patent situation in general. To my mind there is no basis for a fear that rival concerns are on the way to, or are even unconsciously drifting into, the position of interfering with each other by means of trivial patents. The entire situation was, as I believe, so completely worked out by the American Rolling Mill Co. before the industry became convinced of the practical importance thereof that there is but little room so far as this development is concerned for the automobile or radio situation to be repeated."

Increased Output of Conventional Mills

R. J. Wean, vice-president Aetna-Standard Engineering Co., Youngstown, Ohio, said it would be well to give due credit to the accomplishments of those engaged in this great industry, whose total output this year will approach 5,000,000 tons, having an approximate sales value of \$300,000,000 to \$400,000,000. "When it is realized that the sheet and tin plate industry has invested upward of \$75,000,000 in the last two years for the production of tin plate and sheets by new methods and processes, they cannot, in all fairness, be accused of a total lack of progressiveness.

"While it is true that for many years this industry was slow to take up new developments, it must be remembered that this was during a period when profits were ample to satisfy the stockholders and the pressure of low selling prices was not present. In recent years this industry has made tremendous strides in the improvement of the quality of their product, as well as increased production from existing equipment. For many years the sheet industry was largely in the hands of mill men—men who had been trained to roll steel by actual experience. Very little engineering knowledge was applied to the industry as a whole, and this possibly accounts in some measure for their lack of progress, as in recent years the developments that have come into the sheet industry have been brought about by applying engineering effort.

"Strange as it may seem, the introduction and development of wide strip rolling, when used for tin mill breakdown purposes, caused the development of new methods of heating, as well as new methods of finishing this material, that can be applied to any existing conventional type sheet or tin mill. Continuous pack heating furnaces and mechanical catchers for the mills constitute largely these improvements at the present time, and this permits an increased output per mill with a reduced mill crew.

"In past years on full finished or automobile sheets," continued Mr. Wean, "it was general practice for the bars to be roughed down from two to four passes on the roughing

mill and then swung to the finishing mill, where they would be given several additional roughing passes before matching. The pack would then be returned to a sheet furnace for reheating and subsequently finished on the finishing mill.

"When operating in this manner, one crew would operate both the roughing and finishing stands. The result would be that either one of the mills would be idle 30 or 40 per cent of the time and, in many cases, even more. During the past year, what is known as the 'double mill' or 'Tipperary' system has come into quite prominent use, which means that the roughing mills are operated by one crew and the finishing mills by another crew, so that all mills are being operated as nearly 100 per cent of the time as heating and mill conditions will permit.

"To the writer's knowledge as much as 25 to 30 tons of 19-gage sheets 36 in. wide, 78 in. long, rolled three in a pack, were finished on a sheet mill of the above type in 8 hr. When this is compared to the old style production of 9 to 12 tons in 8 hr., it can readily be appreciated what this will mean to the sheet producer in the form of reduced cost, as well as increased tonnage, without the addition of any actual rolling equipment. When all of the economies of this nature have been accomplished in what we will term the conventional type sheet mill, it will be extremely difficult for wide strip steel producers to manufacture at a lower cost than the ordinary sheet mill producers.

"The actual cost today for erecting an 8-stand sheet mill would be approximately \$1,500,000 to \$2,000,000, which represents about \$250,000 per hot mill. This, of course, would include buildings, furnaces and other machinery, without which it would be impossible to operate the mill."

Makes Long, Thin Strips Without Reheating

Lloyd Jones, E. W. Bliss Co., Salem, Ohio, said he could not agree that the wide strip mills have proved a failure. Of the last three wide strip mills to be put in operation, two of them exceeded expectations in thinness of gage and the third is producing within the limits of gage. "It is true that, under the present hot strip practice, No. 12 to No. 16 gage may be considered commercial limits in wide widths, but with the addition of cold rolling these strips can be reduced to any gage desired."

Mr. Jones's idea of the sheet mill of the future is in part as follows: A tandem roughing section and a continuous finishing section. The product of this mill may range from 12 to 36 or 42 in. in width, about 250 ft. in length and from No. 3 maximum to No. 26 minimum in gage. The mill would cover jobbing mill plates and sheets within the width capacity in all gages, sheet mill products within the width capacity and all gages down to No. 26-gage—or probably 75 per cent of the sheet tonnage. As to tin

mill products, the mill would cover No. 18 to No. 22-gage material, which could be doubled and hot rolled on hand mills to light gages. An alternative to this would be cold rolling on cluster or backed-up mills to the desired gage. In conclusion he said: "We have produced hot strips of long length No. 24 gage thick from a hot slab in one rolling without reheating, by a process recently developed."

Marked Improvements in Conventional Rolling

As a part of his contribution to the discussion, H. L. Bodwell, assistant district manager, American Sheet & Tin Plate Co., Vandergrift, Pa., gave a brief description of the present method of rolling light gage sheets to assist in visualizing some of the difficulties involved and to point out the improvements made to improve quality and quantity.

"The size of the rolls," he said, "has increased from 18 or 20 in. in diameter to 30 or 32 in., with corresponding increases in the size and strength of the housings and drives. Methods of heat control of the rolls have been perfected so that variations in temperatures are held within 50 deg. Fahr. in all stages of the rolling operation, with consequent longer life of rolls. Roll breakage is now a rare occurrence and it is usual to obtain a life of roll of 100 days or more before it has to be discarded on account of the entire chill being removed.

"Preheating of rolls is practiced, eliminating the necessity for making a large amount of more or less unsalable warming-up sizes and permitting the immediate rolling of orders, with consequent better deliveries.

"Continuous pair furnaces are used, with less labor in charging and elimination of puddling and with improved quality of pair heating. Mechanical doublers have been introduced, doing away with one of the most difficult jobs. Various mechanical means of handling bars and handling packs into sheet furnaces and at mills have been devised. Working conditions have been improved by installation of water cooled floors, ventilating systems and forced air cooling systems. On the whole, many improvements have been made and the output per mill has been doubled in the last 25 years.

"The standard mill unit consists of a roughing mill, sometimes called the soft mill, with both top and bottom rolls driven, a finishing mill with only the bottom roll driven, the top roll being driven by friction, and the necessary complement of pair and sheet furnaces, shears, doublers, etc.

"The roughing rolls may be steel or gray iron, but usually wornout finishing rolls are utilized. They are kept cold by means of a spray of water. The finishing rolls are of cast iron, with about $\frac{3}{4}$ in. chill, 28 in., 30 in. or 32 in. in diameter, of a length suitable for the ranges in widths to be rolled, varying from 34 in. in length of barrel to 84 in., and

weighing from 8000 to 25,000 lb. They are run hot but kept below about 750 deg. Fahr. by means of steam or air blowers.

"The crew consists of the roller, who is the foreman of the crew and has general charge of all operations on his mill, and these other members: Sheet heater, roller's helper, heater's helper, rougher, catcher, pair heater, pair heater's helper, matcher, doubler, shearman, leader and opener. Additional help is provided as required by reason of excessive weight of bars or other causes.

"The bars are drawn from the pair furnace in pairs and broken down on the soft mill until approximately $\frac{1}{4}$ in. thick. Then they are swung over to the finishing mill, where the roughing is finished, the rougher and catcher doing this work. The two pieces are matched together for length and thickness and the roughing finished in that way.

"After the roughing, the breakdowns are matched and doubled and reheated in the sheet furnace. After

reheating, if 28 or 30 gage, the pack is run over on the finishing mill one pass, then opened, matched and doubled again. The pack now consists of eight sheets and is reheated again in the sheet furnace and finished by the roller in as many passes as necessary to obtain the required length. No. 26 gage is matched in 3's after roughing and doubled into packs of six, then reheated and finished.

Other gages may be rolled either single or double, in 2's, 3's or 4's as may best suit the particular gage and size being rolled. The bars are generally worked in heats of 12 pairs each. Both bars and packs are, at some stage of the process, worked below the critical temperature. As the greater part of the roughing, the run-over and the finishing are done on the one finishing mill, those members of the crew performing each part have ample time to rest. The hot finishing rolls are kept almost constantly in use and are, therefore, kept at a uniform temperature."

Melting speed depends upon the physical character of the charge and the analysis of the steel to be made. Heats already made in the furnace have demonstrated that under ordinary conditions, 600 lb. of steel or base metals (Swedish pig iron and muck bar) can be melted in 50 to 55 min. The container for the metal is a monolithic crucible or a lining tamped in around a core, and acid, basic or neutral refractories may be used. Experiments have disclosed a life of crucibles of 45 heats, but this record may be materially bettered, it is believed, with more constant use.

Advantages claimed for the new method of melting over others are that the stirring motion in the bath causes complete dissemination of the alloys; that, because the heat comes from induction, there is uniform distribution of the temperature throughout the bath; that the steel is made in the absence of oxygen, and of phosphorus and sulphur from fuels; that there is no contact with carbon electrodes, and that the consistent chemical results indicate that the furnace provides a most delicate control over all of the elements contained in the steel.

The furnaces are housed in a new building of brick and steel, called the electric furnace department. It is remarkable for its roominess, lighting and ventilation. Along the wall, opposite to the side on which are located the electric furnaces, are bins for holding the raw materials, and the entire plant is served by a 5-ton overhead electric traveling crane.

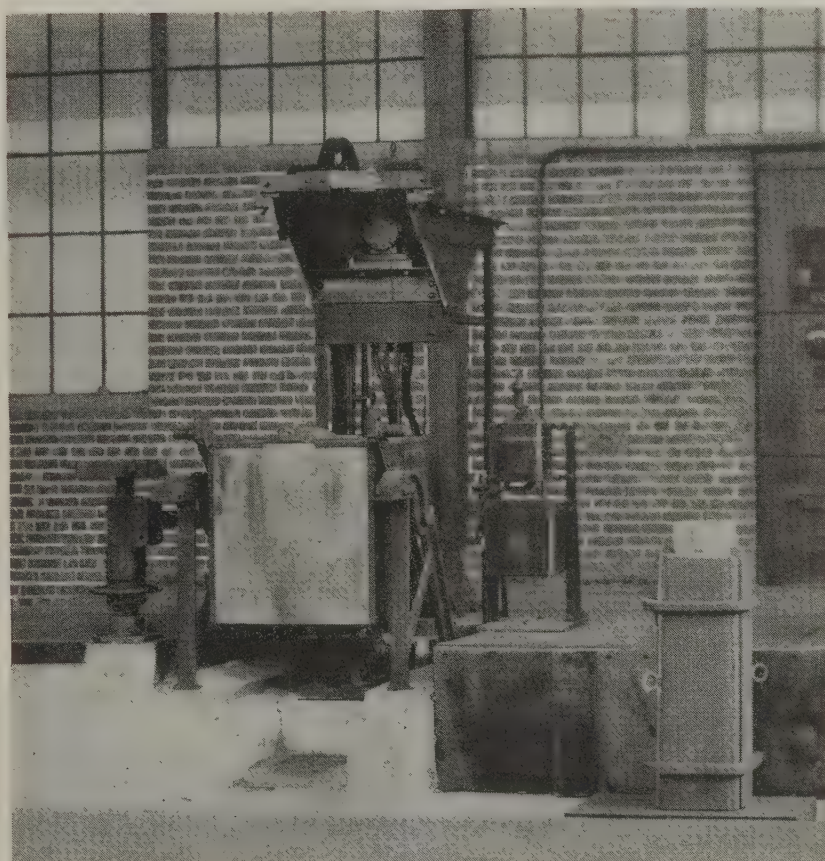
Rapid Melting of High-Grade Steel

High-Frequency Electric Induction Furnace at Pittsburgh Melts 600 Pounds in About an Hour

A DEMONSTRATION of a new 600-lb Ajax-Northrup high-frequency induction steel melting furnace, recently placed in operation at the plant of the Heppenstall Forge & Knife Co., Pittsburgh, was held at the plant of that company Friday afternoon, Nov. 16. It attracted some 300 members of the Engineers Society of Western Pennsylvania and the American Society for Steel Treating and others interested in the manufacture of high-grade steel. The visitors saw steel made by a process that is believed to be the first installation of its type in the country to cast steel ingots for production work. In a little more than an hour a charge of cold metal was melted and poured, and neither the melter nor those who stood close to the furnace experienced discomfort because of the temperature of 3000 deg. Fahr. of the molten metal. The shell of the furnace could be touched without danger of burning at any time during the operation, and the radiation of heat is evidently not great even during the periods when the cover of the pot is opened to receive alloy additions.

The high-frequency current is supplied by a 150-kva. motor-generator set, in which the current is transformed from 60 cycles to 960 cycles. This current is passed through a helical copper coil, which surrounds the container of the metal charge. Electromagnetic currents are set up and heating and melting ensue. Because there is no contact between the coil and the charge, induction melting often is referred to as "melting by radio or wireless." The furnace is

the product of the Ajax Electrothermic Corporation, Trenton, N. J.



Pouring Side of a 600-Lb. Ajax-Northrup High-Frequency Furnace

Boring and Drilling Machines for Automotive Use

DIRECT motor drive of the spindles and plate mounting of the spindle bearings in the head are outstanding features of a cylinder boring machine and a valve hole drilling and reaming machine—both of vertical type—which have been brought out by the Shaw Crane-Putnam Machine Co., subsidiary of Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York. Except for details of the head, the machines are of the same general design.

In both machines the motor is mounted on the head, close to the tools as shown, and the drive is through chrome-vanadium steel heli-

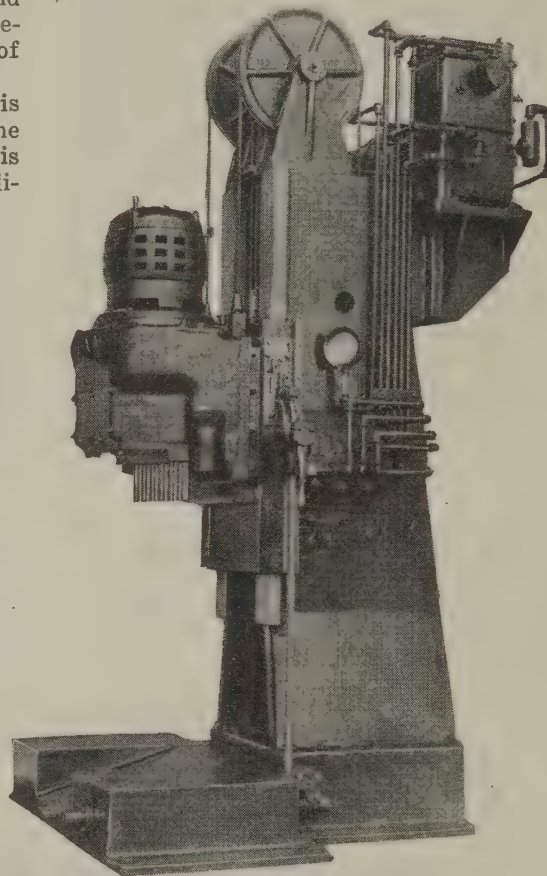
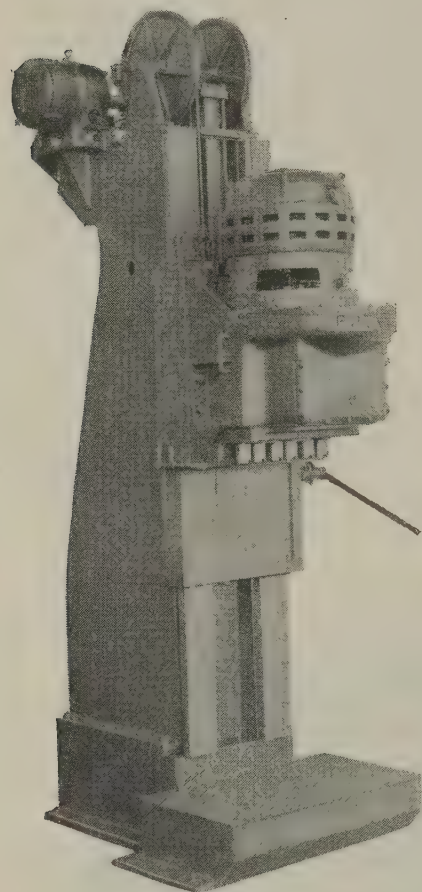
automatic and manual control is employed. With the automatic feed the head rapidly approaches the work, goes into feed and continues at the predetermined feed until the work has been bored or drilled; it then returns rapidly to the upper position and stops. When the work is changed,

from 31 to 79 in. The work table is 25 x 48 in. and is located 12½ in. above the floor. The spindles of this machine are driven by a 20-hp. constant-speed motor which is controlled by push buttons.

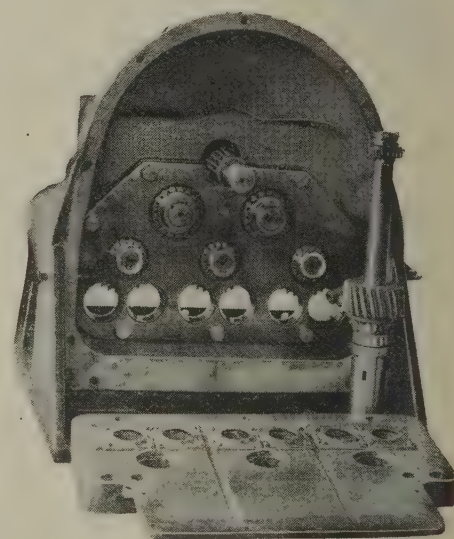
The valve hole drilling machine can have 6, 8, 12 or 16 spindles. The distance from the center of the tool spindle to the column face is 13 in., and the distance between the top of the table and the ends of the spindle may be from 32 to 58 in. The work table, located 10½ in. above the floor, measures 27 x 56 in. A 5-hp. constant-speed motor with push button control is used on this machine.

Machine Knife Makers Are Merged

The A. A. Simonds Co., Dayton, Ohio; the L. & I. J. White Co., Buffalo; the R. J. Dowd Knife Works, Beloit, Wis., and the Worden Tool Co., Cleveland, leading manufacturers of machine knives, have been merged under the name of the Simonds-Worden-White Co. For the present the four plants will be operated as separate units, with general headquarters at



THE Cylinder Boring Machine Is at the Left and the Valve Hole Drilling and Reaming Machine Is Above. The separate plate arrangement of the Timken bearings, which permits changing center distances of spindles by installing new plates and gears in the head, is shown at the right



cal gears. All shafts are mounted in Timken roller bearings and flood lubrication is provided by a geared pump.

Separate plate mounting of the Timken bearings permits changing the center-to-center distances of the spindles by installing new plates and spindle gears in the head, which arrangement is emphasized as eliminating the necessity of applying an entirely new head for various spindle groupings. The outer bearing cups are pressed into the steel plate and the inner cones of the roller bearings are machined directly on the shafts, which are heat treated. Use of these steel plates and the special application of the Timken bearings provides space for unusually large diameter spindles, thus affording strength for maximum speed of operation. The spindles, held rigidly, are practically vibrationless.

Oilgear hydraulic feed with both

this cycle of automatic operation is again started by means of a convenient lever. The hydraulic pump with its 3-hp. motor is mounted on a bracket on top of the column of the machine, which construction minimizes floor space requirements.

The saddle has a narrow guide and taper gibs are provided at both top and bottom to assure accurate alignment. The table and base on both types of machines is made in one casting and the upright is bolted to the base and fitted with key and dowels to assure rigidity. Work tables of various sizes and heights above the floor can be furnished to suit particular requirements.

The cylinder boring machine can be arranged for 4, 6 or 8 spindles. The distance from the center of the tool spindle to the column face of the machine shown is 14½ in., the distance from the spindle ends to the top of the work table may be

Dayton, Ohio. W. E. Bonesteel, who was president-treasurer of the Worden Tool Co., becomes chairman of the board of the new organization and will maintain his office in Cleveland. Herbert R. Simonds is president of the new company and Frank R. Henry is secretary and manager of sales. Both were affiliated with the Simonds company. W. S. Wall of the White company is first vice-president. In addition to the manufacture of machine knives the White company makes edge tools, carpenter tools and saws, and the Simonds company manufactures emery wheels.

Cold Metal Process Co., manufacturer of light gage strip, or shim steel, has moved to larger quarters in the old plant of the Youngstown Boiler & Tank Co., Glenwood and Mahoning Avenues, Youngstown. Beside rolling shim steel, the company has begun to make stampings.

Accuracy of Tools and Work Checked Rapidly

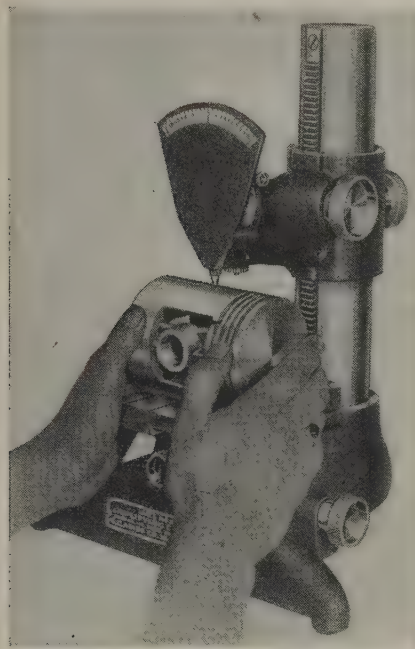
AN amplifying comparator with diamond measuring point and a dial having 0.0001-in. graduations spaced 3/16 in. apart, to facilitate reading, has been placed on the market by the B. C. Ames Co., Waltham, Mass. The instrument is sensitive, accurate and impersonal, and is in-

justable up and down for coarse setting by means of rack and pinion. The head cannot drop and injure the indicator when the binding clamp is loose. A special feature is the lever inclosed in the bracket. This lever serves to hold the indicator contact point and absorb all horizontal stress and strain, thus causing dial readings to repeat positively. It does not affect amplification, the latter being obtained directly from the measuring point through the 0.0001-in. dial gage.

A stop bracket, consisting of a casting and a hardened tool steel stop blade, is adjustable to accommodate

the work in testing position. Stops are provided on the bracket lever to protect the indicator from being jammed or injured.

The platen, of tool steel, hardened, ground and lapped flat, is 5 in. long, 4 in. wide and 1 in. thick, and is movable to prevent local wear. It is mounted on a large adjustable spindle, fitted with a clamp, and is raised and lowered by a knurled screw through worm and gear. Platens of special shape, and V-blocks, can be furnished. The diamond in the measuring point is rounded and will not scratch or mark the work. The height of the amplifying comparator is 16 in. and the weight 70 lb.



Variations of 0.0001 In. Are Amplified to Nearly 3/16 In. In the above set up pistons are being tested to 0.0005-in. limits

tended for use in maintaining size control both on work in process and the tools employed. It will accommodate work up to 8 in. under the measuring point.

The instrument is simple to use. A standard size block, or unit, is placed on the platen under the measuring point and the dial is adjusted so that the pointer comes to rest at zero. After the block is moved away, it is returned a few times to make sure of the adjustment. In testing the work, movement of the dial pointer to one side of zero indicates a minus dimension and to the other side a plus dimension. Ability to repeat readings is an outstanding characteristic claimed, and the most delicate setting can be quickly and securely locked in place. Rigid construction prevents errors due to spring of the instrument.

The micrometer dial gage is of fan shape. Its entire range shows only 0.001 in. plus and 0.001 in. minus, and occupies a sweep of nearly 4 in. The amplification thus secured is emphasized as relieving eye strain, and permits the operator to read down to 0.000025 in. easily and precisely. The minus graduations, at the left of zero, are in red, and those at the right of zero, the plus readings, are in black.

The iron base is heavy, has three-point support and three rubber feet. The column is of solid steel and is bolted against a wide shoulder. The bracket which holds the indicator is of massive design, ribbed and clamps to the column positively. It is ad-

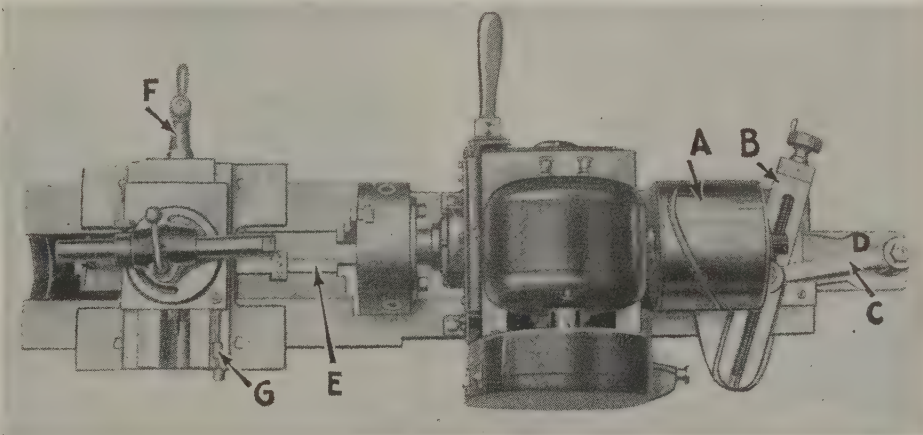
Oil Grooving Machine of Simple Design

SIMPLICITY of design and convenience of operation are features of a self-contained ball-bearing oil groover which has been placed on the market by the Watson Brothers Machine Co., Inc., Bound Brook, N. J. Three sizes can be furnished, one smaller and one larger than the particular machine illustrated, which is for grooving bushings from 3/4 to 6 in. in diameter and up to 6 in. in length. It will also cut barrel cams and score bushings and inserts with endless threads for die castings. Taper attachment can be supplied and the machine can be furnished without legs for bench mounting.

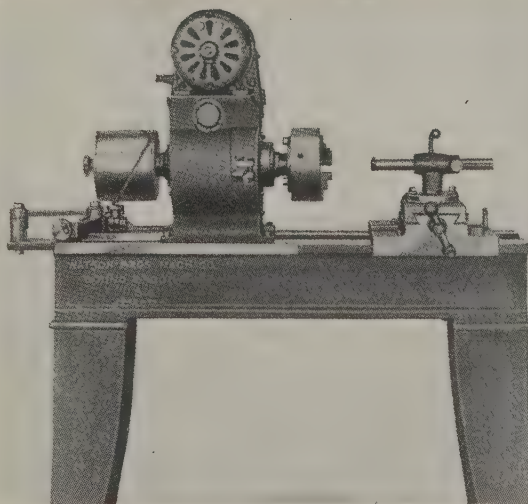
Bushings to be grooved are held in a 6-in. universal chuck or in an air chuck, the spindle of the machine be-

ing hollow and threaded on one end to permit attaching the air chuck. The grooving tool is mounted in a swivel toolpost on a cross-slide on the carriage. Grooves are reproduced by cams, two of which, one single and one double, are furnished. The cam has a clutch within it which provides a double index for grooving on the opposite side of the bearing. By disengaging the carriage and rotating the spindle any number of grooves in a plane perpendicular to the axis can be cut.

The forming cam A, mounted on the rear end of the spindle, gives longitudinal movement to the cutting tool and carriage through a follower, stroke adjustment arm B, connecting link C, slide D and connecting rod E.



Oil Grooves Are Reproduced by Cams, Two of Which Are Furnished. Barrel cams can be cut and bushings and inserts scored with endless threads for die castings. The component parts and action of the machine are shown in view above



The stroke may be adjusted from 0 to 6 in. by the small handwheel on the end of arm *B*. Depth of cut is controlled by the cross feed handle *F*, a depth adjustment and stop being provided at *G*. The spindle and cam are driven by a ¼-hp. motor through spur gears, worm and worm wheel. Control of the motor is by means of a switch at the front of the machine. Spindle speeds of 60, 80 and 120 r.p.m. are obtained by change gears.

To make the machine ready for operation, all that is necessary is a simple adjustment of the stroke arm, depending on the length of the bushing and the setting of the tool. When changing work in the chuck the spindle is disengaged by means of a clutch.

The machine occupies floor space of 20 x 60 in. and the height to the center of the spindle is 41½ in. The net weight is 500 lb.

power the lever returns to idle position, the fingers automatically lock it in place.

Drive of the block spindle is through cast steel gears of the herringbone type. Different speeds may be obtained by changing these gears, or the machine might be built with change-gears that would permit drawing several sizes of wire at the will of the operator, without alteration of the mechanism.

Three horizontal rods seen extending along the front of the bed constitute the means of automatic operation of the electrical device for stopping the machine. Pressure against the uppermost rod, such as would happen were an operator's body to be thrown or to sag against it, operates the drum-switch which shuts off the power. Pulling forward the lower rod starts the motor operating again.

Ball-bearings are used throughout, with positive circulating lubrication. Driven by a Westinghouse line-start motor of 40 hp., the machine is about 15 ft. long and weighs close to 11 tons.

Three-Block Wire-Drawing Frame

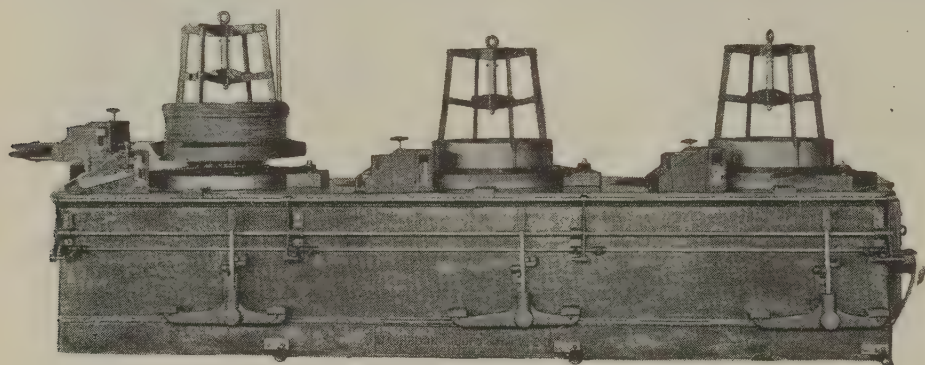
Safety Features and a Slip-Clutch Used on New Machine for Production of Drawn Wire

BY JOHN NELSON

TWO devices feature a three-block rod-frame designed and built by the Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass., for the Atlantic Wire Works, Branford, Conn. The essential feature of the machine is the use of a slip-clutch designed by the Washburn

proper degree of acceleration and removes the chance of snapping the wire.

Provision is made for quick overcoming of momentum and bringing the block to rest when power is shut off, by means of a self-energizing brakeshoe operated by a lever, the



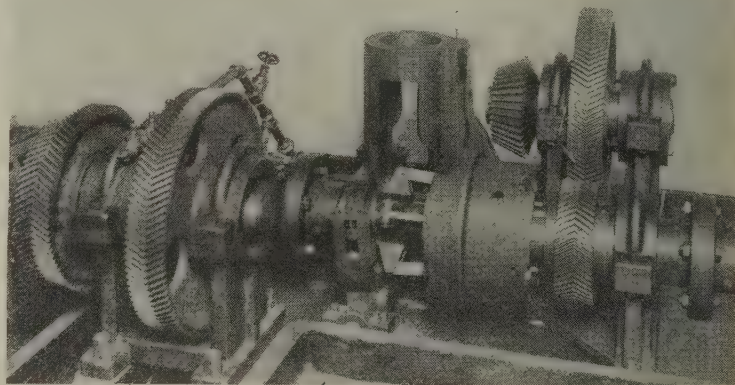
shops for wire-drawing purposes. Another important feature is the provision made to guard against injury to the operator. The motor may be stopped by pressing a button, or mechanically through a rod that extends along the front of the bed, and acts to shut off the power, should a man's body fall against it.

The friction clutch is designed to do away with starting strain and possible snapping of the wire. The clutch operates somewhat after the manner of the automobile clutch. It is highly sensitive and, if desired, may be started at a speed even as low as 2 r.p.m. Naturally, the 60 r.p.m. for which the machine is designed, or even a higher speed, is wholly feasible. This particular machine has three blocks, one a two-decker which permits passes of the wire through the medium of a sheave pulley.

Vertical starting levers for the three blocks, seen at the front of the bed, are attached at their lower ends to a shaft which operates fingers that act to slide a sleeve on the main driving shaft. The motion of the sleeve operates the cams which tighten the friction disks, of which there are seven sets of two, one cast iron, the other bronze. An unskillful, sudden movement of the starting lever would start up the block with a jerk. But a sufficiently gradual motion insures the



THREE-Block Machine, Showing at Upper Left the Two-Story Block Designed for Passing Wire Around a Sheave. The other views are of the driving mechanism and the lubricating system



device resembling those used in controlling talking-machine disks.

Each vertical lever which operates the clutch has a safety device which insures that it will remain in its neutral position. It is held between two fingers, the left one of which must be snapped back before the lever may be moved. When with the shutting off of

Reducing Varieties of Welded Chain

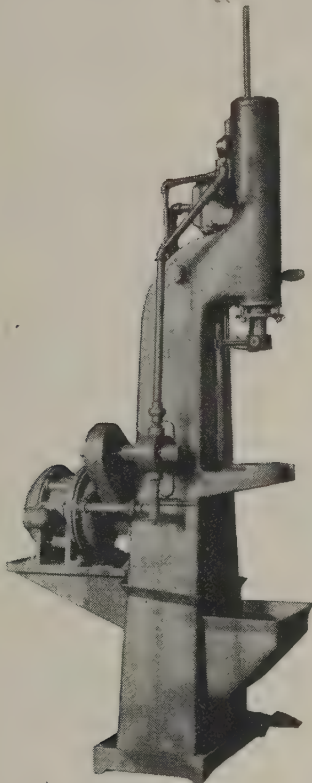
WASHINGTON, Nov. 19.—Approval of a simplified practice recommendation for welded chain was given at a general conference of manufacturers, distributors and users at a meeting held at the Department of Commerce under the auspices of the division of simplified practice last week. The program will become effective for new production on Feb. 1, 1929, while the distributors will have until May 1,

1929, to use up present stocks. R. L. Lockwood of the division, who represented the department at the conference, pointed out that, after a careful study and survey of production and demand covering all regularly catalogued items, it was found that two-thirds of such items would amply satisfy all normal demand.

Two-Ton Hydraulic Broaching Press

A NEW 2-ton hydraulic press with maximum stroke of 14½ in., for broaching, assembling, arbor pressing and other operations, has been brought out by the American Broach & Machine Co., Ann Arbor, Mich. The machine is self-contained and can be furnished either for belt or motor drive.

The ram, which is 2 in. in diameter and is tapped at the end to receive



Work Up to 10¼ In. in Diameter Can Be Handled on the Table. The stroke of the ram is adjustable up to 14½ in.

attachments for pushing, has a speed of 14 ft. per min. The stroke is adjustable up to the maximum, 14½ in. The work table has a 2¾-in. hole central with the ram and at the front has a notch which can be cut through, if desired, to facilitate removing assembled parts. The finished working surface of the table is 8 in. in diameter and the offset in the frame of the machine permits handling of work up to 10¼ in. in diameter.

Control of the machine is either by hand lever or foot pedal and the arrangement is such that upon release of either lever the ram returns automatically to the upper, or starting position.

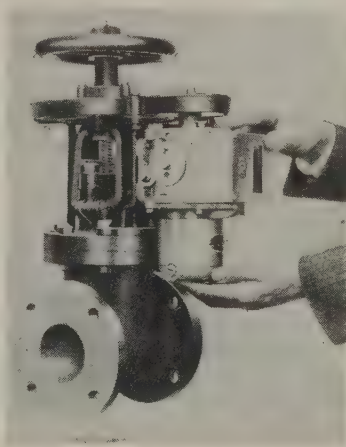
A 5-gal. oil reservoir is contained in the base of the machine. The pump is of continuous-flow type and control of the action of the ram is by means of a balanced piston valve. The hydraulic cylinder is 4 in. in diameter and is of gray iron; the piston is of conventional type using step joint rings and one leather cup. Oil is delivered to the full area of the piston on its downward stroke and to the lower end of the cylinder on the return stroke. The up-stroke of the ram is 25 per cent faster than the down-stroke.

For motor drive a 2-hp. 1800-r.p.m. motor is recommended. Lubricating pump and lubricant receptacle can be furnished. The machine is available for bench mounting as well as with the pedestal, the former weighing 580 lb. and the latter 800 lb.

Motor-Driven Mechanism for Operating Valves

A MOTOR-DRIVEN valve-operating unit is being put out by the Cutler-Hammer Mfg. Co., Milwaukee, which makes possible automatic operation of all valves up to 6 in. Although so small that it can be held in one hand, this unit has a rating of 15 lb.-ft. It can be actuated automatically by float switches, temperature controlling devices, pressure regulators, etc., or by push buttons.

This unit is similar in principle to the standard C-H "Dean" operating unit. While designed primarily for valve-operating service in industries where regulation of pressures and temperatures of gases and fluids is

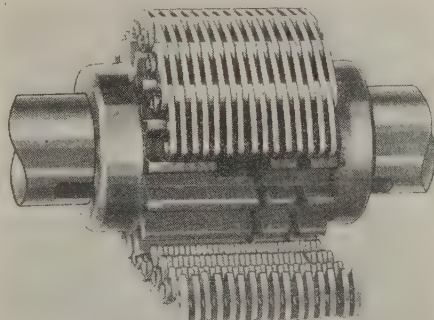


Valve Mechanism Designed for a Wide Variety of Services

necessary, it is likewise adaptable to many miscellaneous applications, such as operating skylights, awnings, radiators, doors, etc.

New Flexible Coupling

A NEW flexible coupling brought out by the Morse Chain Co., Ithaca, N. Y., consists primarily of a

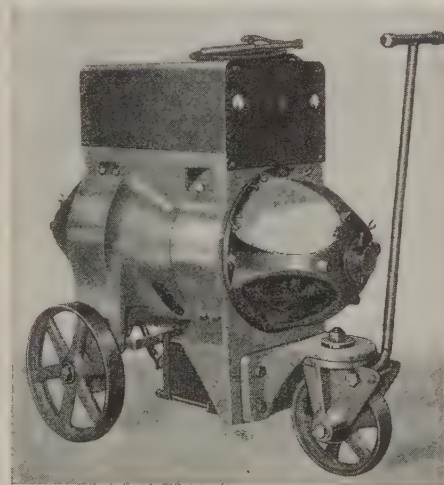


Efficiency, Durability and Simplicity Are Claimed for This Coupling

Morse chain wrapping two sprockets, each one-half the width of chain. One sprocket has a guide groove in center of face to hold the chain in place; the other has no guide groove and is free to float under the chain. The chain fits loosely enough on the sprockets to take care of ordinary misalignment and lack of parallelism. High efficiency, durability and simplicity are claimed for this coupling.

Welding Set for Direct Current Circuits

A 200-AMP. welding set containing many new features in design and construction has been placed on the market by the Westinghouse Electric



Starting Rheostat, with Low-Voltage Protection, Is in Cabinet on Top

& Mfg. Co., East Pittsburgh. It has particular application in shops where only direct current is available for the driving motor of the welding set. It is designed so that either a 230 or 550-volt driving motor may be used. The construction permits use either as a portable or stationary unit.

Driving motor and generator have a common frame and common shaft, supported by ball bearings. The control, mounted on top as a part of the frame, is protected by a sheet steel cabinet. Three wheels on roller bearings make the set readily portable and give the welder small overall dimensions and a low center of gravity. For stationary use the running gear can be omitted.

Rating of the unit, in accordance with the N.E.M.A. standards of practice, is 200 amp., 1 hr., 50 deg. C. rise in a resistance load at 25 volts. The welding range is 60 to 300 amp. The compound-wound driving motor maintains constant speed with a voltage fluctuation of not more than 10 per cent. The motor starting rheostat with low-voltage protection is inclosed and mounted in the sheet steel cabinet on top of the set.

Richard A. Feiss, Inc., Boston, engaged in specialized consulting service in management, organization and merchandising, has removed its offices to 470 Atlantic Avenue.

European Steel Conditions Improving

German Lockout Finds Ample Stocks—British and French Makers Getting Better Tonnage—Conversion of Steel in Transit

(By Cablegram)

LONDON, ENGLAND, Nov. 19.

DEMAND for Cleveland pig iron is improving, mainly as a result of increasing domestic requirements. Consumers are buying more freely and withdrawals from makers' stocks are the largest for many months.

Hematite supplies are almost negligible, and some furnaces already are in arrears with deliveries. Prices are stiffening. Foreign ore is quiet.

Rolled iron and steel markets are moderately active in semi-finished and light-weight material, owing to the German lockout. But plants making heavy material are still badly in need of orders.

Tin plate inquiry is improving, although business still is slow. Makers are well placed for the early months of next year, but there is a shortage of orders for the remainder of the current year, and output is now below 70 per cent of capacity. All classes of wasters are now scheduled, at prices fixed at from 15s. to 16s. 9d. (\$3.64 to \$4.07) f.o.b. works port, according to specifications.

Galvanized sheets are in more active demand and prices are steadier. Black sheets are generally quiet.

On the Continent of Europe

Continental markets are less excited over German developments, and prices are easing. Further declines are an-

ticipated if the lockout ends soon, as German supplies are ample and the Steel Works Association has authorized the release of certain quantities for export.

Moscow is to build an underground railroad (subway) at a cost of R. 55,000,000. [At 1913 rates of exchange, this would have represented about \$28,325,000.]

German Lockout Threatens to Spread

Suspension of Steel Output, However, Will Have No Immediate Effect on Manufacturing Consumers

BERLIN, GERMANY, Nov. 7.—The lockout of 225,000 men employed in the Northwestern iron and steel industries has been under way since Nov. 1. The area involved normally produces 80 per cent of Germany's heavy iron and steel as well as a large part of the country's finished products. Virtually all producers in this section have entirely ceased operations. The wage dispute threatens to spread to other areas, such as Solingen and Hagen-Schwelm, with the possibility that an additional 100,000 men will be thrown out of work.

The original dispute, in the "Northwestern group," began with a denunciation of the existing wage agreement by the employees, followed by a demand for a wage increase of 15 pfennigs an hour for all workers over 21 years of age. The employers offered certain minor wage advances, affecting a few thousand men, and

gave notice of a lockout, to begin Nov. 1. An arbitrator appointed by the Government awarded an advance of 6 pfennigs an hour for time workers, which would have raised the hourly wage rate from 78 to 84 pfennigs, and an advance of 2 pfennigs an hour to the "time supplement" received by piece workers. The piece workers predominate in the heavy branches, time workers in the manufacturing branches. The increase to the piece workers, on basis of a 48-hr. week, would have been less than 25c. a week.

The employees accepted the arbitrator's decision, but the employers rejected it. The Minister of Labor, Herr Wissell, a Socialist, thereupon declared the arbitration decision binding on both parties, under a clause of an ordinance of 1923 that gives the Government such power. The employers on two different grounds declared the minister's action invalid

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....		£0 17½s.		\$4.25	
Bilbao Rubio ore*	1 2	to £1 2½s.	5.35	to \$5.48	
Cleveland No. 1 foundry.	3 8½	to 3 9½	16.64	to 16.89	
Cleveland No. 3 foundry.	3 6		16.04		
Cleveland No. 4 foundry.	3 5		15.80		
Cleveland No. 4 forge...	3 4½		15.68		
Cleveland basic (nom.)...	3 5		15.80		
East Coast mixed.....	3 10	to 3 11	17.01	to 17.25	
East Coast hematite.....	3 10½	to 3 11½	17.13	to 17.37	
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to 40.10	
Billets	6 5	to 6 10	30.37	to 31.59	
Ferromanganese	13 15		66.83		
Ferromanganese (export)	14 0		68.04		
Sheet and tin plate bars,					
Welsh	6 0		29.16		
Tin plate, base box.	0 18	to 0 18½	4.37	to 4.40	
Black sheets, Japanese					
specifications	13 7½		65.00		
Ship plates	7 12½	to 8 2½	1.63	to 1.74	
Boiler plates	9 0	to 10 10	1.92	to 2.25	
Tees	8 2½	to 8 12½	1.74	to 1.84	
Channels	7 7½	to 7 17½	1.58	to 1.69	
Beams	7 2½	to 7 12½	1.53	to 1.63	
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62	to 1.69	
Steel hoops	9 0	to 10 0	1.92	to 2.14	
Black sheets, 24 gage....	10 0		2.14		
Galv. sheets, 24 gage....	13 10	to 13 15	2.93	to 2.98	
Cold rolled steel strip, 20					
gage, nom.....	16 0		3.42		

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):		£3 3s. to £3 5s.		\$15.31 to \$15.80	
Belgium	3 3	to 3 5	15.31	to 15.80	
France	3 3	to 3 5	15.31	to 15.80	
Luxemburg	3 3	to 3 5	15.31	to 15.80	
Basic pig iron (a):		3 3		15.31	
Belgium	3 3		15.31		
France	3 3		15.31		
Luxemburg	3 3		15.31		
Coke	0 18		4.37		
Billets:		5 2		24.78	
Belgium	5 2		24.78		
France	5 2		24.78		
Merchant bars:		6 4		1.37	
Belgium	6 4		1.37		
France	6 4		1.37		
Luxemburg	6 4		1.37		
Joists (beams):		5 4		1.15	
Belgium	5 4		1.15		
France	5 4		1.15		
Luxemburg	5 4		1.15		
Angles:		6 2½		1.35	
Belgium	6 2½		1.35		
½-in. plate:		6 13		1.47	
Belgium (a)	6 13		1.47		
Germany (a)	6 13		1.47		
⅝-in. ship plate:		6 8		1.41	
Belgium	6 8		1.41		
Luxemburg	6 8		1.41		
Sheets, heavy:		6 1		1.33	
Belgium	6 1		1.33		
Germany	6 1		1.33		

(a) Nominal.

and illegal, brought a suit in a court of law to obtain a judicial review of the case, and closed down their works.

A court decision on the disputed point cannot be given before the middle of the month. No further official efforts have been made to terminate the dispute, but the question has been up before the Prussian Diet, and both parties have declared themselves ready to negotiate. The lockout may last for weeks, but may terminate any day. Both sides have sizable "war chests."

The lockout so far has had little effect upon manufacturing outside the district involved. The Stahlwerksverband has ceased booking home and export orders, but has not stopped deliveries against old orders. The Pig Iron Syndicate has taken no action whatever. Prices have not been changed, and it is expected that the usual monthly syndicate meetings that fix prices and selling conditions will not be held until the dispute is settled. Deliveries of scrap have ceased, and ore orders from abroad have been countermanded except in the case of ore already under way. Domestic manufacturers are not threatened with an immediate shortage of materials. Considerable stocks are in the hands of producers and traders. Manufacturers of small metalware

have for some time past been producing largely for stock, and will therefore suffer little should material run short. Should the lockout, contrary to expectations, last a long time, the home market will have to depend upon imports. South Germany will be supplied by the Saar; but it is doubtful whether the French and Belgian works, which before the lockout had abundant work and which will obtain further orders owing to the cessation of German exports, will desire to supply the German market. As a result of the lockout the Belgian market, which showed slight weakness at the end of October, is again firm, and the price tendency is slightly upward.

Until the lockout terminates, Germany will be eliminated from the international market, so far as exports of heavy iron and steel are concerned. Her net exports in this branch in September were 304,000 tons, against 101,000 tons in January and a monthly average of 137,000 tons in 1927. Her production of iron and steel, which this year promised to be only a little behind that of the boom year 1927, will suffer materially. Exports of machinery are not likely to decline unless the lockout lasts a long time. Engineering firms announce that they will continue to execute all orders promptly.

rates are higher in Germany. The exporter in such a transaction pays interest on the cost of converting the wire rods into wire for from 30 to 60 days, but the extra profit more than compensates for this expense. At present there is an active demand upon mills near the German frontier and on the way to a port, and the volume of such business is increasing rapidly. The problem is proving a serious one to the German syndicates and producers, and no solution has been found.

Britain Looking to Continent for Steel Outlet

LONDON, ENGLAND, Nov. 9.—Chief interest in the British iron and steel trade has centered in the turn of events on the Continent, and in particular the German lockout. So far no real effects of the lockout have been felt, except that in certain cases the supplies of raw material have been curtailed, but as most of this material has been coming from Belgium, France and Luxemburg, this stoppage is not very important.

What is looked for, however, is the chance of exporting to Germany. It is this possibility that is focusing the attention of British makers, especially of those engaged in the manufacture of heavy material for shipbuilding and allied trades.

In the meantime business generally in this country continues small. Producers of heavy rolled steel are struggling to secure sufficient orders to keep their plants regularly employed, but some of the mills rolling lighter material are not in such an unfavorable position. Orders coming in for pig iron are meager, except for some brands of hematite, which have been selling well, especially to Italy. Cleveland pig iron is quiet generally. Local steel works are absorbing the restricted output, and any material improvement in the demand would undoubtedly force the lighting of additional blast furnaces. At the moment, however, consumers show little inclination to purchase other than on a hand-to-mouth basis.

German-Austrian Coke-Ore Contract to Be Revised

WASHINGTON, Nov. 19.—Since the German-Austrian coke and iron ore exchange contract has lost most of its significance, as a result of changed business conditions during the past two or three months, the United Steel Works of Germany has begun negotiations looking to the preparation of a new contract, according to James E. Wallis, Jr., American trade commissioner at Berlin. The present contract, made between the German company and the Alpine Mining Co. of Austria, provided that the former was to deliver 240,000 tons of coke a year and the Alpine company 120,000 tons of ore a year.

Figures given out by the German

European Exporters Convert in Transit

Make Greater Profits by Buying Semi-Finished Steel in Germany for Conversion in Other Countries

BREMEN, GERMANY, Nov. 3.—Conversion of material in transit on an international scale is a recent European development that is causing some uneasiness among German manufacturers of bolts, nuts, screws, wire and heavy hardware. Wages paid in these plants are slightly higher in Germany than in most of the surrounding countries, such as France, Belgium, Luxemburg, the Saar, Poland and Czechoslovakia. In addition, the German syndicates control prices, so that concessions, even for export, are seldom permitted. As a result, exporters at Hamburg, London, Rotterdam and other large centers of the export trade have been buying raw materials or semi-finished material in Germany, which they ship to a neighboring country, where the cost of conversion is less than at a German mill, and then export to the foreign market where the finished product has been purchased.

When the material is intended for shipment to an overseas consumer, the semi-finished steel is shipped to a mill in Belgium, the Saar or Luxemburg, from whence it can continue in the form of the product required to the port of Antwerp. If the order is from a buyer in Southeastern Europe, a mill in Czechoslovakia may be selected, and, when intended for ultimate use in a Scandinavian country, a Polish mill receives the order and the German semi-finished material.

In the case of wire rods the domestic prices in all European countries are considerably higher than the export market, so that by buying the rods in Germany and shipping them to another country to be drawn into wire, there is a considerable saving. While a duty is paid on the material when it is shipped into another country from Germany, when it is re-exported the owner of the material receives the refund.

One example of this new trade may serve as an illustration. An exporter in London sells 500 tons of galvanized wire f.o.b. Argentine port at a base price of £9 12s. 6d. (\$46.78) per ton. By the new method of having material converted in transit, the exporter buys 505 tons of wire rods in Germany at £6 2s. 6d. (\$29.77) per ton, delivered at a Belgian mill, where it can be converted under present market conditions at £2 7s 6d. to £2 10s. (\$11.54 to \$12.15) per ton, which brings the cost to a maximum of £8 12s. 6d. (\$41.92) per ton. To this must be added about 7s. 6d. (\$1.82) per ton for transportation, making the total cost, f.o.b. the Argentine port, £9 (\$43.74) per ton—a profit to the exporter of 12s. 6d. (\$3.04) per ton.

No German mill could convert these wire rods into galvanized wire at the low prices of Belgian and other foreign mills, as wages, as well as taxes, social charges and railroad freight

statistical office show that the result of the agreement was a strong revival of the German coke trade with Austria. Sales of German coke to Austria increased from a monthly average of 8400 tons during the first quarter of 1927 to an average of 40,700 tons a month during the last quarter of that year. This figure exceeded the monthly average for the first quarter of 1928, which was 32,500 tons. During the April-August period the high-

est monthly total was 19,894 tons, in July.

Beginning with the third quarter of 1927 imports of iron ore into Germany from Austria averaged something over 10,000 tons a month and remained approximately at this level through May, 1928, but dropped to 4310 tons in June, 442 tons in July and only 70 tons in August, the latest month on which a report has been made public.

French Export Trade Good

Domestic Market Quiet Following Heavy Buying in October —Luxemburg Adds to Pig Iron Capacity

PARIS, FRANCE, Nov. 5.—Probably as a result of heavy buying in October, in expectation of a further price increase, the iron and steel market here has been quieter in the past few days. Domestic consumption of pig iron has been good, but sellers admit that competition of British foundry iron has necessitated special quotations to consumers near the Coast. Pig iron output in Luxemburg is large, with furnaces increasing their production. Export orders for steel products and semi-finished material are sizable, and rolling stock manufacturers report some desirable business from other European countries, one such contract being for four locomotives burning shale oil, bought from Societe Corpet Louvet et Cie. at La Courneuve by the Esthonian railroads. This is understood to be the first part of a program that calls for the purchase of 60 locomotives.

Illegal export of iron and steel scrap continues to be a much discussed subject in the steel industry and Government circles. Despite efforts of the Government to prevent exports of old material needed by French producers, old rails and ships to be dismantled for their scrap have been sold out of the country, so that a revision of the present regulations on scrap exports is expected.

Pig Iron.—The hematite iron market is unchanged, except that tonnages are still being sold as semi-phosphoric iron to be used for mixture, taking a lower price than is openly quoted for hematite. In Luxemburg the Acieries Reunies de Burbach-Eich-Dudelange is replacing its six blast furnaces with three new furnaces having the same total capacity. Other large producers are following a similar program of modernization. The Ougree-Marihayé works is remodeling its furnaces at the Rodange works to produce a total of 400 tons of pig iron a day instead of 180 tons. Improvements are being made at the Differdange works and the Rumelange plant, closed since the war, is to resume operations. Increased pig iron output with modern equipment is expected to reduce costs considerably.

Semi-Finished Material.—Export business continues good, and prices

are firm at £5 2s. (\$24.78) per ton for billets.

Finished Products.—Domestic business is smaller than early in October, but prices are firm and deliveries on most products range from three to six months. Export quotations are strong, and a good volume of trade is reported by most mills. Merchant steel bars for export are quoted at about £6 3s. per ton (1.35c. per lb.), f.o.b. Antwerp. In the Eastern domestic market, merchant bars are maintained at 740 to 750 fr. per ton (1.30c. to 1.32c. per lb.). Special shapes range from 950 fr. per ton (1.60c. per lb.) to as much as 1200 fr. per ton (2.12c. per lb.), f.o.b. mill. The sheet market is substantially unchanged except for a slight tendency to advance prices quoted on light-gage sheets.

Lockout Does Not Affect All German Steel Producers

HAMBURG, GERMANY, Nov. 3.—The lockout in the German steel industry does not affect all producers. On Nov. 3, about one-third of the pig iron producers, 28 per cent of the steel ingot producers and 37 per cent of the makers of finished products were in operation. The lockout, however, is general in the Ruhr, districts excluded being the left bank of the Rhine, the Eastern Valley in Westphalia and all of the industry in Silesia, Saxony and Central Germany.

Duffield Process for Direct Conversion From Ore

LONDON, ENGLAND, Nov. 9.—An interesting sidelight was thrown upon the Duffield process for producing iron and steel direct from the ore at a recent meeting of the Duffield Iron Corporation. C. E. Stearns, the chairman, remarked that the iron resources in the locality of the works (Adderbury, Oxfordshire, England) are sufficient to supplant imported iron ore, to offset importations of unfinished iron and steel into this country and to cover the total iron and steel requirements of England for generations, if worked and fabricated with

plants especially adapted to the physical conditions of the ore and the general circumstances of the locality.

Average analysis of the ore face showed 36.7 per cent iron, the bottom seam being carbonate ore, lean in iron, and this would not be worked. There was estimated to be 1,000,000 tons on the property, available for being readily mined. The designed capacity of the plant now being erected is from 350 to 500 tons a week.

It is expected that a unit of iron will cost $\frac{3}{4}$ d.; in the case of Oxford and Northampton ore, delivered at the blast furnace in Wales and Middlesbrough, in accordance with general practice, the cost is $4\frac{3}{4}$ d. per unit. The difference is over 30s. (\$7.30) a ton, apart from the economics of the process. The Duffield process is designed to use bituminous black coal costing from 10s. to 12s. (\$2.40 to \$2.90) a ton, as against coke at from 20s. to 30s. (\$4.85 to \$7.30). Iron purer than ordinary pig iron may be produced at 32s. 6d. (\$7.90) a ton, and steel ingots at 50s. (\$12.15). This process, if developed, may mean a radical cheapening in the costs of iron and steel production in Great Britain.

German Iron Mines Suspend Operations

HAMBURG, GERMANY, Nov. 3.—It is generally accepted that before long the last of the German iron mines will have been closed. General suspension was contemplated in 1927, but the protracted strike at the mines in Sweden enabled the German producers to continue operation. Shipments of iron ore from Sweden have been resumed at a normal rate, and the two large steel corporations, Friedrich Krupp A. G., Essen, and the Vereinigte Stahlwerke A. G., Düsseldorf, have suspended operation of their Siegerland mines, which have been producing about 40 per cent of the total German iron ore output of about 5,000,000 tons annually. Other mines are expected to close, as the German iron ore is rather poor and well under the surface and the mines are subject to a large influx of water. The total German output has represented about 25 per cent of the country's consumption.

Sharp Drop in Mechanical Stoker Sales

WASHINGTON, Nov. 17.—Mechanical stokers to the number of 100, with 27,219 hp., were sold in October, against 161 with 65,060 hp. in September, according to the Department of Commerce. For the 10 months ended October, sales totaled 1272 stokers, with 428,537 hp., compared with 1224 units with 434,445 hp. for the corresponding period of last year. The October rating was the lowest since January, but was almost identical with October, 1927.

Fabricated Structural Steel

Awards of 47,300 Tons Include Large Plate Tonnages— Only 12,000 Tons in New Projects

WITH 12,000 tons of plates in a group of oil storage tanks at Houston, Tex., and 10,000 tons in a municipal water line at Philadelphia, fabricated structural awards reported in the last week totaled nearly 47,300 tons. A group of buildings for the A. M. Byers Co. at Pittsburgh took 4000 tons, a Cleveland hospital 3000 tons, and a brass and copper mill at Cleveland 3000 tons. New projects, calling for only 12,000 tons, included no jobs of outstanding size. Awards follow:

BROOKLYN, 1560 tons, apartment building, Garfield Place, to Hedden Iron Construction Co.

NEW YORK, 900 tons, office building, Thirty-sixth Street and Fifth Avenue, to Taylor-Fichter Steel Construction Co.

NEW YORK, 515 tons, apartment building on East Twentieth Street, to A. E. Norton, Inc.

NEW YORK, 200 tons, subway station work for city, to Harris Structural Steel Co.

NEW YORK, 132 tons, float bridge and gallows for Reading Co. at Port Richmond, to Bethlehem Steel Co.

WHITE PLAINS, N. Y., 360 tons, People's National Bank Building, to Hay Foundry & Iron Works.

PHILADELPHIA 1000 tons, Philadelphia General Hospital, to McClintic-Marshall Co.

PHILADELPHIA 10,000 tons, municipal water line of seven miles of 6-ft. and 8-ft. riveted pipe, to Witt-Humphrey Steel Co., Greensburg, Pa.

PHILADELPHIA 500 tons, store, offices and garage building at Chestnut and Twenty-first Streets, to Bethlehem Fabricators, Inc.

PHILADELPHIA 2200 tons, plant for United States Gypsum Co., to American Bridge Co.

CAMDEN, N. J., 440 tons, sheet steel piling for City Hall and annex to County Court House; 220 tons to Jones & Laughlin Steel Corporation and 220 tons to Bethlehem Steel Co.

WASHINGTON, 2600 tons, Government Printing Building, to Lehigh Structural Steel Co.

DISTRICT OF COLUMBIA, 300 tons, highway bridges, to unnamed fabricator.

DURHAM, N. C., 258 tons, building for Duke University, to Virginia Bridge & Iron Co.

BIRMINGHAM, 200 tons, addition to American Cast Iron Pipe plant, to Southern Steel Works Co.

NEW ORLEANS, 175 tons, Y. M. C. A. gymnasium, to unnamed local fabricator.

HOUSTON, TEX., 12,000 tons, oil storage tanks for Roxana Petroleum Corporation, to Chicago Bridge & Iron Works.

PITTSBURGH, 4000 tons, buildings for A. M. Byers Co., to Fort Pitt Bridge Works.

CLEVELAND, 3000 tons, new plant for Chase Brass & Copper Co., to Austin Co.

CLEVELAND, 3000 tons, University Hospital group, to McClintic-Marshall Co.

DETROIT, 1900 tons, building for Murray Corporation, to Mahon Structural Steel Co.

CHICAGO, 100 tons, building for Illinois Tool Works, to New City Iron Works, local.

CHICAGO, 500 tons, store on South State Street, to American Bridge Co.

CHICAGO, 280 tons, McCrory store, to Duffin Iron Co., local.

HARVEY, ILL., 500 tons, building for Buda Co., to American Bridge Co.

HERMANN, MO., 1800 tons, bridge across Missouri River, to Kansas City Structural Steel Co.

SAN FRANCISCO, 185 tons plates, 20-in.

shore pipe, United States Engineers' Office, to Pacific Coast Engineering Co.

HONOLULU, 456 tons, plates and shapes, two barges for Inter-Island Steam Navigation Co., to Bethlehem Shipbuilding Corporation, San Francisco.

SAN FRANCISCO, 110 tons, plates and shapes, steel barge for unnamed interest, to Bethlehem Shipbuilding Corporation.

OAKLAND, CAL., 103 tons, factory on Cotton Street, to California Steel Co.

LOS ANGELES, 800 tons, plates, two 134,000-bbl. oil storage tanks for General Petroleum Corporation, to Western Pipe & Steel Co.

LOS ANGELES, 370 tons, plates, 40-in. welded pipe for city, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON & MAINE RAILROAD, 2100 tons, 24 bridges.

Railroad Equipment

Orders for 800 Freight Cars— Wabash to Buy 55 Locomotives

ORDERS for freight cars placed during the week included 500 box cars for the Chicago Great Western and 300 ore cars for the Great Northern. Among the larger inquiries were 200 ballast cars for the Chicago & North Western, 500 hopper cars for the Boston & Maine and 200 tank cars for an Oklahoma oil company. The Wabash is soon expected to enter the market for 55 locomotives and the Chicago & North Western for 10. Details of the week's business follow:

Great Northern has ordered 300 ore cars from Standard Steel Car Co.

Chicago Great Western has ordered 500 box cars from Pullman Car & Mfg. Corporation.

Northwestern Pacific has purchased five motor and five trailer coaches from St. Louis Car Co.

Chicago & North Western is inquiring for 200 50-ton steel ballast cars, in addition to 300 flat and 25 hopper cars under negotiation. This road is also expected to make inquiry for 10 locomotives.

Fruit Growers Express is inquiring for 50 underframes for refrigerator cars.

Armour Car Lines, Chicago, are inquiring for 500 refrigerator car underframes.

Boston & Maine contemplates purchasing 500 70-ton hopper cars.

Imperial Oil Refining Co., Tulsa, Okla., is inquiring for 200 tank cars.

Nevada Consolidated Copper Co. has ordered 20 Ingoldsby-type ore cars from Koppel Industrial Car & Equipment Co.

Chicago, Rock Island & Pacific is in market for 50 steel cap caboose cars and two parlor cars.

BOSTON, 300 tons, freight house for New York, New Haven & Hartford Railroad.

WESTCHESTER, COUNTY, N. Y., 150 tons, highway bridge.

ORANGE, N. J., 1000 tons, Memorial Hospital.

ELIZABETH, N. J., 2500 tons, manufacturing building; Turner Construction Co., general contractor.

NORRISTOWN, PA., 500 tons, Montgomery County Court House; Golder Construction Co., Philadelphia, and Henry A. Batton, Philadelphia, low bidders on alternate specifications.

WILLIAMSBURG, VA., 600 tons, building for Williamsburg College.

WASHINGTON, 350 tons, produce stores for Pennsylvania Railroad.

SAN ANTONIO, TEX., 200 tons, Gross Building.

ROSITA, MEX., 1000 tons, building for American Smelting & Refining Co.

CLEVELAND, 200 tons, bridge for Cleveland Union Terminals Co.

CHICAGO, 280 tons, store building on Milwaukee Avenue.

DELTON, WIS., 280 tons, State highway bridge across Wisconsin River; bids on general contract close Nov. 27.

SEATTLE, 550 tons plates, 24-in. pipe line; bids opened.

SEATTLE, 425 tons, sawmill for Weyerhaeuser Lumber Co.; bids being taken.

VANCOUVER, B. C., 125 tons plates, 18-in. pipe line; bids Dec. 11.

SAN FRANCISCO, 1500 tons, apartment building, Sacramento and Gough Streets; bids to be taken next week.

Wabash Railroad is preparing specifications for 55 locomotives.

Reinforcing Steel

Awards and Inquiries Decline Sharply

AWARDS of less than 2600 tons represented one of the lowest totals of the year, while new projects amounted to only 650 tons. Awards follow:

MILWAUKEE, 800 tons, Catholic school, to American System of Reinforcing.

MILWAUKEE, 500 tons, Cudahy apartment building, to American System of Reinforcing.

EVANSTON, ILL., 110 tons, cafeteria, to Concrete Steel Co.

CHICAGO, 600 tons, building for Stewart-Warner Speedometer Corporation, to Barton Spiderweb System.

SACRAMENTO, CAL., 206 tons, highway work in San Diego County, to unnamed interest.

SACRAMENTO, 129 tons, bridge in Orange County, to unnamed interest.

SANTA CRUZ, CAL., 225 tons, hotel, to Truscon Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CHICAGO, 187 tons, apartment building at 550 Arlington Place.

CHICAGO, 143 tons, apartment building at 515 Briar Place.

CHICAGO, 110 tons, West Hotel at 20 South Des Plaines Street.

CHICAGO, 100 tons, apartment building at 915 Edgecomb Place.

CHICAGO, 100 tons, apartment building at Seventy-second Street and Coles Avenue.

Address on Costs Features Foundry Equipment Meeting

When indirect labor and factory burden equal 5 or 6 per cent of the sales total, a situation has arisen that calls for executive attention, said W. Clement Moore, assistant district manager Wolf & Co., industrial engineers, Philadelphia, in addressing a meeting of the Foundry Equipment Manufacturers Association at New York, Nov. 20. Well managed plants keep this cost down to 3 or 4 per cent, he said.

The successful operation of a plant, Mr. Moore stated, requires that all important facts regarding the business be available every month so that comparisons can be made with previous months, and for the year to date with corresponding periods in previous years. In this way the management can put its finger on conditions that call for correction. Such monthly statements should be prepared for the business as a whole and by departments, and both types of analyses should include the following: Total sales, gross profits, material costs, direct labor costs, indirect labor costs, factory burden, selling and administrative costs and delivery costs.

Despite generally prosperous conditions, he said, there is a surprisingly large mortality among smaller corporations. The number of business failures in October was 200 more than in the same month in 1927. In large part, profits are being made by the larger corporations. Last year \$24,000,000 worth of business was done in this country without a dollar of profit. Out of 452,000 corporations, nearly 45 per cent showed losses. Moreover, out of all the profits made, only 1119 corporations accounted for 33½ per cent. Among manufacturing corporations, 95 out of a total of 89,000 companies made nearly 50 per cent of all the profits.

An important reason for this showing, Mr. Moore said, is that while total business is large there is constant pressure for lower prices. Since high wages constitute one of the mainstays of commodity demand, business must find ways of maintaining a spread between costs and selling prices without reducing wages. This calls for increased efficiency in production and the reduction of waste in administration and marketing. No doubt the necessity for reducing costs has been a prime cause for industrial mergers. In the past two years there have been more consolidations than in any previous 10 years.

Never before has there been such a pressing need for knowing one's business thoroughly. Large corporations maintain research bureaus and statistical organizations. Similar information can be obtained cooperatively in trade associations. Trade bodies should supply their members periodically with data showing average prices and average costs, so that each company may compare its own condition with that of the industry as a

whole. It is always important to know whether one is progressing or not.

The meeting was under the chairmanship of S. C. Vessy, W. W. Sly Mfg. Co., Cleveland, president of the association. A feature of the program was the presentation of a leather and ivory mounted jewel box as a token of appreciation to T. W. Pangborn, Pangborn Corporation, Hagerstown, Md., who was president of the association in 1927. A motion was passed approving a federation of machinery trade associations. A summary of business conditions revealed a favorable situation. The three-month moving average of foundry equipment orders in October, at 211 (100 equals average monthly shipments in 1922, 1923 and 1924), was the highest index ever reached in a record kept since the first quarter of 1925.

Timken Company Increasing Bearings Capacity

The Timken Roller Bearing Co., Canton, Ohio, has announced expansions to its production facilities, which, when completed, will enable the company's output of bearings to be increased from 175,000 daily to 200,000. Work has already been started on various extensions to the bearings factory. The program has called for the expenditure of \$6,000,000 during the current year and has included additions to the steel mill as well as the bearings factory.

Ten-Month Record in Motor Trucks

WASHINGTON, Nov. 20.—Production of motor vehicles in the United States in October totaled 398,818 units, of which 341,705 were passenger cars and 57,113 were trucks, according to the Department of Commerce. Production in September totaled 415,283, of which 358,872 were passenger cars and 56,411 were trucks. Canadian production in October amounted to 18,536, of which 13,016 were passenger cars and 5,520 were trucks, comparing with a total of 21,193 in September, of which 16,572 were passenger cars and 4,621 were trucks.

For the 10 months through October United States production was 3,869,009 vehicles, of which 3,405,942 were passenger cars and 463,067 were trucks. This compares with a production of 3,133,385 for the corresponding period of last year, 2,730,760 units being passenger cars and 402,625 trucks. Canadian production totaled 221,188 during the 10 months of the current year, of which 181,849 were passenger cars and 39,399 were trucks. For the corresponding period of last year Canadian production was 169,331 vehicles, of which 139,420 were passenger cars and 29,911 were trucks.

[United States production for 10 months is fractionally lower than in 1926, when the total was 3,874,574 vehicles, of which 3,446,484 were pas-

senger cars and 428,090 trucks. In trucks the current year has seen the greatest number ever produced in a like period. Except for 1925, production last month was the heaviest in any October.]

Witt-Humphrey Steel Co. Takes Large Pipe Job

The Witt-Humphrey Steel Co., Greensburg, Pa., has received a contract from the Bureau of Water, Philadelphia, for a pipe line consisting of 7 miles of 6-ft. and 8-ft. steel pipe. The contract will require approximately 10,000 tons of 9/16-in. steel plate, which will be riveted at Greensburg and shipped to Philadelphia in 38-ft. sections. The pipe will be protected against corrosion by being dipped vertically in a bath of special refined asphaltum. The company is at present completing an 8-ft. pipe line for the city of Detroit, and will begin making shipments on the Philadelphia job about Jan. 1.

Plan Steel Plant and Ore Exportation in Brazil

The Itabira Iron Ore Co., Ltd., Rio de Janeiro, Brazil, controlled by the Farquhar group headed by Percival Farquhar, 120 Broadway, New York, has obtained a concession from the Brazilian President to export ore deposits at Itabira in the Brazilian State of Minas Geraes. The contract calls for the construction of a steel plant consuming 150,000 tons of ore annually, which will probably be built by a Chicago firm.

The company will reconstruct the Victoria-Minas railroad with an extension to Itabira and a branch line from Colatina to Port Santa Cruz, where extensive equipment will be installed for the handling of ore and coal. It is planned to export from 3,000,000 to 5,000,000 tons of ore annually. Coal for the plant will be imported duty free and the ore will pay a reduced export tax. The concession includes the Itabira Peak, containing approximately 170,000,000 tons of hematite, said to contain 67 to 68 per cent iron. The project will require an expenditure of \$75,000,000.

Continental Can Acquires Wheeling Can Co.

The Continental Can Co., Inc., New York, has acquired the plants, machinery and business of the Wheeling Can Co., Wheeling, W. Va., subsidiary of the Wheeling Steel Corporation. The purchase includes two modern plants in the Wheeling district, manufacturing a diversified line of cans, and conveniently located to tin plate mills. Plants will be operated as before without important changes in policy or personnel and will be used by the Continental company as outlets to the South and Southwest.

Coal Stocks Decline at Steel Plants

WASHINGTON, Nov. 20.—Stocks of coal at by-product coke plants have increased during the past quarter, but the supply on hand at steel works has declined slightly, according to a survey by the Bureau of Mines. Complete returns from the by-product plants showed a total of 5,193,486 tons of coking coal in storage on Oct. 1, of which 1,209,058 tons was low volatile and 3,984,428 tons of high volatile. The steel works and rolling mills reporting had 909,599 tons of steam coal on hand and 586,673 tons of gas coal, a total of 1,496,272 tons. In terms of days' supply, the stocks of low volatile coal on hand at by-product plants on Oct. 1 was 28 and of high volatile 27 against 24 and 25, respectively, on Aug. 1. Steel works had 30 days' supply of gas coal and 32 days' supply of steam coal on hand on Oct. 1 compared with 32 days' and 35 days' supply, respectively, on Aug. 1. On July 1 stocks of coal at by-product plants represented 23 days' supply, while at steel works there were reserves of 38 days' supply. On Oct. 1, 1927, there were 40 days' and 58 days' supply, respectively, the highest on record since Jan. 1, 1919.

The total stocks of bituminous coal in the hands of all consumers on Oct. 1, 1928, amounted to 41,100,000 tons, a decrease of 600,000 tons under supplies on hand Aug. 1, and 20,000,000 tons under the unusually heavy reserves on hand on Oct. 1, 1927.

Larger Shipments of Mining Locomotives

Mining and industrial electric locomotives shipped in the quarter ended Sept. 30 are reported by the Department of Commerce at 141 units, with a value of \$860,305. This is a considerable gain over the preceding quarter, when 111 units were shipped, valued at \$729,458. The total is lower, however, than in any quarter of last year, or than in any of the three latest quarters of 1926. In the September quarter of 1927 shipments were 193 units, valued at \$898,970.

Iron and Steel Movement Into New England

The movement of commodities into and out of New England is shown in a bulletin entitled "The External Trade of New England," just issued by the Department of Commerce and prepared by Robert J. McFall, Domestic Commerce Division. Generally, the period covered is from Feb. 1, 1924 to Jan. 31, 1925. Where data are given for 1926 it is shown there

	Inward	Outward	Net Inward	Net Outward
Iron ore.....	1,534	215	1,319	.....
Iron, pig and bloom.....	560,780	12,468	548,312	.....
Rails and fastenings.....	75,214	17,380	57,834	.....
Bars and sheet iron, structural iron and iron pipe.....	862,665	143,169	719,496	.....
Other metals, pig, bar and sheet....	396,763	89,564	307,199	.....
Castings, machinery and boilers....	156,501	289,314	.....	132,813

are no striking changes from the movement for the previous year.

Figures for the iron and steel and related lines are given in the accompanying table stated in net tons.

Record River Movement of Steel from Pittsburgh

The down-river movement of iron and steel products from Pittsburgh district mills last month set a new high record. Shipments on the Ohio River, which are generally recognized as a reliable measure of the movement of these products for consumption beyond the confines of the Pittsburgh district, amounted to 130,808 net tons, the monthly report of the Pittsburgh office, United States Engineers' Corps, discloses. That compares with 125,062 tons in September and 80,423 tons in October last year. For the ten months ended Oct. 31, Ohio River shipments were 1,025,426 tons, or almost double those of the same period last year, when they were 557,927 tons.

Heavy Orders for Foundry Equipment

Foundry equipment orders in October are reported at 182 net, on a basis of 100 as the average monthly shipments for 1922 to 1924. The gross orders of 185 compare with 170 in September and 278 in August. Except for August and last May, they have not been equalled since February, 1927; with that one exception, they are the highest in more than four years. Shipments in October were 254.3 on the same basis. Unfilled orders are reported at 462.6, and the three months' average of gross orders at 211.

Heavier Production of Steel Barrels

WASHINGTON, Nov. 20.—Production of steel barrels in October increased to 656,021, or 56.4 per cent of capacity, against 593,255 barrels, or 50.2 per cent of capacity, in September, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. Shipments in October were 661,009 barrels, compared with 595,640 barrels in September, while stocks at the end of each month were 50,071 barrels and 55,059 barrels respectively. Unfilled orders at the end of October for delivery within 30 days totaled 301,782 barrels, against 292,686 barrels at the end of September, while unfilled orders for delivery beyond 30 days were 522,090 barrels and 704,134 barrels respectively. Production during the 10 months ended with October,

1928, totaled 6,283,025 barrels, compared with 5,685,433 barrels for the corresponding period of 1927.

Members of the Steel Barrel Manufacturers Institute shipped 376,998 barrels in October, accounting for a business volume of \$1,143,898. Their plants were occupied to the extent of 58 per cent. I.C.C. capacity was engaged at an average of 40.7 per cent and capacity for light barrels at 63 per cent. Unfilled orders Nov. 1 called for 411,312 units.

By-Product Coke Makes New Record in October

WASHINGTON, Nov. 19.—Production of 4,219,262 net tons of by-product coke in October set a new high record, while the output of 421,000 tons of beehive coke was the largest in any month since last March, and the output of 3,373,806 gross tons of pig iron was the largest since May, 1927, according to the Bureau of Mines. In comparison with September the daily rate of output increased 3.1 per cent for by-product coke, 25 per cent for beehive coke and 6.6 per cent for pig iron. Of the by-product coke produced in October, 3,335,000 tons, or 79 per cent, came from plants associated with blast furnaces and 884,000 tons or 21 per cent came from merchant or other plants.

By-product coke production in the first 10 months has aggregated 39,755,486 tons, a new high record. This exceeds by 2,800,000 tons, or 7.6 per cent, the previous record, made in 1926. Last year 36,774,884 tons was made in 10 months. Beehive coke output, on the other hand, was the smallest in several years, the 10-month total of 3,562,000 tons being less than one-third as much as in 1926 and only 57 per cent of the 1927 output.

Total coke production in 10 months was 43,317,486 tons—less than 1 per cent above last year and over 9 per cent below the high level of 47,661,000 tons reached in 1926.

Cement Production Continues Heavy

Production of Portland cement in October is reported by the United States Bureau of Mines at 17,533,000 bbl., the largest figure ever reported for October. It was exceeded by the two preceding months and by August, 1927, but otherwise is the largest for any month. It compares with 17,856,000 bbl. in September and 18,730,000 bbl. in August, 1928 (the record). In October, 1927, production was 17,174,000 bbl.

Shipments in October are reported at 19,836,000 bbl. This gain is the largest for any October, and has been exceeded by only four earlier months, of which three were those immediately preceding it. There was a reduction from the 20,460,000 bbl. of September, but a heavy gain on the 18,105,000 bbl. of October, 1927.

For 10 months production made a new record, at 148,569,000 bbl.,

against the previous high of 145,460,000 bbl., made last year. Shipments in 10 months were 156,120,000 bbl., about 2 per cent above the previous record of 153,103,000 bbl., made in 1927.

Canadian Iron and Steel Production Higher

October production of pig iron in Canada is reported by the Dominion Bureau of Statistics at 93,186 gross tons, compared with 90,516 tons in September, and with only 38,097 tons a year ago. Ferroalloys to the amount of 2127 tons were produced in October, against 2008 tons in September. For the first ten months of the year pig iron production has been 838,659 tons, an increase of about 38 per cent over the 608,511 tons of last year. There has been a drop in ferroalloys within the ten months from 47,649 tons to 35,541 tons.

Steel ingot production in October was 105,437 gross tons, compared with 97,275 tons in September. Adding castings, the total was 108,987 tons, against 99,888 tons in the preceding month and only 56,371 tons a year ago.

In the ten months ingot production has reached 993,476 tons, a gain of almost 300,000 tons over last year's 695,688 tons. Castings have amounted this year to 35,221 tons, against 34,972 tons in 1927.

There were seven furnaces in blast at the end of October, representing 2725 tons daily capacity. The four furnaces not operating had a listed capacity of 1350 tons daily.

British Steel Trade Rises Sharply in October

WASHINGTON, Nov. 19.—Exports of iron and steel from the British Isles in October aggregated 377,390 gross tons, against 295,123 tons in September, while imports increased to 261,404 tons, compared with 184,464 tons, according to cablegrams received by the iron and steel division, Department of Commerce, from London. The largest export movement in October was galvanized sheets, 71,031 tons, compared with 50,116 tons in September. Tin plate ranked second, 54,210 tons against 35,270 tons. Exports of plates and black sheets totaled 45,798 tons, compared with 35,536 tons, while the outgoing movement of pig iron and ferroalloys was 43,439 tons, compared with 35,815 tons. The largest incoming products consisted of ingots and semi-finished steel, with a total of 119,914 tons, against 67,896 tons in September.

Production of pig iron increased to 543,600 tons from 503,900 tons, while the October output of steel ingots and castings aggregated 756,000 tons, compared with 718,600 tons. Active blast furnaces at the end of October totaled 136, against 131 at the end of September, while the number of open-hearth furnaces in operation decreased to 264 from 266.

Sharp Drop in Wholesale Prices

Wholesale prices of commodities in October are reported by the United States Bureau of Labor Statistics at an index of 97.8, based on 100 as the average of 1926. This shows a drop of more than 2 per cent from the September average of 100.1, and compares closely with the 97 average of a year ago. The drop has come almost entirely from sharp declines in farm products, foods and hides and leather products, all of which declined more than 3 points and some of them more than 5 points. Changes both up and down in the seven other groups were fractional only.

Metals and metal products went up to 101, compared with 100.5 in September. The change came from an increase of the iron and steel items from 94.7 to 95.1 and of non-ferrous metals from 93.8 to 95.8. No change occurred in agricultural implements, automobiles or other metal products. The metals are about 4 per cent above the 97.1 of a year ago.

October Sheet Production Gained, Orders Declined

Production of steel sheets by independent mills increased sharply during October, amounting to 369,243 net tons, compared with 318,907 tons in September, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. Sales during October decreased to 344,614 tons, compared with 370,936 tons in September, and shipments also increased, resulting in some decline in unfilled orders on Nov. 1. The October report and comparisons in net tons follow:

	Oct.	Sept.	Aug.
Total number of mills.....	724	721	721
Capacity per month.....	508,000	450,500	506,000
Percentage reporting.....	70.2	70.1	70.1
Sales.....	344,614	370,936	254,397
Production...	369,243	318,907	329,396
Shipments....	354,925	322,876	324,691
Unfilled orders	525,161	539,960	498,023
Unshipped orders.....	100,800	102,313	102,825
Unsold stocks..	49,800	44,519	51,636
Percentages to Capacity			
Sales.....	96.6	117.5	71.7
Production...	103.5	101.0	92.8
Shipments....	99.5	102.2	91.5
Unfilled orders	147.3	171.0	140.4
Unshipped orders.....	28.3	32.4	29.0
Unsold stocks..	14.0	14.1	14.6

Industrial Plants Asked to Mark Roofs for Airplanes

Industrial corporations have been asked to cooperate with the Daniel Guggenheim Fund for the Promotion of Aeronautics in a nation-wide campaign for roof markings which will identify the country's towns to the aviator. Such identification is a first requisite for an air transportation system.

In a printed bulletin the Fund describes the type of roof most suitable for marking and urges the use of block letters in chrome yellow with a

black background. It is suggested that it should be from 10 to 20 ft. in height and on roofs preferably of tiled shingles, tin or other metal, or slate where the visibility is not reduced by smoke. Besides the name of the town or city, the marking should include an arrow pointing due north with the letter "N" over it and a small letter indicating the airport if there is one.

Worcester Machine Shops Unusually Busy

WORCESTER, MASS., Nov. 20.—The machine tool shops of Worcester are in a period of great activity which in the opinion of the manufacturers promises to continue for a long time. Orders have piled up in such volume that the larger establishments are not only running on a full-time daylight schedule, but are working night gangs, which are being increased as rapidly as skilled men can be found. The city is suffering from a famine of good machinists and toolmakers, and manufacturers have been compelled to seek help by advertising in the newspapers of other cities.

The Machine Division of the Norton Company, after reaching maximum daytime production, is operating some of its departments nights, with a prospect of extending this second shift. In addition to a large aggregate of business already on the books, this company has just received large orders from the Ford Motor Co., Chrysler Corporation and the General Motors Co. The Heald Machine Co. has been working night and day for some time. The Reed-Prentice Corporation has found it necessary to put on a night force, which is building up as rapidly as men can be hired. Other shops report similar conditions of active business, among them those of the Leland-Gifford Co., Stockbridge Machine Co., Arter Grinding Machine Co. and Francis Reed Co. The O. S. Walker Co. reports a heavy demand for magnetic chucks.

Philadelphia Steel Club Elects Officers

The Steel Club of Philadelphia on Nov. 13 elected the following officers for the ensuing year: Willard S. Haring, Alan Wood Iron & Steel Co., president; Paul M. King, Worth Steel Co., vice-president; Samuel H. Baker, secretary-treasurer. Thomas C. Ham, Jones & Laughlin Steel Corporation, and W. W. Deal were elected to the board of governors.

"Photomicrography and Its Application to Mechanical Engineering," by Francis F. Lucas, is the title of a pamphlet issued by the Bell Telephone Laboratories, New York. It is a reprint of a paper presented at the annual meeting of the American Society of Mechanical Engineers in joint session with the Optical Society of America in New York, December, 1927. Some very fine reproductions of photomicrographs are included.

This Issue in Brief

Profit-sharing for executives pays, especially for high men in small organizations. Payment of profits in common stock is preferable, says speaker at management meeting, because then the executive shares losses as well as profits.—Page 1291.

* * *

Cuts cost of locomotive repairing by use of "spot system" of progressive work. Stripped engines are moved progressively to various designated sections of shop, each specializing on certain work. Time for each operation is scheduled. Repair schedules are prepared five months ahead.—Page 1279.

* * *

Sounder welds are produced by coated electrodes, welding engineer declares. Chemical covering of the rod, he says, produces a gas which sheathes the arc, excluding harmful gases.—Page 1293.

* * *

Will present method of operating open-hearth furnaces be obsolete in three years? Yes, says open-hearth man. He believes that the Stevens furnace, which takes the guesswork out of combustion, will be generally adopted. Better yield and considerable savings in fuel consumption and brickwork are claimed for this furnace.—Page 1296.

* * *

Denies that anti-trust laws disregard economy and efficiency. Trade Commission may protect business by regarding as illegal any secret departure from resolutions a firm has led its competitors to believe it will observe.—Page 1282.

* * *

"Pretty miserable" is term American economist applies to French wages. Though industry in France is busy and well above pre-war level, wages are so low that buying power of wage earners is very poor. Though wages are higher in England, industry there has not reached the pre-war level, and considerable forced idleness exists.—Page 1285.

Better castings produced by pouring locomotive frame molds on edge. Pouring can be done more easily and casting is less likely to warp.—Page 1286.

* * *

Tool steel buyers' problem simplified by preparation of convenient table. Metallurgist provides a table showing chemical analyses of tool steels known to give excellent results for each kind of service.—Page 1286.

* * *

Central welding shop will enable company to get maximum savings from use of welding equipment. Many firms fail to bear in mind that welding equipment used for production can also take care of repairs, cut up scrap, install pipe lines, etc. A central welding shop cuts costs by providing a common point for handling all jobs requiring welding.—Page 1284.

* * *

Price discrimination may be regarded by Trade Commission as "unfair competition." Commissioner declares that firm price policy will be encouraged and that secret departures from prices openly established are frowned upon by the Trade Commission and may be classed as illegal.—Page 1283.

* * *

Steel can be made at lower cost in large furnaces, say open-hearth men. Slightly greater yield is obtained from large furnaces owing to deeper bath, reducing amount of oxidation, as relatively less surface is exposed for each ton of steel present.—Page 1296.

* * *

"Bootleg loans" upset forecasts by opening up new credit reservoir. Increase in credit volume is due to loans from firms and individuals, says Colonel Ayres, rather than to loans from banks. His forecaster shows business rising until the middle of 1930 and then dipping sharply, but he will not commit himself in view of the new factor — "bootleg loans." — Page 1299.

Denies allegation that sheet rolling industry is unprogressive. "Analysis of present development would give this industry a mentality of 12 years," A. S. M. E. official charges. Sheet manufacturers point to great amount of money spent on new continuous process as evidence of progressiveness. But for many years industry was in hands of mill men with little engineering knowledge.—Page 1301.

* * *

Shop superintendent keeps track of plant operations closely by means of simple visual record. Round tags, each bearing number of a locomotive, are moved forward as repair work on engines progresses. Superintendent is thus able to tell quickly when any given engine will be ready for service.—Page 1281.

* * *

Zinc can be welded with hardly any volatilization by using best brass welding rod with 0.5 per cent silicon added. And such a rod, when melted into a joint in alpha brass or admiralty brass pipe, will produce a strong, non-porous union, says metallurgist.—Page 1293.

* * *

You will lose money if you cut prices to get more business than your market affords, association head tells fabricators. Decide what kind of work you can handle profitably; find out what tonnage can reasonably be expected to come out of your territory; develop a definite selling plan, and stick to it.—Page 1289.

* * *

Bronze-welding of steel should not be done except on unimportant and non-stressed locations, says research worker. Otherwise internal stresses of at least 4000 lb. per sq. in. will occur, except in annealed metal.—Page 1293.

* * *

Makes hot strips from hot slab in one rolling, without reheating. Strips are 24-gage, long length. This is done by a process recently developed, says rolling mill builder.—Page 1302.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Our Tariff and Europe

SOME familiar anti-tariff war cries were missing from the late national campaign. Never since the first comprehensive act in protection of home industry was passed at Washington have the leading national parties been so nearly at one on this question, and never has the fear of tariff unsettlement figured so little in a presidential election.

Such approach to agreement on this subject, after the hard-fought battles of other years, is not encouraging to foreign manufacturers who had hoped the election of 1928 would bring a letting down of tariff barriers. Ever since the Armistice we have heard from Europe that if the allied nations are ever to pay their debt to the United States we must arrange to let more of their goods into our ports. The one way to make this possible, we have been told, is to lower our tariff schedules. Many of our own people have held the same view. Low-tariff men naturally took to it. Many protectionists saw the force of it, but generally wanted its application limited to lines of industry other than their own. Now that the national referendum has been had, certainly there is nothing in the election returns to indicate that the people of the United States are favorable to a freer entry of foreign goods, to the displacement of the products of workers in our own industries.

European critics of our tariff, like European advocates of the cancellation of European debts to the United States, have seemed at times to believe that, if a sufficient demonstration of ill will be made, this country can be induced eventually to bargain for its abatement. No headway in better understanding will ever be made by that route. In helpfulness to Europe the United States has been generous to a degree. Yet it cannot be said that this evidence of good will has been responded to in kind. Our European allies may well take to heart some of the plain but friendly speech of the President's address at Washington on the night of Nov. 11, particularly these words:

If we could secure a more complete reciprocity in good will, the final liquidation of the balance of our foreign debts and such further limitation of armaments as would be commensurate with the treaty renouncing war, our confidence in the effectiveness of any additional efforts on our part to assist in the further progress of Europe would be greatly increased.

American tariff policy must be determined in the light of American standards of living, American industrial development, trade expansion and the many other things which accentuate the difference between American life and European life. And what holds in respect to the tariff applies also to the continued invest-

ment of American capital in Europe, in view of the great demand that will be made upon our resources by power and transportation projects in the next few years. As President Coolidge aptly said: "Europe, on the whole, has arrived at a state of financial stability and prosperity where it cannot be said we are called on to help or act much beyond a strict business basis. The needs of our own people require that any further advances by us must have most careful consideration."

These words have added significance from the knowledge that in respect to this country's attitude to Europe the President and the President-elect have long been in hearty agreement.

Less Merchant Iron, Better Prices

SINCE late in August the average market price of northern pig iron in the various districts has advanced considerably more than a dollar a ton, following a long period of declines. Reasons for such advances, depicted in our market reports, include the withdrawal of steel companies as sellers of merchant iron.

Statistics drawn from the monthly blast furnace reports of THE IRON AGE show clearly why the market should soften as it did for months and then pick up of late. There has been a remarkable divergence in the relative production of pig iron by steel companies and merchant furnaces. Of course it cannot be argued that the demand for steel and the demand for merchant iron should run precisely together, but surely they should not swing in opposite ways.

Late last year there was light demand for steel while there was heavy production of merchant iron. After January of this year merchant iron production declined, while in the last four months it has been at a steady and low rate. To bring out the divergence we compare the four months through January, with average daily rate of pig iron production by steel works of 66,407 tons, and a merchant furnace rate of 23,073 tons, with the four months through October, with a steel works' rate of 83,199 tons and a merchant furnace rate of 19,596 tons. In the first period the merchant furnaces produced 35 per cent as much as the steel works, while in the latter period they produced less than 24 per cent as much as the steel works. From the first period to the second steel works' production increased 25 per cent while merchant furnace production decreased 15 per cent.

These figures suggest strongly that pig iron must have been accumulating in the earlier period, for it is not conceivable that merchant iron demand was heavy when the steel works had such poor employment. It was well known in the trade a few months ago, as a matter of fact, that there were large stocks of merchant

iron. On the other hand it cannot be thought that the recent activity in steel has not been accompanied by a fair degree of activity on the part of consumers of merchant iron, an activity that could hardly be well taken care of by a rate of production evidently light by comparison with rates of the past.

Mere comparison of October figures is striking. In October, 1927, there was 66,991 tons of steel works iron and 22,819 tons of merchant iron daily. In October of this year there was 88,051 tons of steel works iron and 20,781 tons of merchant iron, and yet the northern steel works had largely withdrawn from the merchant pig iron market.

Length of Bull Stock Markets

SOMETIMES statistics can be boiled down to simple terms, and then they are likely to show something important. We find such condensation possible with a presentation in the Cleveland Trust Company's circular of Nov. 15; it shows twelve bull stock markets in a half century, the number of months of each being given. One bull market began with the reopening of the exchange at the beginning of 1915. One may conveniently assume the present bull market to complete the present calendar year.

In the 14 years 1915 to 1928 inclusive, the bull markets cover a total of 111 months. The preceding 14 years, 1901 to 1914, included 51 months of bull movements, and the 14-year period before that, 1887 to 1900, included 74 months. Thus the latest period has had more than twice as much bull movement, in length of time, as the intermediate period, and one and one-half times as much as the first period. Fourteen years contain 168 months. In the first period there were bull movements during 44 per cent of the time; in the second, 30 per cent, and in the present, 66 per cent.

Various references to this remarkable stock market have been made in these columns. Here is a new angle from which it may be considered. The nub of the matter lies in the question whether this country has been growing, in one way or another, at a better or more sustainable pace than in the past. Here we avoid considering the amount of the advance in share values, which contain a factor of the rise in commodity prices or the depreciation in the value of the dollar.

Instead, we have been thinking lately that the country has reached a position of maturity, and this does not seem to conform with the showing of the stock market advancing two-thirds of the time in the last 14 years, against less than one-third of the time 14 years earlier, or less than one-half the time 14 years earlier still. Such apparent inconsistencies sometimes point the way to the truth.

One must grant the maturity, at least in a relative sense. In maturity, then, one knows better what he can do, he can have more confidence in his future. There would have been more bull markets in the past if there had been assurance that the current earnings were to be continued, for there were larger yields in much of the past. In maturity there is less likelihood of sweeping changes. We do not need to fear that steel will be replaced by some other metal. If radio is to be succeeded by something better, the idea is that the radio companies themselves will be the ones to find it.

By no means, however, should anyone dismiss the idea that the present bull market may be a mistake. That term involves much latitude. Every bull market, right after its termination, has been considered a mistake, at least in part, but in the long run it proves otherwise. Here in the Cleveland Trust Company chart referred to we have share value records beginning with 1879. The bull market of 1892 failed to attain the 1882 height, while the depression of 1896 was below that of 1884, but there were falling commodity prices throughout the period and that must be allowed for. When this bull market ends it will look like a mistake but it will be only partly so unless commodity prices fall greatly, and the swing of the last few years does not appear to presage any marked change in the next few years.

Association Market Stabilizers

FALLING into line with the practice in several other basic industries, lead producers and consumers last week organized the Lead Industries Association. One of the objects is to collect and disseminate information regarding uses of lead and its products and to gather statistics on production, distribution and marketing.

About a year ago copper producers formed the Copper Institute, which supplements the valuable work of the Copper and Brass Research Association and of Copper Exporters, Inc. In recent months the American Zinc Institute started a new department, the collection of information as to the condition of forward orders on the books of producers. The net result of these activities on the copper and zinc markets has been greater stabilization, to the advantage of both producer and consumer. In lead similar results may be expected.

Workers' Share in Compensation

THE contributory principle is now generally accepted, in theory or in fact, in connection with most undertakings for the benefit of industrial employees. It is being applied rapidly to sick benefits, group life insurance, unemployment insurance and in old age pensions as distinguished from those pension plans in which workers are considered to have earned a pension by long and efficient service. The one universal exception is workmen's compensation. A movement is now under way to put this, too, on a contributory basis, compelling the employee to bear a portion of a cost now exclusively borne by the owners. To do so would be to amend the principle upon which compensation was based when it replaced employers' liability in the United States.

The proponents of the contributory plan were represented at the recent annual meeting of the National Associations of Manufacturers by Walter Linn, secretary of the Pennsylvania Self-Insurers Association, his address being entitled "The Pennsylvania Plan" because its inception was in the attempt to establish the principle by act of the Pennsylvania legislature in 1926, when the State's compensation laws were revised. In the course of his remarks Mr. Linn said:

It takes the worker out of the "gim-me" class and puts him into an insurance partnership with his employer. If he gets more, he has to pay more, and there is nothing like a personal re-

sponsibility of that sort to rationalize men's demands.

One of the attractive arguments for the plan is that it would give the employee a financial interest in reducing accidents and preventing malingering. The millions of dollars invested in safety appliances and in alterations or installation of more expensive equipment, to reduce the hazards of employment, were justified to many a corporation by the dollars and cents savings to be effected. There would appear to be grounds for the assertion that, if the workman were given the same financial interest in seeing to it that fellow workmen observed safety regulations, the psychological influence would immediately reflect itself in further and marked reductions in accident severity and frequency.

Mr. Linn's stand is not shared by most employers of labor. It does not take into account that when compensation was established to replace employer's liability it was agreed that the worker gave as his contribution a certain amount of sacrifice of benefits which were his under the old law.

Employers' liability had worked out badly. At times the employee suffered injustice, at other times the employer had to pay damages all out of proportion to the injury. The shyster doctor and lawyer were much in evidence. The fellow-servant clause rid owners of

liability where an accident to one employee was due to the negligence of another employee. One great accident might bring ruin to an owner when a group of victims received over-generous damages from a sympathetic jury. It was not good business from any point of view. An unknown quantity was always present in estimates of production costs.

Quite naturally when workmen's compensation came over from England it was quickly accepted. The gambling element of accident was eliminated. Compensation for the employee was sure for every bona fide injury. Accident expense became a fixed cost to the employer. The theory was established that the worker's share in the cost was his sacrifice of certain former advantages.

Everything in connection with the system has worked nicely. Few complaints have been heard from the employee class. Owners have found the cost a none too heavy burden. Apace with the operation of the act has proceeded a prodigious work in the reduction of accident hazard. The inevitable result has been an amazing decrease in number and seriousness of accidents. We wonder if a survey of the manufacturers of America would not find probably relatively few firms which would urge that their employees share in the cost of compensation.

Statistical Abstract of the United States

IN annual publications such as the Statistical Abstract of the United States, of which the fiftieth edition, 1928, has come to hand, each succeeding volume is nearly like those which have gone immediately before. Each new volume, however, is of increasing value, as it brings data more closely up to date, and shows us, when we study its contents, how we are progressing, both as to quantity and as to direction.

In the present edition are 842 pages consisting almost wholly of tabular matter, well indexed, and appertaining mainly to the physical characteristics of the United States and its people and their activities. Commerce, finance, agriculture, mining, forestry, fisheries, manufactures and many other topics in great profusion are treated, besides the usual figures for area, population, immigration and vital statistics.

Standards for Compressed Air and Hydraulic Work

BOTH the Hydraulic Society and the Compressed Air Society have issued books of standards covering not only the technical definitions and standard practices relating to their respective fields, but also, in each case, a set of 15 principles of business conduct approved by the two societies, and identical in form.

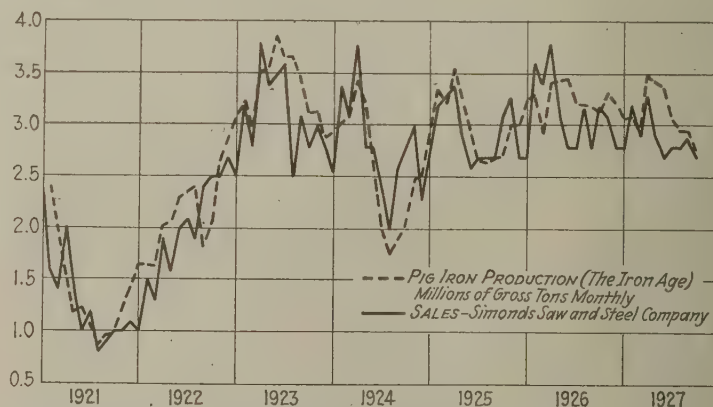
The Hydraulic Society is a trade association comprising the principal manufacturers of displacement and centrifugal pumps in the United States. It cooperates with the Department of Commerce, United States Chamber of Commerce, American Society of Mechanical Engineers, American Mining Congress, National Fire Prevention Association, the trade associations of other industries and other technical and commercial organizations with which the pump industry has problems in common. Its Book of Standards is of 78 pages, illustrated with both line cuts and half-tones, and carries some tabular matter and a great mass of data for the use of those interested in pump equipment.

Similar material is comprised within the 48 pages of

the Standards Book of the Compressed Air Society, this being material specific to the use of compressed air and to the equipment by which that use is carried out. The members of this society are fifteen of the leading companies making equipment for this purpose. The secretary of both societies is C. H. Rohrbach, 90 West Street, New York.

Pig Iron Output in Close Correlation with Manufacturers' Sales

CLOSE correlation between the country's monthly production of pig iron, in tons, and monthly sales, in dollars, of the Simonds Saw & Steel Co., Fitchburg, Mass., is shown in the chart, which appears in "The American Way to Prosperity," by Gifford K. Simonds, general manager, and John G. Thompson, assistant to the president of



Showing Close Parallelism Between Pig Iron Output and Simonds Sales

the Simonds company. The book, which is just off the press, is published by the A. W. Shaw Co., Chicago.

Neither of the curves shown in the graph is adjusted for long-time trend or seasonal trend.

A chapter on "Forecasting" gives many of the details of the system of forecasting used by the Simonds company.

Cast Iron Discussed by British Metallurgist

ONE of the last lectures delivered by Dr. W. H. Hatfield of Sheffield, England, on his recent tour of American metallurgical centers, was on "Cast Iron" before a joint meeting of the Boston chapter of the American Society for Steel Treating and the New England Foundrymen's Association at the Massachusetts Institute of Technology on Friday evening, Nov. 9.

The meeting was well attended, preceded by a dinner at which 75 were present. Doctor Hatfield had with him the 1928 edition of his book, "Cast Iron in the Light of Modern Research," and used this as a text for his talk which was quite informal.

First he outlined the work of the Cast Iron Research Association, which is a British institution supported by funds from the industry and from an equal contribution directly from the British Government. The affairs of the association are handled by a council made up of properly qualified men in this industry. It carries out research at Birmingham of a fundamental nature covering the metallurgy of cast iron. It also does a great deal of work in disseminating the existing knowledge regarding foundry problems and the metallurgy of cast iron. This is sent to contributing members in the form of bulletins. Also it answers any questions sent in by members and carries out at the foundries themselves research of a practical nature leading to the solving of foundry problems.

He next very briefly dealt with the addition of special alloys to cast iron and pointed out that cast iron would probably always find a large field of usefulness because of its lower melting point compared with steel. He next outlined his theory in regard to the freezing of cast iron, the separation of graphite and the final decomposition of the austenitic ground mass and pointed out briefly the influence of silicon in this mechanism of freezing. This was handled in a sensible and non-technical manner following the lines of the chapter in his book and was well received by his audience.

The lecturer next briefly referred to pearlitic cast iron, pointing out how narrowly the needed factors had to be followed and reminding us that this method was not for the jobbing foundry but might attain importance for the foundry specializing on particular work. Reference was then made to the growth of cast iron, his view of this subject being that it was intimately connected with the presence of graphite flakes in the metal, so that to prevent growth, iron should be used

which had fairly low silicon, a low total carbon, and possibly a little chromium added so as to give a suitable stable carbide. Emphasis should be laid on the complete stoppage of any graphite formation.

The lecture was followed by an animated and interesting discussion, most attention being given to semi-steel, to iron for special abrasive purposes, and to the influence of nickel on cast iron.

Princeton Engineering Building Dedicated

The new engineering building at Princeton University, Princeton, N. J., was dedicated on Nov. 15 with appropriate ceremonies, which were attended by more than 200 engineers, including representatives of 38 technical and engineering schools. The building, which cost \$500,000, will enable the university's engineering school to be greatly expanded, and new curricula will be introduced. Among the speakers at the exercises were Carleton S. Proctor, of the engineering firm of Moran, Maurice & Proctor, New York, and president of the Princeton Engineering Association; Dexter S. Kimball, dean of the school of engineering, Cornell University, and Matthew S. Sloan, president of the New York Edison Co., New York.

American Mining Congress To Meet in Washington

WASHINGTON, Nov. 16.—Rounding out nearly a third of a century of activity, the American Mining Congress will hold its thirty-first annual convention at the Mayflower Hotel in this city Dec. 5 to 8. The convention will draw to Washington the leaders in all branches of the mining industry. Governors of States having important mining interests will send official delegates, and representatives of various Government departments having contact with the industry will attend and participate in a discussion of pending mining issues.

The enlarged use of machinery in industry will occupy considerable attention by the convention. Meetings will be held of the boards of directors of the American Mining Congress, and of its Western, Southern and manufacturers' divisions. J. G. Bradley of Dundon, W. Va., president of the Elk River Coal & Lumber Co., will open the convention as president of the congress with an address on the organization as the "Clearing House for Mining." S. L. Mather of Cleveland, president of the Cleveland-Cliffs Iron

Co., will speak on the iron industry. Sidney J. Jennings of New York, president of the United States Smelting, Mining & Refining Co. and a former president of the American Mining Congress, will preside at one of the sessions and speak on the mining industry. "The Future of Copper" will be discussed by C. F. Kelley of New York, president of the Anaconda Copper Mining Co.

Canadian mining officials and operators are being extended a special invitation to attend the convention.

Lead Companies Form an Institute

Representatives of 34 companies which produce or consume lead organized the Lead Industries Institute at a meeting at the Hotel Roosevelt in New York last week. The new organization will follow closely the lines of similar associations in other industries, such as the American Iron and Steel Institute, the American Zinc Institute and the Copper Institute. Membership will comprise every large factor in the industry in the United States, Mexico, Canada and South America. Mutual protection, the dissemination of accurate information regarding the uses of lead and its products, and the collection of statistics on production, distribution and marketing are three of the main objects of the new institute.

Clinton H. Crane, president Saint Joseph Lead Co., was chosen president, with Hamilton M. Brush, general sales agent American Smelting & Refining Co., and Ralph M. Roosevelt, vice-president Eagle-Picher Lead Co., vice-presidents, and Felix E. Wormser, secretary and treasurer, all of New York. Headquarters have not yet been selected.

Consulting Chemists Form Association

The Association of Consulting Chemists and Chemical Engineers has been organized. Every member on joining "shall refrain from associating with or allowing the use of his name by any enterprise of questionable character. If in his opinion work requested of him by clients seems to present improbability of successful results, he shall so advise before undertaking the work."

The following are the officers: President, Hal T. Beans, Columbia University; vice-president, Irving Hochstadter, Hochstadter Laboratories; secretary, Clarence V. Ekroth, Ekroth Laboratories, 461 Eighth Avenue, New York; and treasurer, Jerome Alexander.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Nov. 29—Activity in Steel Consuming Industries; Dec. 20—Position of Iron and Steel Producers.

Iron and Steel Markets

Decline in Specifying Checked

Heavier Shipping Orders from Automotive Industry — First
Quarter Contracting Under Way in Sheets
and Strips—Tin Plate Advanced

STEEL output has shown a further decline, but the recession in specifications has been checked and a buying movement for the first quarter is getting under way. Finished steel prices, for the most part, remain buoyant, as evidenced by advances during the week of \$2 a ton on tin plate and tin mill black plate.

In pig iron, also, sustained market activity is indicated in most districts. In the Central West, forward contracting is extending into the second quarter of next year, and at Birmingham prices have gone up 25c. a ton.

Scrap is again notable for its contrary trend. Heavy melting scrap at Pittsburgh has declined to \$17 a ton, or \$1 below the level of four weeks ago.

Steel ingot production in the Greater Pittsburgh district now averages 80 per cent, compared with 85 per cent last week. At Chicago, output has declined to 82 per cent, largely as a result of the annual overhauling of rail mills. Similar work is being done at the Alabama rail mill, which is scheduled to resume operations Nov. 24. The rate of steel ingot output for Steel Corporation subsidiaries is 80 per cent for the second week.

Specifications for finished steel at Chicago were the largest since February, but new business is small, possibly reflecting a desire to keep stocks down preparatory to inventory taking. Cleveland, however, reports not only heavier shipping orders, but a good volume of first quarter contracting in alloy steel bars, sheets and strips.

The automotive industry, which accounted in large part for the recent decline in specifications, is conspicuous in contributing to the current recovery. It is also supplying the chief impetus to first quarter buying. In fact, parts makers that use steel bars are anxious to have prices named for next quarter for use in figuring on contracts with motor car builders.

The failure of mills to announce first quarter quotations on bars, plates and shapes is interpreted, in some quarters, as reflecting uncertainty regarding the success of an advance, in view of the seasonal decline in the demand for those commodities. On the other hand, the recent advance of \$2 a ton on sheets has been adopted by nearly all mills, and some first quarter business, notably in body sheets, has been booked at the new prices.

The rise of 10c. per base box in tin plate, to apply on contracts for the first quarter and first half of 1929, was contrary to expectations. It had been believed that the base price would be left unchanged and the cash discount reduced to 1/2 per cent. Under that plan the

mills would have netted only slightly less than with the advance and the unchanged discount.

Alloy steel bar prices now generally range from 2.65c. to 2.75c., base mill. The lower price is \$2 a ton below the last advance, which apparently failed to apply on much tonnage business.

A high rate of construction is indicated by fabricated steel awards of 47,300 tons, following a total of 55,000 tons in the previous week. The oil industry contributed one letting of 12,000 tons of storage tanks, besides miscellaneous orders (not included in the total) aggregating 10,000 tons. The gas pipe line from Tulsa, Okla., to Lockport, Ill., sponsored by the Texas Corporation and the Empire Gas & Fuel Co., will take a total of 76,528 tons, which has been divided between a Milwaukee and a Pittsburgh mill instead of being placed at Youngstown, as previously reported.

Railroad buying of the week includes the placing of 10,000 tons of rails by the Missouri-Kansas-Texas and the distribution of 800 freight cars. The Chicago & North Western is in the market for 30,000 tons of rails, and the Wabash will buy 55 locomotives.

Sales of foundry grades of pig iron by Cleveland producers, at 52,000 tons, were nearly as large as a week ago. Continued pressure for iron is evident in other districts, notably at St. Louis and Chicago. Malleable pig iron at St. Louis has been advanced 50c. a ton, and another rise of \$1 a ton in the Chicago market is regarded as an early possibility. The 25c. a ton advance at Birmingham is expected to be followed by another of 50c. In the Valleys, where the scarcity of pig iron has been relieved by the reduced needs of steel works, producers have not succeeded in raising the market to the higher quotations recently announced.

Jackson County makers of silvery pig iron and Bessemer ferrosilicon have increased prices \$2 a ton.

Structural steel lettings in October (computed) totaled 240,000 tons, compared with 319,000 tons in September.

The European steel market, especially in semi-finished and light-weight material, is moderately active because of the German lockout. Our London cable, however, reports diminishing concern over German developments, with prices easing on the Continent.

Another slight rise in THE IRON AGE composite price for pig iron, the tenth in three months, brings it to \$18.54 a gross ton, against \$18.50 last week and \$17.63 a year ago. Finished steel remains at 2.369c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Nov. 20, 1928	Nov. 13, 1928	Oct. 23, 1928	Nov. 22, 1927
No. 2 foundry, Philadelphia...	\$21.26	\$21.26	\$20.76	\$19.76
No. 2, Valley furnace.....	17.50	17.50	17.00	17.50
No. 2, Southern, Cin'ti.....	20.19	19.94	19.94	19.69
No. 2, Birmingham.....	16.50	16.25	16.25	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	19.00	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.50
Basic, Valley furnace.....	17.50	17.50	17.00	17.00
Valley Bessemer, del'd P'gh...	20.01	20.01	19.26	19.76
Malleable, Chicago*.....	20.00	20.00	19.00	18.50
Malleable, Valley.....	18.25	18.25	17.50	17.50
Gray forge, Pittsburgh.....	18.76	18.76	18.26	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:

	Cents	Cents	Cents	Cents
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.95	1.95	1.90	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.29	2.29	2.24	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.22½	2.22½	2.22½	2.14
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.19½	2.19½	2.19½	2.14
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Nov. 20, 1928	Nov. 13, 1928	Oct. 23, 1928	Nov. 22, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.65
Sheets, galv. No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.75
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.20
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$17.00	\$17.25	\$18.00	\$14.25
Heavy melting steel, Phila....	15.50	15.50	16.00	13.50
Heavy melting steel, Ch'go....	14.50	14.50	14.00	11.50
Carwheels, Chicago.....	14.25	14.25	13.75	13.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	15.50	15.50	14.25
No. 1 cast, Philadelphia.....	16.25	16.25	17.00	16.00
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	13.50
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)..	13.00	13.00	12.75	9.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.85	\$2.85	\$2.90	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	15.62½	13.75
Electrolytic copper, refinery...	15.75	15.75	15.25	13.50
Zinc, St. Louis.....	6.25	6.25	6.25	5.82½
Zinc, New York.....	6.60	6.60	6.60	6.17½
Lead, St. Louis.....	6.17½	6.20	6.32½	6.05
Lead, New York.....	6.35	6.35	6.50	6.25
Tin (Straits), New York.....	51.12½	50.12½	48.75	58.12½
Antimony (Asiatic), N. Y....	10.25	10.37½	10.50	10.87½

Pittsburgh

Steel Business, After Slight Lull, Shows a Gain—Tin Plate Price Raised for First Half

PITTSBURGH, Nov. 20.—Steel business in the past week has shown some gain over that of the week before. While consumers still are governed in their purchases by known requirements and are influenced to some extent by the close proximity of the inventory period, the advances announced in sheets, which have had almost full subscription to by producers, and a belief that steel makers will seek higher prices on first quarter tonnages on a number of other finished products have tended to stimulate specifications on contracts for this quarter. Sheet business is notably better, and makers of strips find this month to be running well up to October in point of tonnage releases on contracts.

There has been a further recession in plant engagement in the Youngstown district and there is evidence here and in Wheeling and Johnstown that the necessity has gone by for producing ingots to the limit of capacity. The general average of ingot production of these districts now is about 80 per cent, which compares with 90 per cent a month ago, but stands out favorably with this time last year, when ingot output was not much above 60 per cent.

Announcement of the price of tin plate for the first half of next year has been followed by an expansion in orders and in mill operations, which had been somewhat checked by the lack of information respecting prices. The price was a surprise in view of the common expectation that any change would be in the discount for cash rather than in the base price.

In leaving the cash discount at 2 per cent and raising the base price to produce as much of a return as would have resulted from a lower discount, the mills have partly opened the question of the discount on sheets, as sheet jobbers, in protesting the reduction in the discount on sheets, advanced the suggestion that the price be raised and the discount be allowed

to remain at 2 per cent. The dominating consideration probably is found in the fact that advances have been better held in tin plate than in sheets.

A local maker of seamless pipe shares in a line pipe order recently closed requiring in all nearly 78,000 tons. Pipe makers feel pretty cheerful about the oil country pipe requirements for next year.

Dealings in pig iron confirm the impression held by buyers that producers had higher price ideas than they could realize. Basic iron again has been sold at \$17.50, Valley furnace, in the face of \$18 asked. Another drop of 25c. a ton on heavy melting scrap means that this material has gone down \$1 a ton in four weeks.

Pig Iron.—An Alliance, Ohio, melter has closed for 5000 tons of basic iron for first quarter delivery at \$17.50, Valley furnace, the business being divided among three producers. This transaction clarifies the price of that grade, on which the common quotation recently was \$18, Valley furnace. No important sale of this grade has been made at more than \$17.50, Valley furnaces, and that price now appears to be as high as can be done in view of the fact that steel companies, which recently had none for sale, now

appear to have some available for the market. A merchant furnace, which will start up about the middle of next month, will make basic in addition to foundry and malleable iron. Fair-sized tonnages of foundry iron, including some of 1000 tons or more, have been sold for first quarter shipment at \$18, Valley furnace, for No. 2 grade, but the purchases were entirely by melters west of the Valleys and the freight rates to their plants are well under those to the Pittsburgh district. Delivered prices in most cases would work back to approximately \$17.50, Valley furnace, if the delivery were to this district, and, indeed, that price actually continues to be made on business in this district. Bessemer and malleable iron hold at the prices of a week ago, but with sales mostly in small lots. Some large users of foundry iron in this area are melting rather moderately, and one very large consumer reports that present supplies will last well through January. Asking prices on iron generally have been a little higher than consumers have been willing to pay or have been obliged to pay when they were able to offer attractive tonnages.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50 to \$18.00
Bessemer	18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Specifications for billets, slabs and sheet bars on fourth quarter contracts continue heavy, but new business does not amount to much, as non-integrated manufacturers do not find it necessary to supplement contract deliveries and it is a little early for them to be interested in first quarter requirements. For the latter delivery the mills are asking \$34, Pittsburgh or Youngstown, for sheet bars, an advance of \$1 a ton, but are holding to the present price of \$33 for large billets and slabs. Wire rods are firm at \$42, base Pittsburgh or Cleveland. There is talk of higher prices for nails

and wire and, if they come, an advance on rods is a likelihood.

Bars, Plates and Shapes.—Business is rather slow, particularly in comparison with the record for October. Those who buy bars for further manufacture are not doing as well as they did a few weeks ago and consequently are sparing in ordering shipments on contracts. Demand for merchant bars is steady and reinforcing bars are moving well, although individual sales and specifications are small. While the inquiry for fabricated steel is brisk, actual awards of size are few. Plate fabricating shops are not especially busy. Views as to first quarter bar, plate and shape prices are mixed. There is a belief in some quarters that an advance might encounter some difficulty in face of the seasonal decline in demand and the fact that considerable fourth quarter contract tonnage written mostly at 1.90c., base, remains to be specified. On the other hand, a single price basis is getting serious consideration and that would mean higher prices on much tonnage through a reduction or an elimination of the preferred buyers. The essential change in the market as compared with October is that fairly prompt deliveries are promised on all three products.

Rails and Track Supplies.—The New York Central Lines will open bids Nov. 27 on the tie plates and spikes to go along with its recent standard-section rail orders. This is a Clayton Law inquiry. Railroads supplied with rails from Pittsburgh have placed their 1929 requirements, and the local rail mill is now understood to be sold up for a run of four months. Light-section rails are dull in keeping with the fact that the coal market is neither active nor profitable enough to sustain a very full operation of the mines. Spike prices show some irregularity, but those for rails and tie plates are steady.

Wire Products.—Business is as much as one-third below that of October, but is as good as usual at this time of the year, when inventory considerations influence purchases. Prices

are very steady. Manufacturers have not yet taken action on first quarter prices. A new sales method for woven wire fence, providing zone prices, is an early possibility.

Tubular Goods.—The pipe for a gas line to run from Tulsa, Okla., to Lockport, Ill., it develops, will be furnished by a Milwaukee and a local mill and not by Youngstown mills, as was at first reported. For this line, sponsored by the Texas Company and the Empire Gas & Fuel Co., the A. O. Smith Corporation, Milwaukee, will furnish 630 miles of 12¾-in. pipe, or 71,528 net tons, while 100 miles of 6½-in., or 5000 tons, seamless pipe will be produced by Spang, Chalfant & Co. Pipe business generally is making a fairly good showing. While oil country requirements are no tax upon productive capacity, the demand for them is constant and standard-weight pipe is doing as well as it ever does at this time of year.

Sheets.—With the announcement late last week by the American Sheet & Tin Plate Co. of an advance of \$2 a ton in prices, to 2.85c., base Pittsburgh, for black; 3.60c., base, for galvanized; 2.10c., base, for blue annealed; 4.10c., base, for automobile body sheets, and 3c., base, for tin mill black plate, mills representing most of the productive capacity of the country now are quoting these prices. Some business for January and February shipments has been booked at the new levels, but dependence for mill schedules still is upon specifications on fourth quarter contracts and these are reported to be coming along in good volume, considering the lighter requirements of the motor car builders and the close proximity of the end of the year, which usually means some contraction in tonnage releases.

Tin Plate.—There has been a substantial quickening in demand and mill operations since the announcement of the American Sheet & Tin Plate Co. on Nov. 15 of the new prices to rule on contracts for the first quarter and half of next year. The announcement was quite contrary to expectations in that the base price was

THE IRON AGE Composite Prices

Finished Steel

Nov. 20, 1928, 2.369c. a Lb.

One week ago.....	2.369c.
One month ago.....	2.362c.
One year ago.....	2.397c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1928	2.369c., Oct. 30;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Nov. 20, 1928, \$18.54 a Gross Ton

One week ago.....	\$18.50
One month ago.....	17.92
One year ago.....	17.63
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.54, Nov. 20;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill.....	1.95c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.27c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.10c.
Cooperage stock, Chicago.....	2.20c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.85c.
Strips, Cleveland.....	2.85c. to 2.95c.
Strips, del'd Chicago.....	3.15c. to 3.25c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.60
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Cut Nails

Per 100 Lb.

Carloads, Wheeling, W. Va., or Reading, Pa.....	\$2.75
Less carloads, Wheeling or Reading.....	2.85

Woven Wire Fence

Base to Retailers per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c. to 2.95c.
No. 24, del'd Cleveland.....	2.94c. to 3.04c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.69c. to 3.79c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c. to 4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.\$11.20	25-lb. coating I.C.\$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
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4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
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4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
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5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
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5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
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5100 Chromium Spring Steel.....	0.20	2.95
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6100 Chromium Vanadium Bars.....	1.20	3.95
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6100 Chromium Vanadium Spring Steel.....	0.95	3.70
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9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
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Rounds and squares.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25

Carbon Vanadium.....	0.95	3.70
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Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Black	Galv.
1½.....	45	19½	1½ to ¾.....	+11	+39
1¼ to ¾.....	51	25½	1½.....	22	2
1½.....	56	42½	¾.....	28	11
¾.....	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			

Lap Weld

2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	53	40½			

Butt Weld, extra strong, plain ends

1½.....	41	24½	1½ to ¾.....	+19	+54
1¼ to ¾.....	47	30½	1½.....	21	17
1½.....	53	42½	¾.....	28	12
¾.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2¼ in.....	27
2½ to 2¾ in.....	37
3 in.....	40
3¼ to 3½ in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
	1½ in.....+18
	1¾ to 1½ in.....+8
	2 to 2¼ in.....—2
	2½ to 3 in.....—7
	3¼ to 4½ in.....—9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1¼ to 1½ in.....	55	3¼ to 3½ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2¼ in.....	34	4½, 5 and 6 in.....	45
2½ to 2¾ in.....	42		

Hot Rolled

2 and 2¼ in.....	40	3¼ to 3½ in.....	56
2½ and 2¾ in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

advanced 10c. per box and the discount for cash in 10 days allowed to remain at 2 per cent; it was commonly believed that the discount would be reduced to one-half of 1 per cent and that the base prices would remain at \$5.25, Pittsburgh, and \$5.35, Gary. The advance in the base prices to \$5.35, Pittsburgh, and \$5.45, Gary, gives the mills slightly more than they would have obtained by allowing the former prices to stand and to cut the discount.

Cold-Finished Steel Bars and Shafting.—Shipments on old orders or contracts are good, but new business is light and order books are dwindling. Sentiment still is divided as to first quarter prices. On account of the narrow spread between hot-rolled and cold-finished steel bar prices, many believe that the price should be advanced regardless of the first quarter hot-rolled bar prices, but others wait on the announcement of the first quarter hot-rolled bar price.

Hot-Rolled Flats.—Some strip makers find business somewhat under the October record, but others report orders and specifications to be running this month at substantially the same rate as last month. The need of orders is not urgent enough to cause the mills to take them except at full prices. The real test of the new prices and the card of extras is ahead, as large consumers have not yet started negotiations for first quarter tonnages.

Cold-Rolled Strips.—Business is holding up better than most makers expected it would. On new orders, 2.85c., base Pittsburgh, is well maintained, and small tonnages are being sold at as high as 2.95c., base. The bulk of the tonnage, however, is being shipped at this quarter's contract price of 2.75c., base.

Coke and Coal.—Offerings of spot coke, both furnace and foundry, still are ample for wants. Prices are no more than steady at last week's levels.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets.....	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large.....	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

The coal market is dull and very weak. With the Lake shipping season almost over, an outlet of size has been closed and there has not been a corresponding curtailment of production. The result is that buyers have much more to say as to prices than producers.

Old Material.—Heavy melting steel has been sold within the past week at \$17 for delivery to three points in the district. More seems impossible to obtain; dealers with short orders to cover report considerable difficulty in purchasing for less. Scrap rails and compressed sheets also command \$17 on sales into consumption. The market, as typified by heavy melting steel, has dropped an even dollar per ton from its peak of a month ago, but this decline seems to be more a case of deflation than of outright weakness, as supplies still are scant. Lower prices are noted on most grades in sympathy with heavy melting steel.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel.....		\$17.00
Scrap rails		17.00
Compressed sheet steel....		17.00
Bundled sheets, sides and ends	\$15.50 to	16.00
Cast iron carwheels.....	15.00 to	15.50
Sheet bar crops, ordinary..	17.00 to	17.50
Heavy breakable cast....	13.50 to	14.00
No. 2 railroad wrought...		17.00
Heavy steel axle turnings..		15.00
Machine shop turnings....	10.50 to	11.00
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	18.50 to	19.00
Railr. coil and leaf springs	18.50 to	19.00
Rolled steel wheels.....	18.50 to	19.00
Low phos. billet and bloom ends	20.50 to	21.00
Low phos., mill plates....	19.00 to	19.50
Low phos., light grade....	18.00 to	18.50
Low phos., sheet bar crops	19.00 to	19.50
Hvy. steel axle turnings..		15.00
Electric Furnace Grades:		
Low phos. punchings.....	18.50 to	19.00
Hvy. steel axle turnings..		15.00
Blast Furnace Grades:		
Short shoveling steel turnings	12.00 to	12.50
Short mixed borings and turnings	12.00 to	12.50
Cast iron borings.....	12.00 to	12.50
No. 2 busheling.....	9.50 to	10.00
Rolling Mill Grades:		
Steel car axles.....	20.00 to	21.00
No. 1 railroad wrought...	13.00 to	13.50
Sheet bar crops.....	18.00 to	18.50
Cupola Grades:		
No. 1 cast.....	14.50 to	15.00
Rails 3 ft. and under.....	17.50 to	18.00

Edgar E. Brosius, Inc., engaged in designing and marketing steel plant and blast furnace equipment, no longer "farms" the manufacture of the various machines and equipment bearing the Brosius trademark to outside shops, but does this work in a plant of its own located in Sharpsburg, just outside the corporate limits of Pittsburgh. Among the Brosius products are a double barrel automatic clay gun for blast furnace plants, an automatic single hoist grab bucket for handling loose materials, such as cinder, coal and ashes, a single hook grab bucket, cinder notch stoppers, coke testing tumbling barrels, various types of charging machines, ash pit buckets, monorail bucket hoists, dump buckets, the wide opening scraper type grab buckets and crucible drawing and charging machines.

First Boat Load of Steel Reaches Moline, Ill.

The first shipment of steel to pass through Moline, Ill., by boat since the Inland Waterway Corporation started operating, went through the Moline locks Nov. 8. The barge, containing 385 tons of steel wire products, was forwarded by a Pittsburgh producer.

Continuous Furnaces Have Soaking Chambers

Two triple fired continuous furnaces, built by the Rust Engineering Co., Pittsburgh, for the Timken Roller Bearing Co., at Canton, Ohio, have been put into operation. Each is designed to heat 40 tons of 18 ft. x 10 in. x 10-in. blooms per hour.

One of the features of these furnaces is an independently fired soaking chamber, through which the blooms pass just before being discharged. This soaking chamber is separately controlled from the rest of the furnace although built as part of it. Two sets of burners immediately behind the soaking chamber, fire above and beneath the blooms, and it is these burners which determine the tonnage output of the furnace, the soaking chamber being used as the name implies, to soak the blooms and equalize their temperature throughout.

Wood Refuse as Fuel

Many plants which have a large amount of wood refuse from operations are utilizing this as a part of the fuel burned under boilers for producing steam. In some cases this is comminuted and then sent through suction pipes to hoppers over the boilers, which may be at a distant point. Other methods of handling are more or less widely used. In any case, however, the material usually is thrown into the furnace by means of pressure from behind or suction from the stack.

Considerable quantities of moisture usually are present in waste wood. Experiments have determined the remaining available heat in this material with varying contents of moisture. Based on 8700 B.t.u. for each pound of dry wood, with an assumed stack temperature of 560 deg., the heat available with wood containing 10 per cent moisture is about 7700 B.t.u. This quantity reduces by about 1000 B.t.u. for each addition of 10 per cent in the moisture.

Woods of various kinds have varying heating values when dry. Oak is given as 8316 B.t.u., while pine is listed as 9753 B.t.u. Ash, elm, beech, birch and fir are given intermediate grades, the ash being nearest to the oak. These thermal figures are taken from a pamphlet, "Burning Wood Refuse for Fuel," issued by the International Combustion Engineering Corporation, 201 Madison Avenue, New York.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	34.00 to 35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars

	(Open hearth or Bessemer)	Per Gross Ton
Pittsburgh		\$33.00 to \$34.00
Youngstown		33.00 to 34.00
Cleveland		33.00 to 34.00

Slabs

	(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh		\$33.00
Youngstown		33.00
Cleveland		\$33.00 to 34.00

Skelp

	(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Grooved		1.90c. to 2.00c.
Universal		1.90c. to 2.00c.
Sheared		1.90c. to 2.00c.

Wire Rods

	(Common soft, base)	Per Gross Ton
Pittsburgh		\$42.00
Cleveland		42.00
Chicago		43.00

Prices of Raw Material

Ores

	Lake Superior Ores; Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron.....		\$4.55
Old range non-Bessemer, 51.50% iron.....		4.40
Mesabi Bessemer, 51.50% iron.....		4.40
Mesabi non-Bessemer, 51.50% iron.....		4.25
High phosphorus, 51.50% iron.....		4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore		Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....		10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.		
Manganese ore, washed, 52% manganese, from the Caucasus.....		38c.
Manganese ore, Brazilian, African or Indian, basic 50%		37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates		\$11.25 to \$11.50
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard		\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered		50c. to 55c.

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$30.00 to \$33.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

	F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
10%		\$32.00
11%		34.00
12%		\$36.00

Silvery Iron

	F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
6%		\$25.00
7%		26.00
8%		27.00
9%		28.00
10%		\$30.00
11%		32.00
12%		34.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.00
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. An-niston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick

	High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey ...	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	Per Cent Off List
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t, square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. 70	70
Stove bolts in packages, Pittsburgh. 80, 10 and 2½	70
Stove bolts in packages, Chicago. 75, 20, 10 and 5	70
Stove bolts in bulk, Pittsburgh. 80, 10 and 5	70
Stove bolts in bulk, Chicago. 75, 20, 10, 5 and 2½	70
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(½-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

	(¾-In. and Smaller)	Per Cent Off List
F.o.b. Pittsburgh		70 and 10
F.o.b. Cleveland		70 and 10
F.o.b. Chicago		70 and 10

Cap and Set Screws

	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	Per Cent Off List
Milled cap screws	80, 10 and 10	
Milled standard set screws, case hardened, 80 and 10		
Milled headless set screws, cut thread.....	80	
Upset hex. head cap screws, U.S.S. thread, 85 and 5		
Upset hex. cap screws, S.A.E. thread. 85 and 5		
Upset set screws.....	80, 10 and 10	
Milled studs	70 and 5	

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Chicago

Heavy Specifications for Steel But New Buying is Light— Ingot Output Now at 82 Per Cent

CHICAGO, Nov. 20.—Large buyers in the Western steel market are inactive from the viewpoint of new purchases, but their shipping orders to cover nearby requirements have swelled total specifications for finished steel products to the largest volume since the third week in February. New orders are small, indicating the intention of users to take care of immediate needs only and to cut stocks to the minimum in anticipation of the year-end inventory period. A few buyers have stated their expected requirements for the first quarter in the new year.

Prices of plates, shapes and bars are firm at 2c. to 2.10c. per lb., and, as the circle of buyers at 2.10c. expands, producers to the east of Chicago find this territory a more fertile field for the sale of their products.

The number of furnaces in blast remains unchanged, but it is probable that an Inland stack, which is now being relined, will be blown in soon after Dec. 1. Steel mill pig iron production is a trifle in excess of finishing departments' demands, affording producers an opportunity to offer small lots to the merchant pig iron trade.

Rail mills, having completed the most urgent requests for immediate delivery, are operating at greatly reduced output while the mechanical equipment is being put in shape for the heavy winter and spring rolling schedules. Curtailment in rail production has brought down the rate of ingot output, the average now being about 82 per cent of capacity. Building operations in Illinois in October swung upward in contrast with the downward movement a year ago.

Pig Iron.—This market remains strong. Shipments of Northern iron are going forward in heavy total tonnage. Quotations for large tonnages are at \$20 a ton and scattered lots bring \$20.50. It is believed in some quarters that an advance to \$21 is an early possibility. A Chicago buyer is in the market for 5000 tons of basic iron for delivery east of here. A Wisconsin user has placed a round tonnage of malleable iron and another order is for 2000 tons. Several Northern iron purchases aggregate 4000 tons. Southern iron has been advanced 25c. to \$16.50 a ton, Birmingham. The charcoal iron market remains active, and prices are strong at \$24 a ton, furnace. The three producers have their four furnaces in blast and a shortage exists in several grades. Several brokers in Chicago have received notice that silvery iron is advanced \$2 a ton, bringing the 10 per cent grade to \$30 a ton, f.o.b. Jackson County, Ohio, furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.51
Low phos., sil. 1 to 2, copper free	\$29.00 to 29.50
Silvery, sil. 8 per cent.....	31.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Spiegeleisen is being

offered to local users in tonnage lots at \$31 a ton, Hazard, Pa., in the 19 to 21 per cent grade. The delivered price of \$83.50 a ton for ferrosilicon has not held on all 1929 contracts, cuts of \$2 to \$3 a ton having been made.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Plates.—A Chicago fabricator has taken 12,000 tons of oil storage tank work for the Roxana Petroleum Corporation. The tanks are a part of a program of 130 to be erected by this oil company at Houston, Tex. In addition to the above tonnage, about 10,000 tons of tank plates has been ordered by miscellaneous users in the Southwest and on the Pacific Coast. Among fresh inquiries for railroad equipment are 500 underframes, 200 tank cars and 50 steel caboose cars. Greater activity in car shops is indicated by larger specifications for steel from that source. Average deliveries on plate mill products are about two weeks.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago

Cast Iron Pipe.—Marked improvement is noted in this market. Actual orders have not mounted to any extent, but definite and large-sized inquiry is in the making. Contractors have placed orders for a total of 5000 tons; railroads, gas companies and other miscellaneous users are ordering more liberal quantities. Many municipalities are taking prompt action on pipe covered by recent bond issues, and sellers expect that a number of actual inquiries will be before the trade by the turn of the year. Deliveries are prompt. Prices are steady at \$37 to \$38 a ton, Birmingham, for 6 in. and larger diameter pipe.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Bars.—Demand for bar mill products is well sustained. Shipments of mild steel bars represent about 87 per cent of mill capacity. Both automobile and parts makers' needs are lower, but schedules that are now being arranged for deliveries in December give promise of heavier shipments to those users. The new six-cylinder Chevrolet car is in production and shipments of steel to that manufacturer are heavier. Needs of agricul-

tural machinery plants are larger than had been anticipated at the turn of the quarter and orders for fill-in tonnages are being placed with mills. Chicago prices for mild steel bars are stronger at 2c. to 2.10c. per lb. The iron bar market is quiet except for scattered orders from the railroads for immediate shipment. Shipments of alloy steel bars to automobile manufacturers are fully 30 per cent lower than at the turn of the month. Producers here have met this situation with a cut in operations to 75 per cent of capacity. Alloy quality bar base prices, f.o.b. makers' mills, are 2.65c. to 2.75c. per lb., depending on the character of orders. Prices for rail steel bars are strong; scattered sales have been made at 2.05c. per lb., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Structural Material.—In the absence of large tonnage awards, this market is being supported by fabricators' needs for old orders. Specifications are heavy, considering the time of the year, and, for the most part, shops are well engaged and have sizable backlogs. It is reported that the Fine Arts Building, Chicago, requiring 5000 tons, will again be brought out for bids, and Dec. 1 is the date now set for opening bids on the 15,000 tons needed for the Chicago Board of Trade Building. Fresh inquiry is light, and bidding is keen, with resultant low prices. It is reported that an order will soon be placed for the 4000 tons required for the Northwestern National Bank Building at Minneapolis.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—Rail purchases in the week have come from miscellaneous sources and aggregate a few thousand tons. Fresh inquiry for 40,000 tons includes 30,000 tons for the Chicago & North Western. The track accessory market is active, with sales of 15,000 tons and inquiries for 30,000 tons. The Missouri Pacific is in the market for 4,000,000 tie plates, of which 2,000,000 are to be of copper-bearing steel. Several round tonnages of iron tie plates are also being sought. Prices for tie plates are steady at Chicago at \$43 a ton, but to the south quotations are said to be lower than this figure. The light rail market is dull. Output of standard-section rails is sharply curtailed this week while producers attempt to put mills in condition for the winter and spring rolling schedules.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Sheets.—Demand from most users has lessened. Based on present indications, hot mill output will drop below the current rate of 85 per cent of capacity by the end of this week. Barrel and light tank makers have entered their dull season and the roof-

ing trade has not come out of the slump experienced several weeks ago. Sellers report a favorable outlook for railroad car roof sheets, but this business is not expected to develop in volume before late winter or early spring. With the approach of the inventory season, there is the urge among consumers to hold stocks to a minimum; accordingly, current sales are light. First quarter business is developing slowly, with no sales reported, but inquiry is moderately active. Deliveries are somewhat improved, especially in the blue annealed product, which can be had in two weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Coke.—Buyers of by-product foundry coke are actively seeking contracts for first half, but sellers have not opened their books for the new year. Prices are strong at \$8, local ovens, and \$8.75, delivered in the Chicago switching district.

Bolts, Nuts and Rivets.—Specifications from agricultural machinery manufacturers are unusually heavy and some improvement is seen in demands from the railroads. Several large users are taking smaller quantities, with the net result that output remains at 65 per cent of capacity.

Reinforcing Bars.—Although prices remain at the low levels of recent weeks, sellers are now disposed to quote higher. Local producers contemplate making a \$5 a ton extra charge on cut to length orders. This would bring the mill cut to length quotation to 2.35c. per lb. Mild steel bars out of Chicago warehouses are quoted 2.10c. per lb. Business during the week has been light.

Cold-Rolled Strip.—Books have been opened for first quarter at 2.85c. to 2.95c. per lb., Cleveland. The freight rate to Chicago is 30c. per 100 lb. New buying is light, but improvement is noted in specifications. Inquiry for future needs, especially by automobile manufacturers, is active.

Cold-Finished Bars.—Prices are firm at 2.20c. per lb., Chicago, for de-

livery during the remainder of this year. Sales are in fair volume and specifications are sustaining output at nearly local plant capacity.

Wire Products.—Purchases average well up to those of recent weeks and mill output is supported at 65 per cent of capacity. November shipments are running a trifle above the rate in October and decidedly better than in November, 1927. Demand for woven wire fencing continues dull and below seasonal expectations. Prices for nails are steady. The tonnage shipped in the first 10 months of this year was smaller than that shipped in the corresponding period of 1927. Current orders, although still small, show some improvement over the total for last week. Jobbers in the Northwest are rounding out stocks and are ordering more freely. The jobbing trade in the South is quiet, but it is more active in the Central West and in the East.

Wire Rods.—Specifications are for liberal quantities and current purchases for immediate delivery are in fair volume. Prices are firm at \$43 a gross ton, Chicago.

Old Material.—The Chicago scrap market is marking time, in the absence of movement of heavy tonnage grades, except as dealers trade against old orders. Brokers are paying \$14 to \$14.85 a gross ton, delivered, for heavy melting steel, in which grade orders were taken at \$14.50 to \$15. The supply is more than adequate to meet current requirements of buyers, and inspections are tightening, with the result that rejected scrap is quite troublesome. At a recent sale by the Chicago & Alton Railroad, heavy melting steel was bid in at \$15.10 a gross ton, delivered, indicating the lower range of prices that brokers are willing to pay at sources of supply. On the whole, consumption remains large and many dealers take this condition as an indication that prices in the next few weeks will not fluctuate over a wide range. Railroad shipments are coming out more slowly, deliveries now being 30 to 40 days, while at the turn of the month scrap appeared on track within a few days after it was sold. Cast iron borings are quiet except in dealer activity in covering old contracts. One

user has requested sellers to hold back shipments. Bad weather is hindering the preparation and loading of scrap in local yards. Electric furnace grades are moving in good volume and sales are active. Miscellaneous foundry grades are being taken in small lots for immediate consumption. Dealers no longer are having trouble in obtaining cars for scrap.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraulic compressed sheets	12.50 to 13.00
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to 18.25
Railr'd tires, charg. box size	17.50 to 18.00
Railr'd leaf spring cut apart	17.25 to 17.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings.....	14.00 to 14.50
Low phos. punchings.....	16.25 to 16.75
Low phos. plate, 12 in. and under	16.00 to 16.50
Blast Furnace Grades:	
Axle turnings.....	12.00 to 12.50
Cast iron borings.....	11.50 to 12.00
Short shoveling turnings..	11.50 to 12.00
Machine shop turnings....	7.50 to 8.00
Rolling Mill Grades:	
Iron rails.....	15.00 to 15.50
Rerolling rails	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft..	17.50 to 18.00
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	14.25 to 14.50
Malleable Grades:	
Railroad	16.00 to 16.50
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles.....	26.50 to 27.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought..	13.00 to 13.50
No. 2 railroad wrought..	13.00 to 13.50
No. 1 busheling.....	11.50 to 12.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast....	14.00 to 14.50
Stove plate	12.00 to 12.50
Grate bars.....	12.50 to 13.00
Brake shoes.....	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Steel Castings Orders Decline in October

WASHINGTON, Nov. 20.—Orders for commercial steel castings in October totaled 77,783 tons, or 54 per cent of the monthly capacity of the 129 manufacturers reporting to the Department of Commerce. Orders in September amounted to 82,329 tons, or 57 per cent of capacity. Production in October was 86,669 tons, or 60 per cent of capacity, against 75,356 tons, or 52 per cent of capacity, in September.

Of the October orders, 26,529 tons was for railroad specialties, being 39 per cent of that class of capacity;

while 51,254 tons was for miscellaneous castings, representing 67 per cent of that class of capacity. Of the October production, 29,113 tons was for railroad specialties, or 33 per cent of that class of capacity, and 57,556 tons was for miscellaneous castings, being 75 per cent of that class of capacity.

Orders for commercial castings for the 10 months ended with October totaled 814,571 tons, against 779,062 tons for the corresponding period of last year. Production during the 10 months of the current year aggregated 852,609 tons, compared with 847,386 tons for the corresponding period of last year.

Philadelphia

Steel Consumers Well Engaged and Specifying Freely —Jobbers Advance Sheets \$3 a Ton

PHILADELPHIA, Nov. 20.—First quarter buying of pig iron and steel is expected by most sellers to develop early next month, by which time it is believed that most consumers will be in a position to estimate their requirements for the period. Deliveries of steel on contracts are in good volume. Shipyards are quoting on more tonnage than for a number of years, local radio manufacturers are operating at a high rate and fabricating shops are expecting some substantial business for next year from the Reading Railroad electrification to be begun in the spring. Warehouses have advanced blue annealed, black and galvanized sheet prices \$3 a ton.

Pig Iron.—Only 20 to 25 per cent of the total tonnage of foundry iron required by consumers in this district for the next quarter is estimated to be under contract. Furnaces have backlogs sufficient to carry them into January. For delivery this year the market is firm at \$20.50 per ton, but the quotation of \$21 per ton for first quarter contracts has not yet been tested by the purchase of a substantial tonnage. Low phosphorus iron continues inactive in this district, but the price is firm. A large user of basic iron, which has been in the market for about 20,000 tons, is expected to buy this week.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.00
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Practically all the important consumers have contracted for next year with domestic producers at \$105 per ton, seaboard. British sellers report a few contracts for small tonnages.

Bars.—Mills have sufficient tonnage in sight or on order to carry them to the end of the year. Current contracts are at 1.90c. and 1.95c., Pittsburgh, but 2c., Pittsburgh, or 2.32c., Philadelphia, is being maintained on new business. Contracting for the next quarter has not yet begun.

Shapes.—Fabricating shops are busy and have some desirable business in prospect for next year. Shipbuilders are more active in bidding for contracts than for some time and are expected to provide a substantial tonnage of shape business next year. Prices are unchanged at 2.05c. per lb., f.o.b. nearest mill to consumer, or 2.11c., Philadelphia, based on Pen-coyd, Pa.

Plates.—Bids on four ships requiring 13,500 tons of plates to be built for the Export Steamship Corporation, New York, have been rejected, and it is understood that a new and slightly less elaborate specification is

to be prepared. The Pusey & Jones Corporation at Wilmington, Del., has contracts for three private yachts, about 236 ft. over all and a \$750,000 oil tanker for the Tidewater Oil Co. Plate prices continue at 2.05c. to 2.15c., Coatesville, or 2.15c. to 2.25c., Philadelphia, with most of the current buying of small lots at 2.10c., Coatesville.

Sheets.—Eastern Pennsylvania mills have advanced sheet prices \$2 a ton for delivery over the rest of this year and for first quarter. Prior to the increase, consumers were given an opportunity to place any additional requirements for the present quarter at the former prices, so no test of the new level is in prospect until first quarter contracting develops. The extra charge of 10c. per 100 lb. on blue annealed sheets 45 in. and wider has been eliminated with the advance to 2.10c., base Pittsburgh. Black sheets are quoted at 2.85c., Pittsburgh, or 3.17c., Philadelphia, and galvanized at 3.60c., Pittsburgh, or 3.92c., Philadelphia.

Warehouse Business.—To adjust their sheet prices to the new mill situation, jobbers have advanced black and galvanized sheets \$3 a ton to 4c. per lb. for black and 4.75c. per lb. for galvanized, effective Nov. 19, and have increased blue annealed to 3.15c. per lb., effective Nov. 20. Announcement is also made that freight will be allowed on shipments to consumers in

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅝-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia, Berks, Northampton, Lehigh Counties, Pa., Warren County, N. J., and the State of Delaware, on steel bars, shapes, hoops, bands and cold-finished bars.

Imports.—Arrivals of pig iron at this port in the week ended Nov. 17 totaled 855 tons, of which 706 tons came from British India and 149 tons from the Netherlands. A total of 335 tons of spiegeleisen and 31 tons of ferromanganese was received from the United Kingdom and 900 tons of chrome ore from Portuguese Africa. Steel imports consisted of 43 tons of structural shapes from Germany and 35 tons from France, seven tons of strip steel from the United Kingdom, eight tons of iron bars from Sweden and 1002 tons of skelp from France.

Old Material.—All grades of iron and steel scrap are inactive. Although prices are substantially unchanged, there is an undertone of weakness. Heavy breakable cast is not quotable at more than \$16, based on offers made by dealers. A small tonnage of No. 1 cast has been sold by a broker at \$17 per ton, delivered, but the maximum price today is said by sellers to be \$16.75 per ton, delivered. No. 1 heavy melting steel is quiet; on a moderate sized tonnage, dealers believe \$15.50 per ton is the market.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Reduction in Building

Building construction in the United States in October is placed at an index of 243 by the Associated General Contractors of America. This is on the base of 100 for the average of 1913. It shows a sharp reduction from the 266 in September, but otherwise, except for the 244 in June, was the highest figure yet reached.

The first unit of the new by-product coke plant of the Davison Coke & Iron Co., Neville Island, Pittsburgh, will be one of 35 Koppers-Becker ovens and will be built by the Koppers Construction Co., which also will build and instal the coal and coke handling equipment, the by-product, benzol and gas purification units.

Cleveland

Releases by Automobile Companies Increase Steel Bookings —Pig Iron Sales Heavy, Some for All of First Half

CLEVELAND, Nov. 20.—The demand for finished steel increased the past week following the lull during the earlier part of the month. The increase is due to a large extent to the releasing of larger specifications by the automotive industry, which evidently is planning heavier production schedules during the latter part of December. Better specifications have come from this source for sheets and hot-rolled strip. Most buyers in other fields are taking out about all the steel covered by their contracts. Mills are getting a fair amount of business in current orders for steel bars, plates and structural material. Quite a little inquiry has come out for first quarter contracts. Many of the larger consumers of alloy steel bars have covered for the quarter and some contracts for that delivery have been placed by the automotive industry for sheets and hot and cold-rolled strip steel. Some of the steel bar users in that field are anxious to have prices named for the first quarter to be used as a basis for figuring contracts with automobile manufacturers, but none of the mills has as yet named first quarter prices on steel bars, plates and shapes.

Local structural awards during the week included two 3000-ton lots. There is not much new inquiry.

Local mills continue to quote steel bars at 1.90c., Cleveland, and while 1.95c., Pittsburgh, is the usual quotation by outside mills, they find it necessary to go to 1.90c. for shipment to some points because of the Cleveland mill competition. In using a Cleveland base, outside makers quote 1.95c. to 2.05c. Plates and structural shapes are commonly quoted at 1.95c. to 2c., Pittsburgh.

Iron Ore.—The consumption of Lake Superior ore during October was 5,024,642 tons, a gain of 416,679 tons for the month. This compares with 4,023,985 tons consumed in October last year. Furnace stocks Nov. 1 amounted to 33,081,717 tons and stocks on furnace yards and Lake Erie docks on that date amounted to 39,554,612 tons, compared with 42,163,529 tons on the same date a year ago. There were 169 furnaces in blast Oct. 31, an increase of eight for the month. Ore shipments this month up to Nov. 16, inclusive, amounted to approximately 3,500,000 tons. As several of the ore firms shipped their last cargoes Monday, shipments will be rather light during the remainder of the month.

Pig Iron.—The market continues very active in foundry and malleable grades. Sales by Cleveland interests during the week were 52,000 tons, only slightly less than those of the week before. Prices are firm at the recent advance. Buying is now extending into second quarter. A Cleveland producer, after having sold considerable iron for the first quarter, announced last week that it would hereafter limit its sales to contracts for the entire first half and has made several sales for the most extended deliveries at \$18.50, furnace, for out-of-town shipment. Other producers have not yet opened their books for delivery beyond the first quarter. One Lake furnace is holding to \$19 for foundry and malleable iron and is making sales at that price in Indiana, but this price virtually shuts this producer out of the Ohio market. The

Cleveland furnace price for local delivery is \$19, furnace, and \$20 is the ruling price in Michigan. Several large consumers in the automotive field have contracted for the first quarter, but some of the larger consumers in other fields have not yet bought for that delivery. Among current inquiries is one from the Link-Belt Co., Indianapolis, for 5000 tons of malleable iron. Southern foundry iron has been advanced 25c. a ton to \$16.50, Birmingham. A \$2 a ton advance on Ohio silvery iron has been announced.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	22.50
Malleable	19.50
Ohio silvery, 8 per cent....	30.00
Basic Valley furnace.....	\$17.50 to 18.00
Stand. low phos., V'ley fur. 26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Alloy Steel Bars.—Manufacturers have opened their books for the first quarter at 2.65c., base, for large buyers and at 2.75c. for smaller consumers. A number of the larger consumers in the automotive industry have already placed contracts for the quarter. The 2.65c. base is a \$2 a ton concession from the regular quotation, but there have been recent reports of price shading. Previous to the adoption of the present method of quoting, with one base and added alloy differentials, there was a spread in prices and the attempt to maintain one price for both large and small buyers is said to have not worked out satisfactorily.

Sheets.—Nearly all the mills have

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.50c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'l'd sheets (No. 10).....	3.35c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

adopted the \$2 a ton price advance on all grades for current orders and the first quarter. However, some have not yet closed the door on regular customers who wish to place tonnage at the old prices that can be delivered in December. The market has a firm tone and some first quarter business, particularly in auto body sheets, has been taken at the new prices. Advances of \$2 a ton are announced on tin mill black plate to 3c., Pittsburgh, and on tin plate to \$5.35. Mill operations show a slight decrease.

Coke.—The current price of \$7.75, Painesville, for by-product foundry coke has been reestablished for December shipment. Specifications are good, but new demand is light.

Reinforcing Bars.—The seasonal falling off in the demand is in evidence. On billet steel bars, 1.85c., Cleveland, apparently has not disappeared. Rail steel bars are quoted at 1.95c., mill.

Wire Products.—Nails are moving slowly. Jobbers have good stocks, some evidently having taken advantage of concessions that some mills have allowed recently from the \$2.55 price. Wire is firm. It is still uncertain whether prices will be advanced for the first quarter.

Warehouse Business.—Sheets are moving well, but the demand for other products is somewhat lighter than during October. This is regarded as a seasonal falling off due in part to a lessened demand from the building field.

Strip Steel.—Several consumers in the automotive field have placed first quarter contracts at the prices announced a week ago by some of the mills, or at the same prices that have been prevailing recently. These are 1.90c., Pittsburgh, for hot-rolled strip up to 6 in. wide and 2c. for 6 in. and wider and 2.85c., Cleveland and Pittsburgh, for cold-rolled strip. Some of the mills are holding to 2.95c. on the latter for small lots. Fender stock has been quoted for the next quarter at 4.25c., Cleveland and Pittsburgh, for No. 20 gage and 4.40c. for No. 22 gage, an advance of \$2 a ton. Specifications, which recently showed a lull, are now coming out somewhat heavier as automobile plants are ordering material for increased production schedules in December. Mills making narrow strip are crowded with orders, but the situation is easier with wide strip mills because of the large capacity. Shipments have been held up temporarily by a leading Detroit automobile manufacturer because material was coming in too fast.

Semi-Finished Steel.—Specifications are holding up to the recent heavy volume. The leading Cleveland producer, which recently advanced prices to \$34, Cleveland and Youngstown, for sheet bars, billets and slabs, is still adhering to that quotation for the three products, although Youngstown mills have come out with a \$33 price on large billets and slabs.

Bolts, Nuts and Rivets.—The demand is not as heavy as in October,

which is evidently due to the slowing down in the automotive industry. There are indications that the present discount of 70 per cent off list will be re-established for the first quarter, although there is a possibility of an advance in wire, which is used for fully half the tonnage of bolts, and also an advance on steel bars for the next quarter. Rivets are moving fairly well.

Fluorspar.—Recent sales have been limited to small lots for filling in during the remainder of the year. While prices have not yet been announced for next year, there are indications that the present \$18 price will be named for gravel fluorspar for the first quarter. This is from \$1 to \$2 a ton above the price consumers paid during the last half of this year.

Old Material.—A Cleveland mill has bought 5000 tons of No. 1 heavy melting steel scrap from dealers and producers at about \$16. This consumer requires a grade of scrap that brings a price well above common grades. Dealers are paying \$15.75 against this contract. The market is steady at recent prices without apparent trend in either direction. The only exception is a decline of 50c. a ton on No. 1

busheling, which goes to the Valley district, there being no local demand. Dealers are paying \$11.25 to \$11.50 for blast furnace scrap. Heavy melting steel is bringing \$17 from dealers in the Youngstown district.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.50 to	\$15.00
No. 2 heavy melting steel.	14.00 to	14.50
Compressed sheet steel....	14.00 to	14.50
Light bundled sheet stamp'gs	12.00 to	12.50
Drop forge flashings.....	12.25 to	12.75
Machine shop turnings....	9.50 to	10.00
No. 1 railroad wrought...	12.75 to	13.00
No. 2 railroad wrought...	14.50 to	15.00
No. 1 busheling.....	12.50 to	13.00
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops...	16.00 to	16.50
Low phos., billet, bloom and slab crops.....	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap....	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.....	11.00 to	11.50
Mixed bor'gs and short turn'gs	11.00 to	11.50
No. 2 busheling.....	11.00 to	11.50
Cupola Grades		
No. 1 cast.....	16.50 to	17.00
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable	16.00 to	16.50
Rails for rolling.....	16.25 to	16.50

40, 50 and 60-ft. lengths, and 2.25c., Pittsburgh mill warehouse, for the cut lengths. The Turner Construction Co. has been awarded the general contract on the Jersey City terminal warehouse of the Delaware, Lackawanna & Western Railroad Co., but the bars will be bought direct by the railroad. Business has been very quiet in the past week, with both awards and new projects calling for small tonnages.

Warehouse Prices, f.o.b. New York

Base per Lb.		
Plates and structural shapes.....	3.30c.	
Soft steel bars, small shapes.....	3.25c.	
Iron bars	3.24c.	
Iron bars, Swed. charcoal..	7.00c. to	7.25c.
Cold-fin. shafting and screw stock—		
Rounds and hexagons.....	3.50c.	
Flats and squares.....	4.00c.	
Cold-roll. strip, soft and quarter hard		
Hoop's	5.15c. to	5.40c.
Bands	4.50c.	
Blue ann'd sheets (No. 10) ..	4.00c.	
Long terme sheets (No. 24) ..	3.35c. to	3.90c.
Standard tool steel.....	5.60c. to	5.80c.
Wire, black annealed	12.00c.	
Wire, galv. annealed.....	4.50c.	
Tire steel, 1½ x ½-in. and larger..	5.15c.	
Smooth finish, 1 to 2½ x ¼ in. and larger	3.30c.	
Open-hearth spring steel, bases,		
4.50c. to	7.00c.	
Per Cent Off List		
Machine bolts, cut thread:		
¾ x 6 in. and smaller.....	60	
1 x 30 in. and smaller..	50 to 50 and 10	
Carriage bolts, cut thread:		
½ x 6 in. and smaller.....	60	
¾ x 20 in. and smaller..	50 to 50 and 10	
Coach screws:		
½ x 6 in. and smaller.....	60	
1 x 16 in. and smaller..	50 to 50 and 10	
Boiler Tubes—		
Per 100 Ft.		
Lap welded, 2-in.....	\$17.33	
Seamless steel, 2-in.....	20.24	
Charcoal iron, 2-in.....	25.00	
Charcoal iron, 4-in.....	67.00	

Discounts on Welded Pipe

Standard Steel—		
	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—		
A	AAA	
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to	\$11.00
IC—30-lb. coating.....	12.00 to	13.00
IC—40-lb. coating.....	13.75 to	14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.	
Nos. 18 to 20.....	3.60c. to	3.80c.
No. 22.....	3.75c. to	3.95c.
No. 24.....	3.80c. to	4.00c.
No. 26.....	3.90c. to	4.10c.
No. 28*	4.05c. to	4.25c.
No. 30.....	4.30c. to	4.50c.

Sheets, Galvanized

	Per Lb.	
No. 14.....	4.15c. to	4.35c.
No. 16.....	4.00c. to	4.20c.
No. 18.....	4.15c. to	4.35c.
No. 20.....	4.30c. to	4.50c.
No. 22.....	4.35c. to	4.55c.
No. 24.....	4.50c. to	4.70c.
No. 26.....	4.75c. to	4.95c.
No. 28*	5.00c. to	5.20c.
No. 30.....	5.40c. to	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

New York

Pig Iron Business Continues in Good Volume—Some Sales of Sheets at the New Prices

NEW YORK, Nov. 20.—A steady demand for pig iron is indicated by the week's sales in this district, amounting to over 14,000 tons, and by a good flow of new inquiries. The upward trend of pig iron prices has halted and, if anything, the tone of the market is easier. While the base price of \$18, Buffalo, on foundry iron appears to be holding fairly well, silicon differentials have been waived in some instances. The Thatcher Co., Newark, N. J., has closed for 4000 to 5000 tons, part of which covered a stock of barge iron stored at a New Jersey port. The Farrell-Birmingham Co., Ansonia, Conn., has bought 1500 tons, and the Worthington Pump & Machinery Corporation has concluded purchases against its inquiry for 2605 tons for various plants. The General Electric Co. has placed 175 tons of No. 2X for its Bayway, N. J., plant and is understood to be in the market for other plants. The Newbury Mfg. Co., Monroe, N. Y., is inquiring for 300 tons of foundry iron. Other pending business includes 2000 tons for the remainder of this year and possible additional tonnage for the first quarter, also a lot of 1500 tons for the first quarter and a third lot of 1000 tons for next quarter. Sizable supplementary requirements are indicated by scattered inquiries for smaller ton-

nages for delivery this year. Current demand, however, is mainly for 1929.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$22.91
*Buf. No. 2, del'd east. N. J.	21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	\$21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	22.39 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania. *Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—Quotations for spiegeleisen in carload lots have been advanced \$1 per ton. The 19 to 21 per cent alloy is now quoted at \$34, furnace, with the 16 to 19 per cent quoted at \$33. These quotations are effective at once. Several contracts involving large tonnages for next year's delivery have been renewed at prices which prevailed early this year. In ferromanganese there is some buying of carload and small lots and also further contracting for 1929 delivery, all at \$105, seaboard basis.

Reinforcing Bars.—Distributers in this territory have advanced New York warehouse prices \$1 a ton and are now quoting 2.85c. per lb. for lots of 5 tons or more, 3c. for lots of 2 to 5 tons and 3.25c. for less than 2 tons, all delivered at job. Mill prices are unchanged at 2c., Pittsburgh, for

Sheets and Strips.—Advances of \$2 a ton on all finishes of sheets for first quarter and spot shipment have apparently been general in this district, and there have been a few small sales to cover current needs at the new levels, namely 2.85c. per lb., Pittsburgh, for black, 3.60c. for galvanized, and 2.10c. for blue annealed sheets. Some large consumers are also negotiating for first quarter requirements and mills are generally firm in quoting the new levels. Some opposition to the prices is being encountered in the case of jobbers who are forced to accept a lower discount than was formerly allowed. Specifications came in at a slightly better rate during the last week than in the earlier days of the month, but November business will show a considerable falling off from October unless the last few days of the month prove to be unusually active. Cold-rolled strip is quoted at 2.85c. to 2.95c., Pittsburgh or Cleveland, with the higher quotation obtainable on most of the new business. Demand is not active. Hot-rolled strip is also quiet, with 1.90c. the ruling quotation on widths of more than 6 in. and 2c. obtainable on the narrower widths.

Plates, Shapes and Bars.—Small-lot buyers of bars who are not covered by contract are now paying 2c., Pittsburgh, in almost all cases. Most of the larger buyers are taking regular shipments on contracts which were made at 1.90c. and 1.95c., Pittsburgh. The plate market is quiet, but a good deal of work in pipe lines and shipbuilding is in prospect. The usual price for plates is 2.27½c. per lb., delivered New York, but on sizable orders the quotation is frequently 2.22½c. Small-lot buyers, however, are paying 2.32½c. No large contracts for structural steel have been closed in the week, but mills and fabricators are figuring on a large aggregate tonnage.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Warehouse Business.—Jobbers report a fair volume of buying and prices steady except for continued shading on black and galvanized sheets. Concessions on galvanized sheets range from \$2 to \$3 a ton on desirable orders. Business has improved slightly since election, but the month is not expected to reach the total of tonnage shipped from stock in October.

Cast Iron Pipe.—Northern makers of pressure pipe are maintaining the recent price advance, but the volume of new inquiry continues rather small. Stamford, N. Y., has been accepting bids on about 420 tons of 10-in. Classes A and B water pipe and there is some export inquiry. A large export house dealing with South American markets has asked for prices on 396 metric tons of 4, 6, 8, 10 and 12-in. water pipe and about 15 tons of fittings for Peru, and a New York construction company is reported in the market for about 15,000 tons of pipe for export to South

America. Much of the current domestic business is still limited to small lots to complete installations, such as the purchase by Geneva, N. Y., of about 70 tons of 8-in. water pipe from the McWane Cast Iron Pipe Co.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Consumers in this district using by-product and special beehive brands of foundry coke have in most cases covered their requirements for first quarter or first half of next year. Connellsville producers have adopted a firmer attitude, but desirable tonnages still bring out concessions from the quoted prices. Standard foundry ranges from \$3.50 to \$3.75 per ton, Connellsville, and standard furnace from \$2.85 to \$3.05, Connellsville. Special brands of foundry coke are quoted at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York or Brooklyn. By-product foundry coke prices are \$9 to \$9.40 Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Iron and steel scrap contracts are being completed by brokers, who report no difficulty in obtaining a plentiful supply of material at present prices. New buying by consumers is still limited to small

lots at prices that show a tendency to decline. No. 1 heavy melting steel is being purchased by brokers at \$14 to \$15 per ton, delivered. Yard grade of heavy melting steel is being bought at \$11.75 to \$12 per ton, delivered, but only a small tonnage is moving to consumers on old contracts. Stove plate is quoted at \$12 per ton, delivered to a Phoenixville, Pa., consumer and machine shop turnings at \$11 to \$11.25 per ton, delivered to the same mill. Dealers point out that stocks of scrap on consumers' yards are not large.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.75 to \$12.00
Heavy melting steel (yard)	8.25 to 8.50
No. 1 hvy. breakable cast.	11.25 to 11.75
Stove plate (steel works)	8.50
Locomotive grate bars...	8.75 to 9.25
Machine shop turnings...	7.50 to 7.75
Short shoveling turnings..	7.25 to 7.75
Cast borings (blast furn. or steel works).....	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought...	12.25 to 12.75
No. 1 yard wrot., long....	11.25 to 11.75
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.50
Stove plate (foundry)....	9.50
Malleable cast (railroad)..	10.00 to 10.50
Cast borings (chemical)...	11.25
<i>Prices per gross ton, deliv'd local foundries:</i>	
No. 1 machry. cast.....	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.).....	14.50

Germany Develops Chromium Plating Preliminary Coating of Non-Ferrous Metal on Steel Makes Even Plating and Prevents Chipping Under Stress

HAMBURG, GERMANY, Oct. 20.—Chromium plating has developed more slowly in Germany than in other countries, although German manufacturers are combined in the Chrom-Interessen-Gemeinschaft and are constantly exchanging experimental information with the American Chromium Corporation and British companies. Plating with chromium has not met with great success in Germany, as it is claimed that the plating chips too easily when the steel is undergoing a severe test or is used as a cutting material. It is further stated by the manufacturers who have experimented with chromium-plated steel that it is impossible to determine that all parts of the material being plated will receive a uniform coating of about 1/100 mm. Microscopic tests are said to have proved that the plating on steel varies from 1/80 to 1/150 mm. It is also claimed that chromium suffers decidedly from fatigue, especially when it is plated on steel in constant and regular use.

Experimentation is understood to show that copper and brass, plated with chromium, do not develop the unsatisfactory defects of steel. The plating has been found to range in thickness from 1/95 to 1/105 mm. and does not chip, even when submitted to a severe test. Following recent experiments, steel has been

coated with a thin plating of copper or cadmium, after which it is chromium plated. In this way, chromium-plated steel has been found to meet as severe tests as non-ferrous metals. This treatment increases the cost of production and experiments continue in an effort to cheapen output.

It has also been found that a variety of colors in the chromium plating is obtainable by changing the electric current in the bath. Milky, gray, bright or dull silver plating has been developed, and an effort is being made to produce both red and gold tints by this method.

Makers are understood to be considering the production of wire, coated with cadmium and plated with chromium, to export to the African native trade, which consumes large quantities of copper and aluminum wire in making jewelry, such as arm and leg bands. The cost would be about 50 per cent less than copper or aluminum wire, and its non-corrosive quality should be an attractive feature.

Joseph T. Ryerson & Son, Inc., Sixteenth and Rockwell Streets, Chicago, with plants in a number of large cities, has taken the agency for portable electric tools manufactured by the Millers Falls Co., Millers Falls, Mass.

Pacific Coast

Steel Inquiries More Numerous—Price Situation Firmer— 800 Tons of Plates for Oil Tanks

SAN FRANCISCO, Nov. 17 (*By Air Mail*).—While awards of iron and steel products on the Pacific Coast this week were not heavy, inquiries are more numerous and a considerable tonnage is pending. The outstanding letting called for 800 tons of plates for two additional 134,000 bbl. oil storage tanks for the General Petroleum Corporation at Los Angeles, placed with the Western Pipe & Steel Co. The price situation is somewhat firmer, save in out-of-stock prices on reinforcing steel bars in the Los Angeles and San Francisco districts.

Pig Iron.—Bids were opened this week on 300 tons of No. 2 foundry iron for the Quartermaster Supply Officer at Fort Mason, San Francisco, but no award has been made. A shipment of several hundred tons of Indian pig is due to arrive on the Coast the latter part of this month. Imports of iron in August totaled 2383 tons.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—The largest letting called for 225 tons for a hotel at Santa Cruz, Cal., booked by the Truscon Steel Co. An award of 1800 tons for the Life Science Building at Berkeley will be made within a few days. Pending business exceeds 7000 tons. Imports of bars during August totaled 2388 tons, compared with 3615 tons for the previous month and 3638 tons for August a year ago. Out-of-stock quotations on reinforcing bars continue at 1.80c., base, in San Francisco and Los Angeles districts. Merchant bars appear to be firm at 2.30c., c.i.f. Coast ports.

Plates.—In addition to two 134,000 bbl. tanks for the General Petroleum Corporation, Los Angeles, requiring 800 tons, awarded to the Western Pipe & Steel Co., the Llewellyn Iron Works secured 370 tons for a 40-in. pipe line for Los Angeles; the Pacific Coast Engineering Co. booked 185 tons for 20-in. shore pipe for the United States Engineer office, San Francisco, and the Bethlehem Shipbuilding Corporation took 340 tons for

two barges and one tug boat, the tug boat and one barge being for the Inter-Island Steam Navigation Co., Honolulu. Bids were opened this week on 550 tons for a 24-in. riveted pipe line at Seattle. Vancouver, B. C., will open bids on Dec. 11 for 125 tons of 18-in. pipe. Prices continue firm at 2.25c., c.i.f., as a minimum.

Shapes.—The California Steel Co. was awarded 103 tons for a factory in Oakland and the Bethlehem Shipbuilding Corporation booked 106 tons for a barge for the Inter-Island Steam Navigation Co., Honolulu. Inquiries include 1500 tons for an apartment in San Francisco and 425 tons for a saw mill for the Weyerhaeuser Lumber Co. in Washington. Imports in August totaled 1745 tons, compared with 1428 tons in July and 3067 tons in August, 1927. Of the total, 1418 tons was taken by San Francisco fabricators. Plain domestic shapes are firm at 2.35c., c.i.f., while foreign shapes are about 1.60c., c.i.f., duty paid.

Cast Iron Pipe.—Little improvement in demand for cast iron pipe has oc-

curred recently, and awards this week did not exceed 600 tons. Phoenix, Ariz., placed 164 tons of 2 to 12-in. Class B pipe with an unnamed maker. Watson & Sutton took 106 tons of 4 to 10-in. Class B pipe for the improvement of Turquoise Street, San Diego, and L. Coluccio took 305 tons of 30-in. Classes A and B pipe for the improvement of East Olive Street, Seattle. Bids were opened this week on 1640 tons of 24-in. Class B pipe for Seattle, and on 111 tons of 12-in. Class B pipe for Aberdeen, Wash. The only new inquiry of importance calls for 548 tons of pipe for the improvement of Arlington Street, Los Angeles, bids on which will be opened Dec. 3. During August 2174 tons of pipe was imported on the Coast, compared with 4135 tons in the preceding month and 4211 tons in August, 1927.

Steel Pipe.—Bids were opened this week on 102 tons of ¾-in. and 1-in. galvanized pipe for Los Angeles. No outstanding pipe line tonnages are up for figures. Imports of tubular products in August were 3833 tons, compared with 2157 tons in July and 1794 tons in August a year ago.

Coke.—A shipment of 4000 to 5000 tons of English by-product and bee-hive coke is due to arrive late this month. Coke importations in August totaled 10,543 tons, compared with 4659 tons in July and 8115 tons in August a year ago.

St. Louis

Pig Iron and Scrap Markets Continue Strong—Sheet Mills Active—10,000-Ton Rail Order Placed

ST. LOUIS, Nov. 20.—Sales of pig iron by the St. Louis Gas & Coke Corporation during the last week totaled 8700 tons, including 5000 tons of basic to an East Side melter for shipment during the remainder of 1928 and 2000 tons of malleable to a northern Illinois melter and 3700 tons of foundry iron for first quarter shipment. Of the foundry iron, a Kansas melter and a local machinery manufacturer took 500 tons each, and 400 tons will go to a northern Illinois consumer. The melt in the district continues heavy, with especial activity by car building, implement and stove interests, the latter enjoying one of the best seasons in years. The Granite City maker is now quoting malleable iron 50c. a ton higher than the foundry grade. That company expects to blow in on Dec. 1 its second furnace, which has been idle several months for relining and other repairs. Southern makers have opened their books for first quarter at an advance of 25c. a ton.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.	
Granite City, Ill.	.....	\$20.00
Malleable, f.o.b. Granite City	.....	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	.....	22.16
Southern No. 2 fdy., deliv'd	.....	20.92
Northern malleable, deliv'd	.....	22.16
Northern basic, deliv'd	.....	22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—The Granite City Steel Co. has advanced sheet prices \$2 a ton, in line with similar action by Chicago and Eastern mills. While the demand for sheets has fallen off since the first of the month, the Granite City company has sufficient bookings to operate its sheet mills at full capacity. Five of the steel company's 20 tin mills are down for repairs. Business in tank plates is dull. Warehouse business is about on a par with last week's volume. Struc-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	 3.25c.
Bars, soft steel or iron	 3.15c.
Cold-fin. rounds, shafting, screw stock	 3.75c.
Black sheets (No. 24)	 4.10c.
Galv. sheets (No. 24)	 4.95c.
Blue ann'l'd sheets (No. 10)	 3.45c.
Black corrug. sheets (No. 24)	 4.15c.
Galv. corrug. sheets	 5.00c.
Structural rivets	 3.75c.
Boiler rivets	 3.75c.

Per Cent Off List

Tank rivets, ¾-in. and smaller, 100 lb. or more	 65
Less than 100 lb.	 60
Machine bolts	 60
Carriage bolts	 60
Lag screws	 60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	 3.15c.
Soft steel bars	 3.15c.
Small angles, ¾-in. and over	 3.15c.
Small angles, under ¾-in.	 3.55c.
Small channels and tees, ¾-in. to 2 ¾-in.	 3.75c.
Spring steel, ¼-in. and thicker	 5.00c.
Black sheets (No. 24)	 5.00c.
Blue ann'l'd sheets (No. 10)	 4.00c.
Galv. sheets (No. 24)	 5.40c.
Struc. rivets, ½-in. and larger	 5.65c.
Com. wire nails, base per keg	 \$3.40
Cement c't'd nails, 100 lb. keg	 3.40

tural fabricators are operating on a large number of small orders.

Rails and Track Supplies.—The Missouri-Kansas-Texas has bought 10,000 tons of 90-lb. rails for 1929 from the Inland Steel Co., Bethlehem Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co. The Wabash has issued an inquiry for its rail requirements for 1929, but no tonnage is stated.

Old Material.—As the result of orders for railroad cars being placed or in prospect, purchases of a limited tonnage of specialties and rails were made during the week by several companies. However, mills and dealers cannot agree on prices, some mills endeavoring to buy old material at the market prevailing 30 days ago. Advances of 25c. a ton were made this week on miscellaneous standard-section rails, railroad springs, railroad malleable and rails for rolling. Railroad lists include: Southern, 8200 tons; Chicago & Alton, 1165 tons; In-

ternational Great Northern, 620 tons; New Orleans & Great Northern, 100 tons, and Nickel Plate, 34 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel.....	12.25 to 12.75
No. 1 locomotive tires....	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart....	15.00 to 15.50
Railroad springs.....	16.00 to 16.50
Bundled sheets.....	9.50 to 10.00
No. 2 railroad wrought....	13.25 to 13.75
No. 1 busheling.....	9.50 to 10.00
Cast iron borings.....	8.75 to 9.25
Iron rails.....	13.50 to 14.00
Rails for rolling.....	15.50 to 16.00
Machine shop turnings....	9.00 to 9.50
Steel car axles.....	19.00 to 19.50
Iron car axles.....	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought....	12.00 to 12.50
Steel rails, less than 3 ft..	17.50 to 18.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.00 to 14.50
No. 1 machine cast.....	15.50 to 16.00
Railroad malleable.....	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate.....	12.50 to 13.00
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Cincinnati

Alabama and Tennessee Iron Up 25c—Jackson County Silvery Advanced \$2—Scrap Declines

CINCINNATI, Nov. 20.—Interest in the pig iron market centers in the upward trend of prices. Alabama and Tennessee makers have advanced quotations 25c. a ton to \$16.50, base Birmingham, and there is a possibility of a further increase of 50c. Closely following the announcement by Southern producers has come an advance of \$2 a ton on all grades of Jackson County silvery iron and Bessemer ferrosilicon, the new schedule specifying a price of \$27, base Jackson, for 8 per cent. Pig iron sales in the past week totaled about 5000 tons, divided almost equally between Northern and Southern iron. Bookings included 2000 tons of Northern foundry for an Indiana melter, 500 tons for each of two Ohio consumers, and 600 tons for a central Ohio company. The growing number of inquiries indicates that many buyers are watching the market closely to prevent the necessity of paying higher prices for first quarter requirements. Pending business includes 5000 tons of foundry for a central Indiana company, 800 tons for a local melter and 700 tons for a Greenville, Ohio, company. Reports are that the Marting Iron & Steel Co., Ironton, Ohio, will blow in a blast furnace soon to convert into pig iron a considerable quantity of ore remaining on its yards. If this furnace is put into operation, it is likely to be for only a short run. Southern Ohio foundry iron remains nominally at \$18.50, base Ironton.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25.....\$20.39
Ala. fdy., sil. 1.75 to 2.25..... 20.19
Ala. fdy., sil. 2.25 to 2.75..... 20.69
Tenn. fdy., sil. 1.75 to 2.25..... 20.19
S'th'n Ohio silvery 8 per cent..... 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—By-product foundry coke specifications continue to lag considerably behind those of October. The curtailment of demand is partly attributed to a reduction in the melt of foundries associated with the automobile industry, although lessened requirements by consumers are reported to be rather general. Domestic grades are moving in liberal volume. Wise County beehive foundry coke is quoted at \$4.25 to \$5.25, ovens, with furnace coke selling at \$3.50. New River beehive foundry coke is firm at \$6 to \$6.50, ovens.

Finished Material.—Steel sheet specifications turned upward the past week, with the result that mills in this district added somewhat to their unfilled tonnage. Much of the business came from automobile companies, which again are releasing substantial shipments. However, bookings from other sources also have been satisfactory and mill operations are being sustained at practically 100 per cent

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops.....	4.00c. to 4.25c.
Bands.....	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.....	\$18.00
4-in.....	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.....	39.00

of capacity. The American Rolling Mill Co. has announced an advance of \$2 a ton on all grades of sheets, the new schedule calling for 2.10c., base Pittsburgh, on blue annealed; 2.85c. on black; 4.10c. on automobile body stock, and 3.60c. on galvanized. Makers of cold-rolled strip steel are asking 2.85c. to 2.95c., base Pittsburgh or Cleveland, while hot strip steel is on a basis of 1.90c., Pittsburgh, for material from 6 to 24-in. wide. Structural steel fabricating shops are in need of work, recent lettings having been small. Bars, shapes and plates are being sold in carload lots at 2c., base Pittsburgh, but larger tonnages are being taken at \$1 a ton less.

Old Material.—Heavy melting steel has declined 25c. a ton and other items have dropped 25c. or 50c. Despite the downward trend of prices, dealers are of the opinion that quotations will remain close to their present level during the remainder of the year on account of the high rate of consumption by steel plants and other users of scrap.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting....	13.25 to 13.75
Loose sheet clippings.....	9.50 to 10.00
Bundled sheets.....	10.25 to 10.75
Cast iron borings.....	9.50 to 10.00
Machine shop turnings....	9.00 to 9.50
No. 1 busheling.....	10.75 to 11.25
No. 2 busheling.....	6.25 to 6.75
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought....	13.00 to 13.50
Short rails.....	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	14.75 to 15.25
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	14.00 to 14.50
Agricultural malleable....	13.00 to 13.50

Detroit

Automobile Production Declines

DETROIT, Nov. 20.—The dropping off in automobile production in the Detroit area is having its effect on industry in general and on steel bookings in particular.

The labor barometer, which is a statement of the combined payrolls of representative firms constituting two-thirds of the city's industrial population, shows a decrease this week of 1936, with a present total of 297,737. Over the last four weeks, all of which showed a decrease, the average is found to be about 3400 per week. The present total, however, is still very much higher than that of a year ago, which was 194,301.

October shipments of the Buick Motor Car Co. set a new record, at 28,614, a gain of 1814 units over the previous month.

W. S. Knudsen, president Chevrolet Motor Car Co., in announcing the new six-cylinder model, estimates full production by Dec. 15. The schedule for December is tentatively set at 32,000 units. This will be increased in January to 104,000 units. Mr. Knudsen estimates that 1929 production will amount to 1,500,000 units.

The Chrysler Corporation in October sold 60,000 cars, which sets an all-time record. For the remainder of the season, however, it is expected that a reduction in the production rate will be ordered.

The Ford Motor Co. has reached a daily production rate of 6000 units, an increase of approximately 500 per day over the September figure. Total production for October was 106,404 units.

Graham-Paige set a record in October, with production of 4921 units.

The Hupp Motor Car Co. turned out 4129 cars in October, setting a new record.

The Oakland Motor Car Co.'s production for October was 17,232 cars, 1614 units greater than in the same period a year ago.

The Olds Motor Works shipped 7288 units during October, an increase of 73 per cent over the same figure of a year ago.

The Packard Motor Car Co. shipped 5802 cars in October, setting a new record and surpassing the figure of 5001, made in August of this year. The November schedule is 5500 units.

The Reo Motor Car Co. is preparing to introduce a new model, which in price range will drop in just under the Flying Cloud. It is stated that this car is to be built on entirely new

lines. Public announcement, however, will probably not be made before the middle of next month.

The Continental Motors Corporation is maintaining its high production schedules this month, and the same rate will probably be continued during December. This is the result of a large increase in demand for automobile motors and a standing order for 1000 crankshafts per day for the Ford Motor Co. T. M. Simpson, secretary of the company, believes that 1929 will surpass 1928 production.

The pig iron melt in the district is showing a slight tendency to decrease, owing to the seasonal slowing up in production among automobile producers. This will probably be offset in December with the bringing out of several new models by large makers.

Scrap prices are the same as quoted a week ago.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast.....	19.00 to 20.50
Hydraul. comp. sheets....	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 bushelings	10.50 to 11.00
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

Old Material.—Buying is still in scattered lots. There has been some improvement in sales of steel scrap and No. 1 cast in the last few days. Prices are unchanged. Shipments to consumers are increasing.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails	\$12.00 to 12.50
Short shoveling turnings...	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Canada

Car Orders Stimulate Demand for Steel

TORONTO, ONT., Nov. 20.—The placing of more than \$20,000,000 worth of rolling stock orders by the two leading Canadian railroads has had a stimulating effect on steel business. Steel mills, foundries and other companies will benefit by the railroad buying. Large orders have been placed for sheets by Canadian automobile plants. Foundries have closed contracts that will keep them busy well into the new year. Considerable business in wire and chain rods is pending. Sales of these products this year have reached new high levels. Belgian wire rods are less prominent in the Canadian markets this year than in recent years.

Pig Iron.—Foundries are taking keen interest in the market, and new inquiries have recently appeared from a number for foundry and malleable iron for spot and future delivery. Sales for the week were larger than those of several past weeks. Some inquiry for first quarter is appearing, but so far producers are not encouraging business beyond the end of the year. While there has been no change in Canadian pig iron prices, shading has disappeared, and there are strong possibilities that the Canadian quotation will be at least \$1 per ton higher for first quarter.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00

Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Canadian fabricators report a steady flow of new orders. The Manitoba Bridge & Iron Works, Winnipeg, Man., has received an order for 1500 tons of structural steel from the Canadian National Railways for bridge construction. Business pending includes 2000 tons for the Hudson Bay Co. store at Calgary, Alta.; 250 tons for technical school at Oshawa, Ont.; 5000 tons for

Birmingham

Southern Pig Iron Advanced 25c. Per Ton—Ensley Rail Mill to Resume Operations

BIRMINGHAM, Nov. 20.—Merchant producers of pig iron opened their books on Nov. 15 for first quarter at the base price of \$16.50 for No. 2 foundry. This advance of 25c. per ton is effective on sales for iron to be delivered during the remainder of the year as well as for first quarter. There has been no buying rush for first quarter iron, but furnace interests report several orders in round tonnage. The advance was not as large as was generally expected, and another increase before the end of the year is predicted by some. Very little iron has been stocked so far this month. No change in furnace operations has occurred during the past three weeks. Eighteen furnaces are in blast, of which 13 are on foundry, four on basic and one on ferromanganese. Work has been completed on the new No. 1 city furnace of the Sloss-Sheffield Steel & Iron Co., but no date has been announced for its operation.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$16.50
No. 1 fdy., 2.25 to 2.75 sil.....	17.00
Basic	16.50

Finished Steel.—The Ensley rail mill of the Tennessee company will resume operations on Nov. 24. One of its largest orders is 65,000 tons of 100-lb. rails for the Louisville & Nashville, reported in these columns several weeks ago. Bookings of bars, plates and shapes during the first half of November have been up to the high

volume of the last half of October. Mill schedules in all departments are heavier than at any time in the past several seasons. Buyers are protecting themselves a little farther ahead in some lines, owing to the lengthening of deliveries. Quotations continue firm and unchanged. Fabricated structural steel plants report only one new order above 100 tons, 200 tons booked by the Southern Steel & Rolling Mill for the American Cast Iron Pipe Co. Reinforcing bar orders have been light for the past two weeks. The Alabama highway department will open bids on Nov. 26 for 487 tons of reinforcing steel. Open-hearth operations are unchanged; the Tennessee company has seven active at Fairfield and five at Ensley and the Gulf States Steel Co. four at Alabama City.

Cast Iron Pipe.—The market is quiet and shows no indications of improvement before the end of the year. Plants are operating at about 50 per cent of capacity. The volume of shipments has dropped a little, but is still fairly good for this season. Makers are holding closely to the new base prices of \$37 to \$38 on 6-in. and larger sizes.

Coke.—Requisitions on contracts are fairly good, but new business is quiet. First quarter requirements were well covered in the buying movement several weeks ago. Domestic coke sales have improved slightly. Quotations are unchanged; \$5 is the base for both spot and contract.

Montreal University building at Montreal, Que.; 2500 tons for hotel building at Government and Belleville Streets, Victoria, B. C. Several large building projects recently announced for Toronto, including an addition to the T. Eaton Co. store, the Canadian Bank of Commerce Building and others, bring the total prospective demand for structural steel in this city alone to well over 25,000 tons.

Old Material.—Mills, foundries, sanitary ware and radiator makers, electric furnaces and various other consumers are showing keen interest in the market and their orders are increasing both in number and quantity. The demand affects practically all grades of scrap. Dealers are buying more extensively both for yard stocks and direct shipment to consumers. Bidding has been keen for a supply of scrap offered by the Toronto Electric Commission. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel....	\$9.50	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast....	16.00	13.00
Stove plate	13.00	13.00
Standard carwheels	16.00	
Malleable	13.00	
Per Net Ton		
No. 1 machinery cast....	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Butler Mfg. Co. Begins Aircraft Production

The Butler Mfg. Co., Kansas City, Mo., fabricator of sheet steel products and long identified with the aircraft industry through the manufacture of steel hangars and other airport equipment, has announced the formation of the Butler Aircraft Corporation to act chiefly as a selling organization for the airplanes and airplane equipment to be manufactured by the parent company. A large section of the company's plant in Kansas City has been set aside for the new manufacturing division, and production on two types of planes has already begun. Later the company expects to bring out other types of planes and accessories, with all-metal craft as the final development.

In commenting upon the new company, E. E. Norquist, president and general manager of the Butler organization, stated that the company's "early experience with airplane transportation, its contact with the aircraft industry and the trend toward a wider use of metal in aircraft construction all were important factors in prompting its entry into the manufacture of airplanes."

Boston

Pig Iron Firm—Scrap Sales Fall Off, with Some Recession in Prices

BOSTON, Nov. 20.—Pig iron sales the past week totaled 8000 tons. In the absence of open inquiries for attractive tonnages, prices appear firmer. Eastern Pennsylvania iron has been marked up 50c. a ton. Buffalo furnaces are maintaining their recent price advance. Other New York State iron and Mystic iron are firmly held at delivered prices equivalent to those on Buffalo iron.

Finished Material.—Indications are local steel mill representatives will book a slightly larger tonnage of finished material this year than in 1927 despite the fact that New England railroads have bought less material this year and that a large tonnage going into New England-made parts for Ford cars has been purchased outside these States. With the exception of shapes, all kinds of material will show an increase. The market on steel bars is 1.95c. to 2c. per lb., base Pittsburgh. Standard shapes are generally 1.95c. to 2c. per lb, Pittsburgh base, but on a large tonnage 1.90c. undoubtedly could be done.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.91
*Buffalo, sil. 2.25 to 2.75..	23.41
†Buffalo, sil. 1.75 to 2.25..	21.78
†Buffalo, sil. 2.25 to 2.75..	22.28
East. Penn., sil. 1.75 to 2.25..	\$24.15 to 24.65
East. Penn., sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.27
Ala., sil. 2.25 to 2.75.....	23.91 to 25.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate. †Rail and water rate.

Coke.—Foundry coke specifications are increasing, indicating a larger iron melt. The New England Coal & Coke Co., the Providence Gas Co. and the Koppers Co.'s New Haven, Conn.,

subsidiary all quote \$11 a ton, delivered within a \$3.10 freight rate zone. Warm weather the past week caused a drastic slump in retail buying of domestic coke, yet there was no check in the movement from ovens to yards. New England ovens are still meeting stiff competition from plants located elsewhere.

Old Material.—A further recession in the movement of old material out of New England is noted. Prices for specification pipe, T and girder rails and mixed borings and turnings have declined. The market for forge scrap is firmer on buying for shipment to a Worcester consumer. Exports of scrap is still held up by a scarcity of steamship space.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$10.50 to \$11.00
Scrap T rails.....	10.00 to 10.50
Scrap girder rails.....	9.00 to 9.50
No. 1 railroad wrought....	11.00 to 11.50
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings....	6.00 to 6.50
Cast iron borings (steel works and rolling mill).	6.00 to 6.50
Bundled skeleton, long....	9.00 to 9.25
Forge flashings	9.50 to 9.75
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	7.00 to 7.25
Shafting	14.50 to 14.75
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling.....	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

Structural Steel Shipments Make New Record

WASHINGTON, Nov. 20.—Orders for fabricated structural steel in October totaled 184,643 tons, or 64 per cent of the monthly capacity of 290,290 tons of the 198 firms reporting to the Department of Commerce. Computed bookings were 240,000 tons. The actual bookings reported were the smallest since January, when the total was 172,284 tons, while the computed orders were the smallest since April, with a total of 236,250 tons. Actual bookings reported in September amounted to 256,811 tons, or 85 per cent of the capacity of the 221 reporting firms, while computed bookings were 318,750 tons.

Computed shipments in October were 330,000 tons, or 88 per cent of estimated total capacity of 375,000 tons for the entire industry. The October computed shipments established a record since the Department began keeping such figures in 1924. Computed bookings for the 10 months ended October totaled 2,797,500 tons, against 2,568,750 tons for the corresponding period of last year, while computed shipments were 2,625,000 tons and 2,407,500 tons respectively.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Buffalo

Pig Iron Sold at Recently Advanced Prices—Scrap Slightly Weaker—Steel Mills Busy

BUFFALO, Nov. 20.—Pig iron inquiries in this district totaled between 6000 and 7000 tons. A good deal of iron has been purchased without the formality of an inquiry by melters, who seem convinced the market is firm at present prices. One of the inquiries was for 2500 tons of foundry and malleable; another for 1500 tons of foundry and another for 1000 tons of foundry, all from points eastward. The quotation of \$18, Buffalo, for No. 2 plain for delivery outside this district is being maintained and the malleable for similar delivery is being held at \$18.50. For district delivery \$18.50 is being adhered to for No. 2 plain. Furnace operations are unchanged. Ten furnaces are in blast.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—A high rate of operation is being maintained by district mills. Bar and shape prices are firm; specifications are good. Sheets show firmness at the new prices, and bookings assure heavy operation for some weeks. Reinforcing bar business has dropped off; the price is 2.515c., warehouse. Wire sales are keeping mill operations at 75 per cent. Warehouse business has improved steadily.

Old Material.—A small tonnage of No. 1 heavy melting steel was purchased by one of the principal users the past week at a price said to have been \$16.50, or 50c. under its larger purchases of a month ago. This is the price also being offered by dealers for delivery to the buyer. Shipments to this interest are still being regulated, but the restrictions are not so severe. Important purchasing by two of the largest plants in the district is expected within a week or two. During the past week there have been some sales of knuckles and couplers and steel car wheels at \$17.50 and a few small sales of No. 1 machinery cast at \$15.75 to \$16. The out-of-town market is not quite so strong and this is reflected in the local market. A smaller demand from Youngstown and Pittsburgh has created a larger supply of No. 2 steel in particular, the

shortage of which has been felt in this district. A blast furnace interest came into the market during the week for borings and turnings, paying \$11 to \$11.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$15.50 to \$16.50
No. 2 heavy melting steel.	14.25
Scrap rails	15.50 to 16.00
Hydraulic comp. sheets	14.25
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	13.50 to 14.00
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	14.50 to 15.00
Acid Open-Hearth Grades	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	11.00 to 12.00
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	17.50 to 18.00
Cast iron car wheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Department of Commerce to Test Airplane Joints

WASHINGTON, Nov. 20.—A comprehensive investigation of the strength and other properties of all the joints and fittings entering into the construction of the airplane from the standpoints of both safety and efficiency in design has been undertaken by the Aeronautics Branch, Department of Commerce, according to the annual report of the director of aeronautics. It is pointed out that the fuselage of many modern airplanes is constructed of seamless steel tubing welded at the joints and that an accurate knowledge of the strength and other properties of the joints and fittings is essential. Copies of the program, including blue prints of all the proposed joints, were sent to aircraft manufacturers and designers. Comments and criticism were invited.

The replies showed much interest in the investigation and contained many practical suggestions as to additions and modifications to be made in the program. The program includes 134 different joints. In addition to specimens made by cutting and fitting the tubes closely, then welding the joint, a number of joints are

included in which reinforcing members of various kinds are used. The material used for the most of the specimens will be chrome-molybdenum steel. The welding is done in a special jig adjustable to fit any proposed specimen. In order that the operation of making the weld may be uniform for all joints, a procedure control prepared by the American Bureau of Welding will be followed. By systematically varying the design of the joints and noting the effect on the strength, weight, and cost the most efficient types of joints will be determined.

Fuller & Johnson Mfg. Co. Under New Ownership

Second Ward Securities Co., and the Quarles Co., associated investment security concerns of Milwaukee, have announced the purchase of the Fuller & Johnson Mfg. Co., Madison, Wis., manufacturer of farm engines and small industrial power units up to 20 hp. The capital structure of the concern, the assets of which are valued at \$1,000,000, is being changed to 66,000 shares of common stock without par value, in addition to which there is a first mortgage bond issue of \$290,000. Executive personnel and management will remain virtually unchanged, C. L. McMullen continuing as president. The directorate will be enlarged to include representatives of the securities companies as well as of the Waukesha Motor Co., Waukesha, Wis., which is identified with the transfer. The Fuller & Johnson company for some time has operated under license from the Waukesha company in using the Ricardo high-turbulence cylinder head for internal combustion engines. The Waukesha concern manufactures motor truck, tractor and industrial power units from 25 hp. upward. While the Madison concern will continue to build farm engines, it will greatly develop its line of small industrial engines, supplementing the heavier line made by the Waukesha company. Origin of the Fuller & Johnson company dates back to 1840.

New Chromium Plating Plant Ready

The Chromium Engineering Corporation of America, with executive offices at 246 Fifth Avenue, New York, announces that its large chromium plating plant at 132-134 West Twenty-second Street, New York, will be open and ready for business Nov. 26. Equipment and facilities large enough to chromium plate anything from a pin to automobile bumpers, radiators, shells, etc., have been provided. It is the intention to handle the chromium plating work for manufacturers and job shops who are not ready to instal their own plating plant. The plant will be operated 24 hr. a day to insure prompt delivery.

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100 lb.	3.75

Non-Ferrous Metal Markets

Copper Moderately Active and Firm, Tin Sales Large, Lead Steady with Zinc Quiet and Unchanged

NEW YORK, Nov. 20.

Copper.—Buying by domestic consumers has been fairly active the past week, the principal delivery involved being January and February. Some consumers are also buying considerable December metal, which is regarded as an indication that consumption is increasing, because recently it was thought that they had overbought. There is some interest in March metal, but practically none has been sold. Producers generally are unwilling to sell this position at this time, unless combined with February metal to regular customers. Foreign buying is moderately active, with France and England taking up the slack caused by the strike in the Ger-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.00c. to 10.00c.
Antimony, Asiatic	12.50c. to 13.50c.
Aluminum No. 1 ingots for re-melting (guarnt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	55.75c.
Tin, bar	57.75c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig.....	6.85c. to 7.10c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	59.25c.
Solder, ½ and ½	33.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods.....	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 20	Nov. 19	Nov. 17	Nov. 16	Nov. 15	Nov. 14
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	51.12½	50.37½	.....	50.12½	50.00	50.05
Lead, New York.....	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis.....	6.17½	6.15	6.15	6.20	6.20	6.20
Zinc, New York.....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

man metal trades. Prices continue firm at 16c. for electrolytic copper delivered in the Connecticut Valley and at 16.25c. c.i.f. usual European ports. The Lake copper market is very quiet but firm at 16.12½c., delivered.

Tin.—At 1200 tons sales were fairly large for the week ended Saturday, Nov. 17. The deliveries named were all the way from spot to June. Consumers were quite active in their purchases of spot and distant deliveries, while dealers took the intermediate positions, including November and December. Yesterday the market was again active, with consumers taking about 500 tons, and today buying has been fairly liberal, with 400 to 500 tons changing hands. The announcement of the price of tin plate has been one cause of the greater activity on the part of consumers, it usually being their custom to buy after this matter

is settled. Spot Straits tin today was quoted at 51.12½c., New York, and London prices were about £2 per ton higher than a week ago, with spot standard quoted £231 17s. 6d., future standard at £227 15s. and spot Straits £232. The Singapore price today was £230 10s. Arrivals thus far this month have been 2550 tons with 6040 tons afloat.

Lead.—Producers report a good volume of sales, particularly in the West where prices are a little easier. Yesterday lead changed hands at 6.15c., St. Louis, but today the market is firmer at 6.17½c. December delivery is principally involved. Large interest centers in the formation last week of the Lead Industries Institute and the effect this may have on steadying the market.

Zinc.—This market is featureless with buying reported as moderately

Non-Ferrous Rolled Products

Mill prices on lead full sheets, having remained at one level since May 29, were advanced ¼c. per lb. on Nov. 15, and are now quoted at 10.25c. to 10.50c., base. Prices on brass and copper products and zinc sheets have not changed.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.

Seamless Tubes—

High brass	25.37½c.
Copper	26.37½c.

Rods—

High brass	18.25c.
Naval brass	20.25c.

Wire—

Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	9.875c.
No. 1 red brass or compos. turnings..	9.50c.	10.50c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	20.50c.	
Copper, hot rolled	25.00c.	
Copper, cold rolled, 14 oz. and heavier	27.25c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	26.87½c.	
Copper	27.87½c.	
Brass Rods	18.25c.	
Brazed Brass Tubes.....	28.50c.	

active the past week or so. Quotations continue remarkably firm at 6.25c., East St. Louis, or 6.60c., New York, for prime Western for delivery into January and possibly into the first quarter. The price of ore at Joplin was unchanged Saturday at \$40 per ton and statistically the market has slightly improved. For the third successive week the output was 11,000 tons and shipments were larger at over 12,800 tons.

Antimony.—Chinese metal in a very quiet market is quoted today at 10.25c., duty paid, New York, for all positions.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99

per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 20.—Spot sales of tin are in good volume and purchases of copper are active. Prices for tin are higher. The old metal market is steady and sales are moderately active.

Prices, per lb., in carload lots: Lake copper, 16.75c.; tin, 51.12½c.; lead, 6.25c.; zinc, 6.35c.; in less-than-carload lots; antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c. aluminum, 12c., all being dealers' prices for less-than-carload lots.

World Trade Passes Pre-War Volume

Exports of 82 Countries Expanding at One-Half Ante-Bellum Rate

EUROPE has increased its foreign trade more rapidly than any other quarter of the world during the last two years and has now made up all but 10 per cent of the volume of export trade it carried on in 1913. Export growth throughout the world, according to the National Foreign Trade Council, represents a resumption of progress at a little more than half the pre-war rate of increase.

Exports in 1927 for 82 nations conducting 95 per cent of the world's trade, the council states, amounted to \$22,664,000,000 at the 1913 value of the dollar. This figure is about half of what the world's trade would have amounted to had its normal growth been uninterrupted by the war. Between 1900 and 1913 these nations made an annual average growth in exports of 6½ per cent, which would have made their exports last year in normal circumstances a little more than \$44,000,000,000 at the 1913 dollar valuation. The accumulated sum by which the world's exports have, during the past 14 years, fallen short of this normal progress is estimated at about \$145,000,000,000 in 1913 dollars, or more than \$200,000,000,000 today. This total, more than 10 times the debt of the United States, is the cost to world trade of the economic dislocation that accompanied and followed the Great War.

Two years ago the council called attention to the fact that in 1925 for the first time since the war international trade, as measured in exports, had surpassed its volume for 1913. The combined nations, other than the United States, had then made a gain of about 4 per cent, while the United States had made an advance of over 31 per cent.

The figures for 82 nations now disclose an even more satisfactory picture for 1927. They show a real growth of 11 per cent in exports over 1913 for the rest of the world and a

gain of 38 per cent for the United States.

As was inevitable, the recovery of the European nations, now in full swing, has stimulated their exports at a more rapid rate than our own during the last two years. The 27 nations of Europe gained 10 per cent in exports during this interval and have practically attained again the momentum of their pre-war growth. The United States gained about 5 per cent between 1925 and 1927. The significant fact is, however, that the world as a whole, with a real export increase of 6 per cent during the two years, definitely embarked on a new growth in international trade at about half the rate of progress it made before the war.

New Weirton Open-Hearth Ready for Operation

The Weirton Steel Co. has completed and is drying out its No. 12 open-hearth furnace, a 300-ton unit, which will be started early next month. The addition of this furnace will give the company an annual ingot capacity of 1,250,000 tons.

Fabricated Plate Orders Unusually High

WASHINGTON, Nov. 20.—Aggregating 60,482 tons, or 75.7 per cent of the monthly capacity of the 51 concerns reporting to the Department of Commerce, orders for fabricated steel plate in October were the highest since March, 1923, when they amounted to 72,509 tons, or 89.3 per cent of capacity, the highest on record since the Department of Commerce has been receiving the figures. The next highest total was in January, 1923, with orders for 62,892 tons, or 77.5 per cent of capacity.

Of the October orders, 23,960 tons

was for oil storage tanks; 3527 tons for refinery materials and equipment; 1804 tons for tank cars; 1861 tons for gas holders; 2435 tons for blast furnaces, and 26,895 tons for stacks and miscellaneous purposes.

Orders in September totaled 40,281 tons. For the 10 months ended with October bookings were 444,339 tons, or 55.9 per cent of capacity, against 434,708 tons, or 54 per cent of capacity, for the corresponding period of last year.

Freight Rate Decisions

WASHINGTON, Nov. 20.—Rates on iron and steel sheets and plates, in carloads, from Middletown, Ohio, to destinations in Missouri, Oklahoma, Arkansas and Louisiana are not unreasonable or unduly prejudicial, according to a decision made public last Saturday by the Interstate Commerce Commission, which ordered dismissal of a complaint by the American Rolling Mill Co. Present rates from Middletown are from 3c. to 6.5c. per 100 lb. higher than those applicable from Cincinnati, while the rates prescribed in the Southwestern cases are from 4c. to 5c. higher.

The rate on pig iron, in carloads, from Duluth, West Duluth, Minn., and Superior and Ashland, Wis., to Lincoln, Neb., was reduced to \$5.27 per gross ton, minimum 60,000 lb. per carload, from \$5.71, minimum 49,280 lb., in a decision of the Interstate Commerce Commission, made public last Saturday. Reparation was also awarded to the complainant, the Cushman Motor Works, Lincoln. The new rate is to become effective Jan. 10.

Mackintosh-Hemphill Will Build Plant in Ohio

The Mackintosh-Hemphill Co., Pittsburgh, has placed a contract with the Hughes-Foulkrod Co., Pittsburgh, for the construction of a new plant at Wooster, Ohio. When completed, it will house the heavy equipment formerly located in the Pittsburgh plant on Twelfth Street, which was sold a few months ago to the Pennsylvania Railroad for increased terminal facilities. The new building will be of steel frame construction and will require approximately 400 tons of structural steel.

As a final step in the consolidation of the Bucyrus Co., South Milwaukee, with the Erie Steam Shovel Co., Erie, Pa., under the title of Bucyrus-Erie Co., it is announced that the sales offices of the Erie division are being transferred to South Milwaukee, where the executive offices were consolidated some time ago. It is stated by G. A. Morison, secretary of the Bucyrus-Erie Co., that there is no intention of stopping or reducing production at the Erie works, which will be continued as the eastern manufacturing unit.

PERSONAL

W. M. GARRIGUES, for the past seven years assistant general manager of sales for the Central Alloy Steel Corporation, Massillon, Ohio, and its predecessor, has been appointed general sales manager of the company. M. H. SCHMID, for two years assistant sales manager alloy division, has



W. M. GARRIGUES

been made sales manager bar and billet division, and J. S. ANDREWS, formerly assistant district sales manager at Detroit, has been named assistant sales manager sheet and strip division, with headquarters at Massillon.

JOHN A. FITZGERALD, for a number of years associated with Remington-Rand, Inc., Iliion, N. Y., has resigned to become sales manager of the Federal Cash Register Co., Kansas City, Mo.

H. W. KNAPP, St. Louis district sales manager for the McQuay-Norris Mfg. Co., maker of piston rings, has been appointed general sales representative for the entire country, and will continue to maintain his headquarters at the company's general offices in St. Louis. He has been identified with the organization since 1915.

ALFRED C. HOWELL, who some months ago resigned the presidency of the Ames Shovel & Tool Co., Boston, to become associated with the Guaranty Trust Co., New York, has been appointed a vice-president of that company. He began his business career with the Carnegie Steel Co. at Pittsburgh and Cincinnati and later became manager of the steel department of the W. Bingham Co., Cleveland. Subsequently he became a sales manager of the Midvale Steel & Ordnance Co., Philadelphia, and when that company became a part of the Bethlehem Steel Corporation he remained as sales manager of the plate department.

J. H. CHUBB has been appointed manager service bureau, Pennsylvania-Dixie Cement Corporation, with headquarters at 131 East Forty-sixth Street, New York. Mr. Chubb, who is a member of the Western Society of Engineers, the American Concrete Institute and the American Society for Testing Materials, has been active in the work of the committee on technical problems of the Portland Cement Association.

LUCIEN EATON, superintendent of the Ishpeming, Mich., district of the Cleveland-Cliffs Iron Co., Cleveland, has been appointed chairman of the metal mining branch, standardization division, American Mining Congress.

A. W. KOEHLER, who has recently served as executive secretary of the safety council of the Rochester, N. Y., Chamber of Commerce, has been appointed secretary of the National Conference on Street and Highway Safety. Mr. Koehler was graduated from Purdue University in 1916 and was for several years identified with accident prevention and industrial relations work for the Commonwealth Steel Co., Granite City, Ill., and the Atlantic Steel Co., Atlanta, Ga.

R. M. SANDBERG, for 16 years associated with the Columbia Tool Steel Co., Chicago Heights, Ill., has been appointed general manager of that company. In recent years he has been active in the work of the American Society for Steel Treating.

A. J. GATES has been appointed chief sales executive of the Baker-Raulang Co., Cleveland, and will have charge of the distribution of the company's industrial tractors, trucks and cranes. He has been associated with the company for the last 10 years, having had charge of the Ohio and Michigan territory. Mr. Gates was graduated from Purdue University in 1908, and before joining the Cleveland company he was connected with the General Electric Co.

FRANK J. BAUMIS has resigned as president Shaw Crane-Putnam Machine Co., Inc., and as vice-president and director of Manning, Maxwell & Moore, Inc., New York, to become associated on Dec. 1 with the Ingersoll-Rand Co., New York. In his new capacity Mr. Baumis will be identified with the development of the oil-electric locomotive.

PHILIP DRESSLER has been elected president of the American Dressler Tunnel Kilns, Inc., Cleveland, succeeding the late E. H. SWINDELL. He is a son of CONRAD DRESSLER, inventor of the Dressler muffle kiln, and has been actively identified with the American branch of the company

since its inception. PAUL A. MEEHAN, vice-president in charge of engineering for the company, has been elected treasurer but will continue to hold his old position. L. A. VINCENT, associated with the company for eight years, has been named vice-president in charge of sales.

HERBERT W. STONE, vice-president and general manager of the United States Hoffman Machinery Corporation, Syracuse, N. Y., has been elected president of that company, succeeding the late EUGENE D. STOCKER.

DAVID C. PARK has been made president and treasurer of Smith & Caffrey, Inc., Syracuse, N. Y., structural steel fabricator, GEORGE G. HEIDLAUF, vice-president, and FRANK B. FLOYD, secretary. The men were directors of the company prior to the death this year of William Blackwood Smith and James A. Caffrey and all have been associated with the firm for many years. Mr. Park went to work as an office boy with Smith & Caffrey, Inc., 31 years ago, and Mr. Heidlauf began work in its foundry department 34 years ago, having been in charge of ornamental iron production for the last 20 years. Mr. Floyd, who is a structural engineer, went with the company 17 years ago and was previously associated with the McClintic-Marshall Co., Pottstown, Pa., and the American Bridge Co., Elmira, N. Y.

L. S. SHAFFER, recently general manager Byers Machine Co., Ravenna, Ohio, has become associated with the C. O. Bartlett & Snow Co., Cleveland, and will be in charge of the sale and development of a truck body, for the transportation of pre-mixed cement, which the company is now building. The sale of this body will be handled outside the regular Bartlett & Snow sales organization, the present plan being to distribute the product through dealers in contractors' equipment and motor truck manufacturers.

B. J. STEELMAN, for a number of years associated with the Wanner Malleable Castings Co., Hammond, Ind., has been made manager of the Kalamazoo, Mich., branch of the Wanner Malleable Iron Co., Decatur, Ill.

ROBERT P. KING, since 1916 works engineer at the Springfield, Mass., plant of the Westinghouse Electric & Mfg. Co., will become associated with the engineering department of the Dupont Rayon Co., Buffalo, N. Y., on Dec. 1. Mr. King is a member of the Cornell Society of Engineers, a director and chairman of the finance committee of the Engineering Society of Western Massachusetts and a past-president of the Springfield section of the American Institute of Electrical Engineers. He was graduated from Cornell University in 1912.

THEODORE C. WILSON, recently associated with E. Arthur Tutein, Inc., Boston, and previously with F. O. Henshaw, Boston, has been made pig

iron representative of the Donner Steel Co., Inc., Buffalo, in the New England territory.

H. S. DURANT, for a number of years manager of the cold-rolled strip and spring department, American Steel & Wire Co., Chicago, has resigned. He has been succeeded by A. J. HESS, who has been acting as assistant manager of that department.

T. E. DAVIS has been elected president of the Caldbeck Tool & Mfg. Co.,

Des Moines, Iowa, succeeding the late WENDELL H. CALDBECK. R. J. BENNETT has been named vice-president and general manager; EDITH CALDBECK, treasurer, and K. H. PETERSON, secretary.

JOHN A. MARR, for 10 years superintendent of the Nugent Steel Casting Co., Chicago, has been appointed works manager of the Chicago Steel Foundry Co., Kedzie Avenue and Thirty-seventh Street, Chicago.

associated with a sewing machine manufacturer, working up to sales manager of the New England territory. In 1892 he became affiliated with a shoe machinery maker, and was instrumental in the formation of the United Shoe Machinery Corporation. EDWARD P. BROWN, his son, is president of that company.

HARRY G. O'BRIEN, for 50 years an active figure in the iron and steel industry in the Pittsburgh district, died at the home of his daughter in Pittsburgh Nov. 14. He was born in that city 70 years ago, and as a boy went to work in the mills of Clark Sons & Co., which later became the Clark mills of the Carnegie Steel Co. He became superintendent of that plant but left that position to become manager of the Fort Pitt Malleable Iron Co., McKees Rocks, Pa. Later he was with the American Steel Co. and the Seaman-Sleeth Co. in sales capacities and then returned to operating work as superintendent of the mills of the Superior Steel Corporation. He joined the Trumbull Steel Co., Warren, Ohio, as superintendent of the strip mill when that company entered that branch of the business. Later he served as general manager of its special products division. For the past few months he had been in the sales department of the Pittsburgh Rolls Corporation.

WALTON HARVEY MEAGLEY, assistant sales manager of the Corbin Screw Co., New Britain, Conn., died suddenly, Nov. 11, at his home in Berlin, Conn. He was born at Binghamton, N. Y., 50 years ago, and had been associated with the New Britain company for more than 25 years.

SIDNEY JOHNSTON JENNINGS, vice-president United States Smelting, Refining & Mining Co., New York, and a past-president of the American Institute of Mining and Metallurgical Engineers, died on Nov. 17, at his home in New York. He was born at Hawsville, Ky., in 1863, and was graduated from Harvard University in 1885. After serving as a surveyor and engineer for the Anaconda Copper Co. in Montana, he went to South Africa, where he was active in a number of large mining projects. In 1907 he became associated with the United States company, serving it until the time of his death. As president of the Mining Engineers during the World War he took an active part in the working out of Government engineering projects and the manufacture of war supplies. In 1922-23 he served as president of the American Mining Congress. At the time of his death he was also president of the Hanover Bessemer Iron & Copper Co. and a director of Cia. de Real del Monte y Pachuca.

JOHN G. WAY, for 20 years general manager of the New Process Stove Co., Cleveland, and a director of the American Stove Co., died suddenly Nov. 18, as the result of a heart attack. He was 55 years of age and had been connected with the company 33 years.

OBITUARY

FREDERICK KENT COPELAND, president Sullivan Machinery Co., Chicago, whose sudden death at Claremont, N. H., on Nov. 10, was mentioned in THE IRON AGE last week, was stricken while visiting the company's plant in



F. K. COPELAND

the latter city. The founder in 1884 of the Diamond Prospecting Co., which at that time was engaged in contracting work in the West with diamond core drills made by the Sullivan Machine Co. at Claremont, he was instrumental in bringing the two companies together in 1892 and had served as president of the combined corporation since that time. During his long and active business and engineering career Mr. Copeland had built up a wide reputation for leadership and vision.

J. W. OLIVER, first vice-president and chairman of the executive committee of the Standard Sanitary Mfg. Co., Pittsburgh, died at his home in Sewickley Heights, Pa., Nov. 13. In 1903 he entered the employ of Ahrens & Ott Mfg. Co., Louisville, Ky., the plant of which is now the Louisville works of the Standard company. In 1911 he was made assistant manager and two years later manager of this plant. In 1918 he was advanced to general manager of the Ahrens & Ott division of the company and the following year was elected secretary-treasurer, with headquarters in Pittsburgh. He held that position until

early in 1924, when he was elected to the offices he held at the time of his death. Mr. Oliver was born in Elmira, Ill., 56 years ago, and was graduated from Iowa State College in 1895. He also completed a course in the Chicago College of Law and was admitted to the bar in the State of Illinois, but followed the legal profession for only a brief period. While a resident of Louisville Mr. Oliver served two terms as president of the Louisville Board of Trade. He was chairman of the Louisville War Industries Commission during the World War, and was a director of the Louisville Million Dollar Industrial Foundation.

CHARLES BRUCE WHITE, Chicago representative of the Cochrane Corporation, Philadelphia, manufacturer of steam power plant equipment, and vice-president and general manager of the Cochrane Engineering Co., Chicago, died at his home in the latter city on Oct. 16. He was born at Black Rock, Nova Scotia, in 1864, and received his early technical training at Boston, later becoming identified with the Thomson-Houston Electric Co., West Lynn, Mass. In this capacity he had charge of the building of some of the first electric railroads in the South. In 1898 he went to Chicago as chief electrician of the Calumet Street Railway Co. and later became associated in a sales capacity with the Western Electric Co. In 1900 he became St. Louis branch manager for the Sprague Electric Co., and the following year became identified with A. Sorge, Jr., & Co., then representatives in Chicago for the Harrison Safety Boiler Works, predecessor of the Cochrane Corporation. At the death of Mr. Sorge seven years ago he became vice-president and general manager of the Cochrane Engineering Co., which succeeded the Sorge company.

GEORGE W. BROWN, vice-president of the United Shoe Machinery Corporation, Boston, and for many years purchasing agent, died in Newton, Mass., on Nov. 16. He was born at Northfield, Vt., Aug. 30, 1841, and at the age of 18 became connected with a railroad company. Later he went into the grocery business and subsequently into hardware. He was then

Machinery Markets and News of the Works

Business Is Less Active

November and December Are Usually Months of Declining Orders, Says Machine Tool Association

ALTHOUGH machine tool business in November probably will not equal that of October, the volume has not dropped off materially and the prospects are promising for a better-than-average demand for tools during the remainder of the year. The monthly review by the National Machine Tool Builders' Association says "there is generally some seasonal recession in the last two months of each year," but the association does not expect any considerable falling off this year.

The index of machine tool orders indicates a larger business in October than in September. The October figure was 263.5, compared with 236.8 in September, 100 representing the average for 1922, 1923 and 1924.

With unfilled orders increasing on the books of machine tool builders, the supply of skilled labor becomes an important factor in the ability to make deliveries. Many shops are working overtime to meet the demand.

A favorable factor is that inquiries have not fallen off greatly. Some of the current inquiries are believed to be predicated on plans of industrial companies for next year. Purchases are frequently held down prior to the annual inventory period, but are resumed when this operation has been completed.

Chicago continues to report an active demand from manufacturers of tractors and other farm machinery. The J. I. Case Threshing Machine Co., Racine, Wis., has ordered \$50,000 worth of tools and the Allis-Chalmers Mfg. Co. has bought for its Springfield, Ill., tractor plant. The International Harvester Co. is buying against a list for its Fort Wayne, Ind., plant.

The Pratt & Whitney Co. has received orders for two lists of tools, one of 18 items and the other of 14.

Quotations are being received by the Fox Brothers International Corporation, New York, on a list of tools for shipment to Colombia.

two 13-in., four 16-in. and one 20-in. lathes, No. 2 jig boring machine, four die sinking machines, bench lathe, drill and milling machine. Sales reported during the week by Niles-Bement-Pond Co. included six high-speed tappers, No. 110 Ransom grinder, 24-in. Aurora drill, 4½-ft. Morris radial drill, 18-in. x 8-ft. Boye & Emmes lathe, 1½-in. Acme forging machine, extra heavy 42-in. rotary planer, four-spindle heavy mud ring drill and a No. 7 carbox boring machine.

Tide Water Oil Co., 11 Broadway, New York, has plans for addition to storage and distributing plant at Nyack, N. Y., to cost about \$35,000 with equipment.

Garford Motor Truck Co., Thirteenth Avenue and William Street, Long Island City, with main plant at Lima, Ohio, has plans for a two-story addition to local branch for service and repairs, 100 x 215 ft., to cost over \$100,000 with equipment. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect and engineer.

Department of Plant and Structures, Municipal Building, New York, has filed plans for two-story automobile service, repair and garage building for motor

trucks and cars, 110 x 150 ft., on West Farms Road, Bronx, to cost about \$110,000 with equipment.

Rizzuto Motor Co., Peekskill, N. Y., has awarded general contract to L. Keill Co., 22 Croton Avenue, Ossining, N. Y., for one-story service, repair and garage building, to cost about \$100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Genfire Steel Co., Youngstown, Ohio, manufacturer of steel windows and other steel building products, has concluded merger with Fireproof Products Co., Inc., 536 East 133rd Street, New York, manufacturer and distributor of kindred specialties. Latter company will operate in future as New York factory branch of Genfire company, and will expand facilities.

Francis O. Blackwell, president Vlele. Blackwell & Buck, 49 Wall Street, New York, consulting engineers; William M. Flook, president American-Brown Boveri Electric Corporation, 420 Lexington Avenue; Thomas W. Streeter, chairman of board Simms Petroleum Co., 120 Broadway, and associates have organized American Cirrus Engines, Inc., to acquire manufacturing, sales and distributing rights of Cirrus aircraft engines in this country, now being produced abroad. New company plans establishment of plant for parts manufacture and assembling.

Independent Cork Co., Inc., Jefferson Crossing, Whippany, N. J., is considering rebuilding main plant unit, 60 x 200 ft., destroyed by fire Nov. 12.

Kolster Radio Corporation, 200 Mount Pleasant Avenue, Newark, has plans for new three-story addition, to cost over \$30,000 with equipment. Company has also acquired existing building near plant for establishment of a radio research and development works, to cost over \$25,000.

Newark Transformer Co., 17 Frelinghuysen Avenue, Newark, manufacturer of electrical transformers, parts, etc., has plans for an addition at 62 Sherman Avenue, to cost about \$35,000 with equipment. J. Kennedy, 44 Grove Street, Kearny, N. J., is architect.

F. J. Mullaney Iron Works, Inc., 574 Twelfth Street, West New York, N. J., is completing plans for new two-story plant, 200 x 200 ft., at North Bergen, N. J., to cost over \$75,000 with equipment. Charles G. Eichholz, Jr., 960 Bergenline Avenue, West New York, is architect.

George B. Steel Co., 370 Coit Street, Irvington, N. J., iron and steel products, has filed plans for one-story storage and distributing plant, 75 x 100 ft., to cost over \$20,000 with equipment.

Borough Council, Highlands, N. J., is asking bids until Nov. 26 for three complete pumping plants and sewage treating plant to cost \$300,000. Remington & Vosbury, 509 Cooper Street, Camden, N. J., are engineers.

Empire State Ice Co., Ninth Avenue

New York

NEW YORK, Nov. 20.—Machine-tool buying and new inquiry continue on a slightly smaller scale, but the railroads and some industrial users of machine tools are beginning to ask for estimating prices to be used in preparing budgets for next year. Among recent inquiries is a list of tools for export to Colombia, asked for by the Fox Brothers International Corporation, New York. The Curtiss Aeroplane & Motor Co., Buffalo, continues as a buyer of machine tools. The General Electric Co., Schenectady, N. Y., has closed on five machines in the past week.

Two sizable lists of machine tools have been placed recently with Pratt & Whitney Co. One list consisted of five 13-in., two 16-in. and one 20-in. engine lathes, bench lathe, No. 2 jig boring machine, 12-in. thread milling machine, two 6-in. and one 12-in. vertical shapers, hob and cutter grinder, two centering machines and a 14-in. vertical surface grinder. Another list consisted of a No. 12 profiler,

The Crane Market

SEVERAL overhead crane lists are still pending award and one was placed last week. New inquiry is fair, but not expected by most sellers to show much improvement before the end of the year. Moores & Dunford, engineers, New York, inquiring for a list of four 5-ton gantry cranes for the Waterfront Service Corporation, Brooklyn, N. Y., are expected to award the business within the next fortnight. Moderate interest is being shown in locomotive cranes by some

large users, but actual inquiry will probably be early next year.

Among recent purchases are.

United States War Department, Washington, 3-ton, 52-ft. span hand-power crane for shipment to Philippine Islands, from New Jersey Foundry & Machine Co.

Erie Railroad, New York, two 25-ton locomotive cranes from Industrial-Brown-hoist Corporation.

Hiler Engineering Co., Brooklyn, six

bucket handling cranes for Brooklyn Ash Removal Co., from a Western builder.

Following recent installations of Cleveland tramrail are reported by Leeds, Tozzer & Co., Inc., 75 West Street, New York, agents: Imperial Laundry Co., Newark, N. J., Elcon Co., Brooklyn, Consolidated Telegraph & Electrical Subway Co., New York, Canada Dry Ginger Ale Co., Hudson, Otis Elevator Co., Yonkers, American Car & Foundry Co., New York, and Palace Laundry Co., Washington.

and 219th Street, New York, is having plans drawn for an addition, to cost more than \$200,000 with equipment. Wigton-Abbott Corporation, 552 West Twenty-third Street, is engineer.

Petty & Wherry, Inc., 50 Church Street, New York, has been appointed distributor in metropolitan district for Buckwall Engineering Co., Brooklyn, manufacturer of Buckwall sprocket wheel.

American Brass Co., Waterbury, Conn., is rebuilding its electrical cable plant at Hastings-on-Hudson, N. Y., preparatory to production of high quality power cable. Insulating machinery and drying and impregnating apparatus will be installed. A testing laboratory for high tension cable work and examination of insulating oils, paper and cable sheath is also planned. Hastings plant was formerly operated by National Conduit & Cable Co. and its annual capacity of non-ferrous products is approximately 100,000,000 lb.

Although plant and general offices of De La Vergne Machine Co. have moved from New York to Philadelphia, company still maintains an office at 100 Broadway, New York.

American Electric Switch Corporation, Minerva, Ohio, has discontinued connection with Holland & Monaghan and now has direct factory representative in metropolitan district with office and warehouse at 430 East Fifty-third Street in charge of G. N. Lindstrom.

New England

BOSTON, Nov. 19.—Although sales in most cases involved only single items, in general, business again was good the past week. It included a variety of new as well as of used machinery for prompt delivery. Most of the buying is for increasing output or for reducing costs rather than for plant extensions. The Atlantic Works, East Boston, has bought wood-working and pipe shop equipment and will, it is expected, close on machine shop requirements this week.

New inquiries for single high-production tools are in fairly satisfactory volume and it is the belief in the local machine-tool trade that New England industries will require much equipment early next year.

Leading manufacturers are increasing production in an effort to keep up with bookings. General Electric Co., Pittsfield, now has 6500 workers on its payroll, an increase of 200 since Nov. 1, and of 600 within a year. Textile machinery makers are employing many more than three months ago. It is possible Draper

Corporation, Hopedale, Mass., will establish an assembling plant in the South early in 1929. Machine tool manufacturers, especially those in Worcester and Hartford, are adding night shifts as fast as skilled workmen are available. Makers of paper, sugar and rubber machinery, and of heaters and coal and gas ranges, are doing a better business than in several months, and the outlook for 1929 is encouraging.

Charles H. Lockwood, 171 Westminster Street, Providence, architect, has completed plans for a two-story addition, 40 x 49 ft., and 30 x 30 ft. for a jewelry manufacturer, owner's name withheld.

Milton Bradley Co., Springfield, Mass., has purchased from Nilco Lamp Works, Inc., Emporium, Pa., two four-story and two two-story manufacturing units on Wilbraham and Waltham Roads, Springfield, to manufacture toys.

Construction has been begun by Abertshaw Co., Boston, on new feldspar grinding plant for American Mineral Products Co., Inc., at Cold Village, town of Walpole, N. H. Plant will include three connected units, about 60 x 230 ft.

Contract has been let by Brown & Sharpe Mfg. Co., Providence, to Central Engineering & Construction Co., 20 Bond Street, Holyoke, Mass., for one-story foundry addition, to cost about \$45,000 with equipment. Jenks & Ballou, Grosvenor Building, are engineers.

Linstrom Sign Co., 115 First Street, Cambridge, Mass., has removed to a new location on Western Avenue, formerly occupied by Federal Iron Works, and will expand operations.

Berenson & Moses, Hartford, Conn., architects, have plans under way for three-story and basement automobile service, repair and garage building, 70 x 140 ft., to cost over \$100,000 with equipment.

Uncas Mfg. Co., 85 Sprague Street, Providence, manufacturer of jewelry, has filed plans for a two-story addition, to cost over \$40,000 with equipment.

Moore Drop Forge Co., Springfield, Mass., has awarded general contract to Adams & Ruston Construction Co., 1387 Main Street, for two-story addition, to cost more than \$45,000 with equipment.

Container Corporation of America, 111 West Washington Street, Chicago, has purchased plant and business of Corrugated Paper Mills Co., Natick, Mass., and will operate as branch mill. Company is also starting a new mill at Bridgeport, Conn.

Johnson Steel & Wire Co., Inc., Worcester, is erecting a one-story addition, 60 x 233 ft., which will more than double present capacity. New building will house additional equipment for drawing high-carbon steel wire, including tire, rope and music wires.

National Foundry & Machine Co.

Worcester, manufacturer of wire-drawing dies, is erecting a building, 40 x 80 ft., to take care of increasing business.

Precision Casting Co., Syracuse, N. Y., has acquired controlling interest in P. & R. Tool Co., Inc., 100 Lamartine Street, Worcester, Mass., and will move business to Cleveland, where a building is being erected for branch plant. P. & R. Co. builds Lester die-casting machine and dies. Nathan Lester, manager, will be connected with Cleveland plant.

M. C. Wright Co., Worcester, Mass., manufacturer of vacuum cleaners, has been reorganized under management of Dwight C. Daniels, who has resigned as production manager of machine division of Norton Co. Directors include F. Harold Daniels, president and general manager Riley Stoker Corporation. Officers are: President, Henry H. Wright; treasurer, E. Stanley Wright; secretary, Clifford L. Wright, and vice-president and assistant treasurer, Clayton M. Wright.

Philadelphia

PHILADELPHIA, Nov. 19.—Plans have been filed by International Harvester Co., 2905 North Sixteenth Street, Philadelphia, for two-story service, repair and sales building, 110 x 225 ft., for motor truck division, on site lately purchased, to cost \$140,000 with equipment. Headquarters are at Chicago.

Nathan and Harry Alterman, 3115 West Cumberland Street, Philadelphia, have organized Paramount Iron Works to establish a local plant for steel fabricating and iron working, including production of ornamental iron and bronze products, and plan to begin manufacture soon.

Department of City Transit, City Hall Annex, Philadelphia, C. E. Myers, director, will receive bids until Nov. 28 for car, track and electrical equipment, and for a battery charging unit, as per specifications on file.

Sun Oil Co., Finance Building, Philadelphia, has acquired 164 acres in Twin Oaks section, near its refinery at Marcus Hook, Pa., and is said to be planning construction of additional units to cost more than \$500,000.

Standard Wire & Iron Works Co., 1512 North Thirteenth Street, Philadelphia, has purchased two-story factory on Hancock Street, about 8,000 sq. ft. floor space, for expansion.

Ford Motor Co., Detroit, has plans for expansion at its assembling and distributing plant at Chester, Pa., including construction of new units and additional equipment. Works will be developed for a main branch for export business; loading and mechanical handling facilities will be provided at company docks; a

mill will be built for manufacture of wire-bound crates, box materials, etc. Project is reported to cost more than \$500,000.

Central Airport, Inc., care of C. Townsend Ludington, president Ludington Philadelphia Flying Service, Inc., Island Road and Tinicum Avenue, Philadelphia, recently organized by Mr. Ludington and associates, has engaged Black & Bigelow, Inc., 551 Fifth Avenue, New York, aero engineer, to prepare plans for air port at Camden, N. J., with shops and other units, to cost more than \$1,000,000 with equipment.

Automotive Rim & Stamping Co., Williamsport, Pa., recently organized by Edwin Wilkinson, 769 West Fourth Street, and associates, with capital of \$100,000, plans early operation of local metal stamping plant and machine shop. George E. Sands, 520 Pine Street, is also interested in company.

Barnard Tractor & Equipment Co., Harrisburg, Pa., has been organized by W. F. Barnard, Camp Hill, Pa., and associates as eastern factory branch and distributing representative for Caterpillar Tractor Co., Peoria, Ill. Company has leased space in building of Oliver Chilled Plow Works, Fifteenth and Mayflower Streets. E. P. Townsend will be manager of new company.

Milwaukee

MILWAUKEE, Nov. 19.—The machine-tool market is somewhat quieter. A good volume of business, however, continues to develop, sources of orders covering virtually all metal-working lines. Automotive industries, while still in the market, appear to have satisfied their present requirements, many awaiting deliveries before placing new specifications. Local output of tools continues at a high rate, with numerous shops still far behind on deliveries.

Ladish Drop Forge Co., Packard Avenue, Cudahy, Wis., is enlarging its plant for increase in capacity of drop and steam hammer products. Contracts have been placed for a new steel storage building and an extension of steam generating house. Present steel storage area is being converted into shop space. Work is under direction of Battey & Kipp, Inc., consulting engineer, 231 South LaSalle Street, Chicago.

Allis-Chalmers Mfg. Co., Milwaukee, is closing bids for a one-story shop addition, 200 x 600 ft., to its tractor division at main works in West Allis. Plans also are being completed for additions to Monarch tractor division works at Springfield, Ill.

Kwik-Mix Concrete Mixer Co., Port Washington, Wis., manufacturer of small-batch devices, contemplates erection of a new office and warehouse and conversion of space now used for these purposes into manufacturing area.

Rundle Mfg. Co., 1025 Cleveland Avenue, Milwaukee, manufacturer of enameled sanitary ware, has engaged Charles A. Cahill & Sons, consulting engineers, 214 Mason Street, local, to design alterations in its millroom, new equipment to include a rotary drier, one smelter, air preheater, etc.

Zenith Mfg. Co., Racine, Wis., manufacturer of super-power cylinder replacement heads for light cars and other automotive accessories, has purchased plant of Vogue Auto Painting Co. at 326

Thirty-seventh Street, in North Milwaukee, and will not erect a new plant as previously reported. Present shop, 40 x 60 ft., will be enlarged to 60 x 100 ft.

Lakeside Railway Signal Co., Freeport, Ill., has purchased site at Beloit, Wis., and will make an investment of approximately \$200,000 in a one-story shop, 60 x 300 ft., with considerable new equipment. Work is to begin Jan. 1. J. H. Shunk is president.

Wesley Steel Treating Co., 651 South Pierce Street, Milwaukee, engaged in commercial steel treating, has opened branch office at 308 South Fifth Street, Racine, Wis., with J. G. Barr as representative.

South Atlantic

BALTIMORE, Nov. 19.—Bids will soon be asked by Edward Katzinger Co., 1949 North Cicero Avenue, Chicago, manufacturer of bakers' machinery and tools, for two-story plant at Baltimore, to cost more than \$250,000 with equipment. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are architects and engineers.

American Oil Co., American Building, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for three-story addition to plant in Curtis Bay district, for storage and distribution, to cost \$100,000 with equipment.

Western Electric Co., 195 Broadway, New York, is said to have engaged H. K. Ferguson Co., Cleveland, to prepare plans for initial units of new plant in River View Park section, Baltimore, to cost more than \$5,000,000.

Tudor Ice & Cold Storage Co., Danville, Va., plans new six-story ice-manufacturing and cold storage plant, 120 x 120 ft., to cost over \$115,000 with machinery.

Hydro-Electric Corporation, care of M. E. Marcus, Mutual Building, Richmond, Va., president, is completing plans for hydroelectric generating plant on James River, near Snowden, Va., with initial capacity of 10,000 hp., to cost over \$200,000 with transmission system.

E. R. Taylor Motor Co., LaGrange, Ga., has plans for one-story and basement automobile service, repair and garage building, 100 x 150 ft., to include machine and parts department. Lockwood & Pondstone, Forsyth Building, Atlanta, Ga., are architects.

Chesapeake Paperboard Co., Key Highway and Baltimore & Ohio Railroad, Baltimore, has awarded general contract to Fred Wright Co., 217 North Calvert Street, for two additions, 85 x 178 ft., and 86 x 116 ft., including extensions in machine department, to cost about \$100,000 with equipment.

Sears, Roebuck & Co., Arthington and Homan Avenues, Chicago, have acquired about 20 acres at Alexandria, Va., and are said to be planning new multi-story factory branch and distributing plant, to cost more than \$400,000 with equipment.

South Atlantic Ice Co., Savannah, Ga., recently organized to take over and expand South Atlantic Packing & Provision Co., has plans for three new ice-manufacturing plants in different parts of city, to cost more than \$200,000 with equipment.

John E. Lock & Sons, Lawrence, Mass., manufacturers of bobbins and other textile mill equipment, are arranging to lease

building at Charlotte, N. C., for new branch factory. It is purposed to build a new plant later.

Chicago

CHICAGO, Nov. 19.—In contrast with recent weeks, the machine-tool business is showing rather an uneven tendency. Sales bulk large but are not well distributed. Fresh inquiry continues in satisfactory volume.

J. I. Case Threshing Machine Co., Racine, Wis., has placed orders aggregating over \$30,000, and Allis-Chalmers Mfg. Co. has made purchases for its Springfield, Ill., tractor plant. The list issued for Fort Wayne, Ind., by International Harvester Co. is being closed. The Missouri Pacific has purchased a few items at St. Louis, otherwise railroads are showing little interest in the machine tool market. One of the most active sections is Milwaukee and surrounding territory. Demand for used tools is lighter than at the beginning of the month.

Roesch Enamel Range Co., Belleville, Ill., has purchased property, 100 x 150 ft., and will erect a one-story factory to cost \$40,000.

Pines Winterfront Co., Chicago, has purchased property, 425 x 447 ft., at Cicero and Division Streets, and contemplates erection of an automobile parts manufacturing plant.

Dryden Rubber Co., 1014-22 South Kil-dare Avenue, Chicago, has begun construction of an addition to mechanical rubber goods plant, 85 x 125 ft., to cost more than \$125,000 with equipment.

Nachman-Springfield Co., 2241 South Halsted Street, Chicago, manufacturer of springs, has purchased plants and businesses of National Wire Spring Co. and Marshall Spring Co., Chicago, and will consolidate. All units will be continued in service and expansion developed. Automobile spring manufacture will be concentrated in future at National and Marshall plants, while Nachman-Springfield factory will be used for manufacture of furniture, airplane springs, etc.

Sanitary District of Chicago, 910 South Michigan Avenue, T. J. Crowe, president, will receive bids until Dec. 13 for pumping machinery and auxiliary equipment for Racine Avenue sewage pumping plant, including three motor-driven, vertical shaft centrifugal pumping units, each with output of 300 cu. ft. per sec., and six similar units, capacity 600 cu. ft. per sec.

Russell Grader Mfg. Co., 2037 University Avenue, S. E., Minneapolis, Minn., manufacturer of road-building machinery, has taken bids on general contract for an addition, 75 x 330 ft., to cost about \$60,000 with equipment. Sund & Dunham, Essex Building, are architects.

Albertson & Co., 3100 Floyd Avenue, Sioux City, Iowa, manufacturers of valve tools and kindred products, have begun superstructure for a four-story and basement addition, 40 x 150 ft., to cost more than \$80,000 with equipment. K. E. Westerland, War Eagle Building, is architect.

Stark Co., Marshalltown, Iowa, manufacturer of iron castings, etc., has asked bids on general contract for one-story addition, to cost about \$40,000 with equipment. H. E. Reimer, Kibbey Building, is architect.

City Council, Evanston, Ill., is planning installation of municipal electric light and power plant, to cost more than \$50,000

with equipment. City engineer is in charge.

General Motors Truck Co., Detroit, has leased building to be erected at St. Paul, Minn., for new factory branch, service and repair departments, to cost \$100,000 with equipment. Buechner & Orth, Schubert Building, St. Paul, architects, will take bids on general contract this month.

Material Service Corporation, 111 West Washington Street, Chicago, operating crushed stone plants, sand and gravel properties, etc., has disposed of bond issue of \$1,000,000, a portion of proceeds to be used for expansion, including completion of new sand and gravel plant at Lockport, Ill.

American Coil Spring Co., 1455 West Thirty-seventh Street, Chicago, which is building a new plant at Muskegon, Mich., informs THE IRON AGE that Muskegon project is to be a branch plant and main plant will remain at Chicago.

Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, manufacturer of Thor pneumatic, electric and contractors' tools, will shortly begin erection of an addition to its factory at Aurora, Ill., which will increase present capacity 36,000 sq. ft.

Gulf States

BIRMINGHAM, Nov. 19.—Plans are being arranged by W. D. Haden Co., American National Insurance Building, Galveston, Tex., for new one-story mill, 45 x 350 ft., at Houston, Tex., for production of lime products, using oyster shells as raw material, to cost over \$130,000 with machinery. W. A. Brunet, Houston, is construction engineer, in charge.

Lamson & Sessions Bolt Co., operated by Lamson & Sessions Co., 2188 Scranton Road, Cleveland, for production in Southern territory, has awarded contract to Tennessee Coal, Iron & Railroad Co., Birmingham, for structural steel framing for new plant on 8-acre tract recently secured at North Birmingham, adjoining mill of Birmingham Stove & Range Co. It will cost about \$400,000 with equipment, ultimate project to cost more than \$650,000.

A power house and machine shop will be built by Alabama Braid Co., Gadsden, Ala., in connection with new local textile mill, to cost about \$85,000. Sidney M. Edelstein, 55 West Forty-second Street, New York, and Union, S. C., is architect and engineer.

Morris Lewis, head of Lewis Grocery Co., Lexington, Miss., is at head of project to construct a cold storage plant at Durant, Miss., to cost about \$100,000 with machinery.

Westex Engineering Co., Aaraan, Tex., has arranged for a change of name to Westex Machine & Tool Co., and increase in capital. Expansion will be carried out.

Ohio Oil Co., Findlay, Ohio, is reported planning construction of oil refinery near Del Rio, Tex., to cost more than \$200,000 with machinery.

Atlantic Pipe Line Co., subsidiary of Atlantic Refining Co., 260 South Broad Street, Philadelphia, has begun construction of new pipe line from Midland to Port Arthur, Tex., to cost more than \$1,000,000 with booster stations and other operating facilities.

Alabama Power Co., Birmingham, is said to be planning construction of new steam-operated electric generating plant near Mobile, Ala., for service at new mill of International Paper Co., now in course

of building, to cost more than \$500,000 with equipment and transmission lines.

Florida Portland Cement Co., Tampa, Fla., with limestone quarries at Brooksville, contemplates an addition to double present output, to cost more than \$300,000 with kiln and auxiliary machinery.

In connection with extensions of line from Port Arthur to Grayburg, Bragg and vicinity, by way of Beaumont, Tex., Waco, Beaumont, Trinity & Sabine Railway Co., Trinity, Tex., is planning construction of new engine house and locomotive repair shops at Beaumont, to cost over \$100,000 with equipment. Company will issue \$3,000,000 in bonds and \$901,500 in stock, part of fund to be used for expansion.

Swift & Co., Union Stock Yards, Chicago, meat packers, have awarded general contract to Smallman Construction Co., 1109 South Fifth Avenue, Birmingham, for new three-story produce and packing plant at West Point, Miss., 75 x 127 ft., with cold storage and refrigerating department, and isolated steam power plant, 18 x 159 ft.

Cleveland

CLEVELAND, Nov. 19.—Business with machine-tool dealers is fair, but not quite up to last month. However, there has been no falling off in inquiry, which is very good. Tool-room equipment is more active than production machinery. The bulk of business is coming directly or indirectly from the automotive industry. A local manufacturer of turret lathes reports that its November sales have exceeded those during the corresponding period in October. This company has increased production to such an extent that it can make slightly better deliveries than a month ago.

Cleveland Planer Co. reports recent sales of open side planers to Hutto Engineering Co., Detroit; Federal Machine & Welder Co., Warren, Ohio; R. H. Frietag Machine Co., Akron, Ohio, and to a Cleveland steel plant.

Following recent acquisition of aircraft plant of Glenn L. Martin Co., Cleveland, by Great Lakes Aircraft Corporation, purchasing company has arranged for sale of 200,000 shares of stock, portion of proceeds to be used for property purchase and facilities for production of commercial airplanes, including those for mail, express and passenger service. Plant heretofore has been devoted to aircraft for military and naval use. William R. Wilson is president.

Chevrolet Motor Co., West Grand Boulevard, Detroit, has work under way on enlargements in plant at Toledo, Ohio, devoted primarily to production of transmissions and kindred parts, to cost more than \$100,000 with equipment.

Ducket Window Platform, Inc., Toledo, recently formed by Henry C. Ducket and Edward J. Burman, Toledo, to manufacture patented window equipment and affiliated building products, has opened office at 110 Michigan Street, and is considering early construction of local plant.

Falcon Motors Corporation, Elyria, Ohio, affiliated with Willys-Overland Co., Toledo, Ohio, has begun an expansion and improvement program. Considerable part of remodeled plant will be given over to manufacture of coupé bodies for Willys-Knight and Overland cars; another part will be used for light motor truck manufacture.

Hercules Motors Corporation, Canton, Ohio, manufacturer of gas and oil engines, parts, etc., has awarded general contract to A. F. Wendling Co., Massillon, Ohio, for one-story addition, 90 x 100 ft., to be used primarily for testing, to cost about \$85,000 with equipment.

Buffalo

BUFFALO, Nov. 19.—Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, N. Y., is planning for new steel car repair shop, with initial equipment and facilities for annual maintenance of 10,000 cars. Sites are being considered at Lackawanna, N. Y., near shops on Rochester belt line, and in vicinity of Pittsburgh. Plant will cost about \$400,000 with equipment.

Sun Oil Co., Finance Building, Philadelphia, has awarded general contract to A. W. Hopeman & Sons, 569 Lyell Avenue, Rochester, N. Y., for rebuilding part of storage and distributing plant at Syracuse, N. Y., destroyed by fire recently.

Ellicottville Furniture Corporation, Randolph, N. Y., O. S. McLarney, president, will soon take bids on general contract for one-story plant at Ellicottville, to cost about \$45,000 with equipment.

Nicholson Universal Steamship Co., Coe Terminal Building, Detroit, is said to be planning new two-story terminal warehouse and distributing plant at Buffalo, with installation of mechanical handling equipment, estimated to cost \$1,000,000. A. P. Evans is company engineer.

Cunningham-Hall Aircraft Corporation, Rochester, N. Y., has been organized to manufacture airplanes and has leased space in factory of James Cunningham, Son & Co., 13 Canal Street, manufacturer of automobiles. Through arrangement with latter company complete facilities of factory will be available to Aircraft corporation.

St. Louis

ST. LOUIS, Nov. 19.—Plans are being considered by Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, for one-story addition, 120 x 300 ft., to cost over \$125,000 with equipment.

Blackmore Mfg. Co., 2100 Cass Street, St. Louis, manufacturer of furniture, is planning new factory at De Soto, Mo., to cost about \$40,000 with equipment.

Common Council, McAlester, Okla., is planning establishment of municipal airport, including shops and other units. A fund of \$50,000 is being arranged.

United Power & Light Corporation, Abilene, Kan., is disposing of a bond issue of \$1,000,000, part of proceeds to be used for expansion, including transmission lines, power substations, etc.

Kansas Electric Power Co., Massachusetts Avenue, Lawrence, Kan., is said to be planning a new steam-operated electric power plant near Leavenworth, Kan., to cost more than \$100,000 with equipment.

Universal Car Loading & Distributing Co., Wyoming Street, Kansas City, Kan., is planning new one-story storage and distributing plant, 75 x 225 ft., to cost about \$90,000 with equipment. Latter will include a crane and other mechanical-handling apparatus.

Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., architects, have

begun superstructure for a three-story automobile service, repair and garage building, 50 x 140 ft., to cost about \$90,000 with equipment.

Board of Education, Moberly, Mo., is said to be planning installation of manual training department in new two and three-story junior college to cost about \$300,000, for which plans will be drawn by Ludwig Abt, 114 North William Street, architect.

Pittsburgh

PITTSBURGH, Nov. 19.—In point of inquiry the machine-tool market is active, but the more common experience of dealers is that sales are not in proportion to the requests for bids. The Westinghouse Electric & Mfg. Co. has issued a special list which includes two lathes, a radial and a sensitive drill, a shaper and two milling machines. There is also an inquiry for six tools for the Duquesne works of the Carnegie Steel Co. Tools for a new machine shop for the A. M. Byers Co., at its new plant at Harmony, Pa., will be placed through H. A. Brassert, Chicago, who is the consulting engineer.

O. A. and J. C. L. Brown, Tidioute, Pa., have organized Penn Cutlery & Tool Co., with capital of \$15,000, and will operate local plant to manufacture cutlery and small tools. Charles F. Maitland, 1500 Fifth Street, N. E., Canton, Ohio, is also interested in new organization.

Parkersburg Corrugated Box Co., Depot Street, Parkersburg, W. Va., has awarded a general contract to Plate Construction Co., Jeannette Street, for one-story mill unit, 50 x 290 ft., to cost about \$100,000 with machinery.

Pittsburgh Foundry & Machine Co., foot of Thirty-sixth Street, Pittsburgh, is having plans drawn for one-story foundry addition, for which bids will soon be asked on general contract. A. M. Tapp, Jenkins Arcade, is architect.

Mott Core Drilling Co., R. & P. Building, Huntington, W. Va., has approved plans for a two-story machine shop, to be used in part for storage and distributing service, to cost about \$26,000 with equipment.

Cincinnati

CINCINNATI, Nov. 19.—Pure Oil Co., York and McLean Streets, Cincinnati, Moore Oil Refining Division, has plans for new storage and distributing plant, to cost more than \$350,000 with tanks and equipment. Present works will be removed to new location.

Board of Public Service, Columbus, Ohio, plans extensions and improvements in municipal electric light and power plant to cost about \$100,000, including installation of boilers, stokers and other equipment. A new turbine unit is contemplated later.

Texas Corporation, Texas Building, Houston, Tex., is said to be planning to rebuild part of oil refinery at Pryse, Ky., recently destroyed by fire.

Continental Lumber & Mfg. Co., Jeffersontown, Ky., M. B. Patton, president, is planning construction of one-story hardwood mill, 100 x 150 ft., for manufacture of automobile and carriage products, to cost more than \$75,000 with machinery. Company will soon purchase boring machine, band saw ripping ma-

chine, cross-cutting tools, cut-off saws, saw tables, and other equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Nov. 26 for milling cutters, reamers, twist drills, countersinks, etc., circular 182.

Henry Vogt Machine Co., 1002 West Ormsby Avenue, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded general contract to H. A. Doll Construction Co., Lexington Road, for one-story machine shop, to cost \$65,000 with equipment. D. X. Murphy & Brother, Louisville Trust Building, are architects.

Following recent acquisition of Mercury Electric Sign Co., 1717 Magazine Street, Louisville, by Rainbow Light, Inc., Long Island City, N. Y., manufacturer of electric tube luminous lighting units, purchasing company has begun remodeling factory at 432 East Broadway for local branch. Later it is proposed to build entirely new plant unit to cost more than \$200,000.

Detroit

DETROIT, Nov. 19.—Brown-McLaren Mfg. Co., 5853 West Fort Street, Detroit, manufacturer of screw machine products, adjustable reamers, etc., has purchased six acres at Melvindale, Mich., for new plant, initial unit to be one-story, totaling about 50,000 sq. ft. floor space, to cost over \$100,000 with equipment. Present works will be removed to new location and additional machinery provided for larger output. R. C. Brown is president.

Crane Co., 836 South Michigan Avenue, Chicago, has awarded general contract to Cooper-Little Co., 5057 Woodward Avenue, Detroit, for one-story factory branch and distributing plant at Detroit, with pipe and pipe-fitting department, to cost over \$50,000. H. J. Clarke is company architect.

Cardboard Cutting & Supply Co., 1571 Wellington Street, Detroit, has awarded general contract to Myles Standish, 8100 East Jefferson Street, for an addition to cost about \$40,000 with machinery.

Federal Mogul Corporation, 11031 Shoemaker Avenue, Detroit, manufacturer of metal bearings and kindred products for automotive service, has engaged Pollmar & Ropes, Hoffman Building, architects, to prepare plans for one-story addition, 120 x 175 ft., to cost close to \$70,000 with equipment.

Officials of Central Development Co., Chatham, Ont., headed by R. L. Pattinson and J. V. Howard, operating pipe line properties, have organized Muskegon Pipe Line Co., Muskegon, Mich., to construct a 10-mile pipe line to Muskegon and vicinity for natural gas supply. Line will be extended later. Project will cost more than \$100,000.

Hudson Motor Car Co., 12601 Jefferson Avenue, Detroit, has awarded general contract to Otto Misch Co., 159 East Columbia Street, for two-story addition, 80 x 350 ft., to cost more than \$125,000 with equipment.

Wolverine Screw Products Co., Detroit, has awarded general contract to W. J. C. Kaufmann, 10610 Shoemaker Street, for one-story plant unit to cost over \$35,000 with equipment.

Cadillac Machinery Co., 414 Fisher Building, Detroit, has been appointed agent in Detroit territory for Boye & Emmes Machine Tool Co., Cincinnati.

Indiana

INDIANAPOLIS, Nov. 19.—Indianapolis Drop Forging Co., 1300 Madison Avenue, Indianapolis, is said to be considering a one-story addition, to cost in excess of \$30,000 with equipment.

Northern Indiana Public Service Co., Hammond, Ind., has plans for new steam-operated electric generating plant at Michigan City, to cost about \$10,000,000 with transmission lines. Holabird & Root, 333 North Michigan Avenue, Chicago, are architects; Sargent & Lundy, 72 West Adams Street, Chicago, are engineers.

Following recent organization of National Equipment Co., Milwaukee, to take over and consolidate Koehring Co. and T. L. Smith Co., both with local plants for manufacture of concrete mixers, gasoline cranes, road machinery, etc., consolidated company has arranged for acquisition of Insley Mfg. Co., 801 North Olney Street, Indianapolis, manufacturer of contractors' machinery and equipment, and Parsons Co., Newton, Iowa, manufacturer of power trench excavators, etc., and will merge with organization, making total assets of about \$9,000,000. Present plants will be continued and expansion is under consideration. Phil A. Koehring is president of new company.

North American Car Corporation, North Judson, Ind., manufacturer of tank cars, etc., plans rebuilding of local plant destroyed by fire Nov. 12. Headquarters are at 327 South La Salle Street, Chicago.

Board of Waterworks, City Hall, Evansville, will receive bids until Nov. 26 for two steel tanks, each 100,000-gal. capacity, on steel towers.

Tri-State Engineering Co., Zanesville, Ohio, has removed shop to Fort Wayne, Ind., and changed name to Woodard Engineering Co.

Pacific Coast

SAN FRANCISCO, Nov. 15.—Contract has been let by Neilson Steel Aircraft Corporation, Second and Camelia Streets, Berkeley, Cal., to A. Kirby, 2315 Twenty-fourth Avenue, for first unit of new airplane manufacturing plant on 3-acre tract, to cost about \$35,000 with equipment. Other units will be built later, entire project to cost more than \$100,000. Thomas S. Neilson is head.

Board of Education, Pomona, Cal., has approved plans for one-story vocational shop, 50 x 160 ft., at new high school group, to cost \$300,000, for which bids are being asked on general contract until Dec. 11. T. C. Kistner & Co., Architects Building, Los Angeles, are architects.

Buttress Mfg. Co., 507 Shatto Place, Los Angeles, manufacturer of wallboard, has filed plans for two-story plant 117 x 165 ft., to cost about \$70,000 with equipment. Moran Co., 740 South Broadway, is architect.

William Harris and Frank J. Solt, San Bernardino, Cal., have organized company to manufacture airplanes, and have awarded contract for initial unit, 80 x 200 ft., to cost about \$40,000 with equipment. It will be used for parts and assembling. J. Paxton Perrine, Lincoln Building, Los Angeles, is architect.

Shell Oil Co., 200 Bush Street, San Francisco, is considering new storage and distributing plant at Oakland, Cal., to cost about \$300,000 with equipment. Engi-

neering department of company is in charge.

City Council, Santa Monica, Cal., has plans for municipal airport at Clover Field, including shops and other units, to cost about \$50,000 with equipment. City engineer is in charge.

Washington Pulp & Paper Corporation, Port Angeles, Wash., is planning construction of new one-story chipping mill for pulp wood supply and power plant at Neah Bay, to cost over \$85,000 with equipment.

Coast Union High School District, San Luis Obispo, Cal., has approved plans for one-story manual arts building at high school at Cambria. Symmes & Cullimore, Bakersfield, Cal., are architects.

Racor-Pacific Frog & Switch Co., recently organized with capital of \$1,000,000 by officials of Ramapo-Ajax Corporation, Hillburn, N. Y., as a subsidiary, has awarded general contract to Austin Co., at Seattle, for new plant at last noted city, to manufacture railroad frogs and switches, for Pacific Coast trade, to cost about \$250,000 with equipment.

Canada

TORONTO, Nov. 19—Although machine tool sales fell off slightly the past week, inquiries carried over from the first of this month and those now appearing indicate that November business will not fall much below the earlier months this year. Sales were confined to units of one or two, but several lists have recently appeared for a half-dozen tools. Dealers and builders look for a continuation of demand for tools for some time and indications are that this year will set a new high record for peace years.

Riley Engineering & Supply Co., 360 Dufferin Street, Toronto, manufacturer of condensers, coal pulverizers, oil filters, etc., will start work soon on a manufacturing plant and office building to cost \$75,000, in Fairbank District, York Township, Ont.

Hull Implement Co., formerly Mississippi Iron Works, Almonte, Ont., has purchased a site at Hull, Que., for erection of a plant. New tools and machinery will be required.

Former plant of Maritime Bridge Co., Ltd., New Glasgow, N. S., which ceased operations in 1917 after being partially destroyed by fire, has been purchased from liquidator by W. A. McNeil, one of original owners of property. New machinery and equipment will be required.

Grinnell Co. of Canada, Ltd., 2440 Dundas Street, West, Toronto, has acquired control of Ontario Malleable Iron Co., Ltd., Oshawa, Ont., for approximately \$1,000,000. The two plants will be operated separately, and Ontario Malleable company will retain its name. No extensions are contemplated at present. Russell Grinnell will be president of reorganized companies; C. G. Sherman, vice-president; L. W. Jones, treasurer, and E. W. Shaw secretary. Directors include W. L. Horn, F. W. Cowan and John Dyer.

Canadian Cannery Co., St. Isidore de Laprairie, Que., will call for tenders in December for erection of plant at St. Hyacinthe, Que., to cost \$100,000.

Regent Knitting Mills, Ltd., 4060 St. Lawrence Boulevard, Montreal, is considering construction of a power plant on

North River at St. Jerome, Que., to cost \$65,000.

Stuart Construction Co., Art Building, Sherbrooke, Que., has been awarded contract for one-story factory, 100 x 200 ft., for Bates Valve & Bag Co., Ltd., Cap de la Madeleine, Que., to cost \$50,000.

Exide Batteries of Canada, Ltd., 153 Dufferin Street, Toronto, will start work soon on erection of an addition to cost \$27,500.

Western Canada

Dominion Department of Public Works, Ottawa, Ont., has retained C. D. Howe & Co., engineers, Port Arthur, Ont., to prepare plans for a 1,000,000 bu. grain elevator at Fort Churchill, Man.

Winnipeg Electric Co., Winnipeg, will soon call for bids for construction of a \$250,000 power house, to be built on completion of railroad from Whitemouth, Man. This is part of \$15,000,000 power development at Seven Sisters Falls, Man.

Foreign

A COMPANY at Sao Paulo, Brazil, is completing plans for early construction of nitrogen fixation plant requiring large investment for machinery, and has awarded general contract to a local company. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Brazil No. 200891.

Itabira Iron Ore Co., Ltd., Rio de Janeiro, Brazil, has secured approval of Brazilian Government of contract and concession obtained from State of Minas Geraes, covering development of iron ore and manganese properties. Plans are under way for erection of plant, with distributing facilities for raw product.

State Railways, Bangkok, Siam, will receive bids until Jan. 15 for 300 low-side steel wagons, as per specifications on file.

New Trade Publications

Overhead Conveyors.—Cleveland Electric Tramrail, Wickliffe, Ohio. Four-page folder TR-602 is concerned with the ease of pushing heavy loads suspended from an overhead tramrail accurately lined up.

Steam Boilers.—Erie City Iron Works, Erie, Pa. Two booklets describing and illustrating respectively return tubular boilers and the "economic" boiler. Both are horizontal units set in brick or similar casings and fired externally. They may be used with stokers, pulverized coal or oil fuels. Dimensions for the different sizes are given in tabular form. Each pamphlet is of 16 pages.

Oil Engines.—Walter A. Zelnicker Supply Co., St. Louis. Bulletin 373 listing used and rebuilt oil engines now offered by company. List includes marine Diesel engines, oil engine generators and other miscellaneous products.

Meters.—Connersville Blower Co., Connersville, Ind. Bulletin 4D dealing with company's different types of meters. Various features are described in detail with illustrations and charts, and sections are devoted to P. V. T. T. recorders, tandem meters for measurement over wide range of capacity and demand meters recording maximum consumption at hourly or half-hourly intervals.

Henry Ford and associated interests in Ford Motor Co., Detroit, have organized a new European subsidiary to be known as Ford Motor Co., Ltd., capitalized at £7,000,000 (about \$32,800,000), with headquarters in London. New company will take over all Ford interests in Europe, including plants and distributing branches. Work will proceed on main plant at Dagenham, England, where site was secured several months ago. Property has been purchased on Regent Street, London, for display and distributing center, with service and repair facilities and executive offices. Company will expand branch factory at Cork, Ireland, for production of Fordson tractors. Plant at Manchester will be extended. Sir Percival Perry, who introduced first Ford car in England, will be chairman of board of new company.

Plans are under way for a consolidation of Dorman Long & Co., Ltd., known as Clarence Iron & Steel Works, Port Clarence, Durham England, capitalized at \$60,000,000, specializing in production of steel ship plates and kindred iron and steel products, and Bolckow, Vaughn & Co., Ltd., operating Grangetown Iron Works, Bessemer Iron Works and Clay Lane Iron Works, at South Bank, York, and Middlesbrough Iron Works, Middlesbrough, with capital of \$40,000,000. New company will consolidate certain plants and plans expansion in output.

Soviet Radio Trust of Soviet Russian Government, Petrograd, has awarded contract to Radio Corporation of America, Woolworth Building, New York, for radio equipment and apparatus to an amount of 1,200,000 rubles (about \$600,000). Broadcasting and receiving stations will be built at different points in Russia, and accessory apparatus, including power equipment, acquired. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency for Soviet Government.

Handling Equipment.—Steubing Cowan Co., Cincinnati. Pamphlet devoted to use of lift truck platform systems by railroad and other carriers. Numerous illustrations are provided to show handling of materials in storehouse and machine shops. Emphasis is placed on economies to be achieved by consolidating less-than-carload shipments of freight on skid platforms.

Centrifugal Pumps.—Dayton-Dowd Co., Quincy, Ill. Bulletin 267 describing types CS and CSLH double-suction, single-stage centrifugal pumps. Type CS is designed for medium and high head service, type CSLH for low head service, and large capacity pumps, also dealt with, are provided for use in water works, filtration plants and drainage and irrigation projects.

Concrete Products.—Celite Products Co., Los Angeles, Bulletin 340, illustrated, dealing with methods by which relative degree of workability of concrete mixes can be measured. Effects of workability on strength, uniformity, water resistance and appearance of finished concrete are also discussed.

Electric Motors.—Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis. Bulletin 157 describing large RA single-phase repulsion-induction motors. Complete construction details are provided by means of illustrations, charts and text.

THE IRON AGE

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ESTABLISHED 1855

VOL. 122, No. 22

Increased Flexibility in Steel House



Substitution of Steel for Wood Members Permits Architectural Freedom in Dwelling Construction

STANDARD methods of wood frame construction have been adapted to the building of steel frame dwellings by simply substituting steel members for corresponding wood units in a house now being completed at Mount Lebanon, Pa., a Pittsburgh suburb. The frame of the dwelling, which was fabricated and erected by the Steel Frame House Co., Pittsburgh, a subsidiary of the McClintic-Marshall Co., was planned to give architects full leeway in their design and to allow builders to construct the building in the manner to which they are accustomed with wood frames. At the same time the owner was allowed to choose the type of house he desired with practically any floor plan and architectural treatment and was given the advantages of fireproof, non-shrinkable and rigid construction.

The house was designed by Lyon & Taylor, New York architects, and is being built by the L. O. Maines Construction Co., Pittsburgh, under the general supervision of L. Brandt, Pittsburgh housing engineer.

Architectural Standardization Avoided

The steel frame in the Mount Lebanon house takes the place of ordinary wood framing in every detail from the sill to the rafters, including all interior partitions and the framing of all openings, dormers and windows. The foundation is identical with that used for a wood frame. The architects were able to carry out the owner's plan and space requirements and to design the architectural features with the same speed and facility to which they have been accustomed in designing masonry or wood frame houses. Heretofore attempts to adapt steel framing to domestic construction have been centered largely around the idea of standardized units and designs in order to achieve the necessary economy in fabrication. In this instance, dimensions which the architect required within a maximum difference of 2 in. were met by the Steel Frame House Co. system, and with

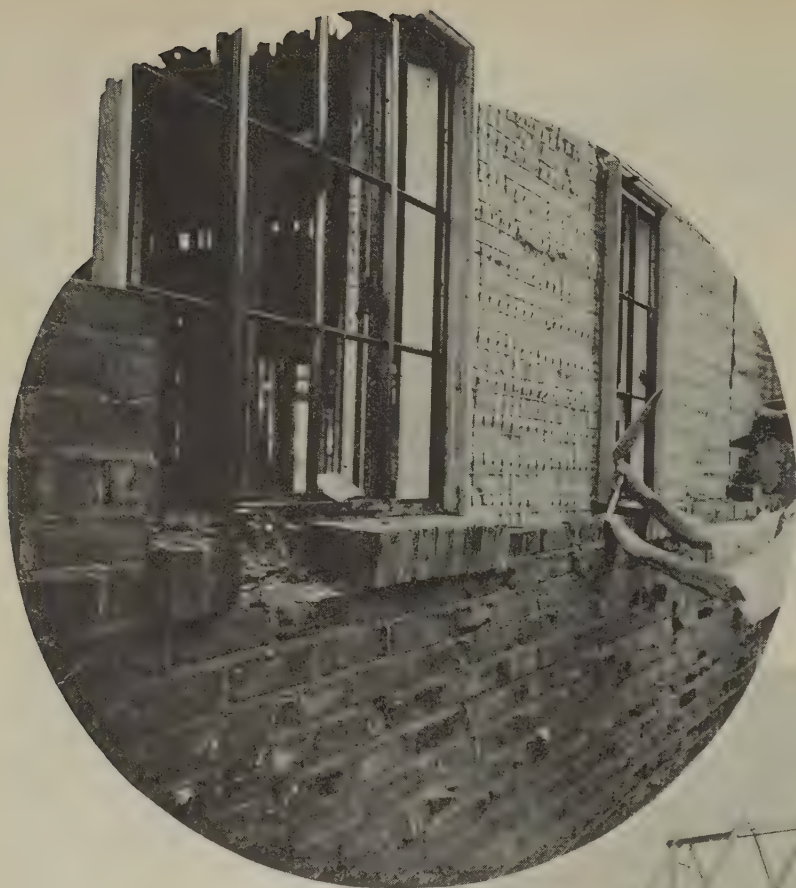
slight extra care exact dimensions can be satisfied to a fraction of an inch where special details make it necessary.

The complete frame for this house was fabricated at the mill and delivered at the job site ready to erect with the use of ordinary tools, a wrench taking the place of hammer and saw. No cutting and fitting, welding or riveting was required at the job and the frame was erected in a relatively short time, particularly in view of the fact that all partitions, doors, window frames and other structural members were completed at the same time. Other standard materials employed in fireproof construction were used in conjunction with the steel frame with no more difficulty and at no greater cost than when they are employed with solid masonry walls or a wood frame. Mechanics wholly unfamiliar with the new system of construction completed the house without preliminary training and with only the normal amount of supervision after the special methods which had been developed were once demonstrated by the supervising engineer.

Frame of Standard Steel Sections

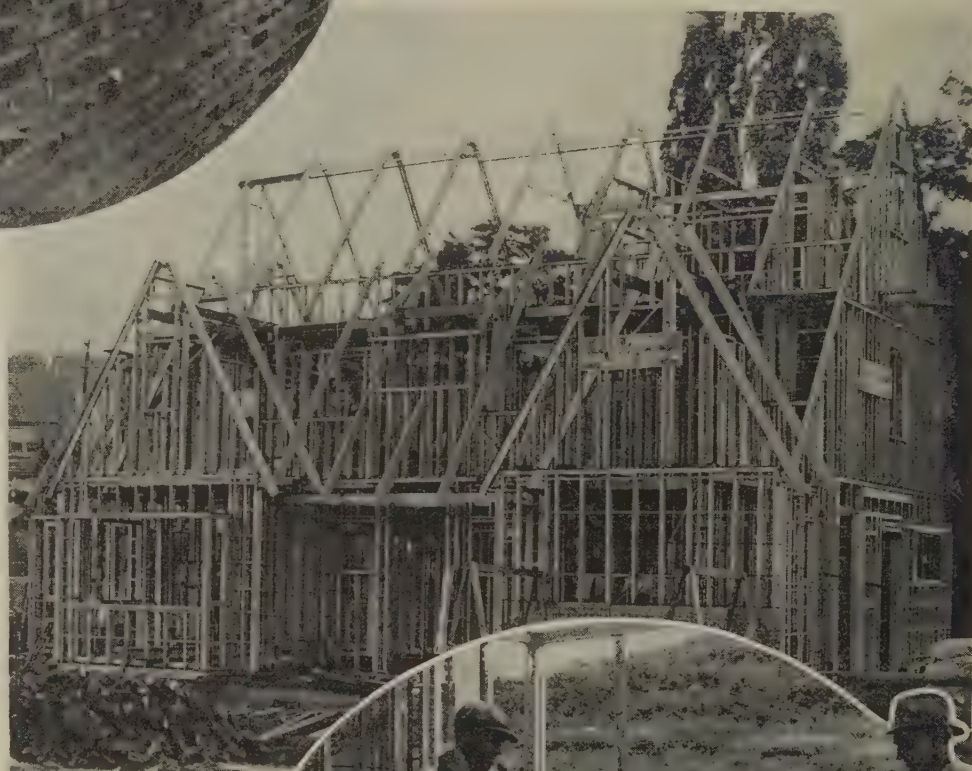
The frame itself is built up of standard steel sections, employing light steel angles for studs, corner posts, lintels and around openings. The horizontal members, including sills, girts and plates, are built up of standard channels. The floor joists are light steel I-beams, Junior beams of the Jones & Laughlin Steel Corporation having been used in this instance, and the roof rafters are channels. With the exception of the floor joists, all of the members are perforated along the flanges with 7/16-in. holes on 2-in. centers. This perforation is the heart of the system, for it permits assembly within a maximum dimensional limitation of 2 in. in any direction.

In a house of this type, when the architect's plan is received at the mill, an engineer prepares a framing plan



(Above) The brick veneer is applied next to the steel reinforcing fabric over a heavy waterproof backing.

(Right) The completed steel frame ready for the exterior walls. (Below) The concrete floors are laid on heavy reinforcing steel fabric over a waterproof backing, without the use of forms



and bill of materials in the ordinary manner. All of the principal structural units are taken from stock and the few special units are quickly fabricated from elements in stock that simply require cutting to length and the attachment of end clips or connections.

The degree to which these units have been developed is responsible for the simplicity with which the framing can be fabricated rapidly while meeting the special requirements of each individual building. The assembled structural units are then properly marked and delivered to the job, where they are put together in the normal sequence of operations employed for wood framing, merely substituting bolts for nails. This system, it is emphasized, reduces the amount of labor required for fabrication by substituting machine methods, permits carrying standard structural units in stock, gives the architect full freedom in design and enables the builder to follow erection methods that have already become familiar to him through the use of wood framing.



As the frame of a dwelling represents only 10 to 20 per cent of the cost of the completed house, importance is attached to the methods of employing standard building materials in conjunction with the structural steel framework. In this house the exterior walls are of brick veneer, of a new type of reinforced veneer construction. Over the exterior surface of the framing members a welded mesh reinforcing fabric, made by the National Steel Fabric Co., a subsidiary of the Pittsburgh Steel Co., with a heavy waterproof backing, is applied by means of clips, which are in turn attached to the studs and corner posts through the perforations in these members. The galvanized steel fabric is of the type used for stucco construction. When the stucco is applied, the waterproof backing is pressed away from the reinforcing wires, which become embedded in the stucco and serve in the same way as steel in ordinary concrete structures.

Outside of this fabric a 4-in. brick veneer facing is

laid and the cement mortar is run down in back of the brick against the reinforcing fabric with which it forms a bond. The waterproof backing protects the interior of the structure from dampness and is counted on to add an insulating membrane. For additional security, wire wall ties are embedded in the horizontal joints of the brick work and clipped to the reinforcing wires of the fabric. The roof deck consists of wood purlins bolted to the rafters, which in turn carry a plank roof deck and a slate roof.

The floors in the house are of concrete, which is laid without the use of forms. For this purpose a wire fabric with waterproof backing similar to that used on the walls, but of heavier weight, is stretched across the steel floor joists and clipped thereto with special wire clips of simple design. A 2-in. concrete slab is poured directly on the fabric, the waterproof backing of which acts as a form. Here again the weight of the concrete presses the backing away from the reinforcing wires, which thus become enmeshed in the slab. Wood sleepers are embedded in the floor in the areas where wood top floor is used, while in some rooms the slab itself is finished to a level surface to receive tile or a resilient flooring material.

The interior walls and ceilings are plastered on a third type of reinforcing fabric with waterproof backing which is slightly lighter in weight than that on the exterior walls. In this case the reinforcing wires are embedded in the plaster, forming a mechanical reinforcement for the plaster and serving to assure a sturdy type of wall.

Special provision is made in the steel frame for pipe chases, the smaller pipes being carried within the stud space and the larger ones, such as soil pipes, which cannot go in normal 4-in. partitions, being carried in special enclosures in the manner ordinarily employed in wood frame construction. Electric conduits, either of the pipe or flexible armor type, are carried through the walls in the usual manner and may run between the floor slab and the ceiling beneath as required. Before plastering is started ordinary wood grounds are attached to the steel frame to receive picture moldings, baseboards, door and window trim and other finishing details.

Fireproof Features Emphasized

The resulting house may be rightfully called a fireproof home, for its floors, walls and roof are of incombustible materials and, with the exception of decorative trim and occasional wood floor surfaces, no wood is employed at

any point in the construction. Even this use of wood can be eliminated by employing hollow metal or Kalamein doors and trim, a concrete or other fireproof roof deck and various types of incombustible finished flooring materials. While the "exposed" steel and specially light steel members in the frame would lose their strength under high temperatures, all of the members in this construction are inclosed behind surfaces of reinforced plaster or masonry. A plaster wall on metal lath or this new type of reinforcing fabric is considered an effective fire retardant.

Plaster Cracks Will Be Avoided

This type of rigid steel construction, it is held, will help to eliminate the cracking of plaster due to vibration, wind stresses and other strains. As steel expands and contracts so little under temperature changes, plaster cracks or other defects developing within the structure seem unlikely on this account. All of the steel received a heavy coating of non-corrosive paint besides being protected on both sides by a waterproof membrane and by masonry surfaces calculated to prevent moisture from having access to the framing members and shortening the life of the steel. The steel frame is advanced as vermin and lightning proof.

The builders of the Mount Lebanon house present an interesting argument in favor of steel frame house construction by stating that the fireproof, rigid and permanent character suggest the use of quality materials wherever practicable. When a steel frame house of this type is constructed the building material merchant sells the same products that he has been selling heretofore with the exception of rough lumber and wood lath and he also is likely to sell higher quality materials with a consequent larger volume of business and margin of profit.

Local Stocks of Steel Members

It is suggested that, while practical considerations at present will probably make it necessary for the manufacturers of the steel frame to handle their business direct or through agencies, the situation may ultimately change and the stock of steel frame units may be carried in local warehouses and by dealers. Thus there is nothing to disturb the materials dealer in the development of the steel frame house, and his cooperation is urgently needed if the wide market opened to steel in this type of construction is to be fully developed.

Alloyed Cast Iron Rolls

IN an article on rolls for rolling mills, F. C. Biggert, Jr., of the United Engineering & Foundry Co., Pittsburgh, in a periodical published for its employees, has the following to say:

Alloyed cast iron rolls are made both in chilled and grain qualities. The grain roll, so called because of its somewhat mottled or grained structure, corresponds to the ordinary sand roll.

In the chilled quality they may be made much harder than ordinary chilled rolls; they have a very high wear resistance and are considerably stronger. Particularly they are valuable on account of their resistance to spalling.

Spalling is the technical term for surface flaking, and is the cause of much trouble to the user of chilled rolls. An ordinary chilled roll is easily bruised. For instance, a sharp blow on the chilled surface with a hand hammer, while it may not cause a visible mark, will have bruised the metal so that a short period of rolling will cause a piece to drop out.

The new alloyed chilled rolls, for which, by the way, our company holds patents, will stand very severe usage without spalling, and in rolling some products, this quality has

practically meant the difference between failure and success.

The new alloyed grain rolls correspond, in a sense, to sand rolls, but are so hard and close grained that in many places they have been substituted for ordinary chilled rolls. Their wearing qualities are almost phenomenal, and combined with very good strength, give them a wide field of usefulness.

Still another type of roll recently developed is so hard that no tool has been able to turn it, and all shaping must be done by grinding. This type is now being used for cold rolling, where it has replaced hardened steel rolls, and to some extent, in hot rolling of flat material.

Chemical Solvent for Metal Cleaning

The chemical solvent trichlorethylene is being used for degreasing metal parts in some European shops. This substance has the chemical formula C_2HCl_3 , boils at 190 deg. Fahr., smells like chloroform, and will not burn or explode. Cleaning is done in three trays, one heated, the intermediate and final for rinsing. The heated tray has a water cooled cover, for condensing the rising vapors. Dirty liquid is regenerated in a simple distillation apparatus.

Self-Rule of Industry a Delusion

Sanction of Regulated Competition Leads to Extremes in Governmental Control—Better Banking Policy Offers Chief Hope of Balancing Consumption with Production

BY VIRGIL JORDAN*

WHEN the records are all in at the end of this year, I think it will be clear that 1928 will go down as the biggest year in our history from the point of view of industrial and trade activity.

Yet I do not believe there has been any year since the war, or even in our pre-war history, in which that over-worked word "prosperity" has had less real and definite meaning or has been more uncertain and questionable than it is today. I do not believe that there has been any time in our experience, outside extraordinary periods of war, of which it could be said that our situation has been marked by greater danger or about which more serious questions could be raised than that which we face now. When we have passed through it, successfully or unsuccessfully, I feel that 1928 will go down as a crucial year in our economic life, for in it we have come face to face with certain new, fundamental and unsolved problems of economic control and adjustment, and the future depends upon how clearly and generally we recognize these problems and how earnestly we attempt to deal with them in the next few years.

Economic Situation Out of Balance

The changes in production, distribution, consumption and finance that have created our "prosperity complex" have resulted in an extraordinarily unbalanced situation, marked by contradictory and inconsistent indications in respect to the trend of wages, prices, employment and profits. High wages in protected trades and occupations have not percolated down to the rank and file, or benefited workers in industries that have been left high and dry by the shifting tide of consumer wants. The high wage levels in some fields have availed the workers little in face of the declining opportunities for employment in these industries and have entailed wide shifts of the working population into new fields, the permanence of which is in turn uncertain.

Falling prices of raw commodities and basic materials in the face of continued high wages have perhaps benefited the lines in which these materials have been elaborated for the consumer's use, but the producer of these goods has had to face increasing pressure upon his profit margins, and there is little evidence that in most lines the consumer has had the benefit of lower prices. In fact, there is clear evidence that, while the prices of basic commodities have not shown signs of inflation, the general level of prices of the goods and services which constitute the general high standard of living in this country have steadily risen since the war and are nearly as high as during the period of war inflation. This in spite of intense competition and increased productive efficiency which have held prices in the basic industries at levels in some cases near the pre-war.

I need not repeat here the now familiar fact that in the last three years of prosperity the proportion of corpora-

tions reporting deficits in all lines of trade together was 41 per cent in 1925, 43 per cent in 1926 and, according to the statistics of income just released, rose to 45 per cent in 1927. The fact that among this continuing group of business concerns operating without profit or at a loss there are found the smaller concerns in industry and trade is admitted as a fact and is used to account for the large proportion of corporate business that is not conducted on a profitable basis.

Not only do these contrasts show themselves so strongly within each field of business enterprise, but more fundamental and serious still is the contrast which has been emphasized in recent years among the various major branches of our industrial structure. Everywhere it is the industries catering directly to the new wants and consumption habits of the population, providing the luxury goods and services that make for the high standard of living about which we talk, that have been most strongly stimulated and have enjoyed the greatest prosperity. This prosperity has been achieved in part at the expense of the older industries furnishing the basic materials and the fundamental services. The prices of these goods and services have tended to remain low or to fall throughout the world, while the goods and services that have been elaborated out of them and into which direct labor and distribution costs have been pyramided have tended to remain high or rise.

And among the nations as among the various industries the same contrasts have been emphasized in the years since the war.

We ought, I feel, to take stock earnestly of the situation and bring what knowledge we have to bear upon these questions. They all, in my opinion, resolve themselves into the question whether the relations that have heretofore existed between wages, prices and capital returns have or have not been permanently altered and whether or not we have entered into a period in which business is to be governed by a wholly new set of economic laws that will involve a fundamental reorganization of business in respect of competition and Government control and a fundamental change in financial structure and policies in respect of the control and distribution of credit.

Why Control of Production and Prices Is Urged

Of this central question there are two fundamentally opposing points of view which go to the root of economic thought about the present situation. One is that the maladjustment between wages, prices and capital returns, which has grown out of apparent overproduction and is the apparent cause of the difficulties and contrasts in many lines of industry and trade, must be met by a fundamental reorganization of the business structure. The anti-trust laws and Government policy toward business in general, it is declared, must be modified so as to permit a greater freedom of action in trade associations and combinations to control production, restrict competition and regulate prices.

*Chief economist National Industrial Conference Board, New York. From an address before the National Founders Association at New York, Nov. 21.

In this way it is anticipated that a sounder relationship can be established between wages and prices, from the point of view of capital returns, as a result of the increasing pressure upon employment that would flow from the closer integration and improved efficiency of industrial processes. Capital charges or normal profits would be made a fixed charge upon industry, through control of production and prices, instead of wages being a fixed charge and capital return a contingent charge, as is now the case. On this principle an effort would be made and the possibility created to make production follow demand instead of, as now, trying to raise demand to meet production. On this plan the equities of the small independent business enterprises would be in large part preserved, whereas now they are being steadily and rapidly wiped out through the relentless process of competition and overproduction.

With this line of thought I fundamentally disagree. I recognize that this process has taken and is taking place, rapidly here and abroad under the pressure of conditions that I have described, and I would admit there is a large and proper field for such reorganization of the business structure for improvement in conditions even without any revision of Governmental policy toward business. But I am convinced that in the long run it is fundamentally fallacious and dangerous to believe that the essential economic problem which we face is going to be solved in this way. That fundamental problem is the expansion and diffusion of consumer purchasing power at home and abroad in proportion to the expansion of our production and productive capacity. We cannot meet this problem in a sound economic way by restricting production or controlling prices in order to meet any fixed overhead charges necessary to preserve the existing capital equities in business enterprise, for this results inevitably in a more than proportionate restriction of consumer purchasing power.

The difficulty today is that production is more rapidly and fully financed than consumption, and you cannot meet this difficulty by any further financing or reorganization of production which increases the purchasing power of the investor's dollar and decreases that of the consumer. In the long run such an effort must defeat itself not only because a restriction of production involves a restriction of consumer purchasing power, but because the relatively high and protected returns to capital under such a system are bound to invite over-investment and increased competition, leading in turn to excessive production and falling prices under which the whole system will break down unless the Government or some outside authority steps in to control.

Regulation of Competition Leads to State Socialism

Such a principle is not only fallacious but dangerous, first because it is bound to stimulate increasing class conflict as between wage earners and investors, which we cannot assume will be materially mitigated by the kind of popular investment in corporate securities that has developed in recent years; and what is far more important it must lead inevitably to Government intervention much more far-reaching than that with which business has now to contend under the existing anti-trust laws. It seems to me obvious that business cannot ask of Government a free hand in the control of production and competition and the regulation of prices without finding itself forced to lean upon Govern-

mental authority to support and sanction the arrangements made and without thereby inviting Government to take an active part in the control of production and prices.

It is of ominous significance to me that in every instance in which, for special considerations, the Government in this or any other country has granted special privileges and exemptions under the anti-trust laws to particular fields of business activity, such as railroad, transportation, shipping, banking, agriculture and labor, it has found itself naturally compelled to set up special bureaucratic agencies of supervision and control in the form of Interstate Commerce Commission, Shipping Board, Federal Trade Commission and the Federal Reserve Board, part of whose functions it is to supervise and control the exercise of these privileges in the public interest. Nowhere can we hope to escape this quid pro quo if we enter into a bargain with Government in this matter. You perhaps do not realize that, in the McNary-Haugen and similar legislation that has been pressed almost to the point of success for the relief of the millions of farmers who find themselves in the same position as that of the small independent business enterprises everywhere, we have presented to us the logical extreme to which this line of policy leads. The fundamental danger that lies in this type of legislation is that, in order to preserve the equities of the six and one-half million individual farm enterprises by raising and controlling the prices of farm products to the domestic consumer, the Government is forced to set up an agency with vast machinery not only to care for the surplus but ultimately itself to control production by regulating the number of farm enterprises, the acreage planted and the output of individual farms—a task that is not only of inconceivable difficulty but means

essentially that the Government, to all intents and purposes, will have taken over the operation of a gigantic industry, and embarked upon a policy of state socialism on the largest scale.

Solution Lies in Financial Policy

In recognition of the dangers that lie in this direction there is a slowly growing realization that the solution of the problem balancing production and consumption can be most hopefully sought, not in any general reorganization and limitation of production, but in the field of financial and banking policy, which is the fundamental and universal factor underlying the whole economic situation because of its profound influence on the expansion, contraction and distribution of consumer purchasing power. In other words, from this point of view the evils of overproduction are essentially evils of under-consumption and they must be attacked not on the side of production so much as on the side of consumption. We are coming more clearly to realize that, contrary to the views of traditional economic theory, general over-production as well as over-production in special fields is not only possible but is inevitable so long as our banking credit and monetary policies do not permit us to utilize our credit resources to finance consumer purchasing power as rapidly as we finance our productive power.

We used to believe that production automatically finances consumption. The fact that consumption does not grow with production has been forced upon us in the last ten years of enormous increase in productive equipment



VIRGIL JORDAN

and efficiency, which have left almost every industry with a tremendous excess of capacity, and we now know that in the financing of production and distribution enormous reserves of credit purchasing power are tied up and utilized several times over to increase the output of goods and services before they flow back into the hands of consumers to enable them to purchase these goods and services. Our traditional banking theory has been that the only legitimate uses of credit are to draw out production which will automatically provide its own purchasing power, and we have failed to realize that the function of credit is not fully performed, and that any advances against future production cannot be extinguished or liquidated, until the entire process is completed in the ultimate consumer's use of the product or service.

Consumption Must Be Dovetailed with Production

It is clear that the entire circle of production and consumption upon which economic progress must proceed cannot be made complete and cannot revolve smoothly until we find some way of controlling and distributing consumer purchasing power domestically and internationally in relation to productive power, and this can be done only through our national and international banking systems, whose fundamental function is the accumulation and distribution of credit resources.

The difficulty is that the realization of these things is so recent and new and involves such a fundamental revision in our banking theory and practice that we are not as yet prepared for the changes in policy which are involved. What is more serious is the fact that our financial system in its present form has developed so rapidly and so recently that we do not know how to proceed, even if we were ready to do so, to control the power which resides in it for the purpose we have in view. We recognize the tremendous power which lies in the hands of our central banking systems in this and other countries; but the principles and technique of central bank operation have had too short a time to be far developed, and there is as yet no fundamental agreement concerning them.

Even though we were to make the stabilization of prices a definite policy at home and abroad we cannot be sure that we are able to or know how to make it effective. We feel that we can exercise more control over credit expansion when the initiative to such expansion comes from industry and trade, but except for the crude and uncertain device of instalment buying, we have found no way effectually to initiate wider use of credit, especially in the direction of increasing consumer purchasing power, when the rate of production is exceeding that of consumption.

Federal Reserve System Facing Crucial Test

In this country at the present time we are in the midst of a profound evolution in financial methods and policies the outcome of which is impossible to foresee. The striking contrast between financial activity reflected in the course of security prices and business activity reflected in commodity prices, volume of production and trade is but an extreme expression of the problem of credit control and distribution with which our banking system is faced. Though it is officially minimized and disclaimed, the so-called struggle between the Federal Reserve System and the stock market is a real and significant aspect of this problem of credit control.

The powers and policies of the Federal Reserve System to exercise a critical control over the distribution of credit power and consumer purchasing power are entering a crucial period of trial the full meaning of which is little realized. Though still limited in its scope and functions by traditional theories of banking policy which were embodied in its legal basis, the Reserve System has made enormous progress in its short history toward a realization of its constructive possibilities in the administration and control

of credit resources. It has developed probably the best measures of production, trade and consumption that have been devised; it has found means of keeping the closest watch upon the expansion of credit and the pulse of business opinion. More significant still is the fact that under the leadership of the late Benjamin Strong it has been able to function perhaps more effectively and creatively in the international distribution of credit than in its domestic control, and laid the foundations for international cooperation among the central banks of the world, which is an indispensable factor in preserving economic stability and promoting economic development at home and abroad.

But because of the limitations and deficiencies in its structure and authority it has so far been unable to exercise that control over the distribution of purchasing power internally which is fundamentally necessary for balanced economic development in this country. The initiative in the expansion of credit and in the utilization of individual and corporate savings has been taken out of its hands, and an enormous expansion of productive capacity has been financed out of bank credit far in excess of savings, without regard to the proportionate expansion of consumer purchasing power that is necessary to sustain this enormous superstructure of productive investment of bank credit. The consequence is that commodity prices have remained relatively low while the prices or values of capital equities have been inflated far beyond the limit of possible earnings on the basis of existing consumer purchasing power.

What is more striking is that an enormous volume of direct consumer purchasing power in the hands of persons of small income is tied up in commitments for the speculative purchase of these capital equities, and thus is actually withdrawn from the market for consumers' goods. How the equilibrium between productive capacity and consumer purchasing power will be restored no one can say positively at this moment. The enormous investment of bank credit in capital expansion may have to be spent and written off without return or with much lower returns than the investors anticipated. Wages may have to undergo a further inflation without a corresponding inflation in commodity prices in order to bring the level of consumer purchasing power higher. The readjustment may have to come through a collapse in commodity prices far below their present levels, to stimulate consumption proportionate to the increased productive capacity.

Must Prevent Unwise Distribution of Credit

Under our present financial organization there is only one way by which additional consumer purchasing power can be called into existence by the use of credit in sufficient volume to help sustain our enormously increased productive investment. The Federal, State and local governments, through their expenditures for public improvements and public services, together constitute the largest factor in the control of consumer purchasing power. They are the only agencies that are able to draw upon credit resources in any considerable amount for purposes of direct consumption. It may therefore be necessary in the event of a general depression for the Governmental agencies in this country to embark upon tremendous projects of public improvement and construction in order to sustain the general consumer purchasing power sufficiently to utilize our industrial capacity. The dangers that lie in this direction I need not enlarge upon but it is a grave question whether even such an influence would be adequate and permanent enough to meet the requirements.

Our main problem for the future is to develop such banking policies and methods as may prevent undue utilization of our credit resources through speculation, for the expansion of our productive capacity and increase of our overhead capital charges to stabilize the general level of prices, and to keep consumer purchasing power in step with production.

Automatic Seamless Pipe Mill

Avoidance of Straight-Line Flow to Achieve
Flexibility—Two Piercers Used to
Avoid Punishing Steel

BY SIDNEY G. KOON*

TWO independent automatic seamless pipe mills have been placed in the Aliquippa plant of the Jones & Laughlin Steel Corporation, Pittsburgh. The first of these, which is capable of making pipe from 6½ to 14½-in. outside diameter, has been in operation for some time. The second mill was more recently completed, and is now in operation. This mill makes pipe from 2½ to 6½ in. outside diameter.

There are six hot working machines in the larger mill and there are five in the smaller, besides two reducing mills. The six include a piercer, an expander, a plug mill, two reelers and a sizing machine. These are not set in a straight or continuous line, but are staggered, with short transfer tables between them, which gives a certain flexibility not possessed by a straight-line flow.

After leaving the sizing machine the pipe traverses a set of cooling-racks, which again, for purposes of convenience, do not form a straight line, but are in two sections with transfer between them. When sufficiently cooled the pipe goes through a straightening machine, and then is delivered to the finishing department, where it is cut off to length, has the ends chamfered and threaded, receives a hydrostatic test and is passed into the shipping sheds.

Inspection is exceedingly rigid, beginning with the blooms in the bloom yard. These are heavy, ranging from 8 x 8 to 14 x 14 in. in section and about 10 ft. long. All blooms are pickled in open-air pickling tanks, then chipped

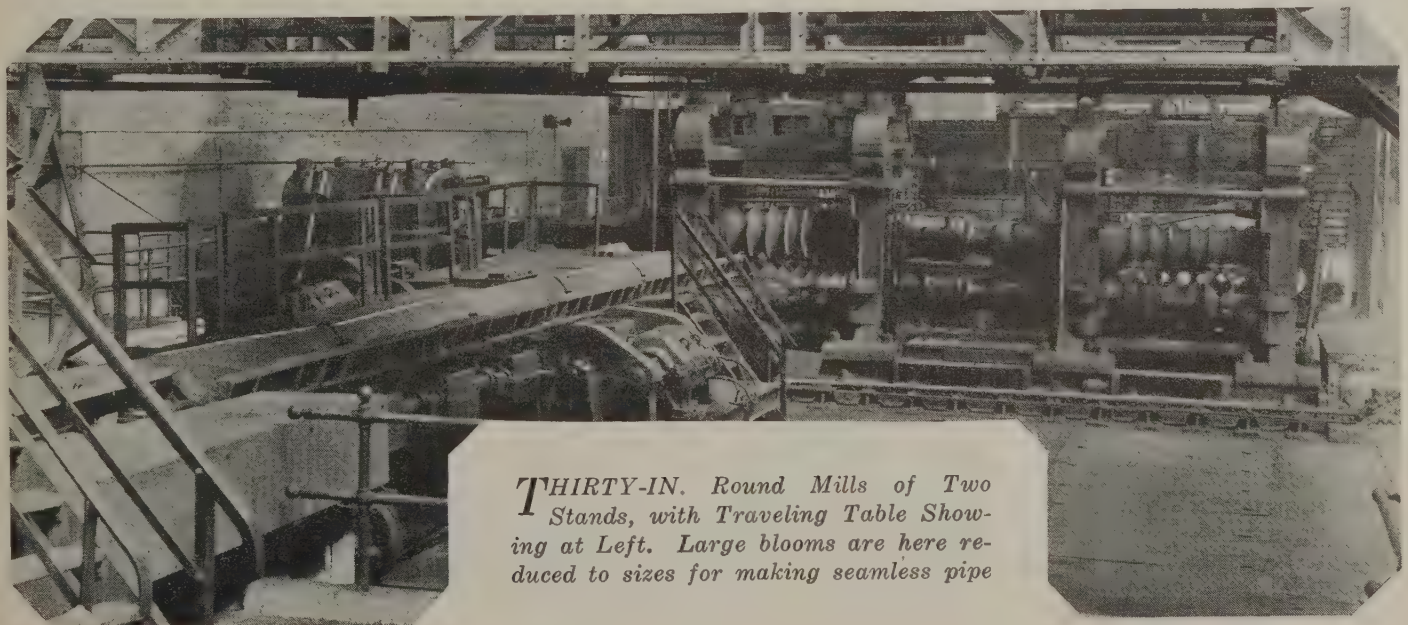
and carefully inspected after the chipping is done, before going to the heating furnaces serving the round mill.

Passing through either of two continuous furnaces, which they enter endwise at one end and leave endwise at the other end, the blooms are rolled on two-high sets of rolls in two stands, served on both sides by traveling tables. The rounds thus produced form the raw material for the tube mill. Before shipment to that mill, however, they are cut to length by hot-saws and one end of each piece is given a deep center-punch mark in a machine which utilizes both pneumatic and hydraulic pressure, the one for striking the blow, while the other holds the piece in position.

Rounds Are Charged Hot

While still at a bright red heat—a temperature of about 1700 deg. Fahr.—these rounds are transported by standard-gage special railroad car and locomotive to the charging side of the tube mill furnaces. Here they are picked from the car, eight or ten at a lift, by a fork suspended from an overhead traveling crane and are deposited upon the charging skids of one or the other of the two furnaces. As so placed, each blank has its punched end in position (at left in plan of mill) for meeting the centering point on the piercing mill.

It is said that the two furnaces serving the tube mill are the longest continuous furnaces of that type in any plant. They use producer gas for fuel, with occasional by-product gas when it happens to be available. The rounds roll by gravity on the furnace bottom until, on reaching the

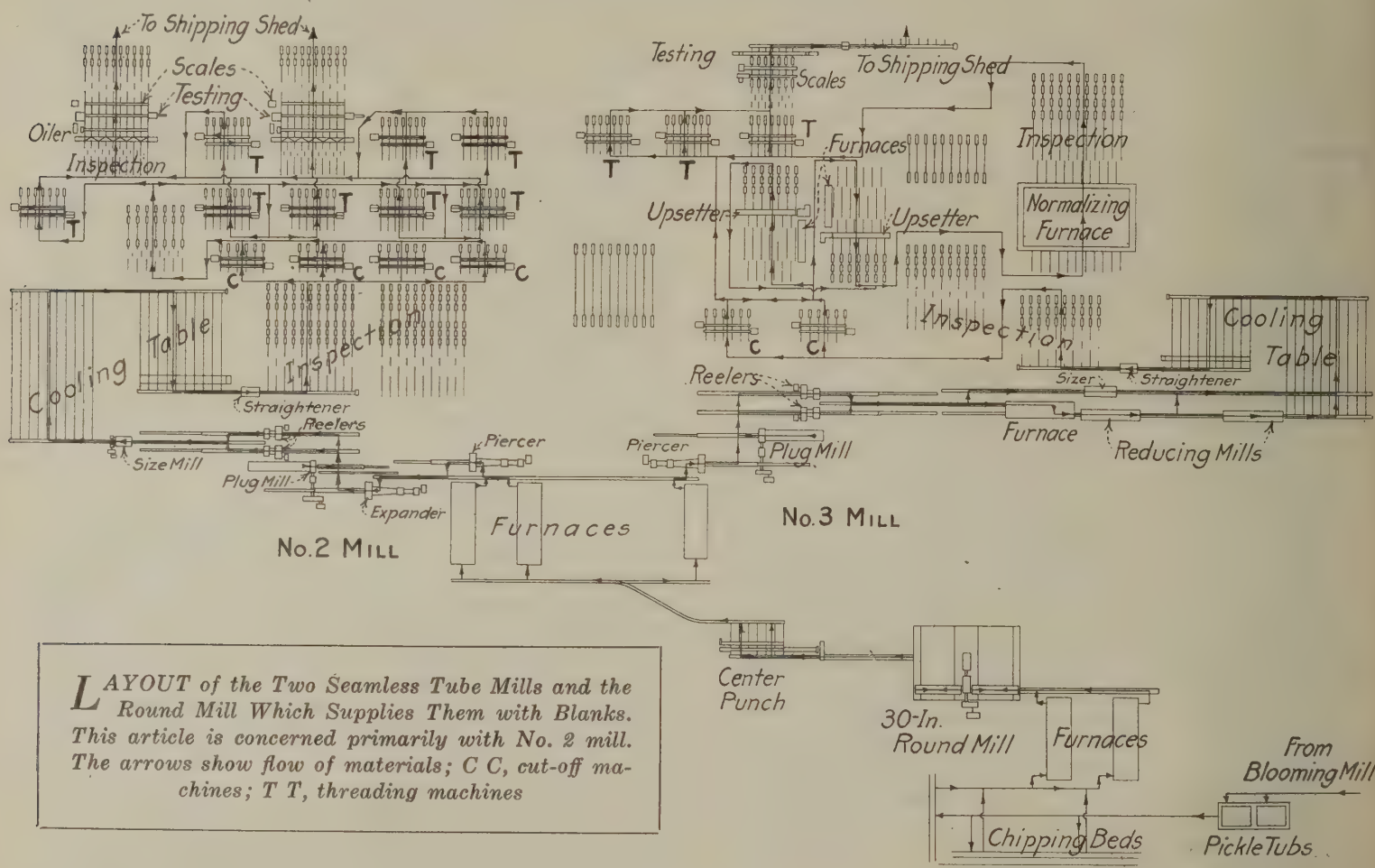


***T**HIRTY-IN. Round Mills of Two
Stands, with Traveling Table Showing
at Left. Large blooms are here re-
duced to sizes for making seamless pipe*

exit, they are thoroughly soaked with heat and are at the proper rolling temperature. The fact that they roll on the furnace bottom and do not slide is an advantage in uniformity of heating.

Each blank is pushed from its furnace lengthwise and then rolls sideways over a short section of transfer to enter the piercing machine. This consists of the Mannesmann type of crossed rolls with mandrel, the general operation of which has been described in THE IRON AGE at various times; in particular, see page 473 of Feb. 18, 1926, and page 681 of March 11, 1926. To take the thrust imposed upon the mandrel, there is a thrust bearing with 17 collars

From the expander another sideways movement places the blank in line for the plug mill, through which it passes in a manner similar to the foregoing, but under the action of a totally different type of roll. The relatively thin wall left by the expander is made still thinner in the plug mill, the operation of which is shown in another diagram. The rolls here have parallel axes and operate in the same manner as rolls in most forms of rolling. They leave the piece with a wall thickness approximately the same as that for the finished job. It differs from the finished pipe in several particulars, however. The interior and exterior are still somewhat rough, the pipe is a little under the finished size



LAYOUT of the Two Seamless Tube Mills and the Round Mill Which Supplies Them with Blanks. This article is concerned primarily with No. 2 mill. The arrows show flow of materials; C C, cut-off machines; T T, threading machines

arranged similarly to the propeller thrust bearing on a steamship. With adequate lubrication, this device performs its function without distress.

Operation of Piercing Machine

As the blank enters the piercing machine, the piercing point at the end of the mandrel bar is applied to the centered end of the round blank. As the outside surface of the round is gripped by the angular rolls, they start it rotating and at the same time advancing against the point on the mandrel. The action of the crossed rolls would open a hole through the center of the bar even were no mandrel present. The particular advantage of the mandrel with its point is that it guides the bar and thus makes the hole concentric as well as uniform in section. At the same time, of course, the displacement of metal results in elongating the bar.

Leaving the piercing machine, practically all of the blanks pass through the expander or second piercer. They reach this unit by a second sideways transfer and here receive treatment similar to that in the first piercer, but such that the piece comes out with a much thinner wall and a larger diameter. The diagram showing the successive sections of the pipe produced by the successive units of the mill illustrates this point clearly.

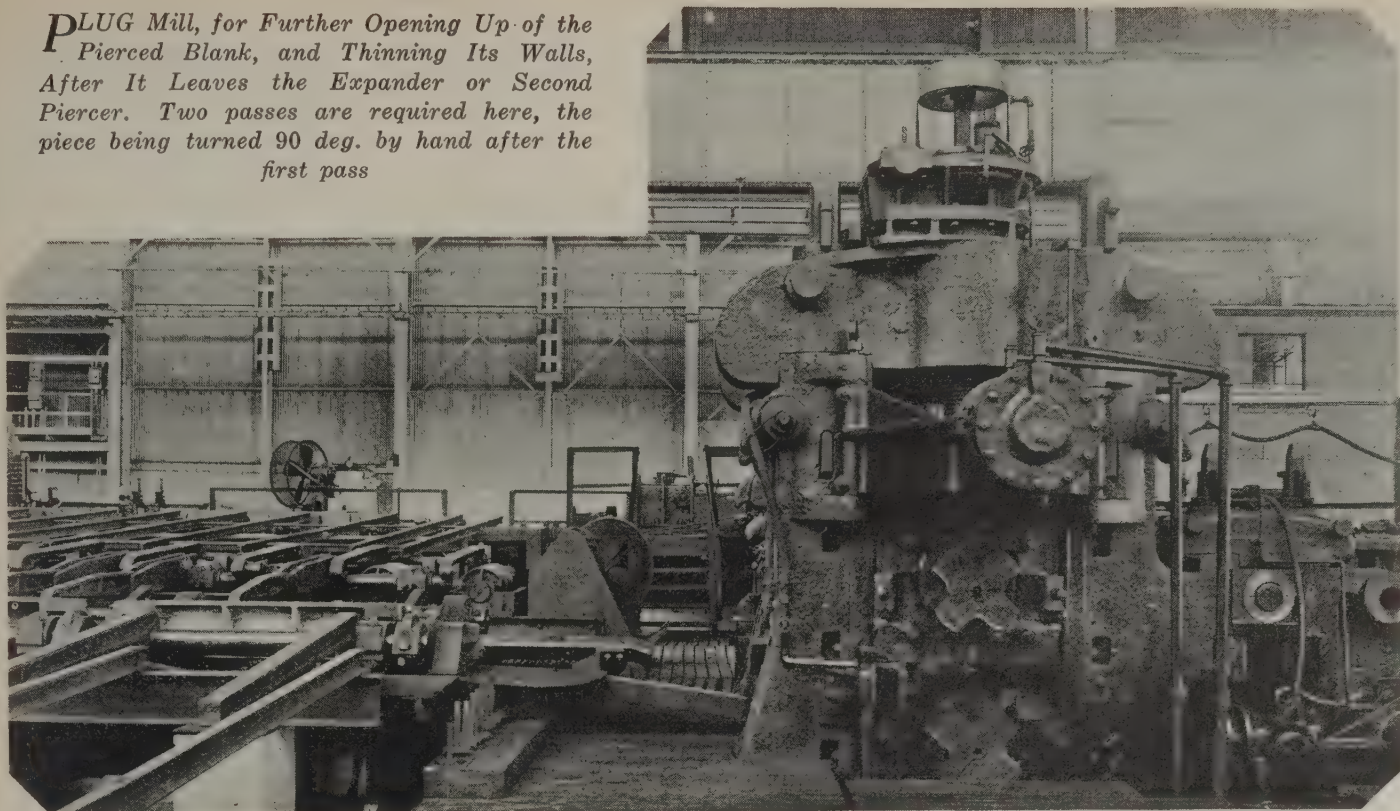
and it is not quite round. It receives two passes through the plug mill, being turned by hand 90 deg. after the first pass.

Stripping rolls are arranged at one side of the plug mill for running the pipe back after the pass has been made. The working rolls are moved away from each other through control of the operator and the stripping rolls then grip the piece and send it back. By this arrangement both sets of rolls are kept continually running without reversing direction, but they rotate in directions opposite to each other.

As the passage through the reelers is slower than that in the three mills already described, two units of this type are provided, to follow the succession of single units. Here again the oblique roll arrangement is used, but with rolls different in shape from the Mannesmann type. The mild expanding action here is of the planishing type, resulting in giving smooth surfaces to both the interior and the exterior.

While the operation in the reeling machines is similar to that of the piercing mills, it is much more gentle. The type and setting of the rolls are similar, but of smaller angle, while the plug over which the pipe passes is slightly larger than the inside diameter of the finished pipe. The rolls give the pipe a forward rotary motion and exert pressure, causing its walls to assume the exact final thickness.

PLUG Mill, for Further Opening Up of the Pierced Blank, and Thinning Its Walls, After It Leaves the Expander or Second Piercer. Two passes are required here, the piece being turned 90 deg. by hand after the first pass



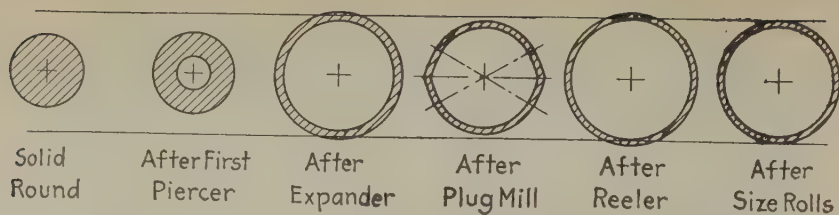
Only one other operation is performed on the pipe while hot. This is to pass it through the sizing rolls, which reduce it from the slightly over-size at which it left the reelers to the exact diameter required for the finished pipe. There is no change in the wall thickness in this operation, while the smooth surfaces inside and outside are maintained. The sizing machine has five pairs of two-high rolls, the axes of each pair at 90 deg. from its predecessor and all at 45

deg. from the floor. Proper regulation of the speed ratios of the rolls in this unit makes the elongation of the pipe compensate exactly for the slight decrease in diameter which it undergoes in passing through.

In addition to making the various mill parts unusually sturdy, measures were taken in the design to guide the round, and later the pipe, closely in obtaining accurate results. The whipping of mandrel bars was thus practically



GENERAL View of Entire Mill, from Sizer in Left Foreground to Furnaces in Right Background. The unusual lighting conditions are shown here, in the large glass area



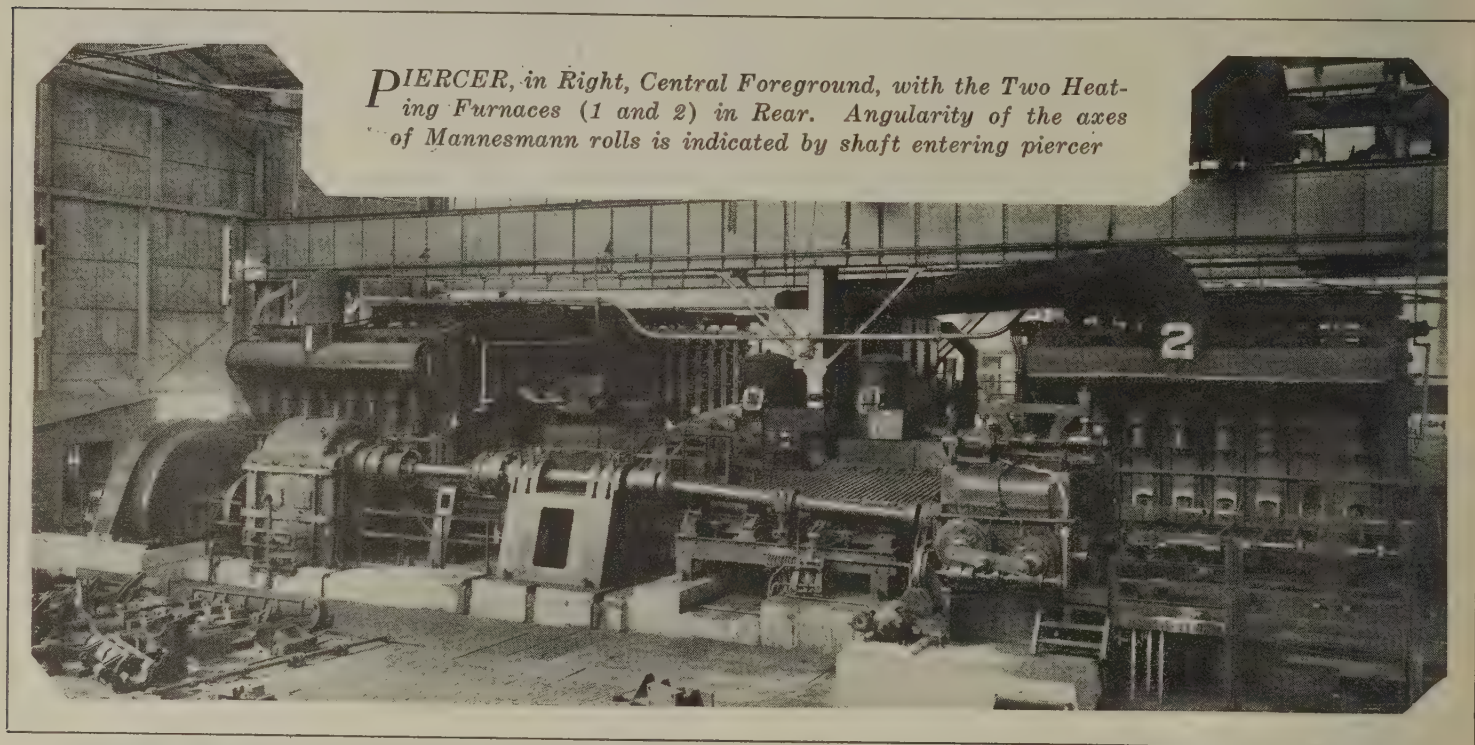
Successive Sections, from the Round Bar to a Completed Pipe

eliminated. All parts were made readily accessible and were so arranged that the vision from the operators' pulpits would be as unhampered as possible.

It was a departure to use two piercers—the second of which is called the expander—for this work. Many mills have only one piercer; this results in a much more severe action on the steel, and one which the Jones & Laughlin en-

Several operations, accompanied by exceptionally severe inspection, follow the cooling of the pipe after it has been made to size. All the pipe made goes through the straightener, which is of the conventional roller type and takes out any kinks or curves which may be in the pipe as it leaves the cooling racks. The straightening mechanism removes the scale from the surface and gives the pipe a high finish, on which any defects which may exist show up plainly.

Inspection of the pipe after straightening includes the use of a ring-gage for determining proper size and a close inspection of every foot, inside and out, for surface flaws. If flaws are found near the end, a ring may be chalked around there to indicate the point at which the pipe can be cut off to eliminate the area containing flaws. Sometimes a flaw in the center will permit cutting two short lengths of



PIERCER, in Right, Central Foreground, with the Two Heating Furnaces (1 and 2) in Rear. Angularity of the axes of Mannesmann rolls is indicated by shaft entering piercer

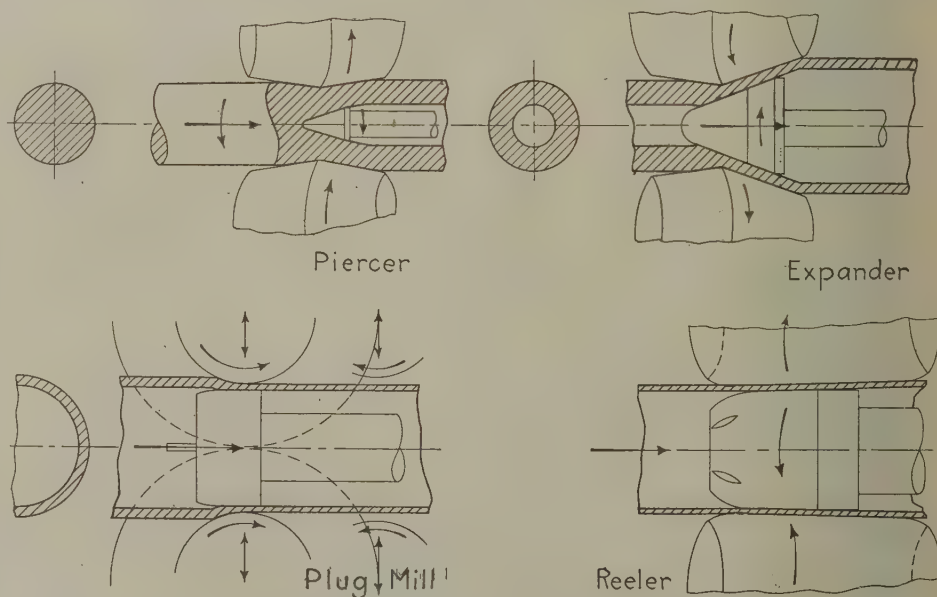
gineers believed would be injurious to it. Their experiments and experience indicate that a more nearly perfect pipe is produced by using a small round, piercing a small hole in it, and then expanding the piece through the second piercer, which is now the practice in that plant. For smaller size pipe, however, dimensional limitations of the product make it impossible, or at any rate inexpedient, to use more than one piercer. That accounts for the fact that only one is used in the mill on which the smaller sizes of pipe are produced.

Finishing the Pipe

TWO hours are required for the pipe to pass from the beginning of the cooling rack to the exit end. This rack is much longer than any other yet built. As the end of the two hours the pipe is practically cold. This procedure avoids internal strains in passing through the straightening process and at the same time insures a uniform grain structure throughout its entire mass. The forwarding chains on the cooling rack are fitted with small rollers like casters, which avoids marking the surface of the pipe, as might be done if it were slid on skids.

pipe, one taken from either side of the marked portion.

After passing through the cut-off machines, where the pipe has already been chamfered, it goes to the threaders and has threads cut on both ends. Hence, when it leaves the threaders, it is finished, but has to have a hydrostatic test.



Illustrating the Actions of the First Four Mills Operating on the Blanks and Showing the Mandrels and Plugs Used. Piercer, expander and reeler use "crossed" rolls

FROM the Plug Mill (Left) the Blanks Go to the Two Reelers—Alternately. These are seen just this side of the bridge. At right of plug mill is one of the numerous fans used to keep the men cool



A coupling is screwed on each end of the pipe, which then goes into the hydraulic tester and is subjected to a pre-determined water pressure. A gage on the movable head of the testing machine gives at once the length of the pipe, which is thereupon chalked on it. One of the final inspection acts is to compare the weight of each individual length of pipe with the theoretical weight for the length chalked upon it, as a final check upon the accuracy of manufacture.

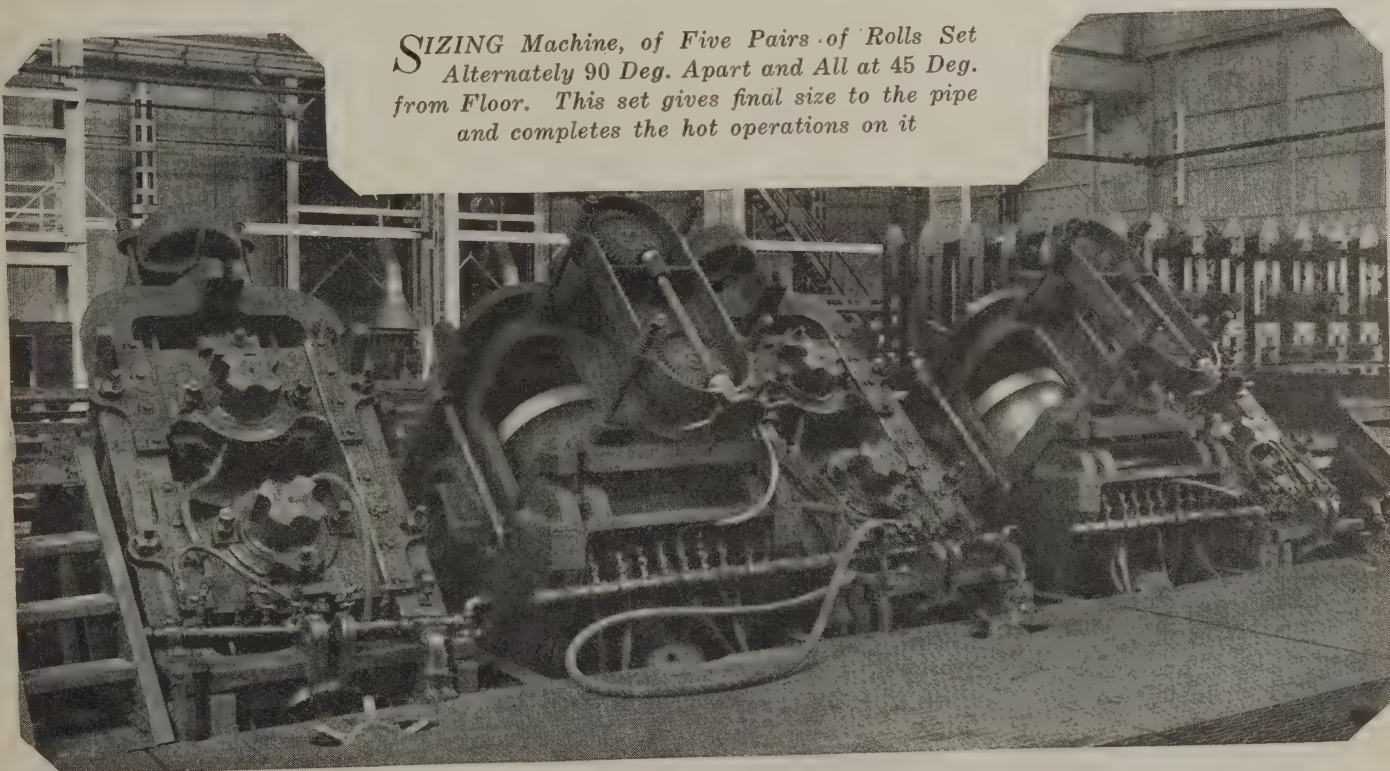
By the time the pipe has passed the weighing bench it has had from 10 to 12 separate inspections and is as nearly perfect as pipe can be made. Even the action of the threading machines is not taken for granted, but inspection of the threaded ends is one of the things always carefully done. Each length of pipe as it is shipped or stocked has a

coupling screwed on one end. On the other end, to protect the threads, is a thread protector, which will be removed when the pipe, at its destination, is about to be put into use. The pipe as shipped is covered with a coating to protect its surface from rusting.

Couplings Made from Larger Pipe

Making and inspecting the couplings for the pipe are just as exacting as making the pipe. These couplings are produced from pipe of larger size than that to which they are to be fitted. Such pipe is cut off into proper lengths for couplings, the length being one of the items immediately inspected. Blanks thus formed are run through one of four automatic machines, each of which has two working heads.

SIZING Machine, of Five Pairs of Rolls Set Alternately 90 Deg. Apart and All at 45 Deg. from Floor. This set gives final size to the pipe and completes the hot operations on it



One head bores the taper on the inside of the coupling, while the other taps the surface thus prepared.

Each machine has four chucking stations, 90 deg. apart, for the work. The chucks may be rotated through 180 deg. so that after one end of a coupling is tapered and tapped it may be turned over and have the other end similarly treated. There is ample time while the tools in the heads are doing their work for the operator of the machine to remove a completed coupling from an idle station and insert a blank in its place. The tapering head is automatically withdrawn as soon as its cut has been completed. The tapping head is fitted with a tap which is automatically collapsed, and then withdrawn, when the threads have reached a predetermined point. Every coupling then is inspected by screwing it upon a standard thread-plug and rotating it to make sure that the cut and tapping are truly concentric.

Careful and complete record is kept of all heats of steel

fore the equipment was running with the precision which now characterizes it, but the unusual experience was had of the plant starting off without all the long development incident to cut-and-try methods, as usually is the case.

Stresses in Steel and Magnetic Properties

Iron and steel will sustain certain stationary loads for an indefinite period. If the same load is repeatedly removed and reapplied, however, failure of the loaded member may eventually occur. Failure because of such repeated stresses is termed a fatigue failure, and no certainty exists as to the reasons for its occurrence, according to the United States Bureau of Standards, which has recently made a brief study of the effects of such stresses on the magnetic properties of steel.

In the few samples studied, the magnetic changes ap-



FINISHING Department, with Cut-Off Machines, Threaders and Inspection Racks Filling a Large Area. From the straightener all pipe passes through various stages here to reach the shipping shed

entering the seamless mill. From this the chemical composition can be secured at any time. Physical tests are made from pieces milled out of sections of pipe. A certain proportion of the pipe shipped is subjected to this form of test, which provides enough work to keep one milling machine constantly busy.

All of the machinery is housed in a steel frame building of generous proportions, with a special form of sawtooth roof, giving north light and providing what is for a steel mill an unusually high quality of natural light. The glass surface of the sawtooth is more than 20 ft. from top to bottom in each bay, the bays being about 100 ft. wide. The building housing the No. 2 mill, which is the one here described, measures 600 ft. in length. This building was extended for an additional 725 ft. to accommodate the No. 3 unit and the auxiliary apparatus on the finishing end. There is no wall between the two units. In consequence, the building now measures 1325 ft. long.

Design of the entire plant, which was developed primarily in the Jones & Laughlin engineering department, was based on a long study of various types of equipment and arrangement which were inspected, both in the United States and in Germany.

So careful was this study made and so well were the lessons learned that, contrary to all expectation, the new unit was producing marketable pipe the first day it was operated. Naturally, there had to be many adjustments be-

peared to be due to the relief of stresses initially existing in the material. Such stresses probably have a detrimental effect on the fatigue resistance of the material in which they exist, and certain types of heat treatment may be resorted to in order to bring about their partial relief and a consequent improvement of the material. The magnetic data indicate that repeated stresses, too small to cause failure, may also effect a partial relief of the internal stresses. Some of the beneficial effects of repeated understressing may be due to such stress relief. This subject is discussed in Research Paper No. 26.

Flame Cutting Harmless to Structural Steel

In an effort to learn whether flame cutting is detrimental to the strength of structural steel, the American Bridge Co. sent some typical wind connections from a 44-story building to the Bureau of Standards for test. When pulled in tension these specimens, cut from 24-in. I-beams, broke through rivet holes, and when bent under impact the only cracks appearing were short ones originating in burrs around punched holes. A report in *Engineering News-Record*, Nov. 1, concludes that "there is no evidence from any of the tests that fabrication by flame-cutting injured the material or had any influence on the strength or reliability of the connections."

Melting Practice in the Foundry

Prime Requisites in Getting High-Grade Metal with Minimum Fuel Consumption—Electric Furnace as Cupola Auxiliary

BY HENRY M. LANE*

THE prime requisite of all foundry operation is properly melted metal. In gray iron practice two melting methods have been in general use. These are the cupola and the air furnace. For many years the air furnace was relied upon to give a superior product and much attention was paid to its proper operation and the control of the metal by means of test pieces. This method is still used quite extensively for producing relatively large masses of uniform iron to meet high test requirements and more will be said later about the process in connection with furnace design.

The cupola has been the main dependence of the foundry trade up to the present time. The fuel was originally semi-bituminous coal or anthracite and later coke came into general use.

There have been many improvements in cupola practice and a good cupola operator should have a knowledge of what chemical reactions take place in the cupola. The cupola is probably the most efficient furnace from a fuel standpoint that has been devised by man. The melting is done in direct contact with the fuel, which is usually coke. The descending charge is preheated by the ascending waste gases. The metal and the ash are all melted and run out in liquid form, the ash as a slag. In the case of short heats the slag is sometimes held in the cupola and allowed to flow out when the bottom is dropped at the end of the heat.

In cupola practice it is necessary to introduce the air as a high-pressure blast to overcome the natural resistance of the material in the descending charge. Originally some form of fan was used and the pressure which it could produce was limited and this limited the possible height of the cupola. With the introduction of the positive pressure blower, cupolas grew in height and there was a greater opportunity for preheating the descending charge and the saving of fuel.

The bed charge in a cupola serves simply as a stage to support the balance of the material during the melting operation. The bed, however, must be brought to melting temperature at the beginning of the heat so that it will not have a chilling effect on the metal. When metal is confined in the cupola and subsequently tapped into a ladle it is necessary to have storage capacity in the cupola and this metal must be stored within the coke bed and hence it is in an excellent position to take up sulphur or other impurities from the partially burnt coke of the bed.

The part of the bed below the tuyeres acts as a stage or support throughout the entire heat. The part between the tuyeres and the melting zone is the active melting ingredient of the charge and enough coke must be added to it on each charge to compensate for the coke burned in melting each charge. If recourse is had to a forehearth or receiving ladle the bed can be reduced to a minimum and a decided saving made in coke.

To understand coke consumption and coke savings some knowledge is necessary of the chemistry of combustion. When the air enters the tuyeres, if the blast is properly proportioned, the oxygen present will all be burned to carbon dioxide gas and this reaction will give off 14,500 B.t.u.'s per lb. of carbon burned. This also gives a maximum possible temperature which is around 3000 deg. Fahr., and which makes possible the rapid melting in the melting zone.

Unfortunately above the melting zone the descending carbon in the form of coke becomes red hot and a secondary reaction takes place in which the carbon dioxide takes more carbon and becomes carbon monoxide. When one pound of carbon is burned to carbon monoxide it only gives up 4450 B.t.u.'s or approximately 10,000 B.t.u.'s less than are given up when a perfect combustion takes place. As a consequence the formation of carbon monoxide above the melting zone locks up heat and carries it up through the charge in the form of carbon dioxide. This gas burns at the charge door with a blue flame much to the annoyance of those who must work on the charging platform. Many attempts have been made to reduce the proportion of carbon monoxide.

Nearly 30 years ago the writer and Thomas D. West ran some tests on this in connection with which we wet the coke and by this means we were able to reduce the percentage of carbon monoxide at the charging door very materially and to our surprise we saved coke, but when we came to figure the matter we found that we had simply prevented the waste of coke. The ascending heat was ample to expel the moisture and turn it into super-heated steam. This in turn preheated the descending charge quite as well as would have been done by the dry gases.

In the past it has been quite a common practice to figure that it required 30,000 cu. ft. of air to melt one ton of iron. If you are figuring maximum blower requirements, this is a safe figure to use, but it is a very wasteful figure and is only arrived at in very poor melting practice.

In figuring the amount of air necessary for a cupola it must be remembered that coke is not pure carbon but carries approximately 12 per cent ash and hence at any given melting ratio this must be taken into calculation in figuring the air requirements.

If the formation of carbon monoxide could be entirely avoided we would melt iron with about 22,000 cu. ft. of air per ton, but this figure is very difficult of attainment.

In order to have figures comparable, the bed should be excluded from the calculations and the amount of coke between charges considered as the actual melting ratio. In most fair foundry practice this is taken as a ratio of 1 lb. of coke to 10 lb. of iron.

Fuel Consumption Affected by Type of Metal

THE amount of fuel necessary is also affected by the type of metal being melted. Where steel is added to the charge there are certain chemical reactions going on as the steel descends through the cupola. Steel in the cupola be-

*Foundry engineer, Detroit. A paper read before the convention of the National Founders' Association, New York, Nov. 22

comes heated and undoubtedly takes up considerable carbon first from the carbon dioxide present and second from a solid carbon. This case-hardening action is increasing the carbon content of the steel and at the same time reducing its melting temperature. If the entire charge is made of steel it will pick up so much carbon in passing through the cupola that it is no longer truly steel but a low carbon cast iron. In order to accomplish these results it is necessary to maintain a very high temperature and the result is a lower melting ratio; that is more pounds of coke necessary to melt a ton of iron than are necessary when a soft grade of iron is being melted and the charge consists entirely of scrap and pig iron.

When cupola malleable is being made a still higher temperature is required and all of the carbon must be combined with the iron, and the result is a still lower melting ratio so far as pounds of iron per pound of coke melted are concerned.

With the old fashioned cupola the main savings which could be accomplished resulted from a careful selection of the proper kind of coke and the wetting of the coke.

Engineers have approached the saving problem from several other angles, all of which looked toward the conservation of heat. There was a Frenchman by the name of DeClercy who brought a cupola to this country 20 years ago in connection with which he had an auxiliary wind belt two or three feet below the charging door, from which he drew a certain proportion of the products of combustion and these he combined with additional air in the blower. His object was to dilute the carbon monoxide to such an extent that it would not burn or explode. The result was the preheating of the blast to around 200 deg. Fahr. and the return of a very small proportion of carbon monoxide to be burnt at the tuyeres. His cupolas did show very good savings, but it required a careful operation, and when the writer visited his foundry in Paris a few years ago this cupola was not in use at the home of its inventor.

The next important step was taken by Bradley Stoughton in his attempt to substitute oil for a portion of the fuel in melting. With this arrangement, oil was burned either in the auxiliary chamber, and the product of combustion introduced through the tuyeres with a small excess of oxygen, or was introduced directly into the tuyeres with oxygen sufficient to burn the oil plus a small amount of coke. Theoretically this arrangement was supposed to give a higher temperature in the melting zone and to reduce the amount of coke necessary. With coke fairly high priced and oil at a low price, as it was on the Pacific Coast some years ago, quite a saving can be shown with this style of melting, but the difficulty was to maintain the rate of oil flow and the excess oxygen on the one hand and the amount of coke added to the bed on the other so as to keep the bed at the proper height and avoid the oxidization of the iron. The nicety of the adjustment made it impossible to run this type of cupola with the same grade of labor which operated the ordinary coke-fired cupola, and this factor eliminated some of the plants, while the rising price of oil as compared with the coke eliminated others.

Powdered Coal as a Cupola Fuel

THE Whiting Corporation has recently been carrying on some interesting experiments in the use of powdered coal as a cupola fuel. In this case the coal is burned in auxiliary combustion chambers outside of the cupola and the products of combustion, together with a slight excess of air, are introduced through the tuyeres. As in the oil fired cupola the bed must be built up at a rate proportional to the excess of air introduced.

Both the oil fired cupola and the powdered coal cupola introduce one additional element into cupola practice and that is the presence of hydrogen in the combustible gases due to the presence of hydrocarbons in the auxiliary fuel used. This may not be wholly an unmixed blessing on the

one hand, the resulting components may break down to oxidize the descending charge, while on the other hand the burning of the hydrocarbons certainly will prevent the excess of CO gas in an all-carbon fuel.

Many engineers have looked for some way to utilize the waste heat, and recently there has been put on the market a hot-blast cupola which is turned out by the Griffin Engineering Co. and which was developed in connection with the plants of the Griffin Wheel Co. In this arrangement an auxiliary air belt, similar to the one in the DeClercy cupola, is placed a few feet below the charging door and a certain proportion of the products of combustion are extracted at this point, but unlike the DeClercy arrangement, no attempt is made to return these products of combustion to the cupola. On the contrary, a practice similar to that followed in blast furnaces is resorted to, and the material exhausted is burned with the addition of a small amount of oxygen and used to preheat the blast. The preheating arrangement is known as a stove. The products of combustion from the furnace pass up through pipes about which the incoming blast circulates. It is necessary to have an exhaust fan to take the products of combustion from the stove and blow them into the open.

This arrangement not only returns to the cupola a portion of the sensible heat present in the gases which have been exhausted, but also the heat made available by burning the carbon monoxide gas exhausted. With this arrangement the blast is heated to from 400 to 500 deg. Fahr. before it enters the cupola. This results in a more rapid combustion at the melting zone and in a higher temperature at the melting zone; also, if you attempt to maintain the same temperature, it is necessary to burn less coke to accomplish the results and hence there is a considerable saving in fuel as well as in the assurance of constant conditions in the melting operation.

There is no reason why the hot-blast system above outlined cannot be combined with the General Electric Co.'s control of the ingoing air and this should result in very efficient cupola practice.

Development of Special Furnaces

Many different types of special furnaces have been evolved to try to improve the quality of iron or to cheapen its melting.

In the air furnace group, attempts have been made to put a high chamber at the back end of the furnace, where a large amount of scrap was piled up, so that it could melt down as the heat progressed. In this connection a type of furnace known as the Pittsburgh furnace was developed and usually in charging a furnace of this kind small but heavy scrap was piled in toward the fire box and then the high part, or "kitchen" as it was called, was piled full of heavy scrap, pig and miscellaneous material. Melting always commenced near the bridge wall and progressed back toward the stack, so that the material in the high part of the furnace was melted down last by the heavy flame.

In like manner, air furnaces have been arranged to operate with oil, powdered coal or other fuel and provided with a stack or cupola at the back in which the real melting took place, the hearth being in use for superheating or for any refining.

In connection with the cupola, as has already been mentioned, a forehearth or receiving ladle is of advantage and in recent years this device has been used to reduce the sulphur by adding an alkali to the forehearth. This method is particularly useful where the cupola is used for melting metal for duplexing to electric furnace.

Use of Electric Furnaces in the Foundry

SO far as iron melting is concerned, electric furnaces divide themselves into two classes known as direct arc and indirect arc furnaces. In the direct arc two or more electrodes are usually arranged in a vertical position

and an arc is struck between them and the charge, the current passing through the charge.

In the indirect arc the electrodes are in a more or less horizontal position and the arc is struck directly between the electrodes without any contact with the charge. The indirect arc type of furnace lends itself particularly to a rocking operation, in connection with which the part of the lining heated by radiation from the arc is rocked under the molten bath, serving to superheat the bath.

The first operations in this country in making gray iron in the electric furnace used the direct arc type furnace and experimented with the melting down of an all-scrap charge. Some of the first experiments used a basic lined furnace and a second slag for reducing sulphur. In later operations an acid lining has been used and no attempt made to reduce sulphur in the electric furnace. Where scrap with the possible addition of pig iron is melted from cold metal in the electric furnace there will be no pick-up of sulphur and it is quite easy to control the amount of sulphur in the final castings. Where duplexing involving the melting of the iron in the cupola and the heating of it in the electric furnace is employed sulphur may be reduced in the forehearth of the cupola by treatment with a suitable alkali.

With the direct arc type of furnace the question of whether this process will pay depends upon several factors. On the Pacific Coast the relatively high price of coke, the low price of electric current and the low price of scrap make an electric furnace production of gray iron a very attractive proposition. In the East, at any point where electric current is particularly cheap it may be an attractive proposition.

Scrap Melting by Century Electric Co.

One exceedingly interesting case is that of the Century Electric Co., St. Louis. This company has a large percentage of very low-carbon steel scrap from the laminations of its motors and with this material as a base it has been making a synthetic gray iron. The process consists of having a baling press into which a certain amount of sheet metal was placed; then they put in a bag containing some cast iron borings, some carbon in the form of scrap from the carbon works and the necessary alloys of ferrosilicon and ferromanganese. They then introduce some more steel and press the entire mass into a bale or block which is charged into the electric furnace. With this is also charged the return scrap and sprues from the foundry and a small amount of coarse steel punchings. The entire mass is melted down into a high grade of gray iron. It is found that this metal is of essentially identical chemical composition with the cupola metal used formerly and is 20 to 25 per cent stronger. This additional strength gives a decided reduction in the breakage of delicate castings during machining operations and during shipment.

In the case of the Century Electric Co. the use of the scrap in the same building in which it originated saves transportation charges and the foundry is arranged on such a schedule that the furnace keeps off from the line during the peak load period. The result is a very nice melting arrangement, an improved product of iron and a reduced cost of castings of approximately \$30 a ton.

The company then decided to build a foundry to take care of its entire output, but here it immediately encountered the following factors: The new foundry was to be a continuous pouring unit with a conveyor system. If sufficient electric furnaces were put in to handle the entire output in a single molding shift the electric current charge would be unduly high if the molds were all made in one period, put on the floor and the furnace and shakeout gang worked throughout the 24 hr. there would be a big investment for building and poorer molding economy, which would more than offset electric furnace gain. In the old location the single electric furnace in use formed but a small part of the total load of the factory. In the new location the electric furnace would be a considerable portion and as a

consequence it was decided to use the cupola method for the bulk of the castings.

There are three methods in common use operating electric furnaces of the direct arc type; two of these methods have been in use for some time and the third has recently been put into commercial operation. In the first we have the direct melting of batches of cold metal either of approximately the composition required or the making of synthetic iron by the addition of carbon and alloys. In the second process we have the duplexing in which metal is melted in the cupola and superheated and refined in the electric furnace with or without the addition of alloys. In the third process a fairly large electric furnace is used, say of seven or eight tons capacity. In the morning a full batch is melted. Throughout the day ladles of say 1000 lb. each are taken from the furnace and a corresponding amount of cold material charged immediately. This material will be melted and incorporated in the bath by the time the next 1000 lb. is poured out. This continuous process is now in use and giving excellent results.

Electric Furnace Has Some Advantages Over Cupola

ELECTRIC furnace iron has a few advantages over cupola metal. The superheating of the metal makes possible its better deoxidization, the freeing of it from gases and the better combining of the carbon with the metal, which results in a product that weighs more per cubic inch than cupola cast iron, has a finer grain and will run 25 per cent or more above cupola metal in strength, even though the composition be the same. Also, this hot metal casts with less loss and particularly with fewer blowholes. As a consequence, the loss of castings in the machine shop is greatly reduced, machining qualities of the metal are also more uniform, and in most cases metal of a given composition seems to machine easier, which is probably due to the finely divided state of the carbon.

In the United States there are at present probably no locations east of the Rocky Mountains where electric furnace iron will not cost more than a corresponding cupola product, but one concern which machines its own castings has proved that, while the electric iron costs \$10 a ton more than cupola metal the final figures show that castings in the finished product cost \$21 per ton less for electric furnace product than for the cupola product. The difference is largely made up by the fact that with the electric furnace product there is so much less back charge for machining defective castings.

Electric current in the East will cost from a little less than 1c. per kw. hr. to approximately 1½c. with an average slightly over 1c. Roughly in the direct arc type furnace current can be taken at an average of \$6.83 per ton, electrodes \$1.20 per ton; refractories 50c.; labor \$1.04, or a total of \$9.57. To this must be added a 5 per cent melting loss and overhead.

In one case we can figure a charge made up of 1000 lb. of cast iron borings at \$11.50 a ton; 300 lb. stove plate at \$13 a ton; 200 lb. forging flashings at \$11.50 a ton; 500 lb. No. 1 gray iron scrap at \$19 a ton. Adding this to the above charge would give us a metal cost of \$21.35 per ton for batch melting. If the charge had been made up of 50 per cent pig iron and 50 per cent heavy gray iron scrap the price would have been \$28.47 a ton. Owing to the fact that in duplexing the electric furnace only takes about 100 kw. hr. per ton we have a much lower electric furnace cost in duplexing and counting refractories and labor we can figure on approximately \$2.47 a ton for duplexing. For continuous cold melting in one case the figure amounted to \$21.94 a ton.

Advantages of Indirect Arc Melting of Borings

THE indirect arc furnace is usually of a rocking type and is not so well suited for melting down heavy or chunky material as is the direct arc, but for melting cast

iron borings or fine material it has distinct advantages over the direct arc type and there are today quite a number of plants of this kind in operation. An interesting fact is that by taking the borings from a given grade of cupola iron and dead melting them in an electric furnace you will obtain a metal of far superior quality both from a wearing standpoint, from strength and from machinability. As already explained this is probably due to the better form of the carbon, to the superheating and also to the refining action.

Where the rocking type furnace is used, the charge generally consists of the back sprues and scrap together with borings. Even where borings are badly oxidized they can be cleaned up, the oxide reduced to metal, giving a good high grade product, but of course the reduction of oxide is made at the expense of carbon and to maintain the same percentage of carbon in the mix it is necessary to add carbon in some form. Generally for carbon additions in any electric furnace petroleum coke or some similar relatively pure carbon is better than high ash coke and in many cases old electrodes or scrap from the carbon works may be used for this purpose.

Planning to Utilize Borings

One of the prominent motor companies has run extensive experiments during the past year with this type of electric furnace and is now planning to put in an extensive plant for utilizing its borings. Where borings originate in a given plant, there is a distinct saving in converting them on the same property and turning them out as high-grade electric furnace castings and under suitable conditions this can be done in competition with cupola practice. This is due largely to the saving effected in handling and the improvement in the quality of the product in addition to the low market value of the borings.

If an electric furnace unit is to be worked to maximum output, advantage must be taken of at least a 20-hr. load, simply keeping off from the power lines during the peak period in the evening. This necessitates either molding 20 hr. or storing the molds. It is evident that in the next few years this process of reducing borings will be used very

extensively by some of the large motor car manufacturers.

The Enot Foundry at Wayne, Mich., recently installed several small Detroit electric furnaces and turned out a line of high-grade castings on purchased borings. From a metallurgical standpoint the operations were thoroughly successful, but from a handling standpoint they decided that 800-lb. furnaces would be much better than the 300-lb. furnaces installed and this new installation is now being put in.

High-Grade Castings Made from Purchased Borings

It is perfectly feasible to work with commercial borings purchased in the open market and to work into them a considerable portion of steel borings and turnings, but the metal composition must be watched carefully and necessary corrections made by means of alloys or other metal additions.

A number of firms have adopted a physical test to check the chemical test. In this connection a step bar having various thicknesses ranging from $\frac{1}{8}$ in. or less up to approximately $\frac{3}{4}$ in. can be cast in an ordinary sand mold, cooled and broken and the operator will be able to judge his silicon and carbon balance very closely and this will enable him to make corrections to the bath without waiting for an analysis.

One concern has recently purchased and is now installing one battery of transformers with two electric furnaces. The transformers are arranged so that one of them can be used singly or they can be used in parallel. When used singly they operate a 350-lb. brass melting furnace. When used together they operate a 1000-lb. iron melting furnace. Both these furnaces, of course, can take a considerable overload in capacity. The iron melting furnace will be used for supplying a small continuous molding unit and the brass melting furnace will be used for taking off one or two brass heats at noon, for pouring the work molded in the morning and for taking off one or two heats late in the afternoon for pouring the balance of the work. Such combined units as this will be of great advantage to concerns having a certain amount of high-grade iron that must show special physical properties.

Fatigue Failures of Large Engine Shafts

THE importance of designing for alternating stress so as to avoid "fatigue failure" of steel shafting and other parts is emphasized in a recently issued report by a British accident insurance company. Broken machinery examined during 1927 included the following:

A rolling mill engine shaft, 35 years old, broke after 520,000,000 revolutions. Nominal stress 4000 lb. per square in. and an occasional maximum of 8500 when the rolls would jam. Break was in crank web 8 in. by 14 in., where steel had been overheated and had coarse grained structure.

A gas engine crankshaft, 20 years old, broke after 220,000,000 revolutions, under a calculated stress of 13,000 lb. per sq. in.

Another gas engine crankshaft, 14 years old, broke after 380,000,000 revolutions. It failed at the fillet between web and shaft, where stress was 10,500 lb. per sq. in.

Still another failure in a similar shaft at the same position occurred after only 20,000,000 revolutions at a calculated stress of 15,970 lb. per sq. in.

Several of the fractures recorded were due to bad or indifferent quality, or else to material damaged by improper heat treatment. For instance, a cracked billet was used for one shaft forging. During the forging operation this crack

had opened, but the damage was patched by autogenous welding, which failed, however, to reach the bottom of the crack. Another shaft of an expensive alloy steel containing 0.43 per cent carbon, 1.43 per cent of chromium and 2.83 of nickel, had been damaged by tempering at too low a temperature, so that it was excessively hard and brittle. It failed, in fact, after ten weeks' service in a gas engine, running at 1000 r.p.m.

Several instances are noted of shafts running for considerable lengths of time in a cracked condition. In one, the crack had extended halfway through the shaft before final failure. With the higher speeds now in general use, cracks may spread seriously in relatively short spaces of time, while in the days when engine speeds ranged from 35 to 60 r.p.m., a cracked shaft has been known to run for years.

In chromium plating, the tanks containing the chromium may be ventilated by means of large exhaust fans, which are connected to umbrella-like hoods over the tanks. The fumes are drawn back into a special chamber where the vapor is condensed and run back into the tank.

W. H. Barr Resigns from Presidency

National Founders' Association Elects Col. Thomas S. Hammond,
of Harvey, Ill., to Succeed Him—Convention
Discusses Variety of Subjects

WILLIAM H. BARR, who for 15 years has served the National Founders' Association as its president and who in that time has been one of the acknowledged leaders in the open shop movement in American industry, declined to stand for reelection at the convention of the association at the Hotel Astor, New York, last week, and was succeeded by Col. Thomas S. Hammond, president Whiting Corporation, Harvey, Ill. In recognition of his long service to the association, the members unanimously voted to pay Mr. Barr a bonus of a year's salary.

The affairs of the association were reported to be

in good condition, financially and otherwise, although there has been some loss of membership, due primarily to the tranquility which has prevailed in employer-employee relationships in recent years.

Sessions of the two-day meeting on Nov. 21 and 22 were devoted to such commercial and technical subjects as foundry cost methods, industrial education, business prosperity and foundry melting practice. One of the outstanding features was a paper by Virgin Jordan, chief economist National Industrial Conference Board, Inc., on "Business Prosperity and the Basic Industries," which is reproduced on other pages.

Advantages of Uniform Cost Systems in Groups of Foundries

WHEN a foundry has educated its own organization to figure costs correctly it has done only half of its job, said John L. Carter, general manager Barlow Foundry, Inc., Newark, N. J., in a report on behalf of the association's foundry cost committee. The other half of the job is to educate its competitors.

"One of the conditions that frequently prevents us from getting a fair price for our product," said Mr. Carter, "is that some of our competitors do not know how to figure their costs, or do not figure them at all. Some time ago our Newark association sent out a blueprint to about 20 foundries and asked them to figure their cost on the job. The weight was given and the desired production was given. The estimates varied from 5c. to 15c. per lb. Similar tests have been made by other associations and the same ridiculous variation has been found. Can there be any doubt that some of these foundries did not know how to figure their costs?"

"If we assume that 50 per cent of the business you lose—or say only 25 per cent—is due to ignorance of cost on the part of some foundries, would it not be worth real money to you to teach those foundries how to figure their costs? And, if you and a number of other foundries in your district were all figuring costs by a uniform method, do you not think that a lot of ridiculous prices would be eliminated?"

"If some of your competitors are ignorant of accurate cost methods or sound economic principles, they can disorganize your market and make it impossible for you to earn a fair profit, no matter how efficient you are.

It is your plain duty to yourselves, your stockholders and your industry to try to educate your competitors to use scientific cost methods if any practicable way can be found to do this."

Group Plan for Figuring Costs a Success

Conceding that a uniform cost system on a national scale has not proved successful, although tried out by the American Foundrymen's Association, Mr. Carter said that uniform cost accounting in local groups has worked successfully, and he cited the experience of the Newark cost group to prove this. The Newark group plan has been working for five years; it employs its own cost accountant; the original group of six has grown to 12, and every member of it, Mr. Carter said, admits that it has improved conditions in the Newark district.

After the cost group had been working for two years a test problem was submitted to all members, and the bids on a specific job varied only $\frac{3}{4}$ c. per lb., instead of a spread of from 5c. to 15c., as was the case when a similar experiment was tried prior to the formation of this group.

"Our market has been stabilized," said Mr. Carter. "There is absolutely no price maintenance; we stop at cost. There is still competition among our members, but it is fair, honest, sound competition; it is based on efficiency. If one foundry is more efficient than another, gets more production or has a lower overhead, it will get a lower cost and can quote a lower price. But the guesswork—the wild, foolish

prices—are being gradually eliminated from the field.

Newark Plan Has Reduced Costs

"Another advantage of this local cost group plan has become of great importance. Periodically we get out comparative cost reports which show various items such as melting cost, cleaning cost, indirect labor, overhead percentages. No names are given, but you can compare your own figures with those of other foundries, and if you find your own costs are high on a particular item you know where to concentrate your efforts to bring this item in line with comparative costs of other foundries.

"You know the attitude of the ordinary foundry superintendent. He thinks he is the most efficient operating head in the country. He has all sorts of alibis. He says, 'My cleaning cost is down to rock bottom, and no one could get it down any lower.' But if you can show him that his costs on the comparative report are higher than the average, you can make some impression on him. And if you have a local cost accountant, as we have, who is in close touch with operating conditions in other plants, he will help to convince him. And when you convince him that he is high, he will go after that item of cost and find some way to reduce it.

Large Savings Effectuated

"A great many big savings by members of our group would not have been effected had we not had these comparative cost reports. In our own foundry we have saved about \$5,000 a year on cleaning cost alone. Another foundry found its bench jobbing division was showing a loss. Its di-

rect labor was high. By continued attention and replacing one or two molders, this loss was changed to a profit, a saving of about \$3,000. Another foundry found that its overhead on floor work was out of line. After six months' intensive work on this item, it was able to cut out 10 men, a saving of over \$12,000 per year. Every one of us has saved the cost of this work many times over.

"There are 25 or 30 of these local cost groups operating now in various parts of the country. They are a recent development—their number is growing. The establishment of more cost groups in other localities would greatly improve conditions in our industry. The main purpose of this committee is to promote the formation of such groups in as many foundry centers as possible. If you wish any advice or assistance in starting such a group we shall give it.

"If you wish to start a cost group, the first step is to have a talk with your best friend among the local

foundries. Sell him the idea and then call in three or four more and sell them the idea. Then jointly hire a cost man to install and operate your uniform system. You can either hire a man to give his full time to the work, as we do in Newark, or you may arrange with a consulting accountant to give part of his time to the job.

"You must, of course, agree on some system. We have no pet system to foist upon you. The important thing is not what system you use, but that all members of your group use the same system. If you operate a malleable or steel foundry, we recommend using the system sponsored by the Steel Founders' Society and the Malleable Iron Research Institute. The American Foundrymen's Association has also recommended these two systems. For gray iron foundries, there is no standard system as yet, but we hope to get a description of a system which has proved successful in some of these groups and have this available for your information. We hope

soon to get data on a system for non-ferrous foundries also.

Cooperative Action Will Solve Problems

"The trend of the times is away from individualism and toward cooperative action. The foundryman who insists on running his business with a total disregard of the interests of his industry is out of date. We have learned that we cannot solve all of our problems by ourselves. Some of them require joint action. In the field of employee relations, this became apparent years ago. The National Founders' Association has clearly demonstrated that only by united action can we hope to maintain satisfactory conditions in this field. This committee believes that the adoption of a uniform cost system by a group of foundries in each locality is the most effective and probably the most far-reaching step to improve conditions in each locality and in the foundry industry as a whole."

How Two Large Companies Handle Personnel Work

DISCUSSING foremen training and personnel work, L. A. Hartley, director industrial education National Founders' Association, related some of the high spots in two large plants. Much of his talk, which was illustrated by lantern slides, was based on methods used by the Ohio Brass Co., Mansfield, Ohio, which he pointed to as one of the best systems he has studied, although, he said, there are some others equally good.

The Frigidaire Corporation, Dayton, Ohio, has established six definite rules of conduct for all employees regardless of the nature of their duties. These rules, which affect thousands of workers, have received the test of time, and, in the opinion of Mr. Hartley, the aims of the management have been achieved in that the men become better on their jobs and their home life is happier. The six rules are as follows:

1. Follow instructions willingly.
2. Be clean and orderly.
3. Take good care of property and materials.
4. Work well from whistle to whistle.

5. Work every day you can and tell your foreman when you cannot.
6. Work well with others.

These are called "the six laws of good work." In this large organization every employee is expected to know them and continually to study their application. Group and individual instruction is organized with this objective.

Ohio Brass Co.'s Methods

The Ohio Brass Co. has applied these same rules a little differently, according to Mr. Hartley, having set forth the following seven questions which apply to every worker:

1. Does he do good work?
2. Is he dependable?
3. Is he careful?
4. Is he clean and orderly?
5. Is he punctual and industrious?
6. Does he follow instructions willingly?
7. Is he agreeable?

To stress the interest of the management in the home life of its employees, and also to stimulate the interest of the foremen in the outside activities of their men, the company

files answers to the following questions about each employee:

1. Is he single? Or married?
2. How many dependents?
3. Does he own his home?
4. Is he buying a home?
5. Has he group insurance?
6. Is he in a savings plan?
7. Has he ever made any suggestions for improvements?

Mr. Hartley said that the two plants mentioned have achieved remarkable savings in production, have noteworthy records in maintenance of equipment, their conservation of materials is unusual, their scrap or unusable product is exceedingly low, the plants are kept clean at little extra expenditure, orderliness is apparent, and accident records are very low. In addition, he said there was an unmistakable atmosphere of happiness.

These rules, he said, are the fundamental principles of industrial economy in these nationally known manufacturing institutions. Their intelligent application by and to all employees carries the interest in each other's affairs beyond the plant and does it without paternalism.

Conditions Today Call for New Type of Business Man

"THE New Forces in Business" was the subject discussed by Charles F. Abbott, executive director American Institute of Steel Construction, New York, who said that "the industry which grasps the full meaning of the new form of competition and adapts its policies to meet it will inevitably outstrip those who are unable to recognize the change which confronts them or who fail to place the proper valuation on public opinion as the controlling factor of industrial progress."

As in addresses which he has made to other conventions recently, Mr. Ab-

bott stressed "the sharp competitive struggle" going on today, and the need for more intelligent handling of the problems of distribution and of scientific marketing and selling. "This new day," he said, "calls for a new type of business man, whose ability to create new ideas, new policies and to assume leadership will be an essential qualification."

A modification of the Sherman anti-trust law, with intelligent interpretations, might relieve the situation which today confronts many businesses, said Mr. Abbott, but he added that the Sherman law is not alone

responsible for the new conditions, nor would its repeal remove the principal of present-day problems.

"It is becoming more and more apparent," he declared, "that production in important fields has outgrown the anti-trust laws of 40 years ago. Trade agreements which have for their purpose the conservation of a product for the best interests of the public or the saving of an industry would not necessarily come under the prohibition intended by the framers of the statute."

"Business men must learn how to regulate themselves if they wish to avoid state socialism. A manufac-

turer has as much right to legal protection as the consumer. He should be accorded as much protection from the vicious acts of his competitors as are consumers.

"Mergers, leading as they frequently do to monopolies, offer no solution of our industrial problem. Cooperation and coordination of effort do. Co-operative activity, aimed primarily at better merchandising methods, offers

the one assurance of prosperity under present conditions of industrial and business activity."

Dwelling on the importance of advertising as one means of solving the problems of marketing and distribution, Mr. Abbott said that "the steel industry is the only large and important industry that has failed to seek the benefits of a national advertising campaign to educate the public."

Inveighs Against Anti-Injunction Legislation

JAMES A. EMERY, counsel of the association, discussed the anti-injunction legislation now pending in Congress, known as the Shipstead bill, and another bill which would "substantially abolish the jurisdiction of the discount courts of the United States with respect to suits predicated on diversity of citizenship or cases arising under the Constitution, treaties or laws of the United States, thus leaving to such courts only their admiralty jurisdiction and that over copyrights, patents or suits to which the Government is a party."

Mr. Emery said that this latter

legislation would leave to the State courts all of that vast body of litigation involving the most serious questions of constitutional rights and also litigation between citizens of different States or between citizens and aliens, for which the Federal courts were primarily created.

"The very existence of a written Constitution," he said, "requires for its interpretation and enforcement a national judiciary, qualified by learning, temperament and character to make it effective in every part of the American nation."

John Alden Grimes, representing

the Internal Revenue Bureau, Treasury Department, sought the aid of the National Founders' Association in a program now being carried out by the Treasury Department to fix standard rates of depreciation on equipment and other physical property. The method of procedure followed by the department is to set up these rates on an equitable basis after a conference with an industry. One such agreement has been in force 10 years, he said, and no serious dispute has arisen under it. The need for such agreement on depreciation rates is the various methods employed by single units of the same industry, thereby confusing the Treasury Department in deciding what are proper charges and what are not.

Important technical papers were by Henry M. Lane, foundry engineer, Detroit, on "Melting Practice," and by H. V. Crawford, General Electric Co., on "Automatic Blast Gate Control for Cupolas." The paper by Mr. Lane will be found elsewhere in this issue. That by Mr. Crawford will be reviewed in a later issue of this publication.

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SECOND

New York and that part of New Jersey north of a line drawn from Lambertville to Point Pleasant and the Provinces of Ontario and Quebec in the Dominion of Canada.

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THIRD

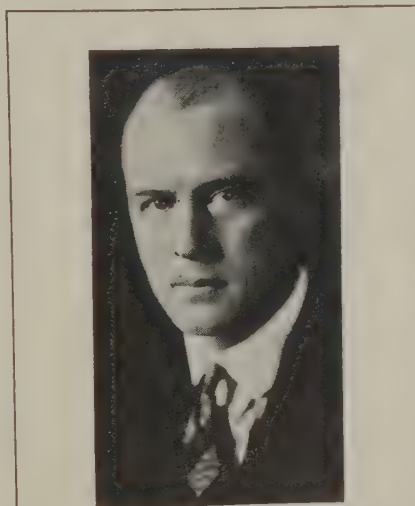
Pennsylvania, Delaware, Maryland, District of Columbia and that part of New Jersey south of a line drawn from Lambertville to Point Pleasant and including these two towns.

C. H. Hoffstetter, Odin Stove Mfg. Co., Erie, Pa.

T. B. Wood, T. B. Wood's Sons Co., Chambersburg, Pa.

G. L. Coppage, Pusey & Jones Corporation, Wilmington, Del.

B. H. Johnson, Cresson-Morris Co., Philadelphia.



Col. Thomas S. Hammond, President, Whiting Corporation, Harvey, Ill., Elected President, National Founders Association.

H. F. Wahr, Mesta Machine Co., Pittsburgh.

FOURTH

Lower Peninsula of Michigan, Ohio, Kentucky, Indiana and West Virginia

William D. Hamerstadt, Rockwood Mfg. Co., Indianapolis.

W. L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland.

D. J. Grant, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

L. W. Olson, Ohio Brass Co., Mansfield, Ohio.

E. A. Leary, Cincinnati Steel Castings Co., Cincinnati.

FIFTH

Illinois, Missouri, Oklahoma, Kansas, Nebraska and Iowa

Walter R. Medart, Medart Co., St. Louis.

C. N. Stone, Deere & Co., Moline, Ill.

A. J. Hartley, Hart Grain Weigher Co., Peoria, Ill.

J. W. Bettendorf, Bettendorf Co., Bettendorf, Iowa.

J. P. O'Neil, Western Foundry Co., Chicago.

SIXTH

Wisconsin, Minnesota, Upper Peninsula of Michigan, North Dakota, South Dakota, and the Province of Manitoba in Canada.

F. H. Clausen, Van Brunt Mfg. Co., Horicon, Wis.

R. P. Tell, National Brake & Electric Co., Milwaukee.

C. S. Anderson, Belle City Malleable Iron Co., Racine, Wis.

Fred S. Power, St. Paul Foundry Co., St. Paul.

E. C. Bayerlein, Nordberg Mfg. Co., Milwaukee.

SEVENTH

Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Tennessee.

D. B. Dimick, American Casting Co., Birmingham.

A. E. Hartwell, Hartwell Iron Works, Houston, Tex.

Charles R. Law, De Soto Foundry & Machine Co., Ltd., Mansfield, La.

R. C. Stobert, Hardie-Tynes Mfg. Co., Birmingham.

H. F. Griscom, Price-Evans Foundry Co., Chattanooga, Tenn.

Honorary Member of Administrative Council

O. P. Briggs, 812 Builders Exchange, Minneapolis.

Discussion of Open-Hearth Problems

Labor Saving Devices, Characteristics of Bottom-Making Material, Automatic Control of Drafts, Oil Burners, Regenerator Brick— Among Topics at Pittsburgh Meeting

LAST week two of the main subjects taken up at the Pittsburgh Meeting of the Open-Hearth Superintendents' Conference were covered in *THE IRON AGE*, (pages 1294 to 1298). The remaining general topic has to do with the operation of the furnaces, this being reserved for discussion at the third session of the conference. As with the previous sessions, there were no papers read at

this closing technical session of the meeting. Reliance was had, rather, on a free discussion from the floor of the several topics as they came up. The chairman called upon various members for expressions of opinion and, after one topic had been exhausted, went to the next one. In the following paragraphs is a digest of the discussion on operating factors.

Operation of Open-Hearth Furnaces

BOTTOM making and patching, combustion control, nozzles, stoppers and regenerator brick formed the topics for discussion at the third session. There were some progress reports on the use of various devices and a general interchange of opinion on matters affecting the day-by-day operating side of the furnace problem.

Use of Dolomite Machines

Something of a progress report on labor saving by the use of these machines was made by several men, who previously had reported installing such equipment. One man who had been running somewhat short of labor in the shop did not save any men with the machine, but it made the existing force much more readily available when the shop was crowded with bunched heats. He found that the machine cut down the elapsed period between tapping a heat and putting in the next charge by an average of 10 min.

Other men reported taking off one man for each two furnaces, taking off two or three men to the turn on shops with 10 or 11 furnaces, etc. Some time was reported saved between heats. In one case this was 20 min.; the time now occupied being 25 min. against 45 min. previously. It was the general consensus of opinion that the machine prevents playing out the men. To save time with it, however, good crane service is necessary, so that there will be no delay in getting the machine into action at the moment the furnace is ready.

One man reported a saving of dolomite to the extent of 5 lb. for each ton of ingots. Others, however, stated that there was no appreciable saving on this score, as the men were likely to put more material on a patch and thus make a better job of it. Some of the belts were reported as lasting 25 to 30 days, whereas other speakers said they were getting 10 weeks to 3 months life. It was stated that it was necessary to start the machine operating just before the furnace door is raised, to prevent burning the belt

through radiation from the furnace. Some of the short-lived belts, however, were reported as having been abraded and not burned.

In the summer-time, with extremely hard operating conditions, men using these machines do not slack the job of making up banks, as there is no occasion for so doing. Furthermore, it is said that the material can be placed on the banks more accurately by the machine than is possible by hand.

Austrian vs. American Magnesite

This topic has been discussed repeatedly at these open-hearth meetings. Most of the speakers reported an inability to distinguish any particular advantage of either type of refractory as compared with the other. It was said, however, that commercial stocks of Austrian magnesite appear to vary so much in fineness that the generally uniform character, physically, of the American magnesite makes it a material preferable to use. One man reported getting better results and lower costs with Washington magnesite than with Austrian.

Another man, however, who formerly advocated the use of American magnesite, has changed his viewpoint and now uses no magnesite whatever. He previously put a veneer of American magnesite over the surface of the laboratory at week-ends and found that about Thursday or Friday of the next week he would run into trouble through cutting the banks. Now, however, he is using a prepared dolomite which will run a whole week and into the next one before any trouble begins. He uses more of this new material in weight per ton of ingots, but it costs less. Formerly he used about 34 lb. of magnesite for all purposes, representing 68c. on a ton of charge, and 85c. on a ton of product. Now he uses 40 lb. of the new material at a cost of 30c. to the ton of charge, or 37½c. to the ton of product. As a result his delays from this cause have been practically eliminated and he is able to schedule his heats

very closely, to meet the needs of the foundry.

Unburned magnesite brick was reported as having been put into bulkheads with very satisfactory results. One man fitted the bulkhead at one end of a furnace with these brick and used a metal-cased brick at the other end. He had to patch the metal-case end after 210 heats, but did not have to touch the magnesite end, even after a much larger number of heats. This magnesite brick is given a metal-case fitting on three sides of it, as indicated in the sketch on next page.

Some plants buy the brick with the metal case on, while others make the metal shells and put them in place themselves. It was explained by the representative of a refractory company that brick of this type, cased with steel on three sides and patented, are being put out. This brick has a chemical binder to hold the magnesite together. One speaker stated that he used these magnesite brick in making the bottom of a furnace 2½ years ago, and thinks that they must have worked all right because he has never heard from them since.

Automatic Control of Fuel and Air

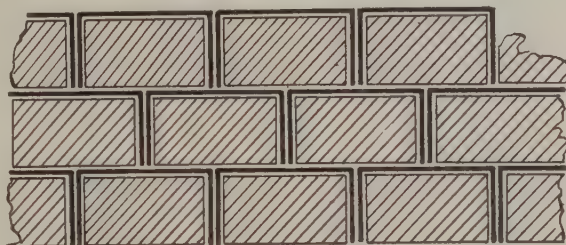
No automatic control is fitted with the Isley furnace equipment, and one speaker thought that such control would involve a very complicated installation. It would be necessary to house in the fans and to arrange control of the air for each end of the furnace separately. Report was made on one furnace at the Homestead works of the Carnegie Steel Co., which is fitted for automatic control. This has a relay which throws the valves over, instead of ringing a bell as does the Isley control. In this case, however, the control is based upon a differential of temperature between the incoming and outgoing ends of the furnace, instead of being dependent solely upon temperature conditions at the hot end.

Keeping a furnace so well balanced that neither end gets hotter than the other was discussed. A good operator

can run a furnace and keep it balanced, but a great many men do not do it. It is in these cases that the form of control on the Isley and other systems is a distinct aid.

Reference was made to a plate glass furnace near Philadelphia, which has been operating for the past four years on a system of control whereby the low temperature at the ingoing end will operate the alarm as readily as the high temperature at the outgoing end. Resulting from this it is possible to keep the cold end from getting too cold and to reverse the furnace whenever either end reaches a condition calling for it. It is claimed that there has been a saving in this case of 25 per cent on refractory costs. The regenerators on this furnace have not

Illustrating Brick with Metal Casing Applied on Three Sides. As each brick rests on the metal of the one below, it is covered, all four sides, by metal



which he saw at the Krupp works, has a supplementary regenerator. In England the maximum regenerator temperatures encountered run about 1300 deg. C. (2372 deg. Fahr.), while a good many do not go above 1000 deg. C. (1832 deg. Fahr.).

An engineer present referred to the fact that for each ton of steel made about 2½ tons of air, and an equal volume of waste gases, are passed through the system. For this reason it is essential that accurate proportioning must govern the various passages through the furnace, beginning with the laboratory, then the ports, downcomers, checkers, flues, valves and stack.

Discussion of the CO₂ measurement as contrasted with measuring oxygen

520 deg. The air going to the furnace is thus heated up to about 1000 deg. About half of the waste gases go through this heater, while the remainder go directly to the stack. A fan, placed on the low-temperature side, is used for the gases, to overcome the resistance through the preheater. This is large enough to take care of peak loads. Another fan is used for the air, both being on the same shaft and run by the same motor.

It was felt, however, that the two should be run separately, so that the speeds could be varied to suit conditions. It was found necessary in this case to put a damper on the air side to get the temperature up to 1000 deg. in place of the 800 deg. previously obtained. This necessarily absorbed more power.

This plant is to be made the subject of careful study by the open-hearth committee of the Corporation, on the basis of running the furnace two weeks with the preheater, then two weeks without and so alternating throughout the next run of the furnace. Probably it will be found advisable in steady operation to change the preheat temperature given to the air at various times during the progress of an open-hearth heat. Otherwise, if this temperature is maintained, the amount of fuel burned might profitably be changed as conditions warrant.

Nozzles and Stopper Heads

Graphite stopper heads and the nozzle, on low-phosphorus steel of 0.08 to 0.10 per cent carbon, are cut in pouring the steel. The question was raised whether this cutting is greater than when killed or semi-killed steel is being made, or when steel of the same carbon content is rephosphorized. No difference on the rephosphorization was reported.

It was stated, however, that rimming steel cuts the nozzle more rapidly than does killed steel. One speaker qualified this statement by saying that this depends somewhat on the temperature, and killed steel can be tapped at a lower temperature than rimming steel and thus save on nozzle and stopper cutting. Another man thought that the greater cutting on rimming steel was due to the slower teeming of the heat. The chairman remarked that cutting is caused by relative absence of silicon.

Magnesite nozzle brick are not in use by any of the companies represented at the meeting. Nozzles of a combination of clay and graphite, however, were reported by one speaker as giving very good service.

Different Kinds of Regenerator Brick

At a previous meeting several men reported experiments under way on the use of silica brick in the upper courses of regenerator chambers, with fire-clay brick below. The Stevens furnace at Indiana Harbor has the upper nine rows of regenerator brick of the silica type. These were reported as giving just as good service

been rebuilt within the past three years.

If gas conditions in an open-hearth furnace remain constant, then the reversals of the furnace will be at pretty regular intervals. When the furnace is being driven fast, however, reversals may come so close together as to cool off the furnace during the many brief intervals in which the change is being made. This was suggested as being a case in which the regenerators are crowded beyond their proper capacity. One speaker expressed the opinion that reversals of the furnace should come at a time when the checkers have been saturated through and through with heat, center and sides being in the same condition. This in the general case should be at about uniform periods.

A man using the Isley system expressed himself as of the opinion that this probably is not the best method of control which can be worked out. It is being given a fair trial in his plant, however, and much is being learned. He believes that furnaces with inadequate regenerative capacity should be operated on short reversal periods. Longer periods can be taken when there is ample checker brick to absorb the heat.

A visitor from England, Edgar C. Evans, fuel officer of the National Federation of Iron and Steel Manufacturers, made some comments on the Mode furnace, which he had seen in operation in Germany. In this case the regenerators are 30 ft. deep and are made of special brick. The temperature measured near the furnace was reported fairly constant at 1500 deg. C. (2732 deg. Fahr.). Stack temperatures on this furnace were reported also to be constant at about 500 to 550 deg. C. (932 to 1012 deg. Fahr.). Another German furnace,

developed the fact that the measurement is ordinarily made on CO₂ recorders because they are commercially available, whereas no satisfactory oxygen recorder, practicable and workable, is on the market. Two speakers took the point that oxygen is the correct measuring stick for flue gases. The amount in the stack should be less than 2 per cent, and in the down-take less than 1 per cent. However, as both oxygen and CO run pretty nearly parallel with CO₂, it happens that the CO₂ measurement works out pretty well as a general guide.

Combustion Control on Reheating Furnaces

Soaking pits and other types of furnace used in reheating steel for rolling are being gradually adapted to the use of combustion control instruments. One speaker reported the use of a preheater on such furnaces where the regenerator capacity is inadequate. This is applicable also to open-hearth furnaces.

Such a preheater of the regenerative type, but with the air flowing always in one direction and the waste gases in the opposite direction, as in a recuperator, is reported to have been in operation intermittently during the last month of a furnace run. That it did not give what was expected of it is laid to trouble with the measuring instruments. On eight open-hearth heats, however, the average reduction in time of making a heat was from 1 to 1½ hr., when compared with 12 heats made previously on the same furnace but without the preheater.

This installation, which is in one of the plants of the United States Steel Corporation, takes waste gases, leaving the furnace at a temperature of 1400 deg. Fahr. or over, and reduces them to practically a constant 500 to

as the fire clay brick previously used.

In general, the speakers reported that the silica brick keep much cleaner, as the grit will not adhere to their surfaces as in the case of clay brick. One instance of this was shown, where five courses of $10\frac{1}{2} \times 4\frac{1}{2} \times 4\frac{1}{2}$ -in. silica brick occupied the top of the chamber and the furnaces were running from 250 to 300 heats before it was found necessary to blow out the accumulation of dirt. This compared with 190 heats average when clay brick were used throughout. The dirt goes down between the rider walls. There was no recovery on this silica brick when they were taken out after a furnace run of 420 heats.

Another plant makes a practice of using four or five courses of silica brick on top, but takes them out, without recovery, after 125 heats, and puts in a new lot. This gives new life to the furnace and speeds up operations generally. In another plant, however, with producer gas as fuel, the use of eight or nine courses of silica brick at the top of the regenerator was discontinued because the gases were hot enough to cut them away almost to nothing.

Another speaker, who uses a large block brick in the large regenerator chambers, uses 9-in. brick in the small chambers of the same furnace and reports that this new arrangement has put new life into the furnace and speeded up the production of steel.

Improved Types of Oil Burners

Divergent reports were made upon types of oil burners in use. One man spoke of using a patented type for several months, but running one gallon more oil to the ton of steel. Another man using a home-made burner put instruments on the furnace to obtain adequate draft control, and thus made an improvement of as much as 7 gal. to the ton; his consumption is now reported down to 25 gal. The draft is run at about 0.4 in. of water, whereas previously it was 1 to 1.5 in. This results in a certain amount of blowing out of gases around the doors of the furnace, cutting the front walls and jambs, but these furnaces have made runs of 769 and 860 heats respectively since the change was made.

Longer life is given to the checkers, and four-fifths of the brick from the checkers are reclaimed. These furnaces have a charge of $27\frac{1}{2}$ tons and make 27 heats in a week, the first one coming out about 7.30 Monday morning and the last one about 2.20 the next Sunday morning. This figures out about 5 hr. 20 min. to the heat in the 139 hr. involved. The oil pressure was given as 21 lb. to the square inch and steam for atomizing is used at 40 lb.

It was said, however, that much can be done on a 27-ton furnace which will not operate equally well on a furnace of 100 tons. The low draft condition cuts out both front and back walls, according to one speaker, who uses 60 lb. oil pressure and 80 lb. of steam.

Another man said that he is getting 450 heats on low-pressure oil and

steam from an 80-ton furnace, where he was unable to go more than about 275 heats on a run when using higher pressures. The heats are made in about the same time under the two conditions. His change was from 130 lb. pressure of oil to 45 or 50 lb., measured at the burner, and his draft was $\frac{1}{2}$ in. of water. His burner passes less oil to the extent of 50 gal. an hour and on cold metal he makes his heats with the use of 33 gal. to the ton of ingots.

Ladle Cars for Hot Metal

A brief report was made on the operation of three hot-metal ladle cars of the American Rolling Mill Co., which were put into operation June 2 last. These carry pig iron from the blast furnace at Hamilton to the open-hearth department at Middletown. The furnace produces 550 tons of iron a day, tapping every four hours. The ladles can take 150 tons, their light

weight being 145 tons. They are run on 16 wheels, there being four axles at each end. Electric operation on the trunnion is utilized to pour this metal into transfer ladles for the furnace. The ladles are used as a sort of mixer or storage, and iron has been held in some of them as much as 16 hr. without causing trouble.

To line one ladle requires about $6\frac{1}{2}$ turns of 10 hr. each. Only four men can work inside the ladle at one time. The lining of a ladle takes 6000 special brick, equivalent to 13,000 9-in. brick. These ladles have been running about five months, before relining, and carrying 40,000 tons of metal in that period. There is reported to be no skull loss in these ladles and only about $\frac{1}{4}$ per cent in the transfer ladles. Adding $\frac{1}{2}$ per cent of kish makes a total loss of about $\frac{3}{4}$ per cent. This ladle was illustrated in THE IRON AGE of June 21 last, page 1746.

Predicts Further Changes in Industry

William R. Basset, of Spencer Trask & Co., Foresees Reductions in Costs, Simplification of Business, New Methods of Selling

"GREAT as have been the basic changes in business in the past 15 years, I confidently look for greater changes in the next 15 years," said William R. Basset, partner of Spencer Trask & Co., investment bankers, New York, in an address at the recent convention of the Associated Business Publishers, Inc., at the Hotel Roosevelt, New York. Mr. Basset said further: "I do not pretend to be able to forecast just what, in detail, these changes will be. However, in their broader aspects they can be stated:

"1. Great reductions in all kinds of costs will expand markets.

"2. Business will be simplified in many respects. Outworn trade customs of many kinds will be discarded.

"3. Channels of distribution will be cleared of needless obstructions. New methods of selling will be devised. Perhaps the slot machine idea will be highly developed and used in many lines of retailing. Selling costs will be greatly reduced by more intensive use of salespeople and by more effective advertising.

"4. Discoveries in pure science will reduce the present markets for certain goods and open markets for new goods. Consumers will discard many of their present wants and develop new ones.

"5. Art will increasingly enter into goods.

"6. It is even possible that uneconomic costly competition will come to be frowned on instead of encouraged by the law.

"The editor of a business paper is better able to sense such changes than almost anyone else, for while a business man is properly immersed in his own business, the editor can be in in-

timite touch with many businesses in his own and affiliated fields and so be in a position to sense trends before they become generally apparent.

"The speed with which business will progress and general prosperity increase will depend to a large extent upon the ability of the business man to foresee these changes and adapt himself to them."

Slight Recession in Industrial Activity

Productive activity in the United States based upon electric energy consumption in 3600 plants showed a drop from 134.5 in September to 132 in October, according to *Electrical World*. Both figures are far above the 119.9 of October, 1927, and all figures are based upon the average monthly activity of 1923 to 1925 as 100. The average for the first 10 months of 1928 was 122.6, which is 6 per cent higher than the 115.8 average of the first 10 months of 1927.

Metal industries showed an advance in October to 144.6, compared with 143 in September. This advance was participated in by both the steel and the non-ferrous plants. This was offset by a sharp drop in the automobile field, including manufacture of parts, and by lesser drops in some of the other major industries listed.

H. C. Atkins Mfg. Co., St. Louis, has commenced publication of a monthly folder called "Nips," which aims to discourse interestingly about the things to look for in a good pipe nipple.

Locomotive Cylinder Planing and Boring Machine

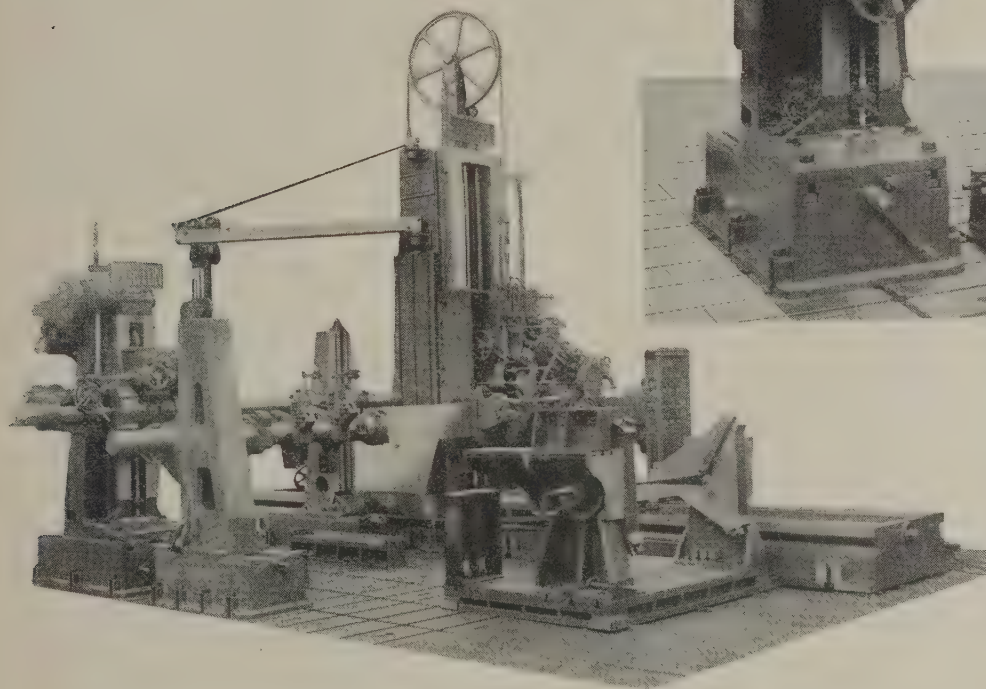
FOR the continuous machining of locomotive cylinders, the Morton Mfg. Co., Muskegon Heights, Mich., is offering the 72-in. stroke traveling head cylinder planing and boring machine here shown. All the planing, boring and milling operations are done by the one machine, the cylinders being completed except for drilling. The machine includes a piston valve boring unit and has capacity for the largest cylinders. When not required for cylinder work the machine may be used for a variety of planing, boring and milling jobs.

Cylinders to be machined are first placed in the floor chucks and made ready for the boring operations. The piston valve chamber is bored and faced by the piston valve boring unit,

5-in. boring bar, cutter heads and cutter support. The port milling attachment may be attached quickly to the square section of the ram without removing the standard planer head. A

matic horizontal feed is provided and there are six feed changes.

Parallels are provided for setting and leveling the cylinder for the boring operations, and provision is made for binding the cylinder. This unit is driven by a 7½-hp. motor, the drive



the main barrel being bored and faced at the same time by the traveling head unit. When boring is completed the cylinder is mounted in special cylinder chucks for planing and milling. The traveling head moves over to the work and on completion of the planing and milling it moves back into position for boring the main barrel of a new cylinder, which in the meantime has been placed in the floor chucks.

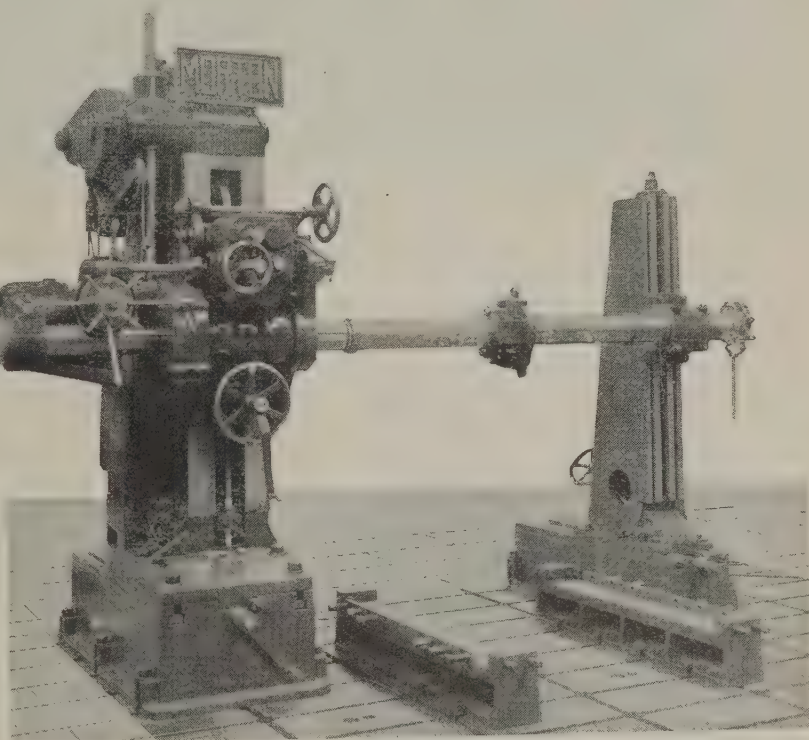
In general design the machine is similar to the company's standard traveling planers. When operating as a planer it has feeds either horizontally on the bed or vertically on the column, the horizontal feed being 18 ft. and the vertical feed 96 in. Automatic feeds for the ram, for boring and milling, are provided, and eight changes of feed in each direction are obtainable through a gear box. Boring and milling feeds are controlled by one lever. Power rapid traverse for all motions.

The floor plate is made in two sections and is approximately 15 by 20 ft. The chucks are of three-jaw universal type, the jaws expanding into the counterbore of the cylinder. The main barrel boring outfit consists of a

10-in. face mill is part of the regular equipment, and a one-piece work table, 30 in. high, 36 in. wide and 8 ft. long, is furnished. The push and pull cut head is threaded to fit either the planer head or the grip ring. The special extension head is designed for planing the upper frame fit of piston valve cylinders.

The machine is driven by a 10-hp. reversing motor, the power being transmitted through miter gears and vertical shaft to the operating mechanism in the vertically moving apron. The reciprocating motion of the ram is controlled entirely by the reversing motor drive. Longer beds and columns can be furnished and two traveling head units can be mounted on one bed, making a double traveling head cylinder planing and boring machine.

The horizontal piston valve boring unit, shown in the separate illustration and at extreme left in the picture of the entire machine, has a 5-in. diameter arbor. The outer bearing for the boring bar has vertical adjustment of 44 in. and horizontal adjustment of 24 in., the adjustments being made by hand. Scales are provided for settings on the column and bed. Auto-

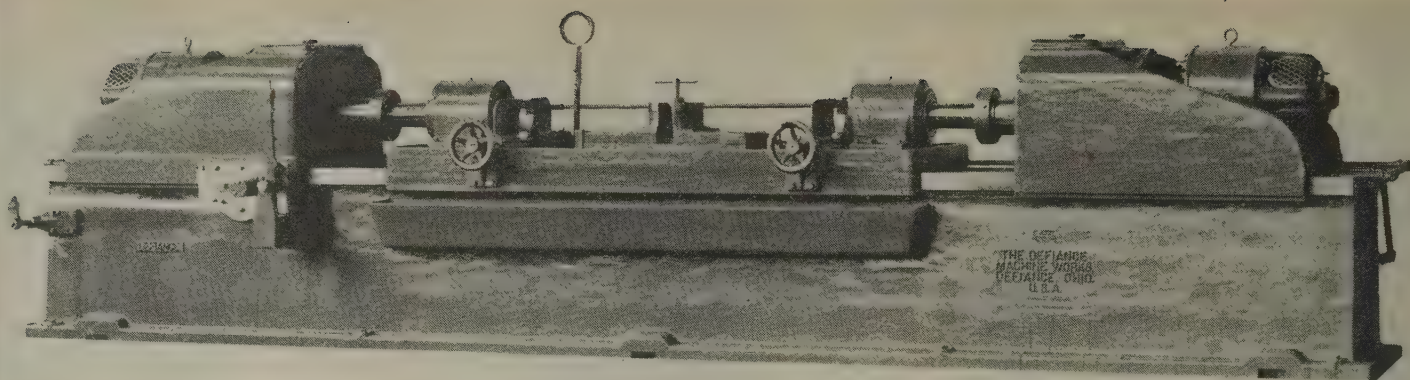


THE Complete Locomotive Cylinder Planing and Boring Machine Is Shown at the Left and the Horizontal Piston Valve Boring Unit Above. All machining, except drilling, may be done continuously, but when needed the machine may be used for other work

being through silent chain, running in oil, to the gear box and friction clutch.

Features of the 13-in. and 16-in. double back geared quick-change screw-cutting engine lathes manufactured by the Porter-McLeod Machine Tool Co., Hatfield, Mass., are described and illustrated in a four-page bulletin issued by the company. The apron is double-walled and all gears run in an oil bath. The spindle is mounted either in bronze or Timken roller bearings. The quick-change gear-box, of unit construction, is bolted to the bed and is of such strength that feed changes, 40 of which are available, may be made while the lathe is under cut.

Easing of automobile manufacturing is continuing in November, according to *Automotive Industries*. Indications are that output for the month will show a decline of approximately 20 per cent from October. Manufacturing changes in a number of large producing factories in preparation for 1929 is in the main responsible for the reduction.



Automobile Axles and Similar Pieces Are Bored, Reamed, Drilled and Tapped

Two-Way Boring and Drilling Machine

FOR heavy-duty boring, reaming, drilling, tapping and other operations on automobile axles and similar pieces, the Defiance Machine Works, Defiance, Ohio, has developed a special two-way opposed, direct motor driven, horizontal boring and reaming machine with Oilgear feed. The machine can be furnished either with single or multiple-spindle heads. The

spindles are of alloy steel and are mounted either in anti-friction or in bronze bearings. Spindle drive gears are of stub tooth form, heat treated, and are inclosed and lubricated continuously either by splash or force feed. The large gears are of the helical type. The machine can be equipped with the Oilgear feed and with mechanical feed having rapid power

approach to work, then rate of feed desired, and with automatic rapid return. The length of the bed height of spindle centers and the fixture are designed to suit particular requirements. Each head of the machine illustrated is driven by a separate 5-hp., 1200-r.p.m. motor and the Oilgear pump by a 3-hp., 900-r.p.m. motor. Floor space is 64 x 228 in., and the weight of the machine is placed at 18,170 lb.

Face Grinder with Hydraulic Table Drive

OILGEAR table drive, permitting wide variation of speed to suit work of different materials and hardness, is employed in the type 74 heavy-duty knife and face grinder here illustrated, which has been added to the line of Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. The machine is also equipped with automatic grinding wheel feed and the company's improved 26-in. sectional type wheel. Tables in 14 different lengths, from 50 to 206 in., can be furnished.

The table, speeds of which range from 0 to 90 ft. per minute, operates on 3½-in. wide flat self-oiling ways that are protected from grit. Thrust from the grinding wheel is taken against the broad flat side of the rear way. The Oilgear pump is piped to a reversible oil motor which drives the table through a short gear train and the work table rack. Reversal of the

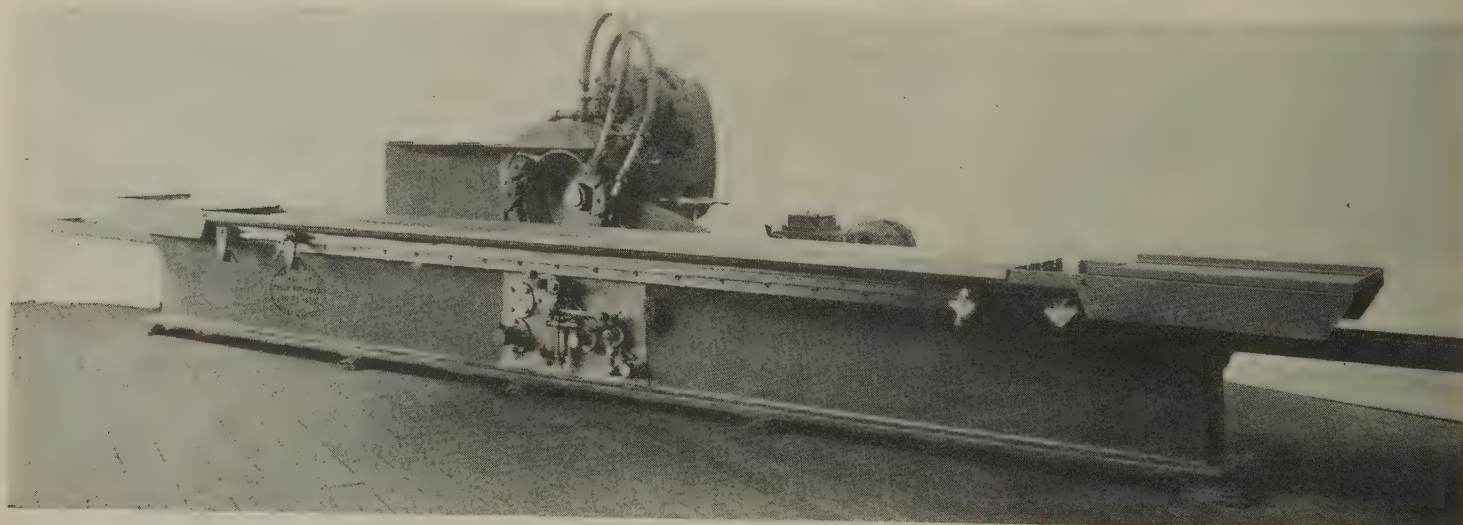
table is smooth and uniform even at high speed.

Control of the machine is centralized. From the operating position the wheel may be brought up or back by hand; it may be fed by hand, or the automatic wheel feed may be thrown in or out and the feed set by graduated dial to 0.00025 in. By depressing a foot treadle the operator may reverse the direction of carriage travel at any point or jump the "shipping" dog to bring the table clear of the wheel for unloading and loading the work. The table speed may be changed at any time merely by turning a hand-wheel and the table may be stopped by opening the bypass valve. Quantity and direction of coolant flow may also be controlled from the operating position.

Three driving motors are employed. A 15 or 25-hp. motor drives the grind-

ing wheel through a 5-in. wide silent chain, which is entirely inclosed and runs in oil. The Oilgear oil pump is driven by a 5-hp. motor through a flexible coupling and the coolant pump by a 1-hp. motor. Coolant is pumped from a 50-gal. two-stage settling supply tank which is arranged for convenient cleaning. Two large fully adjustable nozzles are provided at the grinding wheel. Thorough attention has been given to lubrication. Table driving gears and rack are splash lubricated, while the spindle bearings have large reservoirs and the grinding head lead screw is immersed in oil. Zerk high-pressure lubrication is used at other points.

The grinding wheel consists of 12 sections carried in a steel casting chuck. The sections or blocks are 8 in. deep and have 3-in. face, and it is stated that more than 7 in. of the sections can be used with safety. Provision is made for moving the sections



Hydraulic Table Drive Permits Selection of Speed to Meet Particular Requirements. Automatic wheel feed also facilitates operation

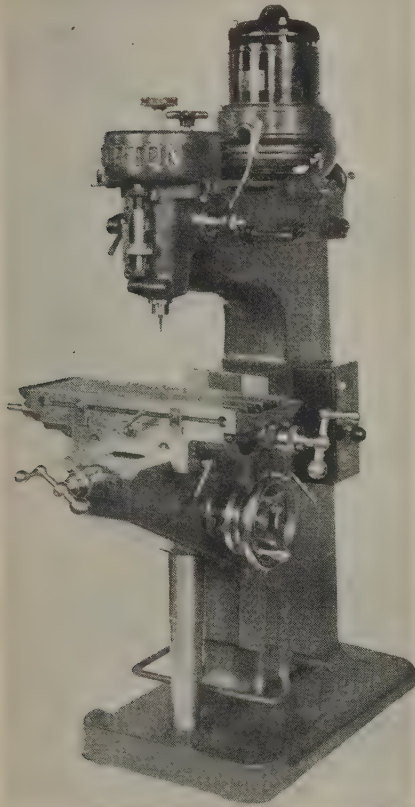
forward as they wear away, this being accomplished simply and rapidly. A complete set of alining shoes for obtaining proper alinement in setting up the machine are furnished. Equipment also includes either angle bar or revolving knife bar, and a magnetic angle bar, magnetic knife bar or magnetic chuck are available as extras.

Width of the table is 22 in., and the height 28 in. The total overhang

of the table beyond the bed rails may be one-fifth of the table length. The spindle is mounted in adjustable ball bearings. With sheet on guards at the ends of the table the floor space occupied by the smallest machine is 8 ft. 6 in. by 17 ft. 2 in., and by the largest grinder, 8 ft. 6 in. by 43 ft. 2 in. The weight of these machines, equipped with knife or angle bar, is approximately 9910 lb. and 19,080 lb.

Vertical Milling and Routing Machine

FOR die and tool room work and milling and routing in brass, steel and cast iron, the George Gorton Machine Co., Racine, Wis., is offering a new vertical milling and routing ma-



The Machine Uses Small Cutters at High Speeds. Sliding head is a feature

chine. The machine is designed to use small cutters at high speeds and although primarily for precision work, the machine is of rugged construction.

A feature is the sliding head which carries the spindle and complete driving mechanism. The minimum distance from the spindle to the column is 15 in., and the maximum distance is 30 in., the area of the working surface of the table being 15 x 22 in. at one setting of the work. The machine will swing a plate 60 in. in diameter and 4 in. thick or a cylinder 22 in. in diameter and 15 in. high. The maximum and minimum distance from the spindle nose to the table is 15 in. and 0 in. respectively.

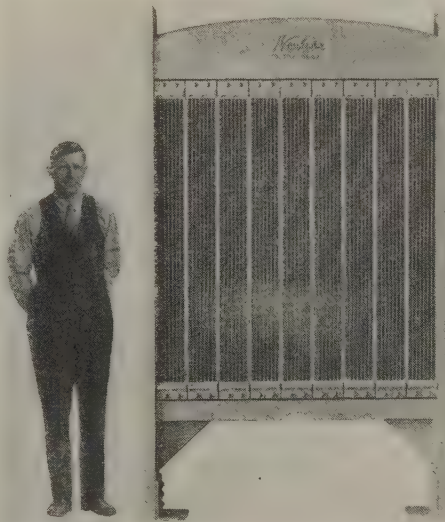
The drive is by a $\frac{3}{4}$ -hp. vertical ball-bearing motor and rubber V-belt. Ten spindle speeds, ranging from 475

to 3000 r.p.m., are obtainable without back gears or without changing pulleys. Higher speeds can be provided for brass routing and for use of diamond tools. The machine is equipped with a foot treadle, a chip blower that is integral with the motor and a forming attachment for cutting curved surfaces. Changing of cutters is facilitated by a spindle pulley brake. Large diameter graduated dials permit accurate adjustment of the feed screws to fractions of a thousandth. All feed screws are covered and ways are protected. Rotating parts are dynamically balanced.

The ball-bearing spindle is entirely inclosed. It is machined from a solid bar of chrome manganese steel, hardened and ground inside and out, and is splined drive. The sleeve, which is hardened and ground inside and out, slides in a hardened and ground steel bushing. The height of the machine, which is designated as the No. 8-D, is 68 in. overall. The weight is 1600 lb.

Industrial Radiator for Heavy-Duty Service

A RADIATOR to be used with engines of 200 to 300 hp. in industrial work is being put out by the Young Radiator Co., Racine, Wis. As the illustration shows, this is a large unit; it is said to be suitable for cooling engines of the power mentioned in tropical plants or under severe

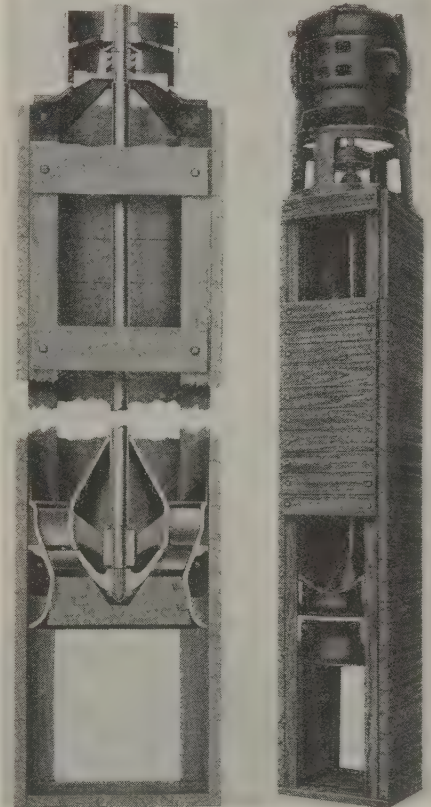


Impressive Size Characterizes This Radiator

conditions in the oil field. It is built in several sizes, depending upon the horsepower required and the conditions, and is furnished either with or without fan equipment. It was designed especially for contracting work in the oil field, and where conditions render the automotive type impractical.

Screw Pump for Low Lifts

A RECENT development in pumping equipment for handling large volumes of water at low head is a self-contained vertical screw pump unit, which has just been announced by Fairbanks, Morse & Co., Chicago. Although this pump unit is designed mainly for irrigation and drainage service, it can be used for any type



This Self-Contained Vertical Screw Pump Unit Will Deliver 7200 Gal. a Min. Against an 8-Ft. Head

of pumping where the head is not over 8 ft. and where a low cost installation is desired.

The pump is a vertical machine consisting of cast iron spiders, carrying a wood screw type impeller and diffuser, and constructed in such a manner that four wooden corner posts are fastened to the spider and the structure boarded up so that it may be placed vertically in a ditch or stream.

Using a wooden box construction for the casing makes it easy to adjust the amount of lift or change the position of openings. The boards on two opposite sides of the box are permanently fastened to the frame posts, but those on the other two sides can be arranged to suit different operating conditions. These boards can be removed from the discharge side if a head of less than 8 ft. is needed.

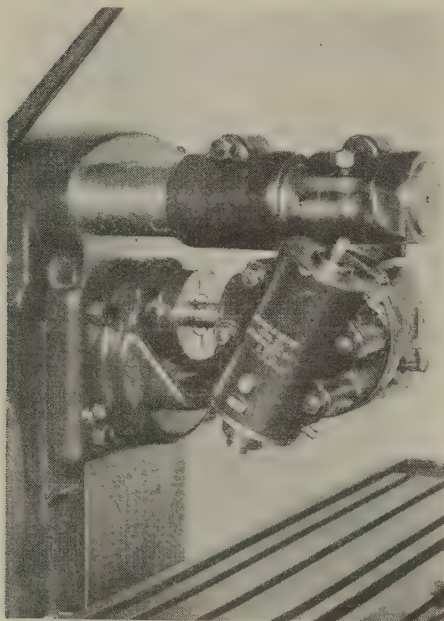
These boards can be replaced or removed according to requirements, and the pump always operates with a minimum amount of power. This feature, it is emphasized, contributes greatly to the efficiency of the unit.

This pump is manufactured in a 24-in. size. The inside dimensions of the box are 25-in. square by 12-ft. high. When driven by a 720 r.p.m., 25-hp. motor, the pump is rated to deliver 7200 gal. a min. against an 8 ft. head.

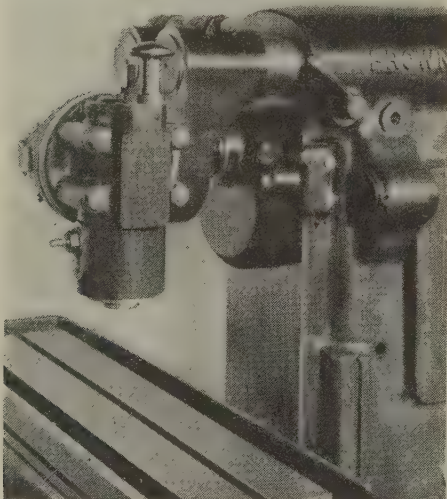
The reach of the machine is 48 in. and the lower horn is designed for 8½-in. and larger cylinders. The electrical rating is 150 k.v.a. and the maximum pressure at the die points is 2000 lb. A 1½-hp. driving motor is employed. Speeds of 21, 27, 37 and 51 cycles per min. are provided.

New High-Speed Milling Attachments

THREE vertical-spindle high-speed milling attachments adapted for manufacturing use have been added recently to the Brown & Sharpe Mfg. Co., Providence, line of milling machine equipment. They are designated as the No. 10 vertical spindle, com-



The Compound Vertical-Spindle Milling Attachment Is Above and the Universal Attachment Is Below



pound vertical spindle and universal milling attachments, respectively, and convenience of control, accuracy of performance and facility of application to constant-speed drive machines are features. Anti-friction bearings are employed for the spindle.

The No. 10 high-speed vertical-spindle attachment is for use where it is desirable to raise the spindle to clear the cutter from the work to facilitate loading, or for milling keyways, slots and other work that requires feeding the cutter into the work

by hand before engaging the power feed of the table. The spindle is always in a vertical plane and has a hand adjustment of 2½ in. Adjustable stops regulate the movement of the spindle when milling duplicate pieces.

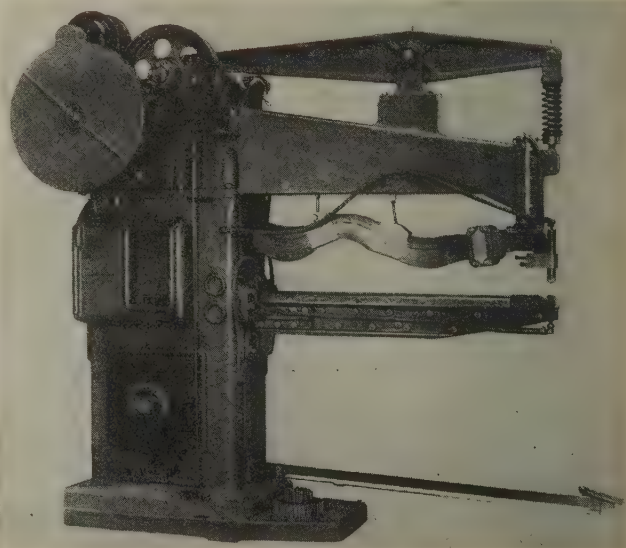
The high-speed compound vertical spindle attachment, which, except for the high spindle speed, is similar to the company's previous compound attachments, is for milling angular strips, tableways, etc., in which the spindle is set at right angles to the table. With the spindle in this position the full length of the table travel is available and an end mill can be used instead of an angular cutter for milling the angle.

Full universal movement, adapting the device for such work as drilling, milling angular slots and surfaces, cutting racks, milling dies, molds and other intricate tool work, is the feature of the high-speed universal attachment. This attachment is also provided with a hand-feed adjustment of 1½ in. which adapts it for angular boring or setting end mills into the work. All of the attachments are held securely in position by means of rugged clamps.

Introduces Deep-Throat Spot Welder

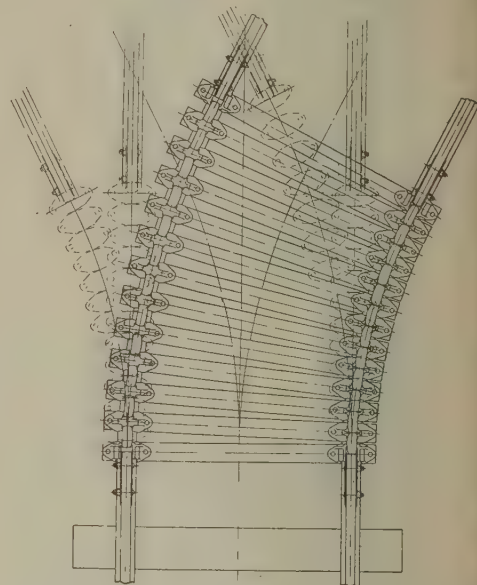
A NEW heavy-duty power-driven spot welder, designated as the No. 75-PA-48, has been added to the line of the Thomson Electric Welding Co., Lynn, Mass. Features of the new welder include unusual depth of throat and special construction of the lower horn, which adapts the machine for welding cylinders or tubes of small diameter.

Unusual Depth of Throat and Special Lower Horn Adapt Machine for Welding Small Cylinders and Tubes



Flexible Industrial Track

A FORM of industrial track including flexible units is being made by the Illinois Power Shovel Co., Nashville, Ill. Known as the Clarkson flexible rail, this device was designed to permit a machine mounted on a track to handle materials over a wide space where only a single track is available. The rail shown in the illustration is composed of small cast steel



Rail Which Can Be Bent as Required in Service

sections with stop ears attached. These rest in chairs mounted on cross-ties. Upon shifting this track into the form of a curve, as shown, the inside sections contract, while those on the outside let out, forming a curve of sufficient uniformity for practical purposes.

How Business Is Now Regulating Itself

Rules Adopted at Trade Practice Conferences with Federal Commission—Extent of Enforceability Not Defined

WASHINGTON, Nov. 27.—The trend of American business is toward self-regulation. One of the latest industrial groups to move in that direction is the Association of Manufacturers of Woodworking Machinery. This organization has proposed a tentative list of rules, which will be discussed with M. Markham Flannery, director of trade practice conferences, Federal Trade Commission, at a meeting in Chicago about the middle of December.

"Never in the history of American business has there been a time when self-regulation has received more intensive consideration," Mr. Flannery told a staff representative of THE IRON AGE. "By self-regulation I mean workable rules prescribed by an industry for its own business conduct, with due regard for the public interest. If an industry is capable of self-regulation the trade practice conference procedure of the Federal Trade Commission affords the most effective method yet devised to accomplish this end."

Self-regulation, Mr. Flannery pointed out, is not an innovation. It has been attempted with varying success for many years, it was explained, the degree of success attained in any industry being readily measured by existing competitive conditions therein. In the event that these conditions are all that can be reasonably desired the success attained is complete, but if practices still exist that result in unfairness or are otherwise bad, self-regulation has failed.

Self-Regulation Demands Means of Enforcement

"Trade associations, 'institutes,' the Chamber of Commerce of the United States and business organized in other forms have done and are doing excellent work," Mr. Flannery continued. "Competitive conditions in many industries are being studied and intelligently analyzed, codes are being adopted, much money is being expended in educating industry for the work of self-regulation. But when the faults are discovered and rules adopted for their correction, it remains for the trade practice conference to supply, in a measure at least, an element that heretofore has been completely lacking—namely, enforcement."

Self-regulation without rules would be impossible, Mr. Flannery said, and rules without some power of enforcement make self-regulation in some instances a mere expensive gesture. The fact that some power rests, as it does, in an impartial, disinterested

governmental body obviates the necessity for its frequent use, he said. To support this statement, Mr. Flannery cited the fact that of more than 300 rules adopted by industries in trade practice conferences, the power of the Federal Trade Commission has not been invoked with reference to a dozen of these. A complete study of the effect of past conferences, now being made by the division of trade practice conferences, may change these figures or disclose some additional reasons, but regardless of the showing on final analysis, Mr. Flannery said, the fact remains that the mere probability that any rule may be enforced adds materially to its general observance.

It was explained that in formal complaints issued by the commission against one who has violated a rule, the charge is based on violation of the statute, not on violation of the rule. Before considering the extent to which trade practice conference rules may be enforceable, Mr. Flannery dealt with the underlying principles and nature of the trade practice conference procedure.

Industry Entitled to Fair Competitive Conditions

It was pointed out that the primary interest of the commission naturally is the interest of the public, which is entitled to the benefits that flow from competition, while competitors are entitled to fair competition. Thus the legitimate interests of business are in harmony with the true interests of the public. Trade practice conferences, it was stated, afford a common ground upon which representatives of business or industry may meet and frankly discuss and agree to abandon any practices or methods which, in their common opinion, are unfair, harmful or against the public interest. This procedure deals with an industry as a unit and is concerned solely with practices and methods. It regards the industry as occupying a position comparable with that of "friend of the court" and not that of the accused. It bans, on a given date, all unfair methods condemned at the conference and thus places all persons engaged in the affected industry on an equally fair competitive basis. It performs the same function as a formal complaint without bringing charges, prosecuting trials or employing any compulsory process. Also it multiplies results by as many times as there are members of the industry who formerly practiced the methods condemned and voluntarily abandoned them.

Representatives of a given industry assemble in conference over which a commissioner of the Federal Trade Commission presides, looking after the interests of the public. The industry proposes, discusses and adopts resolutions defining and denouncing such practices as, in the opinion of the conferees, should be abandoned for the good of the industry. These resolutions, with a report, are submitted to the commission as a whole. Following consideration, the commission may approve, accept or reject the resolutions, in whole or in part. Resolutions approved or accepted by the commission are regarded as rules of business conduct for the government of the industry on the subjects covered. These are usually grouped according to the nature of the practices that they condemn.

Rules Adopted Fall into Two Classes

Group I rules are those that the commission affirmatively approves, thereby stating in effect that those who carry on practices condemned by such rules may be named as respondents in formal complaint. Group II rules condemn practices regarding whose illegality the commission expresses no opinion, but which it accepts as unfair methods of competition as interpreted by the trade. The rules in this group cover a wide range. They deal with practices whose illegality is uncertain, as well as those that may be regarded merely as bad business methods. The only statutory guide to the nature of practices that the commission by Section 5 of the Federal Trade Commission act is empowered to prevent is found in the declaration that "unfair methods of competition in commerce are . . . declared unlawful." Mr. Flannery cited the decision of the United States Supreme Court in the so-called Gratz case which stated that the words "unfair methods of competition" are not defined by the statute and that their meaning is in dispute. The opinion said that it is for the courts, not for the commission, ultimately to determine as a matter of law what they include. It was held that the words are "clearly inapplicable to practices never heretofore regarded as opposed to good morals because characterized by deception, bad faith, fraud or oppression, or as against public policy because of their dangerous tendency unduly to hinder competition or to create monopoly. The act was not intended to fetter free and fair competition, as commonly practiced by honorable opponents in trade."

Mr. Flannery said that the adoption of rules of business conduct at a trade practice conference by the majority of an industry, if free from collusion or fraud, determines the competitive practices that constitute "fair competition as commonly understood and practised by honorable opponents" in their particular trade. Any who violate their self-imposed obligation to abide by these rules, the adoption of which was based upon mutual consideration, and the good faith of all, it was declared, would appear to be guilty of "bad faith."

Enforceability of Group II Rules Still in Doubt

The policy of the commission, as officially announced with reference to this question, was stated as follows: "It is a matter of public impor-

tance that the question of the enforceability of Group II rules be judicially determined. To expedite such determination, the commission has taken the position that the clandestine violation of any Group II resolutions by one who has subscribed thereto in consideration of the like subscription by others in the industry is in and of itself an unfair method of competition calling for action by the commission, even though the practice condemned by such rule has not heretofore been held violative of the act by the commission or any court."

Commissioners Humphrey and Ferguson did not concur in the position taken by the commission. They believe that such enforcement is beyond the power of the commission.

As to the minority members of an

industry who refuse to subscribe to Group II rules, Mr. Flannery said, it is not now apparent how there could be enforcement against them unless the commission in considering a specific complaint should conclude that a proceeding could be sustained under the act, regardless of the rule. The public interest, it was declared, dictates that no rule should be received by the commission that would work an undue hardship on the public or on one who has agreed to abide thereby. Such a rule, if not rejected by the commission in the first instance, would be disapproved when its true character became known. Group II rules are usually observed and have resulted in the abandonment of many bad business practices, Mr. Flannery said, to the lasting good and financial benefit of industry.

Copper Industry's Progress Since the War

New Consumption Record This Year and Condition Now Better Than Ever

A COMPREHENSIVE discussion of the past, present and future of the copper industry was presented by William G. Schneider of the Copper and Brass Research Association, New York, at a meeting of the New York section of the American Institute of Mining and Metallurgical Engineers at the Machinery Club, Thursday evening, Nov. 22. His subject was "The Copper Industry; Its Progress Since the War."

The campaign of the industry to regain its normal status, lost as an outcome of the war, was discussed in the first part of the address, followed by an enumeration of the agencies by which recovery was brought about, Copper Exporters, Inc., the Copper Institute and the research association itself. The concluding part of the address covered the results which have been achieved and what they mean for the future of the industry. From this part of the address has been taken the following:

World Production Must Be Increased

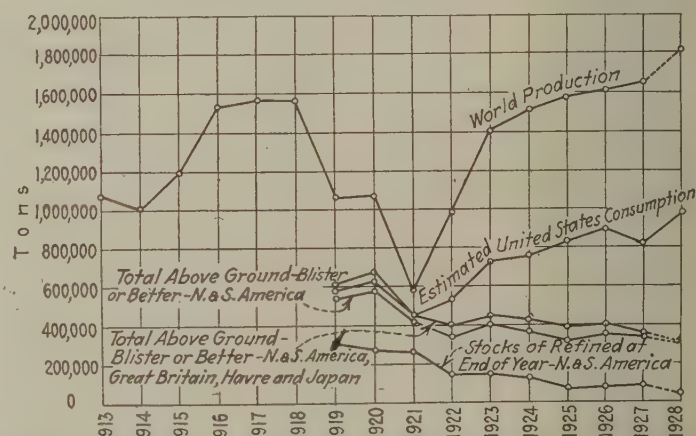
World production of copper from 1913 and including 1928 is shown in the illustration. It is estimated that for 1928 this will amount to about 1,840,000 tons. This is an increase of about 165,000 tons over 1927. The chart also shows the stocks of refined copper at the end of each year. It is believed that such refined stocks by Jan. 1, 1929, will be slightly above 40,000 tons, taking into consideration advance sales, and if it is at all possible to prevent it, in no event will they go below this level. Export shipments for 1928 also will show an increase and will probably total about 700,000 tons.

It is plain that the world produc-

tion of copper must be increased. It is estimated that by 1934 this must be about 2,240,000 tons, as compared to 1,840,000 tons for 1928. This means that the world will demand all the copper North and South America can produce from present mines, and will,

menace to the entire United States industry, but will be needed in the years to come to augment some of our own production. During the next few years a greater production of copper is absolutely essential, from the Southwest, far West and South Amer-

World Output of Copper and American Consumption and Stocks Over a Period of 15 Years



in addition, be able to absorb all the copper which Africa can produce by that time.

African Copper Not a Serious Menace

There is no question but Africa is a potential field, capable of producing large quantities of copper. At the present time African copper fields lack capital for the proper opening, on a sufficiently large scale, of known large deposits. There are also transportation difficulties, and I am sure that there will eventually be some difficulty in obtaining sufficient labor at the right price if many properties start producing. In my opinion, African copper is not such a serious

ican properties. It certainly will be needed, other conditions remaining normal.

New Record This Year in American Consumption

Estimated United States consumption is also charted. It is believed that during 1928 the country will have consumed close to 1,000,000 tons of copper, which is an increase of 160,000 tons over 1927 and 100,000 tons over 1926, and the largest ever consumed by this country in any one year. This consumption is sure to keep increasing unless the proper steps toward finding new markets or holding old ones are neglected.

I feel that for a long time to come

the copper industry will remember the past seven years and will not again let things "go by the board." The continuance of active sales promotion activities through its various associations is recognized by the leaders of the industry as absolutely essential and will be continued for many years to come. The foregoing data are based on figures compiled by the American Bureau of Metal Statistics, covering the first ten months of 1928.

There are markets for copper at any price, irrespective of whether it is selling at 12, 13, 16, 18, 20c. per lb., or even higher. An increase in price does not necessarily mean that curtailment of use must follow. There are needs which only copper can supply and here it will have to be used irrespective of price. There is also today a wider recognition of the merits of the metal, and it is hardly to be supposed that, because the price advances, the demand for it will fall off.

Higher Prices Will Not Affect Use

If one were to consider the use of copper in any finished commodity, I am certain it will be found that the value of the metal figured say at 16c. or higher, will have but a small influence on the retail selling price of the article in question. For instance, in an automobile selling around \$1,500, an increase in the price of copper of 5c. per lb. should only add about \$3 to the cost of manufacture. In an adding machine, selling for \$250, the added cost would amount to about 15c.; in an alarm clock, selling at \$4, it would add about 10c.; and in a \$15,000 house, possibly \$10. The sales value of copper and its alloys is firmly established for many purposes and the purchasing public looks for the metal as an indication of quality and that value is being received. It is hardly to be supposed, therefore, that a few cents difference in the price of the finished article or commodity will deter a prospective purchaser.

From this look into "copper's book" one can see how the industry has progressed for the last seven years. In 1921 there were large stocks of metal, no production because it was unprofitable, outlets for the metal had been closed because of the use of substitutes, no new markets were in sight and in fact the entire industry was demoralized. In 1928, after seven years of applying the methods and practices previously mentioned, we find that stocks of metal have been reduced to the point where the situation is, if anything, acute; production is 100 per cent of capacity at the end of 1928; many markets that turned to the use of substitutes are now again using copper; many new markets have been developed or are in the process of development. In fact at this time there is no single cloud in sight that would indicate that there was anything but prosperity in store for the copper industry for some time to come. The very agencies which brought about this prosperity will, if kept going, assure its continuance.

Pittsburgh Chapter Formed by Scrap Institute

The sixth chapter of the Institute of Scrap Iron and Steel was organized at a meeting held at the William Penn Hotel, Pittsburgh, Wednesday evening, Nov. 21, at which 55 scrap iron and steel merchants and brokers, representing at least 40 firms engaged in the business in Portsmouth, Steubenville, Canton, Massillon, Cleveland and Youngstown, Ohio, Detroit, Erie, Pittsburgh and Johnstown, Pa., were present. The new section was started with 30 subscribing firms and is to be known as the Pittsburgh chapter, but as one of the primary purposes of the institute is to foster cordial relations among the membership through monthly meetings of the chapters, it was realized at the organization meeting that the enrollment is so widely scattered that frequent meetings were not likely to be feasible. Accordingly, it is probable that additional chapters will be formed out of the Pittsburgh chapter, with the latter to embrace only the members within the Pittsburgh district. Chapters were suggested at Detroit, at Youngstown, to take in members engaged in the business in that city, Canton and Massillon and at Cleveland.

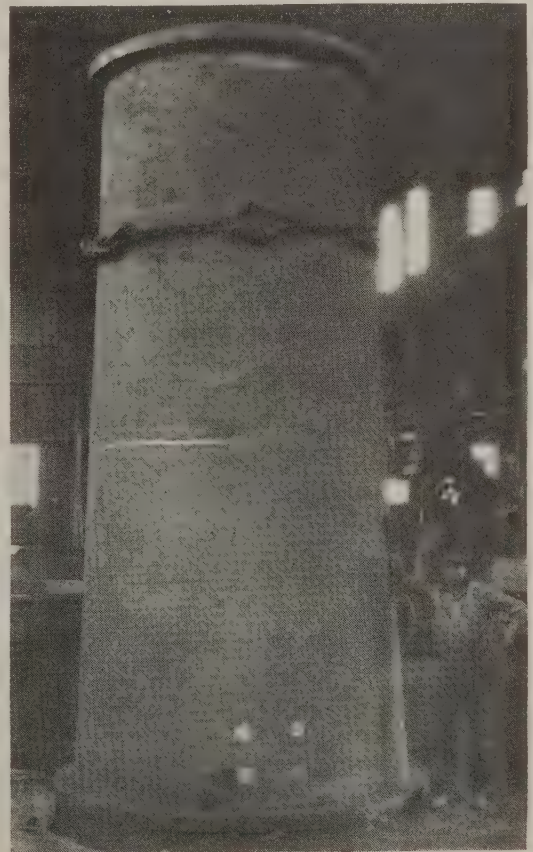
Charles Dreifus, president Charles Dreifus Co., Pittsburgh, was elected president of the Pittsburgh chapter; H. N. Trimble, Pittsburgh, chairman of the executive committee; M. B. Speer, Rotter & Speer Co., Cleveland, first vice-president; Isaac Wilkoff, Wilkoff Co., Youngstown, second vice-president; E. H. Schwartzenberg, Cleveland, third vice-president; I. W.

Solomon, Pittsburgh, secretary; Fred Wimmer, Hausman & Wimmer Co., Pittsburgh, treasurer, and H. Tuch, United Iron & Metal Co., Pittsburgh; Jay G. Stephens, Jay G. Stephens Corporation, Pittsburgh; J. E. Jacobson, Luria Brothers Co., Pittsburgh; Hugh Ruffner, Wellsville Iron & Metal Co., Steubenville, Ohio, and Harry Cohn, A. H. Cohn & Co., Butler, Pa., directors.

Benjamin Schwartz, director general of the institute, who presided at the meeting, explained the aims and purposes of the new organization, and pointed out many of the evils that had crept into the business, which called for elimination if the industry is to take its proper place as an important adjunct to the iron, steel and metal industries. He expressed the belief that the scrap industry had not adjusted itself to the hand-to-mouth systems now generally observed in not only the iron and steel business, but in the business world at large. He mentioned a number of problems immediately confronting the trade, emphasizing the tendency toward amalgamation among both producers and consumers of scrap and the growing disposition of consumers to buy scrap direct from producers. An organized effort on the part of the institute to secure more equitable freight rates on scrap; the setting up of a code of business ethics; education of the dealers in the needs of the consumers; clarification of specifications; an arbitration committee to settle disputes between dealers without recourse to the courts and credit service were among the activities Mr. Schwartz believed the new body might properly engage in.

Vertical Casting 16 Ft. High

WATER condenser connection made by Caldwell Foundry & Machine Co., Birmingham, for the Alabama Power Co. It was cast vertically, all metal being poured at one time. It is 16 ft. 2 in. in length and weighs 36,410 lb. Both ends are faced and drilled. The outside measurements are 8 ft. 8¼ in. at the large end and 6 ft. 8 in. at the small end. Inside it measures 7 ft. 4 in. at the large end and 5 ft. 6 in. at the small end.



Business Analysis and Forecast

Business Volume Tends to Taper Off

Downward Movement of P-V Line Indicates Approaching Recession — Too Much Speculation for Health of Industrial Structure

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

WHILE the net balance of the fundamental factors and the more significant indexes is somewhat less favorable than it was a month ago, probably the most notable change is the setback in retail trade. Also, the underlying trend of building permits and contemplated new construction continues to be downward. We are getting used to the higher money rates, but the fact remains that new bond issues are much curtailed; the cost of funds is so high in comparison with yields on invested capital that the result must be a tendency toward restricted investment. If we add to these factors the decline in commodity prices, the drop in farm purchasing power below a year ago and the fearful development of speculation in stocks, it should become obvious that business factors are not all favorable. It is fairly clear that supplies of commodities have on the average gained on the demand.

But these less favorable conditions are still offset by the prevalence of optimistic sentiment and the evidence of expansion in several of the key industries. Thanks to a large volume of public works and utility construction, building contracts ran high in October. The automobile and steel industries show great activity, in spite of a seasonal decline. Merchandise exports made a record in October, and the importation of some \$50,000,000 in gold, along with a decrease in member bank borrowing at the Reserve banks, has eased the credit situation. The outcome of the national election seems to assure stability of political conditions.

The less favorable trend of the P-V line barometer is not expected to be reflected in business developments for at least three or four months.

Thus the outlook for general business indicates a condition that will on the average amount to stability. The

outlook for earnings continues to be fair to good. A satisfactory level of purchasing power exists. Some recovery is indicated among those industries that have been backward during recent years. These conditions should counteract a little recession in some of the more active lines, which seems likely to show up in the November and December figures. The outlook in general is favorable for the remainder of the year and for the first month or two in 1929.

Barometer Says Decline Is Impending

OUR P-V line (a ratio of commodity prices to the physical volume of trade) took a definite downturn in October. The decline was not sharp, but it makes a forecast of some recession in general business within from four to six months from October. The same remark

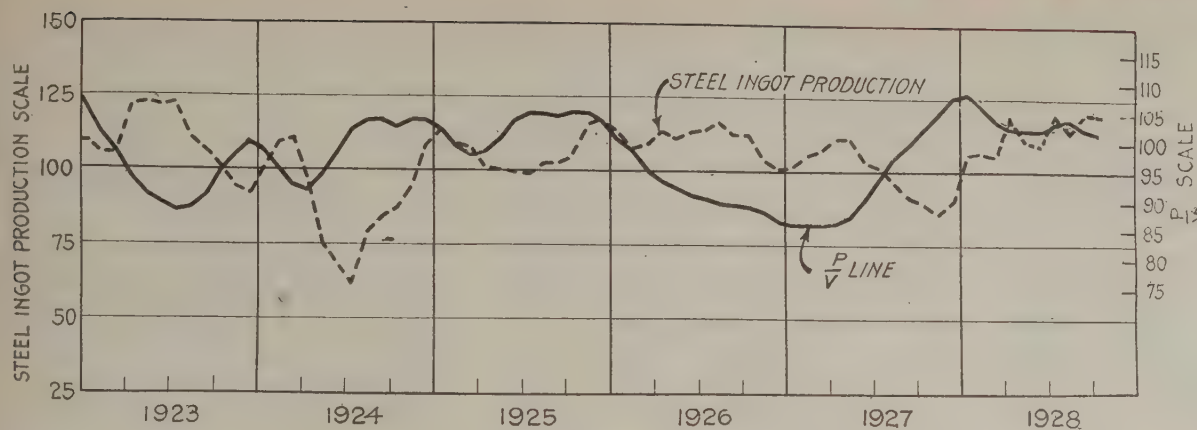
Factors in the General Business Outlook

Favorable Factors

- (1) Construction contracts awarded increased more than usual in October.
- (2) October factory employment made a good gain.
- (3) Railroad freight traffic showed a more than seasonal increase.
- (4) Merchandise exports increased last month and were large.
- (5) Demand for steel and copper is well sustained; unfilled orders of the Steel Corporation increased a little.
- (6) Sizable gold imports have tended to ease credit.
- (7) Republicans win the election.

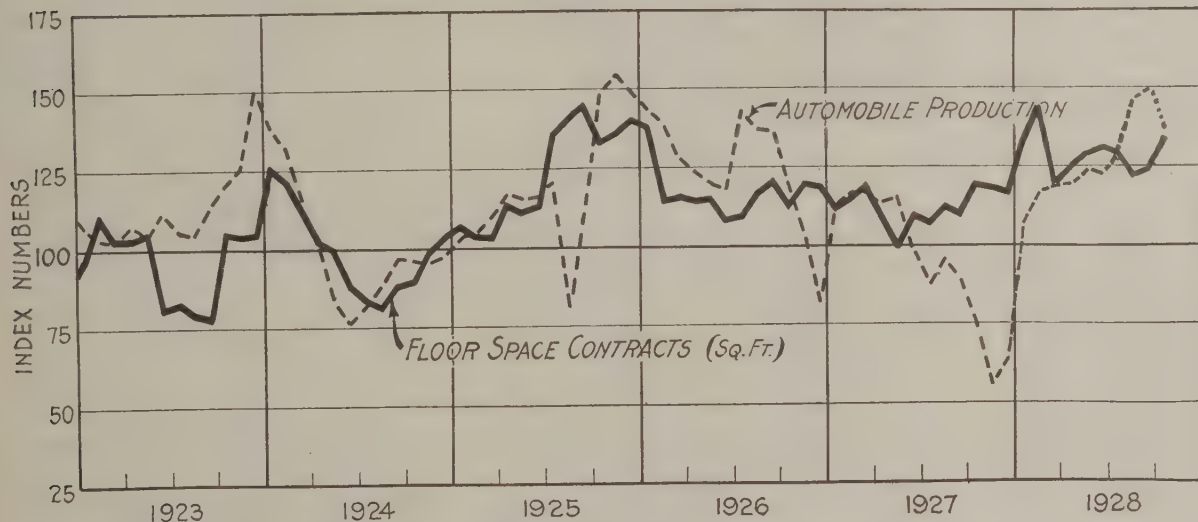
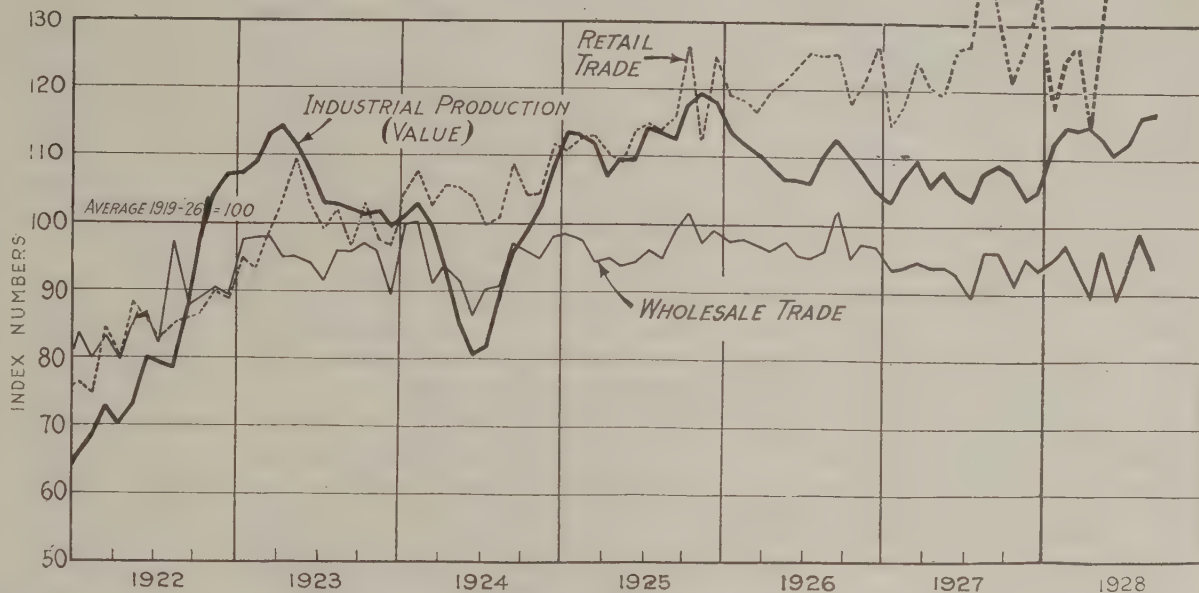
Unfavorable Factors

- (1) The P-V line turns downward.
- (2) Retail trade made a less than seasonal gain; department store sales lower.
- (3) Trend of building plans and permits is downward; bookings of structural steel drop sharply.
- (4) Farm income below a year ago, and purchasing power of the farm dollar lower.
- (5) Speculation is excessive.
- (6) Brokers' loans more and more excessive; banks sell securities and see their deposits decline, as funds flow into speculation.
- (7) Money rates high, restricting security issues.
- (8) October business failures numerous.
- (9) Commodity prices lower; steel scrap declines.



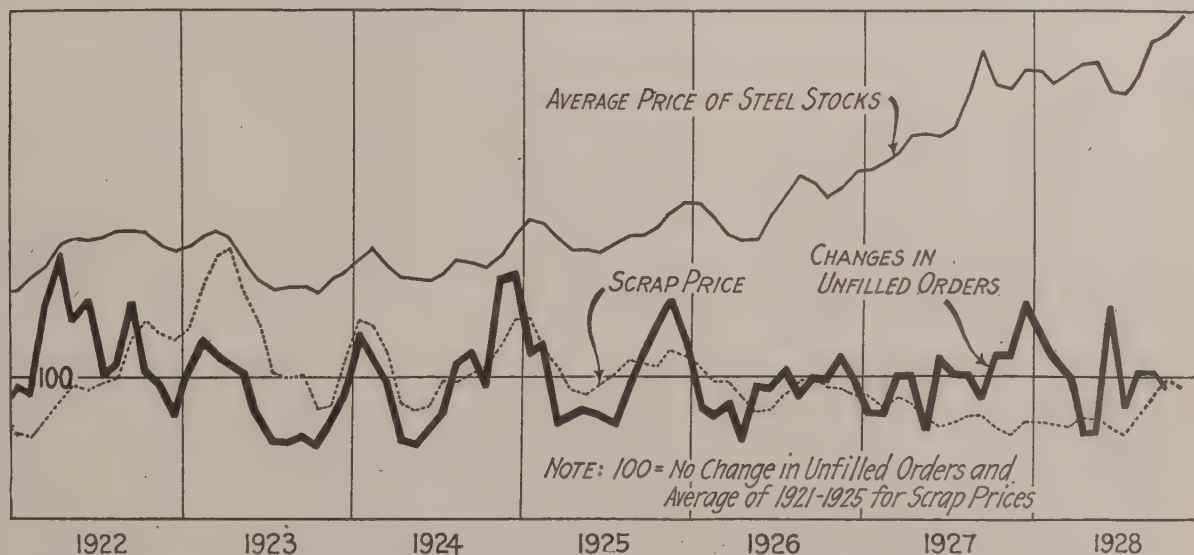
Downward Movement of P-V Line Indicates Approach to a Decline in Business and Industrial Volume. Steel production (adjusted) continues high

Retail Trade Shows a Tendency to Fall Off. Wholesale trade remains slow, while industrial production is progressing at a high level, though somewhat below a normal ratio with final sales



Both Building Activity and Automobile Output Show High Activity. But indications now are that tapering off is to be expected

Unfilled Orders, While Downward, Are Moving Narrowly About the Axis; Stock Prices Are Making New High Records and Scrap Prices Are Again Lower



applies to steel ingot production. Indications based on this barometer are that no considerable further expansion will be shown in the adjusted curve of steel production, and that a moderate setback will appear in the not distant future. Whether it will be a short dip, as in 1926, or a longer decline, as in the first half of 1925, it is yet too early to say.

Apparently the estimated value of the industrial output of the country is rounding off for a year-end decline such as occurred in 1926 and again in 1927. Any such decline this year would be partly due to the lower commodity prices, and partly to a recession in the automobile and steel industries that is somewhat greater than usual for the season. It would be in accord with the trend of the P-V line.

General Trading Less Favorable

RETAIL trade showed a clearly downward trend in October. October this year was a long month, having 4 per cent more working time than a year ago. Naturally, comparisons with September are especially favorable, as that month was a short one. Even so, department store sales decreased from September and the increase over a year ago was less than 4 per cent. Other retail trade figures are affected by the constant opening of new stores. We can only say that they made less than the usual seasonal gain in October. The general trend, therefore, was downward.

Wholesale trade slumped in September, the latest month for which we have figures. The only lines that increased in sales volume were meats and furniture.

While the value of the industrial output in September was high in comparison with wholesale sales, it is still low when compared with the retail trade curve, as shown in the second chart. As already indicated, however, the retail index is so affected by new stores that it is not satisfactory. In comparison with the level of department store sales, the industrial production value curve appears to be a little above the average relationship. The situation is thus less favorable than last month, but there is no such maladjustment as existed in 1923 and again in 1925.

Satisfactory Volume in Automobiles and Building

AUTOMOBILE production, at about 398,000 cars and trucks in October, showed a more than seasonal decline (from the statistical viewpoint). Building contracts awarded, however, increased more than usual for the sea-

son. The average of the two indexes is about on the line of normal trend, which is a fairly satisfactory showing. The significance of the trends for the month is not clear in either case, but it seems doubtful if building has established an upward trend, since building permits and contemplated new work both declined more than usual. The gain in contracts, moreover, was due chiefly to a large volume of public works and utility construction in the New York section.

Less Buoyancy in Steel Indicators

OUR steel barometers this month are slightly unfavorable. The average price of heavy melting steel scrap at Pittsburgh was lower in November than in October. The October increase in the unfilled orders of the Steel Corporation was a little less than usual for the month, causing a decline in the adjusted figure and bringing the rate-of-change curve in the chart below the base line. The average price of a representative group of steel stocks, however, rose a little higher in October than in September. The average for the month was 178, against 173 in September and 152 a year ago.

We conclude that the abnormal speculative situation has carried steel stocks up, though they have advanced less than the average of the more speculative stocks. This movement appears to be contrary to the trend of the barometer lines and largely due to the effects of the general bull market. How long it can continue no one can say. When the inevitable readjustment in the market comes, the steels will doubtless participate in the decline.

Refractories Production Decreased in 1927

WASHINGTON, Nov. 27.—Non-clay refractories to the value of \$22,645,633 were produced in 1927, a decrease of 7.6 per cent under 1926 when the value was \$24,505,519, according to the Bureau of Census. Silica brick production was valued at \$12,756,994 in 1927 as against \$13,614,033 in 1926; magnesite and chrome brick production, \$3,874,176 as against \$4,762,645; refractory cement (magnesite, etc.), \$1,184,121 as against \$1,045,468 and other refractories, including silicon carbide and bauxite brick, \$4,830,342 as against \$5,083,373.

Fire brick production in 1927 was valued at \$37,750,230, a decrease of 11.6 per cent under 1926 with a value of \$42,706,932. The value of fire brick, block, tile, boiler, etc. in 1927

was \$33,866,153 as against \$40,013,394 in 1926; high alumina, \$1,187,096 as against \$978,624 and special shapes, \$2,696,981 as against \$1,714,914.

Railroad Expenditures Less This Year

Capital expenditures for improved railroad plant in 1928 are estimated by the American Railway Association at \$650,000,000. This is the smallest amount so utilized since 1922. It compares with \$771,552,000 last year and \$885,086,000 in 1926. The maximum post-war expenditure was in 1923, at \$1,059,149,000, which is the only post-war year exceeding the expenditures of 1926. For the nine years ending Dec. 31, next, expenditures are placed at \$6,628,296,000, or an annual average of about \$736,000,000.

During the first nine months of 1928, capital expenditures for new equipment were \$165,967,000, a decrease of 19 per cent from the \$204,992,000 for the corresponding period last year. Roadway and structures aggregated \$334,200,000, a reduction of 8½ per cent from the \$365,223,000 in 1927. Additional track cost \$91,241,000, a reduction of 16 per cent from the \$108,002,000 last year. Heavier rail took about the same amount each year, with \$34,891,000 in the first nine months of 1928.

Sub-division of the new equipment expenditures for the first nine months shows \$37,121,000 for locomotives, a drop of 30 per cent from the \$53,721,000 last year. Freight cars cost \$89,920,000, or 13 per cent less than the \$104,565,000 of 1927. Passenger cars at \$27,187,000 showed a drop of 13 per cent from the \$31,383,000 of last year. Other equipment accounted for \$11,739,000, compared with \$15,323,000 in the nine months of 1927.

Expects 20 Per Cent Increase in Advertising

An average increase of 20 per cent in the advertising appropriations of many leading industrial and business concerns was forecast in the address of William A. Hart, retiring president of the Association of National Advertisers, at the annual convention at Atlantic City. Mr. Hart, who is advertising director of E. I. du Pont de Nemours & Co., Wilmington, Del., said that over 50 per cent of the membership favored him with a reply to his questionnaire. Less than 6 per cent anticipate any decrease in their advertising programs. Twenty-nine per cent believe their advertising to be about the same, while 65 per cent forecast increased effort.

Schedule of the next instalment of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Dec. 20—Position of Iron and Steel Producers.

Lower Concrete Bar Duty Upheld

Refunds to Be Made on Protested Shipments—Decision Will Not Affect Bar-Sized Shape Classification

THE decision of Justice I. F. Fischer of the United States Customs Court, Second Division, given on Jan. 31, this year, that deformed bars are structural material, as such are dutiable under Paragraph 312 instead of Paragraph 304 of the tariff act, has been upheld by the United States Court of Customs Appeals, Justice Graham presiding.

In rendering its decision upholding Justice Fischer, the Court of Appeals points out that corrugated bars have upon their surfaces ridges and protuberances so placed and spaced as to make them suitable for holding when embedded in concrete construction. "The principal use of this material, as shown by the testimony, was for reinforcement for concrete. A minor use of the same is shown by the record for making ornamental grill and other iron work, but it is not contended that this is a major, or even an important, use of the product. It is not used for forging or machine work, because of its deformations. It is also disclosed by the evidence that this material is used in conjunction with concrete in making floors, conduits, bridges, walls and, in fact, practically every structure where concrete is used.

"The testimony further discloses that, where used in a building, the plans and specifications prepared by the engineer or architect specify the location, size and strength of such reinforcing material, and that, when so used, the ends of the bars are usually bent in such a form that they can be anchored by means of stirrups, or otherwise, to the wall columns or laterals of the building, and, after having been so placed, are surrounded with concrete and become a permanent part of the building, and cannot be removed without endangering the stability and strength thereof.

"It is further shown that these are used in all buildings of steel construction, wherever concrete work is needed, and are also used as reinforcements in concrete buildings or structures where no steel framework is used. The bending of the ends for attachment to the other members of the building is done by workmen, usually in the progress of construction; when this material is imported it is straight, without any such finishing. When a structure in which such material is used is completed, the said material assists in carrying both the dead and live loads of the building, has the capacity to resist great tension and compression, contributes to the stability of the structure and becomes an integral part of the skeleton of the same. The imported material has not been assembled, manufactured or advanced beyond hammering, rolling or casting.

"The only question for our decision is whether the court below erred in holding, under this proof, that said

material constitutes 'structural shapes' of steel. We incline to the view there was no error in so holding."

The court then cites the case of the United States vs. Frank and the case of Simon, Buhler & Baumann vs. the United States in deciding that the lower court was correct in considering the reinforcing bars in question as structural shapes.

The court then says: "In conclusion, it is argued that if the deformed bars in issue here are to be treated as structural shapes of steel, then all steel which goes into a structure and becomes a part thereof must be so treated. This does not follow, and this opinion should not be taken as so holding. The classification of such steel will, in each case, depend upon its designation, character and use, whether it ought, properly, to be considered as material or structural shapes and forms."

Importers of steel, who have brought into the country some substantial quantities of reinforcing bars, on all of which they have paid the full duty of 30c. per 100 lb. specified in Paragraph 304, at the same time entering protest, will be entitled to refunds, as Paragraph 312, the new classification, exacts a duty of 20c. per 100 lb.

It is suggested by importers that the final paragraph of the decision, pointing out that it does not follow that all steel that goes into a structure must be treated as structural material, removes this case as a precedent that might be cited should a hearing be called on the question of classification of bar-sized shapes. That product was recently placed by the Treasury Department under the bar paragraph instead of the structural, thereby increasing the duty.

Pig Iron Anti-Dumping Order Revoked

WASHINGTON, Nov. 27.—Revocation of the anti-dumping order against imports of pig iron from Germany, announced last Thursday by Secretary of the Treasury Mellon, was a formality that had been expected. Imports of pig iron from Germany since the order went into effect Jan. 29, 1927, have been small. During all of 1927 they were 9211 gross tons, while for the 10 months ended with October of the present year they amounted only to 395 tons, the latest movement having been 300 tons which arrived last July.

The anti-dumping penalty is considered to have been less of an influence than the rising cost of production in curbing imports of pig iron from Germany. It is stated that costs of making pig iron in Germany are now as high as they are in the United States, and a prominent Ger-

man producer recently declared that pig iron is produced more cheaply in Alabama district than in Germany.

The anti-dumping order followed protests from Eastern merchant furnace operators against heavy shipments from Germany at prices which it was contended were lower than the German home market levels. Application was made for an anti-dumping order. It was granted. There also was pending an application before the Tariff Commission for a 50 per cent increase in the pig iron duty. This increase was proclaimed by President Coolidge, but it is considered doubtful that this higher duty has had much effect in checking pig iron imports. The duty increase of 37.5c. per ton is declared to have been small when measured against rising costs of production.

In revoking the order concerning German pig iron imports, Secretary Mellon instructed customs officers to maintain a continued scrutiny so as to guard against renewal of the practices which brought about issuance of the order.

More Stable Employment in Iron and Steel Plants

Studies made by the United States Bureau of Labor Statistics show that 32 identical plants in the iron and steel industry have had an average of about 94 per cent full-time employment from the beginning of 1926 through August, 1928. For the calendar year 1926 this was 94.3 per cent; it was 93.6 per cent in 1927, and for the first eight months of this year has been 94.2 per cent. The 32 plants reporting employ, collectively, about 40 per cent of all the workers in the industry. These figures compare with 91.2 per cent in 1925; 88.3 per cent in 1924, and 88.9 per cent in 1923—the latter for 30 companies only.

During the first eight months of 1928 two of the companies showed more than 98 per cent full-time employment. Two others were over 97 per cent, and 10 more exceeded 96 per cent. Less than 10 per cent of the total in the past three years has been below 90 per cent. Consistent improvement has been shown by many of the plants since the earlier years covered in the survey.

Oakite Products, Inc., Holds Annual Sales Conference

Completing 20 years of industrial cleaning service, the technical staff, field service men and executives comprising the organization of Oakite Products, Inc., met in the general offices in New York, Nov. 14 to 17, for their annual sales conference. District managers and representatives from 33 States and Canada came together in daily discussion, subjects of which ranged from the cleaning of watch crystals to ocean liners and silk stockings to 80,000-bbl. oil storage tanks. There were 19 papers discussed.

Automotive Meeting Well Attended

Production Executives Discuss Costs, Materials Handling, Time Study and Other Shop Problems

HELD at the center of automobile manufacturing activity and offering a program of high caliber, the annual production meeting of the Society of Automotive Engineers, at the Book-Cadillac Hotel, Detroit, Nov. 22 and 23, attracted an unusually large attendance. Twelve papers and six committee reports were presented at the five technical sessions and the production dinner featured an address by K. T. Keller, vice-president in charge of manufacturing, Chrysler Corporation, Detroit.

First of the technical papers read was, "How the Ford Motor Co. Gets Its Low Production Costs," by John Younger, professor of industrial engineering at Ohio State University. He began by citing the 15 basic laws of manufacturing management as codified by L. P. Alford, in 1926, and claimed that the Ford company has been using them for years. The rest of his paper outlined methods in various Ford plants, and spirited discussion followed Mr. Younger's presentation.

The second paper of the morning session was by L. A. Baron, "Accounting for Depreciation as a Production Cost." Mr. Baron, who is Comptroller of the Stutz Motor Car Co., began by quoting a statement made by the Chamber of Commerce of the United States, to the effect that the business man who does not charge depreciation at all is fooling himself. This paper was well received and also provoked active discussion.

An outstanding paper of the afternoon session was "Integral-Contact Gearing," by A. B. Cox, consulting engineer, Wilkensburg, Pa. The paper dealt with problems of gear-tooth breakage, wear and noise. Integral-contact gearing, it was held, is the solution of most of the baffling problems of gear-tooth fatigue and breakage, wear and pitting and vibration and noise. Mr. Cox illustrated his paper with a large number of stereopticon slides, showing tooth contact in stub-tooth and other types of gears.

The production dinner held under the auspices of the Detroit section of the S. A. E. in the main ballroom of the Book-Cadillac Hotel, was attended by 670 members and guests. This number so far exceeded the provisions made for the dinner that tables had to be laid on the balconies and even out in the foyer of the ball room. At the speakers' table were E. P. Blanchard, Bullard Machine Tool Co., Bridgeport, Conn.; B. J. Lemon, United States Rubber Co., chairman of the Detroit section; G. W. Wall, consulting engineer, Indianapolis, president of the S. A. E.; W. R. Strickland, of the Cadillac Motor Car Co., president-elect of the S. A. E.; Coker F. Clarkson, general manager of the S. A. E.; J. M. Crawford of the

Chevrolet Motor Co., chairman of the meetings committee of the Detroit section; E. P. Warner, Assistant Secretary of the Navy for Aeronautics; F. E. Moskovics, president of the Stutz Motor Car Co. of America; S. P. Thacher, second vice-president of the United States Rubber Co.; K. T. Keller, vice-president in charge of manufacturing, Chrysler Corporation; H. M. Crane, chairman of the technical committee, General Motors Corporation; L. Clayton Hill, Murray Corporation of America; V. P. Rumely, Hudson Motor Car Co.; J. H. Hunt, Chevrolet Motor Co., past-president of the S. A. E., and L. L. Roberts, Packard Motor Car Co.

A number of those at the speakers' table made short speeches. In his address on "Production—Men, Methods and Machines," K. T. Keller, speaker of the evening, pointed out that in the rapid development of the automobile industry a new type of engineer has been developed who is as much an integral part of the industry as the mechanical engineers who design the cars. He predicted that production engineers would soon be fully as important and numerous as the mechanical engineers.

Session Devoted to Materials Handling

In addition to three papers, the comprehensive report of the materials handling subcommittee provided much interesting data at the opening session, Nov. 23. New conditions in the transportation, storing and fabrication of materials in the automotive industry were outlined in the report of the subcommittee, which is headed by V. P. Rumely, Hudson Motor Car Co., Detroit.

"Today the universal desire to operate with a minimum inventory in all plants creates a greater need for more rapid movement of stock," states the report. "This requires more mobile equipment than heretofore. Larger production schedules involve greater volume of materials, which in turn justify larger and faster units for handling. It is not uncommon today to find a plant manager operating the factory with few if any stockrooms. Materials are taken from freight cars and trucks in suitable containers directly to the manufacturing department and placed into production with no rehandling."

Some of the important developments in material handling equipment and methods, including the handling of sheet steel, are outlined in the committee's report. The papers at this session were: "Assembly Plant Layout for Material Handling," by N. H. Preble, Mechanical Handling Systems, Inc.; "Selection of Conveyor Power Units," by C. E. Broome, Gears & Forgings, Inc.; and "Possibilities and

Limitations of Conveyor-Chain Curvature," by J. B. Webb, J. B. Webb Co.

"Power Transmission Engineering as Affecting Production and Cost," by W. W. Nichols, D. P. Brown & Co., was an outstanding contribution to the power transmission session, which followed the materials handling meeting.

Outlines Characteristics of Carboloy Tool Material

The last session of the meeting, under the chairmanship of Guy Hubbard, National-Acme Co., Cleveland, had a generous program. In addition to a paper on the "Interpretation of Production Records," by Paul Geyser, General Motors Truck Co., and another on "The Relation of Time Study to Manufacturing," by L. W. Haskell, Dodge Brothers, Inc., G. N. Sieger, sales manager, Carboloy Co., 350 Madison Avenue, New York, spoke briefly on the "Development and Uses of Carboloy."

The full possibilities of this new tungsten carbide tool material, described in THE IRON AGE of Oct. 18, were said to be as yet unknown.

"Carboloy has outstanding characteristics," said Mr. Sieger. "It is extremely hard but its outstanding weakness is that it is not very tough. It will scratch a sapphire, yet it is not a complete substitute for the diamond. It is being used successfully in drawing dies, and even in diamond tools. The turning of Hatfield manganese steel, until now practically unmachinable, yields readily to Carboloy."

Elkonite, advertised as unmachinable and only to be finished by grinding, was said to be turned at a rate of 130 ft. a minute by Carboloy tools. Mr. Sieger gave figures on a number of jobs where Carboloy had been remarkably successful, including its use in machining aluminum bronze. He said that his company does not believe that Carboloy is going to revolutionize the industry or even replace any of the popular cutting steels of today, but that they believe it has a definite place in production methods.

In the discussion following Mr. Sieger's paper, C. R. Burt, general manager of Pratt & Whitney Co., Hartford, Conn., spoke briefly on the new Widia alloy, another tungsten carbide material, developed by the Krupp Steel Works, Essen, Germany, and described in THE IRON AGE of Sept. 27. Speaking of a demonstration he had witnessed in Germany, Mr. Burt said: "In one instance there was a test made on a bar of 8-in. steel, making a cut of about ½-in. in depth with a fine feed, which is necessary, I am informed, in using that alloy, the feed being about 0.020 in. The first demonstration was at a speed of about 300 ft. a min., and it was not a short cut. Two points surprised me; one was: after taking this high-speed cut there was practically no heat in the steel. The heat seemed to have been carried away with the chips, and it was also surprising to

note the very fine finish that it left, partly due, I suppose, to the fine feed.

"I brought back from Germany about 15 or 18 of the Widia alloy tools for experimental purposes. Some of them were finished tools and others were tips which we intend to braze on. We ran into some difficulties simply because we did not understand how to use them. The way the tool is ground is very important. After the grinding operation it is also advisable to give the tool a high finish by buffing. The higher the finish, the better durability you get from the cutting tool.

"I understand that several factories have increased their production 4 to 1 with these tools. They also found the tools would last, in many cases, for one week between grindings, while previously it was frequently necessary that the same tools be ground every day."

"The Widia tools are similar to the Carboloy in that they are extremely brittle," said Mr. Burt in another

part. "They have to be handled with care, and the grinding of the tools, I believe, is one of the most important factors in getting good results. The different shapes have a great deal to do with it. I think, from what I learned over there, one would not always use the same shape that we now use with high-speed steel. It is necessary to reduce the cut materially. It is a mistake to try to put this alloy in with a heavy cut and a heavy feed. You simply will not get the result."

Mr. Burt spoke of a test of this material he had witnessed in England on a high-speed planer, a new machine which was being demonstrated at the Olympia Show. "It was quite a revelation to me for speed," he said. "The table of the planer was traveling on the cutting side at a speed of 280 ft. a minute, with a cut $\frac{3}{4}$ in. deep and about 1/60 in. wide. As the table traveled 280 ft. a minute peeling off the cast iron chips, it gave one the impression that the machine was merely cutting wood."

United States Consumes Half of World's Tin

Consumption of tin in the United States is so large that the annual imports amount to about one-half of the world's production of that metal, according to the United States Bureau of Mines. As the result of a canvass made to ascertain the amount of tin consumed for different purposes in the United States during 1927, the bureau found that 24,527 gross tons of primary or virgin tin was used in the manufacture of tin and terne plate, accounting for 35.65 per cent of the total consumption of primary tin in the United States in that year. Next in order of magnitude as a consuming factor is solder, which required 13,734 tons, or 19.96 per cent of the total. The manufacture of babbitt required 8705 tons, and foil and collapsible tubes consumed 6903 tons. The results of the bureau's inquiry, wherein effort was made to eliminate figures relating to secondary tin, account for 68,797 tons of primary tin, a quantity equivalent to 96.7 per cent of the imports in 1927. The results of this canvass, based on reports from 1050 companies, are tabulated in Information Circular 6084, "Consumption of Primary or Virgin Tin in the United States," by J. B. Umhau, copies of which may be obtained from the bureau.

Warns Against Mania for Mergers

Consolidations Have Disadvantages That May More Than Offset Economies Effectuated

WARNING against the "mania for mergers" was sounded recently by James O. McKinsey, professor of business administration of the University of Chicago, in an address before the Illinois Manufacturers' Costs Association at Chicago.

"The investment bankers," he said, "who largely work out these mergers, may not be particularly interested in your own particular problems. I have a record of 35 mergers each of not less than five companies whose promoters predicted a 45 per cent increase in profits within five years. As a matter of fact, the profits over a 10-year period have been 18 per cent less than they would have been had the companies operated independently."

Some of the disadvantages of mergers as pointed out by Professor McKinsey were:

"While large organizations may have their advantages, especially in banking mergers, some of the customers may feel that they do not receive so distinctive a service. The tendency in large organizations is toward routine and standardization, and lack of flexibility. They cannot make exceptions in policy to meet the needs of a customer.

"One way to overcome this is to maintain the intimate personal contact with old customers by retaining as many as possible of the old executive staffs. This, however, does not decrease the overhead. Frequently, in the case of mergers of companies with competing products, each with a valuable trademark, the company will lose

business in trying to win customers over to one of the two products.

"A company that acquires other manufacturing companies making supplementary products in a measure finds that it loses the business that it formerly enjoyed as a result of concentrating on some specific product. I have in mind a commercial textbook company which undertook to produce every other type of book used in a high school. It was a mistake—an overburdened salesman trying to handle a large variety of products will not do so well as one who specializes in a single product.

"The usual accompaniment of a merger is to undertake the reduction of an over-supply of executives and employees. It is an advantage to eliminate deadwood. It is difficult to secure executives to handle all the larger problems of an expanded business resulting from a merger. A president or sales manager who is doing a business of \$5,000,000 a year frequently cannot efficiently handle a \$25,000,000 a year business although he may grow to it in time if he possesses the necessary intelligence and force.

"In the case of a merger there is frequently jealousy between the former and the more recent group of employees, and it takes diplomacy and care to bring about effective cooperation. Old employees find it difficult to fit into the new picture, especially when they lose contact with the president and other high officials and report to lesser officials. They lose the desire to display initiative, feeling they are part of a chain."

British Metallurgist to Lecture Here

Ulick R. Evans, Cambridge University, Cambridge, England, will deliver the annual lecture of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers during the annual meeting of the institute in New York, the week of Feb. 18, 1929. His lecture will be on "Corrosion," and he will preside at a symposium on this subject.

Following the annual lecture Mr. Evans will deliver groups of lectures at New Haven, Conn., Cambridge, Mass., Cleveland, Pittsburgh and Washington, with single lectures at various other points.

Cleveland Engineers Visit Rubber Plants

The Cleveland Engineering Society made an inspection trip to Akron, Ohio, Nov. 27, visiting the plants of the Goodyear Tire & Rubber Co. and the B. F. Goodrich Co. In the evening a joint meeting with the Akron section of the American Society of Mechanical Engineers, the Akron section of the American Institute of Electrical Engineers and the Rubber division of the American Chemical Society, was held at the Akron City Club. An illustrated talk on dirigibles was given by Dr. Carl Arnstein, vice-president and chief engineer of the Goodyear Zeppelin Co., and H. H. Timlin told of the Firestone Tire & Rubber Co.'s rubber plantation in Liberia, Africa.

Fabricated Structural Steel

Bridge at New York Takes 26,500 Tons—Awards Total 58,600 and New Projects Call for 25,100 Tons

WITH a bridge at New York to connect Staten Island and New Jersey requiring 26,500 tons and another across the Ohio River at Madison, Ind., 5200 tons, fabricated structural steel awards reported during the week amounted to 58,600 tons. New projects, calling for 25,100 tons, included a Chicago club, which will take 6000 tons. Awards follow:

BOSTON, 1100 tons, Boston & Maine Railroad hotel, to New England Structural Co.
 BOSTON & MAINE RAILROAD, 1100 tons, nine bridges, to Boston Bridge Works, Inc.
 BOSTON & MAINE RAILROAD, 193 tons, three bridges, to Bethlehem Bridge Co.
 NEWTON, MASS., 115 tons, high school, to Boston Structural Steel Co.
 PROVIDENCE, R. I., 340 tons, Providence Institute of Savings, to J. H. Tower Iron Works.
 NEW YORK, 26,500 tons, bridge over Kill van Kull connecting Staten Island and New Jersey, to American Bridge Co.
 NEW YORK, 2500 tons, shoring steel for subway construction for Clemente Contracting Co., Inc., to American Bridge Co.
 NEW YORK, 1100 tons, apartment building on East Eighty-sixth Street, to Hedden Iron Construction Co.
 NEW YORK, 1000 tons, apartment building at 623 Park Avenue, from Starrett Brothers, general contractors, to Hedden Iron Construction Co.
 NEW YORK, 900 tons, public school No. 96, to Harris Structural Steel Co.
 NEW YORK, 800 tons, apartment hotel on East Eighty-third Street, to Easton Structural Steel Co.
 DELAWARE, LACKAWANNA & WESTERN RAILROAD, 700 tons, four bridges at Jersey City, to American Bridge Co.
 DELAWARE & HUDSON RAILROAD, 175 tons, bridge at Lanesboro, Pa., to American Bridge Co.
 WERNERSVILLE, PA., 560 tons, building for Jesuit Novitiate, to Robinson Iron & Steel Co.
 EASTON, PA., 300 tons, Lafayette College engineering hall, to McClintic-Marshall Co.
 NEW MILFORD, N. J., 150 tons, building for Austin Co., to Montgomery Iron & Steel Co.
 PENNS GROVE, N. J., 180 tons steel piling, for American Gas & Electric Co. plant, to Bethlehem Steel Co.
 EAST LIBERTY, PA., 100 tons, additional shelter shed for Pennsylvania Railroad, to Guibert Steel Co.
 HARRISBURG, PA., 337 tons, Zembo Shriners temple, to Jones & Laughlin Steel Corporation.
 PITTSBURGH, 160 tons, coal cleaner building, Hillman Coal & Coke Co., to Jones & Laughlin Steel Corporation.
 PORT HURON, MICH., 285 tons, exchange building for Michigan Bell Telephone Co., to Whitehead & Kales Co.
 FLINT, MICH., 125 tons, high school, to Guibert Steel Co.
 CLEVELAND, 3000 tons, Cleveland Union Terminal Co., catenary bridges and other steel work required for electrification of railroads entering Cleveland Union Depot, to Fort Pitt Bridge Works.
 MADISON, IND., 5200 tons, bridge over Ohio River for J. G. White Engineering Corporation, to Mount Vernon Bridge Co.
 INDIANA & MICHIGAN RAILROAD, 1000 tons, highway bridges, to Indiana Bridge Co.
 LOUISVILLE & NASHVILLE RAILROAD, 1300

tons, bridges, to American Bridge Co.
 NORTHERN PACIFIC RAILROAD, 1150 tons, to American Bridge Co., Minneapolis Steel & Machinery Co. and St. Paul Foundry Co.
 ROCK ISLAND RAILROAD, 200 tons, bridges, to American Bridge Co.
 CHICAGO, 400 tons, social science building for University of Chicago, to Wend-nagel & Co.
 OLYMPIA, WASH., 230 tons, Kalama River bridge, to unnamed interest.
 SACRAMENTO, CAL., 150 tons, Bank of Italy, to Palm Iron Works.
 PORTLAND, ORE., 243 tons, Gardiner bridge on Yellowstone-Trail Highway, to unnamed interest.
 SAN FRANCISCO, 900 tons, plates, three 82,000-bbl. tanks for Shell Oil Co., to Steel Tank & Pipe Co.
 SAN FRANCISCO, 900 tons, plates, three 82,000-bbl. tanks for Shell Oil Co., to Western Pipe & Steel Co.
 SAN FRANCISCO, 1500 tons, bridge work for Southern Pacific Co., to American Bridge Co.
 SAN FRANCISCO, 300 tons, two apartment buildings, Broadway and Octavia Street, to Golden Gate Iron Works.
 LONGVIEW, WASH., 425 tons, saw mill for Weyerhaeuser Lumber Co., to Star Iron & Steel Works.
 ALHAMBRA, CAL., 100 tons, factory for Kay Steel Co., to Union Iron Works.
 LOS ANGELES, 180 tons, Stauffer Chemical plant, to Union Iron Works.
 LOS ANGELES, 1600 tons, apartment building, Wilshire Boulevard and Commonwealth Street, to Union Iron Works.
 LOS ANGELES, 381 tons, three buildings for Paramount Film Corporation, to Union Iron Works.
 LOS ANGELES, 344 tons, office building on South Spring Street, to Llewellyn Iron Works.
 SANTA MONICA, CAL., 113 tons, apartment building, Second Street, to Baker Iron Works.
 HONOLULU, 250 tons, steel barge for Young Brothers, Ltd., to Wallace Bridge & Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 200 tons, New England Steamship Co. freight shed.
 BOSTON, 1100 tons, three-story addition to North Station for Boston & Maine Railroad.
 BOSTON & MAINE RAILROAD, 1000 tons, 12 bridges.
 BALTIMORE & OHIO RAILROAD, 200 tons, bridge on Staten Island, N. Y.
 MASSENA, N. Y., 2000 tons, manufacturing building for Aluminum Co. of America.
 SYRACUSE, N. Y., 150 tons, Psychiatric Hospital.
 STATE OF NEW JERSEY, 1240 tons, highway bridges; 1100 tons for Ridgefield Park and 140 tons for Metuchen.
 VENTNOR CITY, N. J., unstated tonnage, public school building.
 CAMDEN, N. J., unstated tonnage, Woodrow Wilson Junior High School.

ORWIGSBURG, PA., unstated tonnage, building for St. Francis Orphan Asylum.
 STATE COLLEGE, PA., unstated tonnage, first unit of Botany Building for Pennsylvania State College.
 HOLMESBURG, PA., unstated tonnage, building for Northeast National Bank.
 HERSHEY, PA., 2000 tons, community building.
 UPPER DARBY, PA., 1100 tons, school building; McClintic-Marshall Co., low bidder.
 STATE OF ALABAMA, tonnage not stated, highway bridges.
 CLEVELAND, 600 tons, addition to Moreland Courts Apartments.
 CLEVELAND, tonnage unstated, plant for Geometric Stamping Co.
 CHICAGO, 1000 tons, addition to Washington Park race track pavilion; Chicago Heights Construction Co., general contractor.
 CHICAGO, 200 tons, sales building for Studebaker Corporation.
 CHICAGO, 6000 tons, La Salle Club.
 CHICAGO, 1000 tons, First Regiment Armory, revised.
 CHICAGO, 5000 tons, Fine Arts Building, revised.
 SUPERIOR, WIS., 700 tons, coal bridge.
 ST. LOUIS, 1500 tons, Continental Life Insurance Co. building.
 SACRAMENTO, CAL., 170 tons, bridge over Southern Pacific tracks near Benham; Paul N. White, Santa Monica, low bidder.

Gain in October British Steel and Iron Output

LONDON, ENGLAND, Nov. 21 (*By Cable*).—October pig iron output was 543,600 gross tons and the production of steel ingots and castings was 756,000 tons.

A comparison of the October output with that of the nine preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly...	855,000	638,600
1920—Av. monthly...	669,500	755,600
1922—Av. monthly...	408,500	490,100
1923—Av. monthly...	620,000	706,800
1924—Av. monthly...	609,900	685,100
1925—Av. monthly...	519,700	616,400
1926—Av. monthly...	203,500	296,700
1927—Av. monthly...	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700
1928—June	563,700	709,500
1928—July	537,800	666,900
1928—August	519,000	648,300
1928—September	503,900	718,600
1928—October	543,600	756,000

Large Coal Production

Production of bituminous coal in the week ended Nov. 17 is reported by the United States Bureau of Mines at 10,918,000 net tons. This is slightly above the average of the two preceding weeks and is nearly 1,000,000 tons above the output of the corresponding week of last year. For the elapsed portion of the calendar year, however, production was lower than in 1927, the total through Nov. 17 being reported at 429,971,000 this year, compared with 462,490,000 tons last year. Except for 1924, when the output was nearly 3 per cent lower than this year, 1928 shows the smallest total since 1922, when there was a coal strike.

This Issue in Brief

Dwellings made of "metal lumber" permit the same architectural flexibility as wood. Metal members have holes at 2-in. intervals. No cutting or riveting is required at the job. Armed only with wrenches, mechanics unfamiliar with the work erect the framing with no difficulty.—Page 1347.

* * *

Avoids straight-line production flow to gain flexibility. Equipment in new automatic seamless pipe mills is staggered, with short transfer tables between machines.—Page 1353.

* * *

Approaching business recession indicated by downward movement of P-V Line. However, the less favorable trend is not expected to be reflected in business developments for at least three or four months, says Dr. Haney.—Page 1376.

* * *

Prosperity of "luxury" industries has been achieved in part at the expense of basic industries, says economist. While prices of basic goods have remained low, the goods and services which have been elaborated out of them have tended to remain high in price.—Page 1350.

* * *

"Happy plant atmosphere" and low costs go hand in hand. Establishment of definite rules of conduct for employees and enforcement of such rules have been found to make for contentment among workers and to have produced remarkable savings.—Page 1364.

* * *

Open-hearth furnaces with inadequate regenerative capacity should be operated on short reversal periods, says open-hearth man. Longer periods can be taken when there is ample checker brick to absorb the heat.—Page 1367.

Higher prices for copper will not necessarily lessen demand, copper man believes. "Sales value of copper . . . is firmly established for many purposes and the purchasing public looks for the metal as an indication of quality." A new consumption record will likely be set in 1928.—Page 1374.

* * *

Appreciable reductions in foundry costs can be made by comparing results. Each superintendent thinks his own costs are lowest obtainable, but, if foundries combine into a cost group, items which are higher than the average will be revealed, and an investigation started to determine the reason.—Page 1363.

* * *

Can Federal Trade Commission enforce rules against violators of trade practice agreements? "Still doubtful," says Commission official. It is still more doubtful how minority members of an industry who refuse to subscribe to agreements can be punished.—Page 1374.

* * *

Exports of iron and steel for first 10 months of 1928 are 12 per cent above same period of 1927, while imports are slightly less. October exports were 50 per cent above last year, and the fourth highest month of the past seven years.—Page 1411.

* * *

Money can be saved for big producers of borings by melting the borings in an electric furnace and turning them into high-grade castings. Borings have low market value and the producer can utilize them most advantageously himself, says foundry engineer.—Page 1359.

If consumption were as generously financed as production is, business would be better, economist states. The belief that production automatically finances consumption is a fallacy. Credit fails to perform its full function when it is confined largely to financing production.—Page 1351.

* * *

Better seamless pipe is made by using two piercers instead of one, pipe maker believes. In all but the smaller sizes of pipe, a primary piercer is used first, to pierce a small hole. This is expanded by passing the piece through the second piercer.—Page 1356.

* * *

No possible way of sustaining capital equities created out of production credit expansion, without a corresponding expansion of consumer purchasing power, says economist. Wages may have to undergo a further inflation, without a rise in commodity prices, to bring this about.—Page 1352.

* * *

Stabilizes foundry business by adopting cost group plan. Ridiculous variations in bids have been eliminated by standardized cost system. Guesswork has been avoided and competition has been put on a fair, sound basis.—Page 1363.

* * *

Regulation of competition is dangerous and fallacious, says National Industrial Conference Board economist. Restriction of production involves a restriction of consumer purchasing power, and protected returns to capital invite over-investment and increased competition.—Page 1351.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Next Forward Move in Steel

AS a cross-section of the cooperative effort that is now the uppermost thing in American industry, a single recent issue of *THE IRON AGE*—that of Nov. 15—was an arresting exhibit. The issue was not planned to center on that subject, but events in the great field covered by this journal conspired to make group action by manufacturers the feature of the week.

A leading place was given to a report of the early proceedings of the Biloxi meeting of the American Institute of Steel Construction, whose executive director, Charles F. Abbott, has done a man's job in propagating a more enlightened selling practice in steel fabrication. Able as were other papers on the Biloxi list, the one which the steel industry most needs just now to digest for its health's sake was given by Charles H. Macdonald, recently head of the market research department of the Colorado Fuel & Iron Co., and now its director of sales. (In passing, we predict that five years hence managers of market research departments will rank higher in the lists of steel company executives than they do today—and they will be much more numerous.) It is not because his preachment is one that *THE IRON AGE* has long urged upon the industry that we specially cite Mr. Macdonald's paper, but because, with all their well-recognized triumphs, the manufacturers of steel now need most of all to move together to get for their products a larger place in popular thought and in every-day life. With no attempt to recapitulate the address, which we have already printed in full, we repeat three or four of its suggestions for better marketing through group action, such as the cement, lumber, brick and other industries have taken with good success:

The public should be educated, through a well planned national campaign of publicity, to the value of steel and its greater use in all requirements large and small.

More effort and money should be devoted to neglected markets for the established and logical use of steel.

A fund should be created for the development of new uses of steel.

We should be in position to offer through an organized bureau, to any industry using or contemplating the use of steel, all the facilities of the entire steel industry for the more rapid and satisfactory development of any practical new product, instead of leaving the customer or some individual steel manufacturer to work out, at an undue expenditure of time and money, products which ultimately bring business to the entire industry.

More attention and study should be given to the problems of individual fabricators and users of structural steel and steel products of every kind.

Also at the Biloxi meeting President W. M. Wood of the institute viewed the situation much as Mr. Macdonald saw it, saying that "in the vital problems of sales and distribution and publicity the industry as a

whole has seemed to be where it was a generation ago, and until recently this fact seems to have been no cause for concern." And F. H. Frankland, who is in charge of the technical service of the institute, declared that the public has not been "sold" on steel, and that it is essential that a "steel consciousness" be inculcated in the minds of the architect, the engineer and the builder through a comprehensive national advertising campaign.

On another page of the Nov. 15 issue the reader learns that 36 representatives of associations in the machinery and equipment industries met at Washington and planned for a series of conferences which will work for the abolition of unfair trade practices. In an adjoining column, E. W. McCullough of the department of manufacture, Chamber of Commerce of the United States, is reported as telling a meeting of manufacturers how by group action whole industries are competing with each other for the supplying of the same demand through different media. On the following page it is told that by cooperating in simplification manufacturers of eaves trough and conductor pipe are now making 94 per cent of the country's output in conformity with the simplified schedule; and the next column reports recent progress in the standardization of small tools and machine tool elements by a committee of the National Machine Tool Builders' Association and two engineering societies.

As a final citation, there is an extended extract from the address of Charles M. Schwab at the "Pioneers of American Industry" dinner in New York, in which he emphasized organization and cooperation as forces in industry, referred to the organization of research on a great scale by manufacturers, and predicted that future pioneering would be by great groups of trained men using each other's scientific knowledge, rather than by individuals as heretofore.

The steel industry is no stranger to cooperation. Judge Gary made the word almost synonymous with his own name. But cooperation in finding new outlets for its products and developing the old, in putting steel in a larger and more rapidly growing place in our twentieth century economy—that is the work to which steel manufacturers are now called by what is happening both in their own industry and in those whose progress depends on its enterprise and vision.

Automobile Prosperity

IT is true that the steel industry is prosperous, but the automobile industry is more so. Comparisons of earnings are frequently made, unfavorable to the former. The difference in conditions is not to be found in the increase in demand or in the demand relative to productive capacity.

As to production, both steel and automobiles made new high records in 1926, then having an off period in 1927. This year the gains over 1926 are not very dissimilar. Production of passenger cars and trucks in the United States and Canada in ten months totaled 4,090,197, of which October accounted for 417,354. A careful estimate allowing for rising Ford production, the present lull in Chevrolet production and seasonal influence with other makers puts the total for 1928 at about 4,800,000, which is 6½ per cent over 1926 and, incidentally, 34 per cent over 1927. This year's steel production gains over 1926 by about 6 per cent, which is much the same thing. No little of the steel industry's prosperity has been due to its automotive trade customer, as the demand came with quite a rush and, cars being made decidedly heavier than in 1926, it called for a substantial gain in tonnage. As we have recently noted, the proportion of the year's steel going into automobile and truck manufacture may easily be 17 per cent, against 14½ per cent in 1926 as shown by THE IRON AGE finding at the end of the year.

On account of Ford being largely out of production in this year, taken as a whole, comparison between production and capacity for 1928 cannot fairly be made. Capacity for 1929 may be put at 7,000,000 cars and trucks, United States and Canada. This figure seems to be reasonably low, based on Ford and Chevrolet estimates and consideration of what other builders did in August, the record high month. A prediction has been made of 6,000,000 production in 1929, which seems altogether rosy, and 5,000,000 is not by any means guaranteed. The latter total would be only a trifle over 70 per cent of capacity, whereas this year's steel production is about 84 per cent of capacity. Thus the comparison of earnings with the ratio of production to capacity makes a curious showing. If it be said that automobiles are more seasonable than steel and thus cannot show as high a percentage of production to annual capacity, it may be rejoined that steel producers have been less resigned to taking their off seasons as they come than the automobile producers have been.

One cannot doubt, however, that the automotive industry is going to have some interesting developments next year as to some producers thriving more than others. A light production works havoc with the individual producer's costs, and the annual turnover relative to assets is so large that price reductions sufficient to turn a poor seller into a good seller are scarcely conceivable.

The combined automobile production of last year and this is about 6 per cent below the combined production of 1925 and 1926, which were both good years. It is on that ground, presumably, that statements have been made that 1929 will be entered with a sort of "deficit" of nearly a million cars. The iron and steel trade had too much experience years ago with computations of alleged deficits in pig iron production to count upon any so-called "deficit" being made up unless conditions are favorable, and when they are sufficiently favorable people will buy even if there is no deficit. If the peak of domestic demand was temporarily passed a couple of years ago, as is quite possible, the growth of exports so frequently mentioned can hardly come in soon enough to bring about substantial increase in total production, for car and truck exports were 305,420 in 1926 and 384,199 in 1927, while 500,000 is an outside

estimate for this year. Increments in future at a greater rate would be remarkable.

Coal Stays in Poor Shape

SUBSTANTIALLY the same stocks of bituminous coal were in consumers' hands Oct. 1 as July 1—the Bureau of Mines reports 41,100,000 tons against 41,700,000 tons. It is normal for stocks to increase during that three-month period. There were reports of coal stocks on these two dates in 1923 and 1926, showing increases of 14,000,000 tons and 4,000,000 tons respectively. One might be disposed to interpret the failure of consumers to accumulate stocks this year as an indication that coal trade conditions will improve. But coal buyers watch the coal situation very closely and their failure to increase stocks seems to indicate they feel assured that next winter coal will be as cheap as ever and as easy to buy. The stocks now reported, it will be understood, are really inconsequential. Since the depletion by the 1922 strike the lowest stocks ever reported were 36,000,000 tons, for May 1, 1926. Approximately that amount is considered an irreducible minimum.

The analysis of coal consumption does not give favorable indication for the future of demand. Weekly consumption during the third quarter of this year was 8,246,000 tons, which is a trifle less than in the same period of 1927 and 9 per cent less than in the period of 1926. Yet we are assured by an imposing array of statistics that industrial activity has been much greater than a year ago and somewhat greater than two years ago. It is plain that year by year coal is being utilized much more efficiently. This fact and the growth of substitutes, both for heat and power, give little promise of increasing tonnage in the future.

It is now several years since "the coal problem" became pressing. Government aid was talked of, but while Congress was willing to spend a large sum of money for information by way of "the fact finding commission," it was unwilling to spend time on the report or on contriving a measure of relief.

It was said, with seeming reason, that if the Government did not help, the coal industry eventually would get some relief by economic forces, by the painful process of elimination, for there were "too many mines and too many miners." A good bit of time has passed and something should have happened, but it has not. Perversely enough coal companies have failed to fail. Had they done so, their mines would still be there, although subject to deterioration; but as it is they have kept up their properties. Of late various idle operators have considered starting up, thinking they might lose less in operation than the cost of upkeep when idle.

We have the production figures year by year of mines arranged in groups according to capacity, and these show no definite drift of production from small to large mines. The smaller mines maintain their relationship. Experts are not surprised by these statistics, remarking that of course many small mines survive because they have lower overhead per ton.

The coal industry is not making profits. Districts formerly union find no difficulty about labor supply. Apparently their trouble is the competition of Southern fields, with considerably lower wages, but the operators in the latter are not making profits either. Several

years have now elapsed with no substantial progress toward a righting of the coal situation. Talk is renewed of the need of Congress doing something, but with little reason to hope that the something really will be done.

The Trade Commission and Business

THE new relation that the Federal Trade Commission is assuming toward business is commanding widespread attention. The point of view of that Government body was set forth by Commissioner Myers in an address published in *THE IRON AGE* last week. It is amplified this week in an interview with the commission's director of trade practice conference, M. Markham Flannery. The point is made that the members of an industry are as entitled to fair competition as the public, in whose interests the Federal Trade Commission law was enacted. Protection of competitor against competitor, according to this view, is in no way inconsistent with the commission's primary obligation to those who buy the products of an industry.

The excellent work that trade associations have done in raising the standards of products and business conduct cannot be fully effective, it is argued, without Government aid. So long as a recalcitrant minority refuses to cooperate, the efforts of the majority are impeded. The commission sees no obstacles to its acting against a minority for practices illegal per se, but whether it can enforce rules adopted by an industry that are aimed at methods not yet held unlawful is a question that the courts have not yet passed on.

So far trade association rules have been focused on

maintaining fair play in competition. To invite the Government to enforce such regulations, no matter how desirable they may be, is a matter of policy calling for careful analysis and unhurried judgment. In the opinion of Virgil Jordan of the National Industrial Conference Board, as expressed in an address before the National Founders Association published in this issue, Government intervention in business inevitably leads to extremes in bureaucratic control. He assumes, however, that trade association activity is headed toward regulation of prices and production. It may indeed be a fact that such group action, once proved effective, would not stop with the mere stamping out of competitive excesses. In such a case it is easy to conceive of Government control taking the course that he predicts.

When Mr. Jordan condemns regulation of competition on the ground that it would stabilize profits and thereby lead to over-investment and restriction of consumer purchasing power, he opposes the view held by most industrialists. A primary aim of efforts to wipe out unfair competition is to eliminate some of the most serious causes of waste in production. Every step toward greater economy is a move toward cheaper output and wider consumption.

Consumption can best be brought into balance with production, according to the Conference Board speaker, by a better banking policy, but he admits that no prompt improvement in that direction is in prospect. Nevertheless his warning against the extension of Government control of business deserves as careful consideration as the presentation of the Trade Commission's position. It is only through a threshing out of this question that industry can intelligently decide its policy.

CORRESPONDENCE

Terms Cash Discounts as Graft

To the Editor: After 40 years' experience in business I am of the opinion that cash discounts are in the same class with tips, bribes and other kinds of graft that are levied for inadequate consideration. That is really what is wrong with them. Tipping may be a kindly act, but when it is exacted mechanically for a trifling service, or for none at all, it is graft.

There was a reasonable basis for cash discount in the days when trade credits ran to 4 or 6 months, with open accounts, and no way of exerting pressure on the debtor except by dunning him. It was worth 5 per cent to get the money in 30 days as compared with an indefinite credit that might run into a year. But even then goods had to be marked to stand it, and if margins were not greater, expenses were less.

When I began work as an office boy in an old-fashioned wholesale house, the usual terms were 5 per cent in 30 days or 4 months net. It meant that 5 per cent was paid for three months' time, and when I remarked to the bookkeeper that it was equal to 20 per cent per annum, he told me to keep my opinions until they were asked for! I mention this because the same kind of reaction still persists. Executives refuse to consider a fact of percentage if it does not fit in with preconceived ideas. Sometimes I wonder what proportion of business men really understand the term "per cent."

No doubt the principle of cash discount is as old as commerce—that is, the buyer who goes to market with money

in his purse expects to do better than the buyer who must ask for credit, or who accepts a term of credit because it is customary. But this falls down when competition and trade use compel the figuring of prices on a cash basis. In primary markets prices are quoted for cash. Go into the country with a cattle buyer who is picking up a carload of steers. There will be bargaining, but once the cattle are delivered as agreed the buyer pulls out a fat wallet and pays in currency. If very well known, he may be able to pay by check, but he must not expect to do this when buying from a stranger. Cash is cash, and no nonsense about it. Imagine the seller being asked for a "cash" discount.

Now it may be said generally that raw materials are sold for cash, and sometimes the rule is enforced strictly—cash against delivery or against documents; or what our Quebec friends call "argent comptant"—a very expressive phrase which means "money counted out." But the inconvenience of this has brought into use a limited term of credit, usually 30 days, which is elbow room in terms of time. It is enough to permit the work of billing to be done accurately as goods are shipped, to allow for transit over a considerable radius, and for eventual delivery to the buyer, who is presumed to be doing business in an orderly manner, which means that incoming goods are checked and inspected and the account certified for payment. Then, in due course, it will be paid—and there ought not to be any necessity for bribery to get it paid. To say that a discount of 2 per cent is "earned" by payment in 10 days instead of thirty days is nonsense. It is not earned, it is graft!

No argument about including the 2 per cent in the cost of goods gets over the fact that 2 per cent for 20 days is at the rate of 36.5 per cent per annum. Now if call money touched 36 per cent for even a day, Wall Street would

have a panic and the Exchange would close for a week to cool the hot bearings. It has been much advertised that surplus working capital of corporations has lately been employed as call money, and it looks like good business to make it earn 6 or 7 per cent. But not much imagination is required to visualize a corporation lending money on call which is in part obtained from customers who are taking a discount of 2 per cent for 10 days. And grave execu-

tives are knitting their brows over zigzags to find out what is wrong with business. They might ask the office boy, or, if that species is extinct, perhaps the bookkeeper might be consulted. A man who stands at a desk working at figures all day has no time for illusions about the facts of percentage.

WILLIAM Q. PHILLIPS.

Sec'y-Treas. Doherty Mfg. Co., Ltd.

Sarnia, Ont.

Waste Elimination Week Brings Results

Steel Corporation Gets Wealth of Suggestions, Many Considered Worthy of Cash Awards, in Contest

WASTE elimination week, which was conducted in all plants of the United States Steel Corporation Oct. 15 to 20, gave impressive results, which, as time goes on, should result in substantial savings in production costs. The general response from employees may be realized from the fact that in one group of plants of the American Steel & Wire Co., those of the Worcester district, there were almost as many suggestions from employees as there were men employed. The number of men was 4700 and the number of suggestions was 4424. Fully one-half of these are considered useful and more than 100 of them have been recommended for consideration for financial award.

In this campaign waste was construed to mean anything which, in the final analysis, causes a loss in dollars and cents. It might be the useless expenditure of time, energy, money, materials; of water, steam, light, heat; of human life or limb.

The Worcester district has been conducting for two years a suggestion system regarding waste elimination, in which employees are urged to cooperate by contributing ideas. In the six days of intensive waste elimination week more suggestions were received than in the two years of the continuous system.

The first step was the general announcement to employees of the works that the campaign would be carried through, everyone being urged to cooperate, and that cash awards would be made for novel and outstanding suggestions. The superintendents and foremen were called together by the assistant district manager, who outlined the plan and what it was proposed to do in stimulating interest among the workers. The foremen in turn addressed their men and aroused their interest.

Of the 4424 suggestions received, 3 per cent were considered worthy of cash awards, in the opinion of the local management, and this recommendation was forwarded to headquarters. This percentage has been the common experience in industries which have conducted similar campaigns. But the accrued benefits to the business were by no means confined to the suggestions of the 100 whose ideas were of novel and outstanding value. Others, less distinctive, are useful to the management.

Many of these called attention to lapses in practice, where the human factor has permitted prescribed methods and regulations gradually to become ineffective.

Most of the more important suggestions may be divided into two classes, practice and equipment. Elimination of processes or the combining of processes received sound, practical attention. The most economical use of materials came in for important consideration, particularly in pointing out that as good or better results in certain cases could be obtained by using a different kind or grade of material. There were other important suggestions concerning the elimination of scrap, always a real problem in the wire industry. Another vital subject of suggestion was that of changes in equipment to make more efficient. Accident prevention and working conditions, such as light and sanitation, came in for a limited amount of comment, but the years of concentrated attention which the Steel Corporation has given to this branch of management has made this field of suggestion a lean one.

Taylor Society to Meet Dec. 5 to 7

The annual meeting of the Taylor Society will be held at Rumford Hall, 50 East Forty-first Street, New York, Dec. 5 to 7 inclusive. On Friday afternoon a visit to the plant of the Sperry Gyroscope Co. in Brooklyn has been arranged for production executives and a meeting of teachers of management has been planned for Dec. 8. The tentative program for the convention includes the following papers:

"Variations in the Applications of Engineering Technique to Management As Illustrated by Variable, Intermittent and Continuous Processing," by G. E. Schulz, Armstrong Cork Co., Lancaster, Pa.

"The Marketing Problems of a Manufacturer of Resale Goods," by Willard E. Freeland, Freeland & Warren, Boston.

"Some Basic Principles of Cost Accounting," by John H. Williams, industrial engineer, New York.

"Some Observations on Workers' Organizations," by Morris L. Cooke, consulting management engineer and president Taylor Society.

"How Scientific Management Can Promote a New Functional Status for Workers," by Geoffrey C. Brown, consulting engineer, East Orange, N. J.

"Suggestions Concerning a More Com-

prehensive Approach to the Problem of the Shorter Work Day and the Shorter Work Week," by Dr. H. S. Person, managing director Taylor Society.

Cleveland Company Goes Into Receivership

The Variety Iron & Steel Co., Cleveland, has been placed in the hands of a receiver on application of the Cleveland Trust Co. Albert R. Manning, an attorney, is the receiver. The bank in its petition stated that the company's assets far exceeded its liabilities and that it is solvent provided assets are properly protected. The Variety company is a fabricator of heavy plate work, blast furnace work and structural steel work.

Republic's New Financing— Directors Added

The Republic Iron & Steel Co., Youngstown, has announced financing plans to provide funds for expanding the company's plants and its business. The company will offer for sale 100,000 shares of new common stock at \$65 per share, and proceeds will be employed for electrification of the Youngstown properties, probable additions to the Birmingham plant, and further exploitation of the tube welding process acquired through purchase of Steel & Tubes, Inc. Stockholders of record of Dec. 15 are entitled to subscribe for one share of the new stock for each six shares now owned. Stock unsubscribed for will be taken over by a banking syndicate. The stock must be paid for by Jan. 3, 1929.

The company has increased its board of directors from 11 to 14 by the election of Philip Wick, Youngstown, and William G. Mather and Myron Wick, Cleveland. Philip Wick was formerly vice-president and a director of the Trumbull Steel Co., now a part of the Republic company, and Myron Wick has been active in Steel & Tubes management. Of Republic's 14 directors, six are from Cleveland, five from Youngstown, two from Pittsburgh, representing the Mellon group, and one, John A. Topping, chairman of the board, from New York.

A motion picture film showing arc welding applied to erecting the structural steel for the Upper Carnegie Building, Cleveland, may be obtained gratis on application to the Lincoln Electric Co., Cleveland.

Iron and Steel Markets

Steel Prices Have Easier Tone

Bar Quotations for Current Quarter Continued for Next

Quarter—Concessions in Hot Strip—

Decline in Production Halted

STEEL prices are easier, but the decline in production has been checked. With the general trend of specifications downward as the year-end approaches, releases by the automobile industry continue to act as an offsetting influence. Construction work and railroad cars are also taking more steel.

Among the primary materials, pig iron still shows strength in the Central West and South, but is less buoyant in the East. Heavy melting scrap at Pittsburgh, after declining for four consecutive weeks, has undergone no further change in the past seven days, and a somewhat steadier price situation obtains in other market centers. Prompt furnace coke at Connellsville has receded 10c. a ton and is now 15c. below the peak reached in the middle of October.

Steel bar prices reflect a marked change in the condition of mill backlogs. Buyers no longer find it necessary to pay premiums for early shipments, and the market is again quotable at 1.90c. to 2c., Pittsburgh, compared with 1.95c. to 2c. when the advantage was with the mills. The possibility of an advance for first quarter has also passed, with the opening of books by two producers at the same prices that rule on current contracts. Cold-finished bar prices likewise have been continued for the next quarter, and similar action is expected on plates and structural shapes.

Large buyers of hot-rolled strip have succeeded in placing first quarter contracts at concessions of \$2 a ton. This product, however, under the new bases and extras recently announced, had been advanced \$3 to \$5 a ton over current invoice prices.

In contrast, sheet prices for first quarter have held in contracts placed thus far, although mills continue to make sales for immediate specification at \$2 a ton less.

Territorially also a mixed situation is indicated, with an advance of \$2 a ton on plates, shapes and bars reported from Birmingham.

Steel output shows little change. The rate for the Greater Pittsburgh district remains at 80 per cent, while Chicago continues on an 82 per cent basis. The average for Steel Corporation subsidiaries has risen to about 82 per cent, compared with a recent rate of 80 per cent.

The recovery in steel specifications from the automobile industry, noted at Cleveland a week ago, has continued and additional first quarter contracts have been placed. The increased steel requirements are to a large extent for new models to be brought out Jan. 1.

Large projects are sustaining the demand for steel in the construction field. For a third week structural steel contracts have been heavy, the current total being 58,600 tons. Of this amount, one contract—for a bridge

between Staten Island and New Jersey—calls for 26,500 tons. A New Jersey pipe line, on which bids will be closed Dec. 6, will require 38,000 tons of plates.

Indicative of the growing steel requirements for ships is an inquiry from a New Jersey builder for prices on 12,000 tons of ship plates and 4000 tons of shapes.

Railroad equipment buying for the week included a total of 2900 freight cars, of which the Wabash bought 2000 and the Chicago & North Western 700. Among new inquiries for more than 4000 cars were 2500 for the Louisville & Nashville, 1025 for the Santa Fe and 250 for the Rock Island.

The current rail buying movement is half over, judged by the tonnage booked by Chicago mills. The Ensley, Ala., mill, which resumed operations Nov. 24, has received an order for 13,000 tons from the Southern Pacific.

Tin plate specifications have increased, following the announcement of the price for the first half of 1929, and mill operations now average 80 per cent, compared with 70 per cent a month ago.

Cleveland reported another good week in sales of foundry and malleable pig iron, which totaled 46,000 tons, and one producer in that city is booked full for the first quarter. Bookings at Cincinnati aggregated 31,000 tons. Extra demands of melters have enabled Valley iron to penetrate as far west as South Bend, Ind., resulting in a 50c. advance in Valley foundry grade to \$18, furnace. Virginia foundry iron, following the lead of Birmingham iron, has gone up 25c. a ton to \$20.25, base furnace. Sales at the new price of \$16.50, Birmingham, have encouraged one Alabama furnace to raise its quotation another 50c. a ton.

A less favorable situation exists along the Atlantic seaboard where the last advances announced by Buffalo and Eastern furnaces are no longer generally adhered to.

The increase in silvery pig iron and Bessemer ferro-silicon by Jackson County makers was not uniform, as reported last week, since one producer marked up quotations only \$1 a ton compared with \$2 by the other.

Machine tool buying is heavy, outstanding orders including two of more than \$300,000 each from domestic buyers and a third of \$100,000 from Sweden.

Machinery exports for the 10 months ended with October established a new record and were larger than for any entire year between 1921 and 1927.

The 10 months' exports for iron and steel, excluding scrap, were the largest since 1921.

THE IRON AGE composite price for pig iron has advanced from \$18.54 to \$18.59 a ton. The finished steel composite has declined from 2.369c. to 2.362c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Nov. 27, 1928	Nov. 20, 1928	Oct. 30, 1928	Nov. 29, 1927
No. 2, foundry, Philadelphia...	\$21.26	\$21.26	\$20.76	\$19.76
No. 2, Valley furnace.....	18.00	17.50	17.50	17.25
No. 2, Southern, Cin'ti.....	20.19	20.19	19.94	19.69
No. 2, Birmingham.....	16.50	16.50	16.25	16.00
No. 2 foundry, Chicago*	20.00	20.00	19.50	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.00
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh...	20.01	20.01	19.76	19.76
Malleable, Chicago*	20.00	20.00	19.50	18.50
Malleable, Valley.....	18.25	18.25	18.00	17.50
Gray forge, Pittsburgh.....	19.26	18.76	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.95	1.95	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.29	2.29	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.22½	2.22½	2.22½	2.14
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.19½	2.19½	2.19½	2.14
Steel hoops, Pittsburgh.....	2.10	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Nov. 27, 1928	Nov. 20, 1928	Oct. 30, 1928	Nov. 29, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.....	2.75	2.75	2.75
Sheets, black, No. 24, Chicago			
dist. mill.....	2.85	2.85	2.85
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago			
dist. mill.....	3.60	3.60	3.60
Sheets, blue, 9 & 10, P'gh.....	2.00	2.00	2.00
Sheets, blue, 9 & 10, Chicago			
dist. mill.....	2.10	2.10	2.10
Wire nails, Pittsburgh.....	2.55	2.55	2.55
Wire nails, Chicago dist. mill..	2.60	2.60	2.60
Plain wire, Pittsburgh.....	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20
Barbed wire, galv., Chicago			
dist. mill.....	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$17.00	\$17.00	\$17.75	\$14.50
Heavy melting steel, Phila.....	15.50	15.50	16.00	13.50
Heavy melting steel, Ch'go....	14.50	14.50	14.50	11.50
Carwheels, Chicago.....	14.25	14.25	14.25	13.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	15.50	14.25
No. 1 cast, Philadelphia.....	16.25	16.25	17.50	16.00
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	13.50
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)..	13.25	13.00	12.75	9.75

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.75	\$2.85	\$2.90	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	16.25	13.75
Electrolytic copper, refinery..	15.75	15.75	15.75	13.50
Zinc, St. Louis.....	6.35	6.25	6.25	5.90
Zinc, New York.....	6.70	6.60	6.60	6.25
Lead, St. Louis.....	6.22½	6.17½	6.32½	6.10
Lead, New York.....	6.35	6.35	6.50	6.40
Tin (Straits), New York.....	52.87½	51.12½	49.25	59.12½
Antimony (Asiatic), N. Y.....	10.00	10.25	10.50	10.87½

Pittsburgh

Bars, Plates and Shapes May Not Be Advanced for First Quarter—Foundry Pig Iron Higher

PITTSBURGH, Nov. 27.—Developments in steel prices engage attention this week. Some makers of steel bars have announced a continuance of this quarter's price on first quarter contracts, and it now appears that no attempt will be made to advance prices on bars, plates or shapes. These lines have had a total advance since a year ago of from \$3 to \$4 a ton over the invoice prices then current, and in this respect bars, plates and shapes have outstripped most other finished steel products.

Hot-rolled strips, with the assistance of a new card of extras, are quoted well up as compared with where they have been much of the time during this year, but late advances suggest that with the opening of negotiations for large tonnages it has been necessary for producers to modify their price ideas.

Makers of cold-finished steel bars are continuing the present price on first quarter contracts. There had been some suggestions of an advance, but failure of the price of hot-rolled bars to move to higher ground removed an important prop. Nothing has developed in connection with first quarter wire and nail prices; an advance may come, but whether it will

be through an out and out raising of prices or through a recasting of sales methods is not yet clearly defined.

Strong demands for foundry iron from consuming points not recently supplied by Valley furnaces, on account of unfavorable freight rates, have stiffened the price to \$18 for the base grade in spite of rather limited demands from Pittsburgh and other points that constitute the usual market for Valley iron.

No marked recession has come in steel works and rolling mill engagement in this and nearby districts, but the operating activity is due chiefly to the momentum of the October rush, since in almost all products there has been a substantial let-

down this month in new orders and specifications. The approach of the end of the year has intensified the desire of consumers for light inventories, and some restriction of demand, furthermore, is common to this time of the year when consumption usually is on a declining scale. November has been light in new tonnage releases compared with October. Although there has been a drop of 10 points in ingot production, it is believed that unfilled obligations have decreased.

Pig Iron.—Valley pig iron still is showing more activity for shipment westward than toward or into the Pittsburgh district. Most of the recent sales of foundry iron have been to melters in Ohio, while several sales of foundry and malleable are reported for shipment to Indiana points. A Valley merchant furnace, which will be blown in about Dec. 15, will start with a backlog of approximately 10,000 tons of basic iron and about 15,000 tons of foundry and malleable; the basic iron is understood to be for an eastern Ohio steel plant, and of the other grades only a few small lots are to be shipped into this district. The Pittsburgh district

proper has contributed only a small part of the total bookings of Valley furnaces over the past few months. None of the Valley producers, however, lacks a backlog, and while business lately has been a little slow, there is a common tendency to ascribe this condition to the close proximity of the end of the year and the desire of melters to keep down inventories. So long as foundries which serve the motor car industry keep as busy as they are at present and their regular sources of supply cannot meet their requirements, there is sure to be a demand upon the Valley furnaces, which, until freight rates intervened, supplied many of the points to which they now are shipping. This demand has stiffened the Valley foundry iron price to \$18 for the base grade. Only a little has been sold into Pittsburgh at that price, but it is so readily obtainable elsewhere that producers are indisposed to sell here for less. No fresh business of consequence has developed in basic iron, and sales of malleable and Bessemer iron have been chiefly in small lots. The Carnegie Steel Co. recently took off one of its Duquesne furnaces.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50 to \$18.00
Bessemer	18.25 to 18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Not much variation is noted in the rate of specifications on contracts for billets, slabs and sheet bars, although in the past week or so there has been a recession in sheet and strip mill operations. Negotiations for first quarter tonnages are yet to get actively under way; non-integrated sheet makers await developments on the higher price schedule announced a few weeks ago. Strip makers are asking higher prices for first quarter than they are netting on fourth quarter contracts, but the open market price of billets and slabs has been left at \$33, Pittsburgh or Youngstown, for the base dimensions. That, however, would mean higher net prices in the event that makers fully apply the chemical

extras, which most of them announced last August and September. Wire rods are firmly held at \$42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—While formal announcements as to first quarter contract prices have not been made by the larger producers, the common belief is that the prices for this quarter will be continued. Some makers of bars have indicated a willingness to take first quarter business at 1.90c. to 2c., base Pittsburgh, and this willingness has taken the form of instructions to salesmen by at least one maker. As most makers now are pretty well caught up with orders and can make prompt deliveries, buyers requiring early shipments find it unnecessary to pay service premiums. The market, accordingly, is again quotable at from 1.90c. to 2c., base, against 1.95c. to 2c., when the advantage was with the mills. Structural steel lettings in this area remain rather small in the aggregate and individual jobs commonly are for small tonnages.

Rails and Track Accessories.—Interest centers in the distribution by the New York Central Lines of the spikes, tie plates and track bolts to go along with the rails recently ordered. Bids closed today (Nov. 27) on these track supplies. Business otherwise is slow.

Wire Products.—Business compares favorably with that at this time last year. Frequent suggestions of price advances are believed to lend some stimulation to specifications at a time when consumption usually is light and distributors are trying to reduce their inventories. No formal announcement has been made as to first quarter nail and wire prices.

Tubular Goods.—Pipe business does not vary much in volume or as to distribution. Butt welded pipe sales show some seasonal contraction, as requirements for gas, water and heating usually fall off at this time of year. There is a fairly steady demand for oil country pipe, in which seamless pipe is figuring to a greater extent than ever before. In backlog business the mills are better off in line pipe than in other classes. Demand for boiler

tubes is fairly active. Mechanical tubing, although not as active as it was recently, is doing well.

Sheets.—The close proximity of the end of the year, with its inventory-taking, is beginning to be reflected in sheet orders and specifications. Some of the motor car builders are seeking to defer deliveries on existing contracts until late next month or the first of January and other consuming industries appear less anxious for shipments. It is said that on first quarter tonnages no resistance to the new prices worthy of notice has been encountered, but it is a little early for a real test of the market. Former prices still rule on tonnage for shipment over the remainder of the year on either contracts or fresh purchases. The market lacks real strength in galvanized sheets, but Monday's advance in the price of spelter may possibly exert a steadying influence on prices.

Tin Plate.—With the price for the first half of next year settled, more tonnage is reaching producers. Mill operations, which a month ago were down to about 70 per cent, now are up to approximately 80 per cent, with the outlook for a further gain as the year draws to a close.

Cold-Finished Steel Bars and Shafting.—Fairly good movement on contracts is noted, but new business is light and buyers are showing no great interest in first quarter requirements. Prices for that period have not been named, but as the price of hot-rolled bars is likely to remain where it is, the common expectation is that there will be no change on cold-finished bars.

Hot - Rolled Flats.—Makers of strip are formally announcing 1.90c., base Pittsburgh, as the first quarter price on strips wider than 6 in. to and including 24 in., and 2c., base, for widths of less than 6 in. Not much business for that period yet has been concluded. Current demands are somewhat smaller than they were recently, owing to the contraction in the general requirements of motor car builders.

Cold-Rolled Strips.—Demands are lighter, but still are well in excess of those at this time last year. Makers

THE IRON AGE Composite Prices

Finished Steel

Nov. 27, 1928, 2.362c. a Lb.

One week ago.....	2.369c.
One month ago.....	2.369c.
One year ago.....	2.307c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1928	2.369c., Oct. 30;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Nov. 27, 1928, \$18.59 a Gross Ton

One week ago.....	\$18.54
One month ago.....	18.25
One year ago.....	17.59
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.59, Nov. 27;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.22c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c. to 2.25c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c. to 1.95c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

6 in. and narrower, P'gh.....	1.90c. to 2.00c.
Wider than 6 in., P'gh.....	1.80c. to 1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.10c.
Cooperage stock, Chicago.....	2.20c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.85c.
Strips, Cleveland.....	2.85c. to 2.95c.
Strips, del'd Chicago.....	3.15c. to 3.25c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galy'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Cut Nails

Per 100 Lb.

Carloads, Wheeling, W. Va., or Reading, Pa.....	\$2.75
Less carloads, Wheeling or Reading.....	2.85

Woven Wire Fence

Base to Retailers per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c. to 2.95c.
No. 24, del'd Cleveland.....	2.94c. to 3.04c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade.....	3.90c. to 4.00c.
No. 24, f.o.b. P'gh, No. 2 grade.....	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.69c. to 3.79c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c. to 4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers	Alloy Differential	Net Price 100 Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	\$3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
..... Rounds and squares.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1½.....	45	19½	1½ to ¾.....	+11	+39
1¼ to ¾.....	51	25½	1½.....	22	2
1½.....	56	42½	¾.....	28	11
¾.....	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			

Lap Weld

2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	53	40½			

Butt Weld, extra strong, plain ends

1½.....	41	24½	1½ to ¾.....	+19	+54
1¼ to ¾.....	47	30½	1½.....	21	17
1½.....	53	42½	¾.....	28	12
¾.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2¼ in.....	27
2¼ to 2½ in.....	37
3 in.....	40
3¼ to 3½ in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	+18
1¾ to 1½ in.....	+8
2 to 2¼ in.....	-2
2½ to 3 in.....	-7
3¼ to 4½ in.....	-9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	2 Tens & 2½
	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	63	3 in.....	48
1¼ to 1½ in.....	55	3¼ to 3½ in.....	50
1½ in.....	39	4 in.....	53
2 to 2¼ in.....	34	4½, 5 and 6 in.....	45
2½ to 3 in.....	42		

Hot Rolled

2 and 2½ in.....	40	3¼ to 3½ in.....	56
2½ and 2¾ in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

are firm at 2.85c., base Pittsburgh, on new business and also for first quarter contracts. Buyers whose requirements run to small lots and whose specifications are exacting are asked to pay 2.95c., base.

Cold-Finished Steel Bars and Shafting.—Leading makers have opened books for first quarter contracts at 2.20c., base Pittsburgh or Chicago, and 2.25c., base Cleveland, reaffirming the present quarter's price. It has become apparent in the past few days that there will be no change in the first quarter contract price of hot-rolled bars. March 15 has been named as the closing date for specifications on first quarter contracts. Current demands are moderate, but a steady movement on fourth quarter contracts is reported.

Hot-Rolled Flats.—The market on strips has become somewhat unsettled by reports of concessions to tonnage buyers on first quarter contracts. Several large contracts with motor car builders are under negotiation and are reported to have brought out concessions of as much as \$2 a ton from the prices named by makers in formally opening their books a few days ago. In these announcements widths up to 6 in. were quoted at 2c., base Pittsburgh, and for 6 in. to and including 24 in., 1.90c., base. Business in strips lately has been dwindling and the price shading is probably the result of the desire for orders, and it is probable also that producers encountered some difficulty in convincing large buyers that they should pay \$3 to \$5 a ton above present invoice prices.

Coke and Coal.—The market is weaker on spot furnace coke, and sales at more than \$2.75 per net ton at ovens have been out of the question lately. Production has not declined as rapidly as the demand for spot tonnages, and the answer is in the lower price. Producers, however, look for improvement next month,

counting on the starting of three blast furnaces to take up the slack, while heating and domestic demands are expected also to provide an outlet for some good-sized lots of Connells-ville coke. Spot foundry coke is going rather slowly, as consumers are disposed to keep their stocks within bounds for the year-end inventories. Some 72-hr. coke is available at \$3.50, but more commonly \$3.75 is the minimum on good brands. The coal market is very weak. With less sized coal now required as the lake shipping season ends, supplies of slack are expected to grow smaller and prices to stiffen.

Old Material.—Nothing has occurred to change scrap iron and steel prices this week. Steel makers are not much interested in fresh supplies, but they are insisting on deliveries on old orders and this creates a dealer demand that is sufficient to keep the market fairly firm. It is still said that heavy melting steel cannot be sold to consumers at over \$17, but also that dealer bids of less do not bring out much material. Steel works operations are off about 10 points from the recent peak; a desire to keep down inventories is another reason for light mill purchasing. Foundry grades are dull. Blast furnace scrap is firm owing to light offerings and more remunerative prices west of this district. The December scrap list of the Baltimore & Ohio Railroad contains 13,910 gross tons, including 6000 tons of No. 1 rails and 2200 tons of No. 1 heavy melting steel.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$17.00
Scrap rails	17.00
Compressed sheet steel.....	17.00
Bundled sheets, sides and ends	\$15.50 to 16.00
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary..	17.00 to 17.50
Heavy breakable cast.....	13.50 to 14.00
No. 2 railroad wrought....	17.00
Hvy. steel axle turnings....	15.00
Machine shop turnings....	10.50 to 11.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers	18.50 to 19.00
Railr. coil and leaf springs	18.50 to 19.00
Rolled steel wheels.....	18.50 to 19.00
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates.....	19.00 to 19.50
Low phos., light grade.....	18.00 to 18.50
Low phos., sheet bar crops	19.00 to 19.50
Heavy steel axle turnings..	15.00

Electric Furnace Grades:

Low phos. punchings.....	18.50 to 19.00
Hvy. steel axle turnings..	15.00

Blast Furnace Grades:

Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings.....	12.00 to 12.50
No. 2 bushelling.....	9.50 to 10.00

Rolling Mill Grades:

Steel car axles.....	20.00 to 21.00
No. 1 railroad wrought....	13.00 to 13.50
Sheet bar crops.....	18.00 to 18.50

Cupola Grades:

No. 1 cast.....	14.50 to 15.00
Rails 3 ft. and under.....	17.50 to 18.00

The Danville Structural Steel Co., Inc., Danville, Pa., maker of steel tubing, angles, channels, special shapes, reinforcing bars, fence posts, etc., has removed its New York office to 11 West Forty-second Street.

Heavy Orders for Steel Furniture

WASHINGTON, Nov. 27.—Increasing \$495,091, orders for steel furniture stock goods in the "business group" were valued at \$3,184,100 in October, against \$2,689,009 in September, according to reports received by the Department of Commerce from 34 producers. This was the largest total since last March and the fourth largest ever recorded. Shipments were valued at \$3,155,353, compared with \$2,754,135, while unfilled orders were valued at \$2,089,956 and \$2,061,856 respectively. Orders in this group for the 10 months ended with October were valued at \$29,678,981, compared with \$25,433,799 for the corresponding period of last year, while shipments were valued at \$29,068,316, against \$25,509,006.

Orders for shelving furniture in October were valued at \$958,736, an increase of \$159,876 over those received during September, according to reports received from 16 companies. This made the largest total on record. Shipments were valued at \$953,804, against \$678,422, and unfilled orders were valued at \$760,104, compared with \$753,813. For the 10 months ended with October orders were valued at \$7,897,123, against \$6,157,083 for the corresponding period of last year while shipments were valued at \$7,590,062 and \$6,095,608 respectively.

New England Activity

The output of forged automobile crankshafts by the Wyman-Gordon Co., Worcester, Mass., this year will exceed that of 1927, and will establish a new high record.

The Moore Drop Forge Co., Springfield, Mass., the largest independent New England drop forge plant, is operating at 100 per cent of capacity on Ford automobile parts.

The New London Ship & Engine Co., New London, Conn., has been awarded a contract for two ferryboats by the State of New York. The boats will operate between New York and Wards Island, and are scheduled to be completed in July, 1929.

Grover Lassen, Hartford, Conn., has agreed to pay the indebtedness of the H. D. Smith Drop Forging Co., South- ington, Conn., manufacturer of hand tools. The plant was closed last January with \$45,000 in bills outstanding. It is assumed the company will resume operations before the end of the year.

Necessary steps have been taken for the reorganization of Billings & Spencer Co., Hartford, Conn. It has been voted to liquidate the company and to reincorporate as the B. & S. Co. until after Jan. 1, when the corporate name will be as originally. Officers of the new company are: David J. Post, chairman of the board; Frederick C. Billings, president; A. H. Deute, vice-president and general manager; Charles T. Jones, secretary and assistant treasurer.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large.....	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms		Sheet Bars		Skelp	
	Per Gross Ton	(Open hearth or Bessemer)	Per Gross Ton	(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00	Pittsburgh	\$33.00 to \$34.00	Grooved	1.90c. to 2.00c.
Rerolling, 4 in. and under 10 in., Youngstown	33.00	Youngstown	33.00 to 34.00	Universal	1.90c. to 2.00c.
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00	Cleveland	33.00 to 34.00	Sheared	1.90c. to 2.00c.
Rerolling, 4 in. and under 10 in., Chicago	35.00				
Forging quality, Pittsburgh	38.00				

Prices of Raw Material

Ores		Ferromanganese		Fluxes and Refractories	
Lake Superior Ores, Delivered Lower Lake Ports		Per Gross Ton		Fluorspar	
Per Gross Ton		Domestic, 80%, seaboard		Per Net Ton	
Old range Bessemer, 51.50% iron	\$4.55	Foreign, 80%, Atlantic or Gulf port, duty paid		Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	
Old range non-Bessemer, 51.50% iron	4.40	105.00		No. 2 lump, Illinois and Kentucky mines	
Mesabi Bessemer, 51.50% iron	4.40	Spiegeleisen		Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	
Mesabi non-Bessemer, 51.50% iron	4.25	Per Gross Ton Furnace		Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	
High phosphorus, 51.50% iron	4.15	Domestic, 19 to 21%		Fire Clay Brick	
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit	Domestic, 16 to 19%		Per 1000 f.o.b. Works	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.	Electric Ferrosilicon		High-Heat Intermediate Heat Duty Brick	
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.	Per Gross Ton Delivered		Pennsylvania	
Manganese ore, washed, 52% manganese, from the Caucasus	38c.	50% 130.00		Maryland	
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.	75% 130.00		New Jersey	
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.40 to \$12.00	Per Gross Ton Furnace		Ohio	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00	10% \$35.00		Kentucky	
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.	11% 37.00		Missouri	
		14 to 16% 45.00		Illinois	
		Bessemer Ferrosilicon		Ground fire clay, per ton	
		F.o.b. Jackson County, Ohio, Furnace		Silica Brick	
		Per Gross Ton		Per 1000 f.o.b. Works	
		10% \$31.00 to \$32.00		Pennsylvania	
		11% 33.00 to 34.00		Chicago	
		12% \$35.00 to \$36.00		Birmingham	
		Silvery Iron		Silica clay, per ton	
		F.o.b. Jackson County, Ohio, Furnace		Magnesite Brick	
		Per Gross Ton		Per Net Ton	
		6% \$24.00 to \$25.00		Standard sizes, f.o.b. Baltimore and Chester, Pa.	
		7% 25.00 to 26.00		Grain magnesite, f.o.b. Baltimore and Chester, Pa.	
		8% 26.00 to 27.00		Standard size	
		9% 27.00 to 28.00		Chrome Brick	
		Other Ferroalloys		Per Net Ton	
		Ferrotungsten, per lb., contained metal del'd		Standard size	
		Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads		Small Rivets	
		Ferrovanadium, per lb. contained vanadium, f.o.b. furnace		(7/16-In. and Smaller)	
		Ferrocarbonditanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads		Per Cent Off List	
		Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton		F.o.b. Pittsburgh	
		Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton		F.o.b. Cleveland	
				F.o.b. Chicago	

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts		Bolts and Nuts		Small Rivets	
Per 100 Pieces		Per Cent Off List		(7/16-In. and Smaller)	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)		Semi-finished hexagon nuts		Per Cent Off List	
Per Cent Off List		Semi-finished hexagon castellated nuts, S.A.E.		F.o.b. Pittsburgh	
Machine bolts		Stove bolts in packages, Pittsburgh		F.o.b. Cleveland	
Carriage bolts		Stove bolts in packages, Chicago		F.o.b. Chicago	
Lag bolts		Stove bolts in bulk, Pittsburgh		Cap and Set Screws	
Plow bolts, Nos. 1, 2, 3 and 7 heads		Stove bolts in bulk, Chicago		(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Hot-pressed nuts, blank or tapped, square		Tire bolts		Per Cent Off List	
Hot-pressed nuts, blank or tapped, hexagons		Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.		Milled cap screws	
C.p.c. and t, square or hex. nuts, blank or tapped		Large Rivets		Milled standard set screws, case hardened	
Washers*		(1/2-In. and Larger)		Milled headless set screws, cut thread	
*F.o.b. Chicago, New York and Pittsburgh.		Base per 100 Lb.		Upset hex. head cap screws, U.S.S. thread	
†Bolts with rolled thread up to and including 3/8 in. x 6 in. take 10 per cent lower list prices.		F.o.b. Pittsburgh or Cleveland		Upset hex. cap screws, S.A.E. thread	
		F.o.b. Chicago		Upset set screws	
				Milled studs	

Chicago

Steel Buyers Exercising Greater Caution But Total Tonnage Supports Ingot Output of 82 Per Cent

CHICAGO, Nov. 27.—The railroad equipment market is active and the outlook for building construction is unusually favorable. Both of these factors lend a buoyant tone to the market. However, a condition less to the satisfaction of sellers is the caution shown by users in holding stocks to a minimum. This movement already has affected measurably the character of new business and also specifications.

Announcements of first quarter prices for plates, shapes and bars are being withheld, and purchases, some of which are to piece out last period contracts, are being made at 2c. to 2.10c. per lb., Chicago.

The chief evidence of the caution exercised by buyers is in smaller orders and specifications. These in the aggregate, however, make a fairly good showing and support the present ingot production of 82 per cent of capacity. Releases for steel are at closer range, and an increasing proportion is for the lighter products, so that the percentage of mill equipment engaged is somewhat less of a measure of production. Notwithstanding the moderate but important changes that are taking place in this market, it seems assured that 1928 will establish a record in tonnage shipped.

It is reported that the Chicago & North Western and the Northern Pacific may add 2000 cars each to recent purchases. The New York Central is in the market for large quantities of tie plates and angle bars and 25,000 kegs of spikes.

Pig Iron.—Prices are firm at \$20 a ton, local furnace, except for tonnages of boat iron offered at Milwaukee at \$19.25 a ton, Chicago basis. A Valley furnace has taken 2000 tons at South Bend, Ind., at \$21.70 a ton, delivered. This figures back to \$18, Valley. The delivered price from Chicago is \$22.05. The St. Louis producer expects to light a second stack in a week or 10 days. Books for first quarter are heavier now than they were a month before the opening of the third quarter.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.51
Low phos., sil. 1 to 2, copper free	\$29.00 to 29.50
Silvery, sil. 8 per cent.....	31.79
Bess. ferrosilicon, 14-15 per cent...	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—The feature of this market is the continued activity among purchasers of railroad equipment. In the past week Western car builders have taken orders for about 2500 cars and 1100 underframes, requiring about 40,000 tons of steel. Of special interest is an inquiry for 950 freight cars by the Santa Fe, this being taken as the forerunner of purchases which it is believed in some quarters will approximate 5000 cars. It is early for

mills to feel the effects of recent car business in any great volume, but shipping schedules are being arranged and some specifications already have been issued. Miscellaneous orders for oil storage tank construction total 3000 tons of plates. Chicago mills continue to withhold announcements of the course to be pursued in the matter of first quarter prices. Meanwhile, orders are being taken at 2c. to 2.10c. per lb., and one seller has instructed salesmen to consider future business only at the higher figure.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago

Ferroalloys.—Domestic producers of spiegeleisen are asking \$34 a ton, Hazard, Pa., for the 19 to 21 per cent grade in carloads. This market is quiet, however, and, in their efforts to attract tonnages, sellers have named as a first offer \$31 to large buyers. Contract prices for ferrosilicon are still somewhat unsettled even where small tonnages are involved.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Billets.—Rerolling billets, 4 in. and under 10 in., are moving in fair volume at \$35 a gross ton, Chicago. There is also a fair demand for forging billets, which are priced at \$40 a ton for local delivery. Several large contracts for this commodity have been overspecified, and orders for the remainder of the year are active. Current shipments are running below the rate of October.

Cast Iron Pipe.—This market continues to mark time, with practically all classes of buyers showing no interest in future needs.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Bars.—Soft steel bars remain the most active among finished steel products. Specifications are fully equal to shipments, showing no variation from a week ago. A few consumers are taking interest in first quarter requirements and several inquiries are before the trade, but sellers have not announced first quarter prices. On spot sales, prices tend to strengthen toward the upper level of the 2c. to 2.10c. range. Shipping schedules now

being prepared by automobile manufacturers give promise of an expanding demand in December, but it is generally believed that it will be the middle of January before heavy shipments will be resumed to that industry. Release orders from the agricultural trade are more liberal. Demand for forgings is widespread, but it has swung toward heavier pieces since the curtailment of orders by the automotive industry. Forward contracting in alloy steel bars is active, and producers already have built up sizable books for first quarter. Shipments from local mills represent about 75 per cent of capacity. Consumers of rail steel bars are being offered first quarter contracts at current quotations. Specifications for the week exceed shipments, which have remained steady for several weeks. Liberal specifications and sizable spot purchases are being made by the bed industry and manufacturers of barn equipment. Deliveries range from two to three weeks.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Structural Material.—The prospect of early placing of several sizable contracts is measurably improved. The La Salle Club, Chicago, requiring 6000 tons, has been financed and work of razing old buildings on the site will be under way in a few days. Two old projects, the Fine Arts Building, Chicago, and the First Regiment Armory, have been revived, and fabricators expect plans at an early date. At Milwaukee, the Civil Courts Building, which will take about 9000 tons, is active. Taking of bids on the 15,000 tons needed for the Chicago Board of Trade Building has been postponed until Dec. 12. It is expected that the general contract for the local Naval Armory will be let before the end of the week. Railroad and State highway bridges have contributed the bulk of ordered tonnage this week. The Louisville & Nashville has placed 1300 tons and the Northern Pacific 1150 tons. Highway bridges in Indiana and Michigan account for 1000 tons. The Chicago Tribune is taking preliminary steps to add a 20-story structure to its plant, and a proposed theater and apartment structure may rise 44 stories above Michigan Avenue. Taken as a whole, the structural steel market is unusually active for this time of the year. Sales in November are not on a par with those of October, but they are well ahead of November a year ago. Competition among fabricators remains keen, notwithstanding that order books are well filled and prices remain at the low levels of recent months. With the bulk of steel already ordered against recent contracts, specifications from structural shops are light.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—The Missouri-Kansas-Texas is said to have placed its 1929 rail requirements with

two Chicago mills, the Colorado maker and an Eastern mill. Forward contracting with Chicago mills has reached about half of the tonnage expected in the fall buying movement. Track supply purchases total 15,000 tons, of which 10,000 tons was in tie plates for the Missouri Pacific. Fresh inquiry totals 5000 tons. In recent days one producer has rolled billets while the finishing end of the rail mill was undergoing extensive repairs.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Present quotations on these commodities have been named for first quarter contracting, which will get under way about Dec. 1. Spot buying is dull. Specifications, although somewhat influenced by the approach of the inventory period, are well sustained.

Sheets.—Producers are taking orders for delivery in the first quarter at present quotations. New business is of moderate proportions. Specifications against old contracts are equal to shipments and sustain output at 75 per cent of capacity. Jobbers are enjoying an active trade and are ordering freely. Deliveries range from two to three weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—A substantial amount of new business has been placed and fresh inquiry is more promising than in many weeks. Inquiries for two junior high schools have been revived and prices are being asked on two new similar projects. It is reported that the General Electric Co.'s warehouse, requiring close to 1600 tons, is to be revived. An apartment on Lake Shore Drive, Chicago, will take about 700 tons. Advances in prices appear to be nearer at hand. Consideration is being given by some sellers to a 2.35c. a lb. minimum on carlot orders of billet steel reinforcing bars out of Chicago warehouses. Rail steel reinforcing bars may be advanced to 2.15c. per lb. In the meantime current prices are low and many quotations at the low levels are in the hands of buyers.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb....	\$3.30
Corn. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

cing bars may be advanced to 2.15c. per lb. In the meantime current prices are low and many quotations at the low levels are in the hands of buyers.

Cold-Rolled Strip.—Forward buying remains active at 2.85c. to 2.95c. per lb., Cleveland. Many purchasers, including manufacturers of automobiles, are showing interest in first quarter requirements. Current specifications from most sources are in good volume.

Hot-Rolled Strip.—Western producers have opened first quarter books at the prevailing price, which is 2c. per lb., Chicago, for 6 in. and wider. Users are slow in making forward commitments, but inquiry is in fair volume from a wide circle of consumers. Specifications have fallen measurably in recent weeks.

Wire Products.—Wire mills are carrying lower stocks than is customary at this time of the year and do not now plan to increase production against an anticipated spring demand, preference being given to meeting the spring trade by greater production at that time. Books have not been opened for first quarter. There is some talk of an advance in prices, but conditions point to unchanged quotations for the first quarter. The manufacturing trade in Detroit is quiet, but in other sections of the country it is well sustained. Jobbers in the Southeast are finding business dull, while orders from the Central West, South and Northwest are numerous, but for immediate requirements. After dragging for several weeks, following the announcement of spring terms, there is a decided increase in demand for woven wire fencing and steel fence posts. The nail market is dull and without feature.

Coke.—Only moderate interest is being shown by users in first half contracts. Prices for the new year have been named at \$8 a ton, f.o.b. local ovens, and \$8.75, delivered in the Chicago switching district. Shipments of by-product foundry coke are heavy.

Old Material.—Large consumer withdrawal from the market appears not to have disturbed the price structure to any marked degree. Brokers are anxious to cover old contracts, and shipments to consumers are active

Union Wage Rates Slightly Higher

Average wage rates for union labor in 1928, on the basis of 750,000 workers surveyed, are reported by the United States Bureau of Labor Statistics at \$1.159 an hour. This shows a fractional increase over the \$1.154 an hour reported for 1927 for the same group. At the same time, however, there was a slight decline in the weekly full-time wage, because the reduction in average full-time hours in a week was greater than the increase in hourly rates. The average per week

and are subject to stricter inspection than prevailed earlier in the fall. Country scrap, released by higher prices at points of consumption, is flowing in freely, but in some cases it does not meet specifications. Consumption of scrap remains at a high level. Distress tonnage, notwithstanding a greater number of rejections, is readily placed in other directions.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to 18.25
Railr'd tires, charg. box size	17.50 to 18.00
Railr'd leaf spring cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings	14.25 to 14.75
Low phos. punchings.....	16.50 to 17.00
Low phos. plate, 12 in. and under	16.00 to 16.50
Blast Furnace Grades:	
Axle turnings.....	12.00 to 12.50
Cast iron borings.....	11.75 to 12.25
Short shoveling turnings..	11.75 to 12.25
Machine shop turnings....	8.00 to 8.50
Rolling Mill Grades:	
Iron rails.....	15.00 to 15.50
Rerolling rails	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft..	17.00 to 17.50
Angle bars, steel.....	16.00 to 16.50
Cast iron carwheels.....	14.25 to 14.50
Malleable Grades:	
Railroad	16.00 to 16.50
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00.
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles.....	26.50 to 27.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought...	13.25 to 13.75
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling.....	11.50 to 12.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	15.00 to 15.50
No. 1 agricultural cast....	14.50 to 15.00
Stove plate	12.00 to 12.50
Grate bars.....	12.50 to 13.00
Brake shoes	11.50 to 12.00
*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.	

for last year was given as 44.9 hr. Index numbers show the hourly wages at 260.6 in 1928, compared with 259.5 in 1927, on the basis of 100 as the average of 1913. These two figures are much the highest for any years in our history. Full-time hours to the week, however, were 91.9 in 1928, against 92.4 in 1927, both based on 100 in 1913. These were the smallest figures ever recorded. Wages on the full-time weekly basis were 240.6 in 1928, against 240.8 in 1927. While there was a reduction from last year, the two figures are both considerably above the highest ever before reached.

Philadelphia

First Quarter Contracting for Steel Not Yet Commenced— Shipbuilders Bidding on More Tonnage

PHILADELPHIA, Nov. 27.—Consumers of steel are beginning to show interest in first quarter requirements of plates, shapes, bars and sheets, but no formal inquiries of consequence are in the market. Mills are asking 2c., Pittsburgh, on bars and 2.15c., Coatesville, on plates, but the actual price level for first quarter contracts has not yet been established by transactions. As current contracts are at 1.90c. to 1.95c., Pittsburgh, on bars and 2.05c. and 2.10c., Coatesville, on plates, a \$1 a ton advance to the consumer is considered as the probable level of prices by some sellers.

Fabricators are well occupied, and shipbuilders are bidding on a substantial tonnage of shipping, including ships for the Matson and Ward lines. The city of Philadelphia has awarded a dredge and completion of a pilot boat to the Kensington Shipbuilding & Drydock Co. Local radio manufacturers are fully engaged, and the Philadelphia Storage Battery Co. has just acquired additional property for expansion of output.

Pig Iron.—About 20,000 tons of basic, which has been in the market for several weeks, has been bought by an eastern Pennsylvania consumer at \$19.50 per ton, f.o.b. furnace. Contracting for first quarter foundry iron is still confined to small tonnages, many consumers evidently estimating present commitments to be sufficient for requirements well into the middle of the quarter. Among current inquiries is one for 1000 to 1500 tons of floor iron for the Baldwin Locomotive Works, Eddystone, Pa., and tonnages for the Lansdale, Pa., and Dundalk, Md., plants of the Central Foundry Co. Low phosphorus continues inactive except for small-lot purchases. Virginia iron has been advanced 25c. per ton to a basis of \$20.25, furnace, reflecting the recent increase of a like amount in the first quarter price of Birmingham iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	.....	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	.....	21.76 to 22.26
East. Pa. No. 1X.....	.....	22.26 to 22.76
Basic (del'd east. Pa.).....	.....	19.75 to 20.00
Gray forge.....	.....	20.00 to 20.50
Malleable.....	.....	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace).....	.....	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace).....	.....	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	.....	24.79
Va. No. 2X, 2.25 to 2.75 sil.	.....	25.29

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Most of the large consumers have covered their requirements for next year with domestic producers, British sellers having booked only some of the smaller tonnages. Contracts for first half and the entire year are at \$105 per ton, seaboard.

Bars.—Contracting for the next quarter has not yet begun, but on recent requests for quotations mills have asked 2c., Pittsburgh, or 2.32c., Philadelphia. A substantial tonnage of bars will be required in a number

of small reinforced concrete projects, upon which bids are being taken.

Shapes.—Mills report a fair tonnage of shapes moving from their stocks and are seeking to maintain a minimum of 2.05c. per lb., f.o.b. nearest mill to consumer. While this is being quoted on most of the current purchases, large projects apparently bring out substantial concessions. On a recent contract for a 2700-ton manufacturing building in Philadelphia, a mill price of 1.83c. per lb., delivered, is reported to have been quoted on the shapes. Shipbuilding contracts should provide eastern Pennsylvania mills with some substantial tonnage. The New York Shipbuilding Corporation, Camden, N. J., has been asking prices on about 4000 tons of shapes for vessels on which it is bidding.

Plates.—Shipbuilders are contributing a considerable volume of activity to the market in securing prices on plates to use in bidding for ship construction contracts, among which are one to four vessels for the Matson Lines, one ship for the Ward Line and new bids to be submitted at a later date on four ships for the Export Steamship Corporation. The Sun Shipbuilding Co., Chester, Pa., has taken a contract for a 10,000-ton vessel for the American South African Line, Inc., and the New York Shipbuilding Corporation is asking for 12,000 tons of ship plates. The city of Philadelphia has awarded a \$50,000 dredge and completion of a pilot boat to the Kensington Shipbuilding &

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier.....	2.70c.
Plates, 5/8-in.	2.90c.
Structural shapes.....	2.70c.
Soft steel bars, small shapes, iron bars (except bands).....	2.80c.
Round-edge iron.....	3.50c.
Round-edge steel, iron finished 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.....	3.45c.
Cold-fin. steel, sq. and flats.....	3.95c.
Steel hoops.....	3.60c.
Steel bands, No. 12 to 1/4-in., inclus.	3.35c.
Spring steel.....	5.00c.
*Black sheets (No. 24).....	4.00c.
†Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.15c.
Diam. pat. floor plates—	
1/4-in.	5.30c.
5/8-in.	5.50c.
Rails.....	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Drydock Corporation. Plate prices are unchanged at 2.05c. to 2.15c., Coatesville, on current business, with the higher price asked on contracts for the next quarter.

Sheets and Strips.—New business is small, but shipments on current contracts continue heavy, and prices show considerable firmness, with blue annealed at 2.10c., Pittsburgh, or 2.42c., Philadelphia; black at 2.85c., Pittsburgh, or 3.17c., Philadelphia, and galvanized at 3.60c., Pittsburgh, or 3.92c., Philadelphia. Local sheet consumers are maintaining a high rate of operation, and contracting for the next quarter is expected before long. Hot-rolled strip steel shows a tendency to weakness on the basis of recent quotations. An automotive buyer in this district claims that on a recent inquiry for about a carload of hot-rolled strip steel the quotations were on bases of 1.70c., 1.80c., 1.90c. and 2c. per lb., Pittsburgh. The Pennsylvania Railroad opened bids Nov. 27 on 700 tons of blue annealed, black and galvanized sheets for first quarter.

Imports.—In the week ended Nov. 24, 2985 tons of pig iron arrived at this port from British India. Ore imports were confined to 4729 tons of manganese ore from British West Africa. In ferroalloys, 370 tons of spiegeleisen and 30 tons of ferromanganese were received from the United Kingdom. Steel arrivals consisted of 71 tons of steel bars from Germany and 66 tons of steel bars, 150 tons of strip steel and 133 tons of structural shapes from Belgium.

Old Material.—Activity in all grades of iron and steel scrap is almost entirely in shipments to consumers in fulfillment of old contracts. In the absence of actual transactions, prices are difficult to determine, except on the basis of quotations which brokers are willing to make on mill requirements. Yard grade of heavy melting steel is quoted at \$12.25 to \$12.50 per ton, delivered, with shipments going to Pottsville and Phoenixville, Pa. Other grades are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.....	\$15.50 to \$16.00
Scrap T rails.....	15.00 to 15.50
No. 2 heavy melting steel.....	12.25 to 12.50
No. 1 railroad wrought.....	16.00 to 16.50
Bundled sheets (for steel works).....	11.00
Machine shop turnings (for steel works).....	11.00 to 11.25
Heavy axle turnings (or equiv.).....	12.50
Cast borings (for steel works and roll. mill).....	11.00 to 11.50
Heavy breakable cast (for steel works).....	16.00
Railroad grate bars.....	12.50
Stove plate (for steel works).....	12.50
No. 1 low phos., hvy., 0.04% and under.....	19.00 to 20.00
Couplers and knuckles.....	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
No. 1 blast f'nace scrap.....	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.).....	15.00
Shafting.....	19.00 to 20.00
Steel axles.....	21.50 to 22.00
No. 1 forge fire.....	12.00 to 12.50
Cast iron carwheels.....	16.50
No. 1 cast.....	16.25 to 16.75
Cast borings (for chem. plant).....	15.00
Steel rails for rolling.....	16.50 to 17.00

Cleveland

Steel Bar Prices of 1.90c. to 2c. Named by One Mill for First Quarter—Concessions on Hot-Rolled Strip

CLEVELAND, Nov. 27.—The gain in steel specifications noted a week ago has held up the past week, and November will make a better showing than was expected early in the month. The aggregate tonnage will probably be nearly that entered during October.

The first announcement of a steel bar price for the first quarter has come from an independent steel company, which is naming 1.90c., Pittsburgh, for consumers who use 1000 tons during the quarter and 2c. for smaller consumers. This indicates that there will be no price advance on steel bars for the coming quarter for large-lot buyers, as large consumers placed contracts for the current quarter at 1.90c. The 2c. price compares with a current market price of 1.95c., Pittsburgh, although a minimum amount of small-lot business is being taken at 2c.

When using Cleveland as a basing point, a Youngstown company is asking 1.95c. to 2.05c. for steel bars for the first quarter. The Cleveland mill steel bar price for current orders is 1.90c., mill. Other mills have not yet named first quarter prices on steel bars or on plates and structural shapes.

The only other interesting development in the price situation is a \$2 a ton concession to large buyers from the regular bases for hot-rolled strip, making 1.90c., Pittsburgh, the price for 6-in. and narrower material and 1.80c. for wider than 6 in. to large consumers. Some contracts have been closed at these prices.

The improved demand for steel appears to be due largely to increased activity on the part of the automotive industry, which is releasing specifications for steel and parts for new models to be brought out Jan. 1. Considerable first quarter inquiry is coming from the automobile manufacturers for sheets and strip steel and some have placed contracts.

Plates and structural material are quoted at 1.95c., Pittsburgh, for current orders. The demand for plates is only fair, but structural shapes are moving well to manufacturing plants. Structural awards include 3000 tons placed by the Cleveland Union Terminals Co. and 14,000 tons for railway and highway bridges, the latter taken by an Ohio fabricator. The Great Lakes Engineering Works, Detroit, has taken Lake vessel repair work requiring 1200 tons of plates. New structural inquiry is quiet.

While rail steel reinforcing bars were advanced recently, rerolling mills are still quoting rail steel bars and angles for manufacturing industries at 1.80c., mill.

Pig Iron.—The market still shows a great deal of activity. Prices are firm and unchanged. Cleveland interests sold 46,000 tons in foundry and malleable grades during the week, foundry having been much more active than malleable. While the business was well distributed, jobbing foundries showed more activity during the week than the automotive industry. One Cleveland interest that is well sold up for the first quarter is taking business only for the first half and made several round-lot sales for

that delivery the past week. Another Cleveland producer has opened its books for the second quarter only, having no iron to offer for the first quarter. Other producers are not taking business beyond the first quarter. The local price of \$18.50, furnace, for outside shipment is bringing out considerable business in Ohio, although a Valley producer with an \$18 price is making quite a few sales in the competitive territory in northern Ohio. One Lake furnace is holding to \$19.50 in western Ohio and portions of Indiana. In Michigan the market is unchanged at \$20, furnace. Following a \$2 a ton price advance on Ohio silvery iron by one producer, another maker has marked its price up, but only \$1 a ton, or to \$26 for 8 per cent.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	22.50
Malleable	19.50
Ohio silvery, 8 per cent.	\$29.00 to 30.00
Basic Valley furnace	17.50 to 18.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Fluorspar.—Producers have opened their books for gravel fluorspar for 1929 at the present price of \$18, mines. While they would prefer to make contracts only for the first half, they will not decline to make commitments for the full year. Consumers are showing some interest in contracts. One Ohio steel maker is inquiring for 3500 tons.

Coke.—New demand for foundry coke is light. Specifications on contracts are good. The demand for by-product coke for domestic use, which has been dragging, is being stimulated by the cooler weather. Ohio by-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.45c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

product foundry coke is quoted at \$7.75, Painesville, for December shipment. Connellsville foundry coke is unchanged at \$3.75 to \$4.85 per net ton, ovens.

Sheets.—Considerable business in auto body sheets for the first quarter has been taken at the new 4.10c. price, and some specifications have already been released for January shipment. A few contracts for other grades have also been taken for the first quarter at the advance, but hardly enough to establish definitely the higher prices. Some first quarter business has been taken in enameling stock at 3.90c., Pittsburgh, this grade not having been advanced. Consumers are still able to place sheet tonnage for December shipment at the old prices. Some early shipment orders are coming from the barrel manufacturers.

Semi-Finished Steel.—Specifications continue to come out in heavy volume. A local mill reports one sale of sheet bars, a 6000-ton lot, for the first quarter at \$34, Cleveland. This producer is asking the same price for large billets and slabs, although Valley mills are on a \$33 basis.

Cold-Finished Steel Bars.—Specifications against contracts increased considerably the past week, and there is a fair volume of new business. The improvement in the demand is due to the placing of orders by some of the automobile companies for parts for new models. A price advance for the first quarter is still doubtful. Makers have set Dec. 10 as the last day for specifications on last quarter contracts.

Wire Products.—Nails are moving slowly, as jobbers have good stocks. Price irregularities are still in evidence in some sections. Nails are firm.

Warehouse Business.—A \$2 a ton price advance on sheets, effective Dec. 1, is announced by a local jobber, and others will probably fall in line. This follows the recent advance in mill prices. The demand for most warehouse products has slowed down.

Strip Steel.—While some business in hot-rolled strip has been taken for the first quarter at the regular base prices, some of the mills have shaded this \$2 a ton to large buyers, or to 1.80c., Pittsburgh, for material wider than 6 in., and it is intimated the large-lot buyers can secure a \$2 concession or 1.90c. on narrow strip. Quite a few first quarter contracts for cold-rolled strip have been taken at the 2.85c., Cleveland and Pittsburgh, price. For small lots, mills are getting 2.95c. Specifications continue to come out in fairly good volume.

Reinforcing Bars.—New inquiry is light. On billet steel bars, 1.85c., Cleveland, appears to be the commonly recognized mill price. Jobbers are asking 2.25c., Pittsburgh, for small lots, but the mill competition is preventing them from getting much busi-

ness at that price. Rail steel bars are quoted at 1.95c. mill.

Old Material.—The market is less active than during the past few weeks. While scrap is coming out somewhat more freely than recently at the quoted prices, no weakness has developed. Some of the mills are restricting shipments, and dealers appear able to buy at quoted prices all the scrap they want to fill outstanding orders. No new consumer demand has appeared. Dealers are paying \$15.75 to \$15.80 for high grade No. 1 heavy melting steel against contracts placed recently by one Cleveland mill. No. 1 busheling scrap, which goes mostly to the Valley district, has declined 50c. more a ton. December scrap lists from Michigan automobile companies show considerable less tonnage than a month ago. The largest list, which was for 2500 tons from the Buick plant, was closed late in the week.

New York

Large Pig Iron Sales at Lower Prices—26,500 Tons of Steel Awarded for Bridge

NEW YORK, Nov. 27.—Pig iron sales for the week were large, totaling more than 17,000 tons. Greater interest is being manifested in first quarter iron, particularly by larger melters. Buying, however, is not so general as several weeks ago, and prices are less buoyant. Buffalo foundry iron now ranges from \$17.50 to \$18, furnace, for No. 2 plain, and on the same grade from eastern Pennsylvania for delivery in this section as low as \$19.50, furnace, has been done, although some producers are still asking \$20.50. The removal of the anti-dumping order against German pig iron is without immediate significance. Apparently, no early revival of imports from Germany is in prospect. The leading importer of Indian pig iron has virtually completed sales against shipments that will get under way before Jan. 1, when an increase in ocean freight rates goes into effect. Among current inquiries is one for 2000 tons of high silicon foundry iron from the Eagle Iron & Brass Foundry Co., Passaic, N. J., for first quarter delivery. The Central Foundry Co., New York, has closed for 600 tons of foundry for its Lansdale, Pa., plant and is still in the market for 4000 to 5000 tons for its Dundalk, Md., works.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.		
N. J.	20.78 to 21.28	
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil.	2.75 to 3.25	21.89 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.50 to	\$15.00
No. 2 heavy melting steel.	14.00 to	14.50
Compressed sheet steel.	14.00 to	14.50
Light bundled sheet		
stamp'gs	12.00 to	12.50
Drop forge flashings.	12.25 to	12.75
Machine shop turnings.	9.50 to	10.00
No. 1 railroad wrought.	12.75 to	13.00
No. 2 railroad wrought.	14.50 to	15.00
No. 1 busheling.	12.25 to	12.50
Pipes and flues.	9.00 to	9.50
Steel axle turnings.	12.50 to	13.00

Acid Open-Hearth Grades		
Low phos. forging crops.	16.00 to	16.50
Low phos., billet, bloom and slab crops.	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap.	15.50 to	16.00

Blast Furnace Grades		
Cast iron borings.	11.00 to	11.50
Mixed bor'gs and short turn'gs	11.00 to	11.50
No. 2 busheling.	11.00 to	11.50

Cupola Grades		
No. 1 cast.	16.50 to	17.00
Railroad grate bars.	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25

Miscellaneous		
Railroad malleable	16.00 to	16.50
Rails for rolling	16.25 to	16.50

for the Wanaque waterline from the Delaware River to Newark, requiring 38,000 tons of plates for fabricated pipe. The outstanding structural award of the week was the Kill von Kull bridge from Staten Island to New Jersey, which will take 26,500 tons of steel. The American Bridge Co. was the low bidder and will get

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.	3.30c.
Soft steel bars, small shapes.	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal.	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.	3.50c.
Flats and squares.	4.00c.
Cold-roll. strip, soft and quarter hard	
hoops	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel.	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger.	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	
	4.50c. to 7.00c.
Machine bolts, cut thread:	
¾ x 6 in. and smaller.	Per Cent Off List
1 x 30 in. and smaller.	.50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.	.60
¾ x 20 in. and smaller.	.50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.	.60
1 x 16 in. and smaller.	.50 to 50 and 10
Boiler Tubes—	
	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12

Wrought Iron—		
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—		
A		AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

Per Lb.	
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

Per Lb.	
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Reinforcing Bars.—General contractors' bids on the Davis loft building in Manhattan, calling for 1000 tons of reinforcing steel, will be opened on Dec. 14. The 8500 tons of bars required for the Delaware, Lackawanna & Western terminal warehouse in Jersey City is expected to be placed this week, and Patrick McGovern, Inc., is expected to take action soon on the steel for the water tunnel in Manhattan and Brooklyn, on which it is general contractor. This calls for 2850 tons of bars. The largest award reported recently was a power house near Amenia, N. Y., taking 660 tons, which went to the Concrete Steel Co. The volume of small orders has kept up at a fairly good rate during the month and indications point to considerable activity during December. Prices are strong at the levels quoted last week.

Bars, Shapes and Plates.—Some of the mills will not formally open their books for first quarter until next week. Meanwhile, a few contracts for bars have been entered, including one of 1800 tons, at the prices which the buyers covered for the fourth quarter. A maker of plates in the East has informed a few customers who have inquired that its fourth quarter price tentatively is 2.15c., Coatesville base, but this is subject to revision if, as now seems probable, most of the mills extend the fourth quarter prices into the first quarter. Many of the large buyers of bars are protected for this quarter at 1.90c., Pittsburgh, with 2.05c., Eastern mills, applying on plate and shape contracts for this quarter. Bids will be closed on Dec. 6 by the North New Jersey District Water Supply Commission

the job, subject to the approval of the Governors of New York and New Jersey.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Sheets.—Contracting for the first quarter has progressed during the past week, many consumers having closed for their requirements somewhat further ahead of the opening of a new quarter than has been their practice previously this year. Contracts have been made at the new prices, which represent a \$2 advance, but some mills are still making current sales for immediate specification and for shipment before the end of the year at the former prices.

Warehouse Business.—Jobbers' quotations on sheets are showing more firmness, but small concessions are still obtainable in the New York district. Despite the advanced season, some substantial orders for structural shapes are being placed with warehouses. Business in November has been good, but less than in October, which was the best month of the year for most jobbers.

Cast Iron Pipe.—Quotations of Northern makers of pressure pipe continue strong and the market today is quotable at \$38.60 to \$39.60 per net ton, delivered New York. Inquiries for spring delivery of gas pipe are accumulating and some substantial buying is expected from privately owned gas companies before the end of the year. An inquiry for about 15,000 tons of gas pipe for a large utility company is not yet reported closed. The Brooklyn Union Gas Co., Brooklyn, is inquiring for about 500 tons of large size pipe. Two recent inquiries for water pipe to be exported to South American markets brought out low bids from Continental makers. On about 1500 tons of pipe for shipment to South America, inquired for by the Foundation Co., New York, the Pont-a-Mousson works in France is understood to have been the low bidder, and on 396 tons of 4 to 12-in. pipe for Peru, inquired for by W. R. Grace & Co., New York, the Gelsenkirchen Bergwerks A. G., in Germany, is reported to have submitted the lowest bid on thin-walled centrifugal pipe.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$38.60 to \$39.60; 4-in. and 5-in., \$43.60 to \$44.60; 3-in., \$53.60 to \$54.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Furnace coke prices continue to show greater firmness, but are unchanged at \$2.85 to \$3.05 per net ton, Connellsville. The foundry coke market is moderately active, and prices range from \$3.50 to \$3.75 per ton, Connellsville. Special brands of foundry coke are quoted at \$4.85 per net ton, ovens, or \$3.56, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York or Brooklyn. Consumers of by-product foundry coke from the local producer and the New England interest are under contract for first quarter and first half of next year, but the West Vir-

ginia company, which sells into this district, has not opened its books for the coming year. By-product foundry coke prices are unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Prices of all grades of scrap are unchanged, except for a slightly lower level of buying prices on machine shop turnings, \$11 per ton, delivered eastern Pennsylvania, being the present maximum offer. Blast furnace scrap is being shipped to Bethlehem, Pa., at \$9.50 per ton, delivered, and to Swedeland, Steelton and Coatesville, Pa., at \$10.50 per ton, delivered. Some small tonnages of yard grade of heavy melting steel are moving to consumers at Phoenixville, Pottsville and Conshohocken, Pa., to complete old contracts.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$11.75 to \$12.00
Heavy melting steel (yard)	8.25 to 8.50
No. 1 hvy. breakable cast	11.25 to 11.75
Stove plate (steel works)	8.50
Locomotive grate bars	8.50
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.25 to 12.75
No. 1 yard wrot., long	11.25 to 11.75
Rails for rolling	13.00 to 13.50
Cast iron carwheels	12.00 to 12.50
Stove plate (foundry)	9.50
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25
<i>Prices per gross ton, deliv'd local foundries:</i>	
No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Coal Carbonization Plant for Lukens Company

The International Combustion Engineering Corporation, New York, has closed a contract with the Lukens Steel Co., Coatesville, Pa., which provides for the building of a low temperature coal carbonization plant at Coatesville. It will be the first low temperature coal carbonization plant identified with the steel industry and the second installation in America. Ground will be broken for the Coatesville installation the first of the year and the plant is expected to be in operation early in 1930.

The new plant will be owned and operated by the International Coal Carbonization Co., a subsidiary of the International corporation, which will sell the gas to the Lukens company under a long term contract. Approximately 1,750,000 cu. ft. of gas will be produced daily. This is a high quality gas which will be used for the heat treating of steel throughout the Lukens plant and will replace raw producer gas now used for this purpose. In addition to the gas derived from the new process other valuable constituents of the coal are recovered, consisting of a high quality tar, light oils, a superior grade of anti-knock motor fuel and a high grade domestic

fuel, which will be sold locally. The initial installation will comprise six retorts and will be capable of carbonizing 500 tons of high volatile bituminous coal per day. The daily coke yield available for domestic use will average from 300 to 325 tons. The ultimate plant is designed for double this capacity.

Massillon Hammers Bought by Industrial Brownhoist

Industrial Brownhoist Corporation, Cleveland, announces the purchase of the complete line of Massillon hammers, formerly manufactured and sold by the Massillon Foundry & Machine Co. Production of Massillon single-frame and double-frame forging hammers, steam drop and board drop hammers, as well as trimming presses and bar shears, is now going forward at the Cleveland plant of the corporation. W. J. Cadman, who has been connected with the Massillon organization for many years, will be in charge of the new hammer department for Industrial Brownhoist and will be located in Cleveland.

Machinery Industries to Meet Again Feb. 14

WASHINGTON, Nov. 27.—Notices have been sent out to members of machinery and equipment associations by Philip P. Gott, secretary of the Machinery and Equipment Conference, stating that the next conference has been set tentatively for Feb. 14 at the United States Chamber of Commerce Building. The announcement listed some of the subjects discussed at previous meetings and asked association members to indicate, in order of importance to their industry, the subjects which should be placed on the program for the February conference. They also were asked to suggest the scope of the survey which should be made and the type of information which should be available for discussion, the purpose being to arrive at plans for solution of problems common to the industry.

Subjects listed as having been discussed informally and which are to be treated for specific action include unfair competitive practices, uneconomic practices, tariff, census schedules and classification, depreciation, obsolescence, uniform cost accounting, statistics, credits and sales terms.

A feature of the seventh National Exposition of Power and Mechanical Engineering, to be held at New York, will be a motion picture program running through the entire week of the show, Dec. 3 to 8. The films include "The Handling of Heat," showing the use of Norton refractories in industry, "The Manufacture of Timken Steel Roller Bearings," and "Conowingo," showing the building of the power plant on the Susquehanna River by the Stone & Webster Engineering Co.

Pacific Coast

Awards of Plates, Structural, Reinforcing Bars and Cast Iron Pipe Feature Western Business

SAN FRANCISCO, Nov. 24 (*By Air Mail*).—Important bookings of iron and steel products this week on the Pacific Coast included 1800 tons of plates for oil storage tanks for the Shell Oil Co., San Francisco, placed with the Western Pipe & Steel Co. and the Steel Tank & Pipe Co.; 1800 tons of reinforcing bars for the Life Science Building at Berkeley, taken by the Pacific Coast Steel Co., and 1600 tons for an apartment building in Los Angeles, booked by the Union Iron Works.

Pig Iron.—Movement of foundry pig iron continues limited to small lots. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—More than 2100 tons of reinforcing bars was placed during the week; the largest lot was 1800 tons for a college building at Berkeley, as mentioned above. New inquiries include 400 tons for a school at Portland, 290 tons for an apartment in Los Angeles and about 400 tons for highway work in California. Out-of-stock material in the San Francisco and Los Angeles districts remains at about 1.80c. base. Several fair-sized lots have gone at as low as 1.70c.

Plates.—The only important award this week in the plate market was 1800 tons for six 82,000 bbl. oil storage tanks for the Shell Oil Co. at Martinez, Cal., the business having been divided between the Steel Tank & Pipe Co. and the Western Pipe & Steel Co. Bids were opened last week on 550 tons of 24-in. riveted pipe for Seattle and alternate bids were taken on cast iron pipe. The city decided to purchase cast iron pipe, placing the general contract with L. Coluccio. Prices continue firm at 2.25c., c.i.f., as a minimum.

Shapes.—Awards of structural material this week were the third heaviest of the year and totaled over 7600 tons. The Southern Pacific Co. placed 1500 tons of bridge work with the American Bridge Co. Other outstanding awards included 425 tons for a saw mill at Longview, Wash., for the Weyerhaeuser Lumber Co., booked by

the Star Iron & Steel Works, and 344 tons for an apartment in Los Angeles, secured by the Llewellyn Iron Works. The Wallace Bridge & Structural Steel Co. obtained an order for a steel barge for Young Brothers, Ltd., at Honolulu, calling for 250 tons of channels. A fair volume of pending business is before the trade, most of which is expected to be placed during the next week or 10 days. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—New inquiries for cast iron pipe come out slowly, and pending business does not exceed 1000 tons. The feature of the market this week was the award placed with L. Coluccio by the city of Seattle for 1915 tons of 24-in. Classes B to F pipe for a line from Volunteer Park Reservoir to Queen Anne standpipe. This is the second largest order placed dur-

ing the last half of the current year. Aberdeen, Wash., placed 90 tons of 12-in. Class 250 pipe with the American Cast Iron Pipe Co. The only new inquiry of importance this week was for 292 tons of 4 to 8-in. Class C pipe for Friday Harbor, Wash.

Steel Pipe.—An award of 102 tons of $\frac{3}{4}$ to 1-in. galvanized pipe for the city of Los Angeles is expected to be made during the coming week. An inquiry for 800 tons of 6-in. line pipe for a Los Angeles interest is now being figured on. Some improvement in demand for standard steel pipe is reported by distributors in this section.

Coke.—Demand for foundry coke has shown little improvement and reflects the quiet condition in the pig iron market. Foundry operations, especially among the jobbing plants, continue on a limited basis, and most consumers have sufficient stocks in foundry yards to take care of present requirements. English beehive is quoted at \$16 a net ton, delivered in-coming dock, and by-product coke at \$11.50 to \$13 a net ton.

St. Louis

Substantial Sales of Pig Iron for First Quarter—All Steel Products, Except Plates, in Good Demand

ST. LOUIS, Nov. 27.—The past week was another good one for makers of pig iron. The St. Louis Gas & Coke Corporation sold 9500 tons, and a leading Southern interest sold 4000 tons, all for first quarter. Sales of the Southern iron were at the new price of \$16.50, Birmingham; the largest lot was 500 tons. The Granite City maker's principal sale was 6000 tons of basic to an East Side melter catering to railroads, which had purchased 5000 tons of basic the preceding week for shipment during November and December. Of the local maker's sales of 3500 tons of foundry grades, the largest lot was 600 tons to an East Side equipment maker; an Illinois manufacturer took 400 tons, and there were four sales of 300 tons each to jobbing foundries in the district, while a northern Illinois home appliance manufacturer bought 350 tons. Business with car builders is increasing, and foundries in the St. Louis trade territory which furnish castings to the Ford Motor Co. have been asked to speed up deliveries. The market is firm, and some melters have offered business at present prices for second quarter delivery, but such offers have been declined.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25, f.o.b.	
Granite City, Ill.	.....	\$20.00
Malleable, f.o.b. Granite City	.....	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	.....	22.16
Southern No. 2 fdy., deliv'd	.....	20.92
Northern malleable, deliv'd	.....	22.16
Northern basic, deliv'd	.....	22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Colder weather has caused a marked increase in the movement of domestic grades of coke from the by-

product ovens in the district to dealers here and in the trade territory. Local dealers have shown no inclination to accumulate heavy stocks. There has been a heavier consumption of foundry grades in the district. Prices are unchanged.

Finished Iron and Steel.—The Board of Public Service will open bids next week for the third unit of the River Des Peres sewer project, which will require 2000 tons of reinforcing bars; the first unit took about 7000 tons. Structural fabricators report business is dull. The Granite City Steel Co. reports that incoming business so far this month has been equal to that of the same period in October and considerably ahead of that of last November. This applies to all lines except plates, this item being dull, al-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	 3.25c.
Bars, soft steel or iron	 3.15c.
Cold-fin. rounds, shafting, screw stock	 3.75c.
Black sheets (No. 24)	 4.10c.
Galv. sheets (No. 24)	 4.95c.
Blue ann'd sheets (No. 10)	 3.45c.
Black corrug. sheets (No. 24)	 4.15c.
Galv. corrug. sheets	 5.00c.
Structural rivets	 3.75c.
Boiler rivets	 3.75c.

Per Cent Off List

Tank rivets, $\frac{7}{8}$ -in. and smaller, 100 lb. or more	 65
Less than 100 lb.	 60
Machine bolts	 60
Carriage bolts	 60
Lag screws	 60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	 60
Less than 200 lb.	 50

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	 3.15c.
Soft steel bars	 3.15c.
Small angles, $\frac{3}{8}$ -in. and over	 3.15c.
Small angles, under $\frac{3}{8}$ -in.	 3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{1}{2}$ -in.	 3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	 5.00c.
Black sheets (No. 24)	 5.00c.
Blue ann'd sheets (No. 10)	 4.00c.
Galv. sheets (No. 24)	 5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger	 5.65c.
Com. wire nails, base per keg	 \$3.40
Cement c't'd nails, 100 lb. keg	 3.40

though it is expected to show some life as the result of prospective car business. Warehouse business is beginning to feel the effects of the pre-inventory lull, everyone bending their efforts to keep down stocks of raw materials.

Old Material.—Consumers of old material and dealers in the St. Louis industrial district are still at variance on the question of price. Several of the larger mills have indicated their willingness to buy at prices that prevailed a month ago, but dealers contend for a higher basis. The only price change is on No. 1 railroad wrought, which is 50c. a ton higher. Railroad lists: Chicago, Burlington & Quincy, 5695 tons; Union Pacific, 3100 tons; Big Four, 1350 tons; Frisco Lines, 1000 tons and 12 carloads; Great Northern, 165 carloads; Nickel Plate, 46 carloads; Cotton Belt, 28 carloads.

Birmingham

Pig Iron Advanced to \$17 By One Producer—Bars, Plates, Shapes and Sheets Higher

BIRMINGHAM, Nov. 27.—The new base of \$16.50 for foundry iron is being well received. One producer has advanced its price to \$17. Makers in the district have accumulated sizable backlogs for the first quarter since the opening of books Nov. 15. There has been a steady day to day buying movement, and several of the larger melters have covered for the quarter. Shipments so far this month have been running about equal to those of October, one of the best months of the year. The No. 2 Bessemer furnace of the Tennessee company, which had been banked since Oct. 7, was blown in Nov. 19 on foundry iron. This company is scheduled to make other changes this week owing to the resumption of operations at its Ensley rail mill. Of the 19 furnaces in blast, 13 are on foundry, four on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil. \$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil. 17.00 to 17.50
Basic 16.50

Finished Steel.—An advance of \$2 a ton has been made on bars, plates, shapes and sheets following a gradual strengthening of the market during the past several weeks. Sheets are strong at the new prices and mills are holding closely to quotations in other lines. Inquiries continue active in all lines. The Tennessee company has booked additional rail tonnage, including 13,000 tons for the Southern Pacific. The Ensley rail mill of this company was placed in operation again on Nov. 24. Inquiries are good in the structural plate market. Reeves Brothers have booked an order for 1000 tons of tanks for Ingleside, Tex. Structural steel fabricators are operating on better schedules than at any time in recent months. Pending tonnage is favorable. Sixteen open-hearth continue in operation; the

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel.....	12.25 to 12.75
No. 1 locomotive tires....	14.50 to 15.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart...	15.00 to 15.50
Railroad springs.....	16.00 to 16.50
Bundled sheets.....	9.50 to 10.00
No. 2 railroad wrought...	13.25 to 13.75
No. 1 busheling.....	9.50 to 10.00
Cast iron borings.....	8.75 to 9.25
Iron rails.....	13.50 to 14.00
Rails for rolling.....	15.50 to 16.00
Machine shop turnings....	9.00 to 9.50
Steel car axles.....	19.00 to 19.50
Iron car axles.....	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought....	12.50 to 13.00
Steel rails, less than 3 ft..	17.50 to 18.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.00 to 14.50
No. 1 machine cast.....	15.50 to 16.00
Railroad malleable.....	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate.....	12.50 to 13.00
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Tennessee company is working seven at Fairfield, five at Ensley and the Gulf States Steel Co. four at Alabama City.

Cast Iron Pipe.—With new tonnage still running light, backlogs of pres-

sure pipe manufacturers are reduced to a low point. Several plants are operating on part time schedules. A few prospective buyers are feeling out the market and makers are hopeful of improved conditions by the end of the year. Prices are firm at \$37 to \$38 on 6-in. and larger sizes.

Coke.—Most of the new business in foundry coke consists of small-lot orders for immediate delivery as first quarter requirements were well covered several weeks ago. Production is a little heavier than last month. Quotations remain at \$5 for both spot and contract.

Old Material.—The improvement in scrap steel rails reported last week has resulted in an advance of 50c. a ton. Tram car wheels have been advanced \$1 a ton, while No. 1 cast and stove plate have dropped 50c. a ton. Other prices are unchanged. New business is spotty. Shipments improved slightly during the past week and are now moving out in fairly satisfactory volume.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	19.00 to 20.00
Iron axles.....	21.00 to 22.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Boston

More Pig Iron Inquiry for 1929 Developing—Scrap Exports Are Resumed

BOSTON, Nov. 27.—More inquiry for 1929 pig iron is developing. Crompton & Knowles Loom Works, Worcester, Mass., is inquiring for 500 to 1000 tons of No. 2 plain and No. 1X iron, deliveries running into April, and a

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

Providence, R. I., melter has intimated it will make early inquiry for 1000 tons or more of No. 2X and No. 1X, with possibly some malleable, for delivery running into second quarter. In addition, several smaller melters say they will buy an aggregate of about 3000 tons, mostly No. 2X, within the near future. Sales the past week included 1000 tons No. 2X, first and second quarter delivery, to a western Massachusetts melter, and 1500 tons, mostly No. 1X, to a Connecticut machinery builder. Otherwise, less than 3000 tons was sold. Alabama iron is 25c. a ton higher at \$16.50 a ton, base furnace, with regular 50c. differentials, while eastern Pennsylvania is \$21 a ton, base furnace.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.91
*Buffalo, sil. 2.25 to 2.75..	23.41
†Buffalo, sil. 1.75 to 2.25..	21.78
†Buffalo, sil. 2.25 to 2.75..	22.28
East. Penn., sil. 1.75 to 2.25..	\$24.15 to 24.65
East. Penn., sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.27
Ala., sil. 2.25 to 2.75.....	23.91 to 25.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.
*All rail rate. †Rail and water rate.

Imports.—Local imports of pig iron for the first half of November were 1707 tons, consisting of 881 tons of

Indian and 826 tons of Dutch. Boston pig iron interests believe that the revocation of the anti-dumping duty on German pig iron will not attract tonnages here for a time at least.

Fabricated Steel.—With the exception of one of the largest firms, New England fabricators have sufficient business on their books to keep shops operating on present capacities well into 1929. Competition for business among fabricators is still keen, but jobs are being taken at better prices than two months ago. Several good tonnages are hanging over the market and should be closed shortly.

Warehouse Business.—In point of shipments out of stock, November unquestionably will be the best month experienced this year by warehouse interests. Full list prices and extras are now maintained on all iron and steel products, regardless of the size of business involved.

Coke.—The New England Coal & Coke Co. has just shipped 2900 tons domestic coke to Halifax for the British Empire Steel Corporation's wholesale fuel trade, bringing exports there so far this month up to 5800 tons. Owing to rail orders, the Canadian company has had to blow in another furnace, thereby shutting off its wholesale domestic coke supply. New England foundry coke makers are catching up on specifications. One of them is taking first half contracts at a flat rate of \$11 a ton, delivered within a \$3.10 freight rate zone, instead of on a sliding scale.

Old Material.—Scrap exports have been resumed. A boat is loading 3500

tons mixed No. 1 and No. 2 steel, mostly automobile, for which \$10.50 a ton, on dock, is being paid. The cargo will go to Danzig. It is expected another boat will load 3000 tons late in December. Scrap prices for Pennsylvania mill consumption are practically the same as a week ago. The recent decline has dried up offerings, making it more difficult for shippers to fill old contracts. The American Steel & Wire Co., Worcester, has stopped buying, and local brokers report no negotiations with the Mystic Iron Works. Only an occasional sale of machinery cast to New England foundries is reported, but prices are firm. The Navy Yard, Boston, will take bids on 800,000 lb. structural scrap, 350,000 lb. angles, rods, channels and other miscellaneous smaller lots of scrap.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$10.50 to \$11.00
Scrap T rails.....	10.50 to 11.00
Scrap girder rails.....	10.00 to 10.25
No. 1 railroad wrought.....	11.00 to 11.50
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings.....	6.00 to 6.50
Cast iron borings (steel works and rolling mill).....	6.00 to 6.50
Bundled skeleton, long.....	9.00 to 9.25
Forge flashings.....	9.50 to 9.75
Blast furnace borings and turnings.....	5.50 to 6.00
Forge scrap.....	6.00 to 7.00
Shafting.....	14.50 to 14.75
Steel car axles.....	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long).....	9.75 to 10.00
Rails for rolling.....	11.00 to 11.50
Cast iron borings, chemical.....	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.00 to 13.50
Stove plate.....	11.00 to 11.50
Railroad malleable.....	15.50 to 15.75

to Boulne & Leonard, Montreal, for hospital at St. Hyacinthe, Que.; 200 tons to Dominion Bridge Co., for power house for the Sun Life Assurance Co., Montreal.

Old Material.—A brisk demand for most grades of iron and steel scrap is reported by Toronto and Montreal dealers. Sales in the week were mostly for spot delivery. Recent inquiry indicates a stronger buying movement in the near future. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast.....	16.00	16.00
Stove plate.....	13.00	13.00
Standard carwheels.....	16.00	16.00
Malleable.....	13.00	13.00

	Per Net Ton	
No. 1 machinery cast.....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

Youngstown

Steel Output Now at 80 Per Cent

YOUNGSTOWN, Nov. 27.—Steel business reaching makers in this district, although much smaller in volume than it was in October, is considerably heavier than at this time last year. Production now is about 80 per cent against an ingot output a year ago of less than 60 per cent. Bar specifications are running a little heavier than they did at the beginning of the month, but orders and specifications for other finished products of Youngstown district mills are tapering. No fresh pipe line business of consequence has been booked lately, and as this ordinarily is a period of light sales of other classes of pipe into consumption, distributors are not calling as heavily nor as frequently upon the mills as recently for warehouse replenishments. Sheets are doing comparatively well, and there is not much variation in the rate of strip steel specifications.

In the primary materials, conditions are growing easier. Against a price of as much as \$18.50 for heavy melting steel scrap, melters here say they can now buy at \$17.50 and believe that if they really wanted supplies they might get them even for less. The pinch in the local supply of scrap has been pretty well relieved, and, since scrap originating in and around Detroit cannot much longer be safely shipped by water to Cleveland and Buffalo, there is a possibility of increased supplies becoming available for this district and Canton and Massillon. While there have been sales of basic pig iron at \$18, Valley furnace, the situation appears slightly weaker in view of the fact that there

Canada

Building Construction Continues to Feature Dominion Activities—Pig Iron Demand Brisk

TORONTO, ONT., Nov. 27.—Current demand for merchant pig iron is chiefly for spot delivery. While there is still a steady flow of orders ranging from 50 to 200 tons, orders for as much as 500 tons for early shipment have also been placed. Inquiry is appearing for foundry and malleable iron for first quarter delivery, but producers have not yet opened their books for that period. It is expected that there will be some change in prices before books are opened for 1929 delivery iron. Canadian quotations are firm but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable.....	23.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable.....	25.00
Basic.....	24.00

Imported Iron, Montreal Warehouse	
Summerlee.....	33.50
Carron.....	33.00

Structural Steel.—Statistics compiled from 63 cities of the Dominion show estimated building values for 10

months of 1928 at \$187,697,420, a gain of nearly \$28,000,000 over the same period of 1927. This activity has been reflected in a steadily increasing demand for structural steel and reinforcing bars. Numerous projects requiring from 50 to 500 tons of steel are pending, and several contracts being figured will take from 1000 to 10,000 tons each. The National Terminals of Canada, Montreal, will require approximately 2500 tons for a warehouse; 10,958 tons will be used in the new store at Yonge and College Streets, Toronto, Ont., for the T. Eaton Co., a part of which has already been ordered. Contracts placed during the week included 750 tons to McGregor & McIntyre Structural Steel Co., Toronto, for Bayview bridge in North York Township; 100 tons to Frankel Brothers, Toronto, for plant for A. R. Williams Machinery Co., Toronto; 2000 tons to Canadian Bridge Co., Walkerville, Ont., for first unit of plant for Chrysler Corporation of Canada; 1250 tons to Standard Steel Construction Co., Welland, Ont., for hotel at Niagara Falls, Ont.; 500 tons

are now steel company offerings of this grade, as against the condition of a few weeks ago when they were not disposed to sell in the belief that they would need all of their production. A recent sale of a round lot at \$17.50, Valley furnace, for first quarter shipment is testimony that \$18, recently asked, is not to be had in all cases.

No formal announcement has been made as to first quarter prices on bars and small shapes, but there is a growing impression that the present prices will be reaffirmed, which would mean 1.90c., base, to the large buyers and 1.95c. to 2c., base, to those with less attractive business to offer.

All sheet makers here subscribe to

the recently announced first quarter prices and some business for that delivery is being entered at the new prices. Higher prices also are being sought for first quarter tonnages of strips, but it is admitted that not much business yet has been done for that period. It is expected that with the opening of negotiations, the hot-rolled strip price will settle to a single base. The new card of extras adopted early in October was formulated with an idea of applying on all widths up to 24 in. and to get away from a triple base, which resulted in no end of confusion and unsettlement in prices. The idea of most makers is a base of 2c., adding the new extras.

the latter figure for small tonnages. Bars, shapes and plates are steady at 1.95c. to 2c., base Pittsburgh.

Coke.—Shipments of by-product foundry coke are running approximately 25 per cent less than in October, and further curtailment in specifications is anticipated as the inventory period approaches. Demand for domestic grades has been about normal for this season. Prices of by-product foundry and of beehive foundry from the New River and Wise County districts are unchanged.

Old Material.—There has been a fair demand from scrap users, and district steel plants are taking their usual commitments on current contracts. Prices are moderately firm, with weaknesses cropping out in certain items, notably cast iron borings, machine shop turnings, No. 1 busheling, railroad and agricultural malleable.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting....	13.25 to 13.75
Loose sheet clippings....	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings.....	9.00 to 9.50
Machine shop turnings....	8.50 to 9.00
No. 1 busheling.....	10.75 to 11.25
No. 2 busheling.....	6.25 to 6.75
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought...	13.00 to 13.50
Short rails	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast....	18.50 to 19.00
No. 1 railroad cast.....	14.75 to 15.25
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.25 to 10.75
Railroad malleable	13.75 to 14.25
Agricultural malleable	12.75 to 13.25

Cincinnati

Alabama Pig Iron Advanced by One Producer to \$17—Sheet Mills of District Hold High Operating Rate

CINCINNATI, Nov. 27.—Sales of almost 31,000 tons and a further upward movement of prices have contributed additional strength to the pig iron market. First quarter buying has been of fairly good proportions, largely on account of the desire of consumers to protect themselves against higher prices, and in a few instances iron for second quarter delivery has been sold. Closely following the recent advance of 25c. a ton on Southern iron has come the announcement by an Alabama producer of a further increase of 50c. to \$17, base Birmingham. While other makers in the South have not formally abandoned their schedule of \$16.50, it is understood that within a day or two all furnace interests will be quoting on the basis of \$17. Incidentally, considerable Southern iron has been sold in the district bordering and adjacent to the Ohio River as a result of the stiffening of prices, most customers having been given opportunity to cover their needs prior to the advance. With northern Ohio sellers maintaining \$18.50, base furnace, and with the Southern iron trend sharply upward, Valley iron has penetrated western Ohio and eastern Indiana and a number of orders were booked at \$18, Valley furnace. Of interest to users of silvery iron is the fact that a discrepancy has appeared in the new schedules of the two Jackson County makers. One furnace has increased its price \$1 a ton on all grades of silvery iron and Bessemer ferrosilicon, whereas the other producer has advanced quotations \$2 a ton. This difference gives a range of from \$26 to \$27, base furnace, on 8 per cent. Southern Ohio foundry iron remains nominally at \$18.50, base Ironton. Sales in the past week included 2500 tons to the Marmon Motor Car Co., Indianapolis, and 3500 tons to another central Indiana melter. The Favorite Stove & Range Co., Piqua, Ohio, is asking for 1000 tons of foundry, and a Kokomo, Ind., con-

sumer is expected to buy a like tonnage.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$20.39
Ala. fdy., sil. 1.75 to 2.25..	\$20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75..	20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25	20.19
S'th'n Ohio silvery 8 per cent	27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Bookings in the past week have been of fairly liberal proportions, and in the case of district sheet mills have about held pace with production. Specifications have been well distributed among consuming industries, an increasing volume of business having come from automobile manufacturers. Sheet steel prices have not yet been seriously tested, although indications are that consumers are not offering effective resistance to the increase of \$2 a ton in all grades. Sheet mill operations continue at about 100 per cent of capacity, with no decline in production in sight. Makers of rail steel reinforcing bars are quoting 1.90c. to 1.95c. base mill, and are insisting upon

Malleable Castings Output Remains High

WASHINGTON, Nov. 27.—Bookings of malleable castings in October totaled 55,909 net tons, according to reports received by the Department of Commerce from 130 establishments, six of which with an aggregate monthly capacity of 3850 tons were idle during the month. Orders in September amounted to 55,278 tons. Production in October, the second highest since that of March, 1926, was 63,274 tons, or 69.8 per cent of a monthly capacity of 90,713 tons. The capacity for 1928 is based on the average monthly production for the best six consecutive months since Jan. 1, 1919. Output in September was 56,650 tons, or 63.2 per cent of a monthly capacity of 89,696 tons. Shipments in October were 55,423 tons, against 55,645 tons in September.

For the 10 months ended with October orders totaled 547,948 tons, against 480,319 tons for the corresponding period of last year, and 564,158 tons for all of last year. Production was 592,432 tons, or 65.1 per cent of a capacity of 910,609 tons, compared with 542,667 tons, or 51.5 per cent of a capacity of 1,052,386 tons. Shipments were 561,744 tons and 528,454 tons respectively.

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

Buffalo

Pig Iron Market Less Active, but Prices Are Steady—Steel Mills Continue 90 Per Cent Operations

BUFFALO, Nov. 27.—The pig iron market has not been active and bookings have been light, though prices are being pretty well maintained. The Eastern section sent about 2000 tons of business to a local furnace, including two lots of 500 tons each and one lot of 1000 tons, malleable and foundry. Probably not more than 1000 tons was booked from the immediate Buffalo territory. A New Jersey inquiry calls for 2000 to 3000 tons of foundry, and a recent order from the East was for 400 tons. The melt is exceptionally high throughout the territory served by the Buffalo furnaces and shipments are steady. Canal shipments are off for the year. Producers expect heavy buying soon for first quarter requirements. Operations remain the same.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil.	1.75 to 2.25	\$18.00 to \$18.50
No. 2X fdy., sil.	2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil.	2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25		18.50 to 19.00
Basic		17.50 to 18.00
Lake Superior charcoal		27.28

Finished Iron and Steel.—Sheet business is being maintained at the regular prices. Inquiry from the automobile trade for bolts and nuts is heavy, though railroad business is not shaping up well. Prices are firm. Reinforcing bar business is lighter. Warehouse business in all kinds of material continues good. Structural awards are not heavy. Operations of

mills continue at about 90 per cent or better.

Old Material.—This market in the past week has been quiet, with little new buying. There is a tendency to keep inventories down as the first of the year approaches. Four of the blast furnace interests have been in the market the past week for scrap, paying \$11.50 for cast iron borings. No. 1 heavy melting steel is still held at \$16.50. No. 2 heavy melting steel is not plentiful for Pittsburgh and Youngstown delivery. Some sales of knuckles and couplers and rolled steel wheels have been made at quoted prices, and a small lot of No. 1 machine cast scrap was sold at \$15.75.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	\$15.50 to	\$16.50
No. 2 heavy melting steel		14.25
Scrap rails	15.50 to	16.00
Hydraulic comp. sheets		14.25
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	13.50 to	14.00
No. 1 busheling	14.50 to	15.50
Hvy. steel axle turnings	13.50 to	14.00
Machine shop turnings	7.50 to	8.00
No. 1 railroad wrought	14.50 to	15.00

Acid Open-Hearth Grades		
Knuckles and couplers	17.00 to	17.50
Coil and leaf springs	17.50 to	18.00
Rolled steel wheels	17.00 to	17.50
Low phos. billet and bloom ends	18.00 to	18.50

Electric Furnace Grades		
Short shov. steel turnings	11.00 to	11.50

Blast Furnace Grades		
Short shov. steel turnings	11.00 to	11.50
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	11.00 to	12.00
No. 2 busheling	11.00 to	12.00

Rolling Mill Grades		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00

Cupola Grades		
No. 1 machinery cast	15.50 to	16.00
Stove plate	14.50 to	14.75
Locomotive grate bars	13.00 to	13.50
Steel rails, 3 ft. and under	17.50 to	18.00
Cast iron carwheels	13.00 to	13.50

Malleable Grades		
Industrial	16.00 to	16.50
Railroad	16.00 to	16.50
Agricultural	16.00 to	16.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100 lb.	3.75

Reinforcing Steel

New Projects Call for 8800 Tons

WITH two high schools in Chicago calling for 2100 tons, a sewer project at St. Louis for 2000 tons, and a warehouse at Chicago for 1600 tons, new projects brought out in the last week will require 8800 tons of bars. Awards of 3800 tons included 1800 tons for building at the University of California. Awards follow:

NEW YORK, 185 tons, Evander Childs High School, to Tidewater Structural Materials Corporation.
AMENIA, N. Y., 660 tons, power house; from M. Kantrovitz, Albany, N. Y., general contractor, to Concrete Steel Co.
NUTLEY, N. J., 175 tons, manufacturing

building for Hoffmann LaRoche Chemical Co., to Igoe Brothers.

CINCINNATI, 250 tons, Heberle School, to Pollak Steel Co.

CHICAGO, 300 tons of rail steel bars, sales building for Studebaker Corporation, to Inland Steel Co.

CHICAGO, 100 tons of rail steel bars, manufacturing building for Hump Hairpin Co., to Inland Steel Co.

CHICAGO, 100 tons, social science building for University of Chicago, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 200 tons of rail steel bars, apartment building at Ashland Avenue and Pratt Boulevard, to Calumet Steel Co.

SEATTLE, 100 tons, Third Avenue South paving, to Northwest Steel Rolling Mills.

WALLA WALLA, WASH., 100 tons, Veterans' Hospital, to unnamed interest.

SACRAMENTO, CAL., 127 tons, highway

work in San Luis Obispo County, to unnamed interest.

BERKELEY, CAL., 1800 tons, Life Science Building, University of California, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW HAVEN, CONN., 200 tons, armory.

NEW YORK, 200 tons, Lincoln High School; George F. Driscoll Co., Brooklyn, general contractor.

JERSEY CITY, 125 tons, laboratory for Port of New York Authority.

HACKENSACK, N. J., 200 tons, bridge work for Pennsylvania Railroad; Foundation Co., general contractor.

CINCINNATI, 100 tons, hangar for municipal airport.

CHICAGO, 150 tons, sewer project for Sanitary District.

CHICAGO, 700 tons, apartment building on Lake Shore Drive; R. DeGolyer, architect.

CHICAGO, 100 tons, naval armory; Zackery Davis, architect.

CHICAGO, 1600 tons, revised bids for General Electric warehouse; Graham, Anderson, Probst & White, architects.

CHICAGO, 2100 tons, two newly projected high schools and two projects being refigured.

CHICAGO, tonnage not stated, eight-story apartment building at Jackson Boulevard and Hamlin Avenue; Rissman & Hirschfeld, architects.

ROCKFORD, ILL., 190 tons, St. Anthony's Hospital.

ST. LOUIS, 2000 tons, Board of Public Service for third unit of River Des Peres sewer project.

SACRAMENTO, CAL., 275 tons, highway work in Imperial County; bids Dec. 19.

SACRAMENTO, 103 tons, highway work in San Diego County; bids Dec. 12.

SACRAMENTO, 188 tons, bridge near Benham; Paul N. White, Santa Monica, low bidder.

PORTLAND, ORE., 400 tons, school; bids being taken.

LOS ANGELES, 290 tons, apartment building, Hillcrest and Franklin Streets; bids being taken.

Detroit Scrap Market Has Firm Tone

DETROIT, Nov. 27.—The market on old material has a very firm tone, with No. 1 busheling showing an advance of 50c. per ton and flashings making a gradual advance over the past 10 days or two weeks of 75c. per ton. The latter material is being used considerably by foundries in the district and this increased local consumption has been a strong factor in the advance. Other prices are as quoted a week ago.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.50 to 12.00

The David J. Joseph Co., 124 Harrison Avenue, Cincinnati, old material dealer, on Dec. 1 is moving its offices to the American Building, Central Parkway and Walnut Street.

Non-Ferrous Metal Markets

Copper Quiet and Firm, Tin Active and Higher, Lead Sales Large, Zinc Buying Heavy With Prices Higher

NEW YORK, Nov. 27.

Copper.—Generally the market is very quiet and buying is confined to fill-in requirements and to some future positions as far ahead as February. Domestic consumers have been buying some December metal, but are well covered for January and nearly so for February. The foreign market is quieter than for some time, although sales for the month thus far are about 30,000 tons; November domestic sales are estimated at 35,000 tons. There is very little inquiry for March metal and still less disposition on the part of producers to sell it. Prices continue very firm and unchanged at 16c., delivered in the Connecticut Valley, for electrolytic cop-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Nov. 27	Nov. 26	Nov. 24	Nov. 23	Nov. 22	Nov. 21
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	52.87½	52.87½	52.87½	52.25	51.37½	51.57½
Lead, New York.....	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis.....	6.22½	6.22½	6.20	6.20	6.20	6.17½
Zinc, New York.....	6.70	6.67½	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.35	6.32½	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

per, with the official quotation of Copper Exporters, Inc., at 16.25c., c.i.f. European ports. The Lake copper market is exceedingly quiet and firm at 16c. to 16.12½c., delivered.

Tin.—Over 2000 tons was sold in an active week ended with Nov. 24, and both dealers and consumers were good buyers. Profit taking on some days did not disturb the market and all offerings were easily absorbed. Straits shipments for November will apparently be very large. At the end of last week the total was close to 9000 tons and the estimate of 10,000 tons for the month will probably be fulfilled. Stocks of tin in London, at approximately 5400 tons, show an increase, but the greater part of this is in control of market manipulators who have virtually taken it out of the market. They thus have a firm grip on the course of prices, but some day this metal must be sold. Prices

both here and abroad have advanced sharply and spot Straits tin sold here today at 52.87½c., New York. London prices were considerably higher than a week ago, with spot standard quoted at £239 2s. 6d., future standard at £236 and spot Straits at £239 5s. The Singapore market today was £237 12s. 6d. The market yesterday was moderately active, with about 200 tons changing hands, but today it has been very quiet. Arrivals thus far this month have been 4825 tons, with 5895 tons reported afloat.

Lead.—Sales have been in very good volume practically every day and prices are stiffer in the West. December delivery is principally involved, but there have been sales of spot and January metal. The St. Louis price, which was 6.17½c. last week, is now generally at 6.22½c., with perhaps a little metal still available at 6.20c. The contract price of

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.00c. to 10.00c.
Antimony, Asiatic	12.50c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.	
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	57.25c.
Tin, bar	59.25c.
Copper, Lake	17.00c.
Copper, electrolytic.....	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig.....	6.85c. to 7.10c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	60.75c.
Solder, ½ and ½.....	34.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods.....	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products are unchanged. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10.25c. to 10.50c. since Nov. 15.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.

Rods—	
High brass	18.25c.
Naval brass	20.25c.

Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls.....	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide		33.00c.
Tubes, base		42.00c.
Machine rods		34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	9.875c.
No. 1 red brass or compos. turnings..	9.50c.	10.50c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	20.50c.	
Copper, hot rolled	25.00c.	
Copper, cold rolled, 14 oz. and heavier	27.25c.	
Zinc	10.00c.	
Lead, wide	9.75c.	
Seamless Tubes—		
Brass	26.87½c.	
Copper	27.87½c.	
Brass Rods	18.25c.	
Brazed Brass Tubes.....	28.50c.	

the leading interest is still unchanged at 6.35c., New York.

Zinc.—Conditions have radically changed the past week. Galvanizers generally have come into the market and a very large amount of prime Western zinc has been sold for delivery in the first quarter. As a result, prices have advanced for the first time since Aug. 7. At that time, 6.25c., East St. Louis, was established and it had prevailed until yesterday, when metal was sold at 6.30c. Today the market has further stiffened and prices are generally at 6.35c., although a little metal may still possibly be obtained at 6.32½c. As the result of the more active market, sales of ore last week at Joplin were high at about 15,300 tons at the unchanged price of \$40. Output was a little larger at 11,500 tons and ore shipments were over 12,300 tons. Today the market for prime Western is quieter, with producers somewhat reserved as to future commitments.

Antimony.—In a very quiet market, Chinese metal is easier at 10c., duty paid, New York, for all positions.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 27.—Both spot and future purchases are active in a market which shows mixed tendencies. Prices for copper are lower and quotations for lead, zinc and tin are higher. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper 16.50c.; tin, 51.12½c.; lead, 6.25c.; zinc, 6.45c.; in less-than-carload lots; antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Ludlum Steel Co. to Expand Capacity

The Ludlum Steel Co., Watervliet, N. Y., and the Atlas Steel Corporation, Dupkirk, N. Y., have called special meetings of stockholders to vote on the consolidation of the two companies. If the vote is favorable, some plan of financing will be arranged that will retire all of the present securities of both companies standing ahead of common stocks. The Ludlum company requires increased capacity for the manufacture of its special brands of valve steel and stainless steels and also for the new series of chrome nickel steels which will be manufactured under its license agreement with the Krupp Nirosta Co., Inc.

The Ludlum company will also erect a plant for the manufacture of tungsten carbide tools and dies under combined patents of the Krupp works and the General Electric Co. Construction of the plant will be begun at once and the design will be based upon specifications supplied by Prof. Dr. Benno Strauss of the Krupp research laboratory, who is at present in this country.

Directors have also authorized the construction of a plant for the drawing of chrome nickel and other highly alloyed steel wire by a German process for which the company has acquired the exclusive American rights. Orders have already been placed in Germany for 30 special wire drawing machines together with the necessary annealing apparatus. In about five months the company expects to be able to supply non-corrosive wire in sizes ranging from 0.195 in. to 0.001 in.

New Tin Trade Association Elects Officers

C. S. J. Trench of C. S. Trench & Co., New York, has been elected president of the American Tin Trade Association, recently formed to supplement the activities of the new National Metal Exchange.

Other officers will be A. B. Hall of the National Lead Co., vice-president, and Martin H. Wehncke of Brandeis, Goldschmidt & Co., treasurer. In addition to the officers, the directors will include Edwin Groves of J. W. Phyfe & Co., John Hughes of the United States Steel Corporation, James E. Pope of the Pope Trading Corporation and Erwin Vogelsang of Lewis Lazarus & Sons of New York, Inc.

The new association has adopted a specific quality tin contract, which will govern dealings in Straits and other specific qualities of tin. It is modeled after the style of the present New York Metal Exchange tin contract, which will no longer be available after Dec. 1, when the New York Metal Exchange goes into liquidation. Nearly all classes of dealers in and large consumers of tin have joined the new association. The main object is to assure uniform contracts for all transactions in the metal.

Railroad Equipment

Orders for 2900 Freight Cars—New Inquiries Amount to 4000

WITH 2000 automobile cars bought by the Wabash and 700 miscellaneous freight cars ordered by the Chicago & North Western, car purchases in the last week totaled 2900. New and contemplated inquiry for more than 4000 cars included 2500 for the Louisville & Nashville, 250 for the Chicago, Rock Island & Pacific and 1025 for the Atchison, Topeka & Santa Fe. Details of the week's business follow:

Wheeling & Lake Erie will build five six-wheel and five eight-wheel switching locomotives in its own shops.

Louisville & Nashville will soon make inquiry for 1200 50-ton and 250 70-ton gondola cars, 750 50-ton automobile cars, 300 50-ton box cars, 12 passenger coaches, six baggage and four dining cars.

Wabash has ordered 1500 automobile cars from American Car & Foundry Co. and 500 from Pullman Car & Mfg. Corporation.

Seaboard Air Line contemplates purchase of 200 all-steel hopper cars.

Missouri Pacific is inquiring for 100 steel underframes.

Chicago, Rock Island & Pacific has come into market for 250 ballast cars. This brings road's total inquiries to 3400 freight and 22 passenger cars.

Hercules Powder Co., Wilmington, Del., has ordered 10 50-ton tank cars from American Car & Foundry Co.

St. Louis-Southwestern has ordered steel underframes and parts for rebuilding five ballast cars from American Car & Foundry Co.

Chicago & Eastern Illinois may buy 300 automobile cars instead of 100 as reported previously.

Chicago, St. Paul, Minneapolis & Omaha has ordered four gas-electric passenger cars from Pullman Car & Mfg. Corporation.

Chesapeake & Ohio has ordered six gas-electric rail motor cars from J. G. Brill Co.

Green Bay & Western is inquiring for four or five combination baggage and mail cars.

Chicago & North Western has ordered 400 composite gondola cars from Standard Steel Car Co., 300 flat cars from Pressed Steel Car Co., 100 caboose car underframes from American Car & Foundry Co. and 10 gas-electric rail motor cars from Pullman Car & Mfg. Corporation.

Montour Railroad has ordered 10 caboose cars from Standard Steel Car Co. Armour Car Lines, Chicago, have ordered 500 underframes for refrigerator cars from Bettendorf Co.

Fruit Growers Express has increased its inquiry for refrigerator car underframes from 50 to 200.

Nevada Consolidated Copper Co. has ordered 80 ore cars from Koppel Industrial Car & Equipment Co.

Atchison, Topeka & Santa Fe is in market for 200 flat, 500 single-deck stock and 250 double-deck stock cars, 125 caboose cars and 16 baggage cars.

Great Northern has purchased 500 underframes from Pressed Steel Car Co. and is inquiring for three dining cars.

Otis Steel Co. Puts New Open-Hearth in Use

The Otis Steel Co., Cleveland, placed a new open-hearth furnace in operation the past week, this being the third new furnace to be built and started this year. This gives the company eight open-hearth furnaces at its Riverside plant, with an annual ingot capacity of 720,000 tons. In addition, it has an annual ingot capacity of 170,000 tons at its Lakeside plant.

PERSONAL

COL. FRANK A. SCOTT, chairman of the board of Warner & Swasey Co., Cleveland, has resigned as chief of the Cleveland Ordnance District, which position he has held for four years. His resignation was necessitated by poor health. As head of the Cleveland Ordnance District and member of the military organization created under the National Defense Act, Colonel Scott has supervised the Army's program of industrial preparedness in the important manufacturing area extending from Erie, Pa., to Toledo and from the shores of Lake Erie to Columbus. To show its appreciation of his services and regret over his retirement the Army has presented Colonel Scott with an official resolution embossed on parchment. The presentation was made at his home in Mentor, Ohio, Nov. 22, by Brig. Gen. Colden L'H. Ruggles, assistant chief of ordnance, who in making the presentation said: "The Army is sorrowful today because it is losing the services of a great leader. And we regard you, Colonel Scott, as truly a casualty of the World War as the man who was wounded in performance of his duty on the battle front." Colonel Scott stood foremost among the industrial leaders who rendered preeminent service during the World War. He served both as chairman of the General Munitions Board and later as chairman of the War Industries Board.

ERNEST F. DUBRUL, general manager of the National Machine Tool Builders Association, was the guest of the Boston chapter of the National Association of Cost Accountants on Nov. 22, at the Boston Chamber of Commerce. He spoke on "Depreciation on the Basis of Replacement Values."

THOMAS W. KENNEDY, vice-president in charge of blast furnace operations for the Massachusetts Gas Companies, Boston, and president and manager of the Mystic Iron Works, Everett, Mass., has been made a trustee and vice-president of the New England Fuel & Transportation Co., a Massachusetts Gas Companies subsidiary. Mr. Kennedy also has been made a director of the New England Coal & Coke Co., the Prince-Wick Coal Co., the Pemberton Fuel Co., the Long Branch Coal Co., the E. E. White Coal Co., the Glencoe Coal Co., and the East Gulf Coal Co. With the exception of the New England Coal & Coke Co., the last mentioned companies are subsidiaries of the C. C. B. Smokeless Coal Co. and are located in the New River field of West Virginia. The C. C. B. Smokeless Coal Co. is a subsidiary of the parent company, as is the New England Coal & Coke Co.

O. NEEDHAM, formerly section engineer in charge of steel mill engineer-

ing for the Westinghouse Electric & Mfg. Co., has been appointed assistant superintendent in the testing department, East Pittsburgh works. WILLIAM B. SHIRK succeeds Mr. Needham. The latter has been with the Westinghouse company since just after his graduation in 1909 from the Oklahoma Agricultural and Mechanical College. Mr. Shirk was graduated in electrical engineering from Lehigh University in 1920 and before joining the Westinghouse company in 1925 he was assistant superintendent of electrical equipment for the Bethlehem Steel Co.

GEORGE R. JOHNSON has been named Pittsburgh resident agent for the M. A. Hanna Co. He succeeds GEORGE D. BUCKWELL, who resigned several months ago to become manager of pig iron, coke and by-products sales of the Davison Coke & Iron Co. Mr. Johnson has been with the Hanna company since 1909, for 11 years at the Pittsburgh, Youngstown & Ashtabula Ore Co. docks at Ashtabula, Ohio, and for eight years as cashier at the Cherry Valley furnace, Leetonia, Ohio. Since early this year he has been engaged in pig iron sales in the Pittsburgh office of the company.

HERBERT MAY, assistant treasurer Union Drawn Steel Co., Beaver Falls, Pa., has been elected vice-president of the company and will continue as assistant treasurer.

K. P. SWENSEN has been placed in charge of the New York office, 117 Liberty Street, of the Radiore Co., Los Angeles. He has had wide experience in mining engineering and electrical prospecting.

WADSWORTH DOSTER, recently Eastern representative for the Mackintosh-Hemphill Co., Pittsburgh, has been appointed to serve in a similar capacity with the United Engineering & Foundry Co., Pittsburgh. Previously he was for many years manager of the Blake & Johnson Co., Waterbury, Conn.

P. N. GUTHRIE, JR., since 1909 associated with the South Chester Tube Co., South Chester, Pa., has been appointed vice-president in charge of sales for the Reading Iron Co., Reading, Pa. The general sales offices of the company will be transferred from Reading, Pa., to 30 Church Street, New York, where Mr. Guthrie will maintain headquarters. H. F. MATERN will continue as general sales manager. Mr. Guthrie was born in Pittsburgh and his first business association was with the Black Diamond Steel Works in that city. Before joining the South Chester company he was for several years identified with

the gas light industry in New York State.

GEORGE E. EVANS, for the past 31 years manager of the Ontario division of the Dominion Bridge Co., Toronto, has retired from active service and has been succeeded by A. ROSS ROBERTSON. Mr. Evans will remain with the company in an advisory capacity.

S. JANOVICI has been elected president and treasurer, and J. GILBERT MASON, JR., vice-president and secretary, of the Orelite Co., Inc., 109 Broad Street, New York, producer of natural and calcined diatomaceous earth for insulation purposes. A. JANOVICI has been named assistant secretary of the company and M. J. KAUFMAN, assistant treasurer.

DR. HARVEY NATHANIEL DAVIS, for the last nine years professor of mechanical engineering at Harvard University, was inaugurated as president of the Stevens Institute of Technology on Nov. 23. At a scientific session preceding the installation ceremonies papers were read by DR. ROBERT A. MILLIKAN, of the California Institute of Technology, and DR. JOHN JOHNSTON, director of research for the United States Steel Corporation. The occasion also marked the unveiling of a memorial tablet to the late DR. ALEXANDER C. HUMPHREYS, for 25 years president of Stevens.

M. CROUSE KLOCK, Syracuse, N. Y., has been elected a director of the Crucible Steel Co. of America, New York.

E. V. NIXON, of Thompsons Engineering & Pipe Co., Ltd., Castlemaine, Victoria, Australia, is spending a short time in the United States on his return home from a visit to England. He is studying steel foundry association activities. His present address is the Union League Club, Thirty-ninth Street and Fifth Avenue, New York; he plans to sail from Vancouver, B. C., Dec. 12.

CHARLES B. KING, vice-president and general manager of the Marion Steam Shovel Co., Marion, Ohio, was elected president of the Ohio Manufacturers Association at the annual meeting held in Cleveland, Nov. 21. New vice-presidents included: J. D. COX, JR., president Cleveland Twist Drill Co.; CHARLES R. CLAPP, National Supply Co., Toledo; P. O. GEIER, Cincinnati Milling Machine Co., Cincinnati; T. J. BARNES, Barnes Mfg. Co., Mansfield, and A. F. SPARKS, James Leffel Co., Springfield.

GEORGE ADAMS has been appointed sales manager of the Bunting Brass & Bronze Co., Toledo, Ohio.

FRANK P. MCKIBBEN, Blackgap, Pa., structural steel engineer, addressed the Engineers Society of Milwaukee at its monthly dinner meeting on Nov.

21, his topic being "Electrically Welded Steel Buildings." The meeting was under the auspices of the Milwaukee chapter, American Institute of Electrical Engineers.

HARRY W. TERRY, formerly sales manager Bayley Blower Co., Milwaukee, and widely known as a merchandising and engineering counselor, has joined the industrial advertising division of the Cramer-Krasselt Co., Milwaukee advertising agency.

H. N. FELTON, since 1927 Milwaukee branch manager for the Wagner Electric Corporation, St. Louis, has been appointed branch manager of the corporation's New York office, succeeding E. W. GOLDSCHMIDT. Mr. Felton was graduated from the University of Illinois in 1917 and went with the Wagner corporation in 1919 as a salesman in the Chicago district. He has been identified with the Milwaukee office since 1920. E. T. COUP, who has been in charge of the Cincinnati office since 1921, has been named to succeed Mr. Felton at Milwaukee. He has been identified with the company since his graduation from the University of Wisconsin in 1912, having served previously at St. Louis, Chicago, Boston and Milwaukee. PAUL F. FORSYTH succeeds Mr. Coup at Cincinnati. He was graduated from Pennsylvania State College in 1912 and before joining the Wagner organization in 1915 he was associated with the J. G. White Co., New York, and the Detroit Edison Co., Detroit. He has since served the St. Louis company in Chicago, Detroit and Cincinnati.

BARNEY G. TANG, assistant general superintendent of the Schenectady, N. Y., works, General Electric Co., has been named general superintendent, succeeding the late JAMES A. SMITH. He joined the company in 1898 and served in the searchlight, switchboard and switch departments. Later he became a subforeman in the tool room and subsequently superintendent of a plant section. JOHN D. HARNDEN, recently superintendent of the testing department, has been appointed assistant to the works manager, F. L. KEMP succeeding him in the testing department. LEROY BEERS has been named plant engineer, a newly created position.

E. W. GOLDSCHMIDT, Eastern district manager of the Wagner Electric Corporation, St. Louis, with headquarters at New York, who has represented the company in that city for 25 years, has retired from his active duties and will devote his entire time to the electric light and power industry as chairman of the exhibition committee of the National Electric Light Association.

R. W. RUDDON, first vice-president of the Federal Motor Truck Co., Detroit, has been appointed general manager of the company and in his new

capacity will take over part of the responsibilities formerly held by M. L. PULCHER, who has been president and general manager. Mr. Pulcher will continue as president of the company. Mr. Ruddon joined the Federal organization 15 years ago as secretary to Mr. Pulcher. In 1918 he became assistant secretary of the company; in 1924, assistant general manager, and early this year, first vice-president. During the last few years his work has largely been centered about the financial affairs of the company.

DR. ROBERT REINER, president Robert Reiner, Inc., Weehawken, N. J., manufacturer of textile machinery, addressed the monthly meeting of the Credit Association of the Building Trades of New York on Nov. 27.

VERNON C. WARD, recently manager of sales in the steel construction department of the Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed a vice-president of the J. B. French Co., 30 North Michigan Avenue, Chicago, building contractor. Before joining the Jones & Laughlin organization he was contracting manager at Chicago for the American Bridge Co.

EARL C. REED and LEWIS N. MURRAY, organizers of the Continental Heater Corporation, Dunkirk, N. Y., which last year became a part of the National Radiator Corporation, are president, and vice-president and treasurer, respectively, of the Dunkirk Radiator Corporation, Dunkirk, which has been organized to manufacture radiators and heaters. NEWELL F. GOULD, who is secretary of the new company, was formerly treasurer of the United States Radiator Co., Detroit, and also vice-president of the Marshal Valve Co., Dunkirk. Among the directors are WILLIAM C. MURRAY, formerly manager of the Utica Heater Mfg. Co., Utica, N. Y., and HOWARD REED, recently plant superintendent of the Continental corporation.

ALBERT N. DINGEE, for the last 18 years identified with the sales department of the Electric Storage Battery Co., Philadelphia, has been appointed advertising manager to succeed the late ALFRED B. KREITZBURG.

CARL W. PEIRCE, late open-hearth superintendent of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has become connected with the Arthur L. Stevens Corporation, 205 West Wacker Drive, Chicago. This organization has developed a form of combustion control for open-hearth furnaces which is said to have great possibilities. Mr. Peirce, a graduate of Oberlin College, has spent many years in open-hearth work, having been at the South Side plant of Jones & Laughlin Steel Corporation, Gary plant of Illinois Steel Co., the former New York State Steel Co., Buffalo, and elsewhere.

Obituary

GARLAND G. KING, purchasing agent Alliance Machine Co., Alliance, Ohio, died recently at Dalton, Ga., while en route to Florida, where he had spent the winter in recent years. He had been identified with the Alliance company since its organization.

J. MAX. BERNARD, of J. Max. Bernard & Co., Philadelphia, steel, coal and coke merchants, died Nov. 17, at his home near Media, Pa. He was 66 years of age and was well known in the steel and coal trades of the Philadelphia district, where he was identified with his own company for about 25 years, prior to which he was for about seven years associated with C. B. Houston & Co., Philadelphia, steel and coal merchants.

EDGAR H. MORGAN, president of the Arcade Mfg. Co., Freeport, Ill., died suddenly on Nov. 16. He was born at Marlboro, N. Y., in 1848 and moved to Freeport with his parents in 1853. When he was 16 he entered a foundry owned by his uncle and after learning the molders' trade he was admitted to partnership.

IRVING ROSS STANWOOD, of the Charles E. Bedaux Co., New York, died recently. He was born at Needham Heights, Mass., in 1892, and was graduated from Colby College, Waterville, Me. He then became associated with the Winchester Arms Co., New Haven, Conn., and later with the Agar Mfg. Co., Somerville, Mass.

FRANCIS MARION KING, president North Wales Machine Co., North Wales, Pa., and treasurer and general manager Challenge Machine Co., Philadelphia, died on Nov. 20 at his home in Philadelphia, aged 82 years. He was born at Wilmington, N. C., and established the companies with which he was associated 42 years ago.

STRICKLAND LANDIS KNEASS, vice-president of William Sellers & Co., Inc., Philadelphia, died at Daylesford, Pa., on Nov. 25. He was born at Philadelphia in 1861 and was graduated from Rugby Academy. In 1880 he was graduated in civil engineering by the Rensselaer Polytechnic Institute, Troy, N. Y. He became manager of the injector department of the Sellers company in 1895 and had been associated with the company ever since. He was awarded the John Scott Medal and premium of the Franklin Institute in 1900 and in 1926 his exhaust feed-water injector for locomotive boilers again brought him the award.

GEORGE ARTHUR STEPHENS, from 1902 until 1918 president of the Moline Plow Co., Moline, Ill., died on Nov. 20 in New York, where he had been taken the week before for medical treatment. He was 77 years of age. The Moline company has been succeeded by International Harvester Co.

Continental Deliveries Extending

German Lockout Strengthens Prices but Early Settlement May
Bring Reaction—British Pig Iron Market Improving

(By Cable)

LONDON, ENGLAND, Nov. 26.

HOME demand for Cleveland pig iron is improving and withdrawals from stocks at furnaces are averaging 1000 tons a day. Export sales, however, are still restricted. Hematite is active and preparations are being made to blow in two more East Coast furnaces. Prices are stiffening.

The foreign ore situation is improving here, but on the Continent it is affected by the German lockout and stocks are accumulating at Emden and Dutch ports.

Finished iron and steel has not yet been affected by the German situation and business in heavy material is still slow. Some new shipbuilding contracts will require more steel tonnage, but export sales are poor and plate mills are especially in need of work. Semi-finished steel mills are moderately active as foreign supplies are smaller. The Blue Star Line has placed an order for a 12,000-ton motor vessel with Palmer's Shipbuilding & Iron Co.

Tin plate is quiet and mills are in need of orders for the remainder of the year, but well sold for the early part of next year. Current output of tin plate is about 75 per cent of capacity, as several mills have resumed operation, having completed the agreed period of suspension.

Galvanized sheets are moderately

active in small lots and most makers are quoting January as the earliest shipment, with some sales covering January-March delivery. Black sheets are quiet.

Continental markets are quiet in

trade with British buyers, but some activity is reported from other markets. Prices generally are unchanged, but stability is lacking and a decline is expected should the German lockout reach a speedy conclusion.

Belgian Market Advancing

Mills Well Filled Since German Lockout, With Deliveries
Lengthening—British Pig Iron Competitive

ANTWERP, BELGIUM, Nov. 9.—Prices show a decided tendency to advance as a result of the lockout in Germany, which has temporarily removed German mills from the export trade. Buyers, however, are resisting the efforts of mills to obtain advanced prices, so that it is difficult to ascertain the actual market at which business is being transacted. Steel bars have been advanced, and certain other products are on a slightly higher level than in recent weeks. Some desirable tonnages of steel have been booked from Japan, China, India and South America, and deliveries of most mills are extending. If the German lockout remains in effect for a few weeks more, it is believed that the steel market will continue to advance and the recession of business that had been evident will be temporarily arrested.

Pig Iron.—Demand for phosphoric foundry iron continues steady, and the stocks of both producers and consumers are low. The export price is firm at £3 6s. (\$16.04) per ton, f.o.b. Antwerp, which is also the quotation for British Midland iron, f.o.b. Antwerp, so that British furnaces are obtaining some business here. Thomas iron shows weakness because of British competition. Bessemer hematite iron quotations are governed by British offers and continue at £3 14s. to £3 16s. (\$17.98 to \$18.47) per ton, c.i.f. Antwerp, or f.o.b. furnace. Iron and steel scrap prices show further advances despite substantial arrivals of scrap from England. Stocks are limited, with heavy melting steel at 104 Belgas (\$14.45) and No. 1 cast scrap at 130 Belgas (\$18.07).

Semi-Finished Material.—Demand is light, but sellers have only limited

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35 to \$5.48
Cleveland No. 1 foundry.	3 8½	to 3 9½	16.64 to 16.89
Cleveland No. 3 foundry.	3 6		16.04
Cleveland No. 4 foundry.	3 5		15.80
Cleveland No. 4 forge....	3 4½		15.68
Cleveland basic (nom.)..	3 5		15.80
East Coast mixed.....	3 10	to 3 11	17.01 to 17.25
East Coast hematite.....	3 10½	to 3 11½	17.13 to 17.37
Rails, 60 lb. and up....	7 15	to 8 5	37.66 to 40.10
Billets	6 5	to 6 10	30.37 to 31.59
Ferromanganese	13 15		66.83
Ferromanganese (export)	14 0		68.04
Sheet and tin plate bars, Welsh	6 0		29.16
Tin plate, base box.....	0 18	to 0 18½	4.37 to 4.40
Black sheets, Japanese specifications	13 7½		65.00
Ship plates	7 12½	to 8 2½	C. per Lb. 1.63 to 1.74
Boiler plates	9 0	to 10 10	1.92 to 2.25
Tees	8 2½	to 8 12½	1.74 to 1.84
Channels	7 7½	to 7 17½	1.58 to 1.69
Beams	7 2½	to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62 to 1.69
Steel hoops	9 0	to 10 0	1.92 to 2.14
Black sheets, 24 gage....	10 0		2.14
Galv. sheets, 24 gage....	13 10	to 13 15	2.93 to 2.98
Cold rolled steel strip, 20 gage (nom.).....	16 0		3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)				
Foundry pig iron (a):				
Belgium	£3 3s.	to £3 5s.	\$15.31	to \$15.80
France	3 3	to 3 5	15.31	to 15.80
Luxemburg	3 3	to 3 5	15.31	to 15.80
Basic pig iron (a):				
Belgium	3 3		15.31	
France	3 3		15.31	
Luxemburg	3 3		15.31	
Coke	0 18		4.37	
Billets:				
Belgium	5 2		24.78	
France	5 2		24.78	
Merchant bars:				
Belgium	6 4		1.37	C. per Lb.
France	6 4		1.37	
Luxemburg	6 4		1.37	
Joists (beams):				
Belgium	5 4		1.15	
France	5 4		1.15	
Luxemburg	5 4		1.15	
Angles:				
Belgium	6 2½		1.35	
¼-in. plate:				
Belgium (a).....	6 13		1.47	
Germany (a).....	6 13		1.47	
⅝-in. ship plate:				
Belgium	6 8		1.41	
Luxemburg	6 8		1.41	
Sheets, heavy:				
Belgium	6 1		1.33	
Germany	6 1		1.33	

(a) Nominal.

stocks available, so that prices are firm. It is difficult to obtain prices on blooms, but sheet bars are quoted at £5 2s. (\$24.79) per ton. Billets are commanding £5 3s. (\$25.03) per ton for 2½-in. and £4 19s. (\$24.06) per ton for 3-in., with only small tonnages available.

Finished Material.—Although mills are asking advances on most products because of the German lockout, steel bars alone have registered a definite advance in price. Buyers are withholding business as much as possible, but the volume of tonnage that must be placed is providing considerable activity. Deliveries are extending, and some mills with heavy tonnages booked have practically retired from the market. Sellers seeking business are quoting bars at £6 5s. to £6 6s. per ton (1.38c. to 1.39c. per lb.), and deliveries extend into February and March. Angles are also in good demand and show a tendency to advance, but beam prices are unchanged, with delivery terms shorter than on other products. Medium-size angles are quoted at £5 18s. per ton (1.30c. per lb.), and ordinary specifications of beams, at £5 2s. 6d. per ton (1.13c. per lb.). Corrugated reinforcing bars are firm at £6 7s. per ton (1.40c. per lb.), and hot-rolled hoops, at £6 5s. per ton (1.38c. per lb.). Heavy-gage sheets are firmer, medium gages are inactive with prices unchanged and the light gages, affected by British competition, show a tendency to decline in price.

Europe Expects Sharp Competition in Aluminum

HAMBURG, GERMANY, Nov. 10.—Aluminum producers in Germany are concerned over the possibility of severe price competition next year. The Aktieselskabet Haugvik Smeltwerk, Gromfjord, Norway, is the only important aluminum producer not a member of the international cartel. Recently British interests have acquired the plant and are understood to be increasing its production to a total of 4000 to 5000 tons a year. The company has begun to offer aluminum at less than the cartel price of £95 per ton (20.94c. per lb.), but with only a small output at present has not had much influence on the market. It is estimated that during 1929 this producer will be able to offer close to 4000 tons for export. Its Continental business has been placed in the hands of agents in Switzerland and Germany.

Consumption of the major non-ferrous metals in Germany has almost attained its 1913 level of 760,000 tons, ranging now from 740,000 to 750,000 tons annually of copper, lead, zinc, aluminum, tin and nickel, according to a report received by the Department of Commerce from Trade Commissioner W. T. Daugherty, Berlin.

Steel Imports Are Small

European Mills Quoting Higher Prices Here Than in Other Markets—Japan Asks for Heavy Rails

NEW YORK, Nov. 27.—Importers in New York are offering European steel from stocks, but at present prices are unable to place any further orders with European mills. German producers of strip steel, hoops and bands are evidently willing to quote, but their prices are high and importers are unwilling to risk possible delays in delivery, which might be caused by the German lockout. Importers who are also exporters of both foreign and domestic steel point out that in recent weeks prices obtained from Continental mills have been several dollars a ton higher than quotations on the same specifications for shipment to other foreign markets. On a steel bar specification, an importer in New York recently asked a Continental mill for prices, c.i.f. New York; Buenos Aires, Argentina, and Shanghai, China. The price for delivery to New York was on a \$4 a ton higher basis than to the other two markets.

The United States Court of Customs Appeals has affirmed the judgment of Justice Fischer, sitting in Customs Court, who decided last February that reinforcing bars were to be classified as construction material, taking a duty of 20c. per 100 lb., instead of as bars, which are

dutiable at 30c. per 100 lb. This decision, unless appealed by the Government to the United States Supreme Court, which is not considered likely, will result in considerable refunds on duties paid by importers on reinforcing bars since Justice Fischer's decision. Importers have protested the decision of the Treasury Department classifying bar-sized shapes as bars, because they are produced on a bar mill, and a hearing is expected in the next few months.

Export trade with the Far East continues rather small. There are occasional inquiries for small lots of tin plate from both Japanese and Chinese merchants, and a large Japanese fishing interest is reported to have closed on about 50,000 base boxes of canners' tin plate. The export prices of American mills are substantially unchanged at \$5.20 to \$5.25 per box, c.i.f. Japanese port.

Two large inquiries for heavy rails from Far Eastern railroads are in the market, but the business is expected to go to Continental or Japanese producers. The South Manchuria Railway Co. is inquiring for 25,000 tons of 75 and 100-lb. rails, and the Nankai Electric Railway, in Japan, is taking bids on 16,000 tons of 80 and 100-lb. sections.

German Imports of Advertised American Machinery Large

HAMBURG, GERMANY, Nov. 10.—Germany is a substantial market for certain types of American machinery and equipment. In the first nine months of this year German imports of machinery of all kinds totaled 135,000,000 m. (\$32,175,000). In certain machines the United States furnished nothing and in other equipment the majority of imports were of American origin. Book printing, paper making and sugar mill machinery imports from the United States were of little consequence, most of this equipment coming from Great Britain and Sweden. In agricultural machinery, however, the United States occupies a satisfactory position. Of a total of 115 tractors imported in the first nine months of the year the United States furnished only a few, but of 1634 plows brought into Germany, 65 per cent were from the United States and 16 per cent from Canada. In harvesting machines, imports of which in the first nine months totaled 5460 pieces, only 25 per cent were from the United States and 68 per cent were from Canada.

The difference in the volume of imports of such machines is not so much in price as in adequacy of representation. American, Canadian and Ger-

man prices on agricultural machinery are about the same, but while American made plows are advertised and sold by local agents in 97 German towns, American harvesting machines are sold by only 38 agents and tractors in only six German towns. The result in volume of business seems to be in proportion to the amount of local representation. American manufacturers of typewriters furnished 13,772 of a total of 15,518 imported in the first nine months of the year. German makers, however, exported 54,396 typewriters in this period. Of total imports of 11,438 business machines for offices, the United States furnished Germany with 8531 in the first nine months.

In this period the United States furnished 51 per cent of 1645 internal combustion engines, 53 per cent of 1087 motor-driven sewing machines, 33 1/3 per cent of 3528 laundry machines, 41 per cent of 7453 fire-fighting machines, 59.8 per cent of 10,950 metal-working tools, 37 per cent of 54 units of coal-washing and sorting machines, 11 per cent of 16,462 blowing and ventilating engines and 57 per cent of 1119 leather-working machines.

The American Institute of Weights and Measures will hold its annual meeting in the rooms of the institute at 115 Broadway, New York, on Thursday, Dec. 6, at 2.30 p. m.

Export Movement Grows Larger

October Total Fourth Highest of Past Seven Years—

Was 50 Per Cent Above Last Year—

Imports Above September

WASHINGTON, Nov. 24.—Rising to 256,870 gross tons, exports of iron and steel products from the United States in October reflected an increase of 28,814 tons or 12.6 per cent over the 228,056 tons exported in September. Imports in October, amounting to 63,880 tons, made a gain of 10.5 per cent over the 57,782 tons imported the preceding month. For the 10 months ended with October exports aggregated 2,384,301 tons, or 29.8 per cent above the 1,836,730 tons exported during the corresponding period of last year. Imports for the 10 months of the current year totaled 629,301 tons, or only 0.9 per cent in excess of the 623,922 tons imported during the corresponding period of 1927.

Average daily export movement in October was 8293 tons, against 7602 tons in September and 9268 tons in August. The October daily movement

United States Imports of Iron and Steel Products in October

(In Gross Tons)	
Austria	50
Belgium	10,371
Czechoslovakia	614
France	8,251
Germany	11,985
Italy	317
Netherlands	1,153
Norway	2,060
Sweden	2,570
United Kingdom	12,140
Europe	49,511
Canada	9,725
Mexico	31
British India	4,610
China	3
Total	63,880

was well above the average of 7889 tons for the 10 months of the present year and 6042 tons for the 10-month period of last year. The average

daily import movement in October was 2061 tons, against 1926 tons in September, 2063 tons for the 10 months of 1928 and 2052 tons for the corresponding period of 1927.

Total exports were the fourth highest this year and were above those for any month in 1922 to 1927, inclusive. Exports of rolled and finished material were the third highest of the year and were exceeded only once (January) in 1927. Semi-finished steel exported made the greatest tonnage since May, 1920. Structural steel exports were the heaviest in over five years.

Principal Export Items

Increases in the export movement in October were made in all but three classes. The largest item was scrap, with a total of 39,413 tons, of which 25,650 tons went to Japan and 11,741

Exports of Iron and Steel from the United States

	(In Gross Tons)		10 Months Ended October	
	October			
	1928	1927	1928	1927
Pig iron	11,532	4,735	64,091	39,823
Ferromanganese	143	1,005	8,435	1,539
Scrap	39,413	25,231	462,700	201,055
Pig iron, ferroalloys and scrap	51,088	30,971	535,226	242,417
Ingots, blooms, billets, sheet bar, skelp	21,885	9,921	128,294	80,644
Wire rods	3,425	2,276	31,986	14,060
Semi-finished steel	25,310	12,197	160,280	94,704
Steel bars	16,264	9,207	125,233	92,501
Alloy steel bars	1,211	799	12,318	4,827
Iron bars	136	144	3,058	3,626
Plates, iron and steel	16,456	8,668	126,018	112,394
Sheets, galvanized	13,046	9,709	125,745	132,149
Sheets, black steel	14,258	8,856	154,826	134,730
Sheets, black iron	1,741	851	13,166	13,681
Hoops, bands, strip steel ..	5,433	2,993	47,488	36,273
Tin plate; terne plate	18,180	17,940	203,652	219,913
Structural shapes, plain material	25,847	13,202	157,939	120,020
Structural material, fabricated	7,413	5,803	74,851	55,336
Steel rails	9,347	14,070	170,477	151,146
Rail fastenings, switches, frogs, etc.	2,330	1,768	36,590	27,079
Boiler tubes, welded pipe and fittings	24,931	14,985	218,197	221,772
Plain wire	4,380	3,233	38,282	29,071
Barbed wire and woven wire fencing	7,397	5,235	61,494	43,844
Wire cloth and screening ..	107	200	1,505	1,955
Wire rope	445	278	4,294	3,669
Wire nails	968	90	12,696	6,685
Other nails and tacks	886	1,512	8,202	7,823
Horseshoes	35	76	375	470
Bolts, nuts, rivets and washers, except track ..	1,117	1,033	10,833	10,053
Rolled and finished steel ..	171,928	120,652	1,607,239	1,429,017
Cast iron pipe and fittings ..	2,824	3,584	27,919	23,625
Car wheels and axles	752	1,113	13,159	14,941
Iron castings	675	650	9,025	9,402
Steel castings	651	358	7,874	6,080
Forgings	1,678	401	9,795	4,169
Castings and forgings	6,580	6,106	67,772	58,217
All other	1,964	940	13,784	12,375
Total	256,870	170,866	2,384,301	1,836,730

Imports of Iron and Steel Into the United States

	(In Gross Tons)		10 Months Ended October	
	October			
	1928	1927	1928	1927
Pig iron	14,108	8,178	118,885	102,127
Ferromanganese*	4,039	2,109	38,716	23,220
Ferrosilicon†	155	94	3,118	6,657
Ferrochrome‡	65	3	635	415
Scrap	9,938	5,178	47,588	50,343
Pig iron, ferroalloys and scrap	28,305	15,562	208,942	182,762
Steel ingots, blooms, billets and slabs	2,005	1,149	18,619	10,568
Iron blooms, slabs, etc. ....	.....	91	4	91
Wire rods	948	2,688	13,078	14,103
Semi-finished steel	2,953	3,928	31,701	24,762
Rails and splice bars	1,057	541	14,039	15,161
Structural shapes	10,530	13,180	141,699	132,840
Boiler and other plates	2,091	2	6,759	3,250
Sheets and saw plates	782	1,222	20,694	13,161
Steel bars	4,759	5,261	75,691	77,727
Bar iron	67	10	1,680	3,174
Hoops, bands and cotton ties	1,794	3,194	17,337	29,643
Tubular products (wrought) ..	4,796	2,298	36,309	45,504
Nails, tacks, staples	1,089	234	8,211	5,155
Tin plate	48	70	865	1,050
Bolts, nuts, rivets and washers	46	22	222	311
Round iron and steel wire ..	606	202	3,826	3,373
Barbed wire	572	248	3,693	3,734
Flat wire; strip steel	222	287	1,957	2,261
Steel telegraph and telephone wire	5	.....	183	32
Wire rope and strand	117	122	1,372	1,921
Other wire	50	642	501	1,109
Rolled and finished steel ..	28,631	27,535	335,039	339,406
Cast iron pipe	3,338	5,265	51,152	74,610
Castings and forgings	153	219	2,468	2,382
Total	63,880	52,509	629,301	623,922
Manganese ore*	26,142	14,780	172,799	246,829
Iron ore	169,902	228,275	2,057,103	2,289,303
Magnesite .....	.....	29	38,391	36,222

*Manganese content only.

†Silicon content only.

‡Chromium content only.

Destination of Iron and Steel Exports from the United States (In Gross Tons)

Country of Destination	October, 1928	January Through October		Country of Destination	October, 1928	January Through October	
		1928	1927			1928	1927
<i>North and Central America and West Indies</i>	<i>136,092</i>	<i>1,162,990</i>	<i>915,592</i>	Greece	39	1,946	3,546
Canada and Newfoundland.....	113,103	970,391	700,486	Italy	3,604	85,217	40,019
Cuba	6,246	53,508	82,342	Netherlands	109	1,812	11,726
Mexico	6,354	67,494	68,980	Russia	90	2,697	7,409
Guatemala	342	6,760	5,639	United Kingdom	5,371	44,445	57,929
Panama	2,011	13,660	16,268	Other Europe	1,755	93,297	47,673
Salvador	254	2,899	3,578	<i>Far East</i>	<i>68,137</i>	<i>600,801</i>	<i>487,882</i>
British West Indies.....	615	6,535	10,908	British Malaya	29	5,483	7,479
Other West Indies.....	6,200	28,985	16,927	China	4,965	81,851	44,706
Other Central America.....	967	12,758	10,464	Dutch East Indies.....	3,657	34,107	31,132
<i>South America</i>	<i>38,353</i>	<i>361,578</i>	<i>290,666</i>	India and Ceylon.....	1,322	19,979	23,328
Argentina	10,126	82,285	68,266	Japan and Chosen.....	47,894	345,913	227,445
Brazil	9,239	69,792	57,630	Kwangtung	809	13,165	18,722
Chile	3,903	56,674	35,603	Philippine Islands	6,498	71,125	51,502
Colombia	4,967	54,035	48,214	Australia	1,020	13,263	23,397
Peru	3,244	22,393	28,372	New Zealand	177	1,978	1,024
Uruguay	606	7,368	9,290	Other Asia and Far East.....	1,766	13,937	9,147
Venezuela	5,907	64,893	40,558	<i>Africa</i>	<i>958</i>	<i>11,149</i>	<i>14,950</i>
Other South America.....	361	4,138	2,733	British South Africa.....	653	5,055	7,356
<i>Europe</i>	<i>13,330</i>	<i>247,783</i>	<i>177,640</i>	Egypt	31	3,456	3,124
Belgium	999	13,174	5,120	Mozambique	85	1,091	3,575
France	1,363	5,195	4,218	Other Africa	189	1,547	895
				Total	256,870	2,384,301	1,836,730

tons to Canada. Scrap exports, however, were 19,098 tons below the 58,511 tons exported in September. Plain structural shape exports increased by 12,470 tons, amounting to 25,847 tons as compared with 13,377 tons. Of the exports of plain material exported in October Canada took 23,015 tons. Outgoing shipments of boiler tubes and welded pipe in October amounted to 24,931 tons, an increase of 7948 tons over the 16,991 tons exported in September.

Of the 12,987 tons of casing and oil line pipe exported in October, 4450 tons went to Venezuela, 2271 tons to the Dutch West Indies, 1858 tons to Argentina and 966 tons to Colombia. Of the 6085 tons of welded black pipe exported that month, 1421 tons went to the United Kingdom, the remainder being widely distributed. Exports of plates in October, amounting to 16,264 tons, made a gain of 5467 tons over the 10,989 tons exported in September; Canada took 12,972 tons. Of the 16,264 tons of steel bars exported in October, an increase of 4479 tons over the 11,785 tons exported in September, Canada took 11,133 tons.

Galvanized steel sheet exports in October, amounting to 13,046 tons, reflected a gain of 4345 tons over the 8701 tons exported in September. Brazil took 2582 tons, Canada 1927 tons and the Philippine Islands 1514 tons. Of the 14,258 tons of black steel sheets exported in October, 7429 tons went to Canada, 2940 tons to Japan and 1375 tons to Italy. Exports of black steel sheets in September were 12,038 tons, a decrease of 2220 tons under those for October.

Tin plate exports in October, amounting to 18,180 tons, showed a gain of 2709 tons over the 16,471 tons exported in September. Of the October shipments, Japan took 4176 tons; China, 2788 tons; Canada, 2319 tons; Argentina, 2129 tons; Brazil, 1281 tons; Peru, 1011 tons.

Of the 21,885 tons of ingots and semi-finished material exported in October, Canada took 20,802 tons, made up of 16,234 tons of skelp and

4568 tons of ingots. Exports of steel rails in October declined to 9347 tons from 16,466 tons in September. Of the October shipments, Canada took 3355 tons; Brazil, 1341 tons; Mexico, 1206 tons; Cuba, 973 tons, and Argentina, 616 tons.

Canada, as usual, was by far the largest consumer of American exports, taking 113,008 tons in October. Japan ranked second, with 47,894 tons, while Argentina was third, with 10,126 tons.

Main Import Items

Pig iron constituted the largest item of importation in October, incoming shipments amounting to 14,108 tons, of which 7702 tons came from the United Kingdom. Of the 4759 tons of steel bars imported in the month, 2105 tons came from Germany and 1217 tons from Belgium, usually the largest supplier of steel bar imports. Of the 10,530 tons of structural shapes imported, 6301 tons came from Belgium, 3069 tons from Germany and 1004 tons from France.

Of the 3838 tons of cast iron pipe imported, 3481 tons came from France. Soviet Russia supplied 12,600 tons of the 26,142 tons of manganese ore imported, while 6469 tons came from Brazil and 6273 tons came from India. Of the 4039 tons of ferromanganese imported, 1760 tons came from Norway, 1653 tons from Canada and 420 tons from the United Kingdom. Of the 4796 tons of tubular products, other than cast iron pipe, imported in October, 2966 tons came from Germany.

Great Britain led as the source of October imports, supplying 12,140 tons; Germany was second, with 11,985 tons, and Belgium third, with 10,371 tons.

Scrap imports were the largest for any month in two years. Imports of finished and rolled material were, with the exception of those in July, the smallest for any month since November, 1927. Steel bars came in in the lightest amount since March, 1926. Structural steel imports were the smallest since February, 1927.

Lower Imports of Iron Ore in October

WASHINGTON, Nov. 24.—Imports of iron ore in October declined to 169,902 tons from 211,494 tons in September, Chile supplying 91,000 tons of the October total and French Africa 41,500 tons. For the 10 months ended with October iron ore imports were 2,057,103 tons, against 2,289,312 tons for the corresponding period of last

year. Chile led by far as the source of these imports for both periods, furnishing 1,170,100 tons during the 10 months of the current year and 1,166,400 tons for the corresponding period of last year.

Owing largely to the strike in Sweden, the 10-month 1928 total from that country, 19,614 tons, was less than 9 per cent of the 1927 shipments. Shipments from Cuba fell off 63,000 tons, while those from Canada showed an advance of nearly 29,000 tons.

SOURCES OF AMERICAN IMPORTS OF IRON ORE (In Gross Tons)

	October		Ten Months Ended October	
	1928	1927	1928	1927
Chile	91,000	121,800	1,170,100	1,166,400
Cuba	11,500	25,500	277,286	340,113
Spain	7,557	448	29,765	27,165
Sweden	...	21,470	19,614	224,280
French Africa	41,500	48,999	403,630	419,821
Canada	...	432	45,359	16,667
Other countries	18,345	9,635	111,349	94,866
Total	169,902	228,284	2,057,103	2,289,312

Machinery Markets and News of the Works

Heavy Machine Tool Buying

Wright Aeronautical Corporation Orders About \$350,000
Worth and Eaton Axle & Spring Co.'s Purchases
Total About \$300,000

HEAVY buying of machine tools featured the business of the past week. Outstanding were the orders of the Wright Aeronautical Corporation, Paterson, N. J., totaling \$350,000 or more, and those of the Eaton Axle & Spring Co., Cleveland, amounting to \$300,000. The latest purchases by the Wright Aeronautical Corporation bring its expenditures for machine tools in the past several months to at least \$1,000,000 and are part of a program of plant expansion begun early in the year. The Eaton company's purchases are to equip a new plant which will manufacture motor truck axles.

Other orders and inquiries received during the week were of such size as to command unusual attention. R. Hoe & Co., New York, printing press manufacturers, bought 10 milling machines and four planers; a company in the Detroit district has ordered about \$50,000 worth of special lathes, and the National Acme Co., Cleveland, booked a \$100,000 order for 10 machines to be shipped to Sweden. In-

cidentally, this order came from Sweden by telephone. Among pending purchases are \$500,000 worth of equipment for a Detroit automobile company for the manufacture of crankshafts, a list of 21 tools, on which prices are being submitted by Chicago dealers, and 12 turret lathes for a large metalworking plant in Sweden. An automobile company in the East which will build a car of foreign design is also in the market for considerable equipment.

While machine tool business has been on the downward trend this month, the orders of the past week will lift the sales records of companies which benefited to a level that probably will compare favorably with October totals. The high level of activities does not affect all machine tool companies alike; some are so busy that they cannot make early deliveries even by working night shifts, while others are engaged at considerably below capacity. Those making special high production tools are in most cases taxed to their utmost.

New York

NEW YORK, Nov. 27.—Extensive purchasing of tools by the Wright Aeronautical Corporation, Paterson, N. J., was a feature of the past week's machine-tool business in this district. For the second time this year, the Wright company bought upward of \$350,000 worth of equipment. The latest list included 21 milling machines, 28 small turret lathes, 15 sensitive radial drills, 12 grinders, 15 single and multiple drill presses, 2 Mult-Au-Matics, 4 crankshaft lathes. The Curtiss Aeroplane & Motor Corporation, Buffalo, continues a small buyer of machine tools for its plant at Buffalo. R. Hoe & Co., New York, have closed on 10 milling machines and four planers and the Bethlehem Shipbuilding Corporation has bought four lathes for its Fore River shipyard. The General Electric Co., Schenectady,

N. Y., has closed on a large lathe for use at Schenectady and a number of tools for Bloomfield, N. J., including turret lathes and drills.

A list of 16 tools has been sent out for bids by Department of Public Instruction, Albany, N. Y. The inquiry consists of two 14-in. x 6-ft. thread cutting lathes, three 11-in. x 5-ft. thread cutting lathes, two 11-in. x 5-ft. South Bend thread cutting lathes, two 9-in. x 4-ft. bench lathes, one universal milling machine, one 16-in. shaper, one 18-in. vertical drill, one sensitive drill, one universal grinder, one Peerless power hack saw, one portable electric drill, a Buffalo forge and blower, Stewart gas furnace and an anvil.

Sales reported the past week by Pratt & Whitney Co. include a deep hole drill, 14-in. vertical surface grinder, 6-in. and 10-in. thread milling machines, two No. 2 jig borers, 6-in. vertical shaper, 13-in. lathe, special Sigourney drill. Sales by Niles-Bement-Pond Co. included two 48-

in. Niles carwheel borers, 8-in. Williams pipe machine, No. 5 Grand Rapids surface grinder, Nos. 2 and 3 Reid surface grinders, No. 13 Brown & Sharpe universal tool grinder and a 16-in. Niles-Acme shaper.

Bids will soon be asked by Western Electric Co., 195 Broadway, New York, for five-story plant at Emeryville, Cal.; to cost close to \$500,000 with machinery. Pacific Coast headquarters are at 680 Folsom Street, San Francisco. Engineering department of company in charge.

William C. Sommerfeld, 31 Union Square, New York, architect, has filed plans for a five-story automobile service, repair and garage building at 524-28 East Seventy-third Street, to cost about \$160,000 with equipment.

Nichols Copper Co., 25 Broad Street, New York, has plans for addition to plant at Laurel Hill, L. I., one-story, 60 x 275 ft., to cost over \$175,000 with equipment.

Johns-Manville Corporation, Madison Avenue and Forty-first Street, New York, has purchased plants and business of Celite Co., Los Angeles, manufacturer of temperature insulation products, filtration materials, etc., with properties at Lompoc, Cal., and will operate as a division of its business. Plans are under way for increase in output of Celite specialties.

Following recent acquisition of Port Henry Light, Heat & Power Co., Port Henry, N. Y., by New York Power & Light Corporation, Albany, N. Y., last-noted company will carry out expansion program in Madison and Cortland Counties, including transmission lines, power substations, etc., to cost approximately \$800,000.

Phelps-Dodge Corporation, 99 John Street, New York, is completing plans for electrolytic copper refinery at El Paso, Tex., to cost over \$3,000,000 with machinery. Project will include power house and machine shop.

American Aeronautical Corporation, 730 Fifth Avenue, New York, recently organized, has concluded negotiations for American rights for production of Savoia-Marchetti seaplanes and other commercial aircraft, from Italian company of that name. It is proposed to build plant on Long Island, comprising parts manufacture and assembling divisions. Motors will be secured from outside sources. Enea Bossi is one of heads of new company.

Bushwick Can Co., 86 Butler Street, Brooklyn, manufacturer of tin cans, boxes, etc., has plans for one-story factory to cost about \$45,000 with equipment. V. A. Lacerenza, 26 Court Street, is architect.

War Department, Washington, has awarded contract to Asdlen Construction Co., Philadelphia, for group of 38 buildings at Picatinny Arsenal, Dover, N. J., to replace structures destroyed by fire several months ago, at cost of \$793,516.

Gates-Day Aircraft Corporation, East Twenty-fourth Street, Paterson, N. J., has leased mill on East Sixteenth Street, totaling about 35,000 sq. ft. floor space, and will remodel for new plant unit. Present works will be continued.

Truscon Steel Co., Youngstown, Ohio, is

The Crane Market

NEW inquiry for overhead traveling cranes continues slack, but there is some substantial business in the market, expected to be placed before the end of the year. Fox Brothers International Corporation, New York, has been asking for prices on 17 special "automobile cranes" for export. Business in locomotive cranes is quiet, but New York subway contractors have appeared in the past week as buyers of short boom shovels for tunnel work. Western Electric Co., Chicago, is in the market for a 10-ton crane for its cable plant.

Among recent purchases are:

Morse-Rogers Steel Co., Glendale, L. I., 5-ton, 67-ft. 6-in. span, 3-motor, overhead crane, reported purchased from Milwaukee Electric Crane & Mfg. Corporation.

Rosenthal Engineering Contracting Co., 12 East Forty-first Street, New York, two short boom shovels for tunnel work, from Bucyrus-Erie Co.

Philip J. Cogan, contractor, New York, two short boom shovels for tunnel work, reported purchased from Bucyrus-Erie Co.

Carnegie Steel Co., two 15-ton, 31-ft. 4-in. span double line bucket cranes for Duquesne Works, to Alliance Machine Co.

Oscar Daniels Co., a 22-ton, standard gage, steam operated, rebuilt railroad crane from Orton Crane & Shovel Co.

Acme Steel Co., Chicago, has ordered an overhead electric crane from Whiting Corporation.

Missouri-Pacific has ordered for Falls City, Neb., a 15-ton, 46-ft. span electric crane from Manning, Maxwell & Moore, Inc.

considering one-story factory branch and distributing plant at Harrison, N. J., to cost about \$40,000.

Passaic Valley Sewage Commission, 20 Branford Place, Newark, is considering installation of Diesel oil-burning engines at Newark Bay pumping station to replace present coal-burning equipment. Estimates of cost will be made by Joseph Hecking, 94 Wheaton Place, Rutherford, N. J., combustion engineer.

Public Service Electric & Gas Co., Public Service Terminal, Newark, is reported planning new power switching station at Elizabeth, N. J., to cost more than \$1,000,000 with transmission lines and equipment.

Elevating and conveying machinery, packing and other equipment will be installed in six-story addition, 124 x 200 ft., to plant of Hoffman Beverage Co., 402 Grove Street, Newark, to cost more than \$350,000. Edward C. Eppele, 44 Commerce Street, is architect.

Universal Body Building Co., Inc., 7 Liberty Street, Lodi, N. J., has been organized to build and repair commercial vehicle bodies. Company will be in market for materials and equipment.

Albert & Davidson Pipe Corporation, 256 Oakland Street, Brooklyn, used pipe dealer, has purchased plant, stock, equipment and good will of McMann & Taylor, Second Avenue, Fifty-first and Fifty-second Streets, Brooklyn, and is moving to new quarters on Dec. 1. Plant has 20,000 sq. ft. of floor space, and will provide considerably increased facilities.

Knickerbocker, Cram & Co., 7 East Forty-second Street, New York, have been appointed agents in the New York territory for production and tool room lathes made by Porter-Cable Machine Co., Syracuse, N. Y.

Buffalo

BUFFALO, Nov. 26.—Dunkirk Radiator Corporation, Dunkirk, N. Y., has been organized to manufacture radiators and boilers. Company has acquired property on Middle Road, Dunkirk, and has begun construction of building, 120 x 450 ft.

National Carbon Co., 3625 Highland Avenue, Niagara Falls, N. Y., has taken bids on general contract for one-story addition, to cost about \$50,000 with equipment. Headquarters are at 30 East Forty-second Street, New York.

Stafford & Holt, Inc., Little Falls, N. Y., has been formed with capital of \$100,000 to take over and expand company of same name, with local plant for manufacture of knitting machinery and

parts. New organization is headed by Walter Stafford and James C. Bronner, both of Little Falls.

St. Regis Paper Co., Watertown, N. Y., is concluding negotiations for purchase of controlling interest in Cellulosa Cubana Co., Havana, Cuba, manufacturer of paper goods. Purchasing company plans enlargement of mill of Cellulosa company, as well as construction of new paper mill in vicinity of Havana, entire project to cost more than \$1,000,000. Company recently disposed of stock issue to total about \$11,250,000, portion of proceeds to be used for expansion.

Houdaille Corporation, Buffalo, has been organized to take over and expand Houde Engineering Corporation, 537 East Delevan Avenue, Buffalo, manufacturer of Houdaille hydraulic shock absorbers. New company will be capitalized with 256,000 shares of stock, and will be headed by Claire L. Barnes, also president of Oakes Products Corporation, Indianapolis, manufacturer of automobile specialties. Frederick B. Cooley, president New York Car Wheel Co., Niagara Street, Buffalo, has also secured substantial interest in company.

New England

BOSTON, Nov. 26.—November probably will be the best month experienced by the local machine tool trade since early this year. Few new inquiries are in hand, but dealers still have a sizable number pending that hold promise of early closing. Some New England railroads are expected to be active purchasers of shop equipment in 1929.

During the past week a Massachusetts airport bought 10 machine shop tools, and the Atlantic Works, East Boston, purchased a shaper, a milling machine, one 15-ton and one five-ton crane for its new machine shop, and is expected to close on other equipment this week. A 3-ft. radial drill and a bench milling machine went to Massachusetts manufacturers. In the used tool market several 8-in. lathes, three shapers, two upright drills, a planer and a few screw machines were among those sold to Massachusetts shops.

Charles R. Graco, 11 Beacon Street, Boston, architect, will close bids Dec. 4 on a three-story and basement school, 80 x 200 ft., at Cambridge, to contain a manual training department and to cost \$650,000 with equipment.

Draper Corporation, Hopedale, Mass., textile machinery, has plans for a two-story assembling plant at Spartanburg,

S. C., to contain a small machine shop. J. E. Firrine & Co., Greenville, S. C., are engineers.

Frank Irving Cooper Corporation, 172 Tremont Street, Boston, architect, will close bids Dec. 4 on a two-story, 78 x 104 ft., and one-story 44 x 97 ft. grade schools for Ashland, Mass., to cost \$100,000 without equipment, to contain manual training departments. C. E. Cristman, Framingham, Mass., is chairman of building committee.

Berkshire Sanitary Ice Co., Pittsfield, Mass., is having plans prepared for a 2½-story ice making plant 70 x 115 ft. Miscellaneous equipment is required.

New York, New Haven & Hartford Railroad Co., New Haven, Conn., has plans for one-story repair shop at Dedham, Mass., for sand-blast and other service, 100 x 150 ft., to cost over \$50,000 with equipment.

National Brake Service, Inc., 562 Commonwealth Avenue, Boston, automobile equipment, has leased space in building at 922 Commonwealth Avenue, for new plant.

American Tube & Stamping Co., 766 Stratford Avenue, Bridgeport, Conn., has awarded general contract to T. J. Pardy Construction Co., 1481 Seaview Avenue, for three-story addition, 36 x 100 ft., to cost more than \$65,000 with equipment.

Cornell Multi-Wall Valve Bag Co., East Pepperell, Mass., has awarded general contract to H. L. Shattuck, Inc., South Street, Manchester, N. H., for a one-story unit, 100 x 150 ft., to cost more than \$75,000 with equipment.

Standard Oil Co. of New York, 26 Broadway, New York, has filed plans for an addition to storage and distributing plant at Lowell, Mass., to cost about \$40,000 with equipment.

Hanson Whitney Machine Co., Inc., 169 Bartholomew Avenue, Hartford, Conn., manufacturer of special machinery, has awarded contract to A. F. Peaslee, Inc., Hartford, for a one-story addition, 50 x 67 ft. Ebbets & Frid, Hartford, are architects.

Philadelphia

PHILADELPHIA, Nov. 26.—Plans are being drawn by I. Fischman & Sons, Tenth Street and Allegheny Avenue, Philadelphia, manufacturers of soda water equipment, for a one-story addition, to cost about \$40,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect.

Karl F. Otto, 1828 Arch Street, Philadelphia, architect, has filed plans for a two-story automobile service, repair and

garage building, to cost over \$100,000 with equipment.

William R. Rorer, 1120 Harrison Street, Philadelphia, and associates have organized Columbia Welding Co. to operate a machine and welding works, and will begin production soon. Edward A. Lynch, 2516 South Twenty-second Street, is also interested in new company.

Machine shop and tools, buildings and real estate of Trexler Co. of America, Inc., Wilmington, Del., will be offered at a public sale Dec. 5, by Delaware Trust Co., Wilmington, trustee for creditors.

Blackmer Pump Co., Grand Rapids, Mich., has leased property at Delaware Avenue and South Street, Philadelphia, in Bailey warehouse group, for local factory branch and distributing plant.

Thomas Halton's Sons, Mascher Street, Philadelphia, manufacturers of silk mill machinery, have plans for one-story machine shop, 69 x 240 ft. W. E. S. Dyer, Land Title Building, is architect and engineer.

Bridgeton Sand Co., Bridgeton, N. J., plans rebuilding power house and glass sand producing plant at Berlin, partly destroyed by fire Nov. 21. Adjoining glass sand plant of Pennsylvania Pulverizing Co. was also damaged and will be rebuilt. Headquarters of latter company are at Lewistown, Pa.

Board of Education, Camden, N. J., is considering installation of manual training equipment in new Woodrow Wilson junior high school, East Camden, to cost over \$500,000, for which bids will be received on general contract on Dec. 6. Davis, Dunlap & Barney, 1805 Walnut Street, Philadelphia, are architects.

Scranton School District, 425 Washington Avenue, Scranton, Pa., has awarded contract to R. D. Richardson Construction Co., Connell Building, for central power plant at Adams Avenue and Gibson Street, to cost about \$230,000 with equipment.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, has plans for new coal breaker at Locust Summit, Pa., to cost more than \$500,000 with equipment.

International Coal Combustion Co., operated by International Combustion Engineering Corporation, 200 Madison Avenue, New York, has closed contract for supply of gas to Lukens Steel Co., Coatesville, Pa., and will soon begin construction of low temperature coal carbonization plant. Power plant will have initial capacity of about 1,750,000 cu. ft. daily, with ultimate output of about twice that amount. Completion is scheduled early in 1930.

Bellanca Aircraft Corporation, New Castle, Del., has disposed of stock issue to net close to \$2,000,000, considerable portion of fund to be used for expansion at local plant. Company will also provide for manufacture of new types of commercial airplanes.

St. Louis

ST. LOUIS, Nov. 26.—Emery-Carpenter Container Co., June and Long Streets, Cincinnati, manufacturer of fibre shipping drums and other fibre products, has leased part of building at 2731 Papin Street, St. Louis, for branch plant. Machinery installation will cost over \$40,000. St. Louis offices are at 705 Olive Street.

American Eagle Aircraft Corporation, 2800 East Thirteenth Street, Kansas City,

Mo., E. E. Porterfield, Jr., head, has asked bids on general contract for new plant in Fairfax industrial district, consisting of two buildings, one-story, 100 x 300 ft., and two stories, 30 x 70 ft., to cost over \$80,000 with equipment. Chester E. Dean, Reliance Building, is architect.

St. Louis Body Equipment Co., St. Louis, manufacturer of automobile bodies, has begun construction of one-story plant at Forest Park Boulevard and Sarah Street, totaling 15,000 sq. ft. floor space, to cost about \$35,000 with equipment. I. O. Boardman is president.

Always-A-Head Mills, Inc., Thirty-fifth Street, East St. Louis, Ill., has awarded general contract to Humphries Contracting Co., Pierce Building, St. Louis, for six-story flour mill, 60 x 142 ft., with grain elevators of 40,000 bu. capacity, to cost over \$250,000. Equipment will include elevating, conveying, screening and kindred machinery.

W. S. Frank, Century Building, St. Louis, architect, is completing plans for three-story automobile service, repair and garage building, 70 x 175 ft., reported to cost about \$115,000 with equipment.

Swallow Airplane Co., Wichita, Kan., has arranged for sale of stock to total \$360,000, fund to be used for expansion, including new buildings and equipment for production of biplanes and parts. William B. Moore is president.

Marshall Supply Co., Inc., Pittsburg, Kan., and Tulsa, Okla., has been appointed distributor in that territory for refractory materials manufactured by Botfield Refractories Co., Philadelphia.

St. Louis Southwestern Railway is in the market for a heavy-duty, motor-driven, coach wheel lathe, capacity to handle carwheels, trailer wheels, engine and tender truck wheels for its shops at Pine Bluff, Ark., and a driving motor-driven wheel lathe with capacity to turn tires up to 86-in. tread diameter, for shops at Tyler, Tex.

Cincinnati

CINCINNATI, Nov. 26.—While some machine tool builders report that the trend of sales has been slightly downward this month, a few important companies have had gains as high as 25 per cent above October volume. In the aggregate, however, bookings in the local market have fallen a little short of those in October, although orders still remain far above what has been regarded as normal in the past few years. The liberal amount of inquiries before the trade gives promise of a continuation of good business during the remainder of the year and no sharp let-down from the present high average is yet in sight.

The matter of deliveries is giving some concern to Cincinnati machine tool plants, some of which are finding it necessary to operate night shifts to take care of current orders. Unfilled bookings which have accumulated recently give assurance of the maintenance of production on the present scale until after the first of the year, at least. That the high level of activities does not affect all machine tool companies is a fact worthy of note. Plants turning out special high production tools are taxed to capacity, whereas, those shops devoted to standard equipment, especially to large tools, are less busy. However, there has been an increase in sales of tools of the latter type in the past two weeks.

Pending business in the automobile in-

dustry is of large volume. A prominent Detroit maker is negotiating for the purchase of special machines costing close to \$500,000, while a foreign automobile company is expected to buy a large number of tools. A company in the Detroit district has closed for about \$50,000 worth of special lathes. Included in purchases of the past 10 days are lathes, drilling machines and other equipment for Eastern airplane motor manufacturers. Missouri Pacific Railroad has placed an order for three engine lathes with a local builder.

G. & G. Mfg. Co., Cincinnati, stamp and die maker, has purchased a building at 2116 Colerain Avenue and will transfer operations to new plant.

Aeronautical Corporation of America, Cincinnati, has been incorporated to manufacture airplanes, airplane motors and other airplane parts, and will construct a plant, 100 x 300 ft., at Municipal Airport. C. G. Dietz, formerly of Dayton, Ohio, will be in charge.

C. Heckel and C. A. Klump have taken over management of Charles A. Taylor Mfg. Co. and E. Conner Machine Co., 120 Opera Place, Cincinnati, and now are operating as H. & K. Machine Co.

Bids will soon be asked by Columbus Heating & Ventilating Co., 425 West Town Street, Columbus, Ohio, for three-story factory, to cost about \$40,000 with equipment.

Walter E. Schott Co., 2340 Gilbert Avenue, Cincinnati, automobile dealer, has plans under way for five-story service, repair and sales building, to cost about \$150,000 with equipment.

National Cash Register Co., Dayton, Ohio, is concluding arrangements for purchase of plant and business of Ellis Adding Typewriter Co., 338 Elizabeth Avenue, Newark, N. J., and will operate as division of National company. Expansion program is planned for manufacture of Ellis type machines.

Goodyear Tire & Rubber Co., Akron, Ohio, has plans for one-story factory branch and distributing plant, 65 x 190 ft., at Knoxville, Tenn., to cost about \$85,000 with equipment. Ryno & Brackney, Brownlow Building, Knoxville, are architects.

Plans have been arranged for merger of Fairbanks Co. and O. S. Kelly Co., both manufacturers of piano plates and kindred castings, with plants at Springfield, Ohio. An expansion program will be carried out. M. L. Milligan, heretofore president of Fairbanks Co., will head consolidated organization.

Board of County Commissioners, Court House, Cincinnati, is said to be planning construction of one-story foundry, shop and power house for County equipment, to cost more than \$200,000 with machinery.

Detroit

DETROIT, Nov. 26.—Contract has been let by Machine Specialty Co., Main Street, Pontiac, Mich., to Austin Co., Detroit, for two-story and basement unit, 38 x 100 ft., to cost about \$45,000 with equipment.

Fisher Body Corporation, Detroit, is planning an expansion program at Pontiac plant, including new buildings and installation of additional equipment, to cost about \$750,000.

Evans Auto Loading Co., Dime Bank Building, Detroit, manufacturer of automobile loading devices, has acquired plant and business of Western Lumber Mfg. Co., Marshfield, Ore., for expansion

for production of battery boxes and battery separator plates.

Stinson Aircraft Corporation, Northville, Mich., is having plans drawn for one-story addition, to cost about \$150,000 with equipment. F. J. Winter, Book Building, Detroit, is architect.

City Commission, Pontiac, Mich., has approved purchase of 80 acres for expansion at municipal airport, providing total of 240 acres, to include construction of new hangars, repair shops and other facilities.

Re-Nu Corporation, a subsidiary of Borg-Warner Corporation, Holland, Mich., operating O. E. Szekely Corporation, manufacturer of automotive equipment, has acquired a building on Eighth Street for production of piston rings, with initial output of about 1,000,000 per month. Later plant will be built for Re-Nu organization, as well as Szekely company and other interests.

Goddard & Goddard Co., 4724 Hastings Street, Detroit, manufacturer of tools, etc., is planning one-story addition, to cost about \$100,000 with equipment.

Square D Co., 6060 Rivard Street, Detroit, manufacturer of electrical switches, etc., has awarded general contract to W. E. Wood Co., Ford Building, for three-story addition, to cost about \$115,000 with equipment.

Federal Steel Corporation, Detroit, has awarded a general contract to Austin Co. for one-story addition to storage and distributing plant, with overhead traveling cranes and other handling facilities, to cost over \$60,000; company will also erect a new office building.

Gorham Tool Co., 2206 Twelfth Street, Detroit, has plans for one-story unit, 120 x 125 ft., to cost more than \$75,000 with equipment. Bids will soon be asked by Lane, Davenport & Peterson, Charlevoix Building, architects.

Cleveland

CLEVELAND, Nov. 26.—Machine tool business came out in heavy volume the past week. The Eaton Axle & Spring Co., Cleveland, purchased \$300,000 worth of machinery for a new local plant under construction for the manufacture of motor truck axles. Nearly one-third of this amount covered boring and drilling machinery that was placed with a Cleveland dealer. The remainder was largely special production machinery.

National Acme Co., Cleveland, took an order for ten of its largest automatic 3 5/16 in. 4-spindle machines for a metal-working plant in Sweden. This order, amounting to \$100,000, was placed by the Aktiebolaget Servus machinery agency, and was transmitted by telephone from Sweden to the Windsor, Vt., plant of the National Acme Co. Another Swedish company has an inquiry out for 12 turret lathes.

Reports from abroad indicate that some European machinery users are selling their old machine tools to Russia and replacing them with more modern American machinery. Other orders placed with Cleveland manufacturers during the week included six turret lathes by the Wright Aeronautical Corporation, Paterson, N. J. Increased activity the past week has brought November sales well ahead of October. Deliveries of some lines are becoming more extended.

Geometric Stamping Co., 221 East 131st Street, Cleveland, will erect a new plant

that will largely increase its capacity. Plans for first unit, 250 x 600 ft., are being prepared by Austin Co. Other units to be built later will increase the floor space to 600,000 sq. ft. Company manufactures automobile stampings and other pressed steel products.

Gluntz Brass Co., Cleveland, has purchased plant formerly occupied by K. & M. Brass & Aluminum Castings Co., on Harvard Avenue, which includes 16,000 sq. ft. of floor space occupied by foundry and finishing departments. Gluntz company will erect a one-story machine shop, 60 x 100 ft.

Central Wire Nail & Specialty Co., Cleveland, has been organized to manufacture airplane wire and special nails for automotive and airplane industries, and has taken over the plant of Brightman Machinery Co., East Seventy-first Street and Quincy Avenue, containing 20,000 sq. ft. of floor space. New equipment will be installed and it is expected plant will be ready for operation about Jan. 1. Officers are John J. Sullivan, Jr., president; John B. Ritchey, vice-president and W. H. Thomas, treasurer, all of whom have been connected with Stronach Nail Co., Pittsburgh.

Chase Brass & Copper Co., Bridgeport, Conn., which will erect a plant in Cleveland to supply its Western trade, has acquired a 60-acre site on Babbitt Road and New York Central and Nickel Plate Railroads. Contract for first unit has been placed with Austin Co. It will be 225 x 1000 ft., one floor, but equivalent in height to a three-story building. Several 5 and 10-ton electric traveling cranes will be required.

Murray Ohio Mfg. Co., Cleveland, maker of automobile stampings and all steel toys, will erect an addition. Company is offering \$1,000,000 of 10-year, 6½ per cent sinking fund gold debentures, proceeds of which will be used for retirement of a \$250,000 mortgage and \$307,300 of 8 per cent preferred stock and toward the cost of plant extension.

Kelley Reamer Co., 3705 West Seventy-third Street, Cleveland, is considering one-story addition, to cost more than \$35,000 with equipment.

General Tire & Rubber Co., 1709 Market Street, Akron, Ohio, has awarded general contract to C. W. & P. Construction Co., Second National Bank Building, for two and four-story addition, to cost \$200,000 with equipment.

Cleveland Automatic Machine Co., 2269 East Sixty-fifth Street, Cleveland, manufacturer of machine tools, etc., is considering plans for one-story plant at Elyria, Ohio, totaling 175,000 sq. ft. floor space, to cost more than \$250,000 with equipment. Company is said to be planning removal of present works to new location and concentrating production there. H. W. Ruppel is general manager.

Industrial Steel Casting Co., Millard Avenue, Toledo, Ohio, has awarded general contract to Comte-Naumann Co., 912 Summit Avenue, for one-story addition, 140 x 175 ft., to cost over \$180,000 with equipment.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, is arranging expansion program in ice-manufacturing and cold storage plants to cost approximately \$1,500,000 with equipment, including addition to plant on Union Avenue, S. E.; additional coal-handling facilities at yard at Payne Avenue and East Fortieth Street; new plants at Willoughby and Hilltop, Columbus, Ohio; electrification and enlargement of ice plant at Norwood, Cincinnati; new plants at Westwood, near Cin-

cinnati, and at Fort Thomas, Ky.; addition to Inwood plant, New York; ice plant at Troy, N. Y.; and two new car-icing plants in South and Middle West. Company has recently acquired Lexa Ice Co., Lexa, Ark., and plans expansion at that place.

Chicago

CHICAGO, Nov. 26.—The situation in the local machine tool market is little changed from a week ago. Some sellers find the volume of purchases well sustained while others report a gradual decline in orders. Many buyers are studying their expenditures for the year now closing, and much of the pending business will probably be deferred until early in 1929.

A number of buyers, including the railroads, are looking forward to budget requirements for next year and are asking for preliminary figures. This action, especially on the part of the railroads, is looked upon with satisfaction by dealers who this year derived little business from that source. Greater interest is noted among manufacturers of road building machinery. One list for 21 tools is now before the trade and another sizable request for prices is expected soon. Several lines of boring mills and grinders have been advanced in price. An engineering firm in Chicago has ordered a 20-in. x 10 ft. geared-head lathe.

Caspers Tin Plate Co., 3414 West Forty-eighth Place, Chicago, will build a factory 100 x 350 ft., to cost \$100,000. A. Epstein is engineer.

Victor Mfg. & Gasket Co., 5701 Fillmore Avenue, Chicago, will erect a seven-story brick addition to cost \$150,000. Frank D. Chase is architect.

American Pneumatic Cleaning Co., 1035 West Lake Street, Chicago, will build an addition, 125 x 125 ft., to cost \$35,000.

Elgin Stove & Oven Co., North State Street, Elgin, Ill., is considering one-story addition, 50 x 135 ft., to cost over \$60,000 and will begin work next year.

Illinois Tool Works, 2501 North Keeler Avenue, Chicago, has awarded general contract to Joseph Haigh & Sons, 140 South Dearborn Street, for one-story addition, to cost about \$35,000. Puckey & Jenkins, 400 North Michigan Avenue, are architects.

Atomized Fuel Corporation, Fort Dodge, Iowa, will soon take bids for new one-story plant for special fuel production, to cost about \$75,000 with machinery. F. W. Griffith, Snell Building, is architect. Pennsylvania Engineering Co., New Castle, Pa., is engineer.

All-Steel Equipment Co., Aurora, Ill., is arranging for early construction of one-story addition, to cost about \$27,000 with equipment. Herbert E. Spieler, Graham Building, is architect.

Minnesota Valley Canning Co., Montgomery, Minn., plans installation of boiler equipment, stokers, deep-well pumping machinery and motor-driven factory equipment in new unit to cost about \$85,000. Ralph W. Richardson, Zenith Building, St. Paul, Minn., is engineer.

City Council, Ottumwa, Iowa, is planning municipal hydroelectric generating plant on Des Moines River, to cost close to \$750,000, with transmission and distributing lines. Brown & Cook, 106 North Market Street, are consulting engineers.

Storkline Furniture Corporation, 4400 West Twenty-sixth Street, Chicago, is hav-

ing plans drawn for one-story addition, to cost \$160,000 with equipment. R. B. Kurzon, 105 West Monroe Street, is architect.

Imblum Aeronautical Co., 430 West Fifth Street, Pueblo, Colo., has plans for new plant, including parts production and assembling departments, to cost about \$200,000 with machinery. Work will begin early next year.

Central West Public Service Co., Omaha, Neb., operating Consumers Ice Co., Sioux City, Iowa, is considering new one-story ice-manufacturing plant at last noted place, to cost about \$125,000 with machinery.

Gulf States

BIRMINGHAM, Nov. 26.—Contract has been let by Missouri, Kansas & Texas Railroad Co., St. Louis, to T. H. Johnson, 107 South Ohio Street, Sedalia, Mo., for new engine house and locomotive repair shop at Smithville, Tex., to cost more than \$125,000 with equipment.

Cabell Electric Co., Jackson, Miss., electric equipment, has plans for a two-story and basement storage and distributing plant, 42 x 60 ft.

Conveying machinery, refrigerating equipment, mechanical mixers and other apparatus will be installed in new powdered and evaporated milk plant to be constructed at Waco, Tex., by Borden Co., 350 Madison Avenue, New York, to cost about \$400,000. A power house is planned.

Southeastern Power & Light Co., Birmingham, operating Alabama Power Co., and other public utilities, has organized a new subsidiary to carry out project for new steam-operated electric generating plant at Mobile, Ala., referred to under last-noted name in this column last week. New interest will be known as Southeastern Production Co., and will begin work at once. Station will have initial capacity of 10,000 hp., and ultimate cost is placed at \$1,300,000. Dixie Construction Co., another subsidiary, will be in charge of erection.

City Commission, Tyler, Tex., is planning establishment of municipal airport, to include hangar, repair shop and other units. A portion of bond issue of \$250,000, now being arranged, will be used for project.

Kelley Stove & Range Co., Leeds, Ala., recently formed by R. J. Kelley, Leeds, and associates, has begun superstructure for main unit of plant, 150 x 300 ft.

Southern Water Heater Co., Los Angeles, is reported contemplating new plant for parts manufacture and assembling at Houston, Tex., to cost over \$65,000 with equipment.

City Council, Fort Worth, Tex., has acquired tract of about 50 acres for enlargement of municipal airport, to include construction of hangars, shops and other buildings.

American Battery Products Co., Wichita Falls, Tex., is considering construction of new one-story plant, to cost more than \$25,000 with equipment.

Masonite Corporation, Laurel, Miss., manufacturer of structural insulating board, has begun construction of third unit at local plant, to increase capacity close to 400,000 ft. of material per day, to be one story, to cost more than \$90,000 with equipment. High pressure boiler equipment, pumping and other machinery will be installed in power department. Company has also secured license for operation of mill in Sweden, and contemplates erection of a plant in that country during coming year.

Davison-Pick Fertilizer Co., Whitney Street, New Orleans, a subsidiary of Davison Chemical Co., Garrett Building, Baltimore, has begun work on first unit of new mill on 15-acre site at Orange, Tex., to cost more than \$100,000 with machinery. Other units will be built later, entire project to cost more than \$300,000.

Texas Corporation, Houston, Tex., is said to have concluded arrangements with Louisiana Land & Development Co. for lease of portion of company lands in Louisiana, for development for oil, natural gas and sulphur. Texas company will begin installation of machinery at early date.

South Atlantic

BALTIMORE, Nov. 26.—Continental Roofing Co., Ponca Street and Boston Road, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for one-story addition to cost about \$40,000.

Seaford Boat Works, Seaford, Del., recently organized to take over property of Seaford Marine Railway Co., is remodeling plant to build barges and other vessels.

Pearce-Young-Angel Co., Greenville, S. C., will soon take bids for two-story cold storage and refrigerating plant, 75 x 125 ft., to cost over \$75,000 with equipment. Haskel H. Martin, Vickers Building, is architect and engineer.

Board of District Commissioners, District Building, Washington, is asking bids until Dec. 10 for metal-working and wood-working machinery for new McKinley high school; until Dec. 4 for gate valves for water department.

Celanese Corporation of America, Inc., Amcelle, Md., will take bids at once for one and one-half story turbine plant for local rayon mill, to cost about \$140,000 with machinery. F. T. Small is company engineer.

Herbst Boat Works, Inc., Wilmington, N. C., recently organized by John L. Hammer, 1801 Grace Street, and associates, plans operation of local boat-building and repair works. J. T. Herbst will head new company.

Chemical & Pigments Co., Patapsco Avenue, St. Helena, Baltimore, has plans for three additions, including power house, pigment-mixing unit and storage and distributing plant, to cost over \$85,000 with equipment.

Nardin-Armstrong Corporation, Bedford, Va., H. E. Armstrong, president, manufacturer of tools, dies, steel stampings, etc., has awarded general contract to Overstreet & Overstreet, Bedford, for new plant consisting of two one-story units, 75 x 325 ft. and 40 x 100 ft., to cost about \$80,000 with equipment. C. A. Bielke is construction engineer.

Frigidaire Corporation, Dayton, Ohio, manufacturer of electric refrigerating equipment, has leased three-story building at Spartanburg, S. C., for new factory branch and distributing plant.

Board of Public Improvement, City Hall, Baltimore, C. F. Goob, city engineer, will soon take bids for municipal airport to cost more than \$1,500,000, including hangars, repair and reconditioning shops and other units.

Cathey Lumber Co., 3088 Fifth Street, Charlotte, N. C., John R. Cathey, president, has awarded general contract to Blythe & Isenhour, Brevard Court, for two-story lumber and wood-working mill, and building material plant, to cost \$100,000. Conveying, elevating and other

material-handling equipment will be installed.

Milton E. Marcuse, Jefferson Hotel, Richmond, Va., and associates have organized Rosecliff Development Corporation, to construct and operate a hydro-electric power plant on James River, near Snowden, Va., for which plans have been approved. Initial station will have capacity of 10,000 hp., and will cost more than \$250,000 with transmission lines.

Milwaukee

MILWAUKEE, Nov. 26.—Machine-tool business of most shops this month represents a satisfactory volume, although there was some let-down from the relatively active trade in September and October. Plants are still busy, many at maximum capacity and on overtime schedules to make delivery specifications. New business being received will carry high rate production through December and January, if not longer. Inquiry is also favorable to active future business.

Liberty Foundry Co., Inc., Wauwatosa, P. O. Milwaukee, has acquired McNally-Tollefson Foundry Co., Stoughton, Wis., taking possession Nov. 28. Liberty company also operates Spring City Foundry Co., Waukesha, Wis. These three plants are engaged principally in production of automobile engine cylinders and pistons. Stoughton plant, occupying gray iron foundry of former Moline Wagon Co., now owned by city of Stoughton as an industrial community, is to be acquired from city and additions made for increase in capacity. J. E. McNally, vice-president and general manager, will continue as manager of Stoughton shop. E. M. Tollefson, president, and R. I. Tollefson, secretary, are retiring. William J. Grede is president, and Ralph L. Lee, secretary and treasurer of Liberty company.

Common Council, Manitowoc, Wis., has appropriated \$250,000 for an addition and purchase of new steam or oil engine equipment for municipal light and power plant, having rejected proposals of Wisconsin Public Service Co. for a hook-up with its generating plant for additional capacity. Fred L. Alter is city engineer.

Gillette Rubber Co., Eau Claire, Wis., which is erecting a new mill, 125 x 180 ft., part two stories, will also build a general factory extension, 128 x 200 ft., one story, and a mixing room addition, 49 x 135 ft. Enlargements call for an investment of about \$500,000 and will increase capacity from 6000 tires a day to 10,000.

W. M. Welch Co., Manitowoc, Wis., manufacturer of laboratory furniture, will build an addition to cost over \$50,000. Work is to start about Jan. 1. R. G. Halverson is general manager.

Otto Biefeld Co., 202 North Water Street, Watertown, Wis., founder and machinist, is awarding contracts this week for the erection of a \$25,000 addition to accommodate production it is undertaking under contract with newly organized Henszy De-Concentrator Co., 120 East Wisconsin Avenue, Milwaukee, manufacturer of devices to eliminate scale and corrosion in steam boilers. Arthur Kuenzi is vice-president and production manager.

Burrell Engineering & Construction Co., 513 West Jackson Boulevard, Chicago, has taken general contract to furnish and equip a truck loading plant and warehouse, five stories, 46 x 100 ft., at Milwaukee, for the Petoskey Portland Cement Co., Petoskey, Mich. It will cost about \$80,000.

Partnership of William A. Brooks and Hugo Mastaglio, doing business as Brooks Pattern & Machine Co., Milwaukee, has been dissolved. Business will be continued by Mr. Mastaglio.

Camm-Blades Machinery Co., 610 Michigan Street, Milwaukee, has been appointed agent in Milwaukee territory for Boye & Emmes Machine Tool Co., Cincinnati.

Pittsburgh

PITTSBURGH, Nov. 26.—Inquiries for machine tools and machinery still are numerous, but sales are rather few. There has been no action yet on the lists of the Carnegie Steel Co. and the Westinghouse Electric & Mfg. Co.

Hajoca Corporation, 120 South Thirtieth Street, Philadelphia, manufacturer of plumbing, heating and kindred equipment, has leased property at Lewistown, Pa., for a new factory branch and distributing plant. Present building, totaling about 12,000 sq. ft. floor space, will be remodeled and other units erected.

Fokker Aircraft Corporation, Wheeling, W. Va., has plans for new plant in East Bay District, Oakland, Cal., for parts production and assembling to cost over \$100,000 with equipment. Company will standardize on five models at this plant and at works at Wheeling and Teterboro, N. J., ranging from six-passenger planes to 14-passenger tri-motored aircraft. James A. Talbot, president Richfield Oil Co., Bartlett Building, Los Angeles, is interested in Fokker project on Pacific Coast.

American Window Glass Co., Arnold, Pa., has work under way for expansion, including installation of equipment, to cost more than \$300,000. Headquarters are in Farmers' Bank Building, Pittsburgh.

Pittsburgh & Lake Erie Railroad Co., Pittsburgh, has awarded general contract to Walker & Curley Co., Sharpsburg, Pa., for one-story addition to airbrake shop at McKees Rocks, Pa., to cost about \$50,000 with equipment. A. R. Raymer is chief engineer.

Struthers Wells-Titusville Corporation, Titusville, Pa., has been formed to take over and consolidate Titusville Iron Works Co., and Titusville Forge Co., both of Titusville, and Struthers-Wells Co., Warren, Pa., manufacturers of steam, oil and gasoline engines, oil well equipment, forgings, etc. New organization will carry out general expansion program and is disposing of bond issue of \$1,300,000, part of proceeds to be used for such purpose, consolidation, etc. J. T. Dillon is president.

Indiana

INDIANAPOLIS, Nov. 26.—Plans are being considered by Highland Iron & Steel Co., Terre Haute, Ind., subsidiary of American Chain Co., Bridgeport, Conn., for one-story addition, to cost more than \$35,000 with equipment.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has plans for two-story and basement service, repair and sales building, 75 x 130 ft., at Indianapolis, to cost about \$100,000 with equipment, to be occupied under lease by Jones-Whitaker Sales Co., 343 North Capitol Avenue, Indianapolis, local representative. Ross Caldwell, 239 Cumberland Street, Indianapolis, is architect.

Board of Trustees, Indiana Village of Epileptics, Newcastle, is said to be con-

sidering construction of power plant at State farm, to cost \$50,000.

G. M. Williams, president Marmon Motor Car Co., 1039 North Meridian Street, Indianapolis, and other officials of that company, are organizing new company to manufacture airplane engines. Local factory will be established for parts production and assembling, to be expanded later for complete aircraft manufacture. New company will not be connected with Marmon company. Howard Marmon will be in charge of engineering for new organization.

Indiana Smelting & Refining Co., 1116 East Sixteenth Street, Indianapolis, is reported planning one-story addition, to cost over \$40,000 with equipment.

Stutz Motor Car Co. of America, Inc., 1002 North Capitol Avenue, Indianapolis, is arranging for increase in capital from 263,000 to 400,000 shares of stock, part of proceeds to be used for expansion, including development of smaller type automobile.

Canada

TORONTO, Nov. 26.—Machine tool sales continue in good volume. Small lists are coming out for new works, and dealers report a steady demand for single tools of a diversified nature for replacement. Car and locomotive builders have bought machine shop equipment, and the automotive industry is also furnishing a good demand. Wood-working tools are in steady call. In general the machine tool market is strong and builders report many unfilled orders on hand.

Canada Pad & Paper Co., Toronto, will start work soon on a manufacturing plant to cost \$150,000. N. A. Armstrong & Co. are architects.

Canadian de Havilland Corporation will erect a factory and hangars at Willowdale, Ont., where it has secured 20-acre site.

L. E. Shaw, Ltd., Chipman, N. S., has started work on a factory to manufacture tile, etc. Machinery will be purchased.

Fairchild Aviation Co., Grand Mere, Que., contemplates erection of an aeroplane manufacturing plant to cost \$500,000. Building will be one and a half stories, 150 x 300 ft.

Frankel Brothers, Ltd., Eastern Avenue, Toronto, has been awarded general contract for erection of a \$70,000 addition to plant of A. R. Williams Machinery Co., Toronto.

Excavation has been started for an office and factory at York Township, Ont., for Riley Engineering & Supply Co., Ltd., 360 Dufferin Street, Toronto. Factory will be one story, 92 x 175 ft., and office building, 32 x 65 ft. H. G. Duerr, 1010 Lumsden Building, Toronto, is architect.

Western Canada

Medicine Hat, Alta., is arranging to increase capacity of its local power plant at a cost of \$100,000.

Hilton Brothers, Ltd., 680 Wall Street, Winnipeg, Man., manufacturer of boiler and pipe covering, has awarded contract to John Gunn & Sons, Ltd., 508 Avenue Building, for a one-story addition, 75 x 90 ft., to cost \$40,000.

Vancouver Pile Driving & Contracting Co., Vancouver, B. C., has general contract for lumber assembly wharf and foundations for \$2,000,000 sawmill and pulp plant at Howe Sound, B. C., for Kraft Co. of British Columbia, Ltd.

Pacific Coast

SAN FRANCISCO, Nov. 22.—Vitalite Piston Mfg. Co., Santa Ana, Cal., has leased two-story factory to be erected on South Main Street for new plant, to cost about \$30,000 with equipment. W. W. Kays, Ramona Building, is architect.

Palo Alto Sheet Metal Works, 521 Ramona Street, Palo Alto, Cal., C. B. Spangler, head, has awarded general contract to Wells P. Goodenough, 310 University Avenue, for one-story unit, to cost about \$20,000 with equipment.

Bach Aircraft Co., Los Angeles, has awarded general contract to Sarver & Sarver, 727 West Seventh Street, for new parts manufacturing and assembling plant, 100 x 200 ft. and 50 x 65 ft., at Metropolitan airport, near North Hollywood, to cost about \$45,000.

Western Sulphur Co., 1 Drumm Street, San Francisco, has awarded general contract to Staton & Dean, 354 Hobart Street, Oakland, Cal., for one-story storage and distributing plant, 40 x 120 ft.

Iron Fireman Mfg. Co., 984 East Seventeenth Street, Portland, manufacturer of mechanical stokers, etc., has arranged for a stock issue of 100,000 shares, part of proceeds to be used for expansion.

Foreign

A COMPANY in Great Britain is planning for a new pulp and paper mill near Rouen, France, with capacity of 3000 tons per month, to cost more than \$2,000,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Great Britain No. 76095.

Luneburg Power, Light & Waterworks, Ltd. (Luneburger Kraft, Lichtund Wasserverke, G.m.b.H.), Luneburger, Germany, is disposing of bond issue of \$1,100,000 in United States, a portion of fund to be used for extensions.

Humber, Ltd., London, England, has been formed with a capital of £1,250,000 (\$6,250,000) to take over and consolidate company of same name, Commer Cars, Ltd., and Hillman Motor Car Co., Ltd., all with plants for manufacture of popular-priced automobiles. Consolidated company will develop increased output for international business.

Nationalist Government of China, Nanking, has awarded contract to Automatic Electric Co., 100 West Monroe Street, Chicago, for installation of local automatic telephone system to cost \$1,800,000, to be completed in 1929.

Officials of H. M. Byllesby & Co., 231 South La Salle Street, Chicago, operating electric light and power properties, have organized Mexican States Public Service Co., Inc. (Empresa de Servicios Publicos de los Estados Mexicanos, S. A.) to take over and consolidate a number of power plants and systems in Mexico, including generating plant at Hermosillo, Sonora; an electric and ice-manufacturing plant at Guaymas, Sonora, and electric generating station at Culiacan, Sinaloa. Plans are under way for enlargement of two first-noted plants, including installation of additional machinery and construction of transmission lines. John J. O'Brien is president of parent organization.

Thompson Purchasing Co., 8 Rue Edouard VII, Paris, France, purchasing and forwarding agent, has removed offices to 4 Rue Fignon.

THE IRON AGE

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Simple Control of 52,000 Parts

Cash Register Company
Solves Problem of Regu-
lating Stock and Retain-
ing Its Production
Economies

BY BURNHAM FINNEY*



RAW and finished stocks of the National Cash Register Co., Dayton, Ohio, are controlled so that the amount on hand does not greatly exceed, and yet fully meets, the demands of production. This is done by means of a simple method, although 52,000 parts go into the company's product and many of them are used in such small numbers compared with the output of the equipment in which they are made that frequent and expensive machine set-ups are required. The problem of stock control, therefore, is complicated by the need for an economical volume of output, in keeping with the investment and set-up costs.

About 42,000 parts are produced in the company's plant and the remaining 10,000 are bought. Excluding machinery and other plant equipment, approximately 98 per cent of the raw materials and finished parts purchased by the company is carried in stock regularly. Material is con-

trolled principally through a stock ordering department, which is under the supervision of the factory superintendent responsible for production. Inspectors, on the other hand, report to the engineering department, which is directly responsible to the management. This arrangement eliminates any sympathetic connection between the inspectors and the production department and insures impartial and rigid inspection.

Procedure in Bringing Out New Machine

Before a new part or a new machine goes into production, the future demands committee must decide that it is warranted to meet the needs of a particular line of business. Information regarding the function of the machine is then turned over to the invention department, which makes up models to be examined for mechanical defects and for betterment of efficiency by the register

*Resident editor of THE IRON AGE, at Cincinnati.

Advantages Attributed to Simplified Stock Control System Used by National Cash Register Co.

1. Only material that is actually in demand by operating departments is stored in the stock rooms.

2. All costs entering into the manufacture of parts are tabulated and are available soon after each operation has been completed.

3. Production officials can locate the position of an order within a few minutes.

4. Duplication of records has been avoided, reducing overhead expenses.

5. Inventories of raw and finished stock are determined with comparative ease, in spite of the large volume of material on hand.

6. The system has contributed substantially to lower operating costs and has increased the efficiency of the company's production division.

After the machine passes the register examining committee, prints are sent to the planning committee, the chairman of which is the foreman of the tool designing department. Other members of the committee are the foremen of departments that may have operations on parts making up the machine. This committee decides whether permanent or temporary tools should be made, the kind of tools that are necessary, the type of machine on which parts are to be machined, the time required to make the design of the tools and the due date for the completion of the tools. The committee also prepares a list of the sequence of operations through which the parts are to pass. This information is incorporated in a report called the "planning department list," which is sent to all departments having operations on any part of the machine. A copy also goes to the stock ordering department, which gets from it the following essential data: (1) name of the part, (2) raw material from which the part is made, (3) number of parts obtained from a strip or bar of stock, (4) departments in sequence of machine operations, (5) number of each part per register. Incidentally, the stock ordering department generally knows how many machines are to be built in a given period, how much raw stock will be required, the date for the completion of tools and the date for completion of the machines.

The stock ordering department is responsible for material from the time it is ordered through the purchasing department until it is delivered to the assembly department. In ordering stock the department proceeds on the basis of maintaining a two weeks' surplus to guard against tieups of manufacturing because of temporary interruptions in the receipt of goods. The surplus also enables the operating departments to increase production beyond normal rates for a limited time.

Master Sheet for Raw Stocks

Form No. 1 also shows the price per unit and the average price per unit. The unit price is obtained from the seller's invoice. At the top right hand corner of the form is listed the monthly usage. These figures are put down in pencil and every six months are transferred to the usage column on the main part of the form card.

Form No. 1 is the only record of raw materials, since none is kept in the stock rooms. When a new item is ordered, the stock ordering department sends a note to the stock room where the item is to be stored requesting its entry in the stock room's index and arrangements for its storage in a compartment. The index gives the location and number of all material in the stock room, and raw items received at the plant are quickly dispatched to the stock room and placed in the compartment assigned.

When the figures in the "quantity in stock" column of form No. 1 show that the stock has been reduced to the

1420—December 6, 1928, *The Iron Age*

THE N. C. R. CO.'S STOCK RECORD NO. 2

The Iron Age, December 6, 1928—1421

Stock Carried by B		Required Stock by (SAMPLE)	
Used on 2000 4 Bl. Feature 100 9 Ant Bl			
No. Used: Class 12 Class 2 Class 2 Class 3 Class			
Name 2000 Latch Plate Arm Stud #1			
Invoiced 8-15 1928		Bin No. 259513 B-P. No. A5267	
Page 81129		Low C-22000 R. W. 5500	
Pattern No.			
Operations			
Started by		Total Opers.	
No. Per Box			
1928	1928	192	192
JAN. 1139	JULY 13000	JAN.	JULY
FEB. 14350	AUG. 8878	FEB.	AUG.
MAR. 1549	SEP.	MAR.	SEP.
APR. 3198	OCT.	APR.	OCT.
MAY 5400	NOV.	MAY	NOV.
JUNE 12200	DEC.	JUNE	DEC.
TTL. 41436	TTL.	TTL. 49723	TTL. 58632
Date	Ordered	Received	Delivered
75	25000	8/30	(9000)
726	10000		
726	15000	due 8/30	
831	15000		
831	10000	due 8/30	
91	25000	10/15	(11000)
used on scheduled parts			
Canned Assm - 4005-88301-88825			

Invoice Card No. 1 for Manufactured Parts, Identified as Form No. 13, Is Filed in a Galvanized Iron Pocket on the Stock Bin in the Stockroom. It is the only record of issues and withdrawals. When more stock is to be ordered, it is sent to the stock ordering department and during its absence information is kept temporarily on invoice card No. 2 (form No. 14)

form No. 1. All essential data, such as the part name, number of parts in each stock box, department in which first operation is done, kind of material necessary and number of operations, are listed. On the back of the form is recorded the usage of the part for six-month periods, also the type of machine on which the part is used and the number per machine.

Invoice Card Avoids Complicated Filing

Invoice card No. 1 for manufactured parts, identified as form No. 13, is filed in a galvanized iron pocket on the stock bin in the stockroom. It gives detailed information about the part and is the only record of the issues and withdrawals, thus eliminating duplication of filing and a large amount of detail work. On parts being machined the time allowed for the various operations or the due date for the completion of the part is arrived at by taking into consideration the number and kind of operations on the part and the condition of the departments in which the operations are performed. Two weeks are added to the time allowed for performing operations to take care of any unusual condition in the manufacturing departments. When the stock in the stockroom and on order diminishes to the "low limit," the invoice card is sent to the clerk in the stock ordering department, who places an order and

enters the quantity ordered and due date on the invoice card, and returns it to the stockroom.

When parts are received in stock, the date and quantity are entered on the invoice card by the stockkeeper. When any of the parts are drawn from stock, the amount delivered is entered in the "delivered" column and is deducted from the amount in stock. The "by number" column is for the check number of the stockkeeper making the transaction.

During the absence of the invoice card from the stockroom while an order is being placed by the stock ordering department, all entries of transactions are made on invoice card No. 2 (form No. 14), the memoranda being transferred to the main invoice card as soon as it has been returned. Form No. 14 is not used when the main invoice card is in its bin.

Inventory Taking Simplified

A label for each raw stock bin describes the stock and gives the numbers of other bins in which the same kind of stock is carried (form No. 8). It also shows the date on which the last physical inventory of the stock was taken. The company takes a physical inventory of raw and finished stock at six-month intervals, and the date on the stock bin card is watched by the stockkeeper, who sees that the stock is invoiced within the time limit, taking advantage when possible of the time when the stock is

Form 878—(1)—Printed in U.S.A.		
AVER. MONTHLY USAGE	DUE-DATE	ORDER NO.
12000	10/15	8112928
PART NAME		
Used On Sched Parts		
2000 Latch Plate Arm Stud #1 Bp A5267		
(SAMPLE)		
QUANTITY ORDERED	NUMBER PER BOX	BIN NUMBER
25000	5000	B-259513
FIRST OPER.	NUMBER OF OPER.	NUMBER OF DEPTS.
45U	11	
To Screw #1 Department 9/1/28 19		
MATERIAL REQUIRED		
400# .356" to .359" x 8' CDSS (B8)		
Stock S 2461		
Page No.		
DATE REQUISITIONED	LOCATE AT MACHINE NO.	FOREMAN
Upon presentation of this order stockkeeper will deliver material required		
DATE DEL'D	QUANTITY	WEIGHT
The N. C. R. Co. Stock Production Order No. 1		CHARGE NO.
		PRICE
Making Dept. Requisition		TOTAL COST

Manufacturing Departments Schedule Work to Conform to Due Dates Specified on an Order, and Stock Production Order No. 1, Called Form No. 15, Is a Sample of Such an Order. Attached to this form is a tracing and cost sheet giving the location of stock, cost of labor and materials and other items, and serving as a record from which annual inventory of work in process is taken

When the stockkeeper is asked for a report on the amount of any particular material on hand in the stockroom, he fills out form No. 9, and sends it to the stock order clerk. When a department needs material from the stockroom, the foreman fills out and signs a requisition, form No. 10, and forwards it to the stockkeeper, who issues the required material and then forwards the requisition to the order clerk, who deducts the amount from the quantity in stock on record form No. 1. The foreman is required to give the use for which the material is intended. If a department returns goods to the stockroom, the foreman fills out a "stock returned credit ticket" (form No. 11) and sends it with the stock to the stockroom. The ticket is then sent to the order clerk for entry on form No. 1.

All manufacturing departments schedule their work to conform with the due dates specified on the order, and stock production order No. 1, called form No. 15, is a sample of such an order. When invoice card No. 1 (form No. 13) is sent to the stock ordering department to have additional stock ordered, the order clerk gets from it and from the master control record (form No. 12) the necessary information to fill out stock production order No. 1. One copy goes to the making department for requisition purposes, a second to the same department to be filed and a third to the stockkeeper. When the making department is ready to start work on the order, the presentation of the requisition copy to the stockkeeper is his instruction to deliver the quantity of stock called for. He then enters the date and quantity delivered on the requisition and forwards it to the stock order clerk, who enters it under "delivery" on form No. 1 and deducts the amount delivered from the quantity in stock.

Accompanying form No. 15 is a "tracing and cost sheet," on which is kept the record of the location of each box of stock in the factory. Information regarding labor costs is got from a copy of the piece-work or day-work labor ticket, known as form No. 23, which is filled out by the clerk of the department upon the completion of the operation on each order and is sent to the stock ordering department. There the department that has had the stock is credited and the department to which it is delivered is charged with it, entries being made on the cost sheet of form No. 15. The data on the tracing and cost sheet give the location of stock, prevent duplication of payment to workmen, and serve as a record from which the annual inventory of work in process is taken. As a result of this system the cost sheet is kept up-to-date constantly and is never more than 5 hr. behind the actual work. The figures include the cost of labor, of materials and of other items entering into the manufacture of the part. When inventory time arrives, the total value of the work in process may readily be computed from these sheets.

Accompanying each box of stock through the factory is a stock card, form No. 16, really constituting the production order after the first operation, as form No. 15 goes only to the department performing the first operation. The stock card contains the part and order number, name of part, quantity ordered, number per box, truck or box numbers, date ordered and the date the part must be completed. As it progresses with the work through the factory, the quantity of parts processed, the date of finishing the work and the workmen's check number are listed. When a department has completed its operation, the foreman charges the material in the box to the next department having work on that stock. The foreman gets this in-

Standard work or tote boxes are used throughout the plant, and material travels through all operations in the same box. The box number is entered on the time ticket by the department performing the first operation.

When the stock on hand is reduced to the "right-of-way" limit, which is a two or four weeks' supply, depend-

*Accompanying Each Box of Stock Through the
Factory Is a Stock Card, Form No. 16, Which
Really Constitutes the Production Order After the
First Operation*

The Iron Age, December 6, 1928—1423

the factory, the tickets indicating to the foreman, tracers and others concerned the importance of the stock.

When the stock in the stockroom is entirely exhausted, a holding ticket is placed in a pocket on the stock bin, which is a notification to the stockkeeper putting away stock that there is a requisition being held for a quantity of the part. Requisitions that cannot be filled because of

stock exhaustion are filed in a central location in the stockroom and are filled immediately when the stock is received.

Whenever it becomes necessary to send stock through the factory ahead of the regular schedule to which it has been assigned, a special "sent-ahead" requisition is used to speed delivery of the material.

Converting Core Ovens to Gas Heating

Ease of Change and Benefits Accruing Stressed in Description of the Revamped Equipment

BY JOHN F. LANGNER*

CORE baking, an essential operation in foundry practice, is still in a state of evolution. This vital process is far from being perfected, but progress toward this end has been accelerated of late years. The essential phase of core baking is the application of heat, and here much of the profits of many foundries is swallowed. The correct fuel properly applied is the answer to this knotty problem. But, while most foundrymen recognize this, they do not seem to know what the correct fuel is nor how to apply it.

Until recently one of the largest boiler foundries in the Middle West used the raw fuel, coke. It was cheap and its use was traditional. But lack of control was a bug-a-bear which cost many rejected charges that had been spoiled by either over or underbaking.

Recently the coke-fired core ovens were converted to use gas as a fuel. The only changes necessary were to block off the ports, at the bottom of the oven, which led from the coke combustion chamber and to place gas burners on the floor of the oven, along each side.

Prior to the conversion the foundry output had so increased that it had been decided to install more ovens. But this was found to be unnecessary, as the use of gas increased the production of the existing units beyond the present needs.

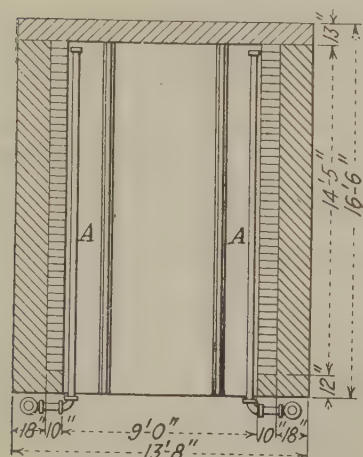
*Industrial gas engineer, Northern Indiana Public Service Co.

Naturally the increased production meant less labor, fuel, time, space and equipment cost. Close temperature control was made possible and through this item rejections and spoiled production were largely eliminated.

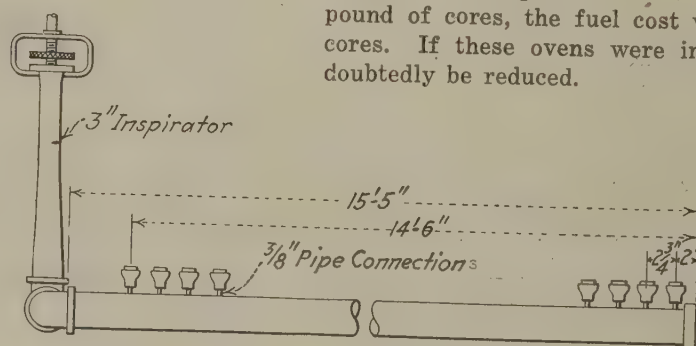
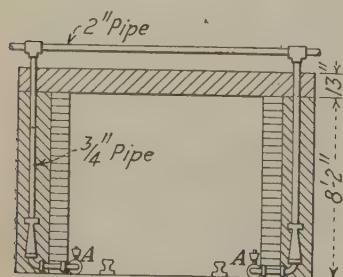
Furthermore, atmospheric control was attained by the use of gas—a considerable accomplishment when it is considered that a distinctly oxidizing atmosphere is a requisite in good core baking. By proportioning the gas-air mix-

EXPERIMENTAL DATA ON 15 HEATS IN CORE OVENS WITHOUT INSULATION

Approximate Weight of Dry Cores, Lb.	Gas Used, Cu. Ft.	Operating Time		Gas per Lb. of Cores, Cu. Ft.
		Hr.	Min.	
5,862	7,722	5	40	1.33
3,365	7,253	6	10	2.15
6,049	7,235	5	0	1.19
6,798	8,811	7	0	1.29
6,445	7,289	11	55	1.13
6,258	7,336	6	35	1.17
2,788	4,359	6	50	1.56
6,258	6,539	5	55	1.04
3,397	4,045	4	0	1.02
5,798	7,110	6	20	1.22
1,621	3,324	4	0	2.04
3,012	7,170	4	45	2.38
2,648	4,029	3	50	1.52
5,256	7,289	5	0	1.38
3,926	3,551	3	40	0.90
69,481	93,042	Average 1.34		



Two Sections of Remodeled Core Oven of Car Type: Horizontal Section Above; Vertical, Below. At A A are shown the burner lines for gas



Arrangement of Gas Burner Line, with Burners at 2 1/2-In. Intervals from Inspirator to Far End

ture, before it is fired through the burner, a reducing, neutral or oxidizing atmosphere is obtained at will. In this case the latter is desired.

Inside dimensions of the oven are 9 ft. wide, 14½ ft. deep and 8 ft. high. It has two high-pressure Surface Combustion Co. gas inspirators, which feed into two horizontal manifolds, one on each side. The sketch shows the burner assembly in detail. The manifold consists of a 3-in. standard pipe on which 1-in. lava-tip burners, 62 in number, are spaced 2½ in. apart and fired as indicated.

Cores made here are of an oil sand mixture, the ratio being one part of oil to 54 parts of sand by volume, and they vary from 1 to 350 lb., dry weight. A test of 15 heats gave an average of 1.34 cu. ft. gas for each pound of baked cores. At 70c. per M cu. ft. of gas, and 1.34 cu. ft. per pound of cores, the fuel cost was \$1.876 per ton of dried cores. If these ovens were insulated this cost could undoubtedly be reduced.

Short Conveyors in Making Trucks

Handling Heavy Pieces from Machine to Machine on
Rollers or by Monorail—Devices
Used in Assembling

BY FRED L. PRENTISS*

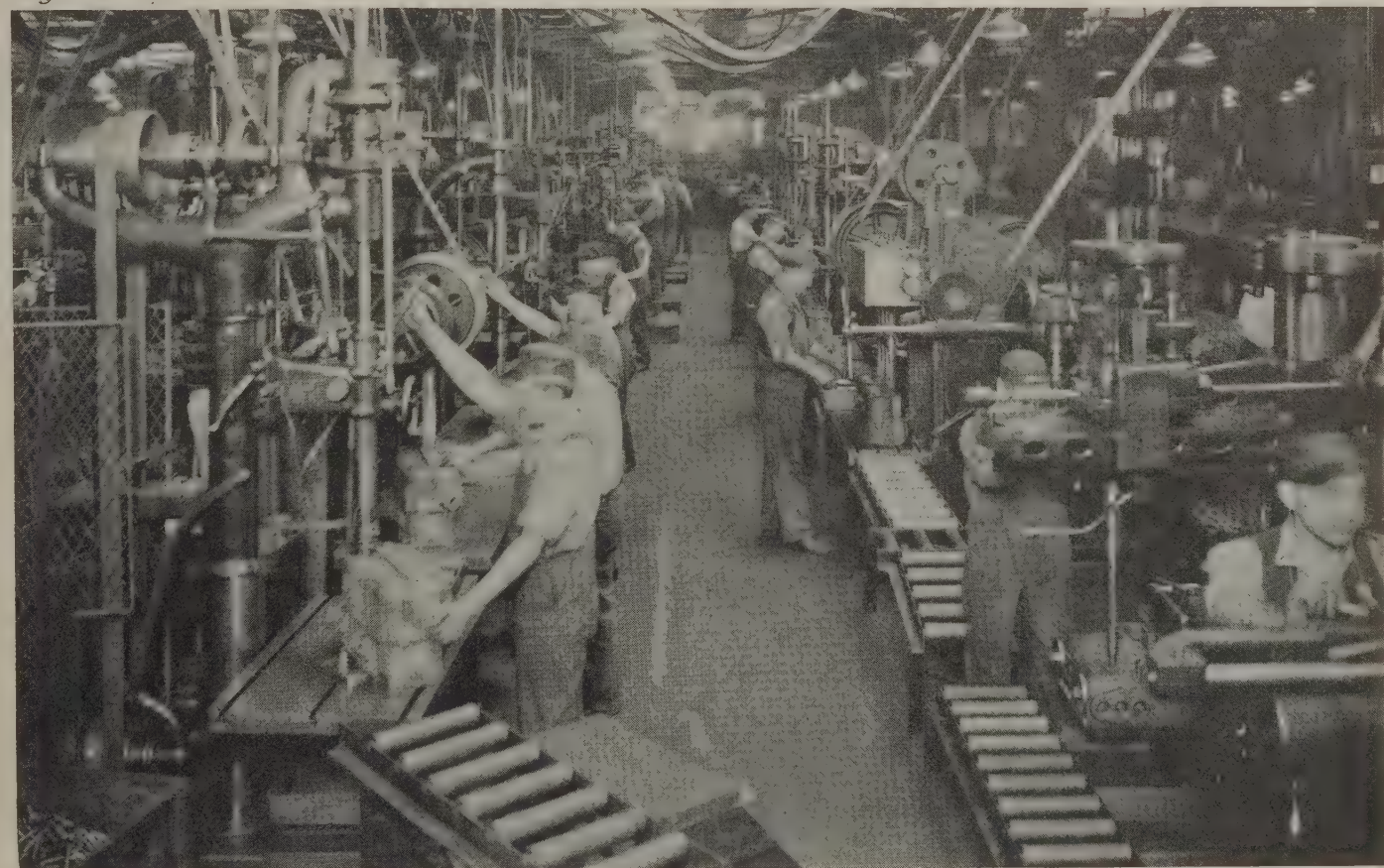
POWER conveyors for progressive assembling of motor truck chasses were recently installed by the White Motor Co., Cleveland. Although the efficiency of the use of conveying equipment for assembling trucks was questioned, the results have proved satisfactory, in that the chasses are assembled more quickly and at reduced cost. Considerable handling of material has been eliminated and the production department is able to do planning better than under the old method of assembling.

The problems faced in laying out the assembly department with power conveyors were more complex in many ways than those involved in building assembly lines for passenger automobiles. On the latter a large volume of cars of one model are turned out. The White company makes 12 distinct truck models on one assembly unit, and in addition there are many departures from the standard designs.

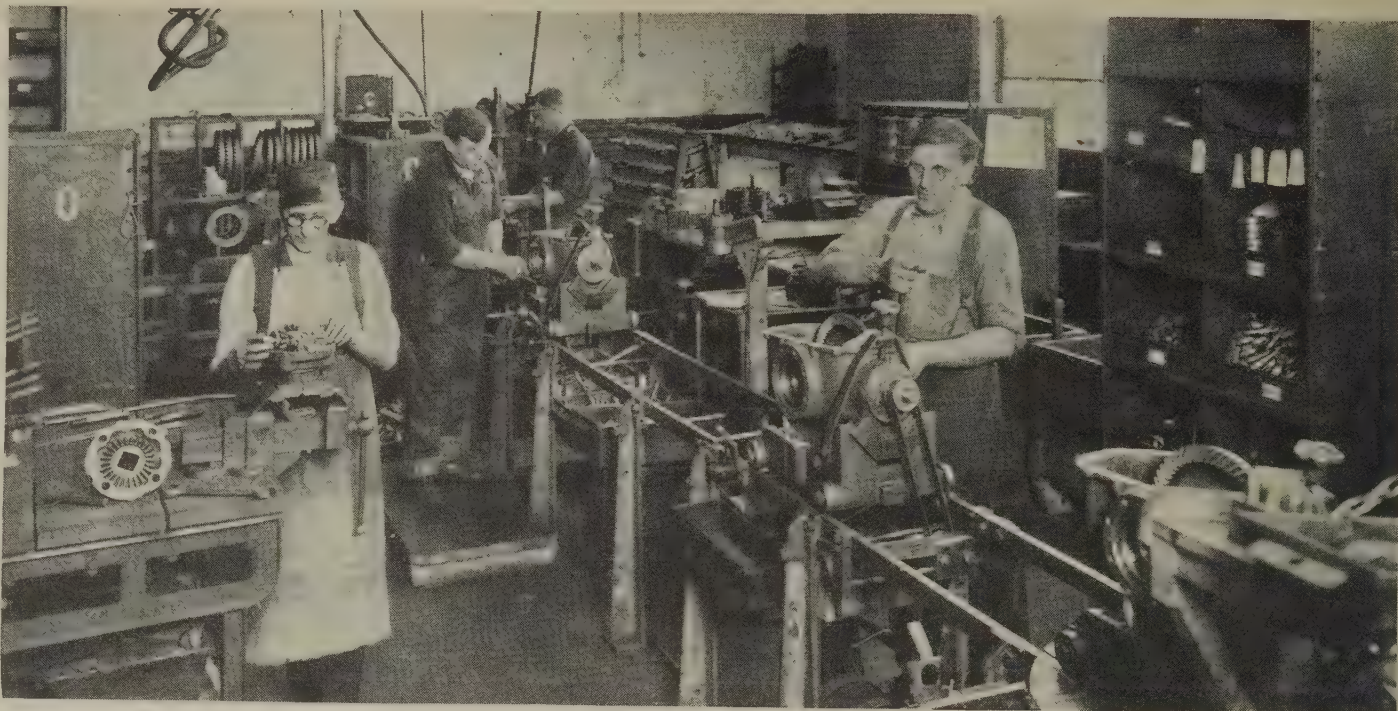
Another important recent change in the methods of this company which has proved of great advantage has to do

with the finished stock. Formerly the company built standard trucks for stock and at times accumulated large stocks. Then much of the truck equipment had to be changed to meet the specifications of the customer. This led the company to discontinue building standard trucks for stock. Instead a stock is built up of standard parts comprising the more important units. A motor is built complete except as to certain parts for which substitution may be made to suit the buyer. Transmissions for the heavier types of cars are built up with various gear ratios, so the purchaser can have without delay the gear ratio he wants. Sleeves are left off the rear axle, permitting these to be assembled with different gear ratios. There are calls from buyers for different types of magnetos and for different motors. With the new method of building up parts that are standardized the buyers' specifications can be quickly complied with by the addition to these standard parts of such parts as are not completely standardized.

As a result of this innovation, the stock is kept in finished machine parts and sub-assemblies or partial sub-assemblies, instead of in finished trucks. This makes the



Cylinder Blocks While Being Machined Are Pushed Over Roller Conveyors from One Machine to Another, for Successive Operations, Thus Eliminating Lifting



Differentials for the Lighter Rear Axles Are Assembled on a Wheel-Mounted Carrier on an Assembly Track. Preliminary adjustments are made with the aid of a small motor belted to the pinion shaft

stock flexible and more liquid and reduces the amount of capital that otherwise would be tied up in finished stock.

Special Racks for Special Parts

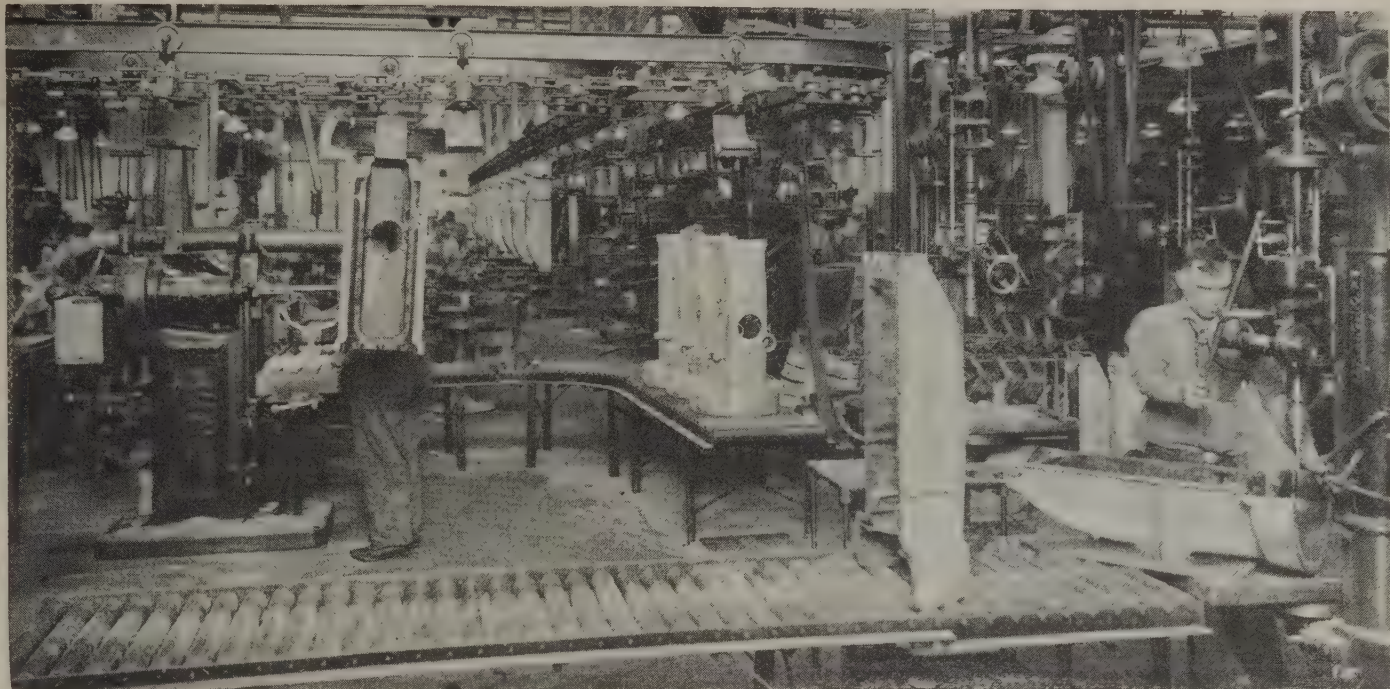
An interesting feature of the plant is the material handling system, which has been gradually developed and extended during the past year or two. Trucks with special racks arranged for convenient handling of work are used to transport such parts as crankshafts, camshafts and connecting rods from machine to machine during operations, and from department to department and to the finished stockroom. These are mounted on wheels and are pushed by hand from machine to machine for successive opera-

tions, but for long hauls they are pulled by a tractor or a lift platform truck. The use of racks on which parts do not come into contact with each other eliminates handling in containers, in which parts are in danger of being damaged, and does away with congestion caused by piling parts on the floor. Some parts are handled on skids with lift platform trucks.

Roller conveyors are used for moving some parts between machine operations and rail type tracks are provided for progressive assembling of transmissions, differentials, rear axles and motors. Hand labor in the handling of material, and consequently the fatigue that it causes, have been materially reduced. One result has been a better



Main Motor Assembly Line, at the Right, Is So Constructed That It Can Be Used for Assembling Motors of Various Sizes and Types



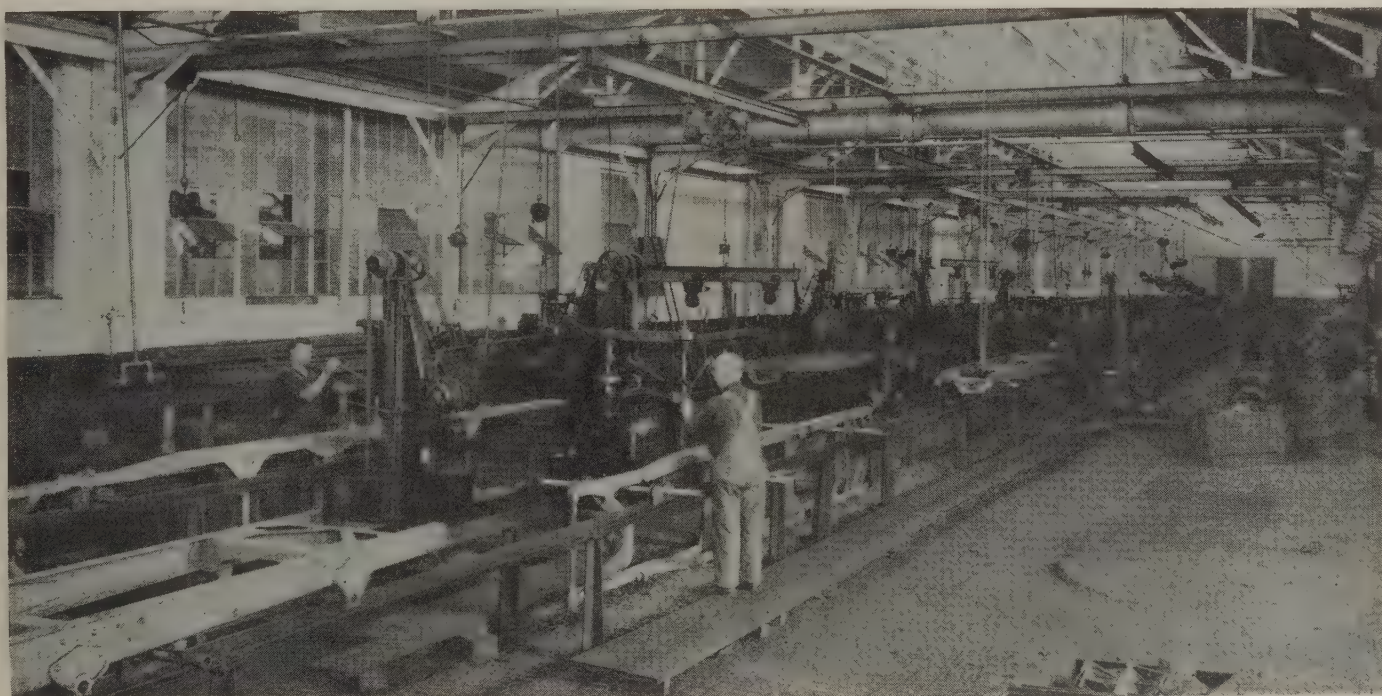
Monorail and Roller Conveyors Are Provided for Moving Crank Cases from Machine to Machine for Successive Operations

quality of work produced. As a man doing production work on a machine is a mechanic rather than a common laborer, the company feels that his efficiency on the machine will be increased to the extent that the amount of handling work he does is reduced. Parts stored on conveyors and racks are stored in a more orderly fashion than would be possible with old methods and there is better stock control.

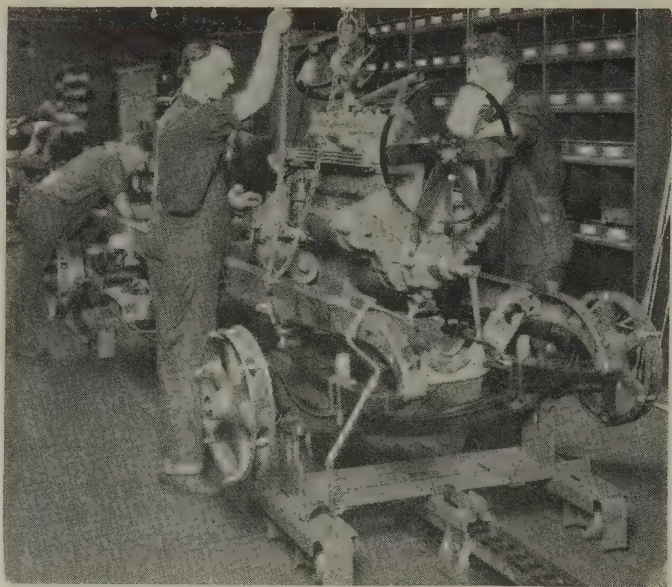
Crankcases and cylinder blocks are moved from machine to machine on roller conveyors. The two rows of cylinder block machines have roller conveyors connected to the tables of the machines, permitting the blocks to be pushed in a straight line from the conveyor on to the table and, after an operation, on to the next section of the roller conveyor.

After the finishing machine operation the crankcases and the cylinder blocks pass over a roller conveyor through a Blakeslee metal washer. From this they move on to a table where an air hose is used in blowing off the chips and water.

Transmission cases are moved through the machining department on roller conveyors. Chain hoists lift the cases from the conveyor to the machine and back to the roller table after each machine operation. On the opposite side of this department gears are cut and other parts that go into the transmission assembly are machined. The various parts come together on the transmission assembly line—a steel track at working distance above the floor. The transmission case, set on a carrier mounted on wheels, is pushed along the track for progressive assembling. A hoist picks



In the Frame Assembly Department There Are Three Parallel Assembly Lines



Chasses Are Assembled on Power Conveyor Lines So Arranged That They Can Be Used for Assembling 12 Different Models of Trucks

up the assembled transmission case at the end of the line and sets it on a test stand.

Crankshaft forgings are brought into the plant on skids handled by trucks and after the first operation on the rough stock the shafts are placed on A-frame trucks holding 10 crankshafts. Camshafts are handled in the same general type of truck. These are loaded on pins on the four sides of the truck, each truck having a capacity for about 60 of the smaller sizes of shafts. The crankshafts and camshafts are pushed on these trucks from machine to machine for successive operations; when finished, the trucks are towed to the assembly line. Flywheels are handled on skids. Pistons are transported on A-frame trucks having shelves on each side. Similar trucks are used for handling connecting rods, each having a capacity for holding 120 rods.

The differential for the lighter type of axles is assembled on a carrier running on an assembly track, the operations being performed at various points along the line. First the case is put on a carrier and when the end of the line is reached it has been built up into a complete rear axle assembly. Permanent fixtures assist in the operations. Some of the parts are banked on adjoining tracks, which are connected to the assembly line by a turntable. When the completed axle is lifted from the line the carrier is pushed off on to a buggy which carries it back to the start of the line.

Assembling Engines on a Conveyor

The motor assembly conveyor line is a track built of two flat rails approximately 200 ft. long. This track is sufficiently wide to handle assemblies of all sizes of motors made in the plant. Three roller equipped carriers are bolted to the ends of the crankcase, which is pushed along the track on the rollers. The assembly line is located in the basement adjacent to natural light and ventilation. All finished stock is kept in a stockroom at the side of the line. Several roller conveyors at right angles to the motor assembly line are provided for feeding finished parts from the stockroom to points where they are wanted along the line. Chain hoists operating on overhead monorails at right angles to the assembly line bring the larger units, such as cylinder blocks, crankshafts, transmissions and flywheels, to the line at points where they are to be assembled. Bins are located along the assembly line for carrying small stock, these being supplied from other bins in the stockroom.

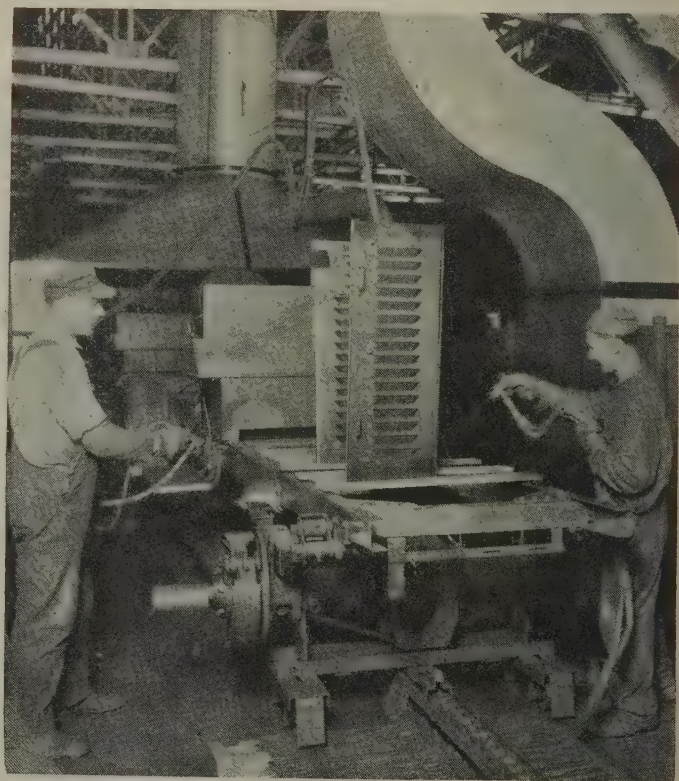
Stops are provided in the assembly track to hold the

motor at fixed points when parts are being added. The track has short hinged sections at various points, which may be raised to permit a man to work at the front end of the motor assembly. For convenience in assembling there are also roll-over sections in the track, for turning over the unit, which starts on the line with the crankcase in an upside down position. Several half revolutions of the unit are made during the assembly of the cylinder block, connecting rod, pistons and cylinder head. Sub-assembly work is done on benches at the side of the line. Nuts for attaching the cylinder head are driven in by a machine located at the side of the line. Two shorter assembly lines, very similar to the main line, are provided for some of the models.

On completion of the assembly the motor is picked up by hand hoists and put on a running-in stand. There is a network of overhead monorails for handling the motors from this point, as well as for conveying other parts. The finished motors are carried on a four-wheel truck to the dynamometer testing machines and from there to a spray painting booth. After painting and drying they are placed on trucks, five to a truck, and hauled to the chassis assembly floor.

Frames Put Together in Three Lines

Three parallel lines of the rail type are provided for the progressive assembly of frames. Two of these are for the lighter frames, which are received assembled with the exception of the brackets, and the third for the heavier units. The frames, as they move along the lines, rest on bar supports extending beyond the rails on each side, and mounted on a carrier which runs along the rails on two wheels. Layout jigs for centering the holes are suspended from overhead hoists that move on a monorail above the assembly lines. Electric hoists mounted on hand propelled trolleys are used for turning the frames over. Suspended from the hoist is an I-beam, at each end of which is a wheel-operated chain that is swung around the frame for turning it over. The side members of the heavy frames are placed on the line, cut to length and bent. The frames are hot riveted,



Section of Final Assembly Line Where the Chassis Is Spray Painted, After Which It Moves into a Drying Oven

rivets being heated electrically. An electric hoist, on a monorail extending over the lower end of the frame assembly lines, picks up the completed frames and carries them to the adjoining erection or assembly shop.

Three parallel chassis assembly lines permit progressive operations. The frame is first placed on two horses mounted on casters. Then the front axle is placed beneath the frame on a dolly and the front springs are fastened to the frame. Then the rear axle is run under the frame on a second dolly and the rear springs are fastened to the frame. The frame at this stage is resting on the two dollies, each mounted on two wheels at each end. The dollies serve as a carriage while the chassis is being moved along the line.

The frame is pushed forward until the first dolly is engaged by the power conveyor of the chain type, which is just above the floor level. As it moves along the line the dolly wheels run on plate rail tracks laid on the floor. Then the motor is let down into the frame by an overhead chain hoist, and the other parts are fed into the chassis from either side as the latter moves along the line.

At the end of this assembly line all parts have been put on the chassis except those which would be injured by heat. Reaching the end of the line the chassis is transferred by means of a monorail hoist to the second conveyor line, on which it moves in the opposite direction, to be cleaned and painted. The conveyor carries the chassis through a washing booth, where it is washed with steam and the dirt is blown off with air. Then it is spray painted in the second booth, in which there is down-draft suction through openings in the floor, to draw away the fumes. It moves from the painting booth into a steam heated oven where the paint is dried. Leaving the oven, a hoist sets it on the third conveyor line and, while it moves along this under power, the wheels, tires and cushions are put on, finishing the chassis assembly.

The assembly conveyor is 350 ft. long and moves at a speed of 3 ft. a minute. The larger units to be used in a day's operation of the chassis assembly line are usually put on the assembly floor at night or early in the morning. Small stock is kept in bins and racks along the line, and one day's supply of the larger parts, such as wheels and axles, is on hand at the proper points on the floor when the assembly starts in the morning. The times of all operations in chassis assembling have been determined by time studies, and the men working on the line are paid under a group

piece rate and bonus system fixed for the crew as a whole.

A method of laying out machinery that is followed in the planning department has proved highly satisfactory. All equipment in each line of buildings is shown in a factory layout made on 9 x 20-ft. layout boards on a scale of 1/4 in. to the foot. When any change in the arrangement is desired, because of the addition of new models or the installation of new equipment for old models, a layout is made on the board. Small pieces of cardboard are used, in different colors, pinned to the board to indicate each machine and its type; lines show the location of conveyors and trolleys and strings show the proposed routing. The proposed routing as prepared by the planning department is closely studied by the production department heads, and perhaps a number of changes may be made before a layout is decided upon. When the arrangement is definitely agreed upon, the pieces of cardboard showing the location of the machines are replaced with similar pieces which are all blue, and the board is kept as a permanent map of the department layout.

Stresses Induced by Arc Welds

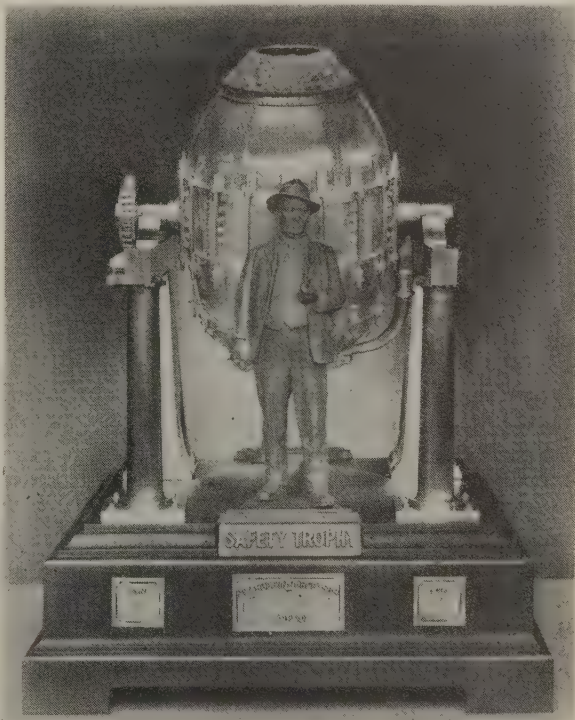
IN an effort to investigate the stresses induced in a metal plate by the electric welding process, the committee on welded rail joints of the American Electric Railway Association took a 1/2 in. plate, 8 in. wide and 24 in. long, and deposited a small welded bead on one 24 in. edge. L. H. Crook of the department of mechanics, Catholic University of America, Washington, studied the stresses by a comprehensive set of strain gage readings.

Large "negative" or compressive stresses are induced in the plate adjacent to the weld. Some of these are beyond the elastic limit of the metal, so numerical values cannot be given them. These deformations persist even after the welded bead is carefully milled off. Along a line two inches below the head an elastic stress of 30,000 lb. per sq. in. is reduced 50 per cent by cutting away one inch of the plate. The stresses in all parts of the plate seem to be reduced by approximately one half of their original value when the first inch below the bead is cut away. Maximum tension stresses of about 15,000 lb. per sq. in. are induced in the edge farthest away from the weld; the neutral axis is about one-third the distance from the bottom edge.

Carnegie Safety Trophy a Miniature Converter

THE safety trophy for which the various plants of the Carnegie Steel Co. will compete in 1929 is an actual Bessemer converter in miniature, perfect in detail, and fashioned after a unit at one of the principal plants of the company.

The converter, supports and accessories are of sterling silver and rest on a bronze plinth, oblong in form, 25 in. by 34 in., which bears silver shields designed to carry the names of the monthly winners. At the front and rear of the converter are bronze statuettes of two of the master steel workers, one of whom is employed at the Homestead plant and the other at the New Castle, Pa., works. Beneath the figure on the front of the composition appears the name of the company, cast in bronze, and a larger shield or plate which will carry the name of the winner in perpetuum at the end of the year.



Mechanizing Minnesota Iron Mines

Changes of Late Years in Both Underground and Open-Pit Mines—Electric Power Shovels

MECHANICAL ENGINEERING in the iron ore industry was covered in a comprehensive paper by A. Tancig, mechanical superintendent Shenango Furnace Co., Chisholm, Minn., presented before the recent St. Paul-Minneapolis meeting of the American Society of Mechanical Engineers. The following has been taken from the contribution:

High production at low cost is the aim of both the open-pit mines and the underground mines. It should apply more particularly to the latter, because production in underground mines is naturally limited. To obtain low costs we are mechanizing more and more our underground operations—using hand-held air-operated jack-hammer drills for hard ground, and hand-held air-operated auger drills for softer ground. Hand shoveling or mucking the ore into cars is a thing of the past in most mines. Loading into the cars and chutes is now being done by slushers, or scraper loaders, a machine consisting of an electric-motor-driven two-drum hoist, with one pulling rope for hauling the loaded scraper and a tail rope for returning the scraper to the face.

An indication of the usefulness and growing demand for these scraper loaders is that the earliest type, six years ago, had a 2¼-hp. motor, whereas today we have them as large as 20 to 50 hp., with either clutch or remote control. The net result is less arduous labor, greater production per miner, and a reduction in the cost per ton of ore produced.

Cars in use underground range from the 1-ton-capacity sub-level type to the 5-ton main-level type, all with ball or roller bearings. The main-level cars have half to three-quarter size automatic couplers to facilitate handling in trains, and are run at high rates of speed over heavy steel rails. The cars used underground are all-steel, sturdily built, usually for 24-, 30- or 36-in.-gage track, with 14- to 16-in. diameter wheels. Chilled-iron wheels are considered preferable to manganese, as being less abrasive on the rails, frogs and switches. As yet, steel ties have been used little in the underground mines, although the only objection is the initial cost.

Steam-engine, handbrake-operated hoists are being replaced with electric-motor-driven hoists, either directly connected or having a single-gear reduction with herringbone gears and oil-operated post brakes. The latest hoists are equipped for safety with overspeed and overwind devices. Such electric hoists range from 100 to 1300 hp. (motor rating) and are for depths of from 200 to 2000 ft.

Pumping Equipment of Today

Underground drainage has been shifted from the old reliable, though sometimes bulky, steam pumps, requiring large pump stations underground and long steam lines, to motor-driven centrifugal pumps or motor-driven multi-plunger pumps. A recent addition to our pumping equipment and one that gives great promise of further economies is the deep-well turbine-type pump.

The last few years have seen continued abandonment of the isolated power plants which every mine had and the installation of electrically driven equipment. The result is a more flexible and efficient operation, fewer men employed and a lower production cost.

When the underground mines operate during the winter, they accumulate stock piles of ore that are loaded during the shipping season into 50- or 75-ton steel ore cars by

steam shovels. Where the shovels are electrically operated and have caterpillar traction, only two men are required to operate each one, where formerly eight men were necessary.

Open-pit mines have relegated the smaller underground producers to the point where their high cost and low production are at best a worry and sometimes a liability. Mines of the open-pit type had their real start in the early 'nineties. The equipment included the ordinary contractor's scrapers, carts and shovels, all of a type which can be seen today in any small grading or foundation job. But the growth of the industry created a demand for bigger and more efficient equipment, until today the machinery is the latest, most efficient and largest in existence for mining purposes.

Electric Power Shovel Introduced

Up to six years ago all shovels were of the steam type, ranging from the 1½-cu. yd. dipper capacity, 50-ton type, to the 8-cu. yd. dipper capacity, 350-ton type. The average production shovel, however, was the standard railroad type having a 4-cu. yd. dipper, self-propelling on rail sections, 135-lb. steam pressure, approximately 85,000 lb. bail pull. These shovels have lately been fitted with caterpillar traction to facilitate moving about and to reduce the labor servicing each machine.

About seven years ago electric power shovels were introduced on the iron ranges. While their general adoption was slow, it was not because of any lack of appreciation of their advantages, these being only too obvious. But rather it was because of a policy of watchful waiting until most of the objectionable features could be corrected by their manufacturers. This policy of cooperation between the few users and the manufacturers was a wise one, because today we have not a large variety of makes of electric power shovels, but rather the shovels of only two manufacturers are in general use.

OPERATING COMPARISON, APPROXIMATE, FOR EACH SHIFT

		Steam		Electric
Operator	1	\$10.35	1	\$10.35
Cranesman	1	7.55	0	....
Fireman	1	5.70	0	....
Oiler-helper	0	....	1	5.70
Pit men	5	21.70	0	....
Night watchman	1	5.70	0	....
Power for 1500-cu. yd. per shift		32.25		12.00
Interest on investment....		7.00		11.60
Maintenance, season repairs and Sunday watchman...		9.00		3.00
		\$99.25		\$42.65

The figures are given merely to show the trend and the result of modern planning. These later-type shovels have cut herringbone gears, inclosed ring-oiled bearings, pressure lubrication, bronze-lined bearings, castings of steel, alloy-steel shafts. Motors and motor-generator sets have ball or roller bearings and the shovels are as nearly automatic and fool-proof as it seems humanly possible to make them.

Ore-Hauling Cars

Two classes of cars are used in the pits. One is the standard 50-ton and 70-ton all-steel ore cars belonging to the railroads and hauled in trains to the ore docks after being loaded in the pits. The other class is the mine-owned

all-steel dump cars ranging from 16 to 30-cu. yd. capacity, equipped with air brakes and with large air cylinders on each side of the center frame for dumping the loads.

In connection with certain pits having ores which require beneficiation, there are ore-washing plants for removing the free silica from the ore through agitation in water. The washing plants, developed over a period of years, range in capacity from 125 tons to several thousand tons an hour.

A later beneficiation plant is the crushing and screening plant for screening out the large lumps of ore and crushing them to shipping sizes. Whole trainloads of ore from the pits are dumped into the bins at one time, and the

material is screened, crushed and reloaded into ore cars within the space of a few minutes.

An interesting sidelight on the increasing use of machinery in production of iron ore is in the fact that there has been no increase in the accident hazard. This result is being achieved because the safety of the employee is always the first consideration when laying out or purchasing new equipment. The employee's safety has become so important that each mining company has a separate department whose sole duty is to cooperate with employees, foremen and superintendents in promoting the greater safety of everyone on the payroll.

Index Which Prophesies Trade Movements

Methods Used to Construct the Valve and Fittings Index Used by Walworth Company to Control Manufacturing Activities

AT the recent Chicago meeting of the American Management Association, Joseph H. Barber, assistant to president, Walworth Co., discussed the scientific methods underlying the "valve and fitting index." His company had been attempting unsuccessfully to correlate production records with known conditions in various markets, and in 1921 concluded that the fluctuations in its business could be best explained in the light of normal activities in general trade.

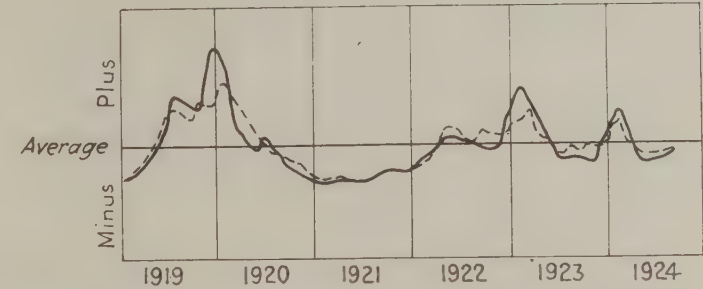
Next it was agreed that the general trade conditions were most promptly reflected in the flow of orders from jobbers. Evidence that this holds true was found in a study of merchant pig iron, for which statistics are available for many years showing orders, shipments, production and prices. The Walworth company's problem then was to find some index, related to orders or to demand (in the several basic industries which consume valves and fittings) which could guide it in budgeting for production. Of course, it was recognized that if some such index could be devised which would closely parallel the condition of the Walworth company's order books, even that would be of little use in forecasting business conditions, unless an adequate theory on the business cycle could be invented.

In attempting to build up an index curve, the many items of valve and fittings manufacture were segregated into several classifications of related products, and the production curves of each group studied individually. It was found immediately that these curves showed violent fluctuations, even though Carl Snyder's "volume of trade index" (carefully adjusted to eliminate seasonal and secular variations) varied no more than 10 per cent up and down. But when plotted data on the various industries which bought a certain group of fittings (called for convenience Group A) was compared, it was found that the swings were from 4 to 12 times as violent as Snyder's volume of trade index for all American industries.

In order to compare this mass of more closely related data, the curve for each industry was recomputed in terms of its own "cycle unit" by methods used by the Harvard Committee of Economic Research. When these adjusted curves for the consuming industries were plotted on a single sheet, and an average struck, it was found to show a surprisingly close relationship to the curve showing orders for Group A of Walworth goods. An even better agreement between the curves (see chart) was forced by giving the various industries appropriate weights, as suggested by knowledge of sales conditions, or by the evident divergence of individual data in those parts of

the curve where the unweighted average departed considerably from the curve representing actual sales of Group A products.

This study proved that orders in Group A fluctuated widely because, on the average, the industries which give orders for such products fluctuated in the same way. Therefore, to budget production of these products intelligently, it would only be necessary to collect opinions and forecasts for each of these consuming industries, reduce them to numerical statement, give each one its proper



Close Agreement Between Orders for Product (Full Line) and Complete Trade Condition in Consuming Industries (Dotted Line)

weight, and plot the result. If the curve turned up, prepare for increased orders; and vice versa.

When this plan of study was worked out for the various classes of valves and fittings, several pronounced similarities in the various groups were discovered. Furthermore, some of the consuming industries were much more "sensitive" than others, that is, seemed to have most effect in the marked divergence from those indexes related to more general business conditions. It was therefore to select the most important or indicative from the 60 series of data available and compute the final index as a weighted average of 16 separate indicators of national demand. Five of them are the "sensitive" ones, and the rest are responsible for the relatively stable absorption in such lines as buildings and equipment. Experience has shown the valve and fittings index, as so computed, to have the following distinctive features:

1. It is a broad sample of conditions, not a single company's experience.
2. It measures the volume of jobber orders; therefore measures jobber's psychology.

3. It indexes trend of demand—the orders to be derived from basic industries.

4. It measures quantity of going business, rather than prices or profits.

5. It turns corners ahead of other barometers, because it reflects immediately conditions among the jobbers.

6. It has definite swings, because of the "sensitive" factors included in its composition.

Should Furnaces Run on Sunday?

Question of Shutting Down Blast Furnaces Once a Week
a Live Topic 79 Years Ago

WHETHER men employed in steel and iron plants should work on Sundays had the attention of those engaged in the business as long ago as the middle of the last century. Going through some correspondence of his grandfather, Frank Brooks, vice-president First National Bank, Pittsburgh, discovered letters bearing dates of July 18 and July 19, 1849, that dwell upon the feasibility of shutting down blast furnaces on the Sabbath Day. A transcript of a reply made by J. Kennedy Duncan, who operated a blast furnace at Springhill Furnace, Pa., to the Rev. Isaac M. Cook, a clergyman of Beaver, Pa., together with the observations of his brother Samuel Duncan, are interesting as showing the views of blast furnace men of those times on the matter of interrupted operation of the furnaces.

Springhill Furnace, Pa., July 18, 1849.

Dear Sir:

Yours of 10th inst. on the subject of closing blast furnaces on the Sabbath Day is before me. To your first inquiry, "Have you ever attempted the experiment of running your furnace without being in blast on the Lord's day?" I answer, I have. The result has been not always the same. Some six years since, in making the experiment, it failed on one or two occasions. Since, up till the summer of '47, attempts were made with unsatisfactory results. In the summer and fall of '47 I had two furnaces in operation; the experiment was again made at both and succeeded well.

To your second inquiry, "If you have made the experiment and failed can you acquaint us with the nature of the difficulties that have thus far frustrated your endeavor to hallow the Sabbath; are they accidental, such as might be remedied by improved machinery, or by removing the necessity of running on the Sabbath because of competition, or are they permanent, growing out of the nature of the business?"

I reply that the failure in the first experiment was owing to the nature and quality of the ores then used, together with a decided dissatisfaction of the workmen who, strange as it may appear, though no diminution was made in their wages, were decidedly opposed to closing the furnace on the Sabbath. Any lack of yield, or if the yield was there and the iron not so good, was always attributed to stopping one day in the week. This to me was a serious difficulty from the fact that it always excited my suspicions that they did not do their duty, although I had no positive evidence of it other than this—that, instead of being stopped 24 hours, it was usually 30 and some times more. I would say then, from the experience I have had, that the blowing of furnaces does not grow out of the nature of the business unless it be owing to certain qualities of ore that are of a hard and obstinate nature, more or less impregnated with sulphur. This difficulty I suppose would be remedied by using hot blast—I have always used cold blast.

To your third inquiry, "If you have succeeded in the experiment is your iron of as good quality as before; by resting do you lose more than one day's blasting? Is your machinery different from that in com-

mon use? Do you make more or less high metal than before? What effect has the change had on the conduct and character of the hands", I state the quality of iron is the same—high and gray iron about in the same proportion as when blasting all the time. As a general thing there was no loss of stock that I could perceive. The machinery for blasting as also the construction of the furnace are as those in common use.

I could not discern any material change in the conduct and character of the workmen other than this, that instead of seeing them at their accustomed posts on the Sabbath they would as a general thing, (at least seemed to be) in their "right mind," for they were clothed and found their places in the sanctuary of God. Allow me the privilege here of saying that in seeing these toiling men coming into the church door and orderly taking their seats, listening with attention to the Words of Life as they fell from the lips of him who was ministering in the Saviour's name, was truly a source of real enjoyment.

It is further my duty to state that, although the furnaces before alluded to operated successfully for a time by resting on the Sabbath day, yet subsequently to my great mortification I have been under the necessity of blowing, during what time the furnaces have been operating, on the Sabbath day. This was owing as I supposed just to a very decided defect in the boshes, which occasioned the putting in of no less than six new hearths in the space of one year, whereas one ought to have been sufficient; second, to the working of poor ore that was of a hard, inflexible character, requiring more coal than ordinarily for smelting.

I also inclose you a communication from my brother Samuel on the same subject.

Very respectfully,

J. KENNEDY DUNCAN.

Rev. Isaac M. Cook, Beaver, Pa.

Fairchance Iron Works, July 19, 1849.

Dear Kennedy:

Agreeably to your request I now give you my experience in blowing furnaces, or rather in not blowing, on Sundays. I think much depends on the stack—that it is tight so as to exclude the air, and a great deal more on the quality of the ore. I mean ore that is easily smelted. In operating with Wharton Furnace in 'forty seven, we adopted the plan of stopping every Saturday night at 12 o'clock and opened 12 o'clock Monday morning; the furnace did well. We made from 16 to 19 tons of metal per week, that is in the six days; which was generally considered a good week's work when Sundays were included. The stack, however, is good, and the principal part of our ore the very best.

We found no difficulty either in stopping or opening up the furnace, as regards the working of it. We would have running cinder in an hour after the blast would go on Monday morning, and by daylight to all appearances the furnace would be hot and working

(Concluded on page 1451)



New Fabricating Plant in Philadelphia

American Steel Engineering Co. Has Space for Considerable Expansion—Easy Handling of Materials

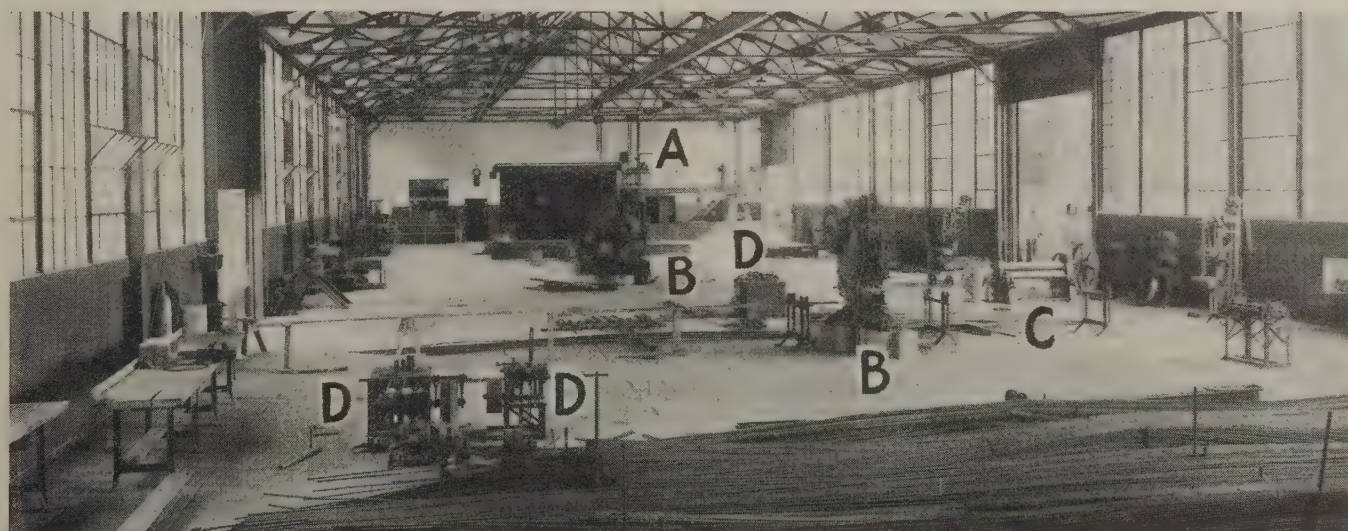
SEVERAL features of the new plant of the American Steel Engineering Co., 3520 Queen Lane, Philadelphia, impress themselves upon the visitor. The plant has been laid out with forethought as to expansion, and in such way as to facilitate handling steel in and out. It is served by a spur track, from the Reading Railroad, which enters the main building at about mid-length and goes clear across.

On the railroad side of the building, traversed, of course, by the same spur, is the steel yard, under cover but not sided in. This shed is of the same span, roof height and skeleton construction as the main building and immediately adjoins it. Expansion will take the form of continuing this shed building to a length approximating that of its mate

and closing the ends and sides, making a second broad bay, parallel to the first, for fabricating work.

Across the street end of the present building is a two-story office and storage building, of brick facing on concrete and measuring 32 x 64 ft. The fabricating bay, in one room, is 64 x 220 ft., directly in rear of the office. Its roof trusses leave 20 ft. clear above the concrete floor. The walls are concrete to about 6½ ft., then ribbed glass to the eaves along the two long sides.

Fabricating work is done mostly upon the basis of engineering in the plant. This covers all details both for structural steel and for reinforcing steel, both of which are prosecuted over a considerable territory centering in Phila-



Interior of the Fabricating Shop Looking North. At A is the platform for tool room or machine shop, with compressor room under it; B B are the punches and shears; C is the roller straightener for plates; D D D are bar benders

At top of page is the plant, viewed from the Reading Railroad crossing. The steel receiving shed appears prominently in center, with storehouse this side of it. At its left is the forge shop

delphia. Bridge work is not attempted, except on simple designs similar in detail to structural forms for buildings.

Materials handling is by means of traveling hoists running on I-beams supported directly under the roof trusses. One 5-ton hoist is electrically driven and carries a cab. The others are differential chain hoists operated from the floor. It is planned to put in a light overhead traveling crane in the main bay, as the present runs do not give the flexibility expected.

Two Pels combination punches, shears and plate slitters are the heaviest pieces of fabricating equipment. The larger one can take a 15-in. I-beam and can punch a 1-in. hole through $\frac{3}{8}$ in. of steel. Some changes are being made so that it can handle 24-in. beams. The other one is used mainly in cutting bars. Three Kardong benders (Minneapolis) are used for reinforcing bars. Two of them are motor-driven. There is a set of bending rolls for plates. For bending structural shapes, when required, reliance is placed on a small forge shop, in a separate brick and concrete building.

There is the usual machine-tool equipment of a fabricating shop—drills, shaper, power hacksaw, etc. A small machine shop is being installed, on a balcony above the air compressor room, which will be in the nature of a tool room, but will be available for a variety of work. This is under command of the projected traveling crane.

Much welding is being done, so far as building regula-

tions and codes permit. That done in the shop is electric, with General Electric units. Field welding is by gas. In a few cases, where it has been necessary to remove a clip or other piece which had been welded on, the clip broke outside the weld and the beading had to be chipped off.

One useful "kink" observed in connection with the bar cutter was in the method for gaging lengths. The bar being cut lies in a trough consisting of a long channel, web downward. At 3-in. intervals holes have been punched through both flanges. These accommodate a gage block. For variations from exact 3-in. lengths, 1-in. or 2-in. spacers are used. Foot marks are stenciled on the channel at the appropriate holes.

Natural light is very good, all over the shop. Night work, which is not infrequent at present, is facilitated by the electric lighting system, lights being suspended in sufficient numbers just above the bottom line of the girders. Heating of the office is by hot water, with gas fuel, under thermostatic control.

In addition to its work of fabricating (and often erecting) steel, the company maintains a welding equipment department. It acts as distributor of General Electric welding units, having territory extending from southern New Jersey over all of Pennsylvania, Maryland, Delaware and most of West Virginia. To handle this business in the western part of Pennsylvania, a branch office has been established in Pittsburgh.

How Procedure Control Welding Originated

Rapid Construction of Overland Pipe Lines Magnified All Managerial Problems Found in Production Welding

BY G. O. CARTER*

WELDING metal by the use of the oxy-acetylene flame (or "oxwelding") had its first beginning in the United States in the early years of the twentieth century, following experimental work done in Europe. The development in 1906 and 1907 of a commercial source of oxygen gas gave the process its first real impetus and oxwelding began to be used to an appreciable extent in American metal working industries.

At first the process was most often used for emergency repair and proved a great boon in many instances. Tremendous amounts of money were saved through reconditioning equipment that otherwise would have been scrapped and in preventing losses through production delays.

Even in these early days, however, it became evident that there was an important application for oxy-acetylene welding in routine production. Of the early ones was the manufacture of steel barrels, and a little later the welding of pipe for various services began to assume some importance.

Early Work on Pipe Joints

As far back as 1911 some work on overland lines of steel pipe was done, and there is a line transporting manufactured gas now in operation which was laid by welding during that year. At the Panama-Pacific Exposition in 1914 practically all of the pipe for all services from water to high-pressure steam was oxy-acetylene welded, this installation involving many miles of pipe in many different sizes.

In the summer and fall of 1922 an important forward step in the construction of pipe lines was taken. A 140-mile, 8-in. oil line was laid by the Prairie Pipe Line Co.,

under the supervision of N. E. Wagner. The work was eminently successful and was described by Mr. Wagner before the International Acetylene Association. Mr. Wagner's work won for him that association's highest award, the Morehead Gold Medal for 1922.

It thus became quite evident that the laying of overland lines with oxwelded joints offered an important application of the oxy-acetylene welding process. However, there were a number of considerations, involving management and operation, that seemed likely to affect the acceptance of welding as a routine construction method for pipe joints.

Difficulties Encountered in Scattered Crews

Early opponents of the welding idea stressed the fact that the quality of the welded joint was dependent on the skill and integrity of the welder. Others pointed out that it required supervision of men more than ordinarily skilled in welding practices to insure uniformly high-grade results. Laying a pipe line in the oil or natural gas country, where the welders operate many miles from their base of supplies and under varying conditions of weather, offered a difficult problem in personnel, training and management. Transporting oxygen and acetylene to the welders also involved some difficulties and the matter of an adequate method for field testing the finished joints before the line was put into operation was another item that required study.

It was evident from the beginning, to members of our organization, that if pipe welding was to be generally accepted these various matters would have to be studied and the best practice developed for each of the fundamental ele-

*Consulting engineer, Linde Air Products Co., New York.

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BOOK REVIEWS



Employee Questions Statistically Treated

Employee Representation. By Ernest Richmond Burton. Pages 283. 5% x 8 in. Published by the Williams & Wilkins Co., Baltimore. Price, \$3.

In an excellent preface to Mr. Burton's book, Henry C. Metcalf calls attention to the three significant contributions that employment representation is making to American industry: converting industry from a purely productive process into an educational experience, facilitating the realization of more truly scientific management, and injecting new meaning and value into democracy.

What this volume covers is an investigation of the history of employee representation in this country, the motives prompting employers to install representation plans, and the obstacles and difficulties that have beset the movement; and finally, an interpretation of employee representation and the desirable direction of its further development. Indications thus are that the author had made up his mind before making the investigation.

The author's definition of the term "employee representation" is: "broadly . . . to include any established arrangement whereby the working force of a business concern is represented by persons recognized by both the management and the employees as spokesmen for the latter in conferences on matters of mutual interest."

Neither the various socialistic and academic experiments in Europe, nor Mill's approval of workers' election of managers, is causally related to the present development. The oldest case in operation in this country is the Filene cooperative association, started in 1898 as an insurance committee. Other companies strove in this direction, but not until 1915, or say when Rockefeller became an earnest advocate of the system, was there any very great progress in this direction. To speak of the various attempts, successful and unsuccessful, in this country and abroad, would take up too much space; so we come to the essential features of the American development of the movement in question.

Special chapters are devoted to the sources and nature of modern industrial conflicts, the managerial objectives of employee representation, the methods of organization and extension of the plan, managerial responsibility for operation, the methods of assuring adequate representation of the employees, joint conference bodies, organization for integration, some of the problems of operation and their solution, and terms and conditions of employment.

There is a good appendix of selected bibliography. As a whole, the book leaves the impression of being a mass of statistics rather academically treated.

quoting the rules themselves and following with a discussion of the law, supported by a citation for each statement. The table of cases includes more than 1600 decisions and the table of contents, 413 headings. The topical arrangement follows closely that of the Patent Office rules of practice with which attorneys and inventors are familiar. The typography is pleasing and the language simple and easily understood and the general arrangement effective for ready use. The index appears to be complete.

The author presupposes a knowledge on the part of the reader of the fundamentals of patent law. The book is addressed to the busy patent attorney and to the engineer who, having had a liberal amount of experience with patents, is desirous of having at hand a volume which will give to him the answer to the hundreds of questions which must come up in his mind. It is a work which will be found of great value to the intense student in the patent field.

The basis of the volume is the collection of notes of Loyd H. Sutton, a successful practitioner in the patent field, a former examiner in the Patent Office, and lecturer at George Washington University on the subject of patent law. Mr. McCrady has bestowed four months of intensive work on these notes, putting them in shape for publication. He has revised them, added to them, rearranged them, and checked them over.

Cartels in Germany and Elsewhere

Kartelle und Staat, unter Beruecksichtigung der Gesetzgebung des Inund Auslandes. By Dr. O. Lehnich. Pages, 314, 6 x 9 1/4 in. Published by Reimar Hobbing, Berlin. Price, 16 m.

Of course, "cartel" has a very elastic definition. Before the Great War when it was attempted in Germany to frame a law covering rings, cartels, gentlemen's agreements, syndicates, *et id genus omne*, there were in the empire at least four hundred such, of about twenty different varieties—vertical, horizontal and otherwise—and it remained for the late Hugo Stinnes to increase the number and variety.

As the functions of each cartel must be considered in relation to one or more of all of four principal factors—selling conditions, price-fixing, amount of production, and method and amount of sales activities—it will be seen that writing a work on this subject is somewhat like preparing a detailed description of the universe, with particular reference to the seven or eight bodies most familiar to us terrestrials.

Demand and supply of course play a great rôle, and cause the rise and fall of one or the other of the various kinds of combinations intended to produce proper equilibrium. For, as the author remarks, when demand is greater than supply, the State must protect the consumer from the producer; the converse, when supply is too great. There are also to be considered such items as movement of population, climatic conditions, natural resources, political divisions, water supply, etc. To all of this we add the general trend of public opinion, and the differences in development and surge of the various branches of industry.

The author starts with the statement that cartels are "agreements between independent producers in the same line, for the purpose of regulating the market and limiting production." He is not of the opinion that their purpose is monopolizing the market, but that they are simply to regulate and reduce competition. The fact that they can first fulfill their purpose when the circle of firms is closed, and that especially for this reason cartels that regulate produc-

Covers Patent Matters for the Engineer

Patent Office Practice. By Archie R. McCrady. Pages 387, 6 1/2 x 9 1/4 in., illustrated. Published by H. D. Williams Co., Ouray Building, Washington. Price, \$10.

Each year America produces more inventions than the previous year; each year the work of the United States Patent Office increases in volume and technicalities; and each year patents for invention become more and more a factor in the country's industrial development. It is by no means an easy task for the inventor to keep abreast of the technical procedure involved in the procuring of his patent.

To meet this situation quite a number of books have been written by patent lawyers covering various phases of technical patent law and Patent Office practice. It has, however, been left to A. R. McCrady to bring together in one volume a concise consideration of the rules of practice,

tion especially desire monopoly does not, in his opinion, alter their object.

The third section of the book considers what is of comparatively little importance to Americans—the purely German cartel laws.

The fifth section concerns cartels in countries without any special laws governing such matters: Peru, New Zealand, Australia, Argentina, etc. The sixth groups according to, on the one hand, whether they provide for legal measures against combines, or, on the other hand, provide full legal protection for them.

England is the only country in which free competition is defended by law. There is no especial legislation about cartel contracts; all is governed by the "common law." France is a good example of making the law agree with the business conditions that it is intended to control; both bearing and bulling of prices being forbidden. In Switzerland the French laws of the late thirties were introduced in some cantons, private agreements preventing unlimited competition. In Belgium, fine and imprisonment threaten those who by illegal or improper methods either raise or lower prices artificially and in great degree. Italian anti-cartel laws are much like the Belgian. In Spain there is no great tendency toward combinations, but there are laws against those tending to limit competition and raise prices unduly. Holland does not concern itself, as a State, with cartel matters. Denmark has a recent law against combinations tending to limit competition. In Hungary, although cartel matters were debated for a great while, there is as yet no law governing them. In Japan there is a law against "uncommon regulation of prices in order to attain excessive profit."

The excellent alphabetical index, and the list of works collated (nearly three hundred in all) show the thoroughness with which this volume has been prepared.

ROBERT GRIMSHAW.

Cyclopaedic Account of Automobile Steels

Autostaehle des Welthandels. By Dr. A. Mueller-Hauff and Dr. K. Stein. Pages, 189, 5¼ x 8½ in.; illustrations, 39, and plates, 10. Published by Verlag Stahleisen, Dueseldorf. Price, m. 9.

The fact that 90 per cent of the materials employed in the automobile industry consist of iron and steel, and that without the comparatively recent improvements in the latter material the wonderful progress in that industry would have been impossible, shows us that "auto-steels" deserve a thorough technical and practical work all to themselves. Here they have it.

Up to date there has been too little exchange of data and opinions on this topic among manufacturers, metallurgists, and technicians generally. This book is a good start in this direction. The progress from melting in crucibles to manufacture in the Siemens-Martin furnace has been of inestimable value to the automobile industry; but there has been no thorough compilation of data concerning all the different varieties of special steels as applied to special purposes.

This little book takes up very practically and thoroughly the matter of testing for elasticity, tensile strength, hardness, etc., by all the approved practical methods known to the technicians. It then proceeds to metallography, with special reference to the influence of manganese, nickel, chrome, and tungsten. Next it treats of the manufacture, as such, of auto steels, going into the details of melting, casting, forging, and rolling, with particular reference to the character of the surfaces attained. Tempering, welding, cold drawing (with its advantages and disadvantages) and general machining, etc., receive careful and competent attention.

The chapter entitled "Auto Steels" covers the ordinary carbon varieties, re-adoption of the so-called silicon steel

(0.10 C., 0.50 to 0.80 Mn., 0.70 to 1.00 Si.) is taken up. As this steel has a very high elastic limit (60 to 70 per cent as against the usual 50 to 60) it is well worth attention.

Case-hardening of ordinary and ternary steels, with particular attention to the discovery and the elimination of defects, especially warping, receives due consideration. Krupp succeeded in doing away with this evil by giving a very high surface hardness—in fact, such steels would scratch glass. The use of chromium is recommended in this connection. The author gives space to mention a process long known in the laboratory, but not sufficiently adopted in practice, namely, the employment of at least 6 per cent of nickel and about 0.5 to 1 per cent of chromium to prevent warping. Steels with this composition, cooled slowly in the air from about 800 deg. C., show the self-hardening quality, their surfaces being glass hard.

The chapter on tempering, as the word is usually employed (meaning hardening and drawing) is especially instructive and interesting, the more so as it is enriched with numerous tables showing the physical properties of various kinds of steel, each with various percentages of alloy.

Balls and rings for bearings get a chapter for themselves. Magnet steels, for both permanent and electro magnets, are taken up in detail. There is a very good section on ball-valve steels.

Taking it by and large, this little book is better worth its cost than nine out of ten of the technical works that have come under the reviewer's observation for a long time.

How to Test and Grade Foundry Sands

Standard and Tentatively Adopted Methods of Testing and Grading Foundry Sands. (1928). Pages 94, 6 x 9 in.; illustrations, 31, paper covered. Published by American Foundrymen's Association, 222 West Adams Street, Chicago. Price, \$3.

This publication is a revision of the foundry sand test methods issued by the joint committee on molding sand research in 1924, and contains in addition descriptions of testing procedures developed since 1924.

Controlling specifications are given, with general information as to methods of conducting tests and details of construction of apparatus which has been found satisfactory for performing the tests.

The book is divided into five sections: (1) Foreword; (2) Standards; (3) Tentative Standards; (4) List of Manufacturers of special testing apparatus; (5) Bibliography.

New Books Received

Standards and Standardization. By Norman F. Harri-man. Pages 265, 6 x 9½ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$3.

The Sales Engineer. By Gilbert Rigg. Pages 112, 5 x 7¼ in. Published by Mining Publications, Ltd., 724 Salisbury House, London, E. C. 2, England. Price, 10s.

Practical Industrial Furnace Design. By Matthew H. Mawhinney. Pages 318, 6 x 9¼ in., illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price, \$4.

The Mineral Industry during 1927. Edited by G. A. Roush. Pages 766, 6½ x 9½ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$12.

Théorie, Calcul et Construction des Cheminées d'Usine. By E. Lafon. Pages 176, 6¼ x 9¾ in., illustrated. Published by Librairie Polytechnique Ch. Béranger, 1 Quai de la Grande Bretagne, Liège, Belgium. Price, 50 fr.

The Work of the International Labor Organization. Pages 197, 6 x 9¼ in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$2.50.

New 42 and 48-In. All-Geared Motor-Driven Lathes

UNUSUALLY heavy all-geared transmission is a feature of a "Lowdrive" lathe of completely new design which has been brought out by the Bradford Machine Tool Co., Cincinnati.

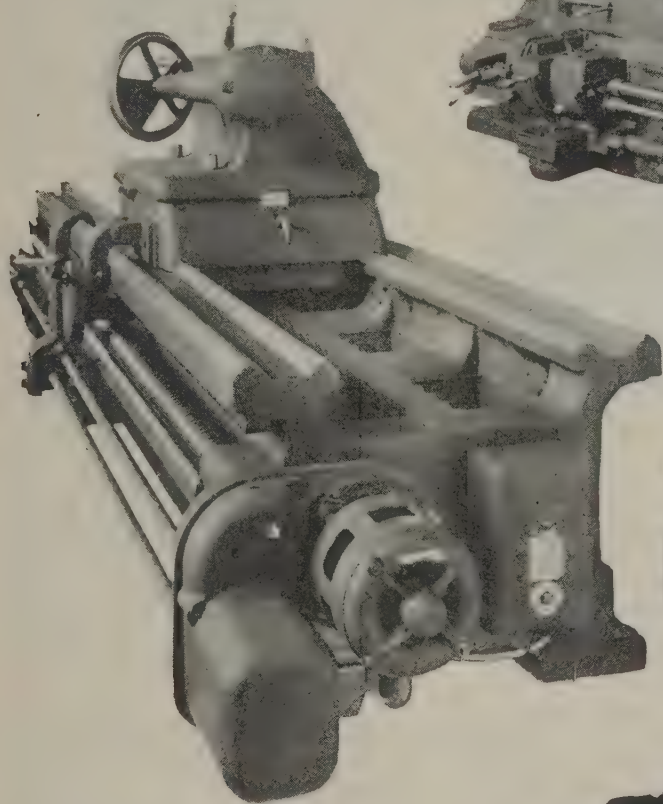
The unusually heavy all-geared drive is made possible by placing about two-thirds of it under the head and down in the bed where six selective initial speed changes are controlled and locked by a single lever. From the speed gearing, power is transmitted by heavy flexible chain to the initial drive in the lower front part of the head. The downward pull

the drive to the spindle is disengaged. The faceplate drive is controlled by a large lever which moves the engaging pinion into or out of mesh with the internal face gear. With this drive engaged, the operator uses the apron control to start, stop and reverse the lathe spindle.

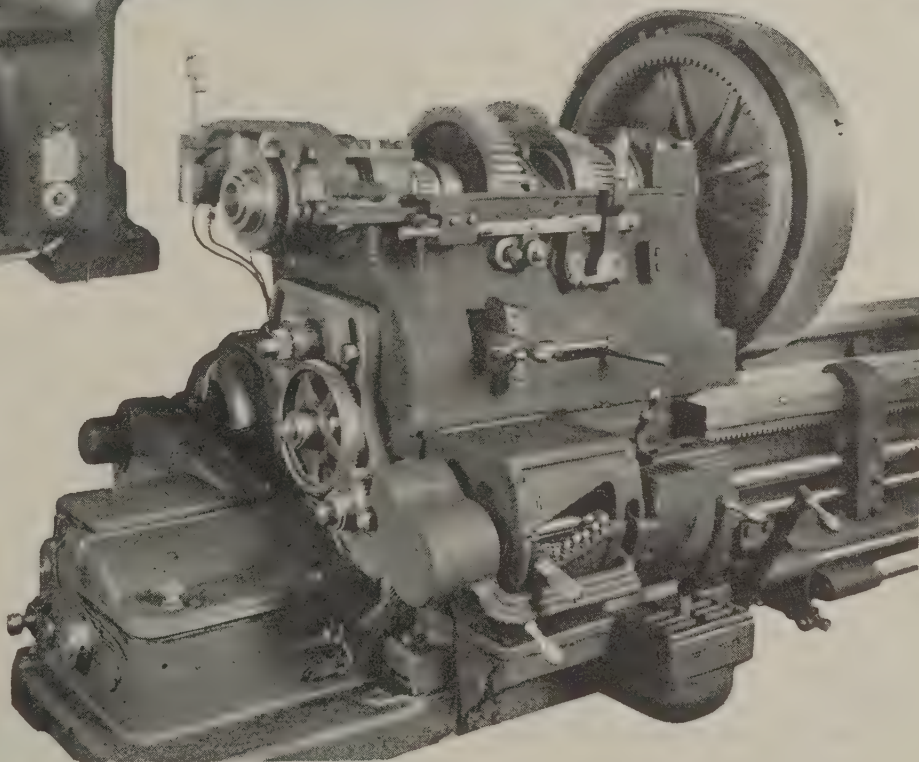
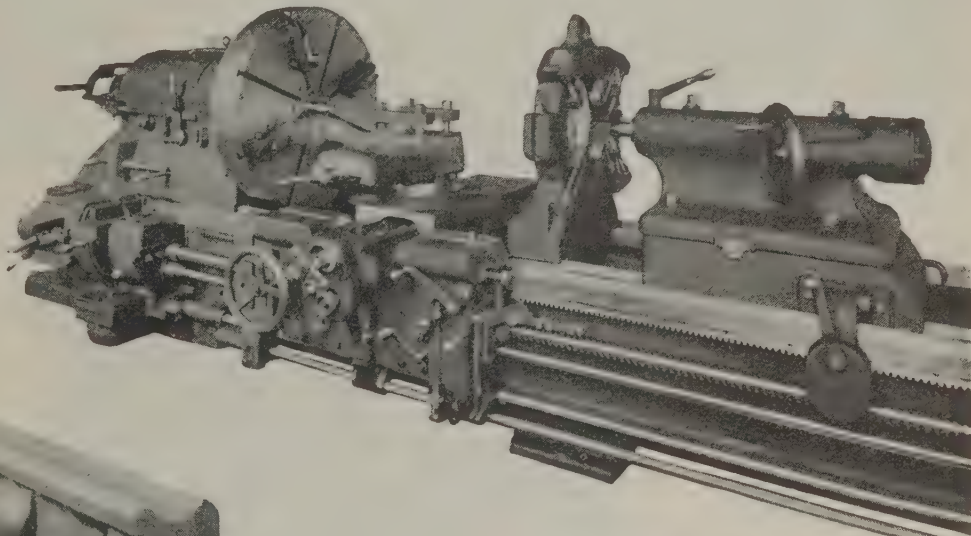
Power rapid traverse is available for traversing the carriage in either

ings. The system includes an automatic oil-pressure accumulator which discharges oil at a pressure of about 300 at fixed intervals as long as the lathe is running.

The lead-screw is 2 7/16 in. in diameter and has one thread per inch. Being used for thread cutting only, it is not splined. The lead is guaranteed to be accurate within 0.001 in. in 18 in. for the full length of the thread. Screw cutting and power



The 42-In. Lowdrive All-Geared Lathe Is at the Upper Right. The planer type bed with pawl rack for the tailstock and power rapid traverse motor is shown in the view above. A close-up of the head, with guards removed, is at the right



of the chain, which increases with heavier cuts, is emphasized as an important factor in securing rigidity between the head and bed. This arrangement is patented.

In addition to the spindle, the head itself carries a back-gear drive and a triple or faceplate drive, as well as a direct spindle drive. The construction permits use of a tumbler in the head for the "feeds" and "threads," as well as a mechanism having two coarse screw ratios (4 and 20) which materially increases the thread and feed range listed on the regular index plate. A lead of 20 in. is regularly available. Eighteen spindle speeds, forward and reverse, ranging from 1½ to 175 r.p.m. are obtainable. A spindle brake acts automatically when

direction along the bed, for the carriage cross-feed screw and tool rest, and for the angular feed to the compound rest top. This traverse is engaged simply by holding down a lever on the carriage until the required movement has been effected. The independent motor on the bed, at the tailstock end, provide for all power traverse requirements. It is impossible to engage the power rapid traverse until the power feed has been so engaged and vice versa.

Oiling of each bearing is automatic, fresh oil being supplied according to the requirements of the different bear-

feeding cannot be in simultaneous engagement. The quick-change gearing for obtaining the various threads and feeds is of the company's standard design.

A 25-hp. constant-speed motor which runs continuously in one direction is usually furnished for the machine. Starting and stopping of the motor is from a push button station on the head, or at one or more other places on the machine if desired. Independent starting, stopping and reversing of the lathe is effected by a

(Concluded on page 1474)

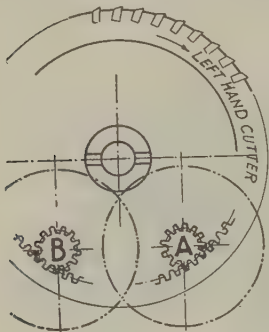
Face Milling Machine Adapted for a Variety of Work

KEARNEY & TRECKER CORPORATION, Milwaukee, Wis., has added to its line of Mil-Waukee-Mils the new Broadside here illustrated. Like other Mil-Waukee-Mils, this machine is built on the unit plan and may be adapted for a variety of production face milling jobs.

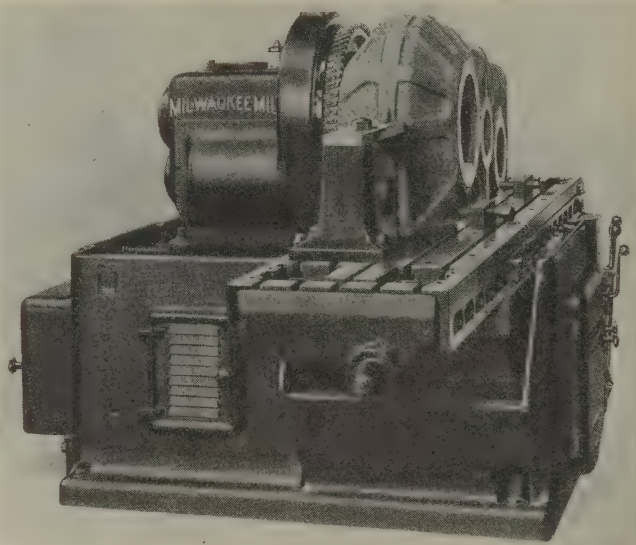
The new machinery has for its foundation the standard Simplex and Duplex Mil-Waukee-Mils described in

8½ in. in diameter and the one at the rear 6 in. On the rear of the faceplate and integral with it is a 4 pitch 20½-in. diameter internal gear with 82 teeth. This gear is driven through a shaft and pinion and large spiral bevel gears and the ratio of the drive pinion to the internal gear is approximately 8 to 1.

A feature is the use of flywheels in the cutter drive. It will be seen from



Use of Flywheels in the Cutter Drive, Shown in the Line Sketch Above, Is a Feature of the Broadside Face Miller



THE IRON AGE of Sept. 15, 1927. By replacing the standard horizontal spindle head on a Simplex with the new face milling head the Simplex machine becomes the Broadside. In like manner two of these heads may replace the standard heads on the Duplex, or, if desired, just one of the Duplex heads may be replaced. Like other Mil-Waukee-Mils the new machine can be furnished with either 14 in. or 22 in. width tables and with seven power feeds ranging from 2 to 11 ft.

Cutters up to 24 in. in diameter may be used. The head is fitted with the new standardized spindle nose. The larger diameter cutters are driven by clutch keyways with the cutters held to the faceplate by means of bolts. Timken bearings are used throughout and automatic lubrication is provided. The main spindle, which carries the faceplate, is 5¾ in. in diameter and is mounted in Timken bearings, the one at the front being

the accompanying sketch that, in addition to the driving pinion shaft, A, which drives the internal gear, there is an auxiliary free running shaft, B, driven by the internal gear. Both shafts carry flywheels that revolve at eight times the main spindle speed. It is stated that with this arrangement the driving shaft flywheel prevents "kicking back" of the cutter as each tooth of the cutter bites into the metal; similarly the auxiliary shaft flywheel prevents the "jumping ahead" of the cutter as each tooth leaves the cut. The two flywheels thus maintain a neutral action, with one set of forces counterbalancing the other, the result being smooth flow of power at the periphery of the cutter. Twelve spindle speeds, ranging from 6 to 60 r.p.m., are obtainable by means of pick-off gears. The head cannot be furnished with quick-change gears. Eighteen changes of feed, obtainable either by pick-off gears or quick-change gear box, are provided.

Annealing Pot of Stainless Iron Welded to Steel

STAINLESS iron, welded, forms the Fuzon annealing pot, made by the Chicago Steel & Wire Co., 103d Street and Torrence Avenue, Chicago. Annealing with this new pot is said to cut time and cost almost in two. The pot, which weighs 660 lb., takes the place of a cast steel pot weighing 3300 lb. Each pot holds about 2000 lb. of wire. Consequently, when annealing wire in the new stainless iron pot, it is necessary to heat only 2660 lb. of metal, whereas with the old cast steel pot 5300 lb. of metal must be heated.

At the annealing point of wire, 1350 to 1400 deg. Fahr., this stainless iron shell has scarcely taken color. Consequently there is no sign of scale over its surface or interior. Because of the rapid scaling action that takes place when heavy cast steel pots are heated and cooled, the metal in them has to be so thick that they will last some time. With stainless iron pots the life should be almost indefinite.

The Fuzon annealing pot is about 7 ft. high and has an outside diameter of about 24 in. The body of the pot

is made of 14-gage stainless iron, 18 per cent chromium with 8 per cent nickel. It has a wrought steel base plate ¾ in. thick and a wrought steel collar on top, about 1 in. thick. Eight carbon steel rods, ½ in. in diameter, are welded to the collar and to the base to take the lift. A steel plate is welded inside of the pot, so that the coils of wire may easily be removed and will not be caught in the corrugations of the outside shell.

The shell of the pot is first formed and riveted, the riveting being pri-

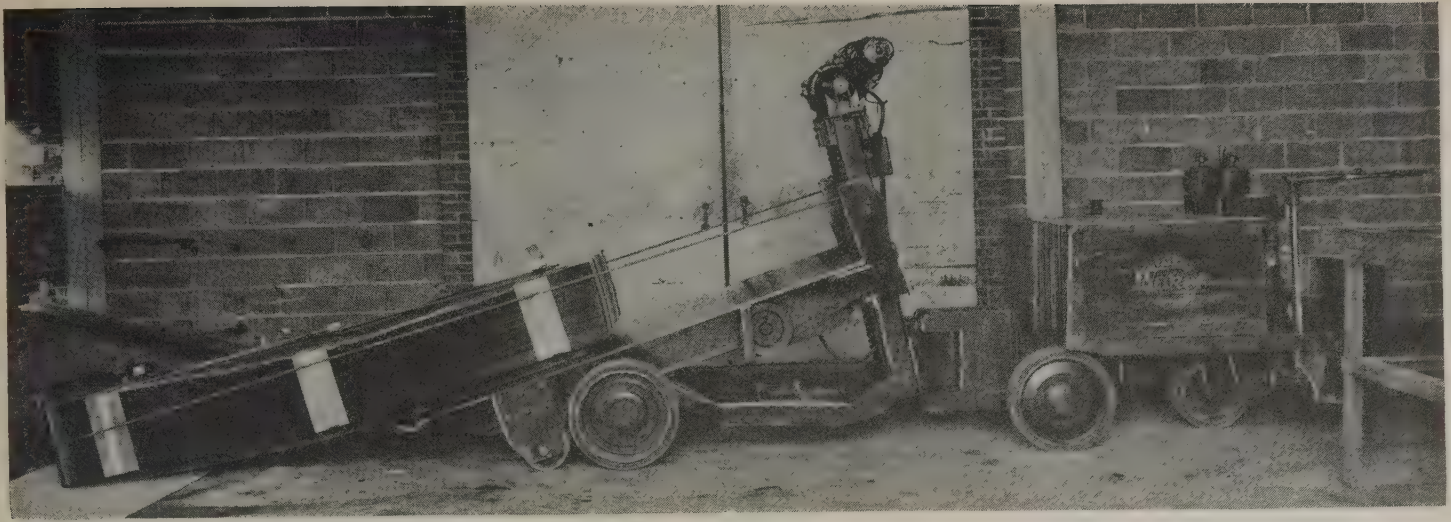


Welded Annealing Pot of Stainless Iron

marily for the purpose of retaining the proper shape, and not to afford extra strength.

Carbonizing Pots of Welded Heat-Resistant Steel

Welded pots for case hardening and annealing are being placed on the market by Mossberg Pressed Steel Corporation, Attleboro, Mass., under the trade name Mephisto. The company has produced a line of welded steel products since 1920, among which are vulcanizing pans. To improve upon the conventional galvanized pan, a special steel has been used, capable of resisting corrosion due to the sulphur and steam from the rubber compounds. Such construction also calls for special welding rod and technique, so the joints may be equally resistant. During experiments designed to improve this material even further, an alloy and welding process was discovered which has resisted oxidation at 1800 to 2000 deg. Fahr. Comparative tests show that a welded pot of Mephisto metal acquires merely a thin, tightly adherent scale under conditions which would destroy a similar pot made of 3/16-in. boiler steel plate.



Baker Articulated Tilting Truck Will Load Approximately 500 Tons of Sheets in a 10-Hr. Day, Putting a Package Weighing from 6 to 10 Tons in a Car in 10 or 12 Min.

Truck Loads Steel in 10-Ton Packages

AFTER more than a year of development work, the Baker-Raulang Co., Cleveland, has put on the market an electric storage battery truck which will load 10-ton packages of sheet steel into box cars without danger of breaking through car floors.

The new truck is known as the Baker type D-96 articulated tilting truck. It is articulated, or hinged, in the center. This hinge enables it to make the very short turn from the loading dock through a 6-ft. car door with a package as large as 48 in. wide and 102 in. long. In operation this truck is like a one-horse wagon, if the horse were turned around in the shafts and faced the wagon.

The power section carries the bat-

tery and the driving and steering apparatus. The load section consists of a tilting platform mounted on a single axle and includes the hoist for tilting the platform and a double drum power winch.

Sheets which are to be handled by the Baker truck should be provided with 2 x 4-in. wood skids and firmly strapped together. The truck will pick such a package up from the floor, but in order to handle the maximum tonnage the packages should be placed on the truck platform by means of an overhead crane. The steel is usually weighed just before it is loaded, and when the crane picks it up from the scale the truck platform is run underneath. The truck

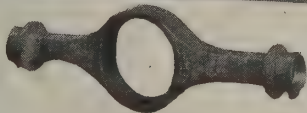
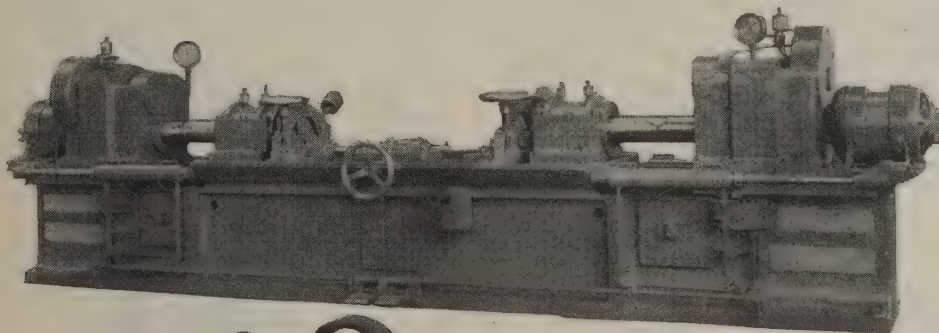
then carries the load from the scale and places it in the car. Under such conditions, and making ample allowances for delays, the truck will load approximately 500 tons of sheet in a 10-hr. day, putting a package weighing from 6 to 10 tons into a car in from 10 to 12 min. In tests packages have been repeatedly loaded into cars within 6 min., but in regular operation delays will nearly double this.

Under the present system, two men will load approximately 80 tons of sheet per day by hand. Accordingly, this truck, with an operator and a helper, will replace 12 men and will eliminate damage to the sheets as a result of scratching or rusting. Sheets larger than 48 x 102 in. can be handled, but automobile cars with 10-ft. door widths are required.

Hydraulic-Feed Horizontal Boring Machines

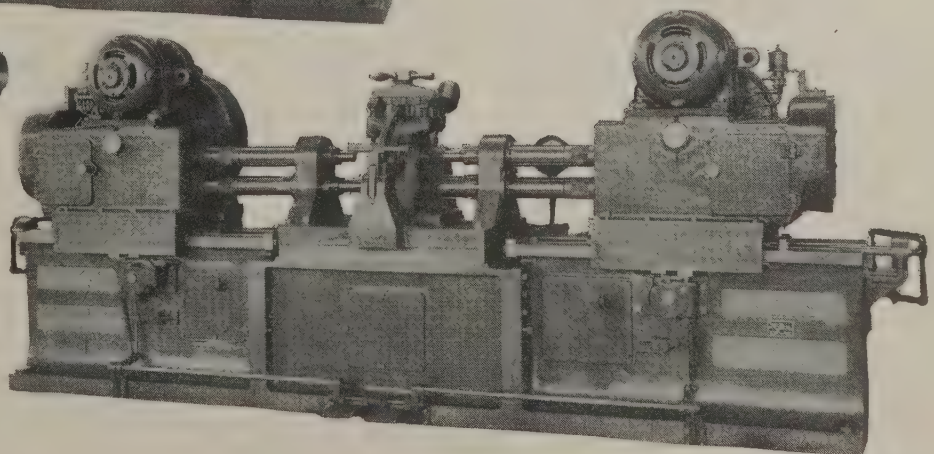
UNIT plan of design to permit adapting the machine for a wide range of work is a feature of the

or drilling heads. The center frame is made in various lengths according to the work-holding fixture required.



hydraulic-feed horizontal boring and drilling machine here illustrated, which has been placed on the market by Baker Brothers, Inc., Toledo, Ohio.

Essential units include the two end frames and the center frame. To the end frames are attached the sliding saddles, each of which is actuated by a separate Oilgear pump, and on the saddles are mounted the necessary single or multiple-spindle boring



The main heads are driven by individual motors mounted either on the heads or the saddles, as shown. The feed, which is controlled by foot pedals at the front of the machine, has the characteristic rapid advance and return of the Oilgear device and also the infinite number of adjustments of rate of feed. Use of two hydraulic pumps, one for each end of the machine, is emphasized as simpli-

The Single-Spindle Machine for Boring and Counterboring Rear Axle Housings Is at the Left. The machine below is for boring transmission cases

fying the piping and eliminating the necessity for an equalizing mechanism. A pressure gage on each hydraulic pump permits checking abnormal operating conditions, such as dull tools, undue hardness of material, incorrect chucking, etc., which conditions are indicated by the building up of high gage pressure. The saddles slide on unusually wide scraped ways and are proportioned to assure rigidity and alinement.

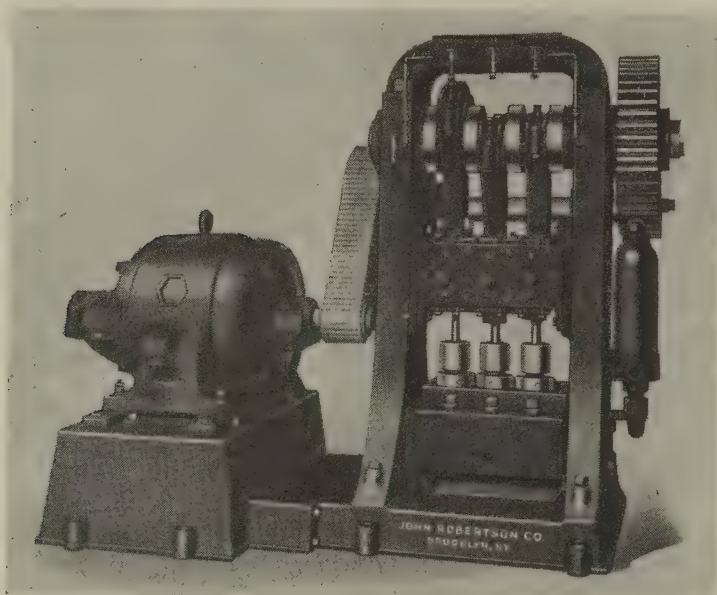
One of the machines illustrated is

fitted with two spindles in each head and with fixture and support for two boring bars for boring two holes in an automobile transmission case. In this installation two machines are employed, one for the roughing and one for the finishing operation. The second illustration is of a single-spindle machine with fixture for boring and counterboring cast steel truck rear axle housings. The machine is designated as the No. 25 H. H.

High-Pressure Continuous Service Pump

L EAD extrusion presses, used by rubber hose manufacturers for lead incasing hose previous to vulcanizing and by electrical wire and cable manufacturers for incasing ca-

which are bronze lined throughout. The main bearings are babbitt lined and the eccentric and main bearings are lubricated automatically from a 2½-gal. oil reservoir. The knuckle



Hydraulic Pump for Lead Extrusion Presses and Other Continuous High-Pressure Use

bles, require hydraulic pumps that will continuously deliver a large volume of water at high pressure. The hydraulic pump illustrated, built by John Robertson Co., 131 Water Street, Brooklyn, is designed for such continuous service and is furnished in sizes up to 50 gal. per min. and for working pressures up to 6500 lb. per sq. in.

The pump has a steel shaft with large diameter eccentric bearings

joints are bronze lined and work in oil. The plungers are of "non-rust" steel and operate in a forged steel pump chamber which is bronze bushed and fitted with removable bronze valve seats. The packing chambers are deep and easily accessible. Each pump is equipped with a hydraulic safety relief valve of sufficient capacity to relieve full discharge of the pump without a substantial increase in pressure.

Artificial Lighting in Industry

I N a pamphlet dealing with the use of Cooper-Hewitt lamps for lighting industrial buildings, much information is given on the subject of vision, its acuteness and its importance in the question of industrial lighting. The utility of producing sharp outlines is stressed, as this increases the contrast between surfaces. Examples are quoted in which this element has meant a definite industrial improve-

ment, either through a saving in labor costs or the turning out of a product containing fewer minute defects not discernible unless lighting conditions are particularly good.

It is stated that the yellow and green light rays constitute the best seeing rays in the entire spectrum, and these rays are said to form 90 per cent of the total rays emanating from the Cooper-Hewitt light. The remaining 10 per cent comes from the blue and violet end of the spectrum, while none whatever, it is said, comes from the red end.

Goggles With Helmet Attachment

G OGGLES attached to a skeleton helmet by fiber links have recently been added to the line of equipment for oxy-acetylene welding, manufactured by the Oxweld Acetylene Co., New York.

The goggles can be readily raised over the forehead or lowered over the

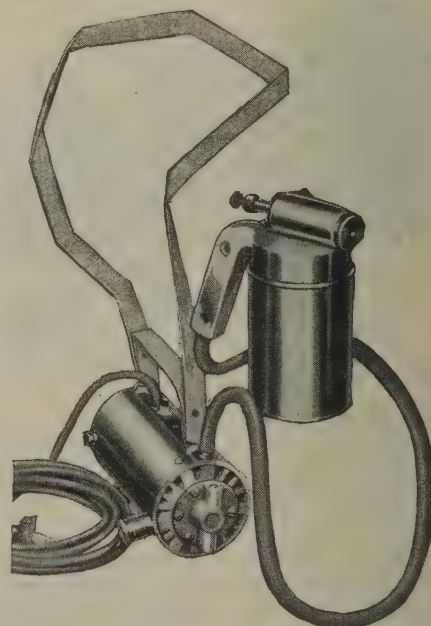


Skeleton Helmet with Goggles Attached

eyes with one hand; the bridge is adjustable and is covered with rubber insulation. Replaceable lenses, in standard size and colors, are used, the colored lenses being protected by cover lenses of clear glass. In another style the lattice skeleton cap is replaced by a fiber helmet, protecting the entire top of the head adequately. Both styles have leather adjusting straps at the rear.

New Paint Spraying Outfit

T HE Weil Lectrospray, a new electric spray painting device developing sufficient air pressure to spray liquid finishes, is being manufactured by the Weil Machine Co., Detroit, for economical painting or spraying in factories, warehouses and other buildings.



The Motor-Compressor Unit of the Spraying Outfit May Be Slung Over the Shoulder

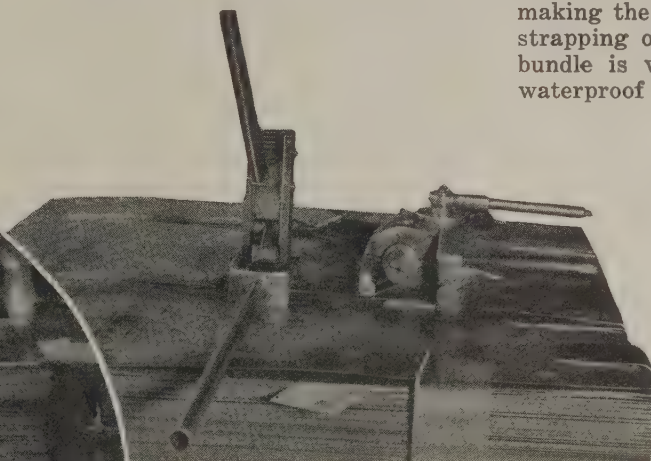
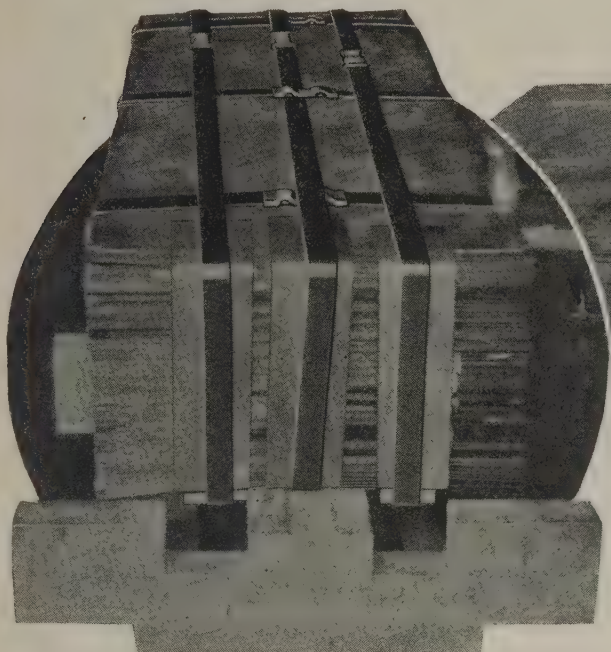
The motor-compressor unit may be slung over the shoulder with the strap provided or it may be set on a bench or on the floor. This arrangement thus represents a departure from the usual practice in this type of gun.

By plugging into an electric light socket and snapping the switch, pressure is generated by the motor-compressor. The density of the spray is controlled by an adjustment of the nozzle.

New Method of Bundling Sheets for Shipment

STEEL sheet, especially full-finished automobile sheets, have been one of the most troublesome commodities handled by the railroads. When wood bracing is shattered by the shifting movement of piles of sheets, the steel is strewn all over the car. Even when the wood bracing holds, the

placed under the band at each corner. There was difficulty, however, in stretching and fastening the ends of the bands, and after working on sev-



Steel Bands and Corner Protectors of Sheet Steel Are Used in Strapping Bundles of Sheets for Shipment. The bands are fastened together with a Signode joint. Tool for making the joint is shown at right

shifting of the piles of sheets—which vary greatly in length—is sufficient to cause the shorter sheets to shuffle back and forth, resulting in scratching and curling up at the ends. As a consequence, many sheets have had to be returned to the mills for reconditioning.

About a year and a half ago, some of the mills, with the cooperation of the Consolidated Steel Strapping Co., 2600 North Western Avenue, Chicago, started experiments intended to do away with wood bracing by bundling the sheets with steel bands and allowing the unit to shift in the car. Progress was made, but without solving the problem.

The Fisher Body Corporation, Detroit, also began experimenting, using 2-in. x 16-in. gage bands and loading the bundles in gondola cars instead of box cars. The bundles were lifted into gondola cars by crane and covered with waterproof paper to protect the sheets from the elements. These shipments arrived in such excellent condition that the Fisher company decided to have all of its shipments made in this manner.

Bundles 20 in. high were put up with three cross bands around the steel only; 2 x 4 skids were strapped to the bundle with two or three longitudinal bands. Corner protectors made of sheet steel (about 6 x 6 in.) were

eral methods of fastening it seemed that welding was the only satisfactory means of fastening the ends; but welding required an experienced welder, and trouble was encountered because of heat going down through the top sheets.

The Consolidated Steel Strapping Co. then developed a simple stretcher and tool for making the Signode joint on a 2 x 0.050-in. band. After making several test shipments to the Fisher body plants, permission was obtained from that company for the mills to use this new Signode equipment.

The Fisher Body Corporation limits its bundles to 20 in. high, for convenient handling, and the average bundle weighs from 15,000 to 16,000 lb. Two 2 x 4 skids, running lengthwise, are used to allow the bundle to shift; otherwise the bundle would stick on the bottom and the top of the bundle would slide. Three crosswise straps are placed next to the steel, and the lengthwise straps are put on over the 2 x 4 skids. These bands are 2 x 0.050-in. material, tightened with a special "heavy duty" stretcher and fastened with the special tool for making the Signode joint. After the strapping operation is completed, the bundle is wrapped with Sisal Kraft waterproof paper, and then loaded by crane on gondola cars.

While gondola loading costs are higher per car than box car loading, the cost per ton is said to be just about the same, due to increased efficiency of handling in the mills by reason of strapping large bundles. For example, a bundle weighing 20,000 lb. can be strapped and covered just about as cheaply as one weighing 8000 lb. From 100,000 to 140,000 lb. can be loaded in a gondola, but only 80,000 to 90,000 lb. in the average box car. Advantages claimed for the Signode method are that it delivers

material in better condition; saves handling, which eliminates scratches; cuts down loading costs at destination; saves railroad equipment; cuts down claims on railroads, and reduces the amount of material rejected.

Some receivers request strapped shipments in box cars. Some of the bundles are strapped the same as for gondola loading, and some are loaded crosswise of the car. In crosswise loading the steel is strapped in small units of 4000 to 6000 lb., and five or six of these small units are strapped together with two or three bands into one large unit in each end of car.

To Control Combustion on Heating Furnace

THE Carnegie Steel Co. is having the American Heat Economy Bureau, Inc., install on one of the heating furnaces at its Duquesne works automatic control equipment for regulating the combustion of fuel in the furnace. Such control has established its value in a recent installation on a slab heating furnace, the heated slabs from which showed a very thin, uniform scale, which readily broke off at the rolls. The flame in the furnace is merely a haze at the rear.

Serious difficulty previously had been encountered in operating the

furnace. At times so much gas was fired that it burned at the stack or excessive scaling occurred, impairing the quality of the finished product. The automatic control is designed to admit only the desired amount of air to the furnace for the fuel fired and maintains this condition for all rates of firing. Under such uniform conditions, the scale loss on heating furnaces is reduced one-half or more, it is stated, while the fuel consumption is maintained at a minimum, dependent on the furnace design and the character of the steel heated.

Mileage Scale Attacked by Shippers

Proposed Freight Rate Changes on Iron and Steel Products Objected to by Mills,
Partly on Ground That New Tariffs Would Be Unreasonably High

WASHINGTON, Dec. 4.—The recent report of Examiners Howard C. Faul and C. M. Bardwell recommending a mileage scale of rates on iron and steel products throughout Official Classification territory was attacked by steel producers, consumers, Chambers of Commerce, railroads, port authorities, and others in briefs of exceptions filed last week with the Interstate Commerce Commission. A principal objection was that the scale carries levels of rates that are too high. But this objection was not voiced by the Chicago and related districts. Protests also were made against suggested rates for short hauls, especially by producers in the Middle West districts; proposed changes in relationships, the arrangement of mileage blocks, the maintenance of present differentials on eastbound traffic from Johnstown, Pa., and Cumberland, Md., and other points. Arguments probably will be heard before the commission the latter part of this month.

Steel Corporation an Objector

United States Steel Corporation subsidiaries filed exceptions to six recommendations. They objected to the conclusions of the examiners that the "level of the rates on iron and steel is of much less importance to shippers generally than is their relationship;" that "the principle of what the traffic can or will bear is a factor which must be given due weight;" that "the evidence is persuasive that, with certain exceptions * * *, rates on manufactured steel should be uniform or level throughout the territory under consideration;" that the scale to be adopted as a maximum reasonable rate scale be applied to the interstate transportation of iron and steel articles; that "in view of the peculiar conditions existing at Johnstown (Pa.) and Cumberland (Md.) * * * no objection be interposed to the retention of the present differentials on this traffic eastbound provided the same differentials are established on westbound traffic;" and that no origin grouping should be authorized in connection with hauls of approximately less than 150 miles.

Discussing the first exception it was contended that it was proved conclusively that the rates were unreasonably high. Ignoring the weight of the testimony showing the unreasonableness of the general level of the short haul iron and steel rates in the middle district, the brief said, the examiners start the scale at 6c. per 100 lb. Manifestly, it was urged, they have overlooked the controlling fact that there are different traffic and

transportation conditions existing within the Pittsburgh district, Mahoning and Shenango Valleys, Cleveland-Wheeling territories * * * which would justify a lower scale for this short-haul territory than that recommended for general application.

It was also pointed out that the examiners overlooked the important fact that the Monongahela, Allegheny and Ohio rivers afford to shippers in the Pittsburgh district a means of water transportation available throughout the entire year at rates appreciably lower than the scale recommended and that the establishment of such a scale in that district would drive away from the rail carriers the traffic which they are now enjoying at highly compensatory rates, with the consequent decrease in the carriers' revenues. It also should be remembered, the brief said, that the present scale of rates in the Pittsburgh, Mahoning-Shenango Valley, Cleveland-Wheeling districts are presumably now on a reasonable basis.

Claims Rates Would Be Unreasonably High

Excepting to the recommendation that "the principle of what the traffic can or will bear is a factor which must be given due weight," the brief said this contention is grounded on the fact that the examiners have ignored the element of reasonableness and have proceeded upon the false premise that the iron and steel traffic can bear unreasonably high rates, notwithstanding that during the course of the discussion they hold "it is the commission's duty in this proceeding to fix reasonable rates on steel." The brief sets forth a part of the scale proposed to support the argument that it would have the restrictive effect of long-haul rates. It is pointed out that over 62 per cent of the movement of steel is for hauls less than 300 miles and that when the length of the hauls from Pittsburgh to the large consuming markets in the East is reached the percentage of the longer movement is much less. It was declared that the short-haul rates in the middle district should not be increased because of the water competition situation and that they are more than amply compensatory, and finally that the long-haul rate from that district should be reduced because the traffic is not moving freely thereunder.

Regarding the recommendation that the rates on manufactured steel should be on a uniform level throughout Official Classification territory, the brief urged that consideration should be given to the transporta-

tion, commercial and competitive situation peculiar to the short-haul movement of iron and steel articles in the Pittsburgh and adjacent territory and that reasonableness should not be sacrificed for uniformity.

Scale Declared Unscientifically Drawn

The brief also maintained that the scale is unscientifically drawn. It was declared to be entirely too high in that the rates of progression are too rapid. Attention was directed to the fact that the rate for the first block, which is fixed at 6c. per 100 lb., was 20 per cent of the first class rate proposed for the first block in the Eastern Class rate case. Dealing with the proposed maintenance of differentials on eastbound traffic from Johnstown and Cumberland, the brief inquires as to why the differential relationship should be preserved to Johnstown and be denied to all competitive districts.

The finding that no origin grouping should be authorized in connection with hauls approximately less than 150 miles, the brief said, would work considerable injury to the competitive mills in the middle district, which have been developed under long established rate groupings on short-haul traffic, unless practical exceptions are permitted so as to mold the scale to fit into the exigencies of trade and commerce. The brief expressed the view that the establishment of groups on traffic involving distances under 150 miles would be in the public interest, but that such groups should be a matter of conference between the carriers and the industries involved, with the proviso that no carrier should be permitted to take out of the prescribed group a particular industry and accord to it a preferential rate, "such as the trunk line carriers in the Philadelphia steel producing district have been according to the favored competitor on traffic moving to the large metropolitan consuming district."

The brief made no objection to the retention of the Pittsburgh group as now constituted, provided that Pittsburgh is used as a central point from which to determine the mileage. But if the mileage from the Pittsburgh group is to be constructed on the average from all points in the augmented group, the brief said, exception will be taken to including Wheeling and related points.

Jones & Laughlin's Objections

The Jones & Laughlin Steel Corporation, Pittsburgh, made seven objections to the recommendations. It contended that the rates for long

hauls are unduly high in their relation to rates for short hauls under the proposed scale; that the level of rates in the scale for hauls in excess of 100 miles is unreasonable; that the level for hauls of less than 50 miles is unreasonable; that points in Ohio and West Virginia now included in the Pittsburgh group should not be constituted into a separate group; that the rates recommended do not give effect to the findings of fact; that the examiners erred in failing to recommend a scale having the progression and level of the scale proposed by F. A. Ogden, traffic manager of the Jones & Laughlin Steel Corporation, and that the scale proposed from five miles and under to 800 miles should not be adopted.

Objection was made to the scale because it names rates for the longer hauls, over 300 miles, that are unduly high in relation to the rates for shorter hauls, under 100 miles. The rate of progression was declared to be too high and the rates to increase too fast for successive distances or mileage blocks. It was contended that the purpose and effect of the scale is to prevent the middle district from shipping to or beyond the other districts, to keep the middle district out of the Atlantic seaboard market and West Coast business available by water only through seaboard, and also out of the St. Louis and Mid-Western market and other territory beyond whose rates base on Chicago or the Mississippi River. It was stated that the "blow dealt the (United States Steel) Corporation by the examiners hit also the middle district independents, including these exceptants." The net result of the scale, it was said, would be to reduce aggregate revenues by less than 5 per cent; that the reductions would fall more to the short haul traffic than to long haul, and that the scale accomplishing the reductions shall progress from 60 per cent of the Central Freight Association fifth class rate at five miles to 100 per cent of fifth class at 480 miles. In its exception that the level of rates for short hauls of less than 50 miles is unreasonable, the brief said that, with one-fifth of the total traffic moving less than 40 miles and a proposed increase thereon of about 40 per cent, it seems clear that some provision should be made in the final decision to take care of the short movements, 40 miles and less, taking place within so-called and arbitrary switching limits or elsewhere.

The proposed separation of Weirton and Wheeling, W. Va., from the Pittsburgh group, it was stated, would simply throw them $\frac{1}{2}$ c. or 1c. out of line with the familiar Pittsburgh rate basis. Quotations, it was declared, would under pressure of competition have to be made, as they are now, in contemplation of the Pittsburgh base price and freight rate. The $\frac{1}{2}$ c. or 1c. difference, it was contended, necessary to take into account on quotations, would be more hindrance and nuisance in the routine of selling and accounting than the money would be worth to the railroads. Finally, it

was declared that the proposed scale, or any other scale embodying full class rates for long hauls, and a substantially lower level of rates for short hauls, "will fail to remedy the discrimination or correct the unreasonableness of the present rates from Pittsburgh."

Valley Producers also File Exceptions

Steel manufacturers in the Mahoning and Shenango Valleys excepted to the report because of its failure to include certain sections in the territory involved, such as a section of Kentucky and Lake Michigan points reached by way of cross-Lake routes; because of its failure to carry fully into effect facts which, it was stated, warrant a lower rate scale than the basic scale and because of proposed maintenance of differentials on east-bound traffic from Johnstown and Cumberland.

The basic scale proposed was declared to be too high for both the long and short hauls. It was contended that a mileage scale should start at a lower figure than 6c. because of the existing short haul rate situation in the important iron and steel producing districts of Pittsburgh, Wheeling and Chicago and because of the competitive relationship between the iron and steel industries located in switching districts and industrial districts. The brief urged adoption of the Rhodehouse scale, which starts at 3c. and progresses at an increase of $\frac{1}{2}$ cent for each five-mile block, reaching the rate of 92.5c. for the 66 to 70-mile block, which is the present intrastate rate between Youngstown and Cleveland. The Youngstown interests, objecting to maintenance of the Johnstown and Cumberland differentials, asked application of the mileage scale basis from all producing points without exception.

Objection was made to any fourth section relief which will permit the direct lines by way of the Western gateways to publish a lower basis on iron and steel in carloads from Pittsburgh than from Youngstown to the Virginia cities and to points located on the Chesapeake & Ohio and Norfolk & Western railroads intermediate to the Virginia cities by way of the Eastern gateways. But whatever scale is prescribed, it was said, should be applied from Pittsburgh by way of the Eastern gateways and should not be equalized by the Western gateways, unless at the same time the same basis of rates is accorded the Valleys as is accorded Pittsburgh by way of direct routes through the Western gateways.

It was also urged that no change be made in the present rail-Lake and rail-Lake-rail rates to Duluth and the Twin Cities, regardless of the rate basis which may be prescribed within official territory. To permit the carriers to advance the rates to Duluth and the Twin Cities, it was said, would result in changing the competitive relationship of Youngstown and other interior points in official territory with other producing dis-

tricts, such as the Chicago district, to the destination territory, which is outside the scope of the proceeding.

Illinois-Indiana Shippers Also Object

Manufacturers and consumers in the Illinois-Indiana territory, through the Illinois-Indiana Shippers' Steering Committee, took exception to the proposed grouping and declared that the commission should reaffirm the principle of grouping as stated in the Jones & Laughlin rate case, which, in effect, provides that rates from and to each group, in the aggregate, average substantially the same as if made from and to each point separately. It was suggested that the establishment of groups of points of origin and groups of points of destination should in the first instance be left to the carriers, and that as to the making of rates to and from Milwaukee, which have always been made on an arbitrary over the Chicago rate, they should be continued to be made on that basis.

The Indiana State Chamber of Commerce, representing numerous producers and consumers in Indiana, excepted to the scale and submitted one of its own, providing a rate of 6c. for five miles and under up to 51.5c. for 1200 miles. The scale is carried in five-mile blocks up to and including 70 miles at a rate of progression of 10c. for each 100 miles. At 70 miles the scale is broken in 10-mile blocks up to and including 160 miles at a rate of progression of 5c. for each 100 miles on the theory that hauls for distances in excess of that are handled largely by through freight trains and the scale would be broken at a rate of 4c. for each additional 100 miles up to and including 500 miles.

In so far as iron and steel are concerned, the brief said, the Pittsburgh interests are striving to get into certain portions of southwestern Indiana and into Illinois in competition with producers located in the Indiana-Illinois territory. Here, it was stated, the element of competition should tend to decrease further the rate of progression, so beyond 500 miles the scale would be broken so that the rate of progression would be 3c. for each 100 miles. Under this scale, it was declared, consumers in certain portions of Indiana and Illinois would have the privilege of purchasing their steel in a highly competitive market.

[Briefs have been filed, also, by producers in the Philadelphia and Buffalo districts, by the Cleveland Chamber of Commerce, Milwaukee Iron and Steel Committee and others, and these will be summarized in the issue of Dec. 13.]

Directors of the General Fireproofing Co., Youngstown, have called a special meeting of stockholders on Dec. 4 to consider a plan for the exchange of the old common stock of the company for new stock on a four for one basis. The plan will necessitate increasing the authorized common shares from 200,000 to 500,000.

Operation of Stevens Steel Furnace

Open-Hearth Unit, Insulated and Incased in Steel, Is Subjected to Close Oxygen Control

WHEN the conditions are met that give the greatest thermal efficiency in the open-hearth furnace, a neutral atmosphere is automatically produced, and the furnace pressure is automatically made constant. It must be remembered that a neutral atmosphere depends upon the correct ratio of air to fuel, and any variation in furnace pressure causes a variation in volume of air induced. A neutral atmosphere improves metallurgical conditions, resulting in a greater yield and better steel.

According to a statement by Arthur L. Stevens, president Arthur L. Stevens Corporation, 205 West Wacker Drive, Chicago, the Stevens furnace is designed to meet these conditions. Regenerators are of a form and capacity, based upon data regarding heat absorption by brick and time of reversal, that give the maximum heat recovery and highest air temperature possible. All of the air for combustion is sent through the regenerators; this is done independently and is in no way related to stack draft. Stack draft is used only to take away the waste gases produced, and the pressure in furnace over the bath is kept constant at all rates of firing.

Air is supplied at constant pressure and is metered, as is also the fuel, so that the correct ratio of fuel and air is always maintained, and cold, infiltrated air is excluded. The flame temperature is raised, which

promotes fast melting. And, as the increased economy in the use of fuel and the exclusion of excess air reduce the volume of hot gases, there results a prolonged life for refractories.

Guarding Against Unwanted Air

To carry out this method the Stevens furnace is incased in steel, with specially constructed doors to insure against inward leakage of air. The regenerators are correctly proportioned for maximum heat effect and are insulated and incased in steel. Air supplied by a fan at a constant pressure is passed through an orifice meter, and this charge is calibrated with the fuel supply. Constant pressure is maintained in the furnace atmosphere. This means that high fuel economy is secured and a neutral atmosphere is automatically maintained.

Various patented devices are used in carrying out this plan and a broad patent has been granted for operating an open-hearth furnace with a neutral atmosphere maintained in this manner.

The first Stevens furnace to go into production is said to have cut fuel consumption sharply. The yield was increased and the percentage of pig iron used in the charge was reduced. The quality of steel was improved and the entire cost of installing the complete new furnace was saved in less than one year.

begun last week on the ground. When assembled these trusses will be hoisted into place whole, without disturbing traffic on Fort Street. When it is completed, about July 1, 1929, the Ambassador bridge will be the largest suspension bridge and have the longest span of any bridge in the world.

Aircraft Manufacturing to Adjoin Detroit Airport

The Detroit Board of Commerce and the Wayne District Association have announced plans for the organization of a \$5,000,000 corporation to undertake the immediate development of the Detroit-Wayne Industrial Airport, a tract one mile square, just outside the city of Wayne, which is 17 miles from Detroit.

Half of the tract will be sold or leased as industrial sites to manufacturers of planes, parts or accessories. The Stinson Aircraft Corporation has already purchased a 10-acre site and has begun construction on a \$250,000 plant, which, it is expected, will be completed in 60 days. Other aircraft companies are said to be considering locations at the industrial airport.

Buffalo Scrap Dealers Form Institute Chapter

The seventh chapter of the Institute of Scrap Iron and Steel was organized at a meeting held at the Hotel Statler, Buffalo, Monday evening, Dec. 3, and attended by 60 representative dealers and brokers from western and central New York. The following officers were elected: Charles Bock, president; Sol Morrison, first vice-president; L. Hurwitz, second vice-president; Ben Rosenthal, third vice-president; J. E. Farrell, secretary; Harry Roblin, treasurer; Joseph M. Maher, chairman executive committee.

Trade Practice Conference in Chicago December 12

WASHINGTON, Dec. 4.—The trade practice conference of the woodworking machinery industry with the Federal Trade Commission will be held on Dec. 12 at the Sherman Hotel, Chicago. The conference will be in charge of Commissioner G. S. Ferguson. An announcement by the commission said that a majority of manufacturers and dealers will be represented, and it is the desire of the commission and the industry that all others who have an interest in the subject consider themselves invited whether or not they have received an official announcement. Among trade practice proposed for discussion are inducing of breach of contract, fraud and misrepresentation, secret rebates, and price discrimination. Efforts will be made to provide for elimination of unfair commercial practices. The Association of Manufacturers of Wood-

working Machinery has drawn up a tentative list of rules which will be submitted.

World's Largest Suspension Bridge Nearing Completion

Construction of the \$26,000,000 Detroit-Windsor Ambassador bridge has progressed so rapidly that all of the cable work will be completed this week, according to Robert MacMinn, chief engineer in charge for McClintic-Marshall Co. Fabrication of the stiffening trusses in the central, over-river span, which is 1850 ft. long, will be begun before Jan. 1 and completed by April 1. On the Canadian side, 17 bays of the 29 bays of steel approach have been completed, and work on the Canadian side approach, including concrete, is about 75 per cent completed. On the American side work on two trusses each 140 ft. long, which will bridge Fort Street, Detroit, was

Use of Blast Furnace Slag in Bituminous Construction

Following several previous publications devoted to use of blast furnace slag, the National Slag Association, Cleveland, has put out Symposium No. 8, "Use of Slag in Bituminous Construction." This is a 60-page pamphlet dealing with application of slag aggregate or slag concrete to the construction of highways and other similar mass engineering projects. Quotations are given from a large number of publications and authorities, showing the requirements for this service, how well the slag fills these requirements, and many other pertinent matters connected with the subject.

Schedule of the next instalment of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Dec. 20—Position of Iron and Steel Producers.

Pig Iron Freight Rates from Granite City Reduced

WASHINGTON, Dec. 4. — Passing upon a complaint of the St. Louis Coke & Iron Corporation, Granite City, Ill., the Interstate Commerce Commission in a decision made public last Wednesday held that rates on pig iron in carloads from Granite City to certain deliveries in the St. Louis district, to Cape Girardeau, Mo., and to Springfield, Mo., are unreasonable and unduly prejudicial. Rates on pig iron from Granite City to certain other destinations in Central, Western trunk line and Illinois territories were found not unreasonable or unduly prejudicial. These latter destinations included points in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, Ohio and Wisconsin.

The new and old rates from Granite City in gross tons, to the St. Louis, Cape Girardeau, and Springfield districts, follow:

	New Rates	Old Rates
St. Louis.....	75c.	56c.—\$1.23
Cape Girardeau ...	\$3.18	\$4.26
Springfield	4.00	4.50

The new rates are to become effective Jan. 10. To destinations on the rails of the Terminal Railroad in the St. Louis switching district a rate of 56c. now applies from Granite City for distances ranging from six to 15.5 miles and averaging about nine miles. To deliveries on other lines in the district, the distances from Granite City range from 14 to 22 miles and average about 19 miles. To most of the deliveries in the district on the Missouri Pacific and to at least one delivery in the district on the Frisco Lines a joint rate of 75c. applies. To other deliveries on connecting lines in the district, combinations apply from Granite City, composed of the 56c. rate of the Terminal Railroad, plus the switching charge of the delivering line. These combinations range from 83c. to \$1.23. Fourth section violations, which had been complained of through failure to establish certain joint rates, were said by the commission to have been removed.

South African Steel Plant of 150,000 Tons Capacity

Plans for South Africa's new State-owned steel plant were outlined by the new corporation's chairman on the eve of his departure for Europe to look into the matter of steel production and select the technical expert who will guide the destiny of the venture, according to the Department of Commerce.

Initial production of 150,000 tons per annum will be aimed at, according to his statement, the department is informed by Trade Commissioner Samuel H. Day, Johannesburg. Importations of raw steel are at present about 300,000 tons. Manufactured steel products made by new subsidiary industries are expected to take another 150,000 tons of raw steel. The

value of steel imported into South Africa in 1927 was £2,500,000, and in 1926, £3,000,000.

Thus, if the corporation obtained the whole Union market and had the benefit of the demand of subsidiary industries for products that could easily be made in South Africa, the total eventual production might be as high as 500,000 tons per year, it is said.

Emphasis was placed on the new company's policy to treat all suppliers, whether British, German or American, on a fair and equal basis in calling for tenders for plant equipment. No contracts were to be placed during the coming European trip, since these were to come only after prolonged study and arrival at final details by the staff of experts.

Booklet on International Foundrymen's Congress

A 44-page illustrated booklet has been issued giving the details of the arrangements for the Third International Foundrymen's congress to be held in London, England, June 11 to 15, 1929. It contains full information regarding the various tours and other arrangements that have been made for the convenience of American foundrymen who expect to attend. The booklet, prepared under the supervision of the committee on international relations of the American Foundrymen's Association, is being distributed by the association and by the official travel agents, Thomas Cook & Son, 585 Fifth Avenue, New York.

A general description of the Third International Foundrymen's congress follows a foreword by S. T. Johnston, president A. F. A. Subsequent sections describe the arrangements that have been made for plant visitation, sightseeing, and the official tours. The latter section, which is very complete, includes detailed itineraries and quotes rates of fare covering the trip to the London congress itself, the official pre-convention tour of Great Britain, and a choice of three post-convention tours covering attractive sections of the continent of Europe.

An American foundryman may attend the Third International Foundrymen's congress for as little as \$391 from New York, including round trip cabin steamship accommodations, hotel rooms in London, breakfasts while ashore, local sightseeing, entertainment, etc. The most elaborate tour listed covers most of England and Scotland, Belgium, Germany, Switzerland, Italy and France.

The booklet is illustrated with reproduction of events at the First International Foundrymen's congress in Paris in 1923 and typical European scenes. Copies may be obtained from the official travel agents, or C. E. Hoyt, executive secretary American Foundrymen's Association, 222 West Adams Street, Chicago.

Study of Metallurgical Problems at Pittsburgh

The current year's program of the metallurgical advisory board of the Carnegie Institute of Technology and the United States Bureau of Mines on which five research fellows, one research engineer and an assistant and an analyst now are at work under the instruction of a group of men from the Pittsburgh station, United States Bureau of Mines, embraces the following problems:

Physical chemistry of steel-making (plant work), by C. F. Christopher, research engineer, University of Pittsburgh, metallurgical engineer, who will have A. D. Myer as assistant and J. F. Sanderson as analyst in the work.

A study of the cause and control of abnormality in case-carburized steel by J. E. Jacobs, Carnegie Institute of Technology, metallurgical engineer, class of 1928.

Formation and identification of inclusions by M. F. Judkins, University of Washington, chemical engineer, class of 1928.

Distribution ratio of iron oxides between slag and metal by W. O. Krebs, Yale University, chemical and metallurgical engineer, class of 1928.

Method of determining inclusions by W. E. Marshall, Georgia School of Technology, chemical engineer, class of 1927.

Viscosity of open-hearth slags by Kenneth Metcalfe, Rose Polytechnic Institute, chemical engineer, class of 1928.

The Bureau of Mines instructors in charge of Dr. C. H. Herty, Jr., are: J. M. Gaines, Jr., B. M. Larsen, G. R. Fitterer, H. Freeman and P. W. Edeburn.

Montclair, N. J., Adopts Institute's Specifications

The standard fireproofing specifications, as drafted by the American Institute of Steel Construction, have been adopted by the city of Montclair, N. J. This is the first city in the United States to take such action. The ordinance adopted by Montclair as an amendment to its building code reads:

"The fireproofing of structural steel shall conform to the standard specifications for fireproofing structural buildings of the American Institute of Steel Construction, dated Oct. 8, 1927."

The Florida Building Officials' Conference unanimously adopted on Nov. 17 a uniform building code which includes in its entirety the institute's standard specification for structural steel for buildings. This building code was immediately accepted by the city of West Palm Beach and will be adopted by all of the larger cities of Florida by ordinance, as the Building Officials' Conference has no mandatory powers. The State of Florida purposes to have legislation enacted ultimately making the use of the new code compulsory throughout the State.

Fabricated Structural Steel

Awards of 42,400 Tons Include Several Large Jobs— Chicago Office Building Will Take 10,000 Tons

AWARDS during the last week totaled 42,400 tons. Of outstanding size were 8600 tons of plates and shapes for a ship to be built at Chester, Pa.; 7200 tons for an insurance building at Hartford, Conn.; 5600 tons of shapes and sheet steel piling for a railroad warehouse at Jersey City, and 5000 tons for an office building at Boston. New projects, calling for 27,400 tons, included 10,000 tons for an office building at Chicago. Awards follow:

BOSTON, 5000 tons, United Shoe Machinery building, to New England Structural Co.

BOSTON & MAINE RAILROAD, 1400 tons, 12 bridges, to Boston Bridge Works, Inc.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 250 tons, freight shed, to Palmer Steel Co.

HARTFORD, CONN., 7200 tons, building for Etna Life Insurance Co., to Levering & Garrigues Co.

WHITE PLAINS, N. Y., 365 tons, Peoples National Bank Building, to Hay Foundry & Iron Works.

NEW YORK, 2200 tons, office building at Madison Avenue and Forty-seventh Street, to Levering & Garrigues Co.

NEW YORK, 785 tons, apartment building at 423 East Eighty-sixth Street, to Paterson Bridge Co.

NEW YORK, 520 tons, apartment building at 237 East Twentieth Street, to A. E. Norton, Inc.

NEW CITY, N. Y., 900 tons, Rockland County Hospital buildings, to unnamed fabricator.

ASBURY PARK, N. J., 1500 tons, convention hall, to Hedden Iron Construction Co.

Jersey City, 5600 tons, 1600 tons in column cores for Delaware, Lackawanna & Western terminal, to Levering & Garrigues Co., and 4000 tons of sheet steel piling, to Bethlehem Steel Co.

CHESTER, PA., 1600 tons of shapes and 7000 tons of plates for ship to be built by Sun Shipbuilding Co., to Carnegie Steel Co.

PITTSBURGH, 400 tons, apartment building, to McClintic-Marshall Co.

CLEVELAND, 700 tons, plant for Geometric Stamping Co., to Austin Co.

FLINT, MICH., 900 tons, Flint Auditorium, to Flint Structural Steel Co.

PONTIAC, MICH., 100 tons, truck repair building for Fisher Body Corporation, to R. C. Mahon Structural Steel Co.

STATE OF INDIANA, 600 tons, highway bridges, to Rochester Bridge Co.

CHICAGO, 345 tons, store and loft building, to Duffin Iron Works.

CHICAGO, 150 tons, warehouse for John Sexton & Co., to Wendnagel & Co., local.

GREEN LAKE, WIS., 375 tons, club house, to Vulcan Mfg. Co., Fond du Lac, Wis.

MONTICELLO, MINN., 800 tons, bridge, to Minneapolis Steel & Machinery Co.

KANSAS CITY, MO., 425 tons, Klein Building, to Kansas City Structural Steel Co.

PARADISE, MONT., 570 tons, Clarks Fork bridge, to unnamed interest.

LA HABRA, CAL., 100 tons plates, riveted pipe line, La Habra Heights subdivision, to Western Pipe & Steel Co.

SAN FRANCISCO, 2870 tons, Methodist Book Concern hotel, McAllister and Leavenworth Streets, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 480 tons, store and office building on Newbury Street.

BOSTON, 110 tons, Boston Elevated Railway garage.

PORTLAND, ME., 500 tons, Maine General Hospital.

NEW YORK, 1000 tons, apartment building at 37 West Seventy-second Street; James Stewart & Co., Inc., general contractor.

NEW YORK, 700 tons, apartment building at 4 East Seventy-second Street; George A. Fuller Co., general contractor.

NEW YORK, 200 tons, building at Broadway and Sixth Avenue for John David store.

STATE OF NEW YORK, 150 tons, highway bridge.

STANDARD OIL CO. OF NEW JERSEY, 1000 tons, five tanks.

PHILADELPHIA, 500 tons, office building at Sixty-ninth and Market Streets.

BALTIMORE, 100 tons, building for Stone & Webster, Inc.

ERIE, PA., 2000 tons, building for Erie Dry Goods Co.

LOUISVILLE, 1600 tons, approaches to highway bridge spanning Ohio River.

CINCINNATI, 140 tons, municipal garage.

CINCINNATI, 2000 tons, building for Union Gas & Electric Co.; George A. Fuller Co., general contractor.

CLEVELAND, 600 tons, Robert Fulton and Louis Agassiz schools.

YOUNGSTOWN, tonnage unstated, seventeen-story building for Central Trust & Saving Co.

FLINT, MICH., 1500 tons, Union Trust Co. building.

DETROIT, 800 tons, section 5, Detroit-Windsor tunnel, including Customs building and Detroit approach.

DETROIT, tonnage unstated, *Detroit Times* building.

CHICAGO, 10,000 tons, office building at 1 North La Salle Street.

CHICAGO, 1000 tons, First Regiment Armory; Mississippi Valley Structural Steel Co., low bidder.

MINNEAPOLIS, 1400 tons, Northwestern National Bank building.

PRAIRIE DU CHIEN, WIS., 1300 tons, highway bridge.

BARABOO, WIS., 280 tons, Federal aid bridge across Wisconsin River at Delton; general contract awarded to Fischer & Yahr, Wausau, Wis.

New Steel Putty Drums

The Geuder, Paeschke & Frey Co., Milwaukee, has added 50-lb. and 100-lb. putty drums to its line of Wedg-Seal containers. These drums have the Wedg-Seal patented inclosure designed to keep the oil from leaking out and are constructed to withstand handling and shipping abuse. It is claimed that this permanent tight seal is necessary to keep the putty in perfect condition, and after opening it can be resealed securely, eliminating the need for adding oil.



Steel Water Tank and Look-out Platform

WENTZ CAMP, 4 miles northeast of Ponca City, Okla., is a boy scout camp of 160 acres on which barracks have been erected and improvements made to accommodate 1000 boys. One of the first things the visitor sees is the combined water tank and lookout, shaped something like a giant scepter.

The spherical portion, 21 ft. in diameter, holds 30,000 gal. of water, which is used as a general supply. The tower or cylindrical portion, 7 ft. in diameter and 75 ft. high, incloses a circular stairway which extends through the tank to a platform 10½ ft. in diameter. This observation point, 94 ft. above the ground, is surrounded by a lattice fence and equipped with a telescope and searchlights.

Steel plates used in building this structure range from 5/16-in. to ¾-in. thick. They were fabricated at the western plant of the Chicago Bridge & Iron Works and erected by one of that company's field crews. A swimming pool and additional buildings are under construction.

This Issue in Brief

Cuts costs and improves quality of work by freeing machine operators from "common labor" work of lifting and carrying. Truck builder finds it pays to install short gravity conveyors to carry heavy parts from machine to machine.—Page 1426.

* * *

Arc welding induces large "negative" or compressive stresses in steel plate adjacent to the weld, investigator finds. These deformations persist even after the welded bead is milled off.—Page 1429.

* * *

Impartial and rigid inspection of manufactured parts is insured by having inspectors report directly to engineering department. In this way sympathetic connection between production department and inspectors is avoided.—Page 1419.

* * *

Dead stock is kept out of stock-room by selling material unused in six months. "Corpses" are cleared by systematic sale of dead items. Purchasing agent is made responsible for sale of materials no longer used.—Page 1421.

* * *

Instead of buying more core ovens, foundry substituted gas fuel for coke. The change increased output to such an extent that existing equipment yielded increased product.—Page 1424.

* * *

Accident hazard not increased by greater mechanization. By placing employees' safety first when laying out or purchasing new equipment, iron mines have been able to keep down accident rate, despite considerable increase in mechanical equipment.—Page 1431.

* * *

Forty-three million dollars' worth of American machinery was shipped abroad in October. This is a gain of 32 per cent over September. Machinery exports for first 10 months are 13 per cent above same period of 1927.—Page 1480.

Takes the "guess" out of manufacturing for stock by budgeting production according to surprisingly accurate sales forecast index. Valve and fittings manufacturer found that his sales curve fluctuated almost exactly in parallel with composite curve based on operations in industries in which his product is used. Now he can tell ahead whether to cut production or to prepare for increased orders.—Page 1431.

* * *

Structural fabricator gages bar lengths quickly by placing the bar to be cut in a long channel, in which holes are cut at 3-in. intervals. Foot marks are stencilled on the channel. The holes accommodate a gage block, permitting accurate measurement to be made almost instantly.—Page 1434.

* * *

Storm of protest raised by proposed mileage freight rates on iron and steel. Consumers, producers, railroads, Chambers of Commerce and others file protests before Commerce Commission. Producers say rates would be unreasonably high. They deny that rates should be on a uniform mileage level, and furthermore claim that the scale is unscientifically drawn.—Page 1442.

* * *

Prophecies steadily increasing foreign trade. Dr. Klein foresees steadily increasing export business for American manufacturers. World buying power is growing, he says, and will grow as long as peace prevails.—Page 1478.

* * *

Lowers production costs by means of simplified stock control. Simple system enables cash register manufacturer to keep track of 52,000 parts, using only 28 different forms. Elaborate records, with accompanying costly clerical force, are eliminated.—Page 1420.

Manufacturing heads must know something about markets, and sales executives must know something about manufacturing, if the business is to prosper to the utmost. The old, neatly drawn divisions are too narrow for modern industrial executives, for manufacture in many lines is in a state of flux, calling for men who can see and comprehend the business as a whole—not just one part of it.—Page 1448.

* * *

Reduces money tied up in stock. As motor trucks are now built to specification, Cleveland plant no longer makes stock models, but keeps stock liquid by maintaining it in the form of finished machine parts, sub-assemblies and partial assemblies. Final assembly is made to meet the specifications of the customer.—Page 1425.

* * *

Work goes through the plant in the same tote box. Material in process in the N. C. R. plant goes from operation to operation in the same box. Accompanying the box is a stock card on which each department foreman marks the quantity of parts processed, the check number of the operator, and the date work was finished.—Page 1423.

* * *

Pig iron output establishes new post-war November record. Daily rate of 110,084 gross tons attained last month is highest November rate since 1918. Gain over October was 1.15 per cent. On Dec. 1 there were 194 furnaces in blast, a loss of 3 during the month.—Page 1452.

* * *

No bewhiskered cost figures here. Cost records are never more than 5 hr. behind the actual work. As soon as work on a certain order is completed, department clerk in cash register plant sends labor ticket to stock ordering department. In this way, not only are cost figures kept up to date, but duplicate payment to workmen is prevented and the location of the work is always known.—Page 1423.

THE IRON AGE

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Editor

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Managing Editor

ESTABLISHED 1855

Higher Convention Standards

ONE who attended the recent convention of the National Founders' Association in New York could not but realize, if he had had similar contact with the association in its earlier years, that the old order has changed, in fact, has been revolutionized. Those conventions of the early nineteen hundreds rang with high-pitched notes of labor conflict. Hours were given to reports from all parts of the country telling of strikes by the molders' union to enforce demands for higher wages or, as in many cases, for shop control with regulation of output, high minimum wage, limitation of employment of handy men on molding machines, and all the rest of the union program in opposition to the open shop. The whole atmosphere of the annual gatherings was charged with militancy.

Partly because the open shop has steadily made headway in the foundry trade, partly because the molders' union has somewhat modified its old views in respect to modern production methods, but chiefly, perhaps, because high wages have come to stay in all industry—at all events the latter-day conventions of the National Founders' Association have lost the old note of militancy. The same is true of the like gatherings of the National Metal Trades Association.

Instead of recounting their engagements with the embattled hosts of unionism, the founders and the men of the metal trades make their annual meetings more like Chautauquas in economics, Government relations to industry, production management, cost accounting, modern marketing, and all the movements that have been remaking industries in the decade since the great war. With manufacture in many lines in a state of flux, executives in the metal-working industries are turning these meeting places into centers of education and of constructive effort. They recognize that leaders in industry today must know much more and about many more things than their predecessors needed to know 20 or 25 years ago. They are finding out also that once orthodox ideas of departmentizing their businesses are much too narrow for this day. Operating men now know that they must study markets and the developments in trade if they are to sit intelligently in conference with managers of sales. And sales executives equally appreciate that the old-time go-getter salesman is being succeeded by a type whose equipment includes much that was once left exclusively to the man in the shop. Thus convention programs take a wide range and appeal to all classes of executives.

What is happening in the association work of the foundry and metal-working industries is seen in manufacturers' organizations in all lines. The changed conditions of post-Armistice years call for bigger and

broader men as heads of industry, and the higher plane of the association convention of today is a distinct response to the new demand.

Is There a New Inflation?

IN a recent address before the Harvard Economic Society Colonel Ayres predicted that high industrial and commercial activity will continue into at least the early months of 1929, but expressed the opinion that this country is now experiencing an inflation; an inflation after \$500,000,000 of our gold (about one-ninth of our total stock) has gone abroad—which would be a new kind of inflation; and he declared that there are vague but real dangers in the increase of loans to brokers by corporations and individuals.

This opinion affords grounds for serious consideration, although exception may be taken to certain of the fundamental statements. Especially is it doubtful if our industrial and commercial activity be at so high a rate as is generally supposed. Many indices support the common belief, but none of our many composite indices of production is satisfactory, and we are lacking any such thing as a general economic index that is any more than a guess. It may be that we are experiencing dazzling activity in some branches of industry and backwardness in others.

There are perplexities in the existing economic situation in this country for which no good explanations are offered; and in the absence of such there are bound to be vague apprehensions.

It is a common belief, entertained by so competent a financier as Secretary Mellon, that our national income has attained the figure of about 90 billion dollars. This implies a remarkably rapid annual increase during the last few years. Income tax returns go some way toward supporting such a belief.

On the contrary, Dr. W. R. Ingalls, who makes an annual estimate that is published in the *Annalist*, reckons the internal national income in 1927 at 73 billion dollars, compared with 74.9 in 1926 and 73.5 in 1925. Doctor Ingalls makes this estimate according to a consistent formula. He also offers an accounting of the industrial income, according to statistics actually reported, into which enter none of the factors that play a part in the formula. The industrial accounting, in millions of dollars, is as follows:

	1925	1926	1927
Agriculture	13,034	12,985	*13,000
Mineral	5,678	6,213	5,520
Building (50 per cent) ..	3,300	3,480	3,470
Steam railroad	6,123	6,383	6,139
Public utility	1,827	1,995	2,113
Telephone	793	878	950
Manufacture	26,800	*28,000	*27,000
Total	57,555	59,934	58,192

The figures indicated by asterisks are more or less

conjectural, which is not, however, to imply that they are reckless guesses. The industrial accounting foots up to about 80 per cent of the total estimated by formula. Both methods give totals of a similar character, i. e., showing but small additions from year to year. This immediately raises two questions: how to account for the difference between 75 billion dollars and 90 billion, and how to account for great increases from year to year.

Some explanation may be found in the stock market. At the middle of 1926 the quotational value of all the stocks listed on the New York Stock Exchange was about 35 billion dollars. At the beginning of November, 1928, it was 61 billion, against which 5.9 billion was being borrowed. All of this great appreciation in nominal value has not been converted into income, either by way of dividends or liquidated profits, but some of it has. Thus the total of State income tax revenue in Massachusetts in 1927 was upward of 21 million dollars, which was about 5 million dollars more than normally, all of which gain is directly traceable to transactions in stocks.

Increases in national income in that way, therefore, may swell and distort the income reckoned as derived from industry, i. e., agriculture, mining, manufacturing, transportation, etc. But all income must be spent, either by the direct recipient or by some one else, unless it be converted into gold to be hoarded. The last certainly has not happened, for we have exported gold. Consequently, if it were really spent, it ought to be used in producing more goods. But irrespective of the exhibitions of single industries, or even groups of industries, our aggregate statistics do not reveal any such thing in any particularly noteworthy way.

A distinct and much discussed feature of the present situation is the great volume of loans on securities that are being made by others than bankers. This means that corporations instead of distributing their surplus among their stockholders, to be spent by them, and instead of themselves spending it for increased production (which they may deem to be temporarily unwise) are lending it to speculators and thus contributing toward the bidding up of security quotations. We have herein a good deal of a paper, or credit, situation, which is different from the physical and material; and presents good ground for apprehension that a reversal of the whole process will extinguish a good deal of fiction or inflation. If, when and as the bubble is punctured there will be losses instead of gains to be figured in income tax returns. Such a puncturing may occur through the withdrawal of corporate credit from the stock market and its use in the production of more goods.

We may draw a distinction, therefore, between goods income and goods plus credit income and this may explain in part the discrepancy between estimates of 75 and 90 billion dollars. It is conceivable that estimates on the former basis may increase while on the latter they are receding; but if so there might be more or less of discomfort in the process.

The retention of great surpluses by corporations looks economically dangerous and to be largely contributory to and explanatory of the existing situation. Let it be observed that, while the total loans on New York Stock Exchange collateral are only about 9 per cent of the total quotational value, probably the major

portion of the latter is owned outright and the loans are in a much greater proportion to the floating supply that changes hands. The corporate surpluses result no doubt from the inability of the corporations to use them in their own businesses, which are already overbuilt in general. If they were distributed to stockholders, the buying ability of the latter would be increased, which would be reflected in increased demands for goods; and excessive producing capacity would be more rapidly brought into use and some of the present paradoxes would disappear.

A Study of Wage Rates

UNCLE SAM finds the same difficulties in personnel management that confront any other large employer. Many of them resolve into the question of wages and salary. "What is the ruling rate for file clerk, for dictaphone operator, for messenger, for truck driver?" are questions which must be answered by anyone who attempts to pay a fair wage for standardized duties. The fair rate is doubtless affected by variable cost of living in different regions and by steady employment or safe tenure. But in any case some comprehensive information is necessary before Congress can act fairly on the prayers for salary adjustments being made by various groups of civil service employees.

For this very purpose the national Government's Personnel Classification Board is undertaking a comprehensive survey of current labor rates, both by field investigators and by questionnaires. As is the usual procedure, the individual returns will be confidential; the tabulated summaries, however, will be published not only for the benefit of Congress and other officials, but for every personnel manager in the country. It is therefore a matter of self interest for those organizations among the metal trades which are approached to procure and forward the desired information promptly. The successful termination of the investigation should not only benefit the great army of government employees, but be of value to economists, labor departments and progressive business executives generally.

The Quest for Business Stability

FOLLOWING a succession of years in which price variations have been narrow, the value of stable markets has won wide appreciation. Profits are being made not so much by luck or foresight as by increased industrial efficiency. Economies have been found in steady plant operations. To make production still more stable, all obstructions to the even flow of business are objects of attack. Organized efforts are being made to free industry from the unsettling and demoralizing effects of unfair competition. Methods of distribution are being studied to find new ways to reduce the cost of getting goods from plant to consumer.

In this connection cross-hauling of steel has been condemned as uneconomic. Yet, curiously enough, certain steel producers deliberately cultivate trade outside their natural markets to achieve the very stability that cross-hauling is said to disturb. On the theory that it is unwise to put all of the eggs in one basket, these companies aim to free themselves from the full effects of a possible local depression by having customers in other districts.

Along with the study of distributing methods, mar-

ket research is receiving more attention. By careful surveys, some manufacturers have succeeded in forecasting their bookings so accurately that great economies in production have been made possible. Finding out what the consumer is likely to buy has become one of the most fascinating of business problems.

In lines of manufacture where style is a factor, calculations of probable consumer demand are always contingent on a certain element of chance. It is well known that eye appeal now is a primary factor in determining the success or failure of automobile models.

Fortunately for iron and steel and machinery no uncertainties of style directly disturb stability. Economical output is virtually assured so long as sufficient demand can be found. To obtain this sine qua non, market research is valuable not only to forecast business but to develop new uses for products. The machine tool salesman has long been on the lookout for new applications for existing equipment and for opportunities to develop machines to fit new requirements. Some steel companies compile records of the tonnage needs of all consumers in their territories; others have profited by a more penetrating study. Knowing the customer's business is becoming not merely a desirable, but a necessary, part of the sales campaign.

Big or Little Business?

PERHAPS it is chiefly the item of brains that determines whether a given business enterprise will succeed better by being big or by being little. There has been a good bit of propaganda about big business, some of it merely by writers or speakers who saw a chance to show off by taking the side that was once unpopular. Yet we still hear a good deal of sound talk about cases in which little business is likely to get along better than big business.

For an illustration we have coal mining. For many years there has been altogether too much productive capacity. One might suppose that by this time a substantial proportion of the small mines would have been eliminated. The statistics show that this is not the case, and when the matter is submitted to men well versed in coal mining matters the rejoinder is: "Of course not. Bare production costs are about the same and the big concerns have much more overhead." Coal mining, if not relatively simple, is a thing on which one readily can secure all the requisite information, there being experts available and ample means for picking out the best equipment. The individual company does not need to possess much ingenuity or initiative.

Steel making might be supposed to be different, but one often hears in the steel trade intelligent references to cases in which the small steel mill will do the better, in highly specialized products. The small strip mills of Germany are mentioned in this connection. They measure their success by revenue rather than by tonnage. When, with a much smaller increase than formerly in the total tonnage, steel has been growing more and more diversified in character and has been passing into innumerable small uses, may we not reasonably infer that conditions are really growing more favorable for the small units? There was a time when costs were being reduced rapidly by mere bigness, but the bigness has gone so far, involving such heavy capital outlays,

that it demands tonnage, and when there is not tonnage it is at a corresponding disadvantage.

If bigness necessarily gives low final cost, and if erection of dwelling houses and other small structures is inefficient, how does it come that by this time we do not have one or more big companies operating throughout the country and putting up these buildings by the thousands? Following the theories accepted in so many quarters it could be demonstrated that here is a great field. The big company could have a much wider variety of plans, all tested and safe, for the customer to select from than is available when as now the prospect consults the individual architect. Yet the thing has not been done, and there must be a reason. Overhead may be one reason; the disposition of the average man to patronize an individual, who may be more sympathetic if not so intelligent, may be another.

If a great deal of research is necessary to make the best product, and if the means cannot readily be imitated, there is a reason for big business in such cases; but when it comes to secrecy the little business seems to have the advantage. To a considerable extent, it appears to be a question of whether or not a great deal of brains is required.

Right before us we now have argument and contest on this score in another branch of business, that of retail merchandising. The chain stores have been succeeding, but it is argued that if the individual storekeeper should use the same skill, not difficult to acquire, he will be able to hold his own in spite of the combinations' advantage in mass buying. If he does not, the case will not necessarily be proved, for many storekeepers do not display merely an average amount of ability.

What Makes a Good Joint?

AT the recent meeting of the International Acetylene Association, a manufacturer of refrigerating equipment stated that in the last five years not a single leaky weld had left his shop. A steam heating contractor also testified that no leaks had been reported in his welded installations in an equal length of time, nor could he imagine the circumstances which would induce one of his workmen to make a defective joint. A past president of the American Welding Society and a pioneer in the industry has stated publicly on many occasions that he has never heard of a failure in a weld made under procedure control. An executive of a company which has arc-welded hundreds of stills for petroleum refineries said that not one had proved defective at the joints, despite continued use at high temperature and pressure.

Over against this remarkable testimony must be placed the exhibit at a Government bureau, containing dozens of electric and gas "welds" which failed in service. We must consider the well-nigh universal feeling among the older engineers that the "weld is no better than the welder," and that even the best workman has his blue Mondays. Lastly, many have had unsatisfactory experiences with the repair man who attempted to fix a broken lawn mower, a gas engine block, or a piece of household equipment.

The reason for this contradictory situation is that the first four men referred to joints made under pro-

cedure control—that is, joints made with due consideration for the quality of the metal being welded, the design of the article, the welder's skill and equipment, his supervision, and the final inspection and test. All of these essentials are the result of good management. With them the result is satisfactory—would be satisfactory, indeed, no matter what the operation might be.

Riveting requires the same elements of procedure control. As the president of the Welding society (who is closely connected with a leading steel fabricator) has pointed out, engineers and the public generally accept riveting not because an inspector has tapped each rivet head, but because long experience has shown that riveting in the hands of an honest organization makes dependable joints.

Only a similar experience with competitive processes will yield a similar confidence, and eventually prove the soundness of welded joints. The customers of the first four gentlemen quoted are part of this growing body of opinion.

Should Furnaces Run on Sunday?

(Concluded from page 1432)

fine. But we never could get a bed of iron until Monday evening; after that, we let out a bed every morning and evening. I noticed, however, that we did not make as much iron in the fore part of the week—say the three first days—as the three last. This undoubtedly was owing to the ore being reduced on Saturday, so as to have the furnace in good order for stopping. This was done to prevent the furnace from cooling off as fast as it would have done had the burthen or ore all been left on. In this case we no doubt would have had a great deal of trouble in starting, and perhaps not have been able to get the furnace cleared at all; for in all my experience with furnaces it was running a considerable risk to stop any length of time with a full burthen. I feel satisfied, had we not stopped on Sundays, the furnace would have made 4 tons of metal with the same hands and nearly the same amount of stock, instead of about 3 per day.

The next year, say '48, the furnace did not do so well. This I thought was owing entirely to the ore, as it had to be got farther in the hill, and underwent a change for the worse. It was much harder to smelt and did not yield as it had done. We tried stopping several Sundays in '48, but found that it did not do anything like so well as when we stopped in the summer of '47. I am therefore clearly of the opinion that it depends upon a great many circumstances, as to the practicability of stopping furnaces over the Sabbath.

Your Brother,

SAMUEL DUNCAN.

How Procedure Control Welding Originated

(Concluded from page 1434)

ments. It was obvious that this program would require a careful analysis of all of the features involved, including the training and supervision of the welding operators, the selection of material to be welded and the welding rod used, the design of the joint for welding, the proper preparation of the parts for welding, the proper technic for actually making the welded joint, and adequate provision for testing the finished job.

Men in the petroleum industry had an adequate appreciation of these essentials; consequently in 1924 members

BEWILDERMENT over the spectacular jumps which every day's stock market records has extended even to men described as "among Wall Street's shrewdest operators." One such observed the other day that without doubt we are going through a process of inflation, adding with due circumspection: "I still cling to the belief that one and one make two." Such an expression might classify its author as of an outgrown era, but it is about the only type of judgment that may safely be passed upon the amazing developments of these six-million-share days. As the wonder grows, the question keeps recurring whether the minds that seemingly control the situation have grasped something which others have missed, though equally intent on knowing all that is to be known. Or is it the Florida boom over again on a more stupendous scale and with no less certain a reckoning ahead, even though the credit supply suffice for further increases in brokers' loans and the reaction when it does come be without a sudden smash?

of the engineering and service staff of the Linde Air Products Co. were asked to cooperate in the laying of a long overland pipe line in eastern Texas. Welding crews for this line were organized and trained and the line put in in record-breaking time. Out of the 60,000 or more welded joints required to lay 220 miles of 16, 18 and 20-in. pipe in 20-ft. lengths, only four or five proved defective under test and these were promptly rewelded.

At the completion of this job all our men who were in contact with it pooled their experiences and out of this fund of information came a schedule of practices covering the six steps previously mentioned. This outline of good practice for pipe laying seemed to furnish a set of specifications whereby similar work could be done on other lines, and were designated a "procedure control" for pipe line welding. This procedure control was used and proved highly successful on other installations of similar character, now totaling several thousand miles.

It was obvious from the first that the principles of procedure control could be applied to other applications of welding—in fact, that they are a set of basic principles upon which any welding application might be conducted. And in practice over several years this has proved correct. Procedure control welding has been applied with outstanding success to the production of pressure vessels, light sheet metal products, the reclamation of steel and gray iron castings, bronze-welding of cast iron pipe, and many other major applications of the oxy-acetylene process.

Procedure control for oxwelding considers the following essentials:

- A. Determining the ability and knowledge of the welding operators.
- B. Selection of material to be welded.
- C. Design of the joint for welding.
- D. Proper preparation of the parts
- E. Welding technic.
- F. Testing of the welded product.

When these elements are properly provided for, the oxy-acetylene process can be depended upon to furnish a dependable and safe construction for practically any type of metal structure. By understanding and applying these fundamentals the outstanding advantages in flexibility, quality and cost of the oxy-acetylene process for joining metal sections can be obtained. This procedure control idea, while representing an outstanding development in the managerial aspects of welding, is not new, but is simply the application of accepted good practice for engineering design and construction to work done by the oxy-acetylene process.

Iron Output Increased in November

Daily Rate Gained 1252 Tons or 1.15 Per Cent Over October—
Largest November Since 1918—Net Loss of Three Furnaces

PIG iron production in November, according to actual returns received from all companies, showed an increase of a little over 1 per cent over October. It was also the largest for this year and exceeded all records for that month since November, 1918.

Total November pig iron output was 3,302,523 gross tons, or 110,084 tons per day for the 30 days, as against 3,373,506 tons, or 108,832 tons per day, for the 31 days in October. This is an increase for November of 1252 tons per day, or 1.15 per cent. In October the increase over September was 6755 tons per day, or 6.6 per cent. The November rate was the

largest this year and compares with 88,279 tons per day in November last year. It was also the largest in 19 months, or since April, 1927, when the daily rate was 114,074 tons. The rate last month was also the largest for November since 1918, when the daily rate was 111,802 tons. There have been but two November daily rates exceeding that of this year—in 1918 and in 1916. In 1916 the rate was 110,394 tons per day.

Operating Rate Active on Dec. 1

There were 194 furnaces active on Dec. 1, having an estimated operating rate of 108,575 tons per day. This

compares with 108,800 tons per day as the operating rate for the 197 furnaces active on Nov. 1. Last month three furnaces were blown in and six were shut down. Several large furnaces were operated at a high rate in November, which accounts in part for the high operating rate of the 194 furnaces on Dec. 1 as compared with the 197 on Nov. 1.

Of the three furnaces blown in during November, one was a Steel Corporation stack, one belonged to an independent steel company and one was a merchant stack. The six furnaces shut down included three Steel Corporation stacks, two inde-

Daily Average Production of Coke Pig Iron in the United States
by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,978	95,199	99,091
Aug.	60,875	87,241	103,241	95,073	101,180
Sept.	68,442	90,873	104,543	92,498	102,077
Oct.	79,907	97,528	107,553	89,810	108,832
Nov.	83,656	100,767	107,890	88,279	110,084
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107,043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	November (30 days)	October (31 days)	September (30 days)	August (31 days)
New York and Mass.	208,651	213,614	183,557	188,399
Lehigh Valley.	100,423	96,912	73,272	72,648
Schuylkill Valley.	60,185	53,364	51,116	52,231
Lower Susq. and Leba- non Valleys.	31,106	31,084	30,680	33,153
Pittsburgh district.	747,080	741,363	622,023	628,471
Shenango Valley.	99,432	101,787	86,136	86,691
Western Pennsylvania.	144,135	146,988	138,021	138,253
Maryland, Va. and Ky.	105,444	111,543	113,108	112,555
Wheeling district.	133,237	141,727	149,813	157,507
Mahoning Valley.	317,439	347,118	309,512	307,547
Central and North'n Ohio	322,405	332,966	328,382	376,706
Southern Ohio.	41,203	46,074	45,363	46,367
Illinois and Indiana.	615,969	655,022	609,891	625,452
Mich., Minn., Mo., Wis., Colo. and Utah.	138,163	125,979	112,030	113,737
Alabama.	231,366	222,142	197,367	183,896
Tennessee.	6,085	6,123	7,043	7,957
Total.	3,302,523	3,373,806	3,062,814	3,136,570

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
November, 1927.	64,600	23,679	88,279
December.	64,118	22,742	86,960
January, 1928.	69,520	23,053	92,573
February.	78,444	21,560	100,004
March.	83,489	19,726	103,215
April.	85,183	21,000	106,183
May.	85,576	20,355	105,931
June.	81,630	21,103	102,733
July.	79,513	19,573	99,091
August.	82,642	18,538	101,180
September.	82,590	19,487	102,077
October.	88,051	20,781	108,832
November.	88,474	21,610	110,084

*Includes pig iron made for the market by steel companies.

Operating Rate of Coke Furnaces in Blast

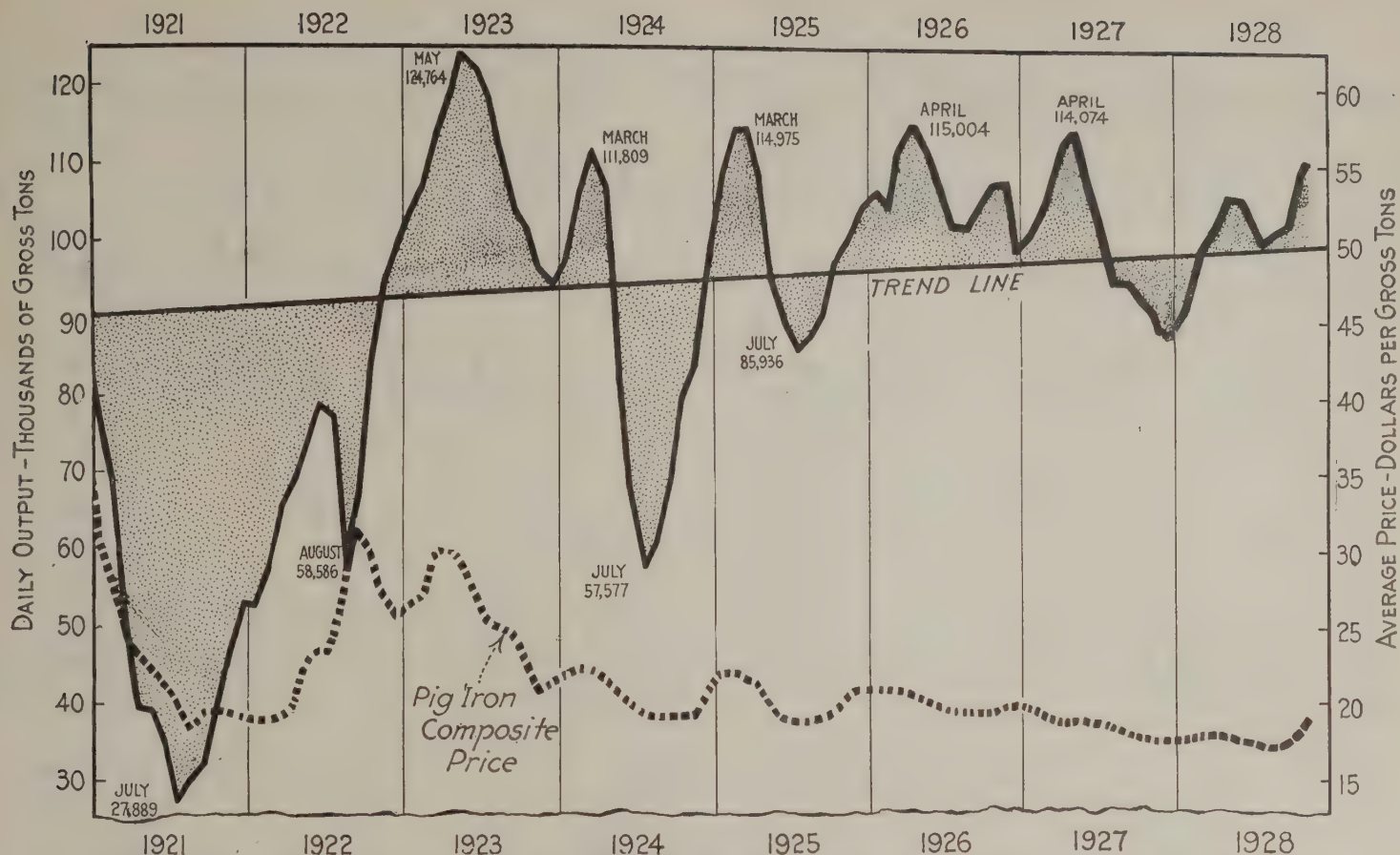
	Dec. 1		Nov. 1	
	Number in Blast	Gross Tons per Day	Number in Blast	Gross Tons per Day
New York:				
Buffalo.	11	5,850	12	5,900
Other N. Y. and Mass.	2	960	2	940
New Jersey.	0	.....	0	.....
Pennsylvania:				
Lehigh Valley.	7	3,345*	7	3,120*
Schuylkill Valley.	4	2,000	4	1,710
Susquehanna Valley.	2	960	2	920
Ferromanganese.	0	.....	0	.....
Lebanon Valley.	0	.....	0	.....
Ferromanganese.	0	.....	1	80
Pittsburgh District.	36	23,000	39	24,600
Ferromanganese.	2	325	2	320
Shenango Valley.	6	3,300	6	3,270
Western Pennsylvania.	9	4,380	9	4,340
Ferromanganese.	2	415	1	210
Maryland.	5	2,680	5	2,740
Wheeling District.	7	4,440	7	4,570
Ohio:				
Mahoning Valley.	18	11,000	18	10,750
Central and Northern.	18	11,000	18	10,740
Southern.	3	1,370	3	1,370
Illinois and Indiana.	29	20,530	29	20,760
Mich., Wis. and Minn.	6	2,860	6	2,700
Colo., Mo. and Utah.	4	1,740	4	1,650
The South:				
Virginia.	0	.....	0	.....
Ferromanganese.	1	90	1	90
Kentucky.	2	745	2	760
Alabama.	18	7,300	17	7,000
Ferromanganese.	1	85	1	70
Tennessee.	1	200	1	190
Total.	194	108,575	197	108,800

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months,
Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May.	3,481,428	3,390,940	3,283,856
June.	3,235,309	3,089,651	3,082,000
½ year.	19,848,461	19,430,678	18,520,921
July.	3,223,338	2,951,160	3,071,824
Aug.	3,200,479	2,947,276	3,136,570
Sept.	3,136,293	2,774,949	3,062,814
Oct.	3,334,132	2,784,112	3,373,806
Nov.	3,236,707	2,648,376	3,302,523
Dec.	3,091,060	2,695,755	.....
Year*.	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in November Was 1.15 Per Cent More Than in October; Composite Prices Increased
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

pendent steel company furnaces and one merchant unit. The net loss of three furnaces for the month was in steel making stacks.

Steel and Merchant Iron

There was a gain in steel-making iron last month of 423 tons per day—the November daily rate was 88,474 tons, as compared with 88,051 tons per day in October. Merchant iron output made a larger gain last month, or 829 tons per day. The November rate was 21,610 tons per day and that in October was 20,781 tons per day.

Furnaces Blown In and Out

During November the following

furnaces were blown in: One Cambria furnace of the Bethlehem Steel Co. in western Pennsylvania; one Toledo stack of Pickands, Mather & Co. in northern Ohio; and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

The following furnaces were blown out or banked last month: One stack of the Donner Steel Co., Inc., in the Buffalo district; the Sheridan stack of the Lavino Furnace Co. in the Lebanon Valley; one Carrie and one Duquesne stack of the Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district, and one Lorain furnace of the National Tube Co. in northern Ohio.

Magnesia and Silica Crucibles Made in Induction Furnace

The production of silica and magnesia crucibles in the induction furnace has been achieved in the laboratory of the Pacific experiment station of the United States Bureau of Mines, Berkeley, Cal. The essential new parts of this work are the development of a technique for the high-frequency furnace production of silica crucibles of greater wall thickness than could be readily fabricated from commercial fused silica, and for heavy-walled magnesia crucibles of great density and mechanical strength. A description of the method employed, which produced crucibles of excellent quality in a reasonable time and with a moderate expenditure of power and materials, is given in Serial 2896, by C. N. Schuette, recently published by the bureau.

The Foote Brothers Gear & Machine Co., Chicago, is offering its common stockholders the privilege of purchasing additional stock at \$20 a share, in order to finance purchase of the Lyle Culvert & Road Equipment Co., the Stockland Road Machinery Co., and the Northwestern Steel & Iron Corporation, all of Minneapolis, and the Bates Mfg. Co., Joliet, Ill.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1926	1927	1928	1926	1927	1928
Jan.	2,599,876	2,343,881	2,155,133	29,129	31,844	22,298
Feb.	2,272,150	2,256,651	2,274,880	22,309	24,560	19,320
Mar.	2,661,092	2,675,417	2,588,158	24,064	27,834	27,912
Apr.	2,677,094	2,637,919	2,555,500	24,134	24,735	18,405
May	2,687,138	2,619,078	2,652,872	23,159	28,734	29,940
June	2,465,583	2,343,409	2,448,905	25,378	29,232	32,088
½ year	15,362,933	14,876,355	14,675,448	148,173	166,939	149,963
July	2,461,161	2,163,101	2,464,896	26,877	26,394	32,909
Aug.	2,424,687	2,213,815	2,561,904	23,557	21,279	24,583
Sept.	2,436,733	2,090,200	2,477,695	25,218	20,675	22,278
Oct.	2,578,830	2,076,722	2,729,589	28,473	17,710	23,939
Nov.	2,484,620	1,938,043	2,654,211	31,903	17,851	29,773
Dec.	2,322,180	1,987,652	.....	31,627	20,992	.....
Year	30,071,144	27,345,888	.....	315,828	291,840	.....

*Includes output of merchant furnaces.

Iron and Steel Markets

Pig Iron Output at a High Rate

November Daily Production Largest Since April, 1927—

Steel Operations Steady Despite Effect of
Year-End Stock Reducing

PIG iron production last month, at 110,084 tons per day, was the highest since April, 1927, and was the largest November output since 1918. With December estimated, the total for the year will be close to 38,000,000 tons, which has been exceeded only in two years since the war, 1923 and 1926.

Steel production holds to a range of 80 to 83 per cent, notwithstanding some falling off in specifications from consumers who desire to keep their stocks at a minimum over the inventory period. The automobile industry, although demanding less steel for December shipment, owing to changes in models and to stock reduction over the year end, has arranged for large shipments early in the new year.

Except for the automobile industry, most of the major consuming lines are taking practically as much steel as at any time in months, and in a few lines, notably railroads and shipbuilding, the outlook is promising for an upward swing.

Rail orders of 42,000 tons placed at Chicago included 28,000 tons for the Chicago & North Western and 10,000 tons for the Wabash, while four roads will take a total of 25,000 tons of track accessories, with 20,000 tons about to be closed. The Santa Fe inquired for 3400 freight cars, in addition to 1075 mentioned a week ago, and is also in the market for 56 passenger cars, requiring in all 70,000 tons of steel.

American shipbuilding, long quiescent, is being stimulated by the loan provisions of the Merchant Marine Act. A Chester, Pa., shipbuilder has ordered 8600 tons of plates and shapes for an ocean liner, and a Camden, N. J., yard is seeking protection on 60,000 tons of plates and 15,000 tons of shapes for six ships on which it is bidding. Bids have been taken on two large Lake cargo vessels. A Wilmington, Del., shipyard bought 1500 tons of plates for three yachts.

The construction field continues to hold attention because of the volume of pending tonnage, which was augmented in the week by 27,400 tons, of which 10,000 tons is for a Chicago office building. Awards were 42,400 tons. A sheet steel piling contract of unusual size was for 4000 tons for a railroad warehouse in Jersey City.

Specifications from the agricultural-machinery industry in November were the largest on record, and the volume of shipments is undiminished.

Such loss as may occur this month in the production of some lines of finished steel will be partly offset by increasing operations of rail mills, which are about to begin rolling of recent orders, and of tin plate mills, which are up to 85 per cent of capacity operations against a recent dip to about 75 per cent.

Although first-quarter steel contracting has not yet gathered momentum, the situation as to prices of plates, shapes and bars has been clarified by the announcements of most of the producers that no advance will be made from the range of 1.90c. to 2c., Pittsburgh, prevailing on contracts and spot orders in this quarter. Chicago mills have withheld decision on forward prices for these products, but outside competitors have sold at the current quotations. With no price advance to stimulate specifications, the mid-December deadline for completing fourth-quarter contracts may not be as effective in driving in tonnage as it was in September.

Some users of sheets, desiring to delay current quarter shipments until after Jan. 1, have been told that tonnages not released for movement this month will be invoiced at the \$2 advance which is in effect on first-quarter contracts.

A reduction of \$5 a ton has been made on cold-drawn alloy steel bars through a change from 1c. to $\frac{3}{4}$ c. per lb. in the extra over the price of hot-rolled alloy bars.

November pig iron production was 3,302,523 tons, only 70,983 tons below the total for October, which had one more day. On Dec. 1, 194 furnaces were in blast, making iron at a daily rate of 108,575 tons, against 197, on Nov. 1, operating at a daily rate of 108,800 tons. Three Steel Corporation, two independent steel company and one merchant stacks went out of blast during the month, and one Steel Corporation, one independent and one merchant furnaces went in, a net loss of three.

Pig iron sales have declined in some sections, but prices are steady. The 50c. a ton advance made a week ago by one Alabama producer may be followed by others. Eastern Pennsylvania basic and Virginia foundry iron have been marked up 50c.

Water shipments of 53,980,874 gross tons of Lake Superior ore in the season just closed were 3,000,000 tons more than in 1927 and were exceeded in only four of the past 10 years.

The Ruhr lockout has ended with recourse again to governmental arbitration, and European steel sellers are now actively seeking orders.

A sale of 5000 tons of steel ties has been made in England to a British railroad, the first contract of the kind.

THE IRON AGE composite prices are unchanged at \$18.59 for pig iron, its high of the year, and at 2.362c. per lb. for finished steel. A year ago pig iron was \$17.59 and finished steel 2.307c.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
No. 2 foundry, Philadelphia.....	\$21.26	\$21.26	\$20.76	\$19.76
No. 2, Valley furnace.....	18.00	18.00	17.50	17.25
No. 2, Southern, Cin'ti.....	20.19	20.19	19.94	19.69
No. 2, Birmingham.....	16.50	16.50	16.25	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	20.25	19.75	19.75	19.00
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh....	20.01	20.01	19.76	19.51
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.25	18.25	18.00	17.50
Gray forge, Pittsburgh.....	19.26	19.26	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80

Finished Iron and Steel,	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.95	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.29	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.22½	2.22½	2.22½	2.14
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.19½	2.19½	2.19½	2.14
Steel hoops, Pittsburgh.....	2.10	2.10	2.20	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago				
dist. mill.....	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.60
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.60	3.60	3.60	3.70
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.....	2.10	2.10	2.10	2.15
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45
Barbed wire, galv., P'gh.....	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago				
dist. mill.....	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.25

Old Material, Per Gross Ton:	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
Heavy melting steel, P'gh....	\$17.00	\$17.00	\$17.50	\$14.50
Heavy melting steel, Phila.....	15.00	15.50	15.50	13.50
Heavy melting steel, Ch'go....	14.50	14.50	14.50	11.75
Carwheels, Chicago.....	14.25	14.25	14.25	13.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	15.50	14.25
No. 1 cast, Philadelphia.....	16.25	16.25	16.75	16.00
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	14.00
No. 1 R.R. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 R.R. wrot., Ch'go (net)..	13.25	13.25	13.25	10.25

Coke, Connellsville, Per Net Ton at Oven:	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.90	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	16.12½	14.12½
Electrolytic copper, refinery...	15.75	15.75	15.75	13.75
Zinc, St. Louis.....	6.35	6.35	6.25	5.85
Zinc, New York.....	6.70	6.70	6.60	6.20
Lead, St. Louis.....	6.32½	6.22½	6.32½	6.37½
Lead, New York.....	6.50	6.35	6.50	6.55
Tin (Straits), New York.....	52.50	52.87½	49.25	59.00
Antimony (Asiatic), N. Y....	10.00	10.00	10.50	11.50

Pittsburgh

Output Maintained By Active Specifying—Price Stability Gives No Incentive for First-Quarter Buying

PITTSBURGH, Dec. 4.—December opens without material change in the rate of steel ingot output in this and nearby districts, but the explanation is less in the volume of new business than in the fact that consumers still are specifying with a fair degree of freedom against old commitments. Such losses of tonnage as there have been in some steel products are pretty well counterbalanced by the swell in the production of rails and tin plate.

Consumers seemingly have few requirements beyond those that cannot be met from existing contracts; fresh purchases also reflect a desire to keep the materials item in year-end inventories at a minimum. First-quarter buying has not yet developed much momentum. Since prices of bars, plates and shapes are to be the same as those in this quarter's contracts, buyers evidently do not sense the necessity of haste.

The stipulation as a deadline date on fourth quarter contract specifications cannot be enforced under the circumstances and this is another reason for the lack of real activity.

Not a few users of sheets do not want shipments made this month in

the fear that they may not be worked off before the inventory date. Mills are insisting on specifications by Dec. 10 under the threat of an advance of \$2 a ton if tonnages are not released for shipment this month. The higher prices named several weeks ago still refer more to January and later shipment than to current deliveries.

Much of the first quarter strip requirements of the motor car builders remains to be placed.

Nothing yet has been said as to first-quarter wire and nail prices, but the idea will not down that producers will seek more money, but an advance of \$2 a ton, as has been suggested, will not, it is believed, include woven wire fence and wire rods.

Structural steel lettings remain very small in this district and fabricators are beginning to express some fear of inability to maintain shop operations throughout the winter unless there is early betterment in business. Railroad buying apart from track supplies has not assumed proportions calculated to elate local steel makers. The oil and gas industry is providing a fair amount of tonnage, and the hope is that it will do much better in 1929 than in recent years. Prospects for tin plate are regarded as very bright because of a belief that this year's pack will prove none too large for needs. The motor car industry is less anxious for steel and probably will not again show real desire for supplies until after the national automobile shows have been concluded next month.

Inactivity characterizes the primary materials markets. If anything, pig iron is a shade easier than it has been and in scrap there is a little more anxiety on the part of dealers for orders than there is on the part of consumers to place them.

Pig Iron.—The Westinghouse Electric & Mfg. Co. has asked for prices on its requirements of foundry and Bessemer iron for the first half of

next year; no specific tonnage is mentioned. Interest in the market on the part of melters in this district is very limited otherwise, and sales for the most part are of single carloads. On such lots of foundry iron, no particular difficulty is had in obtaining \$18, Valley furnace, for No. 2 grade, but the market remains untested on sizable tonnages. No big inquiries lately have developed for basic iron. Supplies of this grade have increased in the past three or four weeks and, while some producers are still quoting \$18, offerings of \$17.50 are uncovered. Incidentally, this is as high as any clear cut, openly competitive business has been done. That price also is well above the average of orders now on the books of merchant furnace companies. A price of \$18.25 for Bessemer and malleable iron is supported entirely by small lot sales. There is some evidence that Ohio and Indiana foundries, which lately have been drawing upon Valley furnaces for supplies, have become well covered on their immediate requirements. This fact, in conjunction with the lower rate of steel ingot production and the incident change in the position of steel companies with respect to surplus iron supplies, gives the general market an easier tone. The Jones & Laughlin Steel Corporation has taken off one of its Aliquippa furnaces for relining.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	\$18.25 to 18.50
Gray forge	17.50
No. 2 foundry.....	18.00
No. 3 foundry.....	17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Billets, slabs and sheet bars reflect in specifications no material letdown in the operation of sheet, tin plate and strip mills. But new business is very dull, and active negotiations for first quarter tonnages are yet to be begun. Non-integrated sheet makers probably are waiting to see how well the advance in first quarter sheet prices goes over before entering orders for sheet bars at an advance of \$1 a ton over this quarter's contract price. Strip makers

appear assured of some advance over the prices they have received in the past six months, while the billet and slab prices for the first quarter are the same as in this quarter, but \$1 a ton above the third quarter price. The next quarter's price on wire rods is yet to be announced, but the common belief is that it will remain at \$42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—Without the formality of public announcements, makers are empowering their salesmen to take first quarter contracts at the prices in effect on fourth quarter commitments. Business is fairly active in specifications, but suffers somewhat from the fact that consumers are desirous of having light stocks at the end of the year, and since there is to be no advance in prices for first quarter, the deadline date on this quarter's contract specifications is rather ineffective as a business stimulant. Structural lettings in this area run chiefly to small tonnages and no sizable projects are in sight. Local shops are busy, but need more orders to carry through the winter at an economical rate of operation.

Rails and Track Supplies.—Distribution of the New York Central track accessories orders is yet to be announced, but local producers expect to share to the usual extent, since there was little or no variation in the prices submitted by the various factors. In general, track fastenings are slow. The local standard-section rail maker has a good backlog of 1929 orders and rolling on them will be under way in the next 10 days. Light-section rails are very dull.

Wire Products.—No announcements have been made as to first quarter prices; in view of the tardiness of word on the matter, there is a belief in some quarters that no change is to be made, but some manufacturers intimate that prices soon to be announced will be \$2 a ton higher on nails and wire. Business reflects the desire of distributors and consumers to keep down inventories, but runs well up to the average for this time of the year.

Tubular Goods.—Business is fairly active. Makers are better supplied with line pipe orders than with oil country or building construction requirements, but there is some demand for all three classes. Among the projected pipe lines, the one to convey natural gas from Wyoming to Salt Lake City, calling for 350 miles of 14-in., 16-in. and 18-in. pipe, is regarded as nearest the mills.

Sheets.—November proved one of the big months of the year in specifications and will not fall far short of being equally good in shipments. There is now some slowing up in tonnage releases, owing to the desire of consumers to be able to show heavy cash and light materials items in their year-end financial statements. The mills are meeting this situation by applying the clause in contracts which sets up Dec. 10 as the date of final specifications. Attempts by consumers to defer shipments until next month find manufacturers willing if the buyers are prepared to pay the January price, which is \$2 a ton higher than that on December shipments. Generally, the mills are driving for specifications, but expect to time shipments in a way that will help buyers to escape heavy stocks on the last day of the year. Producers say that the higher prices announced several weeks ago now are effective, but it is also a fact that most consumers have lower priced contracts that run somewhat to the blanket variety, against which they can specify for any additional early requirements that may develop.

Tin Plate.—Mill operations continue to increase and now average fully 85 per cent of capacity. Early 1929 requirements have been specified rather freely since the announcement on Nov. 15 of the first half price. Sentiment is cheerful as to next year food container requirements. This year's pack of peas, corn and tomatoes is estimated to be below what has come to be regarded as the annual consumptive requirements, and a close clearance of the year's general food pack is looked for before the new crops come in. This condition points

THE IRON AGE Composite Prices

Finished Steel

Dec. 4, 1928, 2.362c. a Lb.

One week ago.....	2.362c.
One month ago.....	2.369c.
One year ago.....	2.307c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1928	2.369c., Oct. 30;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Dec. 4, 1928, \$18.59 a Gross Ton

One week ago.....	\$18.59
One month ago.....	18.34
One year ago.....	17.59
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.59, Nov. 27;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.22c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.90c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c. to 2.25c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c. to 1.95c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base per Lb.

6 in. and narrower, P'gh.....	1.90c. to 2.00c.
Wider than 6 in., P'gh.....	1.80c. to 1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.10c.
Cooperage stock, Chicago.....	2.20c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	2.55c. to 3.50c.
Strips, P'gh.....	2.85c. to 2.95c.
Strips, Cleveland.....	2.85c. to 2.95c.
Strips, del'd Chicago.....	3.15c. to 3.25c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base per Keg

Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base per 100 Lb.

Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Cut Nails

Per 100 Lb.

Carloads, Wheeling, W. Va., or Reading, Pa.....	\$2.75
Less carloads, Wheeling or Reading.....	2.85

Woven Wire Fence

Base to Retailers per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base per Lb.

Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c. to 2.95c.
No. 24, del'd Cleveland.....	2.94c. to 3.04c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade.....	3.90c. to 4.00c.
No. 24, f.o.b. P'gh, No. 2 grade.....	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.69c. to 3.79c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c. to 4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers

Alloy Differential Price 100 Lb. Bars

2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1¼% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....

0.50 3.25

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....

0.70 3.45

4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....

1.05 3.30

5100 Chromium Steel (0.60 to 0.90 Chromium).....

0.35 3.10

5100 Chromium Steel (0.80 to 1.10 Chromium).....

0.45 3.20

5100 Chromium Spring Steel.....

0.20 2.95

6100 Chromium Vanadium Bars.....

1.20 3.95

6100 Chromium Vanadium Spring Steel.....

0.95 3.70

9250 Silicon Manganese Spring Steel (flats).....

0.25 3.00

Rounds and squares.....

0.50 3.25

Chromium Nickel Vanadium.....

1.50 4.25

Carbon Vanadium.....

0.95 3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Black	Galv.
1½	45	19½	1½ to 3	+11	+39
1¼ to 3	51	25½	1½	22	2
1¼	56	42½	3½	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	45½	3 to 6	28	13
9 and 10	54	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1½	41	24½	1½ to 3	+19	+54
1¼ to 3	47	30½	1½	21	17
1¼	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27 1½ in. ....+18
2½ to 2¾ in.....	37 1¾ to 1½ in....+ 8
3 in.....	40 2 to 2½ in.....— 2
3½ to 3¾ in.....	42½ 2½ to 3 in.....— 7
4 to 4½ in.....	46 3½ to 4½ in....— 9
5 to 6 in.....	40

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives 1 Ten
5000 lb. to 12,000 lb.....	5 Fives 2 Tens
12,000 lb. to 21,000 lb.....	6 Fives 2 Tens & 2½
21,000 lb. and over.....	7 Fives 2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn	Hot Rolled
1 in.....	63 3 in. 48
1¼ to 1½ in.....	55 3¼ to 3½ in... 50
1¾ in.....	39 4 in. 53
2 to 2½ in.....	34 4½, 5 and 6 in.. 45
2½ to 2¾ in.....	42

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

to active packing operations next year, especially as the use of canned foods is gaining from year to year.

Cold-Finished Steel Bars and Shafting.—Since prices are not to be different in the next quarter, the recent opening of books for that period has not been followed by a rush of contracting. Business in the past week showed some gain as compared with the week before, but it is recognized that it will not be until after next month's automobile shows that a clear line will be had on the demand or that there will be real constancy to automobile production.

Hot-Rolled Strips.—The market is clearly quotable at 1.80c. to 1.90c., base Pittsburgh, for strips wider than 6 in. and 1.90c. to 2c., base, for 6 in. and narrower, but with the lower figures the prevailing ones. Prices of 1.80c. and 1.90c., which were supposed to have been reserved for the round tonnage buyers, have been named to some relatively small tonnage users. It seems several of the really large tonnage buyers have not yet spoken for their first-quarter requirements and the market thus has not had the test of important business. Current movement of strips on old orders is holding up well, but new business as a whole is quiet.

Cold-Rolled Strip.—Makers have not encountered much resistance on first-quarter contracts to a price of 2.85c., base Pittsburgh, but small lot buyers are voicing objections to more than that and the really large consumers have yet to do much contracting. There is a fairly well sustained movement on old orders, but order books of makers are growing slimmer.

Coke and Coal.—No further recession has occurred in coke prices, but the market is no more active than it has been, and while supplies are moderate, gaged by ordinary standards, they are quite ample for all requirements. The coal market could hardly

be duller than it is, and the concern of producers seems to be greater about keeping their mines going than in the prices they can secure.

Old Material.—Heavy breakable cast scrap has been sold at \$13 in the past week, but except for this change, a decline of 50c. a ton, prices are stationary for the second consecutive week. Heavy melting steel still is appraised at \$17, sales into consumption at more not being possible, while dealers find it difficult to uncover supplies at less. Steel manufacturers do not find it necessary to supplement deliveries on contracts by fresh purchases, but, on the other hand, the scantiness of supplies makes dealers wary about selling. These circumstances obviate the possibility of much fluctuation in prices. The Pennsylvania Railroad December scrap list, closing Dec. 5, contains almost 50,000 net tons, including 7000 tons in a supplementary list.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel.....		\$17.00
Scrap rails.....		17.00
Compressed sheet steel....		17.00
Bundled sheets, sides and ends.....	\$15.50 to	16.00
Cast iron carwheels.....	15.00 to	15.50
Sheet bar crops, ordinary..	17.00 to	17.50
Heavy breakable cast.....	13.00 to	13.50
No. 2 railroad wrought...		17.00
Hvy. steel axle turnings...		15.00
Machine shop turnings....	10.50 to	11.00
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	18.50 to	19.00
Railr. coil and leaf springs	18.50 to	19.00
Rolled steel wheels.....	18.50 to	19.00
Low phos. billet and bloom ends.....	20.50 to	21.00
Low phos., mill plates....	19.00 to	19.50
Low phos., light grade....	18.00 to	18.50
Low phos., sheet bar crops	19.00 to	19.50
Heavy steel axle turnings.		15.00

Electric Furnace Grades:		
Low phos. punchings.....	18.50 to	19.00
Hvy. steel axle turnings..		15.00

Blast Furnace Grades:		
Short shoveling steel turnings.....	12.00 to	12.50
Short mixed borings and turnings.....	12.00 to	12.50
Cast iron borings.....	12.00 to	12.50
No. 2 busheling.....	9.50 to	10.00

Rolling Mill Grades:		
Steel car axles.....	20.00 to	21.00
No. 1 railroad wrought...	13.00 to	13.50
Sheet bar crops.....	18.00 to	18.50

Cupola Grades:		
No. 1 cast.....	14.50 to	15.00
Rails 3 ft. and under.....	17.50 to	18.00

The Sheet Steel Trade Extension Committee, Terminal Tower Building, Cleveland, is undertaking an extensive campaign to promote the wider use of sheet steel in various fields. The economy, durability and fire-resistiveness of sheet steel will be presented to fabricators, sheet metal contractors and the consuming public through various advertising media.

Textile machinery and parts valued at \$100,922,791 were produced in 1927, according to the Bureau of the Census. Other products and receipts for repair work and contract work were valued at \$16,095,538, making a total of \$117,018,330, a decrease of 3.8 per cent, as compared with \$121,653,324 for 1925, the last preceding census year.

Plans Being Pushed for Western Metal Congress

Fourteen metal engineering societies were represented at a preliminary meeting held recently at Los Angeles to make plans for the Western Metal Congress to be held Jan. 14 to 18 at the Biltmore Hotel and the Shrine Civic Auditorium in that city. More than 80 per cent of the display space for the metal and machinery exposition has been subscribed for and the program for the convention sessions is rapidly taking shape. Several of the organizations plan to hold their regular annual meetings during the convention and a special train for Eastern delegates will be run from Chicago over the Atchison, Topeka & Santa Fe Railroad.

The following societies will take part: American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, California division of the American Petroleum Institute, Institute of Metals, American Welding Society, Society of Automotive Engineers, Pacific Coast Electrical Association, Pacific Coast Gas Association, Institute of Marine Engineers, Metal Trades and Manufacturing Association, Chamber of Mines and Oils, National Association of Purchasing Agents, American Foundrymen's Association and American Society for Steel Treating.

W. H. Eiseman, now at the Shrine Civic Auditorium, Los Angeles, is in general charge.

Graham-Paige to Assemble Automobiles in Germany

The Graham-Paige Motors Corporation, Detroit, has acquired a plant of 57,000 sq. ft. of floor space at Johannisthal, Germany, a suburb of Berlin, where Graham-Paige cars will be assembled in the future for distribution in Germany. The German plant of the E. W. Budd Mfg. Co., American body builder, is also located in Johannisthal, as are several other American automotive plants.

All employees of Deere & Co., Moline, Ill., who have been with the company two years or more, will be given an annual vacation of two weeks with pay, according to a recent announcement of William Butterworth, chairman of the board. The order affects about 7000 factory employees, and vacation wages will be governed by the normal wage and length of service of employee.

A 36-in. blooming mill for the Messina, N. Y., plant of the Aluminum Co. of America will be built by the Mesta Machine Co., Pittsburgh, and the order for a 24-in. structural mill for this plant has gone to the Mackintosh-Hemphill Co., Pittsburgh. The Aluminum company is building a plant at Messina for rolling aluminum into structural shapes for railroad cars.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates.....	3.00c.
Structural shapes.....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands.....	3.60c.
Hoops.....	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles.....	3.70c.
Galv. sheets (No. 24), 25 or more bundles.....	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets.....	3.35c.
Galv. corrug. sheets (No. 28), per square.....	\$4.43
Spikes, large.....	3.40c.
Small.....	3.80c. to 5.25c.
Boat.....	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. \$3.50	
Wire, black soft ann'l'd, base per 100 lb. \$3.00 to 3.10	
Wire, galv. soft, base per 100 lb. 3.00 to 3.10	
Common wire nails, per keg 3.00	
Cement coated nails, per keg 3.05	

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

Per Gross Ton

Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to \$4.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars

(Open hearth or Bessemer)

Per Gross Ton

Pittsburgh	\$33.00 to \$34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

Per Gross Ton

Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	\$33.00 to 34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

Per Lb.

Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.

Wire Rods

(Common soft, base)

Per Gross Ton

Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.40 to \$12.00
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₃ , delivered	50c. to 55c.

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.85
Foundry, by-product, Ch'go ovens.	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines..	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines..	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines....	90c. to 1.00

Ferromanganese

Per Gross Ton

Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....	\$31.00 to \$34.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$83.50
75%	130.00
Per Gross Ton Furnace	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10%	\$31.00 to \$32.00
11%	33.00 to 34.00
12%	\$35.00 to \$36.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6%	\$24.00 to \$25.00
7%	25.00 to 26.00
8%	26.00 to 27.00
9%	27.00 to 28.00
10%	\$29.00 to \$30.00
11%	31.00 to 32.00
12%	33.00 to 34.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrosilicon, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick

Per 1000 f.o.b. Works

High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

Per Net Ton

Standard size	\$45.00
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Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t, square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh..80, 10 and 2 1/2	
Stove bolts in packages, Chicago..75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago..75, 20, 10, 5 and 2 1/2	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(1/2-In. and Larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread..	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 3/4 in. x 6 in. take 10 per cent lower list prices.

Chicago

Rail Orders Total 42,000 Tons—Inquiry for 3500 Cars— November One of the Best Months of Year

CHICAGO, Dec. 4.—The Chicago iron and steel market can best be characterized as steady, with little evidence of other than moderate changes in the near future. Prices for finished steel for delivery after the turn of the year are holding the attention of many buyers, as indicated by an expanded volume of inquiry. Local producers are noncommittal, but mills in the East which market in this territory have not hesitated to accept future business at 2c. to 2.10c. per lb. for plates, shapes and bars. New orders for rails bulk large, but output remains low, pending releases against 1929 contracts. In some quarters it is thought heavier rollings will be under way by Dec. 15.

Railroads are active in making known their spring needs of track accessories. The Santa Fe has added 3500 freight cars and 50 passenger train cars to its inquiries of a week ago.

Announcement is made today that a local bond house will underwrite an issue for the 1 North La Salle office building, Chicago. Preliminary estimates place the steel requirements at 10,000 tons. The construction field still holds attention because of the volume of pending tonnage; actual awards are few in number and of moderate size.

November sales of finished steel products made it one of the best months in the year; total business was fully 10 per cent heavier than in November, 1927. Shipments in November far outdistanced the volume sent from mills in the same month last year. Sales for the past week were the best in five weeks and specifications also were the largest, with one exception, in four weeks.

Pig Iron.—Prices for Northern pig iron in and near Chicago remain firm at \$20 a ton, local furnace. Concessions on boat iron and lower quotations in meeting competition to the East seemingly have had no effect on the local situation. Shipments are steady, but producers expect a drop by Dec. 20, when foundries will slow down for the inventory period and the holiday season. Indications are that shipments in 1928 will at least equal those of the record year of 1926. One producer has advanced the price of Southern iron 50c. a ton, bringing the new quotation to \$17, Birmingham, or \$23.01, delivered Chicago. The silvery market is quiet, following an active contracting period.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail) ..	\$22.51 to 23.01
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent....	\$30.79 to 31.79
Bess. ferrosilicon, 14-15 per cent...	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—The Santa Fe has added 3400 freight cars and 50 passenger train cars to its inquiry of last week for 1075 freight cars and 16 baggage cars. The totals now are 4475 freight cars and 56 passenger cars. The steel for these cars will total about 70,000

tons. Local mills compute that 6100 freight cars were purchased by United States railroads in November. New orders for oil storage tanks will take more than 2000 tons of plates, and fresh inquiry from producers of petroleum products in Texas totals 3600 tons. Car shops are beginning to specify against recent orders, but the bulk of plate tonnage being shipped from local mills is going to structural shops and builders of large tanks. Chicago plate mills are engaged at about 80 per cent of capacity.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Ferroalloys.—Shipments of these commodities are in good volume. The spiegeleisen market is quiet. Carloads are being offered at \$34 a ton, Hazard, Pa. Several small orders for ferromanganese have been taken at \$105 a ton, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Billets.—Sales for delivery over the remainder of this year total 25,000 tons. Specifications are well up to the average of recent weeks.

Cast Iron Pipe.—The cast iron pipe market is stimulated by an inquiry from Detroit for 6000 tons of 24, 36 and 48-in. pipe. In some quarters this request for prices is looked upon as the forerunner of a winter buying movement and as a feeler to determine whether winter manufacturing prices will be obtainable. Although this subject has been given some consideration by sellers, no public announcement has been made as to the course to be taken. Quotations for 6 in. and larger diameter pipe are steady at \$37 to \$38 a ton, Birmingham. The freight rate to Chicago is \$8.20 a ton. Contractors in and around Chicago are placing small tonnages. Several public utilities have asked for preliminary figures for use in estimating budgets for the coming year. Railroads are finding little use for cast iron pipe at this time of the year.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Bars.—Shipments of bar mill products to manufacturers of automobiles are not greater than in late Novem-

ber, but builders are looking forward to an active demand for their products soon after the turn of the year. Shipping schedules now arranged for late December and early January are large. Specifications from the agricultural machinery trade in November were the heaviest on record, and the rate of shipping is undiminished. Deliveries on mild steel bars range from four to five weeks. Spot sales of iron bars are numerous at current quotations. Contracting in alloy steel bars is making headway. Shipments to most consumers are lighter as users attempt to hold stocks to the minimum. Forward contracting in rail steel bars is not being pushed by producers, but when tonnages are offered for delivery in the first quarter the price named is 1.95c. per lb., Chicago Heights. Specifications are in larger volume than shipments and deliveries have been extended. Both Chicago Heights mills continue to operate on double turn.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Structural Material.—Structural steel awards in the week totaled 1900 tons and fresh inquiry amounts to 3000 tons. Preliminary figures are being taken on a building to be erected at 1 North La Salle Street, Chicago; it is reported that 10,000 tons of steel will be needed.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—Sales of standard-section rails total 42,000 tons. Included in this figure are 28,000 tons for the Chicago & North Western, 10,000 tons for the Wabash and 4000 tons for the Missouri-Kansas-Texas. Inquiry is slow, although several sizable orders are in the making. Four Western railroads have closed for 25,000 tons of track accessories for delivery in 1929. Fresh inquiry totals about 20,000 tons. In the local market prices for tie plates are steady at \$43 a ton. Inquiry before the trade for iron tie plates reaches a total of 10,000 tons. Standard-section rail production in this district is being held to a low rate, but rolling schedules against 1929 contracts are expected to be put in effect about Dec. 15.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Buyers are being offered first quarter contracts at prices which prevailed in the fourth quarter. Current specifications are lighter, but operations are being held at an unchanged rate, so that producers may expand stocks.

Sheets.—Forward contracting is moving slowly. There is still a large tonnage to be specified against fourth quarter contracts. Spot purchases, except by consumers who do not normally contract, are negligible. Current specifications are a trifle heavier, and mills are operating at a higher rate, the range now being between 75

and 80 per cent of capacity. The roofing trade remains quiet. Jobbers are moving sizable tonnages from stock. Demand from agricultural implement manufacturers is turning upward. Deliveries are improving, common finishes now being obtainable in 10 days.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Local dealers in billet steel reinforcing bars have named 2.35c. per lb. as the minimum on carlot orders and producers are asking 2c. to 2.10c. per lb. for carloads in mill lengths of 40, 50 and 60 ft. Lower quotations by dealers are not to be withdrawn for several weeks. New prices for rail steel reinforcing bars are 2.05c., Chicago Heights, to the general trade and producers are asking 1.95c. for carload orders in mill lengths. Rolling schedules at billet bar mills are arranged unsatisfactorily for bending shop needs. With bar fabricators operating at only 50 per cent of capacity, deliveries from mills are such that some construction programs cannot be held to schedule. Contracts are few in number, but inquiry is active and estimating bureaus are busy.

Old Material.—The movement of heavy melting steel to local mills is steady as dealers press to cover old contracts taken at \$15 a gross ton, delivered. Consumer purchases of this grade are lacking, but dealers, who are looking for steady if not higher prices after the turn of the year, are anxious to complete old obligations and they do not hesitate to trade at the prices named in recent heavy tonnage contracts. The supply of cast iron borings is ample to meet current needs of consumers. Shipments are materially lighter from automobile manufacturers. The embargo against shipments recently put in effect by merchant furnaces has been lifted and borings are again moving freely to those consumers. For this grade dealers are paying \$12 to \$12.25 a ton, delivered, against old contracts. De-

mand for railroad malleable is active at \$16.50 a gross ton for local delivery, but 50c. above this price is obtainable for prompt shipment to outlying points. A melter has closed for 1000 tons of stove plate at \$12.75 a net ton, delivered, which is an advance of 25c. a ton in the week. Plate scrap is scarce and little relief is looked for by the trade until February or March, when it is expected that railroad car shops will be in heavier production. The demand for short rails, 2 ft. and under, is insistent. This specification is more to the liking of users than the older 3 ft. and under lengths. The Chicago & North Western will close a list this week.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraulic, compressed sheets	13.00 to 13.50
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to 18.25
Railr'd tires, charg. box size	17.50 to 18.00
Railr'd leaf spring cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs.....	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings.....	14.25 to 14.75
Low phos. punchings.....	16.50 to 17.00
Low phos. plate, 12 in. and under	16.00 to 16.50
Blast Furnace Grades:	
Axle turnings.....	12.00 to 12.50
Cast iron borings.....	11.75 to 12.25
Short shoveling turnings..	11.75 to 12.25
Machine shop turnings....	8.00 to 8.50
Rolling Mill Grades:	
Iron rails	15.00 to 15.50
Re-rolling rails	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft..	17.25 to 17.75
Steel rails less than 2 ft..	19.00 to 19.50
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	14.25 to 14.75
Malleable Grades:	
Railroad	16.50 to 17.00
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles.....	26.50 to 27.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought...	13.25 to 13.75
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling.....	11.50 to 12.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast....	15.50 to 16.00
No. 1 railroad cast.....	15.00 to 15.50
No. 1 agricultural cast....	14.50 to 15.00
Stove plate	12.25 to 12.75
Grate bars.....	12.50 to 13.00
Brake shoes.....	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—Improvement noted a week ago in sales of woven wire fencing is sustained, but the tonnages on the books of producers are far below those usual this late in the fall. Specifications for this commodity are more liberal from the South and Southwest, where weather conditions

are favorable for outdoor work. Demand for nails is light, sustaining output of not more than 30 per cent of capacity; the total tonnage so far this year is far below the volume of orders taken in 1927. The display of new automobile models is resulting in larger demands from several car manufacturers in the Detroit district, and accessory makers in and around Cleveland are also taking larger quantities of wire. The jobbing trade is well sustained in parts of the country where severe weather has not been experienced. Distributors generally are holding stocks to a minimum and are ordering extremely close to actual requirements. Inquiry for first quarter is more active, but producers are holding back the opening of books for that period.

Coke.—Forward contracting for the first half of 1929 is active. Deliveries remain on a par with those of a week ago.

Shipments of Sheet-Metal Ware Increase

WASHINGTON, Dec. 4.—Shipments of galvanized sheet-metal ware in October included 206,854 dozens, valued at \$832,243, as compared with 189,789 dozens, valued at \$742,188 in September and 182,469 dozens, valued at \$724,692 in October, 1927, according to reports received by the Department of Commerce from 15 concerns comprising a large proportion of the industry.

October shipments of enameled sheet-metal ware were 417,387 dozens, valued at \$1,650,657, as compared with 352,484 dozens, valued at \$1,372,242 in September and 322,081 dozens, valued at \$1,297,431, in October, 1927, according to reports received by the Department of Commerce from 18 manufacturers comprising approximately 80 per cent of the industry.

A continuous furnace for heating slab ingots is to be built at the plant of the Dominion Foundries & Steel, Ltd., Hamilton, Ont., by the Rust Engineering Co., Pittsburgh. The furnace will employ the Rust double firing principle in which a separately fired soaking chamber is utilized to equalize the temperature of the slab ingots before discharging. The furnace is approximately 60 ft. in length and 15 ft. in width, and will use coke oven gas as fuel.

An exposition of modern American industrial and decorative arts will take place in Chicago in January. It will embrace decorative work and include metalwork as well as lamps and lighting fixtures. Interiors will represent respectively a modern business office, a Pullman compartment, a passenger airplane interior, etc. James D. Cunningham, president Illinois Manufacturers' Association, is executive director of the exposition.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand, railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List

Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Philadelphia

No Price Change for First Quarter on Plates, Shapes and Bars—Shipbuilders Inquire for Large Tonnages

PHILADELPHIA, Dec. 4.—First quarter contracts on steel bars and plates will be closed at the current contract prices, instead of at an advance suggested by mills several weeks ago. Some small tonnages of bars are reported to have been closed at 1.95c., Pittsburgh, and plate mills are quoting 2.05c. to 2.10c., Coatesville, on contracts. Sheet mills are maintaining a firm attitude on prices, but consumers are not yet showing much interest in future buying. The opening of bids on 700 tons of black, galvanized and blue annealed sheets by the Pennsylvania Railroad brought out the current market prices at mill, except in the case of blue annealed sheets, on which one eastern Pennsylvania maker quoted 2c., mill, for delivery to Dec. 31, but 2.10c., mill, for first quarter.

Construction projects are less numerous, but shipbuilders are providing substantial prospective business in plates for work on which they are bidding. A Camden, N. J., yard has inquired for prices on about 60,000 tons of plates and about 15,000 tons of shapes for six ships, awards of which are pending.

Ferromanganese.—Most consumers have contracted for part or all of next year. The price is \$105 per ton, seaboard, quoted by domestic and foreign producers.

Pig Iron.—Orders for 25,000 tons of basic iron, reported last week as placed by an eastern Pennsylvania consumer, are understood to have been distributed among three producers. The tonnage was bought at a price quoted when the inquiry was issued about a month ago. Furnaces are now quoting on a basis of about \$20 per ton, furnace, or a 50c. a ton advance. Foundry iron is steady at \$21 per ton for first quarter; contracting is light. Activity by shipbuilders is beginning to develop some tonnage, and the Sun Shipbuilding & Dry Dock Co., Chester, Pa., is inquiring for about 500 tons of foundry grade. The Pusey & Jones Co., Wilmington, Del., is expected to inquire before the end of the year for a small tonnage. The Standard Steel Works Co., Burnham, Pa., is inquiring for 2500 to 3000 tons of low phosphorus. The Virginia pig iron producer has advanced its prices 50c. a ton, following an increase in the Birmingham market.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	21.26 to 21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X.	22.26 to 22.76
Basic (del'd east. Pa.)	20.25 to 20.75
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Contracts for first quarter have been closed for small tonnages, and the prices to larger buyers are 1.90c. to 1.95c., Pittsburgh, or 2.22c. to 2.32c. per lb., delivered Philadelphia. A substantial tonnage of rein-

forcing bars will be required for the Reading Commercial Building, which was originally planned for structural steel, but is now designed for nine stories of reinforced concrete and three of structural.

Shapes.—Except on especially desirable business, 2.05c., f.o.b. nearest mill to consumer, is being quoted by eastern Pennsylvania mills. On a Pencoyd, Pa., basis this would be 2.11c., delivered Philadelphia. The successful bidder on a recent structural steel contract of 2700 tons used a price of 2c., mill, on the plain material, THE IRON AGE is informed, and a lower price on the shapes, mentioned in this column last week, appears to have been the basis of a bid by one of the unsuccessful contractors. Construction projects have declined recently and the tonnage in the Reading Commercial Building revised to call for part reinforced concrete construction has been reduced to about half the former total of 16,000 tons. A Camden shipbuilder, bidding for the contracts to build two Ward Line and four Matson Line ships, is seeking prices on about 15,000 tons of shapes. About 1600 tons of shapes for a ship contract has been placed by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., with the Carnegie Steel Co.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ½-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ½-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
½-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Plates.—Protection is being given on substantial tonnages of plates required in pending shipbuilding contracts. The New York Shipbuilding Corporation, Camden, N. J., is inquiring for 12,000 tons of plates for two ships for the Ward Line and for 50,000 tons of plates for four Matson Line vessels. Although the Di Giorgio Fruit Co. is reported to have bought two or more ships in Europe, the present inquiry of that line for one or two ships to be built here has not been withdrawn. About 7000 tons of plates for an American South African Steamship Co. liner to be built by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., has been awarded to the Carnegie Steel Co. The Pusey & Jones Co., Wilmington, Del., has awarded 1500 tons of plates and a small tonnage of shapes for three private yachts to the Bethlehem Steel Co. Plate prices continue at 2.05c. to 2.10c., Coatesville, or 2.15c. to 2.25c., Philadelphia.

Sheets.—Mills are maintaining 2.10c., Pittsburgh, on blue annealed; 2.85c., Pittsburgh, on black, and 3.60c., Pittsburgh, on galvanized sheets for first quarter delivery, but contracting has not developed to any extent. Bids on 700 tons of sheets for the Pennsylvania Railroad were at these prices, f.o.b. mill, except in the case of blue annealed sheets, on which one maker quoted 2c., Pittsburgh, for delivery to Dec. 31 and 2.10c. per lb. for the first quarter.

Imports.—In the week ended Dec. 1, 6700 tons of iron ore arrived at this port from Algeria and 152 tons of pig iron from Holland. Steel imports consisted of 65 tons of steel bars from Belgium and 36 tons of structural shapes and 10 tons of wire rods from Germany.

Old Material.—Except for a small tonnage of No. 1 heavy melting steel bought by a Claymont, Del., consumer at \$15 per ton, delivered, the iron and steel scrap market has been decidedly inactive.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.00 to \$16.00
Scrap T rails	14.50 to 15.00
No. 2 heavy melting steel	12.25 to 12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Roller steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Cleveland

Mills Announce Continuance of Fourth Quarter Prices of Plates, Shapes and Bars for First Quarter

CLEVELAND, Dec. 4.—Most of the leading producers have announced a continuation of the fourth quarter prices for first quarter contracts on steel bars, plates and shapes. This means a range of from 1.90c. to 2c., Pittsburgh, but producers expect to maintain a minimum of 1.95c. on most business. When Cleveland is used as a basing point for steel bars, the present range of 1.95c. to 2.05c., Cleveland, is continued by outside mills. Local bar mills expect to continue their 1.90c. mill base. While a few first quarter contracts have been written, mills are not pressing consumers for contracts. Specifications fell off the past week, particularly for steel bars, sheets and strip steel.

With the slowing down in production due to bringing out new models and the reduction of stocks for inventories, most of the automobile companies have curtailed their steel shipments for December, but the release of large tonnages is expected from this source for January shipment. One maker of low-priced cars has placed a large order for alloy steel bars for the first quarter. Some of the stamping plants in this territory have taken considerable automotive work against which they have not yet secured releases. This is causing a holding back of sheet specifications. Some of the mills can still take on a little tonnage in hot and cold-rolled strip steel for December shipment.

Plates are moving rather slowly. The American Shipbuilding Co. has taken ship repair work requiring 600 tons, which has been placed with a Pittsburgh district mill. The Pittsburgh Steamship Co. has taken bids on two large freight boats. Not much new work is developing in the building field.

Iron Ore.—The ore shipping season closed during the week with a total movement from the Lake Superior district of 53,980,874 gross tons, or about 3,000,000 tons more than during the previous year. This season's shipments were exceeded in only four of the past 10 years. Shipments in November were 4,260,942 tons, or more than double the November movement in 1927. Stocks at furnaces and at Lake Erie docks on Dec. 1 were approximately 39,500,000 tons, or 2,000,000 tons less than the amount at furnaces and docks on the same date a year ago. If the present rate of consumption is maintained, dock and furnace stocks on May 1 next year will be considerably less than on the corresponding date this year. However, consumers have secured shipments of all the ore that they expect to need before the opening of navigation, and while some stock piles may become well exhausted during the winter, a shortage is not looked for. The amount on docks and furnace yards May 1, this year, was 19,570,000 tons. Tabulation of shipments for November and for the season and for the past 10 years, as prepared by the Lake Superior Iron Ore Association, will be found in another column.

Pig Iron.—Sales declined the past

week, this evidently being partly due to the holiday. Cleveland interests during the week sold 32,000 tons in foundry and malleable grades, mostly for the first quarter. Few consumers are showing an interest in contracts beyond the first quarter. Inquiry is somewhat lighter. November shipments by some producers exceeded their production, and indications point to heavy shipments during December. While some of the automotive and stove and furnace foundries are curtailing operations this month and will take less pig iron, this decline in the demand will to some extent be offset by increased shipments to some of the other automotive foundries. Prices are firm and without change. One Valley furnace appears to have become rather active in parts of the Indiana territory, where it has made a few sales of foundry iron. An \$18 Valley price brings that grade to some Indiana points at a slightly lower price than the delivered price of Lake furnace iron. Cleveland furnaces are holding to \$18.50 for foundry and malleable iron for outside shipment and one Lake furnace to \$19.50 for its nearby territory. In Michigan, the market is firm at \$20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	\$22.50 to 23.00
Malleable	19.50
Ohio silvery, 8 per cent.	29.00 to 30.00
Basic Valley furnace	17.50 to 18.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Ferroalloys.—Most consumers of spiegeleisen were covered by contracts before the recent \$1 a ton advance in prices. Some consumers have placed contracts for ferromanganese at \$105 a ton, and other business is pending.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.45c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Sheets.—Specifications have fallen off considerably, reflecting the slowing down of the automotive industry and the approach of inventory time. However, mills have received some good specifications, mostly for auto body sheets, for January shipment. Most mills have a good backlog to tide them over until next month. Some first quarter contracts are being placed, and there is a limited amount of early shipment business. Part of this is being taken at the new prices, but some of the mills that can take orders for December rolling are entering these at the old prices. Regular prices are firmly maintained for first quarter contracts.

Cold-Finished Steel Bars.—With the reestablishment of present prices on cold-finished steel bars for the first quarter, a \$5 a ton reduction has been made on cold-drawn alloy bars, this being effected by reducing from \$1 to 75c. per 100 lb. the differential over hot-rolled alloy bars. One producer made this reduction a few days ago and others decided to meet it. The reestablishment of the present cold-finished steel bar price is expected to result in considerable falling off in specifications this month, as consumers will reduce their stocks for inventories.

Reinforcing Bars.—New inquiry is limited to small lots. Both mill and warehouse prices continue irregular on new billet steel bars. Rail steel bars are unchanged at 1.90c., mill.

Semi-Finished Steel.—Specifications are holding close to recent volume. Not much contracting has as yet been done for the first quarter, for which a local producer is holding to \$34, mill, for sheet bars, billets and slabs.

Wire Products.—Manufacturers' wire continues in good demand, but nails are moving slowly. First quarter prices have not yet been named.

Warehouse Business.—This shows the seasonal slowing down in all commodities. Jobbers are still using the old card of extras for hoops and bands, but expect to adopt the new card Jan. 1.

Strip Steel.—While concessions of \$2 a ton from regular prices are being made on hot-rolled strip to round lot buyers, mills appear to be holding firmly to the regular 2c., Pittsburgh, base for widths narrower than 4 in. Few mills make the narrow strip, and deliveries are more extended on this than on the wide material, some of the mills making the narrow strip being filled up into January. Cooperage stock is being maintained at the regular 2.10c. base. With the new card of extras, present prices on narrow strip are from \$2 to \$4 a ton higher than those that prevailed on fourth quarter contracts, but the advance is smaller on wide strip. Quite a number of first quarter contracts have been entered. Cold-rolled strip is firm at 2.85c., Pittsburgh and Cleveland, for round lots. Most of the mills are asking 2.95c. for small lots.

Bolts, Nuts and Rivets.—The de-

mand for bolts and nuts is still good. Specifications from jobbers have declined, as usually happens at the approach of inventory time, but the demand from the automotive industry has increased. Rivets are moving in good volume. Present prices on bolts, nuts and rivets probably will be reaffirmed for the first quarter. With steel bars unchanged for that delivery and an advance in wire in doubt, makers see no reason to change prices.

Coke.—Specifications are fair, but there is very little new business. Prices are unchanged. Ohio by-product foundry coke is quoted at \$7.75, Painesville, for December shipment. The demand for domestic coke is rather slow.

Old Material.—There is not much activity in the market, which remains firm at recent prices. While mills have good stocks, they continue to take shipments in fair volume, and dealers apparently are buying enough scrap to fill outstanding orders to sustain prices at present levels. Scrap is

coming out in plentiful volume at these prices.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.50 to \$15.00
No. 2 heavy melting steel.	14.00 to 14.50
Compressed sheet steel....	14.00 to 14.50
Light bundled sheet stamp'gs	12.00 to 12.50
Drop forge flashings....	12.25 to 12.75
Machine shop turnings...	9.50 to 10.00
No. 1 railroad wrought....	12.75 to 13.00
No. 2 railroad wrought....	14.50 to 15.00
No. 1 busheling	12.25 to 12.50
Pipes and flues	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades	
Low phos. forging crops, ..	16.00 to 16.50
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap....	15.50 to 16.00

Blast Furnace Grades	
Cast iron borings	11.00 to 11.50
Mixed bor'g and short turn'gs	11.00 to 11.50
No. 2 busheling	11.00 to 11.50

Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25

Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

New York

Pig Iron Sales Total 18,000 to 19,000 Tons—4000 Tons of Sheet Steel Piling Placed

NEW YORK, Dec. 4.—A total of 18,000 to 19,000 tons of pig iron was closed in the past week by sellers in this district. Consumers are maintaining a steady interest in first quarter requirements, and it is estimated that about 50 per cent of the total needed for this period has been covered by contracts. Despite efforts of Buffalo producers to maintain \$18 per ton, \$17.50 seems to be obtainable on desirable tonnages and eastern Pennsylvania sellers have quoted competitive prices. About 5000 tons of foundry iron for the Dundalk, Md., plant of the Central Foundry Co. has been placed, the greater part reported to have gone to the New England producer for water delivery. The Eagle Iron & Brass Foundry Co., Passaic, N. J., has closed on 2000 tons of foundry iron with a Buffalo furnace. Among current inquiries for first quarter delivery are 500 tons of foundry iron for the Lancaster, Pa., plant of the Burnham Boiler Corporation, Irvington, N. Y.; 150 tons of low silicon foundry iron for the A. P. Smith Mfg. Co., East Orange, N. J., and about 600 tons of foundry grade for the Hilles & Jones plant of the Consolidated Machine Tool Corporation, Rochester, N. Y.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania. *Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars.—The market has had little activity in the past week. Interest still centers in the 8500 tons of bars required for the Delaware, Lackawanna & Western terminal at Jersey City. These bars will be bought by the Turner Construction Co., general contractor. The contract is likely to be closed during the week. No new projects of outstanding size have come out recently. The general run of small orders is keeping up to expectations for this time of the year. Prices are unchanged.

Warehouse Business.—Prices of black and galvanized sheets have been advanced in the New York district 20c. per 100 lb. on black, to 4.00c., base, and 25c. per 100 lb. on galvanized, to 4.75c., base. For delivery to consumers in northern New Jersey, the black sheet price continues at 4c., base, and galvanized sheets have been advanced 5c. per 100 lb., to 4.75c. The advance is attributed to the strong mill situation rather than to increased local demand. Continued mild weather is contributing to an active market for structural material and some substantial plate orders have been taken recently.

Plates, Shapes and Bars.—Developments of the week have made certain that there will be no advance in prices of plates, shapes and bars for first-quarter contracting. Some companies have informed their customers that their books are open at the fourth quarter prices of 1.90c. and 1.95c., Pittsburgh, or \$3 higher at Eastern plate and shape basing points. Specifications have fallen off somewhat, but are expected to take an upward

turn the middle of the month, when grace expires for entering shipping orders against fourth quarter contracts. One of the largest awards of the week was 4000 tons of sheet steel piling to be furnished by the Bethlehem Steel Co. for a warehouse for the Delaware, Lackawanna & Western Railroad near Jersey City. The city

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal...7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter hard	
Hoop	5.15c. to 5.40c.
Bands	4.50c.
Blue ann'l'd sheets (No. 10).....	3.90c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger..	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases, 4.50c. to 7.00c.	
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	60
1 x 30 in. and smaller..50 to 50 and 10	
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	60
¾ x 20 in. and smaller..50 to 50 and 10	
Coach screws:	
½ x 6 in. and smaller.....	60
1 x 16 in. and smaller..50 to 50 and 10	
Boiler Tubes— Per 100 Ft.	
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—		
A		AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

Per Lb.	
Nos. 18 to 20.....	3.80c.
No. 22.....	3.95c.
No. 24.....	4.00c.
No. 26.....	4.10c.
No. 28*.....	4.25c.
No. 30.....	4.50c.

Sheets, Galvanized

Per Lb.	
No. 14.....	4.40c.
No. 16.....	4.25c.
No. 18.....	4.40c.
No. 20.....	4.50c.
No. 22.....	4.60c.
No. 24.....	4.75c.
No. 26.....	5.00c.
No. 28*.....	5.25c.
No. 30.....	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

of New York will require 2800 tons of 60-in. steel pipe for a water line in Queens Borough, on which bids will be taken in about a month. Another municipal project calls for 600 tons of 48-in. pipe for Manhattan.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Cast Iron Pipe.—Private buyers of gas and water pipe are actively inquiring for small lots and some of the usual large tonnages of gas pipe have appeared for spring delivery. About 15,000 tons of gas pipe for the American Light & Traction Co., New York, is understood to have been awarded to the United States Cast Iron Pipe & Foundry Co. A local New Jersey company is asking for bids on about 200 tons of gas pipe, and E. L. Phillips & Co., 30 Church Street, New York, are inquiring for about 850 tons of gas pipe for the Long Island Lighting Co. The Stamford Water Co., Stamford, Conn., is in the market for 700 tons of water pipe. Quotations of northern foundries are steadier, but \$38.60 to \$39.60 per net ton, delivered New York, is still a fair range of the market.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$38.60 to \$39.60; 4-in. and 5-in., \$43.60 to \$44.60; 3-in., \$53.60 to \$54.60; Class A and gas pipe, \$4 to \$5 extra.

Sheets and Strip.—A small amount

of first quarter contracting has been done in sheets and strips, and in all instances the higher prices have applied. It is expected that this month will bring heavy specifying against fourth quarter contracts for hot-rolled strip because the new base prices, plus the new extras, will mean an advance in first quarter of \$2 to \$4 a ton on many widths and gages.

Coke. — Connellsville prices on standard foundry and furnace grades are less firm than a week ago, but no definite decline in prices has appeared. Standard foundry continues at \$3.50 to \$3.75 per net ton, Connellsville, and standard furnace at \$2.85 to \$3.05 per ton, Connellsville. Special brands of foundry coke are quoted at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44, to New York or Brooklyn. The West Virginia producer of by-product foundry coke has not yet opened its books for next year. By-product foundry coke prices are unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Recent sales of No. 1 heavy melting steel to eastern Pennsylvania consumers have been at \$15 and \$15.50 per ton, delivered, the higher price having been on about 1000 tons and the lower quotation on

about 500 tons. Heavy breakable cast has been sold at \$15.50 per ton, delivered, and brokers are offering \$15 per ton on deliveries to eastern Pennsylvania users. The local stove plate market shows less strength and brokers are offering \$11.25 per ton, delivered to West Mahwah, N. J., a reduction of 25c. per ton. Although buying is light, dealers report only a small tonnage of scrap obtainable at the present level of prices.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.25 to \$12.00
Heavy melting steel (yard)	8.25 to 8.50
No. 1 hvy. breakable cast.	11.25 to 11.75
Stove plate (steel works)	8.50
Locomotive grate bars	8.50
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.25 to 12.75
No. 1 yard wrot., long	11.25 to 11.75
Rails for rolling	13.00 to 13.50
Cast iron carwheels	12.00 to 12.50
Stove plate (foundry)	9.25 to 9.50
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Unique Steel Structure for Diabetes Patients

THE spherical steel structure shown in the illustration is a large tank just completed at the Cunningham Sanitarium, Cleveland, for use in a new treatment for diabetes and allied diseases that requires the patients to be kept for a considerable time under prescribed air pressure. Fabricated and erected by the Biggs Boiler Works Co., Akron, Ohio, the tank is 64 ft. in diameter and its outside shell is made of ¾-in. flanged steel plate. Its construction required 600 tons of steel. While the fabricating problems involved in building the shell did not differ materially from those met in other classes of work in tank and boiler shops, difficulties were encountered because of the large size of the tank.

All seams were closed with double butt straps and double riveted with 1½-in. rivets. When the last course of plates had been put in place, the top plate was dropped in place with perfectly matched rivet holes. This indicates the accuracy with which the work was fabricated and erected in the field. The sphere has 349 special port lights, part of which are equipped with aluminum covers on the inside. These lights are constructed to open inward on hinges and carry 1½-in. glass.

Inside the sphere a complete five-floor structural building was erected. The interior steel work was designed to allow for contraction and expansion of the outside structure. The

sphere rests on 12 cast steel base lugs, which in turn are supported on concrete bars tied together with a reinforced circular mat. The whole is designed to withstand a wind pressure of 100 miles an hour.

In addition to the sphere there are two air locks, one 16 ft. in diameter and 35 ft. long and the other 16 ft. in diameter and 70 ft. long. Both are equipped with port holes and divided into rooms with a corridor

through the center. Connection with the sphere is made by an entrance lock 10 ft. in diameter and 20 ft. long in the shape of a T. This arrangement allows for using different air pressures between the locks and sphere. The entire equipment is designed for 30-lb. air working pressure and was tested at 50 lb.

The project was financed personally by H. H. Timken, president, Timken Roller Bearing Co., Canton, Ohio.

Inside This Sphere Are a Dining Room, 36 Private Rooms and a Recreation Room, All Served by an Electric Elevator in the Center



Cincinnati

General Advance of 50c. on Southern Pig Iron Expected— Automobile Companies Specify Sheets Heavily

CINCINNATI, Dec. 4.—Southern furnace interests, with the exception of one Alabama producer, still are quoting \$16.50, Birmingham. That an increase to \$17 a ton may become general in a few days or a week is predicted by sellers. Sales the past week were comparatively small and were in sharp contrast with the heavy orders of the previous week. The most important order was for 1500 tons of Northern foundry iron for a nearby consumer. A feature of the market has been the crossing in numerous instances of the lines marking the normal boundaries of the selling territories of certain furnaces. Small quantities of Valley iron are being shipped into Cincinnati and also are going into western Ohio and into Indiana. Other makers have also been taking tonnages which usually are supplied by Lake Erie furnaces. Brokers have been selling small lots of southern Ohio iron at \$18.50, base Ironton, which is the price asked by the Marting Iron & Steel Co. for the iron remaining on its yards. Jackson County silvery iron is quoted at \$26 to \$27, base Jackson, for 8 per cent; since users are well covered for first quarter requirements at the old price, the new schedule probably will not be thoroughly tested for some time.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$20.39
Ala. fdy., sil. 1.75 to 2.25... \$20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75... 20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25 20.19
S'th'n Ohio silvery, 8 per cent 27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—An increased volume of sheet steel specifications from automobile makers getting into production on new models has given added strength to the position of district mills. Moreover, the liberal flow of tonnage from the Detroit district has been supplemented by well diversified bookings from other sources, so

that backlogs insure the continuation of mill operations at 100 per cent of capacity for at least several weeks. The new prices are holding firm under the test of first quarter buying. Sales of reinforcing bars have been somewhat meager. A maker of rail steel bars is quoting 1.90c. to 1.95c., base mill. The movement of bars, structural shapes and plates has been only fair. Common wire nails are being sold at \$2.69 per keg, delivered Cincinnati.

Coke.—By-product foundry coke will remain at \$7, ovens, during December, but No. 2 nut and walnut sizes have gone up 25c. a ton to \$3.50 and \$4, ovens, respectively. Egg size is unchanged at \$5, ovens. An advance of 50c. a ton on all grades of domestic by-product coke is predicted for Jan. 1. At Detroit, by-product foundry is quoted at a local delivered price of \$9. Domestic grades at Detroit are firm and unchanged, but there may be an increase of 50c. a ton on Dec. 15. Shipments of by-product foundry coke in November were about 20 per cent less than in October, and specifications this month may show a

further recession on account of the reluctance of users to take material at or near inventory time. Sales of by-product domestic coke were about 10 per cent larger in November than in October. New River beehive foundry coke is quoted at \$6 to \$6.50, ovens, and Wise County foundry at from \$4.50 to \$5.25.

Old Material.—Steel plants are accepting less scrap on current contracts than a week ago. Railroad offerings purchased in the past few days by local dealers are reported to have brought less than in the early part of November. However, the market is holding fairly steady, and prices probably will stop at or near present levels until after the first of the year. The Southern has sold a special lot of about 2500 tons of steel rails.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting....	13.25 to 13.75
Loose sheet clippings....	9.50 to 10.00
Bundled sheets.....	10.25 to 10.75
Cast iron borings.....	9.00 to 9.50
Machine shop turnings....	8.50 to 9.00
No. 1 busheling.....	10.75 to 11.25
No. 2 busheling.....	6.25 to 6.75
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought....	13.00 to 13.50
Short rails.....	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast....	18.50 to 19.00
No. 1 railroad cast....	14.75 to 15.25
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	13.75 to 14.25
Agricultural malleable...	12.75 to 13.25

St. Louis

Pig Iron Buying in Smaller Volume But Prices Are Firm— Steel Bookings Steady

ST. LOUIS, Dec. 4.—The sale of 5000 tons of basic iron by the St. Louis Gas & Coke Corporation to an East Side melter for shipment in December was the principal transaction of the week, in which a total of 7450 tons was sold by the local maker and 1000 tons by a leading Southern interest. The lull, following weeks of heavy buying, seems to indicate that the bulk of first quarter buying is over, although an attractive tonnage is yet to be covered. While the market is still strong and prices unchanged, the tone is not quite as good as it has been, because there is a feeling that present prices will tempt makers to overproduce. The local maker sold 2450 tons of foundry iron, including 350 for immediate shipment and the remainder for first quarter delivery. Stove foundries continue active, and orders for railroad car parts are materially increasing the melt.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$20.00
Malleable, f.o.b. Granite City.....	20.50
N'th'n No. 2 fdy., deliv'd St. Louis..	22.16
Southern No. 2 fdy., deliv'd.....	20.92
Northern malleable, deliv'd.....	22.16
Northern basic, deliv'd.....	22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Consumption of foundry coke continues on a large scale as a result of the heavy melt in the district, the November consumption being nearly 4 per cent greater than in October. However, buying continues on a hand-to-mouth basis. Domestic grades are moving more rapidly.

Finished Iron and Steel.—Total bookings of new business by the Granite City Steel Co. were slightly greater during November than in the

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq. blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops.....	4.00c. to 4.25c.
Bands.....	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in... 4-in.....	\$18.00
Seamless steel boiler tubes, 2-in... 4-in.....	38.00
	19.00
	39.00

preceding month. The demand for black, galvanized and blue annealed sheets is well sustained. However, plate business lags, and the volume of tin plate orders is somewhat smaller. Prices continue firm. Warehouse business is satisfactory. Structural fabricators report business is light.

Old Material.—The market for old material is quiet. Mills in the district are delaying all buying, except for fill-in material, until after inventories have been taken, being in a good position to do this because of ample stocks on hand or purchased. Dealers are anticipating a heavy buying movement the latter part of December or the first week in January and have been offering high prices for railroad scrap. The only price changes are in steel car axles and cast iron carwheels, which are 50c. a ton higher. Railroad lists include: Baltimore & Ohio, 13,910 tons; New Orleans & Great Northern, 57 tons; Missouri Pacific, 106 carloads; Frisco Lines, 21

carloads; Mobile & Ohio, 24 carloads; Chicago, Milwaukee, St. Paul & Pacific, 40 carloads; and Louisville & Nashville, 7869 ft. of 68-lb. rails.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires...	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart...	15.00 to 15.50
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought...	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Machine shop turnings...	9.00 to 9.50
Steel car axles.....	19.50 to 20.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought...	12.50 to 13.00
Steel rails, less than 3 ft..	17.50 to 18.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.50 to 15.00
No. 1 machine cast.....	15.50 to 16.00
Railroad malleable.....	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Birmingham

Heavy Buying of Pig Iron for First Quarter—Steel Plant Operations at High Rate

BIRMINGHAM, Dec. 4.—One merchant producer continues to quote \$17 on No. 2 foundry, while others are taking business at \$16.50 except small orders. There has been heavy buying during the past 10 days. Practically all of the larger melters have covered their requirements through March and several of the smaller consumers have contracted for most of their first quarter requirements. Some iron is being sold outside the district. Shipments are holding up well; no iron was stocked during November. The Woodward Iron Co. changed its No. 2 Woodward furnace from foundry to basic on Nov. 21. The furnace of the Gulf States Steel Co. at Alabama City was changed from foundry to basic on Dec. 1. On Nov. 26, the Tennessee company changed its Ensley furnaces Nos. 1, 3 and 6 from foundry to basic and furnace No. 4 from basic to foundry. Of the 19 furnaces in blast, 10 are on foundry, seven on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil.. \$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil.. 17.00 to 17.50
Basic

Finished Steel.—Prices are becoming firmer, following the advance of \$2 a ton on bars, plates, shapes and sheets reported last week. Mills are holding closely to quotations of 2.25c. on bars, plates and shapes. Sheets continue strong. New business in November was slightly ahead of October bookings in all of the more important lines. Inquiries indicate an active market for the next two or three weeks. Plant operations are at a higher rate than at any time in recent years. The Tennessee company has

increased its active open hearths at Ensley from five to eight. Seven are active at Fairfield and the Gulf States Steel Co. is working four at Alabama City. Structural steel fabricators are operating on good schedules with satisfactory tonnage pending. The Ingalls Iron Works Co. has booked an

order for 750 tons for the American Smelting & Refining Co. at Rosita, Mexico.

Cast Iron Pipe.—Pressure pipe makers are booking odd lots for private and contract work, but the total volume is small and below the average for this season. Several municipal feelers for winter buying have come in during the past week and makers are hopeful of specifications by the end of the year. All plants are operating on reduced schedules. Very little stock is being carried and output is being gaged by demand. Quotations are unchanged at \$37 to \$38 on 6 in. and larger sizes.

Coke.—Prospects are brighter for foundry coke. Industrial coke users are covering for the first quarter and interest is also being shown in second quarter. Sales of domestic coke continue at a fairly active rate. Quotations remain at \$5.

Old Material.—Buying is spotty, with the aggregate below the average for November. Lessened production in some fields is having its effect on consumers' demands. Consumers are keeping stocks light for approaching inventories. Prices are the same as quoted last week.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Buffalo

Pig Iron Demand Not Heavy but Prices are Maintained—Steel Mills Operating at Undiminished Rate

BUFFALO, Dec. 6.—Pig iron inquiries and orders the past week have not been heavy, but apparently prices are being maintained in the district. One inquiry from New Jersey is for 1000 tons of foundry and a New England inquiry is for 2000 tons. Two other inquiries from New England for foundry are for 500 and 1000 tons. More purchasing is expected for the first quarter. Shipments from Buffalo furnaces are heavy. Preparations are being made to blow in another Hanna stack. The Bethlehem Steel Co. is now operating six blast furnaces here, the highest number in months. This year has brought a

large increase in pig iron shipments on the New York State barge canal. Actual figures will not be available until next week, but the total probably is over 130,000 tons.

Prices per gross ton, f.o.b. furnace:
No. 2 fdy., sil. 1.75 to 2.25 \$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75 18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25 19.50 to 20.00
Malleable sil. up to 2.25.. 18.50 to 19.00
Basic

Finished Iron and Steel.—Operations at Buffalo mills continue at an undiminished rate. Specifications are satisfactory notwithstanding that the inventory period is close at hand. Prices are firm on the major rolled products, with 2c., Buffalo, quoted on bars, shapes and plates for volume purchasing and 2.10c. for small lots. Specifications from the drop forging industry indicate that this business is maintaining heavy operations. Sheet business is very good, and the prices of 2.85c. for black and 4.10c. for automobile body for first quarter delivery are firm. Reinforcing bars are in light demand, and no important structural contracts have been let. Warehouse business shows no decline.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

Old Material.—New purchases are small, but all dealers have orders to fill. An active market exists for cast iron borings for blast furnace consumption at \$11 to \$11.50. Some lots of this material are going into Pittsburgh and Youngstown districts. A few sales of knuckles and couplers and rolled steel wheels have been made at \$17.50, and some lots of No. 1 cast have brought \$15.75. Dealers are anticipating a better demand for specialties because steel castings business continues to show an upward trend. One steel plant is still regulating shipments of scrap, but the restrictions are not as severe as they have been in the past. A recent purchase of No. 2 heavy melting steel made at \$13.25 establishes a lower figure and a wider spread for this material.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$15.50 to	\$16.50
No. 2 heavy melting steel.	13.25 to	14.00
Scrap rails	15.50 to	16.00
Hydraul. comp. sheets	13.50 to	14.00
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	13.00 to	13.75
No. 1 busheling	14.50 to	15.50
Hvy. steel axle turnings	13.50 to	14.00
Machine shop turnings	7.50 to	8.00
No. 1 railroad wrought	12.50 to	13.00
Acid Open-Hearth Grades		
Knuckles and couplers	17.50 to	18.00
Coil and leaf springs	17.50 to	18.00
Rolled steel wheels	17.00 to	17.50
Low phos. billet and bloom ends	18.00 to	18.50
Electric Furnace Grades		
Short shov. steel turnings	11.00 to	11.50
Blast Furnace Grades		
Short shov. steel turnings	11.00 to	11.50
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	11.00 to	12.00
No. 2 busheling	9.00 to	9.50
Rolling Mill Grades		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00
Cupola Grades		
No. 1 machinery cast	15.50 to	16.00
Stove plate	14.50 to	14.75
Locomotive grate bars	13.00 to	13.50
Steel rails, 3 ft. and under	17.50 to	18.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Industrial	16.00 to	16.50
Railroad	16.00 to	16.50
Agricultural	16.00 to	16.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Advances of 50c. to \$1 a Ton on Pig Iron Expected to Go Into Effect Soon

TORONTO, ONT., Dec. 4.—While the general trend of business in the Canadian pig iron markets showed very little change during the week, there is still unsettlement with regard to the general price situation. With foundry pig iron selling in Buffalo at \$18 to \$19, Canadian producers have an advantage of 60c. to \$1 per ton in the Toronto market over their Buffalo competitors. Canadian prices, however, are deemed too low by local blast furnace representatives, and there has been considerable discussion of the situation of late. It is pretty well settled that advances of from 50c. to \$1 per ton will go into effect here for first quarter delivery. Shading has disappeared; melters who were quoting 50c. under the general market have come up to the current quotation. The demand for foundry and malleable iron continues to expand.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Building trades have not yet been affected by winter weather, and construction work is proceeding at an undiminished rate. Most of the contracts placed during the week involved small tonnages, but fabricators are figuring on several

contracts for from 1000 to 10,000 tons. Approximately 3000 tons of steel will be required for the Canadian National Railways hotel at Vancouver, B. C. Contracts awarded included 250 tons to the Disher Steel Construction Co., Toronto, for factory at New Toronto, Ont., for Ritchie Cut Stone Co.; 75 tons to Standard Steel Construction Co., Welland, Ont., for addition to plant of Grouts, Ltd., at St. Catharines, Ont.; 150 tons to Hamilton Bridge Co., Hamilton, Ont., for addition to building for Hamilton Bakeries, Ltd., Hamilton.

Old Material.—The demand for iron and steel scrap is active, but sales are being held up in some districts because of difficulty in reaching price agreements. Mills are taking in large tonnages and foundries and other consumers are also buying freely. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	16.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00
	Per Net Ton	
	Toronto	Montreal
No. 1 machinery cast	15.00	15.00
Stove plate	9.00	9.00
Standard carwheels	13.00	13.00
Malleable scrap	13.00	13.00

Boston

Pig Iron Sales Extend Into April—Week's Business About 7000 Tons—Scrap Steady

BOSTON, Dec. 4.—Pig iron sales in this territory the past week totaled about 7000 tons, mostly Mystic, Champlain and Buffalo iron, for shipment extending into April. They included a round tonnage to a Worcester, Mass., foundry; 1000 tons No. 1X to another Massachusetts melter, 1000 tons No. 2X and No. 1X to a Providence, R. I., plant and numerous smaller lots. In addition, the Mystic Iron Works sold 1000 tons No. 2X outside of New England at the equivalent of \$18.50 a ton, on cars Buffalo. On large tonnages, buyers claim they can still buy No. 2X Buffalo iron at \$18 a ton, furnace. The most active Buffalo stack, however, is holding at \$18.50, and other New York State and Mystic irons are on an equivalent delivered basis. Buffalo iron for rail and water shipment has been withdrawn from the market. Small lots

of charcoal iron were sold the past week at \$24 a ton, base furnace.

Foundry iron prices per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	\$22.91
*Buffalo, sil. 2.25 to 2.75	23.41
East. Penn., sil. 1.75 to 2.25	\$24.15 to 24.65
East. Penn., sil. 2.25 to 2.75	24.65 to 25.15
Va., sil. 1.75 to 2.25	26.91
Va., sil. 2.25 to 2.75	27.41
Ala., sil. 1.75 to 2.25	23.41 to 25.77
Ala., sil. 2.25 to 2.75	23.91 to 26.27

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Warehouse Business.—Hexagon poultry netting and wire cloth have been advanced 5 per cent for 1929 delivery. Advances in sheets made outside New England have not been followed here. The movement of all warehouse products out of stock is increasing, although slowly.

Iron Imports.—Imports of pig iron at Boston during November were 2304 tons, consisting of 1423 tons of Dutch and 881 tons of Indian. October importations were 420 tons.

Coke.—New England producers of by-product foundry coke have announced that December shipments on contracts will be made at \$11 a ton, delivered within a \$3.10 freight rate zone. That quotation has been in effect since April, last, when the price to foundries was reduced from \$11.50. Higher foundry coke prices in the first half of 1929 appear unlikely owing to the policy of one oven to make a flat \$11 price instead of the customary sliding scale contract. All ovens are now caught up on contract specifications. Domestic coke is in heavy demand.

Old Material.—Aside from a firmer market for steel turnings and an easier market in forge scrap, old material prices are unchanged. The firmness of steel turnings is due to buying against Pennsylvania mill contracts, while the weakness of forge scrap is attributed to the completion of orders for a Worcester, Mass., user. New England foundries in general are using more scrap than a year ago, but are supplying needs from local or nearby yards from which material can be trucked. The export market for No. 1 and No. 2 steel, mostly automobile, is still \$10.50 a ton, on dock. It is expected that 3500 tons will be cleared this week.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	\$10.50 to \$11.00
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.25
No. 1 railroad wrought...	11.00 to 11.50
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings....	6.25 to 6.50
Cast iron borings (steel works and rolling mill).	6.00 to 6.50
Bundled skeleton, long....	9.00 to 9.25
Forge flashings	9.50 to 9.75
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	6.00 to 6.50
Shafting	14.50 to 14.75
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling.....	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25
<i>Prices per gross ton deliv'd consumers' yards:</i>	
Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

Germany Greatly Increases Machinery Exports

WASHINGTON, Dec. 4.—Surpassed only by the United States, Germany now ranks second among machinery exporting countries of the world, according to W. H. Rastall, chief Industrial Machinery Division, Department of Commerce. Record shipments are being made by the German industry, whose exports for the first nine months of the current year may bring the year's total to a figure equal to or more than pre-war exportation. Total exports for the nine months were 397,837 tons, valued at \$162,710,604, against 318,564 tons, valued at \$125,954,122 in the corresponding period of 1927. These figures include machines shipped as reparation deliveries in kind.

Detroit

Employment Declining in Automobile Industry, but Increased Schedules Are Expected After Jan. 1

DETROIT, Dec. 4.—Industrial operations in this district have slowed down, as is usually the case just prior to inventory period. The employment barometer of the Employers' Association shows a consistent drop of about 2500 persons a week. The present employment figure is 274,397—2555 less than a week ago, but 78,504 greater than the figure of a year ago.

The Chevrolet Motor Co. is planning for a production of 1,250,000 cars in 1929. Shipments to dealers are to begin Dec. 15, with a December production of approximately 42,000 cars. The January schedule is estimated at 106,000 cars.

The Auburn Automobile Co. has released certain material orders to cover the first five months of 1929 on the basis of 16,000 units.

The Oakland Motor Car Co. is expected to announce a new line of Pontiacs, larger and more luxurious than the old line. The present construction operations at Pontiac, which will be completed about the first of the year, will increase the capacity of the Oakland-Pontiac plant to about 350,000 cars for 1929. About 3000 additional employees will be required.

The steel work on section 5 of the

Detroit-Windsor tunnel, which includes the customs building and Detroit approach, will be out for figures in about a week. About 800 tons will be required. In the near future figures will be taken on the following: Union Trust Co. Building, Flint, Mich., 1500 tons; also a building for the Detroit Gear & Machine Co. The Flint Auditorium, Flint, Mich., 900 tons, was awarded to the Flint Structural Steel Co.

Indications are that shipments of pig iron will be slightly below those of November owing to inventory and holiday periods. Most melters are covered for their first quarter requirements. Furnaces serving the district will have lowest yard stocks on Jan. 1 of any time in the past five years.

There have been no changes in quotations on old material in this district during the past week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast....	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets....	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.50 to 12.00

Pacific Coast

San Francisco Hotel Takes 2870 Tons of Steel—Prices on a Firmer Basis

SAN FRANCISCO, Dec. 1 (*By Air Mail*).—Demand for iron and steel products on the Pacific Coast during the week eased off, especially as regards large awards. Featuring the market was the letting of 2870 tons of fabricated steel for a hotel in San Francisco for the Methodist Book Concern to the McClintic-Marshall Co. This is the largest structural award placed in this district since May. Prices, generally, seem to be on a firmer basis.

Pig Iron.—Few inquiries or sales involving large lots of foundry pig iron were reported this week. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars this week were the lightest since the early part of June. Only one project in excess of 100 tons was reported. This was 300 tons for a bridge over Mission Bay, San Diego, secured by an unnamed interest. H. E. Doering, Portland, was awarded the gen-

eral contract for a school in that city involving 400 tons and is expected to award a sub-contract for the bars next week. Bids will be opened Dec. 18 on 209 tons for a bridge at Tacoma, Wash. Little or no improvement is noted in out-of-stock prices. In Los Angeles and San Francisco, 1.80c. base, continues to prevail. On merchant bar steel, 2.30c., c.i.f. Coast ports, is being firmly maintained.

Plates.—The Western Pipe & Steel Co. was awarded a pipe line at La Habra, Cal., taking 100 tons. The only inquiry of size in the market is for 125 tons of 18-in. pipe for Vancouver, B. C. No change in prices is noted; 2.25c., c.i.f., is the minimum, with

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, $\frac{1}{2}$ -in. and larger....	5.65c.
Com. wire nails, base per keg....	\$3.40
Cement c'd nails, 100 lb. keg....	3.40

2.30c., c.i.f., applying on some of the smaller lots.

Shapes.—In addition to the 2870 tons for a hotel in San Francisco, mentioned above, 570 tons for a bridge at Paradise, Mont., was placed with an unnamed fabricator. Other awards involved lots of less than 100 tons each. A fair tonnage of pending business is before fabricators. Domestic plain shapes remain firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe awards this week were limited. Lewiston, Idaho, placed 109 tons of 2 to 8-in. Class B pipe with an unnamed company. The American Cast Iron Pipe Co. took 776 tons of 18-in. Classes C and D pipe for the Marin Municipal Water District at San Rafael, Cal., and the Pacific States Cast Iron Pipe Co. secured 90 tons of 6-in. Class C pipe for the same company. Bids have been opened on 292 tons of 4 to 8-in. Class C pipe for Friday Harbor, Wash. Seattle has taken bids on the improvement of West Holden Street, calling for 220 tons of 8 and 12-in. Classes B and C pipe. The largest pending business calls for 548 tons for the improvement of Arlington Street, Los Angeles, bids on which go in Dec. 3.

Establishments engaged primarily in the manufacture of aluminum products reported an output valued at \$123,557,112 in 1927, according to the Bureau of the Census. This represented a decrease of 3.3 per cent, compared with \$127,830,756 in 1925. The 1927 production included \$27,990,354 for aluminum ware, principally cooking utensils and household articles; \$27,080,382 for castings, including motor vehicle accessories and parts; \$62,370,107 for all other aluminum products, including bars, plates, sheets and wire; and \$6,116,269 miscellaneous.

New Trade Publications

Pumping Equipment.—Worthington Pump & Machinery Corporation, 2 Park Avenue, New York. Bulletin WP-1003 devoted to general information regarding Worthington pumping apparatus used in mechanical equipment of buildings. Included are steam and electrical pumps for heating systems, vacuum pumps, wells, sump pumps and pumps for fire protection, elevators and lifts, ventilating systems, cold water meters, refrigerators for buildings and compressed air for buildings.

Steel Buildings.—Blaw-Knox Co., Pittsburgh. Bulletin 1057 dealing with Blaw-Knox standard buildings of copper-bearing galvanized steel. Booklet is generously illustrated and provides complete descriptions of all types of buildings provided, as well as construction details of steel sash, doors and windows, roofing materials and other products furnished.

Heating Specialties.—Vapor Heating Co., York, Pa. Bulletins B-141, B-145 and B-146, illustrating and describing new Broomell sliding sleeve modulating valve, Broomell vapor-pressure system and Broomell damper regulator and compound vacuum-pressure gage respectively.

Electrical Equipment.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2119 devoted to Obround condulets, form 7, covers, wiring devices, reducers and branch extensions, with illustrations and full specifications, Bulletin 2122 describing types F and LB condulets.

Industrial Lanterns; Sanding Equipment.—Nichols-Lintern Co., 7960 Lorain Avenue, Cleveland. Booklet devoted largely to company's Universal signal lanterns, flasher controls and reflector units for steel mill, factory and highway use. Booklet also contains detailed description of Lintern electro-magnetic sander for overhead cranes and of N-L mechanical sanders for locomotive cranes.

Ventilating Equipment.—E. I. Du Pont de Nemours & Co., Inc., Fairfield, Conn. "Auxiliary Ventilation for Metal Mines," booklet dealing with ventilation in operation of metal mines and use of Ventube, flexible tubing for this purpose. Numerous photographs of working installations are included, as well as diagrams and charts.

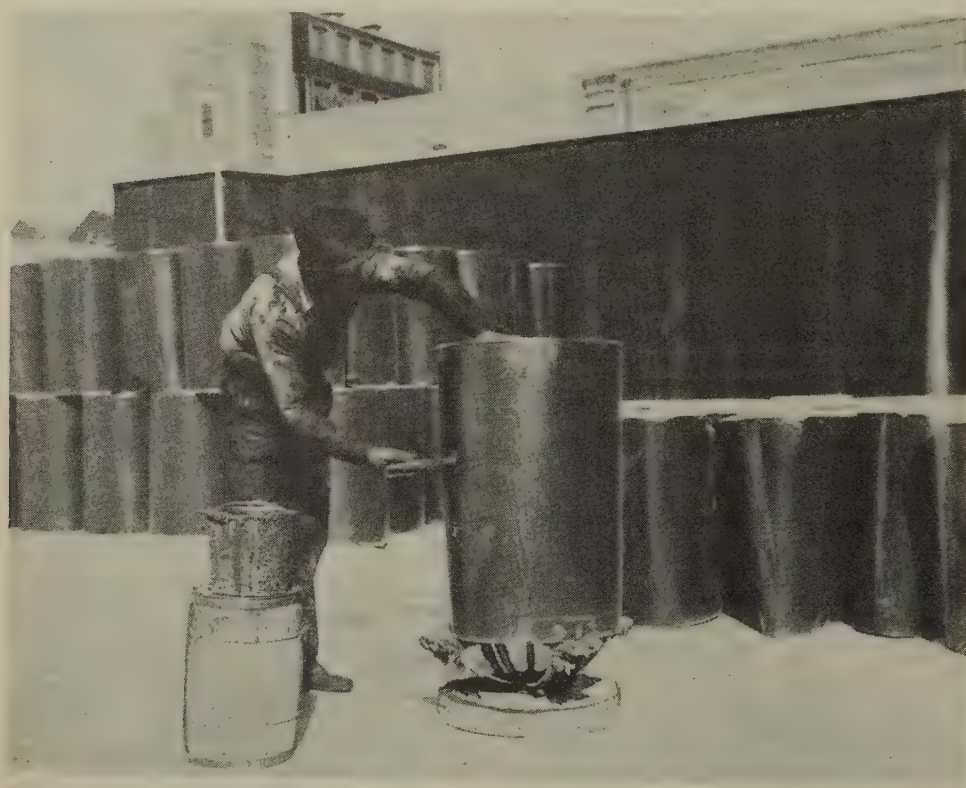
Refining Iron.—Mathieson Alkali Work, Inc., New York. Bulletin No. 285, "Refining Iron with Purite," describes the use and effect of this chemical on cast iron in removing sulphur together with a discussion of other advantages claimed. Its eight pages are well illustrated.

Crushers.—Pennsylvania Crusher Co., Broad and Arch Streets, Philadelphia. Bulletins 2003 and 2004 of 16 and four pages respectively illustrate and describe the Penn-Lehigh and Pennsteel crushers, designed for heavy work on rock, coal, limestone, gypsum and other materials. The Penn-Lehigh type consists of single-roll crushers with rolls 30 and 36 in. in diameter and 48 to 72 in. long. The Pennsteel crusher also is of the single-roll type, but with rolls 21 and 24 in. in diameter and varying from 40 to 60 in. in length.

Temperature Control.—Weaver Brothers Co., Clinton, Mich. Folder 555, two pages, illustrates and describes a Foxboro pickling tank temperature controller for standardized work and uniform results.

Portable Belt Conveyors.—Atlas Engineering Co., Milwaukee. Bulletin 26-B of 16 pages illustrates and describes a line of portable conveyors for loading and unloading purposes, or handling of materials in places where conveyors are not regularly installed. Stacker conveyors are included.

Motor Control.—Cutler-Hammer Mfg. Co., Milwaukee. 4-page folder tendering engineering advice to those who encounter what seem to be difficult problems in motor control.



Rotating Base Aids in Painting

In painting metal drums at the Paraffine Companies, Inc., San Francisco, plant, the drums are placed on a revolving base. The drum is slowly turned, bringing the unpainted areas to within easy reach of the painter and doubling the output as compared with the ordinary method.

Non-Ferrous Metal Markets

Copper Steady and Quiet, Tin Moderately Active and Firm, Lead Advanced, Zinc Sales Large With Price Firm

NEW YORK, Dec. 4.

Copper.—Domestic buying continues in moderate volume with February delivery predominant. Some fill-in requirements are also noted for intermediate positions. Foreign consumers have been more active, particularly Germany, and sales last week were larger than recent previous ones. Total sales to all consumers in November were large, but less than for some months and are estimated at 80,000 to 85,000 tons. Quotations continue firm and unchanged at 16c., delivered in the Connecticut Valley, for electrolytic copper and at 16.25c., c.i.f. European ports. Lake copper is quiet but firm at 16c. to 16.12½c. de-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY					
	Dec. 4	Dec. 3	Dec. 1	Nov. 30	Nov. 28
Lake copper, New York.....	16.12 ½	16.12 ½	16.12 ½	16.12 ½	16.12 ½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.....	52.50	53.25	.....	53.00	52.75
Lead, New York.....	6.50	6.50	6.35	6.35	6.35
Lead, St. Louis.....	6.32 ½	6.30	6.25	6.22 ½	6.22 ½
Zinc, New York.....	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis.....	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

livered, with sales made for February-March.

Copper Averages.—The average price for Lake copper for November, based on daily quotations in THE IRON AGE, was 16.12½c., New York. The average price of electrolytic copper was 15.75c., refinery, or 16c., delivered in the Connecticut Valley.

Tin.—Except for the opening of the National Metal Exchange in New York Monday, there have been no features of interest in the market. Activity both here and abroad was held back because of the new development. The new exchange deals exclusively in standard tin, which is similar to the same designation on the London exchange and which makes possible dealings in this country in futures, both on the long and short side, or so-called "hedging." The exchange opened auspiciously with sales of 650

tons and with fair activity today at 385 tons. For the week ended Dec. 1, total sales in New York were only 600 tons. Consumers have been showing no interest and dealers were not inclined to operate actively. Yesterday, after the close of the new exchange, 200 tons of Straits tin was reported sold. Today, the market has been quiet, with spot Straits tin quoted at 52.50c., New York. London prices today, which were down sharply from yesterday, were close to those of a week ago, with spot standard quoted at £239, future standard at £237 5s. and spot Straits at £239 2s. 6d. The Singapore market today was £242. Deliveries of tin during November were 7145 tons, with 3603 tons in stock and landing on Nov. 30.

Lead.—Yesterday the American Smelting & Refining Co. advanced its contract price from 6.35c. to 6.50c.,

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.75c. to 54.75c.
Tin, bar.....	55.75c. to 56.75c.
Copper, Lake.....	17.00c.
Copper, electrolytic.....	16.75c.
Copper, casting.....	16.00c.
Zinc, slab.....	7.50c. to 8.00c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.50c. to 10.00c.
Antimony, Asiatic.....	12.25c. to 13.25c.
Aluminum No. 1 ingots for remelting (guar't'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	58.50c.
Tin, bar.....	60.50c.
Copper, Lake.....	17.00c.
Copper, electrolytic.....	17.00c.
Copper, casting.....	16.75c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar.....	9.75c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	19.25c.
Babbitt metal, high grade.....	62.50c.
Solder, ½ and ½.....	35.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	20.25c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	25.12 ½c.
Copper.....	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods.....	18.00c.
From New York Warehouse	
Delivered Prices, Base Per Lb.	
Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products have not changed since the advances of Oct. 29. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10.25c. to 10.50c. since Nov. 15.

List Prices, per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	20.50c.
Copper, hot rolled.....	25.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.
Seamless Tubes—	
High brass.....	25.37 ½c.
Copper.....	26.37 ½c.

Rods—	
High brass.....	18.25c.
Naval brass.....	20.25c.

Wire—	
Copper.....	17.87 ½c.
High brass.....	21.00c.
Copper in Rolls.....	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire.....	13.50c.	14.50c.
Copper, light and bottoms.....	11.50c.	12.75c.
Brass, heavy.....	7.75c.	9.00c.
Brass, light.....	6.50c.	7.50c.
Hvy. machine composition.....	10.50c.	11.50c.
No. 1 yel. brass turnings.....	9.25c.	9.875c.
No. 1 red brass or compos. turnings.....	9.50c.	10.50c.
Lead, heavy.....	5.00c.	5.50c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.625c.
Sheet aluminum.....	13.00c.	15.00c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....		20.50c.
Copper, hot rolled.....		25.00c.
Copper, cold rolled, 14 oz. and heavier.....		27.25c.
Zinc.....		10.00c.
Lead, wide.....		9.75c.
Seamless Tubes—		
Brass.....		26.87 ½c.
Copper.....		27.87 ½c.
Brass Rods.....		18.25c.
Brazed Brass Tubes.....		28.50c.

New York. This advance had been foreshadowed by a steadily rising market at St. Louis, which yesterday was 6.30c. and today is 6.32½c. to 6.35c. Sales, which have been heavy for some time, have continued in good volume, with practically all consuming lines represented. Deliveries extended into January.

Zinc.—Buying by both consumers and dealers continues brisk, and prices are very firm for prime Western zinc at 6.35c., East St. Louis, or 6.70c., New York. The heavy buying of recent weeks was reflected last week in the ore market, where over 22,300 tons was reported sold, about double the recent normal quantity. Production was estimated at about 12,000 tons, which is relatively low, and shipments were close to 15,000 tons, the largest week in many months. Ore stocks have been substantially reduced, being estimated now at about 51,000 tons. The feature is the fact that ore still stands at \$40.

Antimony.—The market for Chinese metal is quiet at 10c., duty paid, New York, for all positions.

Nickel.—Wholesale lots of ingot nickel for this year's delivery are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb. The International Nickel Co. announces that electrolytic nickel cathodes, 99.95 per cent, are included for next year's delivery at the same prices as charged for ingot and shot nickel during 1928. Prices on the latter form remain unchanged for 1929.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Dec. 4.—Both forward buying and spot sales are quiet. Prices for tin and lead are advanced. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 16.50c.; tin, 54c.; lead, 6.40c.; zinc, 6.45c.; in less-than-carload lots: antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

New Circuit Breaker for Small Installations

A new oil circuit breaker, type FK-33, has been announced by the General Electric Co. for manual or electric operation. The devices are rated 4500 volts, 200 and 400 amperes, and are 2, 3 and 4-poles, single and double-throw. The circuit breaker is recommended for use in small plant and industrial installations.

The American Road Builders' Association will hold its annual convention and road show at the Cleveland Auditorium, Jan. 14 to 18, 1929.

Railroad Equipment

Atchison Inquires for 3400 Freight Cars

INQUIRY from the Atchison, Topeka & Santa Fe for 3400 miscellaneous freight cars, in addition to 1075 on which bids were asked last week, is the feature of the market. An oil company has ordered 200 tank cars, but outside of this purchases were negligible. The Louisville & Nashville has come into the market for 24 locomotives. Details of the week's business follow:

Richardson Refining Co. has ordered 200 tank cars from General American Tank Car Corporation.

New York Central has given contract for rebuilding 50 70-ft. steel underframe coaches to American Car & Foundry Co.

Boston & Maine is inquiring for 10 baggage and mail cars.

Chicago, South Shore & South Bend has purchased two caboose cars from American Car & Foundry Co.

Lehigh Valley is inquiring for two gas-electric rail motor cars and four trailer cars.

Warner Quinlan Co., New York, has ordered 10 10,000-gal. insulated tank cars from General American Tank Car Corporation.

Mukden-Hailung, Mukden, Manchuria, has ordered steel parts for 60 steel underframe high-side gondola cars and 40 steel underframe box cars from Pressed Steel Car Co.

Chesapeake & Ohio has ordered two dining cars from Pullman Car & Mfg. Corporation.

Atchison, Topeka & Santa Fe is in market for 2000 box cars, 400 50-ton

gondola cars, 250 70-ton gondola cars, 100 hopper cars, 150 sulphur cars, 500 refrigerator cars, 10 chair smoking cars, 10 mail and baggage cars, 10 chair cars and 10 Jim Crow cars. All of these are in addition to cars inquired for last week.

Louisville & Nashville is in market for 24 Mikado type locomotives.

Reinforcing Steel

Commercial Building Will Take 2500 Tons

ARAILROAD commercial building at Philadelphia, calling for 2500 tons, accounted for a large part of the 3100 tons of reinforcing steel required for projects brought out in the last week. The following awards took less than 600 tons:

OAK PARK, ILL., 150 tons, store, to Olney J. Dean & Co.

OAK PARK, 120 tons of rail steel bars, apartment building, to Calumet Steel Co.

SAN DIEGO, CAL., 300 tons, Mission Bay causeway, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PHILADELPHIA, 2500 tons, reinforcing bars for Reading Commercial Building; bids originally taken for all structural steel.

CLEVELAND, 200 tons, Robert Fulton and Louis Agassiz schools.

TACOMA, WASH., 209 tons, bridge on Tacoma Avenue; bids Dec. 18.

SACRAMENTO, CAL., 188 tons, bridge at Benham; Paul White, Santa Monica, low on general contract.

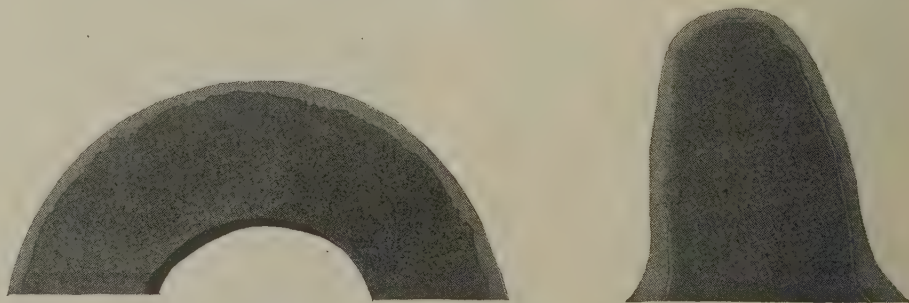
Steel Castings With a Stainless Coating

ANEW product among stainless steel materials has been developed by the Bethlehem Steel Co., Bethlehem, Pa. It is offered under the name of "Stainless-Clad Steel Castings," and it is claimed that this new development in foundry work imparts many desirable and important qualities to castings in an economical and practical manner.

Bethlehem stainless-clad castings are steel castings with a coating of ferrochromium made by a patented process. Either carbon steel or alloy

tion, and can be put on those surfaces that require heat resistance, acid resistance or exceptional wearing qualities. The stainless coating is pointed to as thoroughly amalgamated with base metal so that it cannot be chipped, pounded off or separated by any mechanical means.

It is described as hard and tough, especially durable under conditions where service with extreme heat and resistance to all organic and most inorganic acids is desired. Other alloy elements or metals can be used in the



Cross Section of a Stainless-Clad Steel Casting Etched to Show the Coating

steel is used as the base metal of the casting, depending upon the requirements of the service for which it is intended.

The coating is an integral part of the casting, as shown by the illustra-

coating so as to produce castings having properties to meet different service conditions. It is also stated that the economy of using such castings is considerable because of the low cost of service per hour.

PERSONAL

W. J. JACK has been named manager of the strip steel division Republic Iron & Steel Co., Youngstown, taking the place of F. H. LOOMIS, recently advanced to assistant general manager of sales of the company. Mr. Jack was with the Trumbull Steel Co. for 11 years prior to its absorption this year by the Republic company, and also had experience in the manufacture and sale of strip steel with the West Leechburg Steel Co.

MAJ. ARTHUR A. WEDDERSPOON has resigned as Indiana district sales agent General Refractories Co., Philadelphia, to accept a position in London. He was in the Pittsburgh office of the company for about two years prior to the establishment of the Indiana district sales office at Indianapolis on Jan. 1, 1926. He served with the British forces during the World War. The company has closed its Indianapolis office and Indiana district sales hereafter will be handled from the Cleveland office. HOMER C. WALLACE has been transferred from the Philadelphia to the Cleveland office of the company.

DR. EDWARD E. MARBAKER, industrial fellow in the Mellon Institute of Industrial Research, Pittsburgh, will speak before the Chicago Foundrymen's Club, Thursday evening, Dec. 6, on the subject of "Cast Iron: Its Manufacture."

M. F. TIGHE again has been elected president of the Amalgamated Association of Iron, Steel and Tin Workers and now enters upon his tenth term as head of that organization. DAVID J. DAVIS has been reelected secretary-treasurer, LOUIS LEONARD assistant secretary, and BEN I. DAVIS, managing editor of the *Amalgamated Journal*, official organ of the association. JACOB S. MCGINLEY continues as vice-president of the boiling and finishing division, and EDWARD W. MILLER is vice-president of the sheet and tin plate division.

GRANT B. SHIPLEY, recently appointed a member of the National Committee on Wood Utilization, is president of the Century Wood Preserving Co., Pittsburgh, and of the American Mond Nickel Co.

GEORGE W. DENYVEN retired Dec. 1 as New England sales representative of the Champion Rivet Co., Cleveland, and was succeeded by HENRY J. LINN, who has been his assistant. The company's office is at 250 Stuart Street, Boston.

W. B. MARSHALL has been appointed sales manager of the contract engineering department, Chain Belt

Co., Milwaukee. He has been associated with the company since 1921, when he was graduated from the Sheffield Scientific School of Yale University. He began as a student apprentice and after several years' work in the shops and foundries he was made secretary to the general manager and later spent some time in the Chicago office. In 1926 he returned to Milwaukee and was engaged in contract engineering sales work until his recent appointment.

VERYL PRESTON, for some years president of the Eastern Steel Co., has become associated with the New York Stock Exchange house of McClure, Jones & Co., 115 Broadway, New York.

C. E. GEORGE, for many years Western manager of the American Schaeffer & Budenberg Corporation, Brooklyn, has joined the Chicago sales staff of the Taylor Instrument Companies, Rochester, N. Y., with headquarters at 58 East Washington Street.

DR. V. N. KRIVOBOK, associate professor of metallurgy at the Carnegie Institute of Technology, Pittsburgh, will speak on "Recent Developments in the Study of Iron-Manganese Alloys of Purity," at a meeting of the Cincinnati chapter of the American Society for Steel Treating, to be held at the Engineers' Club on Thursday evening, Dec. 6.

ARTHUR L. COLLINS, since 1922 sales metallurgist for Horace T. Potts & Co., Philadelphia, has been made manager of the company's tool and alloy steel division. He is a graduate of the Stevens Institute of Technology, Hoboken, N. J., and is at present on the lecture staff in the metallurgical department of Temple University, Philadelphia.

EUGENE W. SMITH, general foundry superintendent for the Crane Co., Chicago, spoke before the Wisconsin Gray Iron Foundry Group in Milwaukee on Dec. 5. His subject was "Molding Sand Control in the Foundry and the Use of Artificial Binders as Substitutes for Natural Bond in Molding Sand."

HORACE C. KNERR, consulting metallurgical engineer, Philadelphia, will address the Boston chapter of the American Society for Steel Treating at a meeting to be held at the West Lynn, Mass., plant of the General Electric Co. on Friday evening, Dec. 7. In a paper entitled "Duralumin and Other Aluminum Alloys," he will discuss the use of non-ferrous alloys

and other metals in the manufacture of aircraft.

J. T. GAFFNEY, for four years foundry and pattern shop manager for the Toledo Machine & Tool Co., Toledo, Ohio, has resigned. He has announced no new connection and is at present located at 2723 Monroe Street, Toledo.

GEORGE E. JOHNSON, New York representative for the Saginaw Stamping & Tool Co., Saginaw, Mich., has been appointed general sales manager for that company. Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York, has been appointed exclusive distributor in the New York territory.

HARRISON J. BEHR, for the last seven years associated with the Mechanical Rubber Co., Cleveland, division of the United States Rubber Co., has joined the sales organization of the Boston Woven Hose & Rubber Co., Boston, as special field representative. Before going with the Mechanical company, he was identified for 12 years with the B. F. Goodrich Rubber Co., Akron, Ohio.

E. D. GIBERSON, president E. D. Giberson & Co., 40 Rector Street, New York, agents in the eastern United States of Ferrostahl G.m.b.H., will leave Dec. 10, for a six weeks' trip in Germany, France, Belgium and Austria. He will be the guest during the holidays of ERNST DAMM, of Dusseldorf, vice-president in charge of European plants of the Yale & Towne Mfg. Co., Stamford, Conn.

BENEDICT CROWELL, chairman of the board of the Crowell & Little Construction Co., Cleveland, has been made a director of the Chamber of Commerce of the United States, succeeding R. P. LAMONT, president American Steel Foundries, Chicago, who has been made vice-president for the Northern Central Division.

ALVAN MACAULEY, president Packard Motor Car Co., Detroit, who was recently elected president of the National Automobile Chamber of Commerce, was the guest of honor at a recent dinner given on his eighteenth anniversary with the company.

ABRAM F. MYERS assumed office Dec. 1 as chairman of the Federal Trade Commission, succeeding WILLIAM E. HUMPHREY, who, following the rules of rotation of the commission, served one year.

The annual meeting of the Power Transmission Association will be held at the Hotel Commodore, New York, Thursday, Dec. 6. The association's booth at the Power Show, held in New York Dec. 3-8, is No. 646.

O B I T U A R Y

CHARLES SEITZ, resident manager of the Addyston, Ohio, plant of the United States Cast Iron Pipe & Foundry Co., was killed in an automobile accident Dec. 1. He was 53 years of age and had been in the company's employ for more than 20 years. His first assignment was at Addyston and later he was appointed superintendent of the Scottdale, Pa., plant. About a year ago he returned to Addyston as resident manager.

WILLIAM L. RODGERS, founder and president of the Pittsburgh Gage & Supply Co., Pittsburgh, died at his home in that city Dec. 2. He had been in poor health for some time. He also was the founder and head of the Gainaday Electric Co., manufacturer of electric washing machines and other household electrical appliances.

ALMOS D. NEELD, who was noted for his table of safe loads and stresses for plate girder bridges and for steel roof trusses, and was prominent in construction engineering for almost 50 years, died at his home in Crafton, Pa., Nov. 28. He was born in Pittsburgh Feb. 15, 1858, and was graduated in 1875 from the Western University of Pennsylvania, now the University of Pittsburgh.

RALPH H. BOURNE, who resigned as senior vice-president of the Whiting Corporation, Harvey, Ill., in November, 1927, died Nov. 27, at Wareham, Mass. He was graduated in mechanical engineering from Cornell

University in 1905 and for a time was employed by the Wellman-Seaver-Morgan Co., Cleveland, and later by the Hoover & Mason Co., Chicago. In 1907 he became associated with the Whiting Foundry Equipment Co., now the Whiting Corporation.

VAN LOAN WHITEHEAD, chairman of the board of the Whitehead Brothers Co., Buffalo, maker of foundry supplies and equipment, died in that city on Nov. 10 as the result of injuries sustained the day before when he was run down by an automobile. He was born in 1857 and had been associated with the foundry industry for many years.

BERTRAND G. MACKEY, for 18 years purchasing agent for Goulds Pumps, Inc., Seneca Falls, N. Y., died at his home in that city on Nov. 26, following a long illness. He was born at Locke, N. Y., in 1875 and went with the Gould company in 1906 as assistant purchasing agent. He was made purchasing agent in 1908 and held that position until 1926 when he resigned on account of ill health.

GEORGE M. STEDMAN, for many years president of the Stedman Foundry & Machine Works, Aurora, Ind., died at Columbia Hospital, Milwaukee, on Nov. 27 after a long illness, aged 62 years. He had retired four years ago because of failing health and recently had made his home in Milwaukee.

New 42 and 48-In. All-Geared Motor Driven Lathe

(Concluded from page 1437)

lever on the carriage. There are also knobs on the carriage for engaging the power longitudinal feed and the cross feed, plain or angular, as well as a lever for engaging the half nuts with the lead-screw. The reverse handle for the feeds, and the rapid traverse lever, which controls the motor for traversing the tool carriage in either direction, is also located on the carriage. An automatic stop is provided for the carriage. A chasing dial, which can be swung into an inoperative position when the lathe is not being used for chasing threads is also furnished.

Lead screw and rod hangers are furnished to carry the weight of the lead screw and feed rod. These hangers are engaged and released by hooks attached to both sides of the carriage in such a way that they are pushed or pulled along the outer bed vee and automatically locate themselves at fixed intervals. The tailstock arrangement includes a handwheel that permits the operator to center work

or perform boring operations with minimum effort.

The bed of the machine is of deep girder planer type. The compound rest is of new design. Taper attachment, with taper-turning capacity of 6½ in. per ft. for the full distance between centers can be supplied. A steadyrest with 18½ in. opening and screw adjustable jaws is regular equipment. Follow and full swing rests, extra gears and index plates are available as extras.

A course of lectures on cost reduction is to be given by Dr. Robert Grimshaw on Thursday evenings beginning Feb. 9 at the College of the City of New York. The course is intended for manufacturers and business men as well as students and the fee is \$10. For information one may address Walter Stalb, Bursar, 140th Street and Convent Avenue, New York.

Plan Large Brass and Copper Merger

Directors of the Rome Brass & Copper Co., Rome, N. Y., have approved a plan to merge with six other companies to form the General Brass Corporation. Companies to be included are the Taunton-New Bedford Copper Co., Taunton and New Bedford, Mass.; the Baltimore sheet mill of the General Cable Corporation; the Rome Mfg. Co., Rome, N. Y.; the Michigan Brass & Copper Co. and the Higgins Brass & Mfg. Co., Detroit, and the Dallas Brass & Copper Co., Chicago. The merger is expected to bring about 20 per cent of the country's brass and copper business under one control. Factories of the constituent companies will continue to operate with unchanged management and each organization will be represented on the executive committee of the new corporation.

Cincinnati Car Co. Absorbs Versare Corporation

Directors of Cincinnati Car Co., Cincinnati, have approved terms of merger with the Versare Corporation, Albany, N. Y., under which manufacturing operations will be centered in Cincinnati. The company will manufacture interurban and street cars, gasoline-powered industrial locomotives and a new type of automobile bus. The new company, to be known as the Cincinnati Car Corporation, will be headed by H. L. Sanders as president. O. F. Warhus, designing engineer of the Versare Corporation, will become vice-president. Randal MacDonald, treasurer of the Versare Corporation, will be assistant to the president.

Pontiac Foundry to Install \$200,000 Conveyor System

The plant of the Wilson Foundry & Machine Co., Pontiac, Mich., will be shut down the week of Dec. 10 to permit the installation of a new \$200,000 conveyor system. The conveyor, of the continuous chain type, is expected to carry about 2500 castings per day from the foundry to the cleaning department of the machine shop.

An export day, so called, Dec. 6, has been set apart by the Seventh National Exposition of Power and Mechanical Engineering to be held at Grand Central Palace, New York, Dec. 3 to 8. The export day program is to be marked by the assembling of the members of the various foreign departments of the exhibitors to answer questions peculiar to exporting. The foreign attendance last year, it appears, brought representatives from 33 foreign countries and five insular possessions of the United States.

Industrial Wages at Higher Level

Analysis of employment and wage conditions among 800,000 workers in 1500 manufacturing establishments by the National Industrial Conference Board, New York, discloses that the real incomes of industrial wage earners this fall have reached their highest level since the inflation of 1920. Outstanding in the situation is the marked stability of wage rates and of earnings. Since 1923 these have fluctuated less than 5 per cent.

During the past year the highest figure for hourly earnings was 234, in September, and the lowest, 231, in February and May, both being based on 100 as the average of July, 1914. Weekly earnings during 12 months had a maximum of 221 in September, 1928, and a minimum of 213 in November, 1927. Employment in September was more than 6 per cent above the low point reached in November, 1927. Total hours worked in September were 10.8 per cent higher than in November of last year.

Canadian Output Gained in October

TORONTO, ONT., Nov. 30.—Production of pig iron in Canada in October amounted to 93,186 gross tons, a 3 per cent gain over the 90,516 tons made in the previous month and more than double the 38,097 tons produced in October, 1927. Compared with September, when the output of basic iron reached 57,424 tons, October output showed a considerable gain with a total of 65,625 tons; malleable iron rose from 11,800 tons in September to 13,622 tons in October; foundry iron, of which the production was 21,292 tons in September, declined to 13,739 tons in October. The decline in the output of foundry iron, however, had no bearing on sales or shipments to melters as there are still large tonnages of this grade of iron piled for immediate delivery to consumers.

For the 10 months ended Oct. 31, the production of pig iron in Canada was 838,659 gross tons, an increase of 38 per cent over the 608,511 tons produced during the corresponding period of 1927, which in turn was 4 per cent under the 631,187 tons produced in the 10 months of 1926. This year's blast furnace production included 591,274 tons of basic iron; 174,715 tons of foundry iron and 72,760 tons of malleable iron.

The number of furnaces in blast at the end of October remained the same as on Sept. 30.

Production of ferroalloys in Canada in October at 2127 tons showed a slight increase over the 2008 tons reported for September. The total for 10 months was 35,541 tons, compared with 47,649 tons in the corresponding period of 1927.

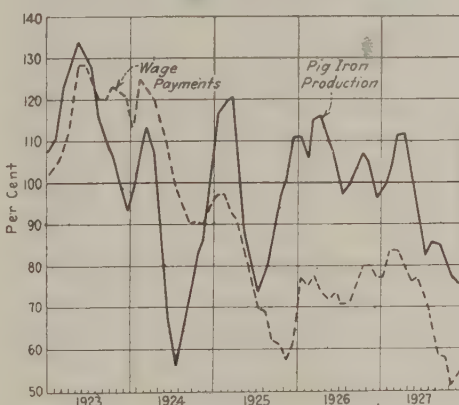
Production of steel ingots and castings during October at 108,987 tons was 9 per cent over the output of

99,888 tons in September and almost double the total of 56,371 tons produced in October last year. For the 10 months ended with October the production of steel ingots and direct steel castings totaled 1,028,697 gross tons, or an increase of 41 per cent over the 730,660 tons produced in the corresponding 10 months of 1927, which in turn was 9 per cent greater than the 664,084 tons for 1926.

Related Wage Payments to Pig Iron Production

Wage payments in blast furnace plants in Pennsylvania have declined 57 per cent from the peak reached in 1923 and early 1924, according to figures gathered by the Department of Labor and Industry of the Commonwealth of Pennsylvania. Along with this decline in payrolls there has been a similar but less pronounced decline in the production of pig iron in the State, this having shown a drop of 43 per cent to the end of 1927. "The relatively greater decline in payrolls does not reflect lower wages," says the report, "since employment has decreased to a like extent; but appears to indicate greatly increased output per worker."

There is a wide divergence between the evidence in the chart shown and



Comparison of Payrolls with Pig Iron Shows How Output per Worker Has Increased

that for other industries in the State. Practically without exception, the others have shown a reasonable parallelism between wages and production. Evidently the drastic cost-cutting effort which has been carried through so successfully by the iron and steel industry has not been so large a feature in other industries included in the survey.

Larger Tonnage of Steel Ships

WASHINGTON, Nov. 30.—On Nov. 1 American shipyards were building, or were under contract to build, for private shipowners 423 steel vessels of 223,566 tons gross register. This compares with 433 steel vessels of 205,820 gross tons on Oct. 1, according to the bureau of navigation, Department of Commerce.

Year's Ore Shipments 5 Per Cent Over 1927

CLEVELAND, Dec. 3.—Shipments of Lake Superior ore by water during 1928 amounted to 53,980,874 gross tons, a gain of 5.6 per cent, or 2,873,738 tons, over the movement of 51,107,136 tons in 1927. Shipments in 1926 were 58,537,855 tons. In 1925 they were 54,081,298 tons, or approximately the same as this year.

Water shipments in November were 4,260,942 tons, or more than twice the amount shipped in November, last year. With the absence of severe November storms, weather conditions were fairly good for shipping ore during the month and shippers kept up so well with their schedules that few cargoes were moved during the last week of November. Usually in previous years a few cargoes were shipped in December, although in 1927 the last cargo started down the lakes before the end of November.

All-rail shipments this year are expected to run slightly below those of last year, when the all-rail movement amounted to 1,236,200 tons. The combined water and all-rail shipments this season will run somewhat over 55,000,000 tons.

Shipments by ports for November, for the entire year and for 1927, and total water shipments for ten years are listed below:

Lake Ore Shipments by Water, Gross Tons

	November	Season 1928	Season 1927
Escanaba	551,836	5,487,556	5,865,224
Marquette	309,170	3,410,902	3,238,855
Ashland	525,443	6,481,153	6,239,774
Superior	1,120,011	15,413,694	14,627,936
Duluth	1,360,247	17,454,063	15,432,188
Two Harbors	394,235	5,733,501	5,703,159
Total	4,260,942	53,980,874	51,107,136
1928 increase			2,873,738

Water Shipments of Last Ten Years, Gross Tons

1919...	47,177,395	1924...	42,623,572
1920...	58,527,226	1925...	54,081,298
1921...	22,300,726	1926...	58,537,855
1922...	42,613,229	1927...	51,107,136
1923...	59,036,705	1928...	53,980,874

Totaling 116,951, applications received by the United States Patent Office during the last fiscal year set a record and exceeded by 3168 the number received the previous fiscal year, according to the annual report of Commissioner Thomas E. Robertson. The commissioner repeated prior statements to the effect that the work of the Patent Office is seriously hampered because of the insufficient number of technical examiners.

Farm implement production during the first nine months of 1928 as reported by 74 companies in the United States was 28.8 per cent above the corresponding period of 1927, according to a report by the Federal Reserve Bank of Chicago. The sales of threshers, tractors and combines increased 38.4 per cent. Purchases of light equipment and of barn equipment gained 6.2 per cent and 6.3 per cent, respectively.

Lockout By German Mills Terminated

Employers and Unions Agree to Arbitration — Increased Shipbuilding
Expected to Aid British Steel Industry

(By Cable)

LONDON, ENGLAND, Dec. 3.

THE pig iron market is quiet, but the outlook is regarded more favorably as the Government derating plan, effective from Dec. 1, should bring a considerable reduction in costs of production. Consumers are expecting to benefit by the plan, but Cleveland producers are still firm in their quotations.

Hematite iron is stronger as a result of restricted output, but export buyers are not inclined to follow the rise in prices and makers are accepting 6d. to 1s. (12c. to 24c.) per ton less for such business. Foreign ore continues quiet.

New shipbuilding is improving. Clyde orders for November totalled 100,000 tons. The Clyde output in November was 12 vessels of 56,600 tons. Steel makers are expecting to benefit by the new shipbuilding contracts, but the heavy plants are at present in decided need of tonnage.

The British Southern Railway has placed an order with British makers for 5000 tons of steel sleepers, which is the first contract of this nature placed here for British railroad use.

Tin plate inquiry is improving with the tin market strong, but business is still inactive, mills needing orders for December. Some mills have begun their agreed period of idleness although most are well booked for delivery early next year.

Galvanized sheets are active in small lots. Black sheets are quiet except for some sales of heavy gages to Japan.

The Ruhr lockout is ended and work is being resumed, both parties having agreed to a settlement by Government arbitration. The steel market is consequently easier with sellers actively seeking orders. Some inquiry for semi-finished material is in the

market from British users, but business is otherwise quiet.

The German output in October was 1,016,000 tons of pig iron, 1,306,000 tons of raw steel and 1,032,000 tons of rolled steel products. The Saar production in October was 169,000 tons of pig iron and 190,000 tons of raw steel. Luxemburg's production in October was 236,000 tons of pig iron and 229,000 tons of raw steel.

British Steel Mills Seek Tonnage

German Lockout Brings No Increase in Orders—Pig Iron Improves—Tariff Advocates Active

LONDON, ENGLAND, Nov. 23.—Although three weeks have passed since the German lockout began, British producers are still awaiting the increased volume of orders that was expected to be diverted from German mills. Recent reports indicate that there are sizable stocks of material in Germany and, as a number of the finishing mills are involved in the lockout, it has been found necessary to seek export outlets. The German Steel Works Association has granted authority for the release of a specified tonnage of material for export.

The British pig iron market is still active. Cleveland iron is once more becoming established as a factor in

foreign markets, and domestic demand is also improving. Stocks are small, and more furnaces are going into blast. Statistics in the *Labour Gazette* show that employment at blast furnaces in October gained 3.7 per cent, although remaining 7.9 per cent below average employment for the year. Employment in the finishing mills continues unsatisfactory, having registered a further decline of 2.3 per cent in October. The total for that month, however, was 2 per cent above the average for the year.

Advocates of protection are still urging that iron and steel be included in the Safeguarding of Industries Act, but the Prime Minister has re-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.	£0 17½s*		\$4.25	
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.35	to \$5.48
Cleveland No. 1 foundry.	3 8½	to 3 9½	16.64	to 16.89
Cleveland No. 3 foundry.	3 6		16.04	
Cleveland No. 4 foundry.	3 5		15.80	
Cleveland No. 4 forge...	3 4½		15.68	
Cleveland basic (nom.)..	3 5		15.80	
East Coast mixed.....	3 10	to 3 11	17.01	to 17.25
East Coast hematite.....	3 10½	to 3 11½	17.13	to 17.37
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to 40.10
Billets	6 5	to 6 10	30.37	to 31.59
Ferromanganese	13 15		66.83	
Ferromanganese (export)	14 0		68.04	
Sheet and tin plate bars,				
Welsh	6 0		29.16	
Tin plate, base box.....	0 18	to 0 18½	4.37	to 4.40
Black sheets, Japanese				
specifications	13 7½		65.00	
Ship plates	7 12½	to 8 2½	1.63	to 1.74
Boiler plates	9 0	to 10 10	1.92	to 2.25
Tees	8 2½	to 8 12½	1.74	to 1.84
Channels	7 7½	to 7 17½	1.58	to 1.69
Beams	7 2½	to 7 12½	1.53	to 1.63
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62	to 1.69
Steel hoops	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage...	10 0		2.14	
Galv. sheets, 24 gage...	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage (nom.)	16 0		3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):					
Belgium	£3 3s.	to £3 5s.	\$15.31	to \$15.80	
France	3 3	to 3 5	15.31	to 15.80	
Luxemburg	3 3	to 3 5	15.31	to 15.80	
Basic pig iron (a):					
Belgium	3 5	to 3 6	15.80	to 16.04	
France	3 5	to 3 6	15.80	to 16.04	
Luxemburg	3 5	to 3 6	15.80	to 16.04	
Coke	0 18		4.37		
Billets:					
Belgium	5 2		24.78		
France	5 2		24.78		
Merchant bars:					
Belgium	6 3½		1.36		C. per Lb.
France	6 3½		1.36		
Luxemburg	6 3½		1.36		
Joists (beams):					
Belgium	5 3		1.14		
France	5 3		1.14		
Luxemburg	5 3		1.14		
Angles:					
Belgium	6 2½		1.35		
¾-in. plate:					
Belgium (a)	6 12½		1.45		
Germany (a)	6 12½		1.45		
¾-in. ship plate:					
Belgium	6 7½		1.39		
Luxemburg	6 7½		1.39		
Sheets, heavy:					
Belgium	6 1		1.33		
Germany	6 1		1.33		

(a) Nominal.

affirmed his previous statements that no further steps in that direction will be taken during the existence of the present Parliament. It is apparent, however, that the safeguarding of iron and steel will be one of the important issues in the coming general election.

As a whole, the steel industry is not prosperous, although certain branches show improvement. Business in galvanized sheets is better, and mills producing light materials are more active. Tin plate mills are well booked with business for delivery during the early part of the coming year, but have insufficient tonnage for current operations. The heavy rolling mills are still in need of orders. A number of shipbuilding contracts have been awarded to British yards, but it will be some time before the orders for material for these ships are actually placed. Export business is poor, but should the German lockout be prolonged, it is believed that Dutch and other Continental shipyards will turn to British mills for their requirements.

German Lockout Had Less Effect Than Expected

(By Radiogram)

BERLIN, GERMANY, Dec. 3.

LOCKOUT of steel workers in the Rhenish and Westphalian districts has been terminated.

Domestic prices of the syndicates for pig iron, semi-finished steel and rolled materials are unchanged. The ingot steel syndicate's price rebates to exporting manufacturers are unchanged for December.

Home markets are quiet. There is no shortage of materials, except for semi-finished products locally. Export prices in the past few days have been weaker. Steel bars are down to £6 a metric ton (1.32c. a lb.), f.o.b., and further weakening is expected.

There is a shortage of bands and wire products for export, but the effect of the lockout on steel exports generally has been less than was anticipated. It will take a week or two to resume full production in the lockout area, where the works have orders ahead for from six to eight weeks.

No Central German Lockout—Other Plants Close

HAMBURG, GERMANY, Nov. 17.—The demand of workmen in steel mills of central Germany for an increase in wages has been withdrawn, and there will be no lockout at these plants on Dec. 1. Central German works produce about 50,000 tons of pig iron and 55,000 tons of rolled products a month. This decision has influenced the metal workers in Saxony, who will not present demands for wage increases when their present agreement expires.

The lockout in northwestern Germany, which began Nov. 1, will extend to western Westphalian pro-

ducers of wire, bolts, rivets and general hardware. This district contributes about 34 per cent of the wire, 67 per cent of the bolts and nuts and 52 per cent of the rivets made in Ger-

many. The workmen at these plants have refused to extend their present wage agreement after Dec. 1, and the employers have announced a lockout, effective Nov. 30.

Opposition to Cartels Grows

Large German Steel Mill Advocates Open Competition—International Steel Scrap Syndicate Suggested

HAMBURG, GERMANY, Nov. 17.—Recent reports state that Gutehoffnungshütte A. G., Oberhausen, Rhine, one of the largest German steel producers, is to enter into active opposition to the present cartels and associations in Germany. It is pointed out that the German and international cartels have not brought about the expected results, and that Government interference has operated against their success in Germany. A return to open competition is urged, with loose agreements to prevent disastrous price cutting. It is suggested that open competition for business, especially in the export field, would be preferable to the present operation through cartels and syndicates organized in their present form.

Despite opposition to cartels, it is said that negotiations in the interests

of a steel scrap syndicate have been initiated by the Grangesborg A. G., which controls the iron ore production of Sweden and most of the North African mines. This company is reported to have proposed a combination of French, Belgian and German iron and steel scrap merchants with a view to controlling the scrap market.

The recently formed international tube, strip and hoop steel cartel has begun to quote export prices, but a large available supply in the hands of merchants and need for tonnage on the part of non-member mills is bringing out lower prices. The official quotation of £6 10s. (\$31.59) per ton for 2-in. and £6 5s. (\$30.38) for 2-in. to 8-in. tube strips is shaded 1s. to 2s. (24c. to 48c.) per ton by non-members and merchants.

Japanese Prices Are Lower

Increased Value of Yen Causes Price Reductions—Large Wire Rod Consumer Temporarily Suspends

THE October report of A. Cameron & Co., Kobe, Japan, on conditions in the Japanese iron and steel market, states that imports of black sheets in September showed an increase of 3270 tons compared with the previous month. Of total arrivals of 21,347 tons of black sheets at Kobe, Yokohama and Osaka, Britain furnished 12,614 tons, the United States 6507 tons, Germany 2096 tons, Sweden 5 tons, and all other countries 125 tons. As a result of the increased importation of black sheets the quotations of merchants declined from 72.50 sen (33.21c.) per sheet to 71 sen (32.52c.) per sheet for the American product, and from 71.50 sen (32.75c.) per sheet to 70 sen (32.07c.) for British sheets. For the first half of October the domestic producer of sheets, the Kawasaki Dockyard Co., reduced its price 50 sen (23c.) per ton and for the second half 1 yen (45.81c.) per ton. The domestic price for January delivery is 193 yen (\$88.41) per ton.

Throughout October tin plate was quiet and prices developed considerable weakness as the month advanced, being affected by recovery of the yen in foreign exchange, which forced small holders to dump their stocks on the market. The highest price paid during the month for British tin plate was 20.50 yen (\$9.39) per box of 170 lb. and the lowest price was 19.20

yen (\$8.80) per 170-lb. box, which was less than the cost of replacement. The price for American tin plate in 170-lb. boxes ranged from 22 yen (\$10.08) early in the month to 21 yen (\$9.62) at the end of October.

The wire rod market was weak during the month as a result of continued heavy arrivals of rods from European mills. Quotations were about 105 yen (\$48.10) per ton early in the month, declining to a low point of 95 yen (\$45.23) by Nov. 1. A factor in this decline of prices was the suspension of a large wire mill in the Osaka district, which closed temporarily following an altercation with the Daiki Electric Railway Co., its source of power supply. This mill consumes about 1500 tons of wire rods a month.

More Steel Houses in Germany

HAMBURG, GERMANY, Nov. 17.—Construction of steel dwellings in Germany is increasing. The city of Düsseldorf, which contracted for 162 such houses last spring, has placed new orders for 82 of the same design and 246 of three other designs, to be erected next spring. Other cities in Germany have ordered 1000 steel dwellings since Oct. 1.

Our Foreign Trade Expansion Aids Europe

Dr. Julius Klein of Department of Commerce Says Our Purchases
Have Supplied Buying Power Abroad

WASHINGTON, Dec. 4.—The post-war expansion of American trade has helped, not hindered, the recovery of Europe, it was pointed out in a joint annual report on general progress and tendencies in foreign trade made by Dr. Julius Klein, director, and E. Dana Durand, chief of the Division of Statistical Research, Bureau of Foreign and Domestic Commerce, Department of Commerce. Imports, it was declared, have grown more than exports and the immense increase in American purchases abroad has created a buying power in the supplying countries, both for American exports and for those of other industrial countries, that would not have otherwise existed. Moreover, it was stated, the growth of American exports has made possible large investments of American capital in foreign countries. European production was declared to have been stimulated by such investments in Europe itself, and markets for European goods in other continents have been stimulated by the greater buying power resulting from increased production brought by American investments in those continents.

"It is true, of course," it was stated, "that the United States has a larger share of world trade than before the war. This is a natural result of the growth of our productive capacity, but little checked by the war, while the productive capacity of Europe was enormously cut down. Our export trade has simply continued its normal growth, and even somewhat less rapidly than would have been the case had there been no war to reduce world-buying power. The concentration of all Europe's efforts on war needs brought its export capacity to a small fraction of its normal volume, and marked as has been the recent recovery it is but natural that European exports should still be less quantitatively than before the war."

Despite the growth of its factories, it was pointed out, the United States is importing more manufactured goods from Europe than ever before. The exports of the leading countries of Europe to the United States were declared to have increased much more, as compared with pre-war years, than their exports to the rest of the world. In the case of practically every non-European country, the report said, its exports to the United States have also grown far more as compared with pre-war years than its exports to all other countries combined. The buying power of this country resulting from its prosperity was said to have made up for the decline in demand resulting from the reduced buying power of Europe.

While declaring that the future of American export trade cannot, of course, be predicted with any certainty, the report pointed out that indications are strong that the tendencies of the last few years will continue "and that we shall witness further large expansion of our sales abroad, particularly of manufactured products, and further large increase of our imports." The report added that the most important point is that, so long as peace is maintained in the world, total world buying power tends to expand steadily. While competition in international commerce in manufactured goods was very vigorous prior to the World War, said the report, it did not prevent the expansion of the trade of every industrial country. At the same time that the United States and Germany, newer competitors in factory industry, were rapidly adding to their exportation of manufactured goods, it was pointed out, England, the pioneer in that field, was still expanding its sales abroad.

"Now that peace has come again the same factors which are building up productive capacity and raising living standards in the United States are again at work all over the world," it was declared.

Pig Iron Imports Above Last Year

WASHINGTON, Nov. 30.—Imports of pig iron into the United States continue to be comparatively small, having totaled only 14,108 tons in October. This, however, was an increase of 3671 tons over the figure for September. For the 10 months ended with October pig iron imports aggregated 118,885 tons, against 102,127 tons for the corresponding period of last year, an increase of 16,758 tons.

Great Britain was the leading source of these imports for both October and the 10 months of the present year, incoming shipments from that country having been 7702 tons

and 47,254 tons respectively. British India ranked second, supplying 4610 tons and 42,637 tons respectively.

Germany has sent no pig iron to the United States since July, when the movement from that country was 300 tons. The total incoming shipments from Germany for the 10 months ended with October was only 395 tons, erroneously stated as 95 tons previously. The action of the Treasury Department in revoking the anti-dumping order directed against German pig iron imports is not expected to have any appreciable effect on shipments from that country. Costs of making pig iron in Germany have risen to a point where, it is said, they are practically as great as those in the United States.

New York District Leads Airplane Industry

The Merchants' Association of New York, through its industrial bureau, has completed a survey of the airplane industry, and reports that the New York metropolitan district leads all other sections of the country in the manufacture of airplanes and accessories. In 1927, the companies in the New York district turned out 29 per cent of the total production of the country. Buffalo was second, Detroit third and Los Angeles fourth. Copies of the report will be available for distribution in about two weeks.

Ohio Power Plant Buys German Engines

HAMBURG, GERMANY, Nov. 17.—The Borsig G.m.b.H., Berlin, has confirmed the recent report that it has booked an order from the International Combustion Engineering Corporation, New York, for equipment to be installed in a power station at Lockland, Ohio. Included in the order are two vertical 6000-hp., direct acting, triple expansion steam engines, among the largest of their type.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT (In Gross Tons)				
	October		Ten Months Ended October	
	1928	1927	1928	1927
United Kingdom	7,702	190	47,254	15,215
British India	4,610	5,196	42,637	49,338
Germany			395	8,871
Netherlands	896	2,260	22,728	23,047
Canada	162		540	689
France	30	500	330	3,000
Belgium	20		222	699
Norway	280		955	
All others	408	32	3,824	1,263
Total	14,108	8,178	118,885	102,127

Where Steel Exports Went in First Nine Months

Canada Took 436,056 Tons of Nine Leading Items—Japan Retains Second Position with 119,804 Tons, Followed by Argentina, 42,156 Tons; Brazil, 35,573 Tons; Mexico, 31,683 Tons; Chile, 29,165 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	September		Nine Months		September		Nine Months		September		Nine Months	
	1928	1927	Ended September	1928	1927	1928	1927	1928	1927	1928	1927	Ended September
Total	10,989	9,780	109,562	103,726	8,701	10,454	112,699	122,440	12,038	7,184	140,568	125,874
Canada	9,034	8,536	91,730	82,420	2,449	1,752	24,922	27,571	6,694	3,346	63,494	51,867
Japan	91	39	1,442	1,088	599	247	2,432	3,384	2,137	1,929	55,628	54,132
Cuba	56	102	894	567	254	724	4,230	9,532	33	50	1,622	840
Philippine Islands	170	417	1,974	1,705	531	1,635	17,066	14,005	326	149	2,374	1,988
Mexico	71	24	589	748	675	1,156	6,273	6,815	198	107	1,932	1,340
Argentina .....	.....	.....	.....	.....	370	717	5,418	6,913	29	88	1,221	1,467
Chile .....	.....	.....	.....	.....	.....	.....	.....	.....	1,483	831	1,786	3,110
Colombia .....	.....	.....	.....	.....	546	848	1,414	7,354	.....	45	315	468

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	September		Nine Months		September		Nine Months		September		Nine Months	
	1928	1927	Ended September	1928	1927	1928	1927	1928	1927	1928	1927	Ended September
Total	16,466	11,897	161,130	137,076	4,634	4,763	54,097	38,609	3,069	4,011	33,902	25,838
Canada	4,548	1,095	22,434	24,861	78	342	2,876	3,262	1,131	584	11,411	11,010
Japan	3,190	2,337	14,255	25,353	.....	.....	.....	.....	114	26	1,286	357
Cuba .....	.....	1,249	2,396	14,751	462	495	3,868	3,131	67	131	798	1,047
Philippine Islands	202	1,684	3,332	4,411	118	570	1,534	1,633	11	.....	219	509
Mexico	276	.....	5,429	4,168	230	292	4,998	3,603	84	1,262	1,749	3,403
Argentina .....	.....	.....	.....	.....	1,636	710	11,830	4,383	889	1,387	7,361	4,325
Chile	121	300	21,613	3,332	.....	.....	.....	.....	55	.....	.....	.....
Colombia	66	.....	9,989	.....	.....	.....	3,282	.....	.....	.....	.....	.....
Brazil .....	.....	960	18,290	17,641	392	762	11,474	6,633	51	43	911	153

	Tin Plate				Steel Bars				Heavy Plain Structural Material			
	September		Nine Months		September		Nine Months		September		Nine Months	
	1928	1927	Ended September	1928	1927	1928	1927	1928	1927	1928	1927	Ended September
Total	16,471	13,242	185,472	201,973	11,785	7,323	108,969	83,294	13,377	13,366	132,092	106,818
Canada	4,344	2,963	38,107	35,225	9,392	3,875	71,737	48,513	10,661	11,451	109,345	87,176
Japan	6,888	4,593	42,403	40,692	82	5	808	670	31	4	1,550	2,426
Cuba	238	204	3,259	3,163	215	324	3,783	2,362	711	1,039	4,539	6,363
Mexico	761	668	9,335	9,330	63	.....	574	.....	127	.....	804	.....
Argentina	386	1,634	15,677	28,770	23	35	317	249	49	4	332	.....
Chile	426	394	2,924	4,490	.....	.....	.....	.....	.....	163	2,842	2,291
Brazil	227	.....	4,898	.....	.....	.....	.....	.....	.....	.....	.....	.....
China	798	1,307	13,475	5,838	.....	.....	.....	.....	.....	.....	.....	.....
British India .....	.....	.....	3,491	.....	.....	.....	.....	.....	.....	.....	.....	.....
United Kingdom .....	.....	.....	.....	.....	1,042	915	12,957	14,228	.....	.....	.....	.....
Italy .....	.....	40	3,950	12,161	.....	.....	.....	.....	.....	.....	.....	.....

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	September, through September			Country of Destination	September, through September		
	1928	1928	1927		1928	1928	1927
North and Central America and West Indies	138,310	1,026,898	827,072	Italy	2,030	81,613	39,960
Canada and Newfoundland	126,131	857,288	632,474	Netherlands	168	1,703	2,300
Cuba	3,709	47,262	72,983	Russia	23	2,607	5,744
Mexico	5,593	61,140	64,164	United Kingdom	3,666	39,074	53,661
Guatemala	121	6,418	5,356	Other Europe	1,249	91,542	45,157
Panama	626	11,649	14,992	Far East	59,097	532,564	398,394
Salvador	243	2,645	3,293	British Malaya	661	5,454	6,820
British West Indies	323	5,920	10,134	China	7,171	76,886	42,233
Other West Indies	823	22,785	14,037	Dutch East Indies	5,081	30,450	27,986
Other Central America	741	11,791	9,639	India and Ceylon	537	18,657	22,536
South America	20,942	323,325	269,623	Japan and Chosen	36,376	298,019	206,826
Argentina	5,169	72,159	62,637	Kwangtung	3,308	12,356	16,416
Brazil	1,190	60,653	54,539	Philippine Islands	3,463	64,527	45,945
Chile	3,071	52,771	33,038	Australia	1,301	12,243	20,299
Colombia	3,328	49,068	43,677	New Zealand	372	1,801	839
Peru	3,638	19,149	27,078	Other Asia and Far East	827	12,171	8,494
Uruguay	377	6,762	8,488	Africa	519	10,191	13,367
Venezuela	4,084	58,986	38,042	British South Africa	401	4,402	6,129
Other South America	85	3,777	2,124	Egypt	11	3,425	3,041
Europe	9,188	234,453	157,408	Mozambique	93	1,006	3,367
Belgium	1,409	12,175	3,872	Other Africa	14	1,358	830
France	629	3,832	4,151	Total	228,056	2,127,431	1,665,864
Greece	14	1,907	2,563				

Machinery Exports at High Level Again

October 32 Per Cent Above September and Ten-Months Total

13 Per Cent Ahead of 1927—Imports Much Heavier

WASHINGTON, Nov. 30.—Making a gain of \$10,166,206, exports of machinery of all kinds in October were valued at \$43,079,588, against \$32,913,382 in September. For the 10 months ended with October the value was \$408,403,112, an increase of \$47,119,012 over the value of \$361,284,100, representing exports for the corresponding period of last year. Exports of agricultural machinery and implements, totaling \$9,045,976 in October, compared with \$8,498,000 in September, were an important item in bringing the October shipments up to their high volume. For the 10 months ended with October exports of agricultural machinery and implements were valued at \$99,227,997, against \$78,355,545 for the corresponding period of 1927.

Exports of power-driven metal-working machinery in October were valued at \$2,491,284, against \$1,660,115 in September and \$1,913,131 in October of last year. For the 10 months ended with October, however, the value was \$15,661,121, compared with \$21,508,533 for the correspond-

ing period of last year, a decrease of almost \$6,000,000. Exports of industrial machinery in October made a striking rise to \$20,228,796, against \$14,872,197 in September (an increase of \$5,356,599) and \$16,728,138 in October of last year. For the 10 months ended with October the value was \$184,590,371, an increase of \$17,437,108 over \$167,153,262 for the corresponding period of last year. Exports of metal-working machinery, as shown in our table, totaled 670 units, valued at \$1,058,129 in October, compared with 553, valued at \$835,866, in September.

Imports of machinery and vehicles in October were valued at \$2,732,161, compared with \$2,226,391 in September and \$2,234,168 in October, 1927. For the 10 months ended October the value was \$23,926,913, against \$23,337,431 for the corresponding period of last year. Imports of industrial, office and printing machinery in October were valued at \$1,708,694, compared with \$1,428,520 in September and \$1,298,698 in October of last year. For the 10 months ended with

October they were valued at \$14,914,161, compared with \$13,996,093 for the corresponding period of 1927.

Imports of machinery as listed in THE IRON AGE table were valued at \$2,127,474 in October, against \$1,499,728 in September and \$1,495,195 in October of last year. For the 10 months ended with October the value was \$17,830,942, compared with \$16,683,823 for the corresponding period of last year. An outstanding feature of October imports was the incoming shipments of "other machinery," made up of industrial equipment largely. They rose to \$1,068,068, against \$780,238 in September and \$528,210 in October of last year; for the 10-month periods of 1928 and 1927 the values were \$8,339,058 and \$6,974,108 respectively.

Of the October imports, shipments to the value of \$474,744 came from Germany, of which New York received \$250,000. Other countries supplying this class of equipment in October were Sweden, \$188,277; United Kingdom, \$91,649; Canada, \$43,708; and Switzerland, \$43,425.

Machinery Exports from the United States
(By Value, in Thousands of Dollars)

	October		Ten Months Ended October	
	1928	1927	1928	1927
Locomotives	\$167	\$175	\$2,716	\$4,584
Other steam engines.....	65	93	772	1,185
Boilers	135	94	1,130	1,560
Accessories and parts.....	64	126	527	553
Automobile engines.....	399	632	11,910	10,154
Other internal combustion engines.....	768	550	7,344	6,052
Accessories and parts.....	259	198	2,999	2,829
Electric locomotives.....	28	208	1,157	1,029
Other electric machinery and apparatus	746	501	6,571	6,185
Excavating machinery.....	259	404	2,512	4,010
Concrete mixers.....	108	83	903	965
Road-making machinery.....	70	104	97	1,807
Elevators and elevator machinery.....	575	477	3,784	4,123
Mining and quarrying machinery.....	1,116	1,155	11,234	11,282
Oil well machinery.....	2,005	1,201	12,896	15,064
Pumps.....	568	512	4,803	6,313
Bending and power presses.....	514	170	2,246	1,112
Power hammers.....	107	95	717	874
Machine tools.....	958	1,173	13,177	12,583
Other metal-working machinery and parts	736	428	5,229	3,980
Textile machinery.....	953	926	10,686	9,285
Sewing machines.....	742	697	7,129	7,492
Shoe machinery.....	139	128	1,477	1,372
Flour-mill and gristmill machinery.....	43	64	378	464
Sugar-mill machinery.....	574	1,162	387	4,390
Paper and pulp mill machinery.....	326	356	2,570	3,222
Sawmill machinery.....	98	78	769	675
Other woodworking machinery.....	259	115	1,649	1,170
Refrigerating and ice-making machinery.....	638	402	7,720	6,386
Air compressors.....	690	432	5,698	4,916
Typewriters.....	1,638	1,381	17,298	16,793
Power laundry machinery.....	103	103	980	1,300
Typesetting machines.....	518	408	3,889	3,655
Printing presses.....	607	462	5,060	5,135
Agricultural machinery and implements	9,046	5,903	99,228	78,359
All other machinery and parts.....	17,059	13,015	150,761	120,426
Total	\$43,080	\$34,011	\$408,403	\$361,284

*Details of principal items in another table.

Imports of Machinery Into the United States

	October		Ten Months Ended October	
	1928	1927	1928	1927
Metal-working machine tools.....	\$34,552	\$31,206	\$467,799	\$359,346
Agricultural machinery and implements	322,955	427,496	4,074,807	4,809,454
Electrical machinery and apparatus	342,408	250,806	2,256,913	2,500,248
Other power-generating machinery.....	1,392	305	10,641	9,031
Other machinery.....	1,068,068	528,210	8,339,058	6,974,108
Vehicles, except agricultural	358,099	257,172	2,681,724	2,031,636
Total	\$2,127,474	\$1,495,195	\$17,830,942	\$16,683,823

Exports of Power-Driven Metal-Working Machinery

	October, 1928		September, 1928	
	No.	Value	No.	Value
Engine lathes	60	\$122,061	56	\$105,444
Turret lathes.....	41	123,515	14	35,291
Other lathes.....	87	112,509	46	87,149
Vertical boring mills and chucking machines.....	4	1,948	6	14,093
Thread-cutting and automatic screw machines.....	62	88,159	47	57,212
Knee and column type milling machines	26	64,112	26	60,464
Other milling machines.....	38	69,843	37	65,975
Gear-cutting machines.....	25	65,215	23	66,719
Vertical drilling machines.....	31	27,111	19	18,157
Radial drilling machines.....	10	17,596	14	40,339
Other drilling machines.....	110	42,540	75	25,103
Planers and shapers.....	18	35,563	25	39,694
External cylindrical grinding machines	58	161,101	73	128,215
Internal grinding machines...	34	70,213	27	55,797
Metal-working tool-sharpening machines	66	56,643	65	36,214
Total	670	\$1,058,129	553	\$835,866

Machinery Markets and News of the Works

Buying Better Than Expected

November Machine Tool Business Did Not Slump
to Extent Usual at This Time of Year

NOVEMBER machine tool business was considerably better than the trade had expected. Sales by some companies were fully equal to those of either September or October, and a Cleveland manufacturer of turret lathes reports that its November volume was the largest for any month this year.

A recent statement by the National Machine Tool Builders' Association that November and December are normally months of reduced volume in machine tool buying finds contradiction this year, and the outlook is for a continued good demand during December, although the time is approaching for year-end inventories. The fact that industry generally is planning for a maintenance of present production schedules in the early part of 1929, and that machine tools ordered now cannot in many instances be delivered until February, account in part at least for orders which normally might be postponed until after Jan. 1.

One of the developments of the past week was a revival of buying by rail-

roads, which have been conspicuously light purchasers this year. The Norfolk & Western has ordered a number of the tools on the list it issued several weeks ago and will buy the remainder during the next week or two. The Southern is inquiring for six machines. The Louisville & Nashville is ordering for its 1929 program, for which a large appropriation has been authorized. The Chicago, Milwaukee, St. Paul & Pacific has ordered six tools and the New York Central has bought two engine lathes.

Detroit still figures prominently in machine tool demand. Further changes in models by companies in the low-priced class will probably result from the showing of the new Chevrolet six-cylinder car. A Detroit automobile company's inquiry for about \$500,000 worth of equipment for making crankshafts, mentioned a week ago, has not been acted upon.

The Whiting Corporation, Harvey, Ill., has issued an inquiry for 21 tools.

A European automobile manufacturer has purchased in this country 40 small and four crankshaft lathes.

New York

NEW YORK, Dec. 4.—Following the recent heavy purchasing by the Wright Aeronautical Corporation, Paterson, N. J., the machine tool market was not so active the past week as in the week before, but there was a good volume of business. For some sellers in this market November was one of the best months of a very good year. The International Motor Co. bought tools for its plants at Plainfield and New Brunswick, N. J., and the printing press firm of R. Hoe & Co., which has recently been a large buyer, continued to place orders for miscellaneous tools. The volume of business in prospect is still large enough to encourage the expectation that buying will not materially fall off in December, which is usually a month of reduced volume, because of the practice of many manufacturers to take inventory at the year end.

Some prospective buyers of tools, finding that deliveries on orders placed now are in many instances not to be had earlier than February, are expected to buy this month, when under other circumstances their purchases might be postponed until after Jan. 1. One instance of a sale of a machine tool with a penalty clause attached is reported; the seller is to pay \$25 a day forfeit for delivery later than Feb. 15, and the buyer will pay a like amount per day if the shipment is received before that date.

The Niles-Bement-Pond Co. has sold during the past week a 100-ton bushing press, 5000-lb. double-frame steam hammer, 36-in.-44-in. sidehead boring mill, two 4-spindle drum type milling machines, 44-in. heavy-duty boring mill, 6-ft. Morris radial drill, a Long & Allstatter punch and shear and other miscellaneous tools, while the Pratt & Whitney division included among its sales six 13-in. and four 16-in. lathes, three 7-in. bench lathes, three 14-in. vertical surface

grinders, two jig borers, two die sinkers and three thread milling machines.

Pioneer Instrument Co., Inc., 754 Lexington Avenue, Brooklyn, manufacturer of aircraft instruments, has asked bids on general contract for two-story addition and improvements in present factory to cost \$60,000. R. M. Segal, 475 Fifth Avenue, New York, is architect.

Streloff-Naughton Corporation, Long Island City, manufacturer of aluminum tanks, etc., has leased space in building at Harris Avenue and William Street, for new plant.

Garford Motor Truck Co., Thirteenth Avenue and William Street, Long Island City, with main plant at Lima, Ohio, is said to be planning early call for bids for two-story addition, 100 x 215 ft., to local factory branch, to cost about \$100,000 with equipment. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect and engineer.

Foote, Pierson & Co., 160 Duane Street, New York, manufacturers of electric signal devices, instruments, have leased two-story and basement factory at 73-77 Hudson Street, Newark, and will remove to new location and increase output.

J. C. Watson, 271 West 125th Street, New York, architect, has plans for a two-story automobile service, repair and garage building, 106 x 126 ft., to cost \$100,000 with equipment.

Department of Street Cleaning, Municipal Building, New York, has secured an appropriation of \$5,000,000 for construction of four incinerator and reduction plants, two in Manhattan and two in Bronx Boroughs, including furnaces, preheaters, flues, conveying machinery and other equipment. Alfred Taylor is street cleaning commissioner.

Lawton-Stephens Co., 427 Marcy Avenue, Brooklyn, manufacturer of sheet metal products, has awarded general contract to C. Salenger, 194 Freeman Street, for one-story plant to cost about \$30,000 with equipment.

Union High School District, Elmont, N. Y., plans installation of manual training equipment in new central high school at Floral Park to cost \$800,000, for which bids will be asked on general contract about middle of month. Knappe & Morris, 171 Madison Avenue, New York, are architects.

Empire State Ice Co., Ninth Avenue and 219th Street, New York, has filed plans for one-story ice-manufacturing plant, 100 x 150 ft., with refrigerating division, to cost about \$240,000 with machinery. Wigton-Abbott Corporation, 552 West Twenty-third Street, is engineer.

Lionel Corporation, 605 South Twenty-first Street, Irvington, N. J., manufacturer of electric toys, has awarded general contract to Austin Co., New York, for one and two-story addition, 390 x 620 ft., to cost over \$200,000 with equipment.

Klemm Co., Inc., Paramount Building, New York, organized a few months ago with capital of \$630,000 to manufacture

The Crane Market

NEW inquiry for overhead equipment continues small, but a number of orders for single cranes are expected to be placed before the end of the year. One builder of overhead cranes reports the sale recently of nine, consisting of a 100-ton, 71-ft. 6-in. span, 30-ton, 20-ft. 2-in. span, two 5-ton and one 3-ton, 32-ft. 8-in. span, two 15-ton, 76-ft. 6-in. span, a 20-ton, 23-ft. span and a 5-ton, 21-ft. 5-in. span. No improvement in locomotive crane business is reported, but further buying of power shovels has been made by contractors. Youngstown Sheet

& Tube Co., Youngstown, is taking bids on 11 cranes of various capacities for the new bar mills at its Indiana Harbor works.

Among recent purchases are:

Thomas Crimmins Contracting Co., 734 Lexington Avenue, New York, steam driven shovel from Bucyrus-Erie Corporation.

John H. Heald Co., Lynchburg, Va., 7½-ton crawl-tread crane from Browning Crane Co.

Joseph Corbiscello & Sons, Fairview, N. J., truck crane from Browning Crane Co.

Forment & Co., 150 Bank Street, New York, 2-ton special electric traveling crane from unnamed builder.

Apollo Steel Co., Apollo, Pa., a 10-ton, 69-ft. span crane from Northern Engineering Works.

Youngstown Sheet & Tube Co., a 10-ton, 35-ft. span crane from Shaw Crane Works.

aircraft, and occupying under temporary arrangement part of plant of Aeromarine Plane & Motor Co., Keyport, N. J., will purchase entire plant, comprising 230 acres and 21 buildings, with mile frontage on Raritan Bay, and will expand for monoplane parts and assembling. A stock issue will be sold to carry out development. Inglis M. Upperco, head of Upperco Cadillac Corporation, 70 Columbus Avenue, New York, automobiles, is president.

Board of Education, 31 Green Street, Newark, R. D. Argue, secretary, is asking bids until Dec. 12 for pumps and air compressor, supply cabinets, work benches, domestic science tables, hardware, iron and steel, gas plates, electrical supplies, etc.

Prest-O-Lite Co., Inc., 30 East Forty-second Street, New York, is considering rebuilding part of plant at Port Newark, Newark, destroyed by fire Nov. 23. Two of group of eight buildings were destroyed.

A. F. Strafer has purchased warehouse and machinery stock of Severin Strafer Machinery Corporation, Jersey City, and will conduct business as Strafer Machinery Co., with office and warehouse at Fourteenth and Provost Streets.

Reading Chain & Block Corporation, Reading, Pa., maker of material handling equipment, has removed New York office from 11 Park Place to 30 Church Street.

New England

BOSTON, Dec. 3.—Business in the local machine tool market the last week in November fell off. Activity centered largely in small used lathes, drilling tools and miscellaneous bench equipment. The lull is believed to be temporary, many users having signified their intentions of purchasing before the close of the year. November sales of dealers in general were well above those for October and were also larger than those for November, 1927.

With New England industries better employed than in months, machine tool houses look for good business during the first quarter of 1929.

Holland & Kenyon Machine Co., 56 North Street, Fitchburg, Mass., has completed plans for a one-story machine shop, 32 x 46 ft.

City of Cranston, R. I., has awarded a contract for a two-story and basement grammar school, 110 x 208 ft., to contain a manual training department. A. A. Rhodes is mayor. William R. Walker &

Son, 49 Weybosset Street, Providence, R. I., are architects.

Precision Electric Tool & Mfg. Co., production tools, dies and special equipment has located at 98 Union Street, Worcester, Mass. Company will also make an electric valve grinder. Tool department is under supervision of Arvid Fyrberg, and Edward Johnson is head of grinder department. J. Vistor Parent is general manager and treasurer.

Bids are being asked by Hart Mfg. Co., Hamilton Street, Hartford, Conn., manufacturer of electrical equipment and supplies, for one-story addition, 60 x 120 ft., to cost about \$40,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

Rhode Island Grinding & Mfg. Co., 263 Richmond Street, Providence, has awarded general contract to P. J. Flynn, 17 Exchange Street, for one-story addition, 50 x 55 ft.

Boston Elevated Railway Co., 31 St. James Avenue, Boston, has plans for one-story repair works, 85 x 150 ft., to include boiler house and automobile service units, to cost about \$100,000 with equipment.

Packard Motor Car Co., 1089 Commonwealth Avenue, Boston, has filed plans for addition to service, repair and sales building, including improvements in present plant, to cost \$400,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Harrington, Robinson & Co., 110 High Street, Boston, iron and steel products, have leased property totaling 21,200 sq. ft. of land, with one two-story building and two one-story shops, and will remodel for new storage and distributing plant.

Department of Public Works, City Hall, Providence, R. I., has completed plans for one-story equipment and repair shop to cost about \$70,000 with equipment. T. J. H. Pierce, City Hall, is city engineer.

Buffalo

BUFFALO, Dec. 3.—Harrison Radiator Corporation, Lockport, N. Y., manufacturer of automobile radiators, has plans for three-story addition, totaling 72,000 sq. ft. floor space, to cost \$130,000 with equipment.

Sherer-Gillett Co., Marshall, Mich., manufacturer of automatic refrigerators for butchers, grocers, etc., will discontinue operations at branch plant at Herkimer, N. Y., and will remove equipment to Marshall, where production will

be concentrated in future. Expansion will be carried out at latter plant.

Continental Can Co., Syracuse, N. Y., has purchased Bedford Can Co., Bedford, Va. New unit will work in close cooperation with plants of Wheeling Can Co., Wheeling, W. Va., recently taken over.

DuPont Rayon Co., River Road, Buffalo, has authorized construction of power plants at branch rayon mills in course of erection at Amphill, near Richmond, Va., and Waynesboro, Va., each to cost over \$100,000 with equipment.

Louis L. Babcock and Hugh McCruss, 610 Manufacturers' and Traders' Building, Buffalo, have organized United States Body & Forging Co. and plan early operation of plant to manufacture automobile radiators, fenders and kindred products.

Endicott Forging & Mfg. Co., Endicott, N. Y., has let contract to H. B. Van Ness, local contractor, for addition to die room, 25 x 116 ft., and addition to heat treating department, 40 x 80 ft. Company has also placed orders for two Tramrail cranes, 48 x 48-in. x 12-ft. planer, 48-in. boring mill, a 3000-lb. friction board drop hammer and a continuous heat treating and drawing furnace. S. J. Marshall is president.

Philadelphia

PHILADELPHIA, Dec. 3.—Philadelphia Storage Battery Co., Ontario and C Streets, Philadelphia, has taken over factory adjoining property, totaling more than 80,000 sq. ft. floor space, to manufacture radio sets. It is purposed to double present output of 2000 sets per day.

National Umbrella Frame Co., Belfield Avenue, near Penn Street, Philadelphia, has awarded general contract to Truscon Steel Co., 1505 Race Street, for two-story addition, 60 x 183 ft., to cost about \$50,000 with equipment.

Reliance Bronze & Aluminum Foundry Co., Philadelphia, recently organized by Alfred Haerberle, 268 West Fishers Avenue, and associates, plans early operation of local plant to manufacture aluminum, brass, bronze and other metal castings. Arthur W. Schuller, 7172 North Twentieth Street, is also interested in company.

A-Z Radiator Repair Co., Philadelphia, has leased three and four-story building at 1318 Ridge Avenue for new plant for automobile radiator manufacture and repairs.

Ajax Metal Co., 46 Richmond Street, Philadelphia, has awarded general contract to M. Ward Easby, 1505 Race

Street, for two-story addition, 52 x 60 ft., to cost about \$25,000 with equipment.

Hoffman Motors Co., Trenton, N. J., local representative for Durant and Moon automobiles, has begun work on two-story service, repair and sales building, 80 x 125 ft., and will install machine and repair shop on first floor, with parts department on second floor.

Board of Education, Glassboro, N. J., plans installation of manual training equipment in high school to cost about \$400,000, for which bids will soon be asked on general contract. Ritter & Shay, Packard Building, Philadelphia, are architects.

Borough Council, West Conshohocken, Pa., plans installation of electrically-operated pumping machinery and auxiliary equipment in extensions in sewage plant and system, to cost \$200,000. Canter, Edgar & Wittwer, 428 Market Street, Camden, N. J., are consulting engineers.

J. Munson Lee, Phillipsburg, N. J., and associates have organized Lee Metal Products Co., with capital of \$100,000, and will operate local plant to manufacture iron, steel, nickel and other metal goods. George H. Tay, Phillipsburg, will be an official of new company.

Board of Delaware County Commissioners, Court House, Media, Pa., is having plans drawn for central steam power plant in Snowden district, to cost more than \$75,000 with equipment. C. W. Brazer, Crozer Building, Chester, Pa., is architect.

Pennsylvania Forge Co., Philadelphia, maker of forgings, die blocks and forged steel pipe flanges, has removed its main office and manufacturing plant to larger quarters at Milnor and Bleigh Streets, Tacony, Philadelphia.

Blue Ridge Pipe & Nipple Co., Greenstone, Adams County, Pa., has started manufacture of black and galvanized pipe nipples in plant at above address. L. E. Beck and C. A. Wills are owners.

Barber-Colman Co., Rockford, Ill., has appointed W. M. Oplinger, 1023 Widener Building, Philadelphia, representative in Philadelphia territory for milling cutters and hobs, and Lloyd & Arms, Inc., 133 South Thirty-sixth Street, Philadelphia, representative for hobbing machines and hob sharpening machines.

Pittsburgh

PITTSBURGH, Dec. 3.—Sales of machine tools reached a good total last month, although not up to expectations based upon a brisk inquiry. Business the past week has been featured by the placing of a few tools on its fourth quarter list by the Westinghouse Electric & Mfg. Co. It is expected that some of the tools inquired for recently in a special list will be bought before the end of the month. The Carnegie Steel Co. has not completed tabulation of bids on its list of tools for its Duquesne works.

Fisher Scientific Co., 711 Forbes Street, Pittsburgh, manufacturer of scientific instruments, laboratory equipment and supplies, is having plans drawn for addition to cost about \$75,000 with equipment. M. Nirdlinger, Empire Building, is architect.

Metropolitan Paving Brick Co., Bessemer, Pa., is said to be planning early rebuilding of part of plant destroyed by fire Nov. 28. Machine shop, boiler plant,

conveying equipment and other buildings were burned. Headquarters are at Canton, Ohio.

Plant and business of Fry Equipment Corporation, Rochester, Pa., manufacturer of gasoline pumps, lubricating apparatus, etc., have been acquired by Wayne Pump Co., Fort Wayne, Ind. It is understood that Rochester works will be continued and output increased.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, has awarded general contract to H. M. Bylesby Engineering & Management Co., 231 South La Salle Street, Chicago, for addition to steam-operated electric generating plant on Brunots Island, to cost about \$3,000,000 with equipment.

Mars Co., Oil City, Pa., subsidiary of United Natural Gas Co., plans rebuilding gasoline refinery at Hampton Station, about 10 miles from Oil City, destroyed by fire Nov. 23.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to Croseau Construction Co., Brownsville, Pa., for new engine house and locomotive repair shop, locker building, and other structures at Benwood, near Wheeling, W. Va., to cost about \$90,000 with equipment.

Turner Aircraft Corporation, Rochester, N. Y., represented by A. W. Legge, Bradford, Pa., has plans for one-story airplane plant at Bradford, including parts and assembling departments, to cost over \$35,000 with equipment.

Pittsburgh Foundry & Machine Co., foot of Thirty-sixth Street, Pittsburgh, is not planning additions to present plants or building operations of any kind, as stated in our issue of Nov. 22.

South Atlantic

BALTIMORE, Dec. 3.—Contract has been let by National Enameling & Stamping Co., 1901 Light Street, Baltimore, to Austin Co., Cleveland, for one-story addition, 90 x 168 ft., to cost about \$35,000 with equipment.

Crown Cork & Seal Co., Highlandtown, Baltimore, manufacturer of metal bottle caps, bottle-capping machinery, etc., is said to be arranging an expansion and improvement program to cost more than \$1,000,000. L. R. White, Hearst Tower Building, architect, is preparing plans for three new units.

Board of Education, Savannah, Ga., is said to be planning installation of manual training equipment in two-story and basement high school to cost about \$275,000, for which plans have been completed. Wallin & Comer, Realty Building, are architects.

Bureau of Street Cleaning, Municipal Office Building, Baltimore, is considering one-story equipment and repair shop at 1139 Granby Street, with automobile service and repair department for motor trucks, etc., to cost about \$100,000 with equipment.

Nu-Idea Desk Co., Darlington, S. C., manufacturer of school desks, etc., has plans for new one-story plant at Sumter, S. C., with main unit of 20,000 sq. ft. floor space, and smaller buildings, to cost more than \$75,000 with machinery. Present plant will be removed to new location.

Potomac Electric Power Co., Washington, is carrying out expansion and improvement program at local Benning steam-operated electric generating plant, to include installation of 30,000-kw. gen-

erator and auxiliary equipment. Entire project will cost over \$2,600,000.

Carolina Paper Co., Charlotte, N. C., is planning one-story storage and distributing plant, 100 x 300 ft., to cost over \$50,000 with equipment.

Wilmington Naval Stores Co., Wilmington, N. C., D. J. Herring, head, has begun construction of new plant near Wilmington, for production of turpentine, rosin and kindred products, to cost over \$80,000 with equipment.

Common Council, Sanford, N. C., has approved plans for municipal airport, including hangar, repair shop and other units.

East Coast Utilities Co., Richmond, Va., operating electric light and power, and ice-manufacturing plants in Virginia, Maryland and North Carolina, has arranged for bond issue of \$1,000,000, portion of proceeds to be used for extensions and improvements in properties.

Cutler-Hammer Mfg. Co., Milwaukee, maker of electrical control apparatus, has removed its Atlanta, Ga., office to larger quarters at 150 Peters Street, Southwest. In addition to sales and engineering service on motor control apparatus and wiring devices, warehouse is maintained where many products will be carried in stock for immediate shipment. A. C. Gibson is in charge.

William Steele & Sons Co., Fifteenth and Cherry Streets, Philadelphia, engineer and contractor, is preparing plans for new textile mill at Pulaski, Va., for Virginia Maid Hosiery Mills, to include machine shop, power house and other units in addition to main mill, to cost about \$200,000 with machinery.

Barber-Colman Co., Rockford, Ill., has appointed J. R. Walraven, Forsythe Building, Atlanta, Ga., representative in Georgia for hobbing machines, hob sharpening machines, milling cutters and hobs.

Detroit

DETROIT, Dec. 3.—Auto-Rad Electrical Corporation, Adrian, Mich., manufacturer of radio receiving sets, is arranging for additional space for increased output in factory now occupied in part.

Crane Co., 836 South Michigan Avenue, Chicago, is having plans drawn for one-story factory branch and distributing plant at Flint, Mich., with pipe-cutting and threading department, etc., to cost about \$45,000 with equipment. George Bachman, Pengelly Building, Flint, is supervising architect.

Upton Machine Co., Edgewater Street, St. Joseph, Mich., manufacturer of electric washing machines and parts, has plans for one-story unit, 100 x 250 ft., to cost about \$85,000 with equipment.

Hayes Body Corporation, Ionia, Mich., is carrying out an expansion and improvement program to cost about \$450,000. Approximately one-half of this sum will be used for extensions at local body-building plant and other half for enlargement of metal stamping plant at Grand Rapids, Mich.

Stout Metal Airplane Division of Ford Motor Co., Dearborn, Mich., is said to be planning one-story addition, to cost over \$75,000 with equipment.

General Foundry & Machine Co., Flint, Mich., is expanding its plant at Marshall, Mich., including installation of additional equipment.

American Forging & Socket Co., Pontiac, Mich., has plans for two additions,

one and two stories, 55 x 80 ft., and 100 x 120 ft., to cost over \$80,000 with equipment. Wright & Nice, General Motors Building, Detroit, are architects.

Reynolds Spring Co., Jackson, Mich., has purchased plant and business of National Appliance Co., Inc., Linden, Mich., manufacturer of interior and exterior flood lighting equipment. Equipment will be removed to Jackson where branch will be established for production of National company specialties. J. L. Brownell, formerly president of last-noted company, will continue as vice-president in charge of engineering.

Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of acetylene welding apparatus, etc., has filed plans for one-story factory branch and distributing plant at Flint, Mich., to cost about \$35,000 with equipment.

Detroit Edison Co., 2000 Second Avenue, Detroit, has plans for new power substation and outdoor switching plant at Bunce Creek, Port Huron, Mich., to cost about \$300,000 with equipment.

Kirk & Blum Mfg. Co., Cincinnati, maker of shavings and dust collecting systems, ventilating, drying and air conditioning equipment, industrial ovens and sheet metal products, is opening a branch factory with sales and engineering office at 4718 Burlingame Street, Detroit. Present district office in General Motors Building will be removed to new address.

Huron Forge & Machine Co., 9041 Alpine Avenue, Detroit, manufacturer of drop forgings, has started construction of a one-story addition to provide for larger output.

Cleveland

CLEVELAND, Dec. 3.—Machine tool business is holding up well and while inquiry slowed down somewhat during the week it is exceedingly good for this season of the year, as December is usually a rather quiet month. A local builder of turret lathes reports that November was the best month of the year in the volume of sales. Business is well distributed, a larger percentage coming from fields outside of the automotive industry than recently. The Curtiss Aeroplane & Motor Corporation, Buffalo, which has been buying small lots of machinery, has a number of tools yet to be placed.

Sales during the week included a 24-in. and a 16-in. lathe to Erie Foundry Co., Erie, Pa.; 13-in. lathe to Pittsburgh Plate Glass Co. for its Columbia division, Barberton, Ohio; jig borer to Radiator Engineering Co., Toledo, and a used 90-in. boring mill to Wheeling & Lake Erie Railroad. This railroad is still in the market for a wheel press and punching machine.

Lamson & Sessions Co., 1971 West Eighty-fifth Street, Cleveland, manufacturer of bolts, nuts, etc., is having plans drawn for four-story addition, including improvements in present plant, to cost more than \$100,000. George S. Rider Co., Century Building, is architect and engineer.

Ohio Cut Stone Co., South Amherst, Ohio, is planning to rebuild part of plant destroyed by fire Nov. 26.

Canton Drop Forge Co., Canton, Ohio, is completing plans for one-story plant, 70 x 320 ft., to cost about \$90,000 with equipment.

Edward Ford Plate Glass Co., Rossford, Ohio, is said to be planning additions, including main glass-making unit,

grinding and polishing plant, and storage and distributing plant, to cost more than \$2,000,000 with machinery.

Indian Lake Motor Boat Co., Lima, which recently changed name to Dart Boats, Inc., has plans for new one-story boat-building and repair plant, 65 x 300 ft., at Toledo, Ohio, to cost more than \$75,000 with equipment.

Brown Fence & Wire Co., 6532 Juniata Avenue, Cleveland, recently formed to take over company of same name has arranged for stock issue to total \$6,187,500, a portion of proceeds to be used for expansion. Company also operates Peerless Wire & Fence Co., with plants at Adrian, Mich., and Memphis, Tenn. Frank Spitz is president.

Cincinnati

CINCINNATI, Dec. 3.—From the standpoint of sales November turned out to be comparable with September and October for local machine tool builders. While some companies report that bookings slumped somewhat in the past 30 days, others showed a gain sufficient to keep the average at the high level of recent months. Pending business is of large volume and indications are that buying will continue heavy well into next year. Some manufacturers have quoted lately on as much as \$150,000 worth of equipment and inquiries among the trade reveal the fact that many users are planning to replace obsolete equipment in the next few months.

Outstanding in the past week's transactions was an order for several lathes placed with a local builder by a European automobile maker. An Eastern airplane motor company has bought a large amount of equipment from Cincinnati machine tool plants and is expected to make further purchases soon. A revival of buying on the part of railroads is noted. The Norfolk & Western has contracted for a number of tools on its recent list and will order the remainder during the next week or two. Southern Railway is inquiring for about six machines, while the Louisville & Nashville has begun purchasing tools on its 1929 program, for which an appropriation has been authorized. The New York Central bought two large engine lathes the past week.

Detroit still is figuring conspicuously in machine tool activities. Purchases by automobile manufacturers continue impressive. A large Detroit company is reported not yet to have acted on its inquiry for about \$500,000 worth of equipment.

C. O. Sherrill, city manager, Cincinnati, will take bids at once for hangar with repair facilities at municipal airport, 112 x 114 ft., to cost about \$50,000. Robert M. Olin, city service director, is in charge.

Crowe Mfg. Corporation, 317 Sycamore Street, Cincinnati, manufacturer of electric-operated safety saws and other equipment, has arranged for stock issue to total \$587,500, part of proceeds to be used for expansion in manufacturing.

Charles Hock, Realty Building, Dayton, Ohio, architect, has plans for multi-story automobile service, repair and garage building to cost \$150,000 with equipment.

Union Utilities, Inc., 46 Cedar Street, New York, operating Memphis Natural Gas Co., Memphis, Tenn., is considering construction of pipe line for natural gas supply to Nashville, Tenn., and vicinity, about 200 miles from supply base, to cost

more than \$5,000,000. Company has recently begun building line from Monroe, La., to Memphis, to cost close to like sum.

Board of Education, Hamilton, Ohio, has authorized installation of manual training department in new three-story high school to cost about \$400,000, for which bids are being asked on general contract until Dec. 13. F. J. Muller Rentschler Building, is architect.

American Glanzstoff Corporation, Elizabethton, Tenn., plans extensions in power house, machine shop and other departments in connection with new unit at local rayon mill to cost more than \$4,000,000. Headquarters are at 180 Madison Avenue, New York.

Louisville Frog, Switch & Signal Co., Louisville, has been organized to take over and consolidate Louisville Frog & Switch Co., and Southern Signal Co., both with local plants, last noted specializing in production of castings as well as signal equipment. It is purposed to continue both plants in operation.

Oakley Pattern & Foundry Co., 4423 Verne Avenue, Cincinnati, has awarded general contract to Erwin Hoinke for an addition, 43 x 80 ft., which will increase manufacturing space 70 per cent.

Ohio Power Co., Newark, Ohio, plans construction of steel tower transmission line from generating plant at Philo to Fostoria, Ohio, and vicinity, about 125 miles with power substation and switching plant at last noted place, to cost more than \$850,000. Company will also build similar transmission line from Philo station to South Bend, Ind., and vicinity.

Chicago

CHICAGO, Dec. 3.—The local machine tool market remains moderately active, with sales and inquiry from widely scattered sources. The list issued several weeks ago for the Fort Wayne works of the International Harvester Co. is still open. Of special interest among new inquiries is a list of 21 tools for the Whiting Corporation, Harvey, Ill. The Chicago, Milwaukee, St. Paul & Pacific has ordered six tools for delivery to points along its lines. Miscellaneous orders for punch presses and ball-bearing drills are noteworthy. Used machine tools are moving freely in a market that is more liberally supplied than of late.

Following the announcement a week ago that several builders had advanced prices are reports that a number of lines may be advanced about Jan. 1.

Des Moines Steel Tank Co., 1819 East Court Avenue, Des Moines, Iowa, is having plans prepared for a warehouse and an addition to its factory.

Raffel Mfg. Co., 4443 Armitage Avenue, Chicago, manufacturer of radio parts, will build a factory at 4528 Fullerton Avenue, to cost \$50,000.

Industrial Steel & Supply Co., Chicago, has removed its offices to 1964 Building, 228 North La Salle Street.

Monarch Tractor Corporation, Springfield, Ill., subsidiary of Allis-Chalmers Mfg. Co., West Allis, Wis., has asked bids on general contract for two one-story plant units, 100 x 200 ft., and 80 x 250 ft., to cost over \$200,000 with equipment.

Federal Sign Co., 1215 Nicollet Avenue, Minneapolis, Minn., manufacturer of electric displays, has awarded general contract to M. Schumacher, 104 South Ninth

Street, for two-story plant to cost \$35,000 with equipment. Larson & McLaren, Baker Building, are architects.

Raffel Mfg. Co., 4443 Armitage Avenue, Chicago, manufacturer of radio equipment and parts, has acquired property, 100 x 135 ft., at 4528 Fullerton Avenue for new plant to cost approximately \$50,000 with machinery and will remove to new location.

Western Screw Mfg. Co., 4413 Kinzie Street, Chicago, has awarded general contract to A. Larson, 19 South La Salle Street, for one-story addition, 25 x 100 ft. Ralph H. Oliver, 115 South Dearborn Street, is architect.

Grau-Curtis Co., 613 First Avenue, N. E., Minneapolis, Minn., manufacturer of furniture, will take bids at once for two-story factory, 137 x 145 ft., to cost about \$100,000 with equipment. Lang, Raugland & Lewis, Essex Building, are architects.

Velle Motor Corporation, Moline, Ill., is arranging to discontinue manufacture of automobiles, and will devote local plant to production of airplanes, largely of monoplane type.

Midway Chevrolet Co., 1641 University Avenue, St. Paul, Minn., local representative for Chevrolet automobile, has plans for one-story service, repair and sales building, 120 x 125 ft., to cost about \$100,000 with equipment. P. E. Crosier, New York Life Building, Minneapolis, Minn., is architect.

Gulf States

BIRMINGHAM, Dec. 3.—City Council, Austin, Tex., is planning extensions and improvements in municipal electric light and power plant, to cost more than \$350,000 with equipment. United Engineers & Constructors, Inc., Grand Avenue and Lincoln Highway, Philadelphia, is engineer.

Universal Car Loading & Distributing Co., Mercantile Bank Building, Dallas, Tex., is planning new storage and distributing plant, primarily for handling automobiles, including loading docks, about 400 ft. long. An electric traveling crane will be installed. Project will cost more than \$100,000.

United Gas Co., operating Houston Gulf Gas Co., Houston, Tex., and other natural gas properties, is planning an expansion and improvement program, including construction of about 1000 miles of pipe lines, increase in producing properties and purchase of Duval Texas Sulphur Co. A stock issue of \$3,000,000 is being sold, part of fund to be used for development.

War Department, Washington, has authorized improvements at flying field at Galveston, Tex., including fund of \$19,369 for extensions in machine shops.

Wilton Dubus and Frank Atwood, Crowley, La., have purchased controlling interest in Acadia Iron Works, with local plant, heretofore held by J. T. Hinchliffe. New owners plan expansion. Company name will be changed to Dubus & Atwood.

Williams Auto Top Co., Dallas, Tex., is arranging for early occupancy of new factory, one story, 65 x 200 ft., now in course of construction, which has been secured under lease.

Roxana Petroleum Co., City National Bank Building, San Antonio, Tex., is completing plans for construction of new oil refinery near Houston, Tex., to cost more than \$500,000 with equipment. Company will also construct 450-mile pipe line to refinery for crude oil supply.

C. B. Schoepl, Florida Theater Building, Jacksonville, Fla., architect, has plans for three-story automobile service, repair and garage building, 100 x 125 ft., to cost about \$100,000 with equipment.

Prest-O-Lite Co., 6119 Harrisburg Road, Houston, Tex., has awarded general contract to Donald Hall, Cotton Exchange Building, for two buildings, for factory branch, storage and distributing service, to cost \$40,000. Headquarters are at 30 East Forty-second Street, New York.

Humble Oil & Refining Co., Houston, Tex., has begun foundations for new gasoline refinery at Ingleside, Tex., to cost more than \$850,000 with machinery. Company is reported planning new oil refinery near Neches, Tex., where 15-acre tract recently was secured. Humble Pipe Line Co., a subsidiary, will proceed with installation of three-unit pumping station near Sweetwater, Tex., to cost about \$140,000, for booster service for pipe line to Hawley, Tex.

Barber-Colman Co., Rockford, Ill., has appointed Rosenfelder Machinery Co., 1024 Post Dispatch Building, Houston, Tex., representative in that territory for hobbing machines, hob sharpening machines, hobs and milling cutters.

St. Louis

ST. LOUIS, Dec. 3.—Contract has been let by United Cold Storage Co., 2101 West Pershing Road, Chicago, to E. W. Sproul Construction Co., 310 South Michigan Boulevard, for eight-story addition to ice-manufacturing and cold storage plant at Kansas City, Mo., to cost about \$900,000 with equipment.

Phillips Petroleum Co., Bartlesville, Okla., has authorized construction of new gasoline refinery in Noodle Creek district, Tex., to cost about \$70,000 with equipment.

Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., has awarded general contract to Fleming-Gilchrist Construction Co., 3525 Broadway, for four-story automobile service, repair and garage building, 125 x 140 ft., to cost over \$175,000.

Cessna Aircraft Co., Wichita, Kan., has arranged for stock issue to total \$131,250, part of proceeds to be used for expansion in output.

N. S. Sherman Machine & Iron Works, 18 East Main Street, Oklahoma City, Okla., has awarded general contract to H. W. Underhill Construction Co., Braniff Building, for one-story addition, 50 x 140 ft., to cost about \$35,000.

Sinclair Refining Co., 1921 Harrison Street, Kansas City, Mo., is said to be planning new oil storage and distributing plant at Nebraska City, Neb., to cost about \$100,000 with equipment.

Seaman-Dunning Corporation, West Fourth Street, Pine Bluff, Ark., affiliated with Nash Motors Co., Kenosha, Wis., has plans for third unit at local plant, one story, 215 x 280 ft., to manufacture bodies for Nash automobiles, to cost more than \$160,000 with equipment.

Bradford Armature Works, 315 East Broadway, East St. Louis, Ill., has asked bids on general contract for one-story and basement plant, 50 x 71 ft., to cost more than \$26,000 with equipment. Seer-Ka Engineering Co., 1732 North Twenty-fifth Street, is engineer.

Coffman Aircraft Co., Oklahoma City, Okla., has begun construction of one-story airplane plant, 60 x 120 ft., to in-

clude parts manufacture and assembling, to cost about \$35,000.

Wilcox Oil & Gas Co., Bristow, Okla., John J. Kerins, manager, has plans for new oil refinery, to cost over \$100,000 with equipment.

Standard Steel Works, North Kansas City, Mo., has been organized to manufacture oil storage tanks, dump bodies for trucks, grain blowers, airplanes, heating and ventilating equipment and other fabricated sheet steel products. Company also has engineering service for working out details of special mill and elevator jobs, smelters, zinc plants, etc.

Indiana

INDIANAPOLIS, Dec. 3.—Contract has been let by Auburn Automobile Co., Auburn, Ind., to Austin Co., Cleveland, for additional units at Connersville plant, to cost over \$300,000 with equipment.

Chevrolet Aviation Motors Corporation, Tenth and Fayette Streets, Indianapolis, an interest of Chevrolet Brothers Mfg. Co., manufacturer of automobile motor equipment, is said to be planning one-story unit to cost over \$40,000.

Schwitzer-Cummins Co., 1125 Massachusetts Avenue, Indianapolis, manufacturer of mechanical fans for automobiles and tractors, has filed plans for one-story addition, 125 x 145 ft., to cost about \$45,000 with equipment.

Chambers Mfg. Co., Shelbyville, manufacturer of fireless cookers, etc., has awarded general contract to Harry O. Phares, Shelbyville, for two-story and basement addition to cost \$35,000.

Common Council, Washington, Ind., is planning establishment of municipal airport, including hangar, repair shop and other buildings.

Columbia Canning Co., Cambria, Wis., is planning new plant at Shelbyville, including power house and machine shop, to cost \$115,000 with equipment. Shelbyville Better Business Club is interested in project.

Peerless Foundry Co., 1843 Ludlow Street, Indianapolis, has filed plans for one-story addition, to cost about \$25,000 with equipment.

R. & R. Mfg. Co., Anderson, maker of overhead valve equipment for motor cars, will remove plant and offices to new quarters at Madison and Nichol Avenues.

Diamond Separator Co., Franklin, Ind., is reported planning one-story addition to cost over \$30,000 with equipment.

Fibroc Insulating Co., Valparaiso, L. T. Frederick, president, has engaged Lockhart & Fett, Associates Building, South Bend, architects, to prepare plans for one-story plant, 110 x 350 ft., with power house, to cost \$100,000 with equipment.

Pacific Coast

SAN FRANCISCO, Nov. 28.—Contract has been let by Water Works Supply Co., Oakland, Cal., manufacturer of power and mechanical equipment, to H. J. Christiansen, Ray Building, for two-story plant, 50 x 76 ft. A. Froberg, 505 Seventeenth Street, is architect.

Board of Education, Los Angeles, Architectural Division, has plans for new high school group on Santa Barbara Avenue, to cost about \$350,000, to include one-story vocational shop. Bids will be asked on general contract early in January.

Lake Airways, Inc., Lakeport, Cal., recently organized by H. W. Hughson and associates, has secured lease from City Council for establishment of airport, to include hangar, repair shop and other units, to cost about \$50,000.

Richfield Oil Co., Bartlett Building, Los Angeles, is planning for airport near properties at Merced, Cal., including six-plane hangar, repair shop and other structures, to cost in excess of \$90,000.

Linde Air Products Co., 351 Everett Street, Portland, with headquarters at 30 East Forty-second Street, New York, is planning two new manufacturing and distributing plants, to cost more than \$150,000 with equipment.

Isaacson Iron Works, 2917 East Marginal Way, Seattle, manufacturer of automobile bodies and other metal products, is planning extensions to cost more than \$90,000 with equipment.

Puget Sound Power & Light Co., Seattle, is arranging an expansion program to cost more than \$10,000,000, and about three times that sum within the next three to four years. Present work will include new steam-operated electric power plant to cost over \$3,500,000 with transmission lines. Company is under direction of Engineers Public Service Co., an interest of Stone & Webster, Inc., 49 Federal Street, Boston.

Scenic Airway, Inc., Phoenix, Ariz., Parker Van Zandt, general manager, is planning construction of local airport, to include hangars, repair shops and other buildings, to cost \$140,000.

Ace Heating & Ventilating Co., 5805 Angeles Mesa Drive, Los Angeles, has been organized to design and manufacture heating, ventilating and refrigeration equipment, specializing in theater, auditorium, school and assembly halls. Company does not maintain manufacturing facilities at present, but expects to arrange for this later. Equipment manufactured for its use is handled on jobbing basis.

Broderick & Bascom Wire Rope Co., St. Louis, will erect a new building, 100 x 100 ft., at Eighteenth and Upshur Streets, Portland, Ore., to take care of its Pacific Coast trade.

Byron Jackson Pump Co., Berkeley, Cal., has established a direct factory branch at 1104 Buyers Building, Portland, in charge of A. P. DuMond. Associated with him is A. H. Marshall, consulting engineer.

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, has removed its Los Angeles branch office and service station to larger quarters at 1220 Hope Street.

Milwaukee

MILWAUKEE, Dec. 3.—Following an excellent run of business in November, which sets the month apart as probably the best the local machine tool industry has experienced since the war, December has opened with bright prospects and the character and volume of inquiry denote a continuance of active demand. In some instances tool builders are falling farther behind in deliveries, despite efforts to keep production abreast of shipping specifications.

Allis-Chalmers Mfg. Co., Milwaukee, has placed contract with W. W. Oeflein, Inc., 110 East Wisconsin Avenue, for a brick and steel foundry, 144 x 130 ft., and a new heat treating shop 50 x 120 ft., as extensions of tractor plant at main

works in West Allis. Estimates also have been closed on a manufacturing building, 200 x 600 ft., for this division. Extensions will also be made to Monarch tractor plant at Springfield, Ill. Purchase of equipment has been under way for some time.

Hackendahl & Schmidt Co., Milwaukee, fabricator of structural and architectural iron, will begin work this month on erection of a one-story storage building, 100 x 240 ft. It will have a 60-ft. craneway and two 20-ft. lean-tos.

J. I. Case Threshing Machine Co., 700 State Street, Racine, Wis., is taking bids through Frank J. Hoffman, architect, James Block, Racine, for an extension of about 10,000 sq. ft. to its branch plant at Lincoln, Neb. Investment in building and equipment will be about \$35,000.

In addition to extensions to heat treating shop, power plant and other enlargements by Nash Motors Co., Kenosha, Wis., to its branch works at Racine, Wis., contracts have been placed for a new shear building, 28 x 41 ft. About \$600,000 is being expended for structures and equipment.

Board of Vocational Education, La Crosse, Wis., has been granted a 1929 budget appropriation of \$52,500 for completion of second story of present building and purchase of equipment. Work is expected to materialize about Feb. 1. G. M. Wiley is secretary of board.

Board of Industrial Education, Racine, Wis., has been authorized an appropriation of \$40,630 for new construction and equipment for Racine Vocational School, available Jan. 1.

Milwaukee Corrugating Co., Milwaukee, has acquired Eller Mfg. Co., Canton, Ohio, which operates a plant 280 x 300 ft. Consolidation will serve as a production and distributing section for Milwaukee company in East and South. Line of products will now include metal lath, corner bead, channels, ceilings, stove pipe, furnace pipe and other types of conductor pipe, and furnace and stove pipe elbows.

Canada

TORONTO, Dec. 3.—Machine tool sales continue in good volume. Reports indicate that November business compared favorably with any former month this year. Inquiries are coming in steadily and dealers and builders are optimistic regarding the future.

Kilgour Chair Co., Ltd., Coaticook, Que., has awarded several contracts for erection of a plant to cost \$80,000. Buildings will be one story, 80 x 400 ft.; 20 x 50 ft., and 56 x 109 ft. The Stewart Construction Co., Ltd., 12 Wellington Street North, Sherbrooke, Que., is contractor.

Canadian Drawn Steel Co., Ltd., Gerard Street, Hamilton, Ont., has awarded general contract to Frid Construction Co., Ltd., 6 Hughson Street North, for an addition to cost \$25,000.

A number of sub-trades have been let for a \$200,000 plant and office building at New Toronto, Ont., for Ritchie Cut Stone Co., Ltd.

Cunningham & Son, Ltd., St. Paul Street, St. Catharines, Ont., manufacturer of castings, will make alterations and additions to plant, and has awarded general contract to P. Teatero & Son, 112 Louisa Street.

Walbridge Aldinger Co., 2306 Penobscot Bldg., Detroit, has been awarded contract for superstructure of \$1,500,000 addition to plant of Chrysler Motor Co., Walker-

ville, Ont., building to be three stories, 380 x 1000 ft. Hutton & Souter, 6 James Street North, Hamilton, Ont., are architects.

S. E. Dinsmore Co., Ltd., Security Building, Windsor, Ont., has been awarded contract for a \$60,000 addition to plant of Auto Specialties Mfg. Co. of Canada, Ltd., Windsor, Ont.

Tenders will be called soon for a 2,000,000-bu. addition to grain elevator of Midland Simcoe Elevator Co., Ltd., Midland, Ont., to cost about \$500,000. C. D. Howe & Co., 712 Whalen Building, Port Arthur, Ont., are architects.

National Utilities Corporation, Winnipeg, Man., purposes to build plants at Port Arthur and Fort William, Ont., to manufacture gas and heating units. Each plant will cost about \$750,000.

Western Canada

Western Steel Products, Ltd., Edmonton, Alta., will build a one story addition, 80 x 190 ft., to cost \$50,000.

John Deere Plow Co., head office, Moline, Ill., is having plans prepared for a warehouse and service plant at Swift Current, Sask., tenders for construction to be called next spring.

Foreign

AN expansion and development program in Brazil will be carried out by Electric Bond & Share Co., 2 Rector Street, New York, through its subsidiary, American & Foreign Power Corporation, to cost over \$20,000,000, including purchase of properties, extensions in power plants, transmission lines and other facilities. Company has recently acquired Pernambuco Tramway Co., Pernambuco, and Tramway, Light & Power Co. of Natal, State of Rio Grande del Norte, Brazil.

Goodyear Tire & Rubber Co., Akron, Ohio, has begun construction of new unit at plant at Sydney, Australia, to cost more than \$300,000 including equipment.

Ministry of Public Works, Prague, Czechoslovakia, has plans for construction of power dam at Vranov, on River Dyje, in Moravia, to cost about 87,000,000 crowns (\$2,558,823), providing water head for hydroelectric power station, to be built at same time to cost approximately 25,000,000 crowns (about \$735,300).

Ford Motor Co., Detroit, has concluded agreement with Turkish Government, Constantinople, for establishment of assembling plant in that country. It is purposed to take over existing property for initial works and later to construct entirely new plant. It will be used as export base for Near East for passenger cars, trucks, tractors and aircraft.

Soviet Russian Government, Petrograd, is planning construction of factory to manufacture watches and clocks, including mechanisms, cases, etc. A delegation has left to visit such plants in western Europe and will arrange for details of project. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency for Soviet Government in United States.

A company is being organized at Trinidad, British West Indies, to construct an artificial gas plant and system for Island of Trinidad. It is expected that there will be selection of American gas works machinery for project. Information at office of Bureau of Foreign and Domestic Commerce, reference Trinidad No. 293026.

THE IRON AGE

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Business Forecasts Put to Practical Use

Telephone Company Applies General Industrial Curve and Supplementary Data to Manufacturing, Line Extension and Toll Service Needs

BUSINESS forecasting may be an inexact science, if it is a science at all, but in the opinion of the statisticians of the American Telephone & Telegraph Co. it is a valuable aid to the making of future business plans, whether it be used by a telephone system, a manufacturer whose distribution is country-wide or one whose trade is confined to certain sections.

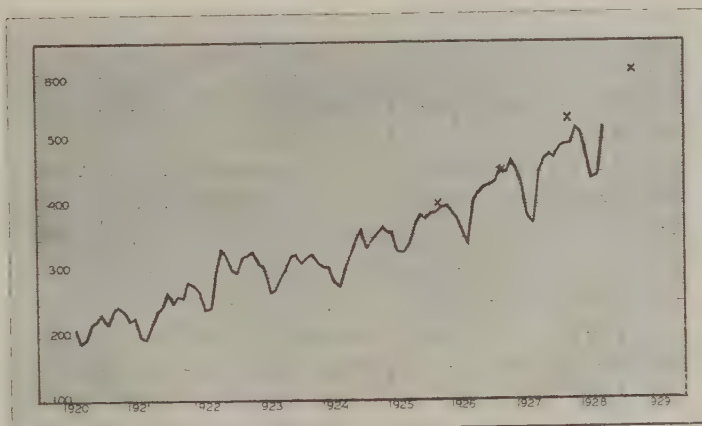
Whatever the defects of business forecasting may be, the American Telephone & Telegraph Co. has employed it since 1921, not only for charting the probable course of telephone traffic over long-distance lines, but to determine the needs for new plant and equipment caused by shifting tides in business or increases in population or general industrial expansion.

When a skyscraper rises in New York requiring several thousand new telephones, that is a matter for the local telephone company to solve, but when the Ford Motor Co. in Detroit resumed production after months of comparative idleness, there was an increase in long-distance traffic which had to be foreseen and provided for by the parent company.

Keeps Close Track of Business Developments

The curves of telephone traffic and general business conditions bear a fairly definite relation to each other, but in the opinion of the officials of the American Telephone & Telegraph Co. telephone traffic is not sufficiently sensitive to be regarded as a definite barometer of business. On the other hand, the business trend has a very definite effect on telephone traffic.

Therefore, the telephone system finds it necessary to



THE Curves of Telephone Traffic and General Business Conditions in the Country Bear a Fairly Definite Relation to Each Other. The American Telephone & Telegraph Co. applies its general business curve, together with supplementary information, to various telephone circuits, forecasting with reasonable accuracy the probable traffic over a given circuit. In the same manner its forecasts are applied to its manufacturing department and to line and plant extensions. The curve reproduced was made in the spring of 1925, and it was borne out fairly well by events.

keep very close to business developments, not only on broad general principles, but as they affect certain industries and certain sections of the country. For example, a boll weevil blight in the cotton growing sections of the South will have a decidedly unfavorable effect on telephone communication in that section. In cotton centers the traffic rises to a high point during the fall and winter, when cotton is being sold and shipped. A stiffening of rubber prices is bound to boost traffic on circuits to Akron, Ohio. Likewise, changes in the lead market quickly affect business over lines to Joplin, Mo.

The coal fields furnish examples of such transient developments. During the coal strike of 1922 there was sudden jump in traffic to points in the non-union fields, where mines were still operating, and a corresponding drop in traffic to the union fields. By the time the strike ended the shortage of coal had become acute, and for some weeks wires to both union and non-union fields were humming. When this condition in the coal supply had been remedied, the traffic fell to normal, in some cases nearly two years after the strike began.

In estimating the volume of telephone traffic, the telephone company gives consideration to three major elements: Past experience, economic factors and common sense. These elements enter into each decision in a varying degree. Not that the forecaster shows varying degrees of common sense from day to day, but in each case common sense dictates that a different weight be given to each factor.

Under ordinary circumstances, past experience has been found by the telephone company's forecasters to be a rea-

sonably reliable basis for prediction over a short period. It shows the seasonal variation and the normal growth of the traffic. The forecasting for long-distance service (which comes closest to the problem of the average manufacturer in shaping his policies) covers a period of one year, five years or greater periods, depending upon the use to which the forecasts are to be applied. The curve is projected into the period for which a prediction is desired. Suitable corrections are made for any factors which may conceivably influence telephone traffic. General business conditions throughout the country and in particular areas are taken into consideration.

Steel and Pig Iron Production Given Considerable Weight

Various business data are used by the statisticians of the telephone company. Steel ingot and pig iron production is given considerable weight, as are machine tool orders, car loadings, electric power consumption and such important indices of business trends.

Each autumn the associated operating companies of the Bell system draw up a detailed budget for the year just ahead and a somewhat less detailed but comprehensive forecast for the four succeeding years. In other words, a tentative five-year program is laid down, subject to annual revision. The budget for the year just ahead takes account not only of expected operating revenues and expenses, but also of capital needs, and goes into much detail in regard also to physical units of plant.

One of the earliest formal steps taken each year in carrying out the budget plan is the submission to executives of the Bell system of certain economic forecasts, of which the most fundamental is the forecast of general business. Each month the executives of the system receive from the statistical department a summary of business conditions, which not only reviews economic events and developments, but indicates the views of the statisticians as to the immediate future of general business. The annual forecast takes the form of a graphic projection of the general business curve. This curve, it is stated, is primarily a curve of fluctuations in industrial activity and follows fairly closely the Harvard Economic Society's curve showing the volume of manufacturing activity in the United States.

The American Telephone & Telegraph Co. does not base its forecasts on any business cycle theories; its statisticians give most weight to the most complete array of business and economic facts it is possible for them to obtain. These facts they obtain by reading and by outside contacts. By following this method they have reduced, they believe, the percentage of error. As a matter of fact, the telephone company's forecasts, which were begun in 1921, have made only one serious miscalculation, and that was for 1926. At that time the constructive elements which made 1926 such a big industrial year were underestimated and the elements which were apparently making for business recession were overestimated.

Adequate Lighting Increases Production and Decreases Accidents

THE importance of adequate lighting in the successful operation of industrial plants was emphasized by several speakers at a symposium on illumination, held jointly by the American Society of Mechanical Engineers and the Illuminating Engineering Society during the forty-ninth annual meeting of the A. S. M. E. at the Engineering Societies Building, New York, Dec. 3-7.

Adequate lighting will increase production, decrease accidents, reduce labor turnover and spoilage of work and assist in maintaining the health of employees, said C. C. Munroe and H. A. Cook, Detroit Edison Co., in their paper on "Light as a Factor in Production." An average increase of 15 per cent in output with increase in cost of lighting of approximately 2 per cent of the payroll cost was said to have followed the installation of a new lighting system in nine plants, most of which are metalworking. A saving of \$30,000 in spoilage on one operation in a large body-working plant is credited to installation of an improved lighting system.

In an adequately lighted plant the intensity is sufficient to enable the operator to perform his work with speed and accuracy. No glaring light sources are present to blind him temporarily or to produce undue eye fatigue; his vision is clear and unhampered, making efficiency possible. Spotted illumination has been eliminated, so the necessary adjustments of the eye are not as great as formerly, thus making it possible for him to work throughout the day without the strain caused by adverse conditions.

When the intensity of illumination is too low to permit quick discernment of necessary details, when glare is present due to bright light sources or reflections in the field of vision, and when the distribution of light in the working area is such that sharp contrasts of intensity are present, the lighting is inadequate.

Advocates Reserve Wiring Capacity in Installing Lighting System

Reserve wiring capacity in designing a lighting system was stressed by Ward Harrison, director of illuminating engineering, National Lamp Works of the General Electric

Co., Nela Park, Cleveland, in a paper on "Artificial Lighting Provisions in Building Design and Process Layout."

"Considerable ultimate economy will usually be effected if a certain factor of safety is provided in the wiring," he said. "That is, the copper is made heavy enough to carry a lighting load of approximately 4 watts per sq. ft., even though the immediate requirements for light may not be for more than half this amount. Obviously, also, the outlets should be spaced close enough together to provide reasonably uniform illumination over the working surface. This cannot be done by spacing them on 20-ft. centers with any ordinary ceiling height. With a 20-ft. spacing and lighting units 10 ft. above the floor (about 7½ ft. above the work) the variation in illumination between points directly under a lamp and those half-way between lamps is of the order of 4 to 1."

A graph showing the wiring installation costs per outlet, from data obtained in 11 cities, indicated that on the average the original installation expense is increased only 28 per cent when the wiring capacity is doubled, whereas to make this change after the building is completed and wired will usually much more than double the cost.

Use of 300-watt lamps on 10-ft. centers was said to be considered an excellent standard of general illumination. In discussing special lighting problems, Mr. Harrison stated that as industry becomes more established the trend will probably be toward specialized lighting for many processes. "With the present frequency of industrial changes, however, it will often be found less expensive to provide for a very high level of general illumination over the entire area, and thus avoid the necessity of varying the type and location of lighting equipment for each change of process or department location in a given plant," he said.

Another paper at this session was "Designing Buildings for Daylight," by H. H. Higbie, professor of electrical engineering, University of Michigan, Ann Arbor, Mich., and W. C. Randall, chief engineer, Detroit Steel Products Co. M. C. Huse, general sales manager, Philadelphia Electric Co., Philadelphia, and president of the Illuminating Engineering Society, presided at the symposium.

Economic Analysis of Jigs and Fixtures

Simple Formulas Developed to Help Solve Tooling Problems—Applicable Also to Punches, Dies, Special Equipment and Machine Tools

BY JOSEPH W. ROE*

THE first and most important element, which applies to all forms of work-holders, is the economic one. A certain amount of "tooling up" is an advantage wherever parts are to be produced in quantity, but how far it should go and how much capital should be tied up in special fixtures and tools depends on immediate conditions.

The question of the amount of expense justified has been handled largely on the basis of judgment. The besetting sin of the tool maker is to tie up money in fixtures which may show a heavy saving when in use, but are seldom used. A saving of 5 per cent in labor cost on a job in constant use might justify greater expense in fixtures than a saving of 90 per cent on a small job coming through only once or twice a year. Other factors besides saving in time and labor expense are involved, such as the life of the fixtures, due not only to their own wear, but to possible obsolescence of the article they make. Fixtures may be desirable even where only small quantities are involved, but the economic advantage of lower labor costs is the controlling factor unless some other consideration, such as improved interchangeability, increased accuracy, or reduction of labor trouble intervenes. Usually, where these latter reasons alone would have necessitated a fixture, it is found that the fixture lowers costs.

In the books available on work-holding devices are to be found methods of construction, much on the details, and examples of good practice in design, but almost nothing on the economics of the subject. It should be the first consideration and is usually given little thought. Few plants give to their fixtures the searching economic analysis which they apply to their power equipment. Until recently, the same has been true for materials-handling equipment; but thanks to the materials handling division of the A. S. M. E. formulas are now available, and are being increasingly used, which provide a standard basis for the economic analysis of equipment in that field and for determining the probable profit on any proposed installation for given costs and performance. These formulas take into account interest, depreciation, obsolescence, and other items of overhead which theretofore had been either neglected entirely, or had been handled differently by every one concerned. They can be used, with modifications and simplifications, for tool equipment just as well as for materials-handling equipment, and should be.

The following is a suggested adaptation of them for this use. Certain factors in the materials-handling formulas which are important in installations in that field are of less importance in dealing with fixtures or may drop out entirely. Others, such as the interest rate, taxes, etc., may

be taken as constant and brought together. This permits simplification.

With fixtures, as with other types of equipment, depreciation is made up of two factors, deterioration and obsolescence. As a rule these do not bear equally. In one case deterioration due to wear may be the chief factor. More often obsolescence due to liability of change in models or design may control. That one should be used which operates the faster.

Fixture Problem Centers on One or More of Four Items

In dealing with fixtures, the economic problem centers on answering one or more of the following questions:

1.—How many pieces must be run to pay for a fixture of given estimated cost which will show a given estimated saving in direct-labor cost per piece? For instance, how low a run must we have to justify a fixture costing \$400 which will save 3c. on the direct-labor cost of each piece?

2.—How much may a fixture cost which will show a given estimated unit saving in direct-labor cost on a given number of pieces? For instance, how much can we put into a fixture to "break even" on a run of 10,000 pieces, if the fixture can save 3c. on the direct-labor cost of each piece?

3.—How long will it take a proposed fixture, under given conditions, to pay for itself, carrying its fixed charges while so doing? For instance, how long will it take a fixture costing \$400 to pay for itself if it saves 3c. on the direct-labor cost per unit, production being at a given rate?

Questions 1, 2, and 3 assume that we just break even. There is also the very practical question: 4.—What will be the profit earned by a fixture, of a given cost, for an estimated unit saving in direct-labor cost and given output? For instance, what will be the profit on a \$200 fixture if it will save in direct-labor cost 3c. a piece on 10,900 pieces?

These questions involve something more than the simple arithmetic which seems all that is necessary for answering them, because, while the credit items for the fixtures depend mainly on the number of pieces machined, the debit items involve time, and also the number of set-ups required, i.e., whether the pieces are run off continuously or in a number of runs.

An important time element is that many companies now require that any new equipment shall pay for itself in a certain period. Investigations by the *American Machinist* and *Manufacturing Industries* show wide variation in practice as to this requirement, ranging from one to six or seven years, the longer period being used by railroad shops which have a stable class of work not liable to rapid obsolescence. The general practice seems to be about two years, but conditions even within one shop might warrant lengthening or shortening this period for different specific cases.

Proposed Formulas

The formulas reduce to the simple and workable forms found in equations [6], [7], [8], and [9] which follow, but

*Professor of industrial engineering, New York University. The article is taken from Professor Roe's paper, "Principles of Jig and Fixture Design," presented Dec. 3, at New York, before the American Society of Mechanical Engineers. The paper also includes a statement of the general principles of design and use of jigs and fixtures.

to use them correctly it is necessary to have clearly in mind the meaning of the symbols used.

Let N = number of pieces manufactured per year

Debit Factors

A = yearly percentage allowance for interest on the initial investment. (If the interest be taken on the depreciating value, this becomes, under uniform depreciation for n years,

$A \times \frac{1}{2} \frac{n+1}{n}$, the value of which decreases from A , for one year, and approaches $A/2$ as n grows large. For a life of two years this is $3A/4$, for three years it is $2A/3$. In the following formula either the original cost or the depreciating value can be used with equal facility. It is recommended, however, that one or the other basis be used uniformly to facilitate comparisons)

B = yearly percentage allowance for insurance, taxes, etc.

C = yearly percentage allowance for upkeep

$1/H$ = yearly percentage allowance for depreciation and obsolescence on the basis of uniform depreciation where H is the number of years required for amortization of investment out of earnings

E = yearly cost of power, supplies, etc., consumed, in dollars. (When the equipment under consideration is wholly new, this item appears in full. When it replaces old methods or equipment, the difference only is used. It is a debit if the E on the new equipment exceeds that on the old. It is a credit if the new E is less than the o'd. E in the formula may therefore be $+$ or $-$.) In many cases, with fixtures this item is small and may be disregarded

I = estimated cost of the equipment or fixture, i.e., cost installed and ready to run, including drafting and tool-room time, material and tool-room overhead, in dollars

K = unamortized value of the equipment displaced, less scrap value, in dollars. Note: In the case of fixtures for new work, K drops out

$YCSU$ = Yearly Cost of Set-Ups, in dollars. This should include the time required for taking down the apparatus and putting machine into normal condition. In some plants with departments large enough to employ several tool setters regularly this time can be included in the department overhead. In this case this factor disappears as a separate item.

Credit Factors

S = yearly saving in direct cost of labor, in dollars
 $= N$ (old unit labor cost, minus the new unit labor cost)
 $= N$ (saving in unit labor cost)
 $= N (SULC)$ using initials as a mnemonic symbol. This covers direct unit labor cost only

T = yearly saving in labor burden, in dollars
 $= St$ (t is the percentage used on the labor saved)
 $= N (SULC) t$

(Note: The latest form of the materials-handling formulas breaks this into T_a = burden on labor saved and T_b = burden on the equipment displaced. For use with fixtures the latter element may usually be disregarded for simplification.)

U = yearly saving or earning through increased production in dollars
 $=$ saving in unit labor cost $\times$ increased yearly production capacity

$\times$ the percentage of that increased capacity which will be utilized

$\times (1+t)$ (this cares for the burden saved)

$+$ cost of extra old equipment which would be necessary to care for the increase if the improvement were not adopted

(Note: In many cases U may drop out.)

V = yearly net operating profit, in excess of fixed charges, in dollars.

Proposed Formulas

If we just "break even" we have: The yearly operating savings = total fixed charges per year. Using the above symbols

$(S + T + U - E) - \text{Yearly Cost of Set-Ups}$

$$= I(A + B + C + 1/H) + KA$$

Since

$$S + T = N(SULC) + N(SULC) t = N(SULC) (1 + t)$$

Then

$$N(SULC) (1 + t) + U - E - (YCSU) = I(A + B + C + 1/H) + KA \dots [1]$$

To find the number of pieces required for a given cost I we have, solving for N ,

$$N = \frac{I(A + B + C + 1/H) + (YCSU) - U + E + KA}{(SULC) (1 + t)} \dots [2]$$

To find the cost I which will just earn fixed charges we have, solving equation [1] for I ,

$$I = \frac{N(SULC) (1 + t) - (YCSU) + U - E - KA}{(A + B + C + 1/H)} [3]$$

To find the net operating profit over all fixed charges we have

$$V = \text{gross operating profit, less set-ups and fixed charges} = N(SULC) (1 + t) - (YCSU) - I(A + B + C + 1/H) + U - E - KA \dots [4]$$

To find the time H in years for the fixture to just pay for itself, the net profit V in equation [4] = 0

Therefore, setting the right-hand side of equation [4] equal to 0 and solving for H , we have

$$H = \frac{I}{N(SULC) (1 + t) - (YCSU) - I(A + B + C) + U - E - KA} \dots [5]$$

In most cases it will be found that U , E , and KA may be neglected, so that equations [2], [3], [4], and [5] may be written as follows:

$$N = \frac{I(A + B + C + 1/H) + (YCSU)}{(SULC) (1 + t)} \dots [6]$$

$$I = \frac{N(SULC) (1 + t) - (YCSU)}{(A + B + C + 1/H)} \dots [7]$$

$$V = N(SULC) (1 + t) - (YCSU) - I(A + B + C + 1/H) \dots [8]$$

$$H = \frac{I}{N(SULC) (1 + t) - (YCSU) - I(A + B + C)} \dots [9]$$

To be of practical value the formulas should be as simple as possible and yet reflect the essential conditions, and should be easily applied.

Equations [6], [7], [8], and [9] meet this condition for most fixtures. They take into account the number of pieces manufactured, the saving in unit labor cost, the overhead on the labor saved, the cost and frequency of set-ups, interest on investment, taxes, insurance, upkeep, and depreciation. The fuller formulas, equations [2], [3], [4], and [5], take into account, in addition to the above, the value of increased production capacity, cost of supplies and extra power, and interest on equipment displaced, if it is deemed that conditions require their consideration. These may be used for the more elaborate fixtures and for analyzing the purchase or building of machine tools.

In using the formulas it must be remembered that N is the number of pieces manufactured in a year, not per run, except for the case of a single run of less than one year's duration.

The items A , B , and C , once settled upon, need change little. If the plant has the practice of requiring new equipment to pay for itself in a definite time H , say two years, the depreciation $1/H$ may be added to the other carrying

charges, making a single percentage factor for the term $(A + B + C + 1/H)$ which can be used until the management deems that changed conditions require modification.

Examples of Economic Analysis of a Fixture

To illustrate economic analysis of a fixture by the use of these formulas, assume the following data:

Estimated unit saving in direct-labor cost	= 3c.
Burden on labor saved	= 50 per cent
Estimated cost of each set-up	= \$10
A	= 6 per cent
B	= 4 per cent
C	= 10 per cent
H	= 2 years
1/H	= 50 per cent
$A + B + C + 1/H$	= 70 per cent

If $I = \$400$, to find the number of pieces to be put through each year in one run per year, we have from equation [6]

$$N = \frac{\$400 \times 0.70 + \$10}{\$0.03 \times 1.5} = 6450 \text{ pieces}$$

That is, if a \$400 fixture is to pay for itself in two years and carry overhead, with a single run per year 6450 pieces must be put through each year.

If, instead, the pieces are put through in six runs per year, then

$$N = \frac{\$400 \times 0.70 + \$60}{\$0.045} = 7550 \text{ pieces}$$

That is, more pieces must be run per year, due obviously to the increased number of set-ups.

There is of course a breaking point where it pays to have multiple runs, even at a higher production cost per piece, due to the balancing of production costs and fixed charges on increased inventory. Formulas are available elsewhere for determining this economic length of run.

Suppose the fixture is to pay for itself in a single run, how large must that run be?

In this case H is unity, as the fixture must pay for itself within the year, and $A + B + C + 1/H = 6\% + 4\% + 10\% + 100\% = 120\%$ then

$$N = \frac{\$400 \times 1.20 + \$10}{\$0.045} = 10,900 \text{ pieces}$$

This says that a smaller *total* output is required than when 6450 pieces are called for, for *two* years, or 12,900, due to one less set-up and carrying the overhead for only one year instead of two.

It will be noted that this assumes the full-year values for A , B , and C . If the run is short and it is felt that this is too drastic, the values could be cut down in the proportion of the actual running time to one year. It would be

safer and therefore good practice to use the yearly rates, as the time for the complete turnover of the money going into the fixture is hard to determine and certainly is longer than the mere run itself. The cost of short-lived equipment should be extinguished as soon as possible.

Reversing the above assumptions, how much money could we put into a fixture for a single run of 10,900 pieces at an estimated saving of 3c. per piece? From equation [7]

$$I = \frac{10,900 \times \$0.045 - \$10}{1.20} = \$400$$

Similarly, if we want 7550 pieces a year in six runs per year, and want the fixture to pay for itself in two years, we have from equation [7]

$$I = \frac{7550 \times \$0.045 - \$60}{0.70} = \$400 \dots \dots [10]$$

If we want to know the reverse of this, namely how long a time it would take a \$400 fixture to pay for itself, we have from equation [9]

$$H = \frac{\$400}{7550 \times \$0.045 - \$60 - \$400 \times 0.20} = 2 \text{ years}$$

From equation [10] we see that we would "break even" with a cost of \$400. Suppose now we can design a fixture for the same conditions which would cost \$250 instead of \$400 what will be the *profit*? Using equation [8] we have, for 7550 pieces per year in six runs per year

$V = 7550 \times \$0.045 - \$60 - \$250 \times 0.70 = \105 per year
For a *single* run of 10,900 pieces the profit would be

$$V = 10,900 \times \$0.045 - \$10 - \$250 \times 1.20 = \$180.50$$

Formulas [3] and [7] may be used to help in deciding between two fixtures of different degrees of refinement for the same job. For instance: For a single run of 2000 pieces, under the above conditions, how much can we afford to put

- (a) Into a fixture if it will save 3 cents per unit, with a set-up cost of \$10 or
- (b) Into a more refined fixture which will save 5 cents per unit, with a set-up cost of \$15

We have from equation [7]

$$\text{For (a) } I_a = \frac{2000 \times \$0.03 \times 1.5 - \$10}{1.20} = \$66.66$$

$$\text{For (b) } I_b = \frac{2000 \times \$0.05 \times 1.5 - \$15}{1.20} = \$112.50$$

Obviously also the same formula may be used to compare the amounts which might be put into fixtures for different lengths of run.

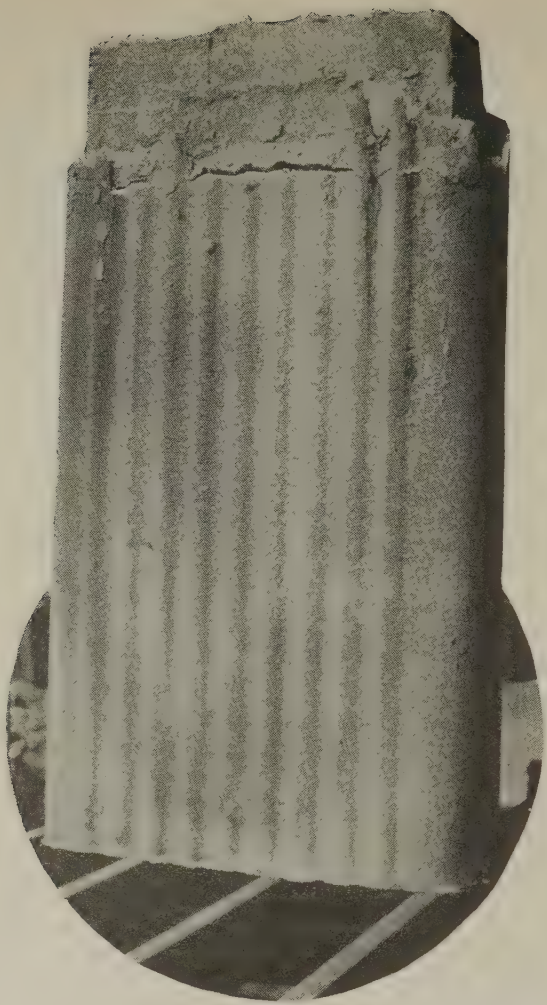
The above examples show how the formulas proposed may help in deciding tooling-up problems as they arise. They apply not only to jigs and fixtures but to punches and dies, special tool equipment, and, in the fuller forms, to proposed machine tools.

Nickel-Chromium Resistance Wires

A STUDY of nickel-chromium alloys, containing up to 60 per cent chromium, with or without tungsten or molybdenum up to 20 per cent has been made by C. J. Smithells, S. V. Williams, and J. W. Avery, and reported to the (British) Institute of Metals. They are solid solution alloys up to the following approximate limits: 45 Cr, 55 Ni; 20 Cr, 70 Ni, 10 W or Mo; 10 Cr, 75 Ni, 15 W or Mo. With more chromium in the binary alloy, or more tungsten or molybdenum in the ternary alloy, a second phase causes it to become unsuitable for resistance wire.

Alloys were made of mixed powders, melted in a tube furnace under hydrogen in a magnesia boat; double melting gave sound ingots. Solid solution alloys could be readily rolled, swaged or drawn to 0.375-mm. wire.

Relative merit was determined by electrically heating a short coil to 1100 deg. C., and noting the life in still air. It was found that at least 20 per cent chromium in the alloy was necessary, that the scale produced on the surface should be adherent and protective. The best life under continuous heating was given by the 20:70:10 Cr:Ni:W alloy; the best for intermittent heating by the corresponding analysis with molybdenum. It was also found that alloys made with electrolytic nickel were markedly superior to those made with reduced nickel, or to commercial resistance wires of the same nominal composition. Data are contained in the paper on the electrical resistivity of the wires, and on the variation of this property with changes in temperature.



Making Large Plates of Alloy Steel

Avoid Splashing During Teeming and Chilling During Stripping—Chipped Slabs Are Cleaned of Scale in Rolling Process

AT the Montreal Meeting of the American Society for Steel Treating the physical properties of the 3-per cent nickel steel plate used for locomotive boilers by the Canadian Pacific Railroad were described (see *THE IRON AGE*, Feb. 23, page 536). The manufacture of such plates was discussed by Charles McKnight and W. G. Humpton,* before the American Society of Mechanical Engineers, Chicago, Nov. 14. Their paper deals with steels having nickel between 2 and 3 per cent without other alloying elements, manufactured into large plates between $\frac{1}{4}$ and $1\frac{1}{2}$ in. thick. In general, however, the practice is applicable to other alloy steels and other sizes.

Manufacture of Steel

During melting it is only necessary to use ordinary precautions to insure a good sound steel. Nickel is introduced by nickel steel scrap, and by adding metallic nickel. It is not oxidized during the heat. Either the acid or basic process may be used. The open-hearth furnaces themselves are conventional in every respect, of from 50 to 100 tons capacity, fired with oil or gas.

First and most important is the killing of the steel, since blowholes in the ingot do not weld up satisfactorily. This is accomplished by the addition of silicon, manganese and aluminum to the bath or ladle.

Ingot Practice Exact

Utmost care and minutest precautions during casting are amply repaid in fewer defects and less rejections. An ingot of satisfactory size for plates is 48 in. x 21 in. x 19,000 lb. with a hot-top. About 3000 lb. of metal will be cropped from the top.

Aside from the hot-top, the design of the mold (taper, wall-thickness and proportions) is most important. A mold

*Metallurgists International Nickel Co. and Lukens Steel Co. respectively.

with fluted walls, making the ingot shown, gives excellent results.

The greatest number of rejections after rolling are due to imperfections originally in the ingot surface. Consequently the greatest care is necessary in pouring to avoid such defects as splashes, laps, stop-pours and mold-pulls. Bottom-pouring is thought by some to result in a superior ingot surface, but it has at least two objections. First is the complication of setting up bottom-plates and runners and later cutting away these sprues. Second, refractory material is often cut loose from the runners by the stream of molten steel. Such an inclusion in an ingot is often more serious than the minor surface defects the process is supposed to eliminate.

Therefore, while bottom-pouring has been largely employed on deck-plate armor of this analysis, the recent trend is toward top-pouring with due care to avoid splashes. One scheme is to place a stove pipe of blue annealed steel in the center of the mold before pouring. This catches the splash, and melts quickly in the rising metal.

Mold washes are also employed by some, either the simple tar smoke coating, a tar or lime wash, or a wash containing flake aluminum. The latter has the added advantage of eliminating any small surface blowholes through chemical action.

Stripping and Reheating

As soon as it solidifies throughout it should be stripped from the mold. This should be done in the soaking pit building where the tender outside surface will be protected from chilled air, and it can be placed immediately in a pit. The latter should remain approximately at the temperature of the ingot for an hour or more, to equalize the hot interior and the cold exterior of the metal. Then the pit should be gradually heated to 2150 deg. Fahr. with a smoky flame. If the ingot gets too hot or an oxidizing flame is used, the original scale on the ingot will fall off and it will be extremely difficult to clean the plate during rolling of the second scale which forms.

An ingot of nickel steel should not be allowed to become cold until after some work has been done on it.

Rolling and Cleaning

It is essential to clean the plate during rolling. This is best accomplished by high-pressure water, salt and old burlap soaked in brine. The water is directed from a series of jets at the surface of the plate as it passes through the rolls; the salt is applied at any time during the rolling and quite generously during the last few passes, while the brine-

soaked burlap is thrown by men, especially stationed for that purpose, in such a way as to hit the spots which need cleaning just as the rolls strike them. Care and attention are productive of better results than the choice of cleaning materials.

Such methods, used for many years in the production of protective deck-plate, have the defect of cleaning only the top surface. The Lukens company uses the very simple device shown to turn the plate over on the tables during rolling, whereby both top and bottom surfaces may be observed and cleaned.

The process of rolling at the plant just mentioned is as follows: The heated ingot is first given one or two passes in a longitudinal direction to "sadden" the ingot. It is then cross-rolled for width. When the ingot is reduced about half in thickness and to a size suitable for reheating, it is cooled and inspected. It is then chipped with pneumatic chisels to remove serious surface defects, although often the entire top and bottom surface is planed off—an expensive treatment which is frequently justified.

Cleaned slabs are then carefully reheated and finish-rolled on a four-high reversing mill. When the plate has been subjected to the heavier drafts and after the top surface has been cleaned by the use of burlap and salt, as above described, it is turned over so the bottom surface can be cleaned while rolling is completed.

Flattening and Heat Treating

Since alloy steel plate hardens when cooled rapidly from the last pass, the quenching effect of the flattening rolls makes important changes in the tensile properties of the cold metal.

Generally speaking, the best combination of physical properties in nickel steel plate is obtained if it is finished at a good red heat (1450 to 1500 deg. Fahr.) and allowed to cool slowly through the critical range on the cooling bed by piling one plate on top of another or by taking them off the beds, piling and covering with sand. Restraightening is done later.

There is a growing conviction among users that plates,



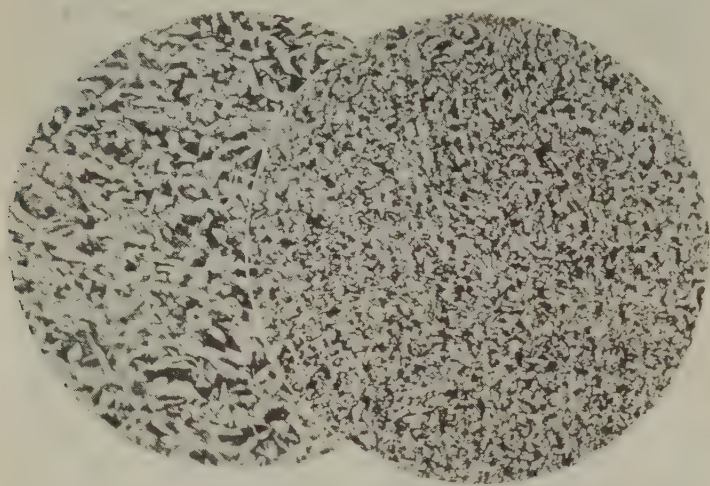
Cradle Engaged in Turning Slab, to Clean Under Side

even of carbon steel, may be more safely and efficiently used if normalized prior to use. It is not known that this heat treatment is being given, except sporadically, by any mill, but the authors believe that sooner or later all plants will be equipped with furnaces sufficiently large to heat-



*Box Pouring
Ingots in Pairs,
Using Stove Pipe
to Control Splash*

treat all plates. While both the manufacturers and users of alloy steel plate will be benefited by such practice, it is more of a refinement than a necessity. It is of interest to note that nickel steel plates for the latest locomotives were ordered normalized after rolling.



Micro Structure of 3 Per Cent Nickel Steel Boiler Sheet, 273 x 145 x 13/16 In. 100 diameters. As rolled and after being normalized

Defects an inspector looks for are "snakes," pits and embedded scale. "Snakes" (long, wavy surface seams of slight depth) are the hardest to control. Careless pouring and stripping seem to cause most of them.

When they occur, they must be ground out. This prac-

tice has been permitted by the United States Navy for a number of years, but it is unacceptable to some purchasers of boiler plate. If the snakes are not too long, an abrasive wheel may be used of diameter sufficiently great so the trough ground out will have no sharp corners. To be sure the defect is removed, the clean ground surface should be etched with a 50-per cent solution of hydrochloric acid. If no trace of the seam remains after this treatment and the plate is not reduced in thickness beyond permissible limits, it should be considered good delivery.

Testing

Killed steel is very uniform and shows little difference in the tensile tests taken from the top or bottom; the transverse strength and the longitudinal strength are also about the same. "Open" steel, however, which, from its nature, is a segregating steel, will show considerable variations in these positions. By the same token, the variation in analysis in different parts of the plate or ingot of killed alloy steel is much less than in ordinary carbon steel.

Microscopic examination is rarely called for by the purchaser. The main defects which show up under such examination are laminations and large grain. The latter is due to high finishing temperatures and is not important if the steel successfully passes the tensile and bend tests.

Laminations are of two kinds. The first is due to a segregation of the pearlite and ferrite constituents of the steel into layers; this is quite common in all plates, and is probably due to more rolling in one direction than in another. It is rarely a serious defect. The other is an actual separation of the metal and is usually caused by incomplete cropping of the plate, so that a portion of the pipe remains.

What Will Carbide Tools Do to Machine Tool Design?

DR. S. L. HOYT, research laboratory General Electric Co., presented a short paper entitled, "Carboloy and Tungsten Carbide Tools," before the American Society of Mechanical Engineers. It is supplemental to a similar one before the Steel Treathers' Philadelphia meeting (see *THE IRON AGE*, Oct. 18, page 959). It will be remembered that Carboloy is an excessively hard composition made by mixing about four parts powdered tungsten carbide with one part cobalt, pressing to shape, and sintering in a vacuum furnace. It is used as an inset at the cutting edge of the tool; the joint is made by "coppering" the bit into a slot milled into a nickel steel shank. (The process is described in *THE IRON AGE*, May 10, page 1305.)

Grinding is done by a light pressure on a dry carborundum wheel; limits of half a mil may be had by lapping with boron carbide powder. Such lapping is necessary to make keen edged tools for finishing cuts.

Most of the tools made so far have been used on such non-metallic abrasive materials as indicated by the following: On Bakelite, Dr. Hoyt says, it does 70 times the work of high-speed steel before regrinding is necessary. In turning soft porcelain insulators the Carboloy lasts indefinitely, and it has changed this work from a hand job to a machine. On fiber the best speed for surface finish is too high for satisfactory endurance of high-speed steel, but easily within the ability of the new tools.

Working on metals it satisfactorily cuts tough aluminum bronzes, and hard manganese steel castings. On ordinary machine steel, plain or alloy, it is most useful on such work as can be cut with light feeds at a very high speed—in other words, under conditions which put moderate pressures on the somewhat fragile tool.

Most of the discussion on the paper was based on the premise that the carbide tool materials would supplant high-speed steel in such machine work as is now done on

steels and cast iron. E. F. DuBrul, general manager National Machine Tool Builders Association, Cincinnati, said that an extensive fundamental research should be immediately organized if we are to determine the limiting capabilities of carbide tools, so that machine tool builders could have the necessary data wherewith to design equipment powerful and fast enough. Even though such an investigation would cost several hundred thousand dollars, this figure would be much less than the total cost of reaching the same point by a number of intermediate designs. Furthermore since the users of the new equipment would be the chief beneficiaries, they should be expected to underwrite the bulk of the investigation.

A. L. De Leeuw, consulting engineer, New York, however, was doubtful whether the present type of lathe or boring machine could ever be speeded up to the limit of the new tool. He therefore visualized an entirely different type of machine, where the work moved with moderate speed, but a well balanced tool holder, with multiple cutters, moved at extremely high speed. The forerunner of such equipment is now the grinder, but in this tool the cutters are of haphazard shape and setting, so that only a minute proportion of the cutting grains work efficiently.

Taking a more conservative view, E. J. Kearney, secretary Kearney & Trecker Corporation, Milwaukee, pointed out that the high speeds available with carbide tools are useful only to firms which have acute problems of mass production. Since such problems are now solved by installing special machine tools, it will require no undue waste to build others for the new tools with proper speed, power and rigidity. On the other hand, there will always be a large use for machines using high-speed steel at slower speeds, and for universal machines, just as there are now still in use in jobbing shops thousands of lathes dating back to the last century, before high speed was developed.

Introducing an Incentive Plan

Care Must Be Taken to Gear Up Plant and Personnel to New Wage Method—How the Dyer System Works

BY PHILLIP H. CONE*

A WAGE incentive system of the Dyer type, wherein the total number of minutes of every employee's time is accounted for, is a vehicle of tremendous possibilities in obtaining efficiency and in reducing costs in manufacturing plants. It can be likened to a good automobile providing transportation with advantages that cannot be obtained in any other way. But the mechanism of the automobile must be thoroughly understood and it must be intelligently handled. So it is with the incentive system. It will take a shop from one degree of efficiency to a higher degree in various intervals of time according to the understanding and ability used in operating it. It is not an automatic cure-all or self-energizing instrument, but a high-speed tool, which, to attain maximum results, requires the proper amount of power and feed behind it. Indeed, during and after installation, the management alone can furnish this power and feed.

How to Overcome the Resistance of Workmen

When a wage incentive system is installed in a plant, the management must remember that any new method is resisted throughout a shop until it has been proved beneficial, and when it affects the pay check of the men the resistance is greatly increased. With this fact in mind, the management must first sell the supervisory organization, namely the superintendent and foremen, because their full cooperation is vital if the best results are to be obtained. Incidentally, the management can go much further than anyone else in selling the incentive plan and moreover, it is not reasonable to expect the incentive engineer to carry the burden of selling the plan singlehanded to everyone in the plant in addition to setting up its application.

When the wage incentive plan is being installed in a department, the management, by spending from one-half to one hour a day on the problem, can inform itself as to how the setup is being made. By so doing it is in a position, when the plan is put into operation, wherein it is convinced of the fairness of the setup and therefore can intelligently stand behind it.

Success of Plan May Require Changes in Processes

Various problems come up while the time study is being made. The duties of the workers, for example, may have to be rearranged in order that each man has a sufficient amount of work to permit him to produce standard performance, or again some manufacturing process may be changed to advantage. In such cases the daily contact of management results in the changes being accomplished expeditiously. The management must drive home to the employees the fact that the incentive department is and always will be fair and impartial toward both the company and the men in the ranks. Furthermore, it is necessary to see that the incentive department always maintains this characteristic as one of the vital elements of its work and

that as time goes on its fairness and precision merit additional confidence and trust.

When the time studies were completed and checked at our plant, we called together the workmen of the department in which the plan was to be applied the following day and explained to them its function, assuring them of its fairness and asking their cooperation. Incidentally, from the first day the plan becomes effective the immediate problem is to get the department efficiency to the point where the men earn a premium. To accomplish this is needed at various times leadership, some joshing, perhaps some driving and, above all, confident assurance. But these elements cannot best be used unless there is intelligent understanding on the part of the management. However, when the men once get a taste of extra earnings, the department is "over the top" and the management can count on their sincere cooperation.

Program Stresses Common Interests of Management and Men

Application of the program just described results in certain definite benefits. The management gets a new and detailed picture of what is going on in the plant. Furthermore, the combined effort of the management and of the shop organization in setting the plan into action gives each a better appreciation of the common good of the plant. Too often the shop doesn't appreciate the viewpoint of the management and the management in turn does not appreciate the troubles of the men on the firing line. Moreover, during the process of making time studies the qualities of workmanship must be thoroughly considered in order that the amount of work necessary for a job may be determined. The qualities of workmanship too often vary to the detriment of the product, and the establishment of a standard in such a situation is of great value. In addition, the management sets an example by intelligently understanding the work and as a result the whole organization keeps step and is prepared to go on with the job after the installation has been made.

In the Dyer system the common denominator, or "unit," is the amount of work that an average man working at an average rate of speed will do in one minute. The workman is paid a premium for all units produced over and above standard performance, which is 60 units for every 60 min. of work. The premium is computed by calculating the total units produced during the day against the total minutes of time the workman spends in the department. Credit is allowed the workman for loss of time not under his control. The foreman is paid a premium based on the efficiency of the men in his department, modified by the loss of time occurring therein and by excessive expense over and above a standard that is set up on this item.

All of Workman's Time Accounted For

Production is tabulated by checkers spending full time in the department to which they are assigned. They also tabulate all delays and waste time. If a checker is encouraged to observe and learn operating methods, he becomes

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not only a valuable assistant to the foreman by advising him immediately of conditions which should be corrected, but also the future foreman in training.

The control sheet is a cumulative weekly record for each department showing the total units produced. It accounts for every minute expended by every man in the department during the week and expresses the cost of time in terms of productive labor, non-productive labor and waste labor per 1000 units produced. It also shows the average efficiency of the workmen. At the top of the control sheet in a line known as the "reference period" is the efficiency of the department before the application of the system. Study of the sheet each week gives a picture of the current results accomplished and the comparison of the weekly record with the reference period tells how much money is being saved.

Study of Records Leads Way to Increased Efficiency

On a separate form just under the control sheet is the work sheet, which amplifies the data on the control sheet. Study of it reveals the reason why a large amount of work must be done in the future to arrive at a still higher rate of efficiency. Some of the factors retarding the development of further savings may be lack of sufficient equipment, absence of a maintenance system which would obviate the necessity of men standing idle while equipment is repaired, use of a productive workman's time to get material or to do some other non-producing task and the tardiness of departments in delivering materials to the main assembly departments.

Through the establishment of a wage incentive system, provided that the management creates and leads in a desire for progress, it is possible to transform an organization hitherto working in a habitual routine into a thinking organization. To place a definite value on the change-over is hardly possible, but its worth can be appreciated. Briefly, the principal beneficial effects can be summarized as follows:

1. Management becomes familiar with important details generally overlooked.
2. The viewpoints of the management and of the shop organization are blended for the common good and better cooperation results.
3. The workmen earn increased wages.
4. Foremen or supervisors earn larger salaries.
5. The training which the checker gets makes him the potential foreman for future needs.
6. A fixed standard of workmanship is established, resulting in a more uniform product.
7. A guide and control for efficiency becomes the tool of the whole organization.
8. Waste becomes the common foe of all.
9. The true value of time is appreciated.
10. An organization heretofore leveled off by routine becomes a thinking organization.
11. New production methods are developed.
12. Constant progress is made toward higher efficiency.
13. The company earns greater profits.

Safety Not Entirely a Mechanical Matter

Human Element Looms Large and May Defeat Best Outfit of Safety Devices Ever Installed

BY JOHN H. WATSON, JR.*

IT is not an easy task to obtain satisfactory results in industrial accident prevention. A large proportion of employees, as well as of other individuals, are naturally habitually careless. Because injury is not sure to result from carelessness, they almost entirely discount the possibility of injury resulting therefrom. They often avoid the use of safety devices furnished them for their own protection, if to use them means a little extra work or trouble. Many of them are even inclined to resent the attempts of the employer to make them utilize safety methods for their own protection.

Even if the safety men be never so hard working, never so zealous, in their crusade for safety, they cannot obtain the desired results without the organized cooperation of the plant superintendents, the foremen and sub-foremen, and the big bulk of the workmen. It is a real problem, how to obtain such cooperation. The safety men must have and use rare tact and good sense in their dealings with the plant managers and men; and right here is where the officers of the company should do their part toward the accomplishment of the safety program. They should support their safety men in all reasonable demands which tend to secure safety, and they should let the whole plant organization know that they stand squarely behind the safety men in such reasonable demands.

Large Drop in Lost-Time Cases

Our industrial accidents have shown a steady decrease since we embarked on a safety crusade. Our lost-time accidents in 1924 amounted to 430; in 1925, to 345; in 1926,

to 174; in 1927, to 46; in the first 10 months of 1928, to 20, although during most of the 10 months we have been operating nearly to capacity. Our blast furnaces have a record of operating 449 days in a stretch without a single lost-time accident. Our open-hearth department has a record of operating 401 days in a stretch without a single lost-time accident. Once in a while, but not often, our entire plant will operate for a month without a single lost-time accident. It did so in October of this year, and there had been no lost-time accident in November up to Nov. 15, making a period of at least 45 days without a single lost-time accident in the entire plant.

Our safety organization, which has been worked out by Dr. R. C. Engel and which I believe to be efficient, is as follows:

The active safety organization consists of a safety inspector from each plant department, appointed from the assistant superintendents and general foremen, and numbering 14 in all, with Dr. Engel at their head. This group meets weekly. At these meetings reports of accidents are presented, investigation is made of the circumstances attending them, and ways and means of preventing similar accidents in the future are discussed. New ideas with reference to safety equipment and safety methods are presented to and discussed at these meetings. Heating, ventilating, lighting and sanitation problems pertaining to the plant are brought before the meetings. In these discussions every safety inspector takes an active part.

General Committee Examines Devices

A general safety committee, consisting of the superintendent of the blast furnaces, the superintendent of the

*President Corrigan, McKinney Steel Co., Cleveland. This is abstract of a paper read before the All-Ohio Safety Congress.

coke plant, one of the superintendents representing the steel plant and the company's chief engineer, together with Dr. Engel, who acts as chairman, meets once a month. All questions relating to safety devices are brought before this committee for thorough investigation and decision. It is a rule that all safety matters brought before this committee must have an expression of opinion from the proper department superintendent, before any action is taken. The general safety committee recommendations with regard to safety devices are forwarded to the management for the necessary authorization. Through the foregoing procedure, every department superintendent in the plant is made thoroughly conversant with all safety suggestions pertaining to his department and with the cost attendant upon the installation of safety devices.

Safety meetings are held in each department of the plant at least once a month. These meetings are attended by all assistant superintendents and foremen and are presided over by the superintendent of the department.

Functions of the Service Department

Dr. Engel's department, called the service department, sends a weekly safety report to the plant superintendents, safety inspectors and foremen, showing the safety standing

of all departments in the plant, thus creating a friendly competition between departments. The service department investigates near lost-time accidents, and studies ways and means of preventing similar accidents. It issues to each superintendent and safety inspector a daily report of all accidents which have occurred in their departments, and brings to the attention of the superintendent reports of safety violations or unsafe practices in his department.

Through the safety inspectors, the service department makes a general safety inspection of the entire plant. Through its employment bureau, it instructs all new employees as to safety methods and safe practices, and uses a follow-up system through personal contact, until the new employee becomes thoroughly familiar with his job.

Through the safety organization which I have outlined, and the active co-operation of the whole plant organization, we have been able to obtain progressively favorable results, as I have already indicated. We hope to make further progress. We may attain practically 100 per cent of perfection in the matter of safety devices, but human frailty does not permit a 100 per cent control of the human element. We believe that we have not yet reduced our accidents to the irreducible minimum, and we hope next year to better this year's record.

Productivity and Markets Intimately Related

Mass Production Economical Only When An Unhampered Market Is Available—Finding Such Markets the Task for Managers

AT a meeting of the British Association for the Advancement of Science, held recently in Glasgow, Scotland, Prof. Allyn A. Young presented an address on "Increasing Returns and Economic Progress." As Professor Young, the president of the section on economic science and statistics, is an American (formerly on the Harvard faculty but now teaching at London University), his comparisons of business conditions as they exist in America and in England were widely quoted. In his opinion the growth of markets has been one of the prime factors in industrial progress for more than a century, and its influence is no less clear in years since the war when "mass production" and "rationalization" have been the catch-words. Extracts from the address follow:

It appears to be generally agreed that Adam Smith, when he suggested that the division of labor leads to inventions because workmen engaged in specialized routine operations come to see better ways of accomplishing the same results, missed the main point. The important thing in the division of labor is that a group of complex processes is transformed into a succession of simpler processes, some of which lend themselves to the use of machinery. In the use of machinery and the adoption of indirect processes there is a further division of labor, the economies of which are again limited by the extent of the market. It would be wasteful to make a hammer to drive a single nail; it would be better to use whatever awkward implement lies conveniently at hand. It would be wasteful to furnish a factory with an elaborate equipment of specially constructed jigs, gages, lathes, drills, presses and conveyors to build a hundred automobiles; it would be better to rely mostly upon tools and machines of standard types, so as to make a relatively larger use of directly applied and a relatively smaller use of indirectly applied labor. Mr. Ford's methods would be absurdly uneconomical if his output were very small and would be unprofitable even if his output were what many other manufacturers of automobiles would call large.

Then, of course, there are economies of what might be called a secondary order. How far it pays to go in equipping factories with special appliances for making hammers or for

constructing specialized machinery for use in making different parts of automobiles depends again upon how many nails are to be driven and how many automobiles can be sold. If the benefits and the costs of using such appliances are spread over a relatively large volume of final products, their technical effectiveness is a larger factor in determining whether it is profitable to use them than any difference which producing them on a large or a small scale would commonly make in their costs. In other instances the demand for productive appliances is more elastic, and beyond a certain level of costs, demand may fail completely. In such circumstances secondary economies may become highly important.

Doubtless, much of what I have said has been familiar and even elementary. I shall venture, nevertheless, to put further stress upon two points. The first point is that the principal economies which manifest themselves in increasing returns are the economies of capitalistic or roundabout methods of production.

Mass Production May Easily Become Wasteful

THE second point is that the economies of roundabout methods, even more than the economies of other forms of the division of labor, depend upon the extent of the market—and that, of course, is why we discuss them under the head of increasing returns. It would hardly be necessary to stress this point, if it were not that the economies of large-scale operations and of "mass production" are often referred to as though they could be had for the taking, by means of a "rational" reorganization of industry. Now I grant that at any given time routine and inertia play a very large part in the organization and conduct of industrial operations. Real leadership is no more common in industrial than in other pursuits. New catch-words or slogans like "mass production" and "rationalization" may operate as stimuli; they may rouse men from routine and lead them to scrutinize again the organization and processes of industry and to try to discover particular ways in which they can be bettered. For example, no one can doubt that there are genuine economies to be achieved in the way of "simplification and standardization," or that the securing of these economies requires that certain deeply rooted competitive

wastes be extirpated. This last requires a definite concerted effort—precisely the kind of thing which ordinary competitive motives are often powerless to effect, but which might come more easily as the response to the dissemination of a new idea.

There is a danger, however, that we shall expect too much from these "rational" industrial reforms. Pressed beyond a certain point they become the reverse of rational. I have naturally been interested in British opinions respecting the reasons for the relatively high productivity (per laborer or per hour of labor) of representative American industries. Those who hold that American industry is managed better, that its leaders study its problems more intelligently and plan more courageously and more wisely, can cite no facts in support of their opinion save the differences in the results achieved. Allowing for the circumstance that British industry, as a whole, has proved to be rather badly adjusted to the new post-war economic situation, I know of no facts which prove or even indicate that British industry, seen against the background of its own problems and its own possibilities, is less efficiently organized or less ably directed than American industry or the industry of any other country.

Power-Driven Machinery Requires Scarce Labor

SOMETIMES the fact that the average American laborer works with the help of a larger supply of power-driven, labor-saving machinery than the laborer of other countries is cited as evidence of the superior intelligence of the average American employer. But this will not do, for, as every economist knows, the greater the degree in which labor is productive or scarce—the words have the same meaning—the greater is the relative economy of using it in such indirect or roundabout ways as are technically advantageous, even though such procedure calls for larger advances of capital than simpler methods do.

It is encouraging to find that a fairly large number of commentators upon the volume of the American industrial product and the scale of American industrial organization have come to surmise that the extent of the American domestic market, unimpeded by tariff barriers at the State boundaries, may have something to do with the matter. This opinion seems even to be forced upon thoughtful observers by the general character of the facts, whether or no the observers think in terms of the economists' conception of increasing returns. In certain industries, although by no means in all, productive methods are economical and profitable in America which would not be profitable elsewhere. The importance of coal and iron and other natural resources needs no comment. Taking a country's economic endowment as given, however, the most important single factor in determining the effectiveness of its industry appears to be the size of the market. But just what consti-

tutes a large market? Not area or population alone, but buying power, the capacity to absorb a large annual output of goods. This trite observation, however, at once suggests another equally trite, namely, that capacity to buy depends upon capacity to produce. In an inclusive view, considering the market not as an outlet for the products of a particular industry, and therefore external to that industry, but as the outlet for goods in general, the size of the market is determined and defined by the volume of production. If this statement needs any qualification, it is that the conception of a market in this inclusive sense—an aggregate of productive activities tied together by trade—carries with it the notion that there must be some sort of balance, that different productive activities must be proportioned one to another.

Expanding Markets Important for Centuries

IT is dangerous to assign to any single factor the leading role in that continuing economic revolution which has taken the modern world so far away from the world of a few hundred years ago. But is there any other factor which has a better claim to that role than the persisting search for markets? No other hypothesis so well unites economic history and economic theory. The industrial revolution of the eighteenth century has come to be generally regarded, not as a cataclysm brought about by certain inspired improvements in industrial technique, but as a series of changes related in an orderly way to prior changes in industrial organization and to the enlargement of markets. It is sometimes said, however, that while in the Middle Ages and in the early modern period industry was the servant of commerce, since the rise of "industrial capitalism" the relation has been reversed, commerce being now merely an agent of industry. If this means that the finding of markets is one of the tasks of modern industry it is true. If it means that industry imposes its will upon the market, that whereas formerly the things which were produced were the things which could be sold, now the things which have to be sold are the things that are produced, it is not true.

The great change, I imagine, is in the new importance which the potential market has in the planning and management of large industries. The search for markets is not a matter of disposing of a surplus product, but of finding an outlet for a potential product. Nor is it wholly a matter of multiplying profits by multiplying sales; it is partly a matter of augmenting profits by reducing costs.

Although the initial displacement may be considerable and the repercussions upon particular industrials unfavorable, the enlarging of the market for any one commodity, produced under conditions of increasing returns, generally has the net effect of enlarging the market for other commodities.

EXHIBITION HALL of the German Machine Tool Builders' Association at the Leipzig Trade Fair, Which Is to Be Held at Leipzig, Germany, March 3 to 13, 1929. This building has about 225,000 sq. ft. of floor space and is served by railroad spurs and three large overhead cranes. Machines of a wide variety of sizes and capacities will be shown, most of them under power. The display of machinery, iron and steel and building materials at the fair will include some 2000 exhibits. Twenty-four countries, including the United States, will show products. American offices of the Leipzig Trade Fair are at 11 West Forty-second Street, New York



Pure Manganese Makes Interesting Alloys

British and Americans Prepare 99.99 Per Cent Metal—Carbon-Free Alloys Much Tougher Than the Corresponding Low-Carbon Manganese Steels

IN a research into the alloys of iron and manganese under way at the Bureau of Metallurgical Research, Carnegie Institute of Technology, Pittsburgh, manganese metal and iron-manganese alloys of unusual purity have been prepared. Manganese steels are, of course, well known, but in commercial castings the higher the manganese the higher is the carbon. To ascertain whether other valuable alloys existed in the range between 1 and 20 per cent it was necessary to provide some manganese metal of unusual purity.

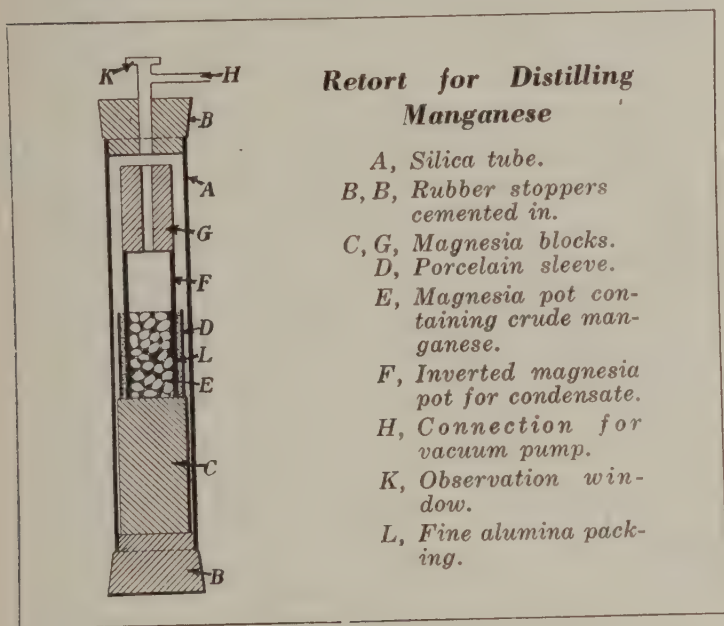
Commercial metal, produced by electric furnace proc-

to sublime is the purest, samples analyzing *nil* for silicon, aluminum, iron and phosphorus, a trace of sulphur, and 0.003 to 0.012 of nitrogen. Typical analyses of samples secured in this manner by Miss Gayler are as follows:

Silicon	0.002 to 0.044	per cent
Aluminum	Trace to 0.035	
Iron	0.003 to 0.067	
Sulphur	Trace to 0.032	
Phosphorus	Under 0.001 to 0.005	
Nitrogen	0.003 to 0.012	
Manganese	99.991 to 99.8	(by difference)

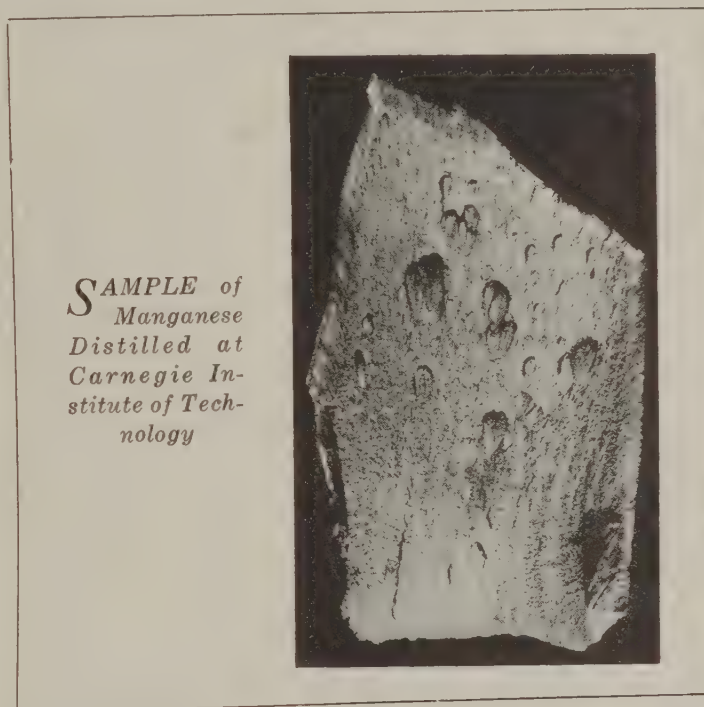
The Pittsburgh scientists report that a single distillation of the 94 per cent commercial grade gave a product with 0.009 per cent carbon and traces of iron, aluminum and silicon. A photograph of a sample of this metal is reproduced.

Miss Gayler finds that the 99.99 per cent manganese melts at 1244 deg. C. (accurate to within 3 degrees, plus or



esses or by silicon reduction, has been available in three grades at least since 1919, ranging from 92 to 97 per cent manganese. Silicon and carbon in these materials are less than 1 per cent and 0.25 per cent respectively, and iron makes up the difference. Manganese produced commercially by aluminum reduction has less than 0.10 per cent carbon, but the manganese analyzes only 96 to 98, the balance being mostly iron and silicon in equal parts. Evidently a much purer metal is desirable for scientific investigation. It is possible to make manganese 99.3 per cent pure by aluminothermic reduction of Mn_2O_3 in an alumina crucible, but since the aluminum powder used for reduction always contains silicon and iron, these metals enter the final product, together with a variable amount of aluminum (which must be used in slight excess).

Consequently Drs. F. M. Walters, Jr., V. N. Krivobok and J. B. Friauf, the Pittsburgh investigators, turned to the vacuum distillation method described by Marie L. V. Gayler before the (British) Iron and Steel Institute on May 5, 1927. The retort is shown in the sketch. It is placed within the coil of a high-frequency induction furnace, exhausted by a vacuum pump to less than 1 mm. pressure, and alternating currents sent through the coil until the electrical currents induced in the crude manganese have heated it slightly above the melting point. The manganese vapor arising slowly from the melt is condensed in the cooler prolongation of the crucible, and the process continued until about half the charge had been so distilled. The first metal



minus). She also finds four thermal changes, representing transformations in the solid, as follows:

On Heating	On Cooling
1,188 deg. C.	1,195 deg. C.
1,043	1,005
744	740
740	681

It is silvery gray; brittle and hard enough to scratch glass and does not tarnish readily in air. The lower transformation points are probably associated with some change in crystal structure; at any rate a cooling ingot of manganese develops numerous cracks and fissures at about 700 deg C. The presence of impurities has marked effect on this shrinkage. Manganese melted under nitrogen also absorbs as much as 2.1 per cent of the gas, which forms a bluish gray micro-constituent.

Pure manganese prepared at Pittsburgh has been used in the manufacture of iron-manganese alloys, melted in vacuum, and ranging up to 19 per cent manganese and 0.06

per cent carbon. A preliminary statement regarding the properties of these alloys was made at the open meeting of the Metallurgical Advisory Board, Oct. 19. The alloys are remarkably tough when manganese is over 6 per cent. Hardness also increases with the manganese up to at least 10 per cent, and is practically independent of heat treatment. Certain interesting abnormalities in the transformation and recrystallization temperatures have also been

noted. Little carbon penetrates the highest manganese alloys during case hardening. Twenty per cent manganese irons are also much softer than the 10 per cent alloys. Drs. Walters, Krivobok and Friauf find the hardness of their alloys agrees generally with that found some time ago for corresponding low-carbon manganese steels by Sir Robert Hadfield; however, Hadfield's steels were reported to be brittle.

A New Measure of Industrial Efficiency

Production Gaged Per 1000 Factory Man-Hours Worked—Wide Variations Shown, With High Rating for Smaller Plants

A NEW measure of industrial efficiency—1000 man-hours—was described in a joint paper by L. P. Alford, vice-president Ronald Press Co., New York, and J. E. Hannum, mechanical engineer, presented at the annual meeting of the American Society of Mechanical Engineers at New York, Dec. 5. This mensural unit, called the "kilo man-hour" for convenience, shows a surprising variation in output for the same amount of labor. A survey of 100 industries showed a range in the value of product per 1000 factory man-hours from \$10,870 down to \$548—a ratio of 19 to 1.

Wide variations were also found among companies in the same industries. For example, in terms of physical production the ratio of maximum to minimum output per kilo man-hour in the manufactured gas industry was 40 to 1. In gray iron castings it was 16 to 1; in iron and steel tubing, 7 to 1; in steel fabrication, which showed the narrowest spread, 1.54 to 1.

A surprising disclosure is that smaller companies, in many instances, show higher physical production per kilo man-hour than larger organizations in the same industry. This high production per hour, says the paper, may be a reason for the persistence of the small plant in spite of consolidations and mergers. It was found that the smallest company has a higher rate of production than the largest company in 35 industries. The reverse was found true in 18 industries.

From the kilo man-hour, the paper states, numerous factors of industrial operation can be developed, among which are the following:

Factor	How Expressed
Productivity	Physical volume of product per kilo man-hour
Labor permanence	Number of workers employed per kilo man-hour
Fixed capital investment:	
Buildings	Investment in dollars per kilo man-hour, or Square feet of floor area per kilo man-hour
Machinery	Investment in dollars per kilo man-hour
Primary power	Horsepower utilized per kilo man-hour
Industrial accidents:	
Frequency	Number of lost-time accidents per kilo man-hour
Severity	Number of working hours lost per 1000 kilo man-hours
Costs:	
Wages	Dollars per kilo man-hour
Material cost	
Prime cost	
Overhead charges	
Manufacturing cost	
Profit:	
Manufacturing	Dollars per kilo man-hour
Net	
Selling price	Dollars per kilo man-hour

The paper was confined to a substantiation of the method and 85 tables, covering different groups of industries analyzed by the new method. The findings of the authors were submitted as a basis for further development. In conclusion they recommend that man-hours of labor be reported in the United States census, so that their method of measuring the efficiency of industries may be generally used.

In discussing the paper Laurence H. Sloan, managing editor Standard Statistics Co., Inc., New York, said that reporting corporate results—volumes, values, profits, etc.—in terms of kilo man-hours would revolutionize the aspect of business that has to do with appraising financial risk. Bankers, careful investors and conscientious security analysts would go beyond mere welcome of such data; it is a safe assumption, he stated, that they would do anything within reason to obtain them.

Physical Volume of Production per 1000 Factory Man-Hours

Industries	Number of Companies	Number of Employees	Number of Factory Man-Hours Worked	Production Rate per 1000 Factory Man-Hours
Iron and steel industry	36	48,889	138,712,045	37.5 gross tons
Fabrication of steel	6	3,004	8,065,790	45.15 gross tons
Skelp, plates and sheets	8	8,634	23,637,192	56.5 gross tons
Structural shapes	6	3,388	9,654,736	32.8 gross tons
Tubing	5	8,062	21,668,941	46.2 gross tons
Machine-building and metal-working industries	224	172,308	414,439,963	10.6 tons
Agricultural implements	5	2,677	6,650,821	16.65 tons
Automobiles	12	151,447	382,211,176	9.08 cars
Automobile parts	5	1,367	3,630,696	12.85 tons
Boilers and tanks	10	4,064	10,079,771	12.05 tons
Bolts, nuts, and rivets	6	4,419	10,895,000	16.60 tons
Brass, bronze, and copper	14	23,510	61,658,572	8.15 tons
Cast-iron enameled ware	5	8,664	20,423,347	8.08 tons
Electric machinery apparatus and supplies	8	14,777	36,053,558	6.03 tons
Engines, turbines, and pumps	5	2,471	6,162,638	3.17 tons
Forgings	11	5,260	12,936,999	16.64 tons
Gray-iron castings	16	9,409	19,167,215	14.05 tons
Hardware	15	8,164	20,008,959	14.20 tons
Hoisting and conveying machinery	5	2,643	6,491,829	7.46 tons
Machine tools	8	2,276	5,308,719	2.70 tons
Malleable-iron castings	11	4,107	9,563,424	6.92 tons
Non-ferrous castings	12	4,170	10,037,141	6.41 tons
Oil-well equipment	5	2,035	5,177,482	7.80 tons
Railroad accessories	13	15,679	36,205,412	15.50 tons
Sheet-metal products	10	8,261	20,566,387	17.30 tons
Special machinery	8	3,098	4,801,704	5.15 tons
Springs	7	1,684	4,393,941	13.50 tons
Steel castings	15	8,485	21,803,482	14.95 tons
Valves and fittings	13	10,215	21,260,800	7.00 tons
Wire products	10	12,143	30,904,117	8.71 tons

Blast Furnace Metal for Castings

Can the Blast Furnace Compete with the Pipe Foundry?—Analysis of Conditions and Costs Involved

BY DAVID BAKER*

IN THE IRON AGE of July 22, 1920, is an interesting account of the first successful attempt at iron making in this country, in Massachusetts. From it we learn that the first casting made in America was an iron pot weighing 2 lb. 13 oz., its capacity being given as one quart less one gill. The inside measurements were 4.5 in. wide by 4.5 in. deep. Under date of March 15, 1647, Robert Child, who was connected with the works, wrote to John Winthrop, Jr., then in Connecticut: "We have cast this winter some tuns of pots, likewise mortors, stoves and skellets."

On Aug. 4, 1648, Governor Winthrop wrote his son that "the iron works goeth on with hope and now yields about seven tuns per week." All these castings were from metal direct from the blast furnace.

I presume there is not a blast furnace manager in this country who has not made it a practice to produce at the furnace a certain number of castings required about the plant for replacements. The usual practice is either to divert from the main runner the metal required to fill the molds or to arrange for filling a small ladle at casting time, which is poured into the flasks by means of a small electric or hand crane. In such cases care is taken to choose the right kind of iron at the time when it is flowing in sufficient volume. The writer remembers seeing in 1886 a whole set of furnace columns and mantel cast at the Paxton Furnaces, near Harrisburg. These were cast in the pig bed for use in the reconstruction of one of the furnaces.

Emergency Practice Becoming Regular

Furnace-made castings have been resorted to from time immemorial in case of emergencies at the blast furnace, developing into a regular practice at most plants for certain castings, on account of the saving in time and cost. The question naturally arises: What economy may be secured by casting direct from the blast furnace as compared with casting the pig in a machine and selling it to the foundry, with the usual rehandling and remelting?

If we assume it possible to dispose of the entire output of a blast furnace to a foundry conveniently located, delivering the product in ladles, the furnace would still require the pig machine to handle Sunday iron and off casts. Hence there would be no saving in the investment; but, as the machine would not need manning all the time, there would be some saving in operating labor and a marked reduction in the cost of upkeep.

In considering this subject let us take a merchant furnace of 250 to 300 tons daily output, for stacks of this capacity are having hard sledding under present conditions. In addition, it is easier to find foundries whose daily melt is up to that figure.

Two Shifts a Day in Foundry

As to the amount of metal which could be absorbed regularly by a foundry under the assumed conditions, let us stipulate that the foundry change its practice of operat-

ing with one crew on day shift, and operate with two 10-hr. shifts. If the objection is made that that is impracticable, we need only refer to English practice, where one may see large foundries operated in this way; for instance, Stanton Iron Works Co., Ltd., which manufactures de Lavaud and sand-cast pipe.

The next phase of the problem, assuming that metal direct from the blast furnace may be made suitable for the production of gray iron castings of standard strength and soundness, is—what percentage of such iron could the furnace under discussion be expected to produce? In other words, can a furnace be kept on grade? Good average practice on basic iron in a month's run from such a stack may be put at 95 per cent and I am sure many furnacemen can show that for a year's run.

Foundry Equipment Savings

Let us now look at the molten iron from the standpoint of foundry costs. If 100 per cent of the hot metal for this shop may be secured direct from the blast furnace, the saving to the foundry would be the cost of remelting in the cupola and the cost of unloading and rehandling the pig in the foundry yard. To this should be added a lower overhead due to reduced investment in cupolas and the larger item, reduced outlay for the foundry equipment, as the plant would be operated night-and-day shifts against the present standard single-shift practice that obtains in this country. This would have an important bearing on the cost of operation, other things being equal. It is apparent in rolling mill costs, when, owing to reduced orders, it is necessary to operate single shifts instead of double.

The saving in the investment can be visualized if one considers the reverse condition, the increase of equipment required to enable a plant to produce, on day shifts only, what is usual with night-and-day operation. We are so accustomed to foundries operating on day shifts only that probably the possible economies obtainable by double-shift operation have not been considered by those with capital in the industry.

In case of double-shift operation, the cupolas are in blast continuously until necessary to blow down for repairs, just as was done in Bessemer steel practice, when all the iron was delivered in pig form from the blast furnace. This means a saving in fuel, refractory material and labor.

Unit Costs Tied Up with Quantity

The cost of melting pig in the cupola depends largely on the tonnage melted per day. In a foundry melting a large tonnage the costs may be as low as \$4 a gross ton, including handling and all overhead, while even a large shop may find these figures read \$10 a ton when not running full. A managing director of a large English foundry placed this average figure at \$4.85 a gross ton for his shop. In this discussion I think a fair figure would be \$5 a gross ton of pig charged.

If now we assume that the foundry is arranged for operation in double shifts on metal direct from the blast furnace, and that 95 per cent of that iron is suitable, we

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probably would find it advisable to give the employees of the foundry Saturday night, Sunday and Sunday night off. That means operating 11 shifts a week. From a blast furnace production of 2100 tons a week, as in the case we are considering, we would find the following disposition of furnace production: 95 per cent of 2100 = 1995 tons, of which the foundry would use as direct metal 11/14 or 1567 tons, leaving 533 tons of iron—some of it a little too high or too low in silicon—which could be sold as basic iron.

The small percentage of high-sulphur pig made would best be remelted in the blast furnace, along with the gates and sprues from the foundry. This would involve no expenditure of fuel if the foundry made the usual yield of marketable product, the excess heat of the furnace hearth taking care of this tonnage without difficulty.

Never Undertaken Commercially

Use of direct blast furnace metal for the production of castings is not a new proposal, but why has it never been undertaken on a commercial basis? In other words, why has not some furnace company started a pipe foundry and operated the shop with direct metal? I mention a pipe foundry because that industry is a large consumer of pig iron and the business is usually obtained in fairly large orders. If a canvass is made of blast furnace managers, probably a small percentage would say such a scheme is practicable; while among foundry managers it would be difficult to find any to approve.

This has been the writer's experience in this country, but in England we found that the process was considered more feasible.

The difficulty in the minds of the foundrymen is the almost universal belief that the cupola purifies the iron by remelting it. There is also a decided opinion that a mixture of several kinds of iron is necessary, to produce satisfactory pipe. The purifying effect claimed for the cupola is a very doubtful one.

Advantage from Mixing Irons

There is a mixing possible in remelting iron, not in the cupola itself but as the iron is tapped into the ladle, which is more effective when a forehearth is provided with the cupola. It is a commercial advantage to be able to utilize several kinds of pig iron and scrap in the foundry production. But it must not be forgotten that in this remelting in the cupola a large percentage of the sulphur in the coke goes into the molten bath, and sulphur is a hardener and tends to produce blowholes in the castings.

As an illustration of the kind of iron found satisfactory in certain cast pipe, the following analysis taken from a report by the Underwriters' Laboratories is interesting. "The results of 35 analyses selected at random from the records of a large foundry over a period of seven months were as follows:

	Silicon Per Cent	Sulphur, Per Cent
Average	2.53	0.077
Maximum	2.73	0.114
Minimum	2.35	0.060

In this case the iron went into the production of de Lavaud pipe, and iron with silicon as shown was chosen to prevent the metal chilling white when cast against the metallic mold. Had direct blast furnace metal been used, iron much lower in silicon would have served as well, provided the sulphur had been kept down to the usual blast furnace practice—0.03 per cent and under.

This iron with the lower silicon would have cost much less to make. Suppose, for example, the average silicon of 1 per cent in the direct metal were found satisfactory with the lower sulphur in place of 2.53 per cent used. To get the 1.50 per cent additional silicon would require an expenditure of from 250 to 300 lb. of coke per ton of pig in Eastern merchant furnace practice, which may mean at some plants an additional cost of \$1 per ton of product. If we take into consideration the loss of output owing to the lighter burden carried on the furnace, a spread of \$4

and even more per ton may be incurred at some furnaces, to secure the higher silicon.

Qualities Required by Foundries

The claim is made in a patent issued to David F. Baker, April 21, 1925, No. 1,534,561, that the low-silicon low-sulphur iron direct from the blast furnace has the qualities sought for in foundry practice, when a much higher silicon cold pig is now specified for that purpose; but the effect of the silicon is nullified to a marked degree by the large increase in the sulphur content during melting in the cupola. The claim is made that the reason all efforts so far to put the full output of a blast furnace into castings for the market other than ingot molds has been a failure is due both to the foundryman and the furnace manager making the error of using iron for the purpose made in too hot a furnace; that is, with a too high silicon content.

This iron is too "rich" as it comes from the blast furnace; it has too much "kish" and graphitic carbon, and the castings produced are unsound and also too soft. It seems unreasonable to some that metal direct from the blast furnace should make sound castings where the sections are thin.

They claim that, because the iron is reduced from the ore in one process, it needs further treatment to produce satisfactory gray iron castings. Carrying this argument to the open-hearth steel process, one would expect steel made by the "pig and ore process" to be less satisfactory, say in wire manufacture, than steel made by the "pig and scrap process," but this is not borne out in practice.

Fluid Iron Can Be Made

I think every blast furnace manager has frequently made iron that was fluid enough for the successful production of stove plate castings. That iron, it is claimed, can be regularly produced up to 95 per cent of the total output.

If this is so, and we get back to the earliest furnace and foundry practice in this country, it would appear that a low-silicon, low-sulphur iron suitable for casting direct could be produced for at least \$4 a ton less than iron run as specified for making de Lavaud pipe. If now we add to this figure the \$5 shown as saved with the combination of furnace and foundry previously described, there is a total of \$9 a ton to be picked up by a blast furnace going into pipe production, or by a blast furnace and iron foundry uniting and using blast furnace metal direct.

Here is an opportunity for the merchant furnace now idle, or operating at a loss, to eliminate the red figures in the ledger; that is, to reclaim an investment that is now on the way to be scrapped.

Heat Treating With Gas Gains

Approximately twice as much manufactured and natural gas is now consumed for industrial purposes as is sold for domestic uses. According to figures issued by Peoples Gas Light & Coke Co., Chicago, the metal trades are the largest industrial users and the consumption is increasing rapidly. That company in 1927 sold 1,800,000,000 cu. ft. to such plants as agricultural implement shops, non-ferrous foundries and railroad equipment manufacturers (to list only the three largest groups), while in 1928 the total was slightly over two billion, an increase of 11.5 per cent.

Steel treatment is a large consumer of gas everywhere. Larger amounts of money are apparently being invested in single pieces of gas-burning equipment by the metal trades than ever before. Several Chicago plants are reported to have purchased furnaces costing more than \$20,000; the largest recently installed cost \$65,000. This record of high investment in a year of guarded spending is evidence that important economies are anticipated. One battery of four gas-fired carbonizers is reported to have effected savings at the rate of \$45,000 a year.

Research Is First Need in Marketing

Sales Activity Based on Adequate Marketing Data May Be
Controlled as Accurately as Production

BY WILLARD E. FREELAND*

WE are in a period of great prosperity but there are many manufacturing enterprises which are not prosperous. Usually they have failed to keep in step with modern marketing, merchandising and advertising. Now they have a lot of lost ground to recover. There is no time for slow convalescence. The problem becomes one of financing extraordinary expense. The needed expenditure could not possibly be thrown into current costs without pricing the product out of the market. The cost must be amortized over a series of years. Some companies which need this treatment are financially sound and by foregoing dividends and cutting into surplus could finance the operation. Others, however, must borrow. The old fashioned banker would not think of lending money upon anything so intangible as a marketing scheme, but we are beginning to have a new type of banker who can see the wisdom of such an operation. Usually such a banker has a staff who can give able counsel and follow through the effort to the benefit of all concerned. Within the next 10 years marketing is going to demand the same banking support that production has long had.

Market Research Indispensable

Many marketing managers have problems because they will not interest themselves in the subject of commercial or marketing research. They are content to base policies and methods upon opinion, largely inbred opinion, rather than find the facts of their own business. Research is of such fundamental value to a business that the resistance to its introduction is almost incomprehensible to one familiar with its achievements. Its value to a small business is relatively as great as it is to a big business. Few businesses are so small that they cannot support at least one man on this work.

The sales forecast in these days of company budgets underlies the plans of every function of a business. The sales forecast has become a necessity for management planning and control of industry. A plea should be made for a larger development of statistical treatment of economic data as a measuring stick for whatever quota methods may be used, whether they be estimates by the sales force, analysis of past sales, or something else. It is just as important to study the business which you are not getting out of a territory as the business you are getting and the statistical measurement of economic data is invaluable for this purpose.

Another problem worth studying is the value of merchandising. This function intervenes between sales and production and serves as a real coordinator of their requirements. It is primarily concerned with the character of products, control of finished goods inventories, prices and similar matters which call for the service of men of special aptitudes and training. It is a particularly useful department of a business which has a long and varied line of products. A study of its usefulness is one of the most profitable things that a business manager can undertake for the work goes on steadily whether properly organized or not.

Marketing managers say much less about marketing or

sales control than production managers about production control. They seem not to recognize that it is important to secure a control of marketing work. In many instances they have not had enough research to discover what they are or should be trying to control. Written marketing plans with quantity and time schedules and expense budgets are rarely found. It will be a big job to catch up with the 20 years' lead of production in this matter of control. There will continue to be a high turnover of sales managers until a type is established who believes in and practice research, planning and control in marketing.

What constitutes a proper sales territory? Shall territories be built upon business which ought to be had or upon business now had? Should a policy of intensive selling be used and territories cut down, or should selective selling be adopted and territories made larger? As it becomes better developed and understood, the statistical valuation will become the prime basis for establishing territories in place of past sales or physical load estimates of uncontrolled sales work.

A sound quota is needed as the basis for plans and budgets, for control standards, and possibly for a basis of compensation. Sales quotas are constantly set up which do not take into account the many forecasts of business conditions, or the estimated effect of planned sales campaigns, and which have no element of flexibility incorporated therein.

Routing of Salesmen

Routing of salesmen, frequency of calls upon customers and classification of accounts are related problems which demand attention. It appears that accounts and prospects must be classified if we are to determine the profitable frequency of all so that in turn men can properly be routed. Many do not believe in controlled routing of salesmen, but good research and cost accounting in marketing disclose conditions that almost demand it. There should be an element of flexibility in routing to meet emergencies, but not enough to break down central control.

Cost Accounting New in Field

Too many sales managers do not realize that cost accounting is one of the real problems in which progressive chief executives are vitally interested. Cost accounting in this field is hardly out of the primary stage. Where cost accounting in marketing has been attempted, the disclosures have often been quite disturbing, even though stimulative.

The actual costs of field work, advertising, sales promotion, etc., should be known. Sometimes rather good figures on these activities seem to be available, but do they provide a real basis for genuine control? Because they are historical, because they are usually total instead of element costs, and because they do not show the effect of various activities upon profits, they do not give a foundation for effective marketing control. The costs of selling varying items or classes of product should be known as an element of price setting. Cost accounting would provide a true picture of profits by salesmen to use as one of the bases of better compensation methods. Scien-

*Freeland & Warren, Boston; from a paper read before the Taylor Society in New York, Dec. 6.

(Concluded on page 1523)

Many Shop Uses for Chrome Plate

Mechanical Applications Requiring Hardness and Resistance to Abrasion Reviewed at Annual Meeting of Mechanical Engineers

IN a paper on the mechanical applications of chromium plating, presented at the annual meeting of the American Society of Mechanical Engineers, New York, Dec. 4, Dr. William Blum, chemist Bureau of Standards, Washington, pointed out that most applications depend either upon the resistance of the plating to tarnish, or upon its hardness and wear resistance. The paper was confined to the latter, in which uses, however, the protection against tarnish and corrosion furnished by the chromium is an added, though secondary, advantage. The value of chromium for any given application may depend not only upon its hardness, but upon other properties, such as tensile strength, ductility, thermal expansivity, density, melting point, electrical conductivity, adherence, and interfacial relations in contact with liquids or solids, data on which are included in the paper.

Chromium Plating Valuable on Measuring Devices

"Chromium plating has proved especially valuable on measuring devices," said Dr. Blum, "because its resistance to abrasion decreases the tendency for change in dimensions, or for any obliteration of graduation marks. The latter factor justifies its use on linear scales, verniers, micrometers, tapes, etc. It has been more extensively and more successfully applied upon plug gages than on any other measuring devices." Of numerous replies to a questionnaire, it was said that all were favorable except one, and the life of the plated gages in service was estimated to be from three to 10 times that of the unplated gages.

"Although it is possible with proper control of the plating process to deposit upon a gage exactly the requisite thickness of chromium, and to use the gage without subsequent lapping, experience has led in almost every case to the deposition of a somewhat thicker coating, the excess of which is then ground or lapped off. Data received include thicknesses from 0.0002 in. to 0.004 in. The thickest coatings were applied for bringing greatly undersized gages to dimension.

"In general the chromium coating should be thick enough so that it will not be penetrated when the gage is worn down to its lower wear limit. It is then a simple matter to strip off the chromium (by a reverse current in a sodium hydroxide solution) and to replating to the desired dimension. While of course the minimum thickness required will depend upon the dimensions of the gage before plating, there is no evident advantage in applying more than 0.001 in. of chromium, and for many purposes half that thickness is adequate.

"Chromium-plated thread gages are now used in several plants, but there is still much uncertainty and skepticism regarding their reliability," said Dr. Blum. "This doubt arises from the difficulty of depositing chromium uniformly upon the surface of the threads. In any plating process the deposit is always thinner in a depression than upon a projection, and this difference is accentuated by the notoriously poor 'throwing power' of the chromium-plating bath. As a result of the uneven distribution of chromium upon the threads, not only the diameter of the gage, but also the thread angle is altered.

"Experiments with thread gages, show that when any appreciable thickness of chromium is applied, the changes in pitch diameter and major diameter and in the included angle are likely to be greater than the normal tolerances for such dimensions. It will therefore usually be necessary to regrind the gages after plating, unless they have been previously so ground as to allow for the uneven distribution of the chromium. The latter procedure is probably feasible if a large number of similar gages are being made and plated.

"Data obtained regarding ring and snap gages indicate that chromium plating increases their life to about the same extent as it does on plug gages. It may safely be stated, therefore, that chromium plating will prove valuable upon any measuring device which is subject to abrasive wear in service, provided the shape is such that the chromium can be applied with reasonable uniformity."

Plated Dies for Forming Metals

Information received relative to drawing dies was said to show an apparent contradiction in that dies and mandrels used for tube drawing were generally reported as satisfactory, while wire-drawing dies were usually unsatisfactory. "The latter were reported as failing through flaking or peeling of the chromium, and subsequent scratching of the wires," said Dr. Blum. "The only obvious explanation of this discrepancy is that the apertures in the wire dies are usually much smaller and therefore more difficult to plate uniformly than those in the tube dies. In one plant a chromium-plated wire-stranding die has yielded over twice the normal service.

"In connection with the manufacture of hot-rolled seamless steel tubes, the successful use of chromium-plated drift balls was reported. This application no doubt rests partly upon the resistance of the chromium to oxidation at the elevated temperatures employed, as well as upon its resistance to abrasion.

"Very favorable reports were received regarding the value of chromium plating upon dies used for forming sheet steel and brass. In some cases the life of the dies is increased up to eight times the normal service. One special advantage observed with the chromium-plated surface is that the metal does not stick to it as much as to steel. It is significant that the thickness of the chromium coating on these dies is usually less than 0.0005 in."

In those cases where the metal is formed, or a design produced upon it, as in stamping dies, by a sudden impact instead of by a steadily applied pressure, the chromium coating was said to be of doubtful value. "This is because under such severe conditions the chromium tends to flake or chip, probably because the underlying metal, even when it is case-hardened, is at least temporarily deformed," said Dr. Blum. "In such cases success is more probable with thin than with thick coatings. A few experiments, not completed, upon coinage dies at the United States Mint in Philadelphia, illustrate this difference. Those dies with a coating of 0.0005 in. or more of chromium all failed in a comparatively short time. Those with only

0.0002 in. of chromium lasted slightly longer than the steel dies, and yielded consistently sharper impressions.

Applied to Hot Forging and Other Dies

"One plant reported favorable results with dies used in hot forging. If this experience is confirmed, the improvement may be due at least as much to the protection furnished by the chromium against oxidation as against abrasion. This application is somewhat similar to the use of chromium on glass molds that has been reported both in Germany and in America.

"Both spinning and burnishing tools may be classified as forming devices, even though the action of the latter is confined to the surface. Several favorable reports were received upon both of these applications of chromium. One of the most successful applications is upon dies used for molding plastic materials such as rubber, bakelite, ceramic clays, etc."

It was said that no definite information has been obtained regarding the use of chromium upon steel rolls employed for either hot or cold rolling of metals. "The great size and weight of the rolls used in many operations render their plating somewhat difficult," said Dr. Blum. "This application at least warrants careful study. Rolls used for finishing sheet metal would almost certainly have their life increased by plating."

Chromium Plated Cutting Tools

Data received regarding chromium on tools used for cutting metals were said to be more variable and less favorable than those for any other uses. "The general difficulty may be summed up by saying that if the chromium is thick enough at or near the cutting edge to exhibit its great hardness, it is likely to fracture, and if too thin, it soon wears off the edge and offers little advantage," he said.

"Nevertheless a sufficient number of successful applications were reported to show that, for some purposes at least, chromium deserves careful consideration. The value of chromium is no doubt affected by such factors as the angle and type of the cutting edge, the speed of cutting, and the material being cut. In at least a few cases favorable results have been obtained by plating only one side of the tool with a fairly thick chromium deposit. The tool can then be ground repeatedly upon the steel side, thus always leaving a cutting edge of chromium.

"Blanking dies furnish a good illustration of the difficulties with chromium plating, especially when they are used on hard metals such as steel. The impact is such that any fairly thick deposit is likely to flake, and thin deposits usually add but little to the service. On the other hand, such tools as milling cutters, reamers, drills, and taps have frequently shown a material increase in service after plating. Even then, however, the results are likely to be erratic. The most consistent gains are obtained when cutting such substances as slate, asbestos board, and bakelite, which materials, though commonly referred to as 'soft,' cause rapid wear of steel tools.

"The experience with saws of various types is like that with other cutting tools. If a thick coating is applied there is a marked tendency for the formation of nodules or 'trees' upon the points of the teeth. These dull the points, and if, as usually occurs, they break off in service

they leave the teeth rough and irregular. For such articles it is therefore preferable to use relatively thin coatings. This conclusion is confirmed by the results reported for hack saws. Even with the thinner coatings they were not so satisfactory for cutting steel as for materials such as slate and asbestos.

"Files are somewhat similar to saws, in that any appreciable thickness of chromium tends to dull the files. It was reported by several persons that chromium-plated files show much less tendency to clog in use than unplated files. Whenever a material tends to fill the files, the use of light chromium coatings may be justified, even though the useful life of the file may not be greatly increased. In some cases, however, an increase to double the original service was obtained.

"A few reports upon woodworking tools, including saws, chisels, and lathe tools, show that their life is very greatly increased by the use of chromium coatings. Results with rock drills are still uncertain.

Few Applications to Machine Parts

"In spite of the apparently obvious applicability of chromium upon all parts of machinery that are subject to wear in service, such use is still far from being a general or even a preferred practice," said Dr. Blum. "The failure to adopt chromium for such purposes may be due to various causes, including the size or inaccessibility of many of the parts, and the fear that if the chromium should become detached from a bearing surface, the particles would serve as an abrasive and cause permanent injury to the mechanism. While the latter possibility warrants careful consideration and proper caution, the probability of its occurrence is not evident from the meager data available. These data, however, refer mostly to successful applications and furnish little or no evidence regarding many types of machinery upon which the chromium may have been tried and found wanting. If, as we suggested earlier in this paper, a lower coefficient of friction can be obtained and maintained on a chromium surface than on other metals, the use of chromium on bearing surfaces may prove beneficial. There is no justification, however, for assuming that the use of chromium will obviate the necessity for lubrication."

Not a Panacea for Wear

Successful application of chromium plating to automobile piston pins, gears for counting machines, Diesel engine piston rods and printing plates are outlined in the paper.

In conclusion, Dr. Blum said, in part:

"Chromium plating owes its application upon mechanical equipment primarily to its great hardness, as exhibited in its resistance to abrasion. The chief limitation in the use of chromium for such purposes is its extreme brittleness, which may cause it to crack and flake when deformed. . . . Chromium plating is not a panacea for wear. An everlasting tool or machine is as visionary as perpetual motion. Chromium plating has, however, solved many machine-shop problems, reduced costs of operation, and improved the quality of the products. When we recall that almost all this progress has been made in less than three years, there is good reason to hope and to believe that with the large number of investigators now at work on this subject, even greater results may be expected."

Symposium on Machine Tool Motor Drives

A SYMPOSIUM on motor application and control, presided over by E. F. DuBrul, general manager National Machine Tool Builders' Association, was a feature of the annual meeting of the American Society of Mechanical Engineers in New York.

The increased use of self-contained motor-driven lathes was emphasized by C. L. Cameron, Eastern representative Monarch Machine Tool Co., New York, in a paper on "Methods of Motor Application and Control on Lathes." The records of his company show production of upward of 90

per cent of the self-contained motor-driven lathes as compared to about 15 per cent 10 years ago.

"There has been a tendency among lathe builders, as well as builders of other machine tools, to recommend motors of far greater horsepower than is necessary for a given size of lathe," said Mr. Cameron in another part. "This over-motoring recommendation is the result either of ignorance on the part of the manufacturer or, more likely, of a desire to create in the mind of the buyer an inflated idea of the amount of power his machine is capable of handling."

Difficulties experienced because of a lack of standardization of motor sizes, armature shaft dimensions, motor bolt hole sizes, etc., were outlined by Mr. Cameron. Some of these difficulties are:

1. It is impossible to jig-drill and tap the motor plate.
2. It is necessary to fit each motor, lay off the holes, take the motor plate off the machine, drill and tap it, and then put it back again.
3. It is not possible to carry motor pulleys, sprockets, or sheave pulleys in stock, border and keywayed ready for use; each must be made up after the motor has been selected.
4. It is impossible to carry standard motors in stock. Frequently considerable delay is experienced waiting for customers to send certified prints and motor to the plant to be attached, entailing a loss of time and unnecessary freight expense.
5. Frequently customers neglect to have the proper starting apparatus sent at the same time with the motor, causing confusion and more delay and making it impossible properly to attach and inclose the wires between motor and starter.
6. It is almost impossible for lathe builders to consider the use of flange mounting due to the lack of standardization of frame sizes.

Best for Manufacturer to Provide Motor

"If the machine-tool manufacturer could include the motor and controller in his machine as a component unit without identity just as if it were a standard part of the machine, such as a speed gear case, the problem would be greatly simplified.

"As the range of motors used on lathes is between 2 and 15 hp., with probably 90 per cent of the motors of 7½ hp. and under, the manufacturer could carry in stock motors and starters of suitable voltage ready for instant application. Savings effected if this practice could be adopted would be greater than those which the users now think they make by buying their own motors, and, of course, these savings would be passed on to the users. Much time, expense and confusion would be saved, as everyone is familiar with the number of questions that arise when ordering a motor-driven machine, such as horsepower, voltage, speed, style of starter, switches, etc. These details have to be settled with every order that is taken when customers order their own motors.

"Wherever possible or practicable it is always advisable for the lathe manufacturer or the machine-tool manufacturer to mount the motor on the tool and do the necessary wiring. In this way the lathe can be tested out and operated under its own power before shipment to the user, and such wiring and motor application can be done at a lower cost by the tool manufacturer than by the user. This also shifts from the user to the manufacturer the responsibility of securing a perfect motor-drive application. There still remains the dual responsibility when the customer selects and purchases his own electrical equipment."

Generous use of anti-friction bearings throughout the headstock, quick-change gear box and apron was said to materially lessen the horsepower required to drive a lathe. The different types of driving motors for lathes, including the most prevalent, the constant-speed alternating-current motor, were briefly discussed. "The development of an a.c.

variable-speed constant-horsepower motor having at least six or eight speed changes with a motor of reasonable size and price would revolutionize the design of lathe headstocks, as well as many other classes of machine tools," said Mr. Cameron.

Motor Equipment for Precision Grinders

Development of motor drives in grinding machines was outlined by R. E. W. Harrison, engineering director Cincinnati Grinders, Inc., Cincinnati, in a paper on "Motor Drives for Precision Grinding Machines."

"It is obvious that the tendency is toward the elimination of the transmission elements," said Mr. Harrison. "However, while this is highly desirable because it has the virtue of simplicity, there are difficulties in the way of successful applications to grinding machines that do not obtain on other types of machine tools."

"The one element which is the most prolific source of difficulty in the way of successful grinding operations is vibration, and until it is possible for motor manufacturers to produce motors that are free from vibration, it is doubtful if the practice of mounting the motor directly on the grinding-wheel spindle will become general. Vibrations due to end movement of the armature shaft are comparatively rare, but vibrations due to lack of dynamic balance are, unfortunately, frequent.

"Machine-tool manufacturers and the users, of course, realize the difficulty which confronts the motor manufacturer, this difficulty being due to the nature of the materials which the motor manufacturer has to use to attain his results. However, it is only a matter of time before an armature will be produced which will have the virtue of permanently correct dynamic balance, and, providing that the motors can be kept within the present limits of size, it will be then only a very short time before practically all motor-driven grinding machines will be made with the main drive motor as an integral part of the wheel head."

In speaking of motor mountings, Mr. Harrison said: "Considerations of floor space, time taken to install, and the fetish of neatness of appearance have brought about the use of the barrel-type motor without feet, in which the motor is carried on a flanged mount in the side of the machine. This is undoubtedly the best looking arrangement yet devised, but it entails difficulties in servicing which have led a number of users to specify alternative methods of mounting." Of the variable-speed motors used extensively up to 3 hp. for work-rotation drive, it was pointed out that so far a speed range of 3 to 1 has been the only one practicable, but that electrical manufacturers are developing a motor with a 6 to 1 speed range."

Of "across-the-line" motors, Mr. Harrison said: "This type of motor is rapidly becoming more popular, and while it costs a little more than the standard type of a.c. motor, the control panel is cheaper and offsets this extra cost. The chief advantage is its simplicity, and it is felt that it is only a matter of time before the electrical power supply companies so arrange matters that all machine-tool equipment calling for motors up to 30 hp. will be fitted with motors of this type.

"At the present time many supply companies are opposed to the installation of across-the-line motors on account of the rush of current involved in starting up. However, with such a motor and a suitable transmission element, with an adequate factor of safety to take care of the torque involved in starting up the mechanism, the equipment represents the best combination which the user of today can buy."

F. E. Cardullo, chief engineer G. A. Gray Co., Cincinnati, contributed a comprehensive paper on "Motors for Planer Service," and J. H. Mansfield, chief engineer Greenlee Brothers & Co., Rockford, Ill., presented a paper on "The Application of Motors to Special Drilling and Tapping Machinery."

Hacksaw Blades of High-Speed Steel

Power Machine So Fitted Held to Be Most Efficient Cutting-Off Tool

BY EDWARD S. NORVELL*

METHODS of cutting metal by saws have changed several times during the past 20 years. Briefly, 20 years ago metal was most generally cut on a production basis by means of cold cutting-off machines, using solid-tooth, circular metal-cutting saws.

At the time of the World War the power hacksaw machine came into favor, because the initial cost of these machines was less than for a circular

inserted-tooth, circular metal-cutting blade with high-speed teeth, to keep up with the metal-cutting bandsaw.

First Use of High-Speed Steel Blades

These methods of cutting competed with each other from the end of the War until three years ago. In 1925 the genuine high-speed steel hacksaw blade was first put on the market. This blade has revolutionized all previous metal-sawing practice. With

cost of the machines. Therefore, more machines can be operated with less labor for the amount of money invested in sawing equipment.

5—High-speed steel hacksaw blades are highly standardized and a complete stock is carried by several supply houses in each industrial locality. Therefore, a user of a power hacksaw machine is never forced to stop work because he cannot immediately obtain blades for the machines, from the stock of a local source of supply.

A modern hacksaw machine combines the best qualities of a metal bandsaw machine with the best qualities of a circular sawing machine, as follows:

- a—Removes a fairly narrow kerf.
- b—It makes a smooth, straight cut.
- c—It requires a minimum amount of power.
- d—It requires a minimum amount of floor space.
- e—One man can handle several machines alone.
- f—The blades are heavy enough so that breakage is not a serious factor.
- g—The blades can be resharpened.
- h—The blades are heavy enough so that they will stand a heavy feed.
- j—The machines are simple and can be operated by any workman of ordinary intelligence.
- k—In case of accident, and where a blade is broken, the loss is not heavy.



THIS Power Saw Is Cutting 2-In. Round Forgings of Tough Vanadium Steel. The time taken was under 2½ min. to the piece and the average production exceeded 100 pieces for each saw

sawing machine, and because they could be operated with fewer attendants. In addition, blades could be changed quickly and a greater production was obtained from several power hacksaw machines than could be secured from the same amount of money and floor space invested in circular sawing machines.

The second stage in the development of metal cutting was the metal-cutting bandsaw machine. This machine was adopted by up-to-date metal-working plants, which threw out their circular cold sawing machines and power hacksaw machines, because the metal-cutting bandsaw machine was a more efficient tool. This was true since the blade cut continuously and there was no lost motion on the return stroke, and therefore it would cut more rapidly. In addition it was more economical, because none of the blade was wasted, because it removed a narrower kerf and because it required less power.

After the development of the metal-cutting bandsaw machine, the makers of cold sawing machines adopted an

it a power hacksaw machine held all the advantages of a narrow kerf and in addition obtained the new advantages of a rapid-cutting blade and a blade which would wear so much longer that it was more economical than any other previously known method of cutting off stock.

Modern, up-to-date power hacksaw machines, such as the Atkins No. 18, the Peerless universal shaping saw and the Racine shear-cut machine, offer any plant that works metal on a production basis a new combination, with high-speed steel hacksaw blades which will cut their metal economically, rapidly and straight.

It will pay any firm that is sawing metal on a production basis to put in one or more high-grade production power hacksaws, and use genuine high-speed steel blades. This type of equipment has the following advantages on most cutting-off operations:

- 1—The blade expense is low.
- 2—The cutting cost will be low.
- 3—The labor cost will be low.
- 4—The production for a given investment in machinery will be high per day, because of the low initial

Flow Meter Joints Welded

TO secure permanent tightness in the new design of indicating flow meter made by the Meriam Co., Cleveland, the joints between pipes, fittings and valves are welded. Atomic hydrogen welding, which has been described publicly a number of times in recent months, is the method used, but it is thought that the Meriam company's installation is the first commercial application of the new process in the Cleveland region.

The meter is designed for measuring air, gas, saturated or superheated steam, oils and other liquids at any temperature, vacuum or pressure. Operation depends upon the fact that the flow of the liquid or gas causes a loss of pressure along the pipe. An orifice-disk of Monel metal is placed in the pipe, and two small tubes are connected, one on each side of the disk. The difference in pressure is recorded by a mercury column, and the scale may be calibrated in cubic feet, barrels, pounds, gallons, or any desired other quantity per hour.

*Manager Metal-Cutting Department, E. C. Atkins & Co., Indianapolis.

Steel Freight Rate Case Hearings Soon

Arguments May Be Presented Beginning in January—Many Briefs
Take Exception to Findings of Examiners on Mileage Scale

WASHINGTON, Dec. 11.—Arguments in the general steel rate structure case will probably be heard beginning in January. Replies to briefs of exceptions to the proposed report of Examiners Howard C. Faul and C. M. Bardwell are to be filed by not later than Dec. 31. The investigation, the most sweeping of the kind ever undertaken, covers all rates on manufactured iron and steel throughout Official Classification territory, and is being made under the Hoch-Smith resolution.

In their joint brief of exceptions to the proposed report, independent steel interests in the Chicago district protested against the proposed destination grouping. These interests included the Inland Steel Co., the Acme Steel Co., the Interstate Iron & Steel Co., Clayton Mark & Co., Joseph T. Ryerson & Son, Inc., the Crane Co., and the Northwestern Expanded Metal Co.

The examiners recommended that reasonable destination groups be permitted in connection with hauls of approximately 450 miles or over, but that reasonable destination groups be prohibited in connection with shorter hauls.

"This is equivalent to saying that reasonable destination groups to Illinois territory shall be prohibited from Chicago, but permitted from Pittsburgh, and from the context it would appear that this is the situation at which the distinction is deliberately aimed," said the brief. "We object with all the emphasis at our command to such unjust and gross discrimination, and respectfully insist that we are entitled to equal treatment with Pittsburgh. If reasonable destination groups are to be permitted we have as much right to enjoy them as has our huge competitor."

The Chicago district independents said that the examiners apparently condemned the existing destination groups in Illinois as not being in conformity with the requirements of the Jones & Laughlin decision. The contention was made that the present destination groups in Illinois are in all respects in compliance with that decision and that the commission has set its stamp of approval on these groups. It was urged that they should not be disturbed. The location of important competing lines and the observation of the long-and-short-haul rule was declared to compel the existing Illinois destination groups.

Deere & Co., implement makers, Moline, Ill., and the Chambers of Commerce of Rock Island, Ill., and Davenport, Iowa, asked for the adoption of rates on bars, plates and shapes,

minimum weight 80,000 lb., not in excess of 75 per cent of the scale in effect on iron and steel articles in carloads, minimum weight 36,000 lb. These interests in the Tri-Cities also proposed a scale of rates which was prepared on the basis of a minimum of 6c., suggested by the examiners, but extended on the basis of 12c. for 100 miles and 24c. to 400 miles. It was maintained that rarely, if ever, does the rate for 100 miles exceed 200 per cent of the rate for five miles and that the rate for 400 miles rarely, if ever, exceeds 200 per cent of the rate of 100 miles or 400 per cent of the minimum rate. The brief supported the contention of F. A. Ogden, traffic manager of the Jones & Laughlin Steel Corporation, who cited the bearing the case had on the Hoch-Smith resolution in that the farmer is the ultimate consumer of a large proportion of the steel manufactured, and that the freight rate on steel is a part of his cost.

Dealing with the competitive situation, the brief pointed out that manufacturers in the Tri-Cities of agricultural implements, railroad cars, and other iron and steel products are in competition with manufacturers of similar articles at Chicago, who receive their bars, plates and shapes on a switching rate or on a low rate of 5c. per 100 lb. from Gary, Ind., as contrasted with a rate of 17c. from Chicago to the Tri-Cities. The latter rate would be increased to 19c. under the proposed scale. It was estimated that the Tri-Cities annually receive 500,000 tons of steel from the Chicago district, its principal source of supply.

St. Louis Groups File Exceptions

Sixteen exceptions to the proposed report were made in a brief filed by the East Side Manufacturers' Association, the Granite City Steel Co., Granite City, Ill., and the Laclede Steel Co., St. Louis. The exceptions covered a wide range, reflecting criticism throughout. These interests offered a scale which, it was declared, would establish a proper level of rates and meet the requirements of the Hoch-Smith resolution, purposes which, the brief said, were not met in the proposed report.

In the course of its contentions, the brief pointed out that to Michigan the Central Freight Association fifth class scale is universally applied and that the application of the examiners' scale would seriously distort the rate relationships between the long haul and short haul shippers. There is no indication, the brief said, that such increased disadvantage even on what

tonnage may be moving could be absorbed to any extent whatever by the farther distant producing points. As illustrating the situation, the brief explained that the East St. Louis district at the present time must absorb 11.5c., 7.5c. and 6c., respectively, to compete with Cleveland, Chicago and Pittsburgh in the Detroit market, while, if the examiners' scale were applied, the difference would be 15.5c., 10c. and 9c., respectively. The rates from Cleveland, Chicago and Pittsburgh would be reduced from 23.5c. to 19.5c., 27.5c. to 25c. and 29c. to 26c., respectively. The rate from East St. Louis would remain 35c.

"This would mean an increased burden on the East St. Louis traffic of 80, 60 and 50c. per ton, respectively, a total differential to be absorbed of \$3.10, \$2 and \$1.80 per ton against our Cleveland, Chicago and Pittsburgh competitors," said the brief. "There is no foundation in fact for the conclusion that the traffic could move freely from the East St. Louis district to Detroit when the absorption necessary to move it against our controlling competitors at Cleveland is equal to 7.5 per cent of the market price of the material, and this is only one instance of the general situation which would be brought about by the application of the examiners' scale."

Syracuse Objects to Paying Higher Rate

The Chamber of Commerce, Syracuse, N. Y., took exception to the statement in the proposed report that the level of rates is of much less importance to shippers generally than is their relationships. The chamber said it is obvious that the receiver of iron and steel products is vitally interested in the level of rates and should be so considered.

Exception also was taken to the proposed basic scale of rates to the extent that the rates for longer hauls are unduly high in their relationships to rates for short hauls. It was contended that the rate of progression of the scale inflates the rates for hauls from 300 or more miles. The rate from Pittsburgh to Syracuse, it was pointed out, is now on a full fifth class basis at 28.5c. per 100 lb., while the recommended scale would result in a rate of 30c. when using 370 miles as the distance from Pittsburgh to Syracuse. In other words, it was added, it would make the recommended commodity rate higher than the class rate. The chamber expressed the view that the scale should be modified to a lower basis.

Although taking exception to three points in the examiners' report, the

Bethlehem Steel Co. expressed its recognition "of the thorough, capable and fair treatment which the examiners in their proposed report have given the many intricate and important problems involved in this proceedings."

Objections were made to the rates of progression (or road haul factors) in constructing the proposed scale; to the method proposed for constructing rates to and from New York, and to the proposals with reference to grouping.

Bethlehem Claims Unjust Relationships

The Bethlehem company said its dissatisfaction with the proposed scale does not relate to its general level, but is based solely on the unjust relationships which it will create. It was claimed it would prejudice short-haul traffic and prefer long-haul traffic. "It was contended that for relatively short hauls the rates would be padded apparently to protect carriers' revenues and that for hauls over 400 miles the rates would be increasingly depressed, apparently to stimulate long haul traffic. Regarding the terminal factor, the brief said that it is agreed that a minimum rate of 6c., of which 5.5c. is pure terminal factor, for hauls up to five miles will give more than full compensation for the total of all terminal service at both ends of hauls of all lengths. With the item of 5.5c. included in every rate, it was pointed out, terminal service is taken care of once and for all. There would be no terminal costs left over to be later "absorbed," it was declared.

Concerning road haul factors, the brief said the proposed scale would inflate Bethlehem's short haul rates and at the same time cut the rates of its long haul competitors so as to foster the latter's traffic as against the former's traffic. To produce a non-prejudicial scale, it was stated, there should be added to a proper minimum rate a way-train haul factor up to about 75 miles and thereafter a through train haul factor without further decrease. The ratio between the maximum or way-train factor and the minimum or through train factor, the brief maintained, should not be greater than as three is to two. The examiners, it was stated, have carried their maximum rate of progression through to 110 miles, for which it was asserted there is no justification. It was declared that it has the effect of forcing an extra cent into the scale at that point. The examiners also were declared to have tapered the rate of progression after 400 miles and it was added that there is no justification for this in transportation conditions. It has the effect, the brief said, of cutting the rates for long-haul traffic 1c. at 500 miles, 3c. at 600 miles, etc., a 2c. additional cut for each additional 100 miles.

If the proposed scale were approved, it was stated, shippers whose mills lie near their markets will be

penalized approximately 20c. per ton, while their long-haul competitors "will secure a subsidy of that amount and upward as their hauls increase." The brief incorporated a compromise scale which, it was said, would do justice to short haul shippers and still foster long haul traffic through the diminishing rate of progression which the examiners had in mind. At 70 miles, the brief said, the compromise scale would produce a rate of 11.5c., as compared with the rate of 11.5c. approved for that distance in another case.

As this 11c. rate is the key rate of the Pittsburgh-Valleys short haul structure, it was stated, the carriers' revenues from the great volume of short haul traffic in that territory would be slightly increased. For hauls up to 200 miles the compromise scale would increase the present rates for such distances in the middle and Western districts and slightly reduce the present rates in the East, which were said to be much higher than those enjoyed by Pittsburgh and Chicago shippers. As the combined in-got capacity of the middle and Western districts is over 46,000,000 gross tons, compared with only 8,000,000 tons in the Eastern district, said the brief, it is obvious that the general effect of the compromise would be to increase the carriers' revenues for hauls up to 200 miles.

Object to "Constructive Miles"

Objections to the recommendation that in making rates to New York City 10 constructive miles be added in the case of long hauls and an arbitrary of 5c. scaled down to nothing at 110 miles be added in the case of short hauls were similar to those made by other producers in the Philadelphia district. It was contended that the proposal to inflate the rates to New York had no basis and would be discriminatory. The proposal to add 10 constructive miles to the actual mileage to New Jersey rail termini, it was declared, cannot be justified as a distance adjustment. It was suggested that the floating of a car for, say, three miles in New York Harbor may well be less expensive than the switching of a car three miles in Pittsburgh or Chicago, particularly when capital costs as well as operating costs are considered. Furthermore, it was stated, the terminal factor of 5.5c. in the proposed scale is more than ample to cover actual terminal costs at cities where terminal costs are the highest. The simple and direct way to handle the situation without discrimination was said to be to add the same arbitrary charge to every rate, if any extra charge is deemed necessary.

Objection was made to the recommendation to accord the privilege of destination groups, upon straight average mileage, to hauls of approximately 450 miles and over on the ground that it would result in a further favoring of long haul traffic as against short haul traffic.

Carriers in New England urged

the commission to find that the classification basis is the proper basis for maximum reasonable rates between points in New England and between New England and other territories in both directions. They also objected to the recommendation that tariffs proposing class rates on iron and steel be canceled. At present, rates on iron and steel in New England are partly on a fifth class and partly on a commodity or classification basis. The carriers further contended that the proposed scale, if adopted, would result in decreasing their revenues.

Higher Rail Rates Will Add to Water Shipments on Lake

The situation created by water competition with rail lines between Chicago and Milwaukee was urged by the Milwaukee Iron and Steel Committee as fully justifying a departure from the proposed scale. It was declared that the carriers should be allowed sufficient latitude to deal with the situation. The committee further asked the commission to sanction the continuance of the differential method of constructing rates to and from Milwaukee and permit retention of existing groups and grouping arrangements between both central and southern Illinois territories. The committee said it could not feel that any good purpose would be served by abolishing these long continued arrangements and the substitution of the mileage scale suggested in the examiners' report.

Protest was made against any increase in the rail rate between Chicago and Milwaukee, a distance of 85 miles. A higher rate, it was asserted, would divert tonnage from the rail to the water lines. The preponderance of the iron and steel movement is now by rail, it was stated. Figures gathered from members of the committee showed that the northbound movement of five products from Chicago to Milwaukee involved 783,360,319 lb. (349,711 gross tons) during the first nine months of 1928 and this was said to represent about 85 per cent of the total iron and steel tonnage moving between the two points for the period mentioned. This movement was made up of 616,128,887 lb. (275,057 tons) of structural steel, 72,703,371 lb. (32,456 tons) of sheet steel, 10,992,000 lb. (4907 tons) of wire, 13,164,676 lb. (5878 tons) of pipe and 70,370,624 lb. (31,413 tons) of merchant iron.

Certain steel mills in the Chicago district, it was pointed out, have facilities for shipping by water and are going ahead with comprehensive plans for expanding their facilities for forwarding and receiving shipments by water, while the Milwaukee Harbor Commission was said to include in its harbor development plan a dock specially designed and constructed for the better handling of iron and steel articles "which cannot help but make the situation more acute with respect to this type of tonnage than it is today." This plan was said to have been undertaken in the light of existing iron and steel rates. Certain of the

larger receivers of iron and steel at Milwaukee, according to the committee, have given the most serious consideration to the establishing of their own barge lines to handle this tonnage between Chicago and Milwaukee and any increase in the existing rate, it was stated, will insure them going ahead in this undertaking.

Railroads Ask for Higher Rates

Railroads generally in Official Classification territory, in direct opposition to the attitude of the steel producers, asked the commission to observe the Hoch-Smith resolution by prescribing higher rates than those proposed in the scale. The inquiry on iron and steel is one of a number undertaken under that resolution.

"The examiners' scale is incompatible with the Hoch-Smith resolution," said the Eastern trunk lines, "in that it reduces rates on commodities on which no reduction is contemplated by that resolution." It was declared that commodities other than those of agriculture are not within the care of the resolution which provides for the "lowest possible lawful rates." On the contrary, it was stated, iron and steel are commodities which may properly be called upon to bear rates approaching the limit of maximum reasonableness.

"The Hoch-Smith resolution is addressed to the commission," these carriers said, "and this case presents to it the opportunity, and, we submit, the duty to make some revenue compensation to carriers for the losses the commission has felt obliged to impose as to other traffic under the resolution."

These carriers proposed a scale which, they said, would not yield excessive revenue. It was stated that the great need of the iron and steel industry is for proper relationships rather than reduction of rate levels. Central Freight Association carriers joined in this proposal and line of argument, and suggested adoption of the Disque scale. Southern lines urged that the official territory scale be confined to the territory north of the Ohio and Potomac Rivers.

Cleveland Argues Against Advance in Short-Haul Rates

The Cleveland Chamber of Commerce said that the proposed report should be corrected by substituting Lorain for Cleveland as the Western limit of short-haul territory. It also excepted to the proposed maintenance of the Johnstown and Cumberland differentials on eastbound traffic. Undue emphasis was said to have been placed in the proposed report in the statement that the level of the rates is of much less importance than is their relationship. It was stated that such emphasis has resulted in the construction of a mileage scale seriously injurious to Cleveland interests and resulting in unreasonably high rates. Exception was taken also to the basic scale of rates to the extent that it would result, the brief said, in unjust and unreasonable rates within

short-haul territory. As to long-haul business, the brief declared that the Cleveland interests ask simply to be given the same rate base as any of their competitors. It was urged that it is unjust to the business of Cleveland to force serious advances in its short-haul rates "by reason of an apparently arbitrary desire to maintain present Pittsburgh-New York and Pittsburgh-Chicago rates." It was further contended that the proposed scale should be modified to start with an initial figure of not more than 5c. for a distance of 15 miles and under and progress so as to reach a figure of not more than 9.5c. at 60 miles.

Buffalo Producers Urge Against Undue Advantage to Any Group

The Niagara frontier iron and steel interests particularly asked the commission to prescribe a basis of rates materially lower than that recommended and that it be applied in such a manner as to avoid undue preference or advantage to any group of shippers. These interests, including the Buffalo Bolt Co., the Donner Steel Co., the Seneca Iron & Steel Co., and the Wickwire Spencer Steel Co., stated, however, that on the whole the proposed report points the way toward a much more logical and enduring basis of rates for iron and steel articles than has heretofore prevailed. One serious departure was said to relate to long-haul rates against short-haul rates. The middle group, including shippers in the Pittsburgh and Buffalo districts, it was said, contended for relatively low rates for long hauls because their principal markets are located 400 miles from the place of manufacture and because their competitors are located in or near the principal markets.

Another group of manufacturers, it was pointed out, consisting principally of those along the Atlantic seaboard and in the Chicago district, contended for relatively high rates for long hauls and relatively low rates for short hauls for the purpose of excluding their Pittsburgh and Buffalo competitors from the markets to which their own plants are in close proximity. From a priori viewpoint, it was stated, it would seem impossible for a judicial determination of this controversy to result in favoritism to one group or the other. Yet, it was stated, the report, while providing that between 300 and 900 miles the full sixth-class rates as recommended in the Eastern Class Rate investigation shall apply, provides for distances less than 300 miles definite concessions from the sixth-class basis. The apparently unfair treatment of the middle district, the brief said, is due to a hump in the middle of the scale, distances between 300 and 600 miles, caused by an unusual rate of progression. It must not be overlooked, it was said, that distances between 300 and 600 miles are especially important to the Niagara frontier manufacturers because they reach both New York and Chicago at these distances. The Niagara frontier interests, it was maintained, do not ask

for any concession in rates for those distances, but they emphatically protest against a construction of the scale in such manner as to penalize them for distances which are more important to them than any other in the entire scale.

The Illinois Rate Committee lines objected to the proposed groupings and asked that the Jones & Laughlin groupings as they now exist be maintained. The present groups were declared to reflect relationships that should not be disturbed.

Philadelphia Mills Take Exceptions

In a joint brief filed by the Alan Wood Iron & Steel Co., the Phoenix Iron Co., the Lukens Steel Co. and the Worth Steel Co., this group of mills in the Philadelphia district excepted to a number of recommendations made in the tentative report. Exceptions were taken to the manner of breaking up mileage blocks, to the phrase "east of" Philadelphia adopted in proposing arbitraries between so-called short-haul trunk line territory and New York City groups, to the proposed dual penalty in connection with the arbitraries, to the proposed adoption of basing points applying to joint rates, and to proposed differentials to Atlantic seaboard ports.

The brief declared that in so far as the proposed mileage scale applies for distances from 75 to 170 miles the Philadelphia mills object to the recommendation setting maximum rates, 36,000-lb. carload minimum, with certain exceptions, between points in central territory. The scale proposes rates 6c. per 100 lb. for each mileage block of five miles and under up to 56c. per 100 lb. for 1200 miles and over 1165 miles, with an additional ½c. for each block up to 280 miles when the rate of progression is 1c. per 100 lb. throughout the remainder of the scale, which is broken into blocks of five miles up to 110 miles. From 110 to 260 miles the blocks are 10 miles each; to 400 miles, 20 miles each; to 500 miles, 25 miles each and to the remainder of the scale, 35 miles each. The Philadelphia mills contended that there should be a break in the road haul factor at shorter distances than 110 miles, and proposed a distance of 75 miles. It was declared this should be accomplished by interposing a range of distances and the accompanying rate of progression between 75 miles and approximately 170 miles, meeting the proposed scale at the latter rate. The proposed modification in the distance range, it was stated, would fit a straight line between the points on the resultant curve at 75 to 170 miles as nearly as may be practically done by rates avoiding fractions other than halves. The brief said the rate of progression should properly be varied at 75 miles when the effect of the way train movement of the traffic ceases on the average or at least rapidly becomes of decreasing importance and proportion and that the scale recommended by the examiners postpones too long the flattening out of the rate of progression.

Labor Demands Efficient Management

New Functional Status for Workers Urged at Taylor Society Meeting—Broad Aspects of Shorter Work Period

RECOGNITION by scientific management of the definite functional status in industry to which the labor groups are entitled was emphasized at the annual meeting of the Taylor Society, held in New York, Dec. 5 to 7. In his presidential address, Morris Llewellyn Cooke, consulting engineer, Philadelphia, urged the members to give more consideration to this ever more important phase of industrial management. In substance, Mr. Cooke stated that "the interests of society, including those of the workers, suggest some measure of collective bargaining in industry to the end that the weaker side may be represented in negotiations as to hours, wages, status and working conditions. Collective bargaining implies the organization of the workers on a basis extensive enough as to make this bargaining power effective. But a bargaining position which implies division into two camps, fundamental as it now is admitted to be, must, in a world abandoning competition for cooperation, gradually give way so that if the group cohesion of the workers is to be continued it will be through giving labor organizations that functional status in the industrial process which is now denied. This can be done only through the discovery of elements of the work which can be as well or better done by the group than by individuals.

"If the labor organizations are in fact desirable social agencies and essential to the orderly conduct of industry, they logically come within the field of management and industrial engineering. It therefore becomes a part of our task to discover all necessary outlets for the energy and spirit of the grouped workers and to aid in the cultivation on the part of both management and labor of those newer disciplines which will effect the maximum cooperative effort."

Cooperation with Management

Mr. Cooke pointed out that in recent years the principal grievances of organized labor, such as low wages, long hours, unsatisfactory working conditions, etc., which were formerly responsible for banding the workers together for a common interest, have now been largely eliminated. It is argued by some that group activity now has nothing further to do unless perhaps to secure the highest degree of cooperation on the part of each individual in carrying out the behests of management. It is also argued, the speaker continued, that the functional work of management does not need to be supplemented by

the group, except as management using its own initiative may from time to time delegate to the group isolated tasks, which, in the opinion of such management, may better be performed by the group than by management itself.

Evidence of labor's growing demand for effective and economic management was claimed in a paper by Geoffrey C. Brown, consulting engineer, East Orange, N. J.

Problems in Marketing Equipment

IN a paper on the "Marketing Problems of Manufacturers of Equipment," Ralph H. Dick, president Barrington Associates, Inc., New York, stated that marketing activities had not until recently received the attention accorded to production problems because the chief executive officers of most companies had been more interested in volume than distribution. Also sales work deals with imponderables and management has hesitated to apply scientific principles to it. Another factor in the lack of development of sales technique has been in the payment of the sales manager's salary. His bonuses are ordinarily based entirely upon volume of sales and this has naturally not led to a concentration on margins of profit.

The marketing of equipment, Mr. Dick pointed out, involves a number of factors not common to other marketing activities. In the first place, buyers of equipment are usually technically trained men. The sale has a direct bearing on the profits of the purchasing company, and a difficult type of competition is encountered in buyers who think they can make the equipment satisfactorily in their own plants. More important than all is the fact that the equipment cannot be sold and forgotten about. The manufacturing company must be prepared to provide competent service on the machine. The equipment salesman should consequently be able to talk the language of the buyer and he should be backed by demonstration of the product, bringing out the use of the laboratory in developing the machine to its highest efficiency. The completion of the sale should be made by a competent engineer. It should be remembered that marketing of equipment involves both the product and engineering service. All sales activity should be backed by sound market research, which should not be used merely in case of emergency, but to avoid emergencies.

A paper on the "Marketing Problems of Manufacturers of Resale

Goods," by Willard E. Freeland, Freeland & Warren, Boston, appears elsewhere in this issue.

Broad Aspects of Shorter Work Periods

IN suggesting a comprehensive approach to the problems of the shorter work day and the shorter work week, H. S. Person, managing director of the Taylor Society, emphasized the fact that these problems are merely aspects of a larger question which also includes technological unemployment, group insurance, old age pensions, etc. In approaching a solution he stated two propositions which should constantly be kept in mind: first, that "the standard length of the work period should be governed primarily by the maximum amount of work, scientifically determined, that workers can do and thrive under, proper allowance being made for adult education, recreation and other cultural factors, and second, that a substantial portion of the larger social income which results from marked increases in technological efficiency should be handled as a credit which shall be drawn upon by workers after middle age, when physical capacity and productivity decrease as a result of age and of inflexibility in adjustment to new technological conditions."

In other words, just as provident individuals plan to work hard during the earlier part of life so that through income from savings they may enjoy relative independence and comfort during the latter part of life, each generation as a group should so organize the distribution of its social income that individuals collectively may enjoy similar benefits. Instead of converting increased social income into a shorter work week or work day, thus emphasizing immediate leisure and spending, a substantial portion might be converted into ultimate leisure and comfort, enhanced in value by security.

Doctor Person pointed out that pressure is growing for prompt conversion of income from technological efficiency into shorter work periods, but at the same time there has been a growing sentiment in favor of unemployment insurance, old age pensions and other mechanism for the relief of the maladjusted, conceived in a form which makes them a charge upon industry. He admitted objections to this form of approach to the shorter work period problem on the grounds of its possible impracticability in modern capitalistic society, but at the same time called attention to

the growing interest of workers in activities which provide security in old age.

New Officers Elected

Henry P. Kendall, president of the Kendall Co., Boston, was elected president of the society for the coming year, succeeding Morris Llewellyn Cooke. Henry Bruere, first vice-president Bowery Savings Bank, New York, was made vice-president, and Edward W. Clark, 3d, of E. W. Clark

& Co., Philadelphia, was reelected treasurer. Morris E. Leeds, president Leeds & Northrup Co., Philadelphia, and Edwin H. Schell, consulting management engineer and professor of business management at the Massachusetts Institute of Technology, Cambridge, Mass., were elected to the board of directors, succeeding N. G. Burleigh and A. B. Rich, Dr. H. S. Person, managing director of the society, was made a director for another term.

chandising advisory committee, of which he is chairman. The report reflected substantial activity. W. S. Hays, 644 Drexel Building, Philadelphia, executive secretary of the association, gave an account of his activities for the association, and L. H. Shingle, president Shingle-Gibb Leather Co., Philadelphia, submitted his report as treasurer. All committee recommendations were referred to the association's executive board for action. The business meeting was preceded by a breakfast meeting of the association's board of directors.

The following directors, representing the various divisions of the association, were elected: G. B. Mitchell, vice-president Union Drawn Steel Co., Beaver Falls, Pa., power transmission division; E. H. Ball, president Chicago Belting Co., Chicago, leather belting division; Z. F. Harshton, general manager Imperial Belting Co., Chicago, fabric belting division; and A. E. Pyott, Pyott Foundry Co., Chicago, pulley division. Also H. T. Hallowell, president Standard Pressed Steel Co., Jenkintown, Pa., hanger division; W. D. Young, vice-president Cling-Surface Co., Buffalo, accessories division; H. W. Boyd, president Armour Leather Co., Chicago, tanners and curriers leather division; and R. J. Howison, Whitney Mfg. Co., Hartford, Conn., chain gear and speed mechanisms division.

Power Transmission Association Meets

Merchandising and Engineering Advisory Boards Submit Reports—Eight Directors Elected

REVIEW of accomplishments of the past year and recommendations for future activities were presented by the various committees of the Power Transmission Association at the annual luncheon and business meeting of the association held at the Hotel Commodore, New York, Dec. 6.

A large number of members and guests listened with interest to the opening remarks of President W. H. Fisher, secretary T. B. Wood's Sons Co., Chambersburg, Pa. At the conclusion of his address he was given a rising vote of thanks for his able service to the association, which is now in its third year.

Most of the effort of the association during its first two years has been in establishing a good foundation upon which to work, said Mr. Fisher. "While it is difficult to enumerate many actual accomplishments, because of the practical impossibility of securing tangible evidence as to when and where our efforts have guided users to consider our arguments and use our products, it is nevertheless a fact that our work has created an atmosphere that is inspiring to the consideration of transmission problems in a more unbiased manner than has prevailed in the past," he said.

Credit for this condition was given the association's merchandising advisory committees, which obtained through the cooperation of member companies a large amount of advertising space in a number of trade and technical magazines for its "Drive Right" campaign. The "Drive Right" booklet has been sent to more than 30,000 users of transmission equipment.

Activity of the board of advisory engineers in obtaining constructive data for power users and in general research work were also commented upon favorably. Contacts of Secretary Hays with research groups in the power-using industries and his attendance at conferences with Government departments and meetings of trade and technical societies related to the association's field were also emphasized. Appreciation of the

generous cooperation of the business press and of the New York and Chicago power shows was expressed.

The report of the association's board of advisory engineers, which is made up of 25 engineers from 20 different industries that are large users of transmission equipment, was presented by William Staniar, belting and transmission engineer, E. I. du Pont de Nemours & Co., Wilmington, Del. During the past year the board has answered a number of technical inquiries addressed to the association and has assisted in the preparation of articles relating to the lubrication and maintenance of mechanical transmission equipment. General test data has been analyzed and published by the board for the benefit of members of the association.

It was recommended that the association keep in touch with the study of obsolescence to be undertaken by the Department of Commerce. It was suggested that development of simple apparatus for testing alinement of shafting be taken up again with the National Electrical Manufacturers Association. Continuation of standardization work was advocated. Creation of a power transmission division, to provide a forum for the discussion of transmission problems, was said to be under consideration by the American Society of Mechanical Engineers.

In view of the compilation of a comprehensive work by the leather interests of the association and the recent publication of a volume on "Mechanical Power Transmission" by Mr. Staniar, the publication of a handbook by the P. T. A. during 1928 was considered inadvisable. A condensed data book has been prepared and its publication in Lefax form was recommended by the board of engineers. This book will fill a longfelt want and can be featured in the association's advertising, said Mr. Staniar. Cooperation of the association in revising mechanical transmission data has been offered publishers of all handbooks.

W. W. French, advertising manager, Dodge Mfg. Corporation, Mishawaka, Ind., reported for the mer-

Michigan Leads in Output of Malleable Castings

WASHINGTON, Dec. 11.—Commercial malleable iron foundries of the United States produced 585,616 net tons of castings, valued at \$81,064,855, in 1927, a decrease of 17.8 per cent in tonnage and 20 per cent in value as compared with 712,499 tons, valued at \$101,348,758, in 1925, according to data collected by the Bureau of Census in the biennial census of manufactures. Michigan, with 121,972 tons, valued at \$14,211,523 in 1927, led as the source of production, while Ohio ranked second with 80,932 tons, valued at \$11,020,268. Figures for 1927, the bureau pointed out, are preliminary.

Production by States for 1927 follows:

	Net Tons	Value
United States:		
1927	585,616	\$81,064,855
1925	712,499	101,348,758
States: 1927		
California	5,926	1,033,742
Connecticut	15,532	3,351,351
Illinois	79,165	10,359,792
Indiana	62,943	8,266,410
Michigan	121,972	14,211,523
New Jersey	7,973	1,855,539
New York	63,142	9,804,938
Ohio	80,932	11,020,268
Pennsylvania	41,029	6,995,557
Wisconsin	77,178	9,378,027
All other States ¹ ...	29,824	4,787,708

¹ Delaware, Georgia, Iowa, Maryland, Massachusetts, Minnesota, Missouri, Rhode Island, Tennessee, Texas and West Virginia. The figures for these States are combined to avoid disclosing the production of individual foundries.

Metal Tariff Hearings in January

Sweeping Changes Believed Unlikely but Upward Revision May be Sought on Bars, Shapes, Cast Iron Pipe and Other Products

BY L. W. MOFFETT

WASHINGTON, Dec. 11.—Changes in the metals schedule of the Fordney-McCumber tariff act when that law is overhauled promise to be limited when compared with the 300 items, more or less, in the schedule. It is unlikely that any of them will be of a sweeping character. The more important revisions may pertain to reclassification and administrative features rather than to duties.

There will be demands, however, for important changes in the metals schedule. This schedule will be the object of hearings on Jan. 14, 15 and 16 before the House Committee on Ways and Means. No schedule has been given more than three days for hearings. The hearings, 31 in number, are to be begun on Jan. 7 and will extend through Feb. 25.

The House committee has adopted a policy of not announcing those who have applied to be heard or of stating the names of the products which will be discussed. It is therefore not possible to say definitely what subjects will be presented in connection with hearings on the metals schedule. Developments under the existing law, however, lend a basis for the belief that a number of items will be discussed. Among them probably will be reinforcing bars, structural shapes, deep-section interlocking sheet piling, cast iron pipe, manganese ore, cutlery, pig iron, tungsten and certain types of machine tools. At its annual convention here last week the American Mining Congress adopted a resolution for continued protection to the minerals industry.

Producers May Ask for Higher Duties on Bars and Shapes

Domestic manufacturers have long expressed dissatisfaction over duties applicable to reinforcing bars and structural shapes and have complained about the volume of imports of these products. Concern manifested has been increased by the recent decision of Justice I. F. Fischer of the United States Customs Court, Second Division, who held that deformed bars are structural material and as such are dutiable under paragraph 312, taking an impost of 1/5c. per lb. or 20c. per 100 lb., instead of under paragraph 304, carrying a duty of 3/10c. per lb. or 30c. per 100 lb. It is reported that efforts will be made to get a separate classification for reinforcing bars with a duty higher than that applying under the decision of Justice Fischer. It is also understood that attempts will be made to

get higher duties on structural shapes and deep-section interlocking sheet piling, the latter classified as structural material, a classification which does not meet with the approval of domestic makers. Consequently, reclassification may be sought for this product. Formerly this particular kind of sheet piling was imported exclusively, chiefly from Germany. It is now made in the United States and manufacturers maintain that it requires greater protection to support the industry adequately against foreign competition.

Belgium is the principal source of imports of structural shapes and bars which, it is held, have been sold into this country at prices which domestic manufacturers often are unable to meet. Most of the structural shapes imported are of the bar size, used for such purposes as lintels, fire escape construction, warehouses, coping work, and other small work. Reinforcing bars coming from abroad have competed more generally in construction work with domestic bars of that type than have imported structural shapes competed with large structural shapes.

Cast Iron Pipe Imports Heavy

Many complaints have been made by domestic producers against relatively heavy imports at times of cast iron pipe, dutiable at 20 per cent ad valorem. A great volume of these incoming shipments originate in France with a substantial proportion coming from Belgium. There is now pending a complaint before the Tariff Commission seeking an increase of 50 per cent under the flexible provision (Sec. 315) in the duty on this product.

Ferromanganese and Manganese Ore May Again Be Contested

Manganese ore was one of the subjects of heated discussion at hearings when the Fordney-McCumber tariff legislation was under consideration. Domestic iron and steel producers generally argued for either a low duty or no duty on this product, and complaints have been made before the Tariff Commission asking for a reduction of the duty of 1c. per lb. on the metallic manganese content when in excess of 30 per cent. Requests also have been made to have the ferromanganese duty of 1 7/8c. per lb. on the manganese content reduced. The duties on both products may again be the subject of vigorous contest before the Ways and Means Committee

and the Senate Committee on Finance by producers and consumers. But it has been indicated that ferromanganese will play a less important part in the hearings than heretofore because of a much larger domestic production by steel works furnaces of the ferroalloy since the present tariff act was passed. Moreover, a reduction in the duty on ore would foreshadow a cut in the duty on the alloy. Domestic producers of manganese ore through the American Manganese Ore Producers' Association have made it plain ever since they organized that they will oppose a reduction in the duty. They contend that they are making progress through beneficiation in developing ore of good manganese content and that given continued protection they will be able to proceed with their research work and processes so that they can meet all domestic requirements for the making of standard ferromanganese. Domestic iron and steel producers generally do not accept this view. General investigation of the manganese situation was completed some time ago by the Tariff Commission and will be the subject of a report soon to be made, it is believed. This inquiry was not instituted under the flexible provision but rather upon the initiative of the commission itself under another section of the act.

Pig Iron Producers May Also Seek Higher Tariff

Interest in the pig iron duty is confined chiefly to Eastern merchant blast furnace operators and importers. Producers succeeded, on the strength of large imports which were entering the country, in having the Tariff Commission make an investigation under Sec. 315, which resulted in a proclamation by President Coolidge increasing the duty by 50 per cent, of 37.5c., from 75c. to \$1.125 per gross ton. The Tariff Commission in its report on pig iron said that differences in costs in the United States and abroad indicated that a higher duty than was warranted under Sec. 315 was required to protect the American industry. It has been suggested that this would afford domestic makers a strong argument for seeking a higher duty. Imports of pig iron during the past few months have been light. For the 10 months ended October, 1928, they totaled 118,885 tons, as against 102,127 tons for the corresponding period of last year.

Producers of tungsten ore are known

to be preparing to ask higher rates on this product as well as on its manufactures, including ferrotungsten and tungsten steel, which take compensatory duties.

Machine Tool Builders May Seek "Unfair Trade" Protection

It is reported that machine tool manufacturers will make protests against certain kinds of imports and seek further protection. There has been considerable complaint that Germany is making "Chinese" copies of American machine tools, but without the high quality or efficient performance of the latter. On the other hand, it is claimed that there are some high-grade German tools imported into the United States which are invoiced at remarkably low figures. In some quarters it has been asserted that action might be taken for application of the "unfair trade practices" section of the tariff act, carrying the drastic embargo power.

Two other items of interest to the iron and steel industry which may be the subject of hearings are magnesite and fluorspar. They were the object of conflicting testimony at the hearings when the present act was in the course of preparation. Magnesite, however, apparently does not share the interest it formerly did. Imports have been light recently, and have not been heavy for a long period, owing evidently to the ability of domestic producers to meet foreign competition. Eastern iron and steel makers chiefly are interested in the duty on fluorspar. It recently was increased by 50 per cent, or \$2.80 per gross ton, from \$5.60 to \$8.40, by Presidential proclamation following a report by the Tariff Commission based on a complaint under the flexible provision by domestic producers. Eastern iron and steel manufacturers had asked for a reduction in the duty.

Sweeping Changes Are Believed to Be Unlikely

The plans of the Republicans to overhaul the entire tariff law are consistent with pledges made during the recent Presidential campaign. By general revision was meant the purpose to go through the whole law and make all the changes at one time as contrasted to piecemeal revision. It is hardly believed, however, that the Republicans will proceed to the point of making sweeping changes in duties applying to the present Republican tariff. The changes contemplated, it is held, are largely required to meet economic and industrial adjustments that have developed since the existing law went into effect in September, 1922. Contention is made that the law has, in the main, operated quite satisfactorily throughout.

The changes in prospect, then, may be looked upon as a sort of leveling-out process, a form of readjustment to meet present-day conditions of competition. Changes in administrative sections are to be the subject of discussion on the last day of the

hearings before the Ways and Means Committee. Much interest is being shown as to the possible revision or repeal of the flexible provision. It has been the source of a great deal of complaint. One objection is that it has been difficult for the Tariff Commission to ascertain costs of production from foreign manufacturers. Another is that this procedure has required such protracted investigation that frequently before the commission has been able to report to the President conditions existing at the time complaints were filed have changed entirely. Meanwhile, the domestic industry had to endure conditions complained of without getting relief at the time it was needed. A great deal of contention has been made that it would have been more satisfactory had the commission relied entirely on foreign invoices on imports, a resort turned to in instances where costs abroad could not be obtained.

There also is considerable sentiment that the right to charge duties should be restored exclusively to Congress and the Tariff Commission be maintained solely as a fact-finding body, reporting to Congress alone.

American Valuations Suggested

There has been renewed discussion also of having duties based on American valuation instead of on foreign valuation. This question was discussed with considerable warmth when the present law was being considered. The foreign valuation basis was continued, except as to some items in the chemical schedule. The general view seems to be that it will not be changed. One argument is that foreign valuation can be more easily justified at the present time owing to greater stability of foreign currencies than it could in 1922, when foreign currencies fluctuated widely.

An important provision which may be asked for in the new law by domestic steel makers is a requirement that imported steel bear a mark showing the countries of origin.

Plans to begin hearings early in January look to speedy enactment of a revised law under the Hoover administration. It is the prevailing opinion that an extra session of the new Congress will be called for the spring by Mr. Hoover shortly after the present session comes to an end. Agricultural relief could also be provided. Such action is not expected to be taken at the present session.

Wants Special Session Postponed

Senator David A. Reed, Republican, of Pennsylvania, a member of the Finance Committee, is in favor of deferring the special session until next fall, but this is plainly a minority view. In the view of a spring session, however, Senator Reed has conceived the unusual idea that the Finance Committee should take the revised tariff bill as prepared by the House Committee and proceed with changes and revisions which the Sen-

ate committee may deem necessary without awaiting passage of the bill by the House. This would be done on the theory that the bill would be passed by the House practically in the form in which it will be reported by the Ways and Means Committee. With the Senate Committee proceeding under the Reed plan, the bill would be whipped into form ready to go before Congress as soon as Mr. Hoover returns from his South American trip and calls a special session. Chairman Smoot, Republican, Utah, of the Senate committee, has not indicated whether he approves of the Reed plan.

Bill May Be Rushed

Chairman Hawley, Republican, Oregon, of the House Committee, has expressed the belief that the committee can meet after the present session and have a tariff bill ready to present the middle of April or the first of May should President-elect Hoover call an extra session in the spring. Mr. Hawley also said he thought that the House could dispose of the measure in 10 days or two weeks. This would be rapid-fire action for such an important piece of legislation, even for the House of Representatives.

Showing the intensity with which the House committee is proceeding with its tariff-revision program plans is the fact that the Tariff Commission has been required to have ready by the end of December a report on each of the thousands of items, together with the administrative sections, in the entire law. Report will be made to committee. The commission staff is now busily engaged in preparing this report, which is a big task.

Oral testimony before the House committee will be confined, so far as practicable, to those who are qualified to give first-hand information. The committee has suggested that, in order to avoid duplication of arguments and to conserve time, those interested in the same items and having the same problems to present, agree, if possible, upon one representative to present their views. With regard to briefs, industries have been asked to file two copies in advance of their particular hearings, stating changes desired, the reasons therefor, and other material information.

Four Companies Taken Over By Foote Brothers

Stockholders of Foote Brothers Gear & Machine Co., Chicago, have approved an increase in authorized common stock to 250,000 shares, par \$5, from 120,000 shares, par \$5. The issuance was also approved for shares for the acquisition of stock control of the Lyle Culvert & Road Equipment Co., the Stockland Road Machine Co. and the Northwestern Steel & Iron Co., all of Minneapolis, and the Bates Mfg. Co., Joliet, Ill.

Program for Western Metal Congress

Steel Treaters Announce Speakers for Semi-Annual Meeting at Los Angeles in January

PREPARATIONS are rapidly maturing for the first Western Metal Congress and Western States Metal and Steel Exposition, which will be held in Los Angeles, Cal., Jan. 14 to 18, under the auspices of the American Society for Steel Treating. The congress is to be held at the Hotel Biltmore and the exposition in the Shrine Civic Auditorium.

Dr. Kotaro Honda of the Imperial University, Sendai, Japan, will be present to deliver a paper before the convention and to discuss other technical contributions to the program. Dr. Zay Jeffries, Cleveland, president of the A.S.S.T., is expected to deliver a paper on the use of aluminum in the construction of airplanes.

The following tentative technical program for the congress has just been made public:

MONDAY, JAN. 14

10 a. m.—Prof. W. H. Clapp, department of metallurgy and machine design, California Institute of Technology, Pasadena, Cal., chairman. Papers:

"The Importance of Shops in University Training," by Arthur B. Domonoske, executive head mechanical engineering department, Stanford University; "Gear Manufacturing, Including Heat Treatment," by F. A. Brooks, chief engineer Johnson Gear Co., Berkeley, Cal.; "Investigation of Fatigue Resistance of Eutectoid Carbon Steel When Drawn at Different Temperatures," by Mr. Watson, metallurgist Regan Forge Co., San Pedro, Cal.; "Heat Treatment of Dies, Tools and Gears," by Jordan Korp, Leeds & Northrup Co., Philadelphia.

2 p. m.—Foundry Division Program (Sponsored by Metal Trades and Manufacturers Association, Carroll A. Stilson, secretary); Mr. Stilson, chairman. Papers:

"Special Nickel Castings," by Paul D. Merica, assistant manager of research, International Nickel Co., New York; "Sand Testing Equipment and Demonstration," by A. A. Grubb, Mansfield, Ohio, (member of American Foundrymen's Association, sand testing committee); "Nickel-Chrome Alloy Iron," by W. R. Shimer, metallurgical engineer Bethlehem Steel Corporation, Bethlehem, Pa.; "Heat Treatment of Carbon and Alloy Steel Castings," by J. E. Donnellan, of the A. S. S. T., Cleveland, secretary recommended practice committee; "Furnaces," by R. E. Talley, president George J. Hagan Co., Pittsburgh.

TUESDAY, JAN. 15

10 a. m.

"Selecting Metals and Alloys for Severe Services Involving Corrosion, Erosion, and Heat Resistance, with Particular Reference to Oil Refinery Conditions," Speaker to be announced. "Valves and Fittings in the Oil Refinery, the Materials Used in Their Construction, Their Design, and Their Application in Particular Services, and High-Pressure Oil Conveying and High-Pressure Gas Distribution." Speaker to

be announced. "Tendency toward Higher Steam Pressures in Both Marine and Stationary Services, the Materials Available for the Construction of Boilers for these Higher Pressures, and Some of the Factors Involved in their Design," by Robert L. Daugherty, professor mechanical engineering, California Institute of Technology. "Heat, Insulation and Insulation Materials, their Properties and their Applicability for Particular Conditions Met with in Furnace Design, Industrial and Marine Boiler Services, and Services in the Chemical Industries Involving Corrosive Conditions Combined with High Temperatures." Speaker to be announced.

2 p. m.—American Society of Mechanical Engineers, H. H. Anderson, chairman of program committee.

The arrangement thus far made for this group for their particular session is in the form of a symposium of five papers on the manufacture of oil field specialties: "Tool Joints," by E. W. Goesor, Emsco Derrick & Equipment Co., Los Angeles; "Cast Steel Slush Pump Cylinders," by Lester Keim, Oil Well Supply Co. of California; "Kellys, or Grief Stems," by E. W. Timbs, National Supply Co.; "Sucker Rods," by W. H. Laury, Axelson Machine Co.; "Heat-Treated Drill Pipe," by a representative of the Standard Seamless Tube Co.

These five papers will be rather similar in the method in which the material is organized, touching chiefly upon the service to which they are subjected, the raw material used, together with its physical property, the forging and heat treating of same, the gaging and control of production.

WEDNESDAY, JAN. 16

10 a. m.—American Petroleum Institute, California Division of Development and Production Engineering, A. C. Rubel, district chairman, Union Oil Co., T. E. Swigart, national vice-chairman, Shell Co. Four papers scheduled:

"Sucker Rod Strains and Stresses," by F. W. Lake, Union Oil Co.; "Drill Pipe Failures," by Ben Stroud, National Tube Co.; "Casing Failures," by K. V. King, of Standard Oil Co. of California; "Welding and High-Pressure Gas Distribution," by C. J. Coberly, of Kobe, Inc.

2 p. m.—American Institute of Mining and Metallurgical Engineers, Glenn Robertson, Associated Oil Co., chairman of program committee and secretary. R. R. Boyd, chairman of the group, Richfield Oil Co. Four papers scheduled:

"On the Double Diagram of the Iron-Carbon System," by Dr. Kotaro Honda, research institute for iron and steel, Imperial University, Sendai, Japan; "Proposed Metallurgical Control for Small Heat-Treating Plants," by Dr. Welton Crook, professor of metallurgy Stanford University; "Electroplating and the Uses of Copper in Machinery," speaker to be announced later; "Heat Treatment of Gears," by W. H. Phillips, vice-president Molybdenum Corporation of America, Pittsburgh.

THURSDAY, JAN 15

10 a. m.—Pacific Coast Gas Association, C. M. Grow, new business manager Southern California Gas Co., chairman of program committee. Five paper scheduled:

"Gas and Electricity as Heat Mediums," by F. W. Manker, vice-president Surface combustion Co., Toledo, Ohio; "Heat-Treating Furnace Design," by J. H. Gumz, industrial engineer Pacific Gas & Electric Corporation, San Francisco; "Existing Heat-Treating Installations," by E. M. DeReamer, industrial engineer Southern California Gas Co., Los Angeles; "What the Gas Companies Are Doing For Industrial Heating," by C. M. Grow, new business manager Southern California Gas Co., Los Angeles; "Gas as Applied to Carburizing," by Robert G. Guthrie, metallurgist Peoples Gas Light & Coke Co., Chicago.

2 p. m.—Pacific Coast Electrical Association, R. C. McFadden, new business manager Southern California Edison Co., chairman. Four papers scheduled:

Address by Paul Downing, vice-president Pacific Gas & Electric Corporation, and president of the Pacific Coast Electrical Association; This session will be in the form of an illustrated symposium on "Electric Heat as Applied to Industry," by C. L. Ipsen, consulting and designing engineer of the industrial heating and welding department of the General Electric Co. Another paper has been prepared, by Gilbert D. Fish, of Westinghouse Electric & Mfg. Co., on "Design as Applied to Arc-Welded Construction."

FRIDAY, JAN. 18

10 a. m.—Society of Automotive Engineers, Ethelbert Favary, Moreland Motor Truck Co., chairman of program committee. Papers follow:

"Manufacture and Heat Treatment of Automobile Leaf Springs," by J. B. Rauhen, general manager United States Spring Co., Los Angeles; "Production of Nickel Steel Castings by Electric Furnace Method," by E. Favary, consulting engineer Moreland Truck Co.; "Aluminum as Applied to the Automotive and Airplane Industry," by Dr. Zay Jeffries, chief research engineer Aluminum Co. of America, Cleveland; "Some Phases of Aircraft Construction." Speaker to be announced. "Metallurgical and Heat-Treating Problems in Motor Car Manufacture (illustrated with moving pictures)," by J. M. Watson, chief metallurgist Hupp Motor Car Co.

2 p. m.—American Welding Society, A. E. DeBurn, Pacific Pipe & Supply Co., chairman of program committee.

"The Welding of Steel Buildings and Bridges," by Dr. Frank P. McKibbin, consulting engineer for the General Electric Co. (The American Society of Civil Engineers, the American Institute of Electrical Engineers and the American Institute of Architects will participate in this meeting.) "Heat Treatment with Oxy-Acetylene Flame," by J. J. Bruton, service engineer Oxweld-Acetylene Co., New York; "Building Machinery with Arc-Welded Steel Replacing Castings," by David Hall, district engineer Westinghouse Electric & Mfg. Co. of Los Angeles.

All morning sessions will be held at the Biltmore Hotel, and all afternoon sessions at the Shrine Auditorium.

Substitutes Used For Strategic Metals

War Department Finds That Ingredients Regarded as Essential in Case of War Can Be Provided By Other Elements

WASHINGTON, Dec. 11.—Work of the War Department in providing for adequate supplies of essential raw materials for use in possible hostilities was outlined to the annual convention of the American Mining Congress on Friday afternoon of last week by Assistant Secretary of War C. B. Robbins. The plans call for strict economy and curtailment or abolition of unnecessary uses of raw materials; ascertainment of materials of domestic origin which can be substituted for those minerals which are not in abundance in the United States; increasing domestic production; and procuring and storing in peace time an adequate supply to carry the country through an emergency.

Among minerals classed as strategic were tin, chromium, manganese, mercury, antimony, nickel and tungsten. Regarding antimony, Mr. Robbins said that there has been a reduction in military requirements for this metal by substitution of an alloy of lead with barium and calcium. Much work, he said, had been done looking to the provision of substitutes for tin in its manifold uses. By replacing bearing metals and solders containing tin with alloys containing little or no tin, he said, the department has been able to reduce its figures for direct military requirements of tin for two years from 20,000 to about 15,000 tons. It was stated that the work which is now in progress on food containers promises ultimately a much larger reduction.

"Until recently," said Mr. Robbins, "tungsten has been regarded as absolutely essential to the production of high-speed tool steel, but work which has been done by our molybdenum producers and at Watertown arsenal by our Ordnance Department leads us to hope that some day we may be able to eliminate practically all of our requirements for tungsten in tool steel. It is believed that when the technique of manufacture has been adequately worked out we shall be able to make perfectly satisfactory cutting tools of a molybdenum alloy to replace the present tungsten alloy. The molybdenum tool is fully as satisfactory as the tungsten tool. In fact, molybdenum tools that have been used in the shops at Watertown arsenal have been preferred by the workmen to the tungsten tools. We have, however, still to perfect a process which will assuredly make every molybdenum steel tool as satisfactory as every other molybdenum steel tool. If this substitution is made we can reduce our requirements for both direct and secondary uses by at least 40 per cent.

"With respect to nickel, it is interesting to note that while we formerly specified nickel steel for all artillery we now find that substitution can be

made on nickel steel with satisfactory results, up to and including the 155-mm. gun. This, of course, effects some reduction in our requirements for nickel."

The convention adopted resolutions for continued tariff protection to the mineral industries, revision of the national tax laws to relieve the mining industry of burdensome taxes, and increased funds for mining investigations by the Federal and State Bureaus of Mines and Geological Surveys. S. L. Mather of Cleveland,

vice-president of the Cleveland-Cliffs Iron Co., advocated removal of State and Federal inequalities in the iron ore mining industry. He discussed conditions in the industry in Minnesota, Michigan and Wisconsin.

The following officers were elected: President, Robert E. Tally, Clarkdale, Ariz., general manager United Verde Copper Co.; first vice-president, William H. Lindsey, Nashville, Tenn., president Napier Iron Works; second vice-president, Jesse G. McDonald, Leadville, Colo., president Downtown Mines Corporation, and former governor of Colorado; third vice-president, S. L. Mather, Cleveland, president Cleveland-Cliffs Iron Co.; secretary, J. F. Callbreath, Jr., Washington.

Centralized Lubricating System

Changes in details of the Farmer System of Lubrication, described at page 416 of our issue for Feb. 10, 1927, have permitted the system to distribute either oil or grease. A wide range in gun capacities is said to justify installation on small machine tools as well as on large ones, and to permit grouping of many machines on a single reservoir and gun. There has been a change in management accompanying the change in the system. The Farmer Lubricating System, Detroit, has been absorbed by Lubrication Devices, Inc., Battle Creek, Mich., and the name has been changed to Farval Centralized System of Lubrication; this name is part of a registered trademark.

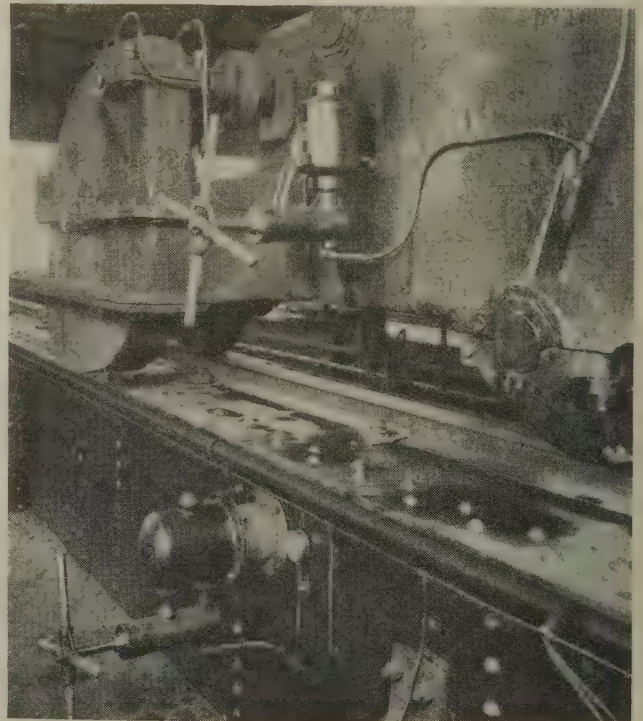
Positive measuring devices located at each bearing have been fitted with screens in the valve to keep foreign matter out. A glycerine fiber gasket forms a perfect seal when the system is idle and thus permits use of very light lubricant. With its positive

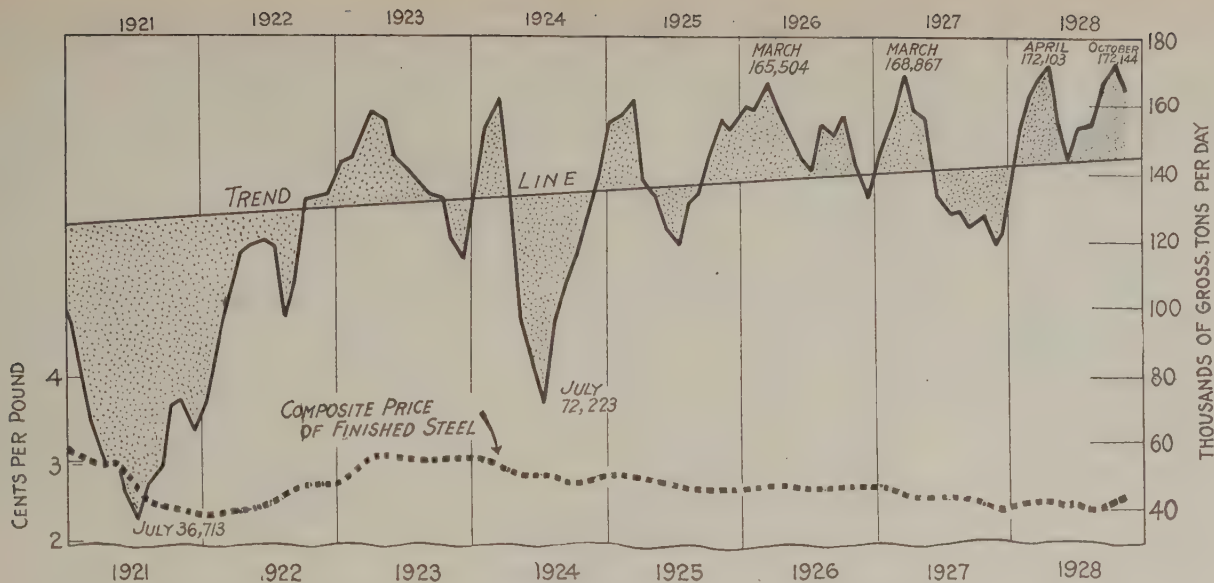
measuring valve at each bearing, this system is said to put plant lubrication on a production basis. It becomes possible to lubricate completely an entire machine or group of machines from one central station. It provides great safety for the operator, reduces the labor of oiling and delivers at high pressure to each bearing the lubricant required.

Two units are shown installed on 50-ton overhead electric traveling crane of 80-ft. span. As will be seen, one gun is mounted on the trolley and the other on the bridge. Together they lubricate 43 points with grease. Some of the features of operation of this installation are as follows:

With the old grease-cups it took a man an hour to lubricate this crane and it usually was done on overtime. Complete lubrication is now accomplished in about 2 min., eliminating danger to the oiler. Lubricant consumption daily with the old method was 2½ lb. Under the present system it is ¼ lb. of grease a day. Economy in the labor of oiling is estimated at \$300 a year.

Centralized Lubricating System on a Traveling Crane, Using One "Gun" on the Bridge and One on the Trolley. Tubes carry the grease, under controlled pressure, from the guns, to the many points of application





November Shows a Drop of 8½ Per Cent from the Record-Breaking Ingot Production of October, but It Was the Largest November Tonnage Ever Made. On the basis of daily averages the figures were high. Prices were fractionally better than at mid-year

Highest November Ingot Production

Steel Output Continues at Record-Breaking Rate—11-Month Total
5½ Per Cent Ahead of 1926 and 14 Per Cent Ahead of 1927

PRODUCTION last month of open-hearth and Bessemer el ingots in the United States, as reported by the American Iron and Steel Institute, was the highest ever recorded for November. The calculated output, at 4,259,380 gross tons, displaced the previous November high of 3,902,900 tons, which was recorded in 1925. The figure compares with 3,127,015 tons a year ago, and with the record-breaking total of 4,647,891 tons in October, which had 27 working days against 26 in November.

Eight months of the 11 so far this year have shown calculated outputs of more than 4,000,000 tons in each instance. Never before has any year contained more than four 4,000,000-ton months; 1926 had four, while 1927 had three such months and 1925 and 1923 each two.

For the 11 elapsed months of the

year, calculated production has reached 45,837,791 tons. This is the largest amount for the first 11 months of any year and exceeds the 12-month figures of all previous years except 1926. The largest previous total for 11 months was in 1926, with 43,469,439 tons. Thus the present year is 5.4 per cent higher than the previous record. (Inasmuch as the earlier figure included both crucible and electric steel ingots, which are no longer reported by the institute, the actual gain is considerably higher than that indicated above.) Compared with last year, there is an increase of more than 5,600,000 tons, or 14 per cent. In fact, the 11 months have exceeded the entire 12 months of 1927 by more than 2,400,000 tons.

Compared with October, November showed a falling off in open-hearth steel of nearly 10 per cent. As to

Bessemer steel, however, the drop was only 1¼ per cent. When comparison is made with last year, however, it is the open-hearth that has shown the greatest gain. The increase in 11 months has been more than 15 per cent, against about 7 per cent for Bessemer steel. October made a new record in open-hearth steel, as well as in total ingots.

On the daily basis, November showed an average of 163,822 tons for each of the 26 working days. This compares with 172,144 tons, the new record established in October. It compares also, however, with only 120,270 tons in November, 1927. Allowances for crucible and electric steel ingots would increase the November figure to nearly 165,000 tons a day. Details of the first 11 months of this year, with comparisons for last year, are covered in the table.

ELEVEN MONTHS' PRODUCTION OF STEEL INGOTS (GROSS TONS)

1927					1928				
Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
Open-Hearth	Bessemer				Open-Hearth	Bessemer			
3,042,133	545,596	3,789,874	26	145,764	3,280,247	498,746	3,991,332	26	153,513
3,043,492	565,226	3,812,046	24	158,835	3,308,728	521,366	4,045,304	25	161,812
3,702,660	590,709	4,535,272	27	167,973	3,700,411	567,309	4,507,520	27	166,945
3,341,750	565,440	4,127,335	26	158,744	3,509,637	564,039	4,302,573	25	172,103
3,273,593	557,785	4,047,251	26	155,663	3,397,631	581,949	4,203,190	27	155,674
2,823,107	486,053	3,495,609	26	134,446	3,016,487	527,351	3,742,964	26	143,960
2,596,349	436,883	3,204,135	25	128,165	3,075,247	533,550	3,811,573	25	152,463
2,806,347	505,596	3,498,549	27	129,576	3,386,750	569,436	4,178,481	27	154,759
2,622,977	471,548	3,268,881	26	125,726	3,381,917	545,015	4,147,583	25	165,903
2,643,562	495,845	3,316,292	26	127,550	3,802,396	598,227	4,647,891	27	172,144
2,478,627	481,599	3,127,015	26	120,270	3,441,985	590,796	4,259,380	26	163,822
32,374,597	5,702,280	40,222,259	285	141,131	37,301,436	6,097,784	45,837,791	286	160,272

Steel Corporation's Orders Decline in November

For the first time since July the unfilled orders on the books of the United States Steel Corporation showed a decrease. On Nov. 30 the total was 3,673,000 tons, a decrease of 78,030 tons from the 3,751,030 tons on Oct. 31. In October the increase was 52,662 tons; in September, 74,325 tons, and in August, 53,116 tons, but in July the decrease was 66,082 tons. A year ago, on Nov. 30, the unfilled orders were 3,454,444 tons, or 218,556 less than on Nov. 30 this year. The table gives the reported figures for the last 23 months.

	1928	1927
Jan. 31.....	4,275,947	3,800,177
Feb. 28.....	4,398,189	3,597,119
March 31.....	4,335,206	3,553,140
April 30.....	3,872,133	3,456,132
May 31.....	3,416,822	3,050,941
June 30.....	3,637,009	3,053,246
July 31.....	3,570,927	3,142,014
Aug. 31.....	3,624,043	3,196,037
Sept. 30.....	3,698,368	3,148,113
Oct. 31.....	3,751,030	3,341,040
Nov. 30.....	3,673,000	3,454,444
Dec. 31.....		3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported, at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Record Earnings for Labor in New York State Plants

Average weekly earnings of employees in representative New York State factories in October are reported by the State Industrial Commissioner at \$29.78, equalling the record made in March of last year. The gain over September was 6c., while there was an increase of 50c. compared with October, 1927. Only in April was the average in any month this year below \$29. Last year, July and November were below that figure.

There has been a gradual increase since 1922 in the yearly averages. In 1923 this was \$27.24. It reached \$27.68 in 1924, \$28.26 in 1925, \$29.02 in 1926, \$29.30 in 1927, and \$29.35 in the first 10 months of 1928. All of these figures subsequent to 1924 have exceeded the average of \$28.15 recorded in 1920, the year of inflation.

Makes Industrial Use of Talking Movie

First to use the talking motion pictures for an industrial or advertising purpose, the Graham-Paige Co., Detroit, has adopted the "Talkie" to deliver a message to its dealers throughout the country, urging them to attend the Graham-Paige dealers' convention in Detroit, Jan. 3 and 4, just prior to the New York automobile show. A satisfactory demonstration of this new use of the talking films was made in Washington, in early December, before a group of 50 Graham-Paige dealers, guests of the company at a luncheon in the

Mayflower Hotel. Included in the film are short addresses by each of the three Graham brothers, making it the first opportunity the Graham Brothers have had to deliver personal messages to their dealers throughout the country.

A portable apparatus has been constructed in which the complete reproducing and projecting machines, together with films and loud speaker, are packed in three trunks no larger than the average wardrobe trunk.

Newark Foundries Are Consolidated

Sacks-Barlow Foundries, Inc., Newark, N. J., has been formed to take over and consolidate Louis Sacks, Inc., 357 Wilson Avenue, and Barlow Foundry, Inc., 551 New Jersey Railroad Avenue, both specializing in gray iron castings. The new organization has acquired by purchase the property and business of the Morrison-Flockhart Foundry Corporation, 216 Rome Street, specializing in similar castings, and which will be consolidated with other interests. The Newark Malleable Iron Co., 357 Wilson Avenue, heretofore operated as a subsidiary of Louis Sacks, Inc., will be included in the merger, continuing in the production of malleable iron castings.

Walter Kidde is chairman of the board of the new organization; David L. Sacks, president; Samuel F. Dixon, vice-president; Arthur E. Barlow, treasurer.

Gray Iron Institute to Hold Local Meetings

The Gray Iron Institute will hold two meetings in eastern Pennsylvania this week, at which the purpose of the institute will be outlined to foundry executives in the respective localities. Thursday evening, Dec. 13, a meeting will be held at the rooms of the Manufacturers' Association, York, and the following evening there will be a meeting in the rooms of the Berks County Manufacturers' Association in Reading. The meetings will be attended by Arthur J. Tuscany, manager of the institute; Albert E. Walton, Eastern representative, and B. H. Johnson, Cresson-Morris Co., Philadelphia, who is vice-president of the institute.

Large Building Operations in November

Building contracts placed in November in the 37 States east of the Rocky Mountains are reported by F. W. Dodge Corporation at \$471,482,000. This shows a gain of 1 per cent over November, 1927, but it is 21 per cent less than in October, 1928. Residential construction made up 42 per cent

of the total and accounted for \$200,226,000. Public works and utilities amounted to \$93,228,000, commercial building to \$68,309,000, and industrial projects to \$38,665,000. New projects contemplated were reported last month at \$931,114,000, representing an increase of 51 per cent over the October total and 13 per cent above last year.

Construction for the first 11 months is reported at \$6,195,530,000. This is an increase of 6 per cent over the amount started in the first 11 months last year. The territory covered accounts for about 91 per cent of the country's total construction. Of the eight districts reviewed, three have shown higher figures than for the entire 12 months of last year.

Obituary

CHARLES E. PIERCE, for 27 years territorial manager in central New York State for the International Harvester Co., Chicago, died at Schenectady, N. Y., on Dec. 3, aged 56 years.

HENRY O. TAYLOR, founder and president of the Taylor-Tenoning Machine Co., Rockford, Ill., died on Nov. 28, aged 54 years. He was born in New York and had been a resident of Rockford for 35 years.

GEORGE WIEGAND, president Standard Stamping Co., St. Louis, died at St. Luke's Hospital in that city Dec. 8, aged 65 years. Since the death of his father in 1908, he had been head of the company. He learned the tinner's trade under his father and when 14 years old became a traveling salesman for the company. In later years his three sons, Porter, James and George G., went to work for the firm, and the former is now vice-president.

WILLIAM H. WASWEYLER, president Milwaukee Brass Mfg. Co., Milwaukee, died suddenly on Dec. 1, aged 64 years. He was graduated from the University of Wisconsin in 1885 and became president of the company in 1892.

EMIL SCHROEDTER, for many years associated with the editorial direction of *Stahl und Eisen* and also prominent in the activities of the Vereins deutscher Eisenhüttenleute (German Iron and Steel Institute), died Oct. 31 at Bonn, Germany. He was born Feb. 26, 1855, and was one of the most prominent men in the German steel industry. A four-page tribute to Mr. Schroedter, giving in detail a history of his life and emphasizing his work as head of the German steel institute, is contained in the Nov. 22 issue of *Stahl und Eisen*.

This Issue in Brief

You can lose money by making a fixture that saves as high as 90 per cent on a certain operation, if you use it infrequently. On the other hand, a fixture used regularly, which saves as little as 5 per cent, may be a profitable investment. Frequency of use, interest, depreciation and obsolescence are some of the factors to consider before fixture is made or purchased.—Page 1489.

* * *

When installing a wage incentive plan, do not put the burden of selling the plan up to the incentive engineer. This is a job for the management to perform, for any new method is resisted throughout a shop until it has proved beneficial.—Page 1495.

* * *

Safety work demands the support of company officers. Safety is not entirely mechanical. The human element looms large. Unless managers and men cooperate, the purpose of the best of safety devices may be defeated.—Page 1496.

* * *

Tougher manganese steel made from pure manganese. Manganese made by the vacuum distillation method, 99.99 per cent pure, produces a carbon-free manganese steel, which is practically independent of heat treatment.—Page 1499.

* * *

Smallest plants more efficient than largest plants in two-thirds of industries surveyed. Using as a measuring unit the value of product per 1000 factory man-hours, investigators find, in 53 industries surveyed, that the smallest plant in 35 industries showed a better performance than the largest. Range of efficiency within individual industries was wide. In foundries, for example, the range was from 16 to 1.—Page 1500.

* * *

Can castings be made satisfactorily from blast furnace metal? Yes, says engineer. Doubts that remelting in cupola purifies the metal. Sulphur content is lower and silicon is conserved when blast furnace hot metal is made directly into castings.—Page 1502.

Proposed mileage freight rates penalize steel mills located near their markets, and favor long-haul competitors, say steel makers in freight rate hearings.—Page 1509.

* * *

Need for collective bargaining by wage earners is suggested by interests of society, says Taylor Society head. And this implies, he adds, the organization of workers on a basis extensive enough to make bargaining power effective, to the end that the weaker side may be represented in negotiations as to hours, wages, status and working conditions.—Page 1511.

* * *

Cost-reducing equipment finds good market in Germany. Germans are particularly receptive to offers of any kind of machines that will further the mechanization of industry, provided German machines are not available. Thirty to 90 days' credit without interest is demanded.—Page 1546.

* * *

No business cycle theory is used in business forecast employed by telephone company. The most complete array of business and economic facts is obtained. Then these are interpreted by the use of past experience, economic factors and common sense.—Page 1487.

* * *

Low production cost per piece is not always lowest ultimate cost. Increasing the number of runs per year on a certain part will raise the cost per piece, but may be justified by balancing production costs and fixed charges on inventory.—Page 1491.

* * *

Have you adequate information about your market? Few businesses are so small that they cannot support at least one man to study markets. It is just as important to study the business which you are not getting out of a territory as the business you are getting, says engineer. Many manufacturers are content to base their methods upon opinion, rather than upon facts.—Page 1503.

Wasteful methods in shop are revealed by wage incentive plan. Cases in which men are standing idle for causes beyond their control, and where existing equipment is insufficient, are revealed by a well-designed wage incentive plan. Dragging inefficiencies into the light transforms an organization which is working in a habitual routine into a thinking organization.—Page 1496.

* * *

Instead of searching frantically for further markets for your product, give a thought to finding other products your plant is adapted to manufacture. Conditions have changed, says economist. Formerly the things which were produced were all the things there were to be sold. Now the things which can be sold are produced.—Page 1498.

* * *

How soon should new equipment pay for itself? General practice is two years, but this depends on conditions in individual industries. Where the rate of obsolescence is rapid the cost of the equipment should be extinguished in a shorter time. If the class of work is stable the new equipment may be a good investment if it pays for itself in six or seven years.—Page 1489.

* * *

Increase output 15 per cent by installing new lighting system costing 2 per cent of the payroll. Nine plants, most of them metal-working, cut costs by providing adequate lighting, and at the same time decreased accident liability.—Page 1488.

* * *

Stove pipe in the mold prevents splashing of nickel steel during pouring, and thereby improves the surface of ingot. The stove pipe catches the splash, and melts quickly in the rising metal.—Page 1492.

* * *

How greatly will machine shops be affected by the new carbide cutting tools? One machine tool builder believes that the high speeds available with carbide tools are useful only to firms having acute problems of mass production.—Page 1494.

A. I. FINDLEY
Editor

THE IRON AGE

ESTABLISHED 1855

W. W. MACON
Managing Editor

Unweighed Iron Exports Large

WHAT are called our "iron and steel exports" are regularly reported in gross tons, the statistics being familiar to all. The figures through October were given in THE IRON AGE of Nov. 29, October totaling 256,870 gross tons and the ten months of this year 2,384,301 tons. A continuance of the October rate for the last two months of the year would make a 1928 total of about 2,900,000 tons, by a margin of about 700,000 tons the largest since 1920.

The common reaction to such a showing is one of gratification. We are doing quite a business. We are, however, doing a much more important business for which weight statistics are not reported. The other merchandise exports of the United States this year actually contain in the neighborhood of one million gross tons of iron or steel. We name these figures after a careful study of the entire statement of merchandise exports. The study involved much estimating, there being basis for close estimates in many cases, particularly those involving the larger quantities, while in others not much more than a careful guess could be made. But all the estimating was done in conservative mood, and an actual count, if it were possible, would be likely to show more than a million gross tons.

The merchandise runs from freight cars to pianos, from bath tubs to tin cans and tinware, from automobiles to canned goods, from agricultural implements to printing presses.

Naturally customers of the iron and steel industry, manufacturers, canners, etc., have the heavy end of the "value product" in our exports. Still, it can be said that the bulk of the material represents a greater value per pound as it leaves the steel mill to go to the exporting consumer than does the material which the iron and steel producers export direct.

Entirely apart from such considerations, something needs to be said in appreciation of the million tons of iron and steel contained in the merchandise exports and in depreciation of the 2,900,000 tons of "iron and steel" exports. The first depreciation of the latter is a glaring one, for there is included over half a million tons of scrap! Pig iron and iron castings account for nearly 150,000 tons, and there is a considerable tonnage of semi-finished steel. We shall have for the calendar year's exports of steel products, beyond the semi-finished steel and including steel manufactures reported by weight in the regular classification, about 2,100,000 tons.

To the million tons of iron and steel contained in the exported merchandise we need to make additions to get to the steel mill basis of quantity. Instead of deducting for scrap, as in the other exports, we must add for

scrap made in manufacture, in the case of much of the tonnage, including steel used in producing automobiles, machinery, hardware, implements, etc. It is true of course that there is a considerable tonnage of iron castings.

Merely as a suggestion of the broadness of the field of these merchandise exports that contain iron and steel a few points may be mentioned. We export large quantities of oil in tin containers and over half a billion pounds of canned meat, fish, milk, vegetables and fruit. We export tinware, galvanized ware, enameled ware and sanitary ware. We export about half a billion dollars worth of electrical apparatus, machinery, office appliances and agricultural implements. Complete trucks and passenger automobiles run about 500,000 in number and car and truck engines about 150,000, other parts for assembly running in value over \$60,000,000, and parts for replacement fully \$50,000,000.

Steady Spending

THAT business has held so straight a course in recent years has been the puzzle if not the despair of forecasters. Trade simply has refused to indulge in the marked swings of former times. Only occasionally, quite too rarely, is it suggested that not enough attention is given to the human factor. We can find much explanatory material by gaging that factor, and thus it may be possible to work out something for the future.

Human nature may not change but styles do change. When in Rome, do as the Romans do. In that case one has moved into a new environment. But if the new environment comes and surrounds him it amounts to the same thing as to his conduct. The war produced tremendous changes in philosophies of life and other great changes have come since.

Steady spending has resulted. In the old days spending ran above the mean by spells and below it in intermediate spells. At one time there was "confidence" and at another time lack of confidence. Clearly it is an improvement to get away from these alternations, which were hard upon everybody except successful speculators.

The spending has been reasonably judicious. Manufacturers have been making large expenditures for new plants or for improvement in equipment of existing plants; but the object has been reduction in cost, which is always sound economics, rather than mere increase in capacity, which was sometimes unwise, freezing capital which it took years to thaw out.

There has been a great deal of building. When one recalls that two or three years ago there were warnings that in some sections at least building had been overdone, and yet the building has continued, there must

be doubt whether we shall overbuild. At the most the main result would be the depreciation of old structures that ought to have paid for themselves long ago. Such improvements are made that the newest buildings can never be in destructive competition with each other, whether they are hotels, office buildings, apartments or private dwellings.

Then we have to consider individual expenditures. It is several years now since instalment buying became a large factor in consumer merchandising. Thus far alarmist prophecies have not been borne out. Numerous cycles of these time payments have been completed and the business goes right along. In automobile buying the thing is so well established that the trade has annual statistics and can compare the percentage of "repossessions" in one year with the percentage of the preceding year. Perhaps the constant warnings against the abuse of the system have been a helpful check, as has the increasing amount of its retail purchases for which the public must pay cash, as chain store trade increases.

Somewhat puzzling is the relation of the stock market to this matter of spending. Are people putting incomes into it or taking them out? By precise arithmetical procedure it might be shown that everything balances, dollar by dollar; but we are looking at it from the human viewpoint—how individuals are affected in their conduct. If there is much spending due to speculative profits, that spending is going to stop some time. If people are putting in much surplus income, then in future they may spend corresponding money on goods or services and increase the general volume of business.

Were it not for the stock market and some things associated with it there would be a fairly clear picture of things running along at an even pace, menaced by little outside of pure accident, particularly destruction by war or nature.

Machining Manganese Steels

AN interesting piece of recent news concerns some machining experiments on Hadfield's cast manganese steel—that superlatively tough substance used for railroad frogs, steam shovel teeth and rock crusher jaws. To those who have battered away unsuccessfully at a thin fin with a cold chisel and hammer, it seemed almost a contradiction of terms to speak of machining such castings. Besides, the utility of such a development promised to be slight. Interesting, if true. If true, what of it? Who wants to machine such an alloy? Its entire utility has been developed with "non-machinability" in mind—any cutting had been done either with the oxy-acetylene flame or with a grinding wheel. The prime effort on the part of designer and foundryman is to make castings which do not require any such finishing.

Taking a broader view of the matter, however, it would appear that a considerable expansion in the use of high-manganese steel in rolled shapes or plates could be developed if they could be machined. For instance, cement mixer shells of rolled manganese steel plate should prove very successful where linings would be too bulky and heavy. Many types of battering tools, burglar proof devices, safes, armored car bodies, could use the alloy in forgings, bars or thin plate if they could be fabricated in the conventional way.

Again, we have recently discovered that the high-

chromium nickel steels are excellent to resist corrosion and scaling at high temperatures, and a large potential demand has appeared from the chemical industry. These steels are similar to high-manganese steel in that their microstructure is austenitic—all the alloying elements are in solid solution. It would seem that the problem of fabricating these new steels into equipment for high temperatures and pressures would depend very much upon the ability to shear, mill, drill, and otherwise manipulate them in the machine shop.

Thus it is already necessary to cut austenitic steels. Of course, some of these corrosion resistant steels are permanently austenitic in microstructure and consequently do not present the extreme difficulties of high-manganese steel (which, as is well known, changes locally by the cold work of a battering and cutting tool into martensite, the hardest of structures). But experience shows that many of them are so tough they machine with difficulty, even though not very hard as measured by conventional methods. In this they resemble some of the complex bronzes.

Consequently it is well that a considerable body of information is now available about how to cut austenitic manganese steel. High-speed steels containing several per cent of cobalt are the ones which have been able to turn the trick. It is necessary to use machines with an excess of power, rugged tools made with low clearances and rakes, chucked up short to eliminate chatter and vibration. Coolant is undesirable, and the chip comes off in a long curly ribbon so hot a cigarette can easily be lighted with it.

Observation of the action suggests that the frictional heat developed by the tool nose is so great that the metal being cut is heat treated just under the cut. Pressure against the manganese steel induces the austenite to martensite reaction which stops ordinary cutting; but if the local heat is more intense, the spot being cut would be tempered into the less resistant troostite. This reaction takes place readily in manganese steel; in fact, one manufacturer of plate containing 13 per cent manganese and 1.2 per cent carbon finds it to be machinable with great difficulty immediately after quenching from 1850 deg. Fahr. The Brinell hardness is only 170 and the microstructure is wholly martensitic. After drawing this quenched material for 16 hr. at 1050 deg. Fahr., the structure is mostly troostite, the Brinell hardness has increased to 387 but the machinability is improved at least four-fold. Requenching after machining restores the austenitic structure desired for wear resistance.

As remarked above, cobalt seems to be the element which imparts the additional red-hardness to the cutting edge sufficient to maintain its strength at frictional temperatures high enough to temper the work. Experiments seem to show that the low-tungsten high-vanadium steel plus cobalt (W 14 per cent, Cr 4, V 2¼, Co 4½) is the best for roughing cuts. The high-tungsten low-vanadium steel (W 18 per cent, Cr 4, V 1) plus cobalt is better for the lighter, finishing cuts.

Opinions vary as to whether 5 per cent cobalt is sufficient for the latter type of steels; at least one American and one English maker recommend a steel with tungsten up to 22 per cent and cobalt up to 12 per cent. Heat treatment standardized for high-speed steels is satisfactory, i.e., quench in oil from 2400 deg. Fahr., and draw at 1050. Somewhat better results

may be had from tools taking the first or roughing cut by drawing only to 600 deg. Fahr. This gives the maximum toughness for the body of the tool to resist the shocks; the cutting edge is rapidly heated to 1050 or 1150 deg. Fahr. by friction, and immediately develops the maximum secondary hardness at the point where it is most needed.

In this practice, where the heat developed by the tool is necessary not only to soften the work but to harden the cutting edge, use of any coolant would obviously impede the desired changes. Whether cutting fluids will be of advantage on the permanently austenitic steels is a question to be answered by future trials.

How to Ruin a Meeting

ONE does not need to attend many sessions of engineering or technical societies before he will overhear an older habitue pine for the meetings of yesteryear, when the formally scheduled paper was merely the signal for animated discussion from the floor, often taxing the chairman's ability to control. Such meetings are disparagingly compared with the present day American standard; then, it is averred, the real meat of the proposition was discovered in the extemporaneous talk; now, it is sure, the audience sits meekly, saying nothing, listening as a crowd of students, too modest to criticize their professor or loath to demonstrate that he does not know it all.

It is sure that this deadly dullness has been observed by the program committees. It is militating against the success of the societies. So they make every effort to provide some discussion beforehand—copies of the address are mailed to experts far and near, imploring them to read it and send comment. But then these fore-handed committees do this strange thing: they give such written comment right of way, instead of holding it as an "ace in the hole," to keep the meeting alive in case no other remarks are made by those present.

The easily imagined result of such practice was observed last week at one of the mechanical engineers'

meetings, and also last month at the steel treaters. A crowded program of four or five papers started with one of real interest to those present. After the author presented his subject, several members in the audience manifested a desire to comment or to ask a question. But no! Rules are rules. Afloat, women and children first; ashore, written discussion, first. So the available time was used up by reading (in the well-known vivacious manner) of page after page of comment. But even this could not dampen the ardor of those present who really wanted to start something. It remained only for the chairman to announce in a judicious manner that, since the available time for the first paper was exhausted, oral comment must be reserved until the close of the meeting.

Need it be remarked that the endurance of the audience was long passed by the time the *written* discussion on the last paper was completed, and those interested in the first had straggled out to lunch, for a walk in the fresh air, or for informal discussion in the lobbies?

SPECIALIZATION in training was urged 30 years ago by the makers of technical school curricula. Graduates were turned loose upon industry who gloried in having prepared themselves in a single branch of engineering. Their deficiencies in cultural education often became glaringly evident, the most common lack being in the use of the King's English. Much has been done to change all this and that much more remains to be done is being recognized at a gratifying rate. The new president of Stevens Institute, Dr. Harvey Nathaniel Davis, has put himself among the leaders of the advance in advocating "one fundamental unspecialized curriculum in engineering," in which studies in literature, history, economics, civil government, philosophy and art would have a larger place than heretofore has been thought needful in the making of a Stevens engineer. It is cheering to know that particular attention will be given to developing expression—an art in which the average graduate of our technical institutions has been all too backward.

CORRESPONDENCE

Making Open-Hearth Bottoms

To the Editor—It might interest your readers to know how the writer makes bottom in 50 and 75-ton basic open-hearth furnaces. When we construct a furnace and put it in operation, we proceed in making the bottom and side walls as follows:

First we take steel turnings, low in phosphorus and sulphur, put them on a pile and set them on fire. As a rule turnings carry from 150 to 200 lb. of oil to a ton, which is enough to burn them to synthetic iron. In large quantities of turnings one may find solid pieces of almost pure iron at the bottom of the pile after burning, which can be thrown into the furnace to improve the heats. After the turnings are burned, we throw them into the mill and grind them into a powder, and proceed as follows:

We take eight parts of American or Austrian magnesite, one part of burned, powdered steel turnings and one part of good basic slag, put this in the mill and thoroughly mix it. Meantime we get the furnace hot enough

to set it up, and make bottom and side walls. We are careful not to use more at a time than the heat of the furnace will set up clear through.

We have found no trouble in making three 50-ton heats in 24 hr., averaging 25 gal. of 14-16 gravity oil to the ton of steel in the ladle. We use Wills fuel oil burners, which can be set to throw the hot-spot in the flame to any point in the furnace. We find that we can do away with the old type of reversing furnace, by keeping our ingoing air at the same temperature. The furnaces work more evenly, with less time to the heat and better control.

E. COOPER WILLS

President Wills Engineering Co.
78 Jacoby Street, Maplewood, N. J., Dec. 7.

Good Welded Joints

To the Editor: Your editorial in the issue of Dec. 6, entitled "What Makes a Good Joint," clearly points out that production control is necessary for satisfactory results. I would like to carry this thought a step further to emphasize the fact that welders who are on production, i.e., doing repetitive work, are much more easily and quickly trained than though they were to handle a variety of occasional repairs.

The situation is paralleled by machine work. Back in

the days before Henry Ford had made his first million (cars or dollars) a workman was not considered a machinist until he had served a long and comprehensive apprenticeship. Then came mass production and with it division of labor and specialization. Today it has reached the point well typified in the familiar anecdote of the father who expressed pride in his son's advancement in one of the large automobile plants. "Why," he told a friend, "Jimmy used to tighten nut 42 but now he tightens nut 187!" Those who admire craftsmanship lament the passing of the old order but the fact remains nevertheless that the new system is, and will continue to be, an important factor of industrial life.

Welding now is experiencing an exactly parallel transition. It is a change that should be welcomed rather than deplored, for it means that welding is accepted as a mass production tool. When welding was merely a method of repair, it was necessary for a man to gain long experience on a wide variety of metals and types of work before he could be considered qualified as a welder. That is, he had to learn a trade.

When considering welding as a production method many manufacturers fail to realize these facts. They immediately raise the objection "Where can we get welders?" The answer is shown by experience: Operators can be trained

for repetitive work in a fraction of the time necessary to develop an all-round welder. In fact, several years' experience in the production of oxwelded pressure vessels has shown that green men are to be preferred, for they can be trained from the start in the procedure that has been determined to be correct for this work and it is not necessary for them to "unlearn" anything. A second striking instance of this proposition is described on page 1293 of your issue for Nov. 22, showing how Servel, Inc., was able to train over a hundred men and girls to make welds in steel tubing for domestic refrigerators that passed a pressure test of 900 lb. per sq. in.

The welding of piping, rapidly becoming so important in the heating and plumbing field, is another operation that can be taught with entire satisfaction in a relatively short time. The degree of training and skill necessary naturally increases for higher steam pressures but in no case does the time of training impose a handicap on obtaining efficient operators from average labor.

The problem of obtaining welders for production work is thus relatively simple and a realization of this should lead to an ever increasing number of manufacturers to adopt this modern method of joining metals.

A. G. WIKOFF.

New York

Linde Air Products Co.

Research Is First Need in Marketing

(Concluded from page 1503)

tific management in production would have been long delayed if it had not been for the invaluable assistance of cost accounting. Few businesses do not now have a problem of hastening the development of cost accounting in marketing so that it may proceed with its major problem of marketing control.

More Flexible Budgets Needed

Based on past results many companies have decided to spend 10 per cent on selling and 3 per cent on advertising and the budget is the apportioning of the lump sums thus arrived at to various classes of expense. This might be called the restrictive budget. Good commercial research would bring out definite objectives for a sales period or a campaign and would enable a definite written plan for the activities necessary to attain the objectives. This plan would call for certain assigned activities on the part of individuals which would create expenses. With this start a budget might be built up from study of these projected activities. This might be called a constructive budget. If the final budget called for more money than the executives were willing or able to appropriate, the initial plan would be modified. This would help decide what to omit from the complete structure and would make for better judgment than would have been possible without the complete plan first. Perhaps in many cases the advisability of making an investment in the manner described of setting the excess expense as a deferred charge to be amortized over a period of time might be considered.

Soon larger use of the flexible budget idea will be made, so that field executives can control the scope or character of activities on the basis of certain day by day figures while the activities are in progress. No amount of historical figures can match this method of keeping informed of the profit angle of the work being done.

Training and Compensating Salesmen

Most marketing managers will agree that new or junior salesmen need sales training, although relatively few actually carry out their belief. That the tried senior sales-

man also needs training is recognized as a problem by few. As a road gets older, ruts appear and it must be scraped and rolled and re-surfaced if it is to be kept in good condition. Ruts appear as men grow older and they are prone to consider their education as finished. In successful lives, training never ceases, and more marketing managers should put training into their schedule of operations.

Many methods have been tried and many found wanting in the human problem of proper compensation. Compensation should not merely be payment for work done; it should also be stimulation to do the work yet undone. A solution may depend upon borrowing from production its knowledge and use of the task and bonus plan with its measurements and incentives.

Hoover's Final Report As Commerce Secretary

Some of the appendices contain much of the most interesting reading in the annual report of the Secretary of Commerce for the fiscal year ended June 30. An economic review showing volume of business quantities in manufacturing, minerals, forestry, building construction, electric power production, railroad traffic, etc., and value of sales in various types of wholesale and retail trade are given for a period of seven years in comparative figures. General wholesale price indexes, gross incomes of farms, banking and finance and foreign trade make up parts of the general review.

Following this are an article showing the general progress and tendencies in our foreign trade, another illustrating progress of national efficiency in output per worker, a third on elimination of waste, including the waste of human life or limb, an article on advance in standards of living, giving indicators of material progress at intervals since 1914, and one on commercial aeronautics. These add specific information on a number of significant topics connected with our national well-being.

Practically all of this type of information has been developed in usable form under the leadership of Hon. Herbert Hoover, who was Secretary of Commerce throughout the period surveyed. It is a brand of service not theretofore enjoyed by American business and one which has high possibilities for future expansion.

Iron and Steel Markets

Steel Output Holds at High Rate

Year-End Decline in Production Likely to Be Small—Active
First Quarter in Sight—Scrap Rises—
Wire Products Advanced

STEEL production is exceeding expectations as the year-end approaches, and the business outlook for the early part of 1929 is promising. Tapering specifications for some products, such as bars, shapes, sheets and strips, are offset, in part, by releases of rail and tin plate tonnage.

Ingot output at Chicago, as a result of greater pressure for rail shipments, has risen a number of points to 83 per cent of capacity, an average that is expected to hold for the rest of the year. Operations in the Greater Pittsburgh district, although likely to decline during the holiday season, have as yet shown no deviation from the 80 per cent rate of recent weeks. The average for Steel Corporation subsidiaries, at 83 per cent, is also unchanged.

Taking into account that these estimates usually err on the conservative side, as was the case in November, output for this month will probably set a new December record and it may prove surprisingly close to the November daily average.

The lack of price incentive, rather than any noticeable change in the volume of consumption, accounts for the decline in specifications and new business in some products. Apparently a tendency to buy at shorter range, together with heavy shipments, was an important factor contributing to the November decline of 78,000 tons in the Steel Corporation's unfilled orders—the first decrease since July. The total on Nov. 30, however, was 218,500 tons larger than on the same date one year previous.

Reduced specifying has occurred particularly in bars, plates and shapes. With no higher prices announced for first quarter, buyers see no reason for heavy last minute releases against current contracts, nor are they in haste to cover for the coming quarter.

In sheets, which have been advanced \$2 a ton, a fair amount of forward contracting has been done, but specifying has been cautious. Failing to induce mills to delay shipments until January, many sheet buyers are waiting until the mid-month deadline, thus to prevent, if possible, pre-inventory deliveries.

In tin plate the technical position of the market has resulted in a sharp rise in production, operations now averaging 87 per cent, compared with 70 per cent a month ago. The announcement of a price of 10c. more a base box released liberal specifications for 1929, and brought in considerable spot business.

Railroad demand is also expanding. At Chicago, largely because of liberal rail and accessory bookings, sales in the past two weeks were equal to those for any 14-day period this year. New rail purchases include 88,000 tons for the Baltimore & Ohio and 50,000 tons for the Missouri Pacific. Specifications for steel re-

quired in cars recently purchased are beginning to reach the mills, and the outlook for further freight equipment buying has been brightened by fresh inquiries, among them 3000 cars for the Missouri Pacific, 1000 for the Lehigh Valley and 500 for the Chicago Great Western. Adding the pending equipment purchases of the Santa Fe, Louisville & Nashville and the Rock Island, more than 15,000 cars are now in the market.

Steel demand from the automobile industry promises to rebound sharply in January. Motor car builders, although at present curtailing operations as inventory-taking approaches, are planning large production schedules for the first quarter. Chicago reports that automobile parts makers are already taking larger quantities of steel.

A recovery of strength in scrap prices is also regarded as an augury of a more active steel market next year. Heavy melting steel at Pittsburgh has advanced 75c. a ton to \$17.75, or within 25c. of its peak in October.

Prospective structural steel work is of growing proportions. Out of 58,000 tons added to pending projects this week, 34,000 tons is for New York subways and 10,000 tons for a Government building at Washington.

Farm implement plants continue to take more steel, although according to current estimates they have consumed 60 per cent more steel this year than in 1927.

A policy intended to protect the position of the jobber is seen in the announcement of an advance on wire products that introduces a new method of quoting. Under this plan, which applies to all items except woven wire fencing and wire rods, base prices will apply on shipments to retailers and consumers who buy in carload lots and jobbers will be given a preferential of \$2 a ton. The method, similar to that used by makers of pipe and bolts, nuts and rivets, reverses the former practice of quoting base prices to jobbers and attempting to obtain an advance of \$2 from other carload buyers. While the new quotations are \$4 above previous base prices, they represent an increase of only \$2 to jobbers.

Another price adjustment affects charcoal and lap-welded steel boiler tubes, which after Jan. 1 are to be sold on the basis of weights and price lists used by manufacturers of seamless boiler tubes. A new schedule of discounts has been published.

Ingot production in November, 4,259,380 tons, was the highest ever recorded for that month. Output for the 11 months was greater than for any previous 12 months except 1926.

THE IRON AGE composite price for finished steel has advanced from 2.362c. to 2.391c. a lb., the highest figure in 22 months. The pig iron composite remains at \$18.59 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
No. 2, fdy., Philadelphia.....	\$21.26	\$21.26	\$21.26	\$19.76
No. 2, Valley furnace.....	18.00	18.00	17.50	17.25
No. 2, Southern, Cin'tl.....	20.19	20.19	19.94	19.69
No. 2, Birmingham.....	16.50	16.50	16.25	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	20.25	20.25	19.75	19.00
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh.....	20.01	20.01	20.01	19.51
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.25	18.25	18.25	17.50
Gray forge, Pittsburgh.....	19.26	19.26	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.95	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars New York.....	2.24	2.24	2.29	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.22½	2.22¼	2.22½	2.12½
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.19½	2.19½	2.19½	2.09½
Steel hoops, Pittsburgh.....	2.10	2.10	2.20	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
Sheets, black, No. 24, P'gh....	2.85	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill.....	2.95	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh....	3.60	3.50	3.50	3.60
Sheets, galv., No. 24, Chicago dist. mill.....	3.70	3.60	3.60	3.70
Sheets, blue, 9 & 10, P'gh....	2.10	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago dist. mill.....	2.20	2.10	2.10	2.15
Wire nails, Pittsburgh.....	2.65	2.55	2.55	2.50
Wire nails, Chicago dist. mill..	2.70	2.60	2.60	2.55
Plain wire, Pittsburgh.....	2.50	2.40	2.40	2.40
Plain wire, Chicago dist. mill..	2.55	2.45	2.45	2.45
Barbed wire, galv., P'gh.....	3.30	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill.....	3.35	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.25

Old Material, Per Gross Ton:	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
Heavy melting steel, P'gh.....	\$17.75	\$17.00	\$17.25	\$15.00
Heavy melting steel, Phila....	15.00	15.00	15.50	13.50
Heavy melting steel, Ch'go....	14.50	14.50	14.50	12.00
Carwheels, Chicago.....	14.25	14.25	14.25	13.50
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	15.50	14.25
No. 1 cast, Philadelphia.....	16.25	16.25	16.25	16.00
No. 1 cast, Ch'go (net ton)...	15.50	15.50	15.50	14.00
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)...	13.25	13.25	13.00	10.50

Coke, Connellsville, Per Net Ton at Oven:	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.85	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	16.12½	14.25
Electrolytic copper, refinery...	15.75	15.75	15.75	13.87½
Zinc, St. Louis.....	6.35	6.35	6.25	5.75
Zinc, New York.....	6.70	6.70	6.60	6.10
Lead, St. Louis.....	6.35	6.32½	6.20	6.32½
Lead, New York.....	6.50	6.50	6.35	6.50
Tin (Straits), New York.....	49.50	52.50	50.12½	58.50
Antimony (Asiatic), N. Y.....	9.62½	10.00	10.37½	11.37½

Pittsburgh

Steel Business Sufficient to Maintain 80 Per Cent Operation —Advance in Heavy Melting Steel

PITTSBURGH, Dec. 11.—Specifications against existing contracts for finished steel are still coming along in volume sufficient to sustain an ingot production of approximately 80 per cent of capacity for this and nearby districts. But in most products shipments on old commitments are exceeding fresh purchases and signs point strongly to some recession in plant engagement during the holiday season.

With specifications for early 1929 requirements and some prompt buying to escape the advance in prices that becomes effective on Jan. 1, tin plate mills are having an exceptionally high rate of operation. Independent capacity is fully 90 per cent engaged, and it is estimated that close to 87 per cent of all mills now are in production. Rail mills also are busier and taking more steel. On the other hand, scheduling of bar, sheet and strip mill operations is becoming a little more difficult with backlogs running down and fresh buying light.

First quarter contracting is proceeding with less speed than would probably be the case if materially higher prices were proposed in bars, plates, shapes and cold-finished steel bars. Fourth quarter prices are continued into the first quarter and therefore coverage merely becomes an extension of existing arrangements. There has been a fairly good amount of contracting for the next quarter in sheets, but in hot-rolled

strips the report still is that several of the large buyers have yet to cover their needs for the period. It is said that buyers and sellers are apart on prices, with buyers resisting the demands of the mills.

Since a week ago, almost all producers of wire and wire products have adopted a new price schedule announced late last week by a large Pittsburgh manufacturer. This schedule sets up an advance of \$2 a ton

on all products except woven wire fence and wire rods on first quarter contracts. It also seeks to establish a new mode of quotation in that announced prices refer to carloads to other than jobbers.

Effective Jan. 1, makers of charcoal iron and lapwelded steel boiler tubes are adopting the weights and price lists used by manufacturers of seamless boiler tubes as the basis of a new list of discounts. On carload lots, lapwelded steel boiler tubes will be almost on the same basis as hot-rolled seamless tubes; the difference will be in the supplementary discount, which is 5 per cent on the latter and two fifths on the lapwelded tubes.

Primary materials are featured by a sharp rally in the price of heavy melting steel scrap. At least two local melters have paid \$18 for that grade, while even more was paid for offerings in a railroad list awarded late last week. Dealers with short orders to cover have become disturbed by the scantiness of offerings and the situation in the Youngstown and nearby districts has become very strong, since expected relief in large shipments from the Detroit district with the closing of Lake navigation has failed to materialize. Automomo-

bile production declined with the ending of Lake shipping season and with it the production of scrap. Even higher prices are mentioned on first quarter tonnages.

Pig Iron.—The pig iron market, so far as the immediate Pittsburgh district is concerned, is dull and not very steady. Melters are drawing against supplies under contract, and the most active merchant furnaces are shipping more than they are producing, but new business, influenced by inventory considerations, runs chiefly to carload lots. The Westinghouse Electric & Mfg. Co., in the market for foundry, silvery and Bessemer irons for its requirements over the first half of next year, has not yet closed and is reported to have a lower price on the foundry iron than \$18, Valley furnace, for the base grade. No great trouble is experienced in getting that price on small lots, and most of the current inquiries are of that character. A Pittsburgh district steel maker was able to place about 3000 tons of basic iron for December-January-February delivery at less than \$17.50 at Valley furnace, but the deal is not believed to have involved any Valley iron. This grade, however, now is available from several sources at \$17.50, Valley furnace, and a buyer of several weeks ago recently added to the original purchase at that price. Struthers furnace, Struthers, Ohio, will be started Dec. 12, after a long suspension.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	\$18.25 to 18.50
Gray forge	17.50
No. 2 foundry.....	18.00
No. 3 foundry.....	17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Hot-Rolled Flats.—Buyers of strips are specifying steadily on old orders, but do not find it necessary to make new purchases. First quarter contracting has not assumed large proportions. Several of the large automobile manufacturers have yet to close for their first quarter needs, and producers report considerable resistance to price from that direction.

Cold-Rolled Strips.—There is a fairly heavy run of specifications on this quarter's contracts, also a fair amount of advance buying. Prices are holding well at 2.85c., base Pittsburgh or Cleveland, and an effort still is being made to obtain 2.95c., base, from buyers whose orders generally are for small lots and whose specifications are rather exacting.

Semi-Finished Steel.—Users have until the end of the month to enter specifications on fourth quarter contracts and this condition probably accounts for a paucity of contracts for the first quarter. January requirements can be specified from this quarter's commitments. Sheet bars are held \$1 a ton higher for the next quarter than in this quarter, but no advance is sought on billets and slabs. Current specifications are steady, but the volume is somewhat less than it was recently, in keeping with the fact that the demand for the finished products is less urgent with the approach of the end of the year. An advance of \$2 a ton on wire products on first quarter contracts does not include wire rods, which remain at \$42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—In view of the fact that present contract prices of these products hold for the first quarter of 1929, it is not surprising that the market is rather quiet, both as to current and first quarter purchases. There is no price incentive for specification of unshipped fourth quarter tonnages, and business for the first quarter suffers somewhat from the fact that unspecified tonnages for this quarter will become part of first quarter contracts. Releasing of tonnages is well under the rate of October and November, but has not dipped as low as was expected, because there has been no accumulation of stocks in second hands and requirements as they develop quickly are reflected in demands upon the mills. It is said that the mills are meeting with some success in raising prices to the very large consumers of bars, and that 1.90c., base Pittsburgh, will be more truly a

minimum in the new quarter than it has been in this quarter. It is probable that mills also will seek more money on specific structural steel jobs which usually are given preferential price treatment. Fabricated steel awards to shops in this district still are few, but inquiry is reported better.

Rails and Track Supplies.—Track accessories orders still lag behind those for standard-section rails. Old orders are pretty well worked out. Increased production of standard-section rails is immediately ahead, as most of the roads accept shipments during the winter to be able to take advantage of the first break in the weather in the spring. The list of spike makers in this and nearby districts has been considerably augmented in the past year, but prices hold despite the increased competition.

Wire Products.—One large producer, under date of Dec. 5, announced the withdrawal of all prices on plain wire, wire nails and other wire products except those on woven wire fence and on the same date announced its prices on first quarter contracts. The new schedule calls for an advance of \$2 a ton over this quarter's prices and also marks a change in the mode of quotation in that the prices are to "carload buyers," instead of "to jobbers in car lots," as formerly. Several other manufacturers since have adopted the new schedule and plan of quotation. For several months the mills have had a nominal extra charge of \$2 a ton on nails and wire to buyers other than jobbers, but it has not been uniformly or regularly exacted. This arrangement was intended to give the jobber, who buys to sell again, an advantage over retailer or consumer, and apparently it is now intended to give the plan full application in the first quarter. While the mills will continue to regard as entitled to direct mill service a few large users, it appears to be part of the plan to divert smaller business to the jobbers by quoting as high a price on carloads to retailers and small consum-

THE IRON AGE Composite Prices

Finished Steel

Dec. 11, 1928, 2.391c. a Lb.

One week ago.....	2.362c.
One month ago.....	2.369c.
One year ago.....	2.307c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

High			Low		
1928	2.391c.	Dec. 11;	2.314c.	Jan. 3	
1927	2.453c.	Jan. 4;	2.293c.	Oct. 25	
1926	2.453c.	Jan. 5;	2.403c.	May 18	
1925	2.560c.	Jan. 6;	2.396c.	Aug. 18	
1924	2.789c.	Jan. 15;	2.460c.	Oct. 14	
1923	2.824c.	Apr. 24;	2.446c.	Jan. 2	

Pig Iron

Dec. 11, 1928, \$18.59 a Gross Ton

One week ago.....	\$18.59
One month ago.....	18.50
One year ago.....	17.54
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High			Low		
1928	\$18.59,	Nov. 27;	\$17.04,	July 24	
1927	19.71,	Jan. 4;	17.54,	Nov. 1	
1926	21.54,	Jan. 5;	19.46,	July 13	
1925	22.50,	Jan. 13;	18.96,	July 7	
1924	22.88,	Feb. 26;	19.21,	Nov. 3	
1923	30.86,	Mar. 20;	20.77,	Nov. 20	

ers as would be quoted by jobbers. The new prices "to carload buyers" are \$2.75, base, per keg, Pittsburgh, for bright nails; \$2.75, base, per 100 lb. for coated nails; \$2.60, base, per 100 lb. for bright wire, and corresponding prices for galvanized wire, barbed wire and staples, with the former differentials retained as to other basing points. These prices are \$2 a ton above what would have been obtained on the basis of former jobbers' carload prices plus the extra of 10c. per 100 lb. No reference is made to jobbers' carload prices, but it is assumed they will take a range 10c. per 100 lb. below the new schedule, or \$2.65, base, per keg, for nails and \$2.50, base, per 100 lb. for plain wire. The less-than-carload extra charge remains as formerly at 25c. per 100 lb. over the carload price.

Tubular Goods.—The demand for pipe is steady rather than active. In a general operation of not more than 70 per cent of capacity, the best showing is among the large lapwelding furnaces, which have a good complement of line pipe, and in seamless mills, which reflect the fact that much of the oil country pipe now called for is for deep wells and pipe of great ruggedness is required. Butt-welded pipe reflects in demand the fact that this is the low point of the year in building and construction and also that jobbers do not want to add to their inventories just now. Makers of charcoal iron and lapwelded steel boiler tubes are to put into effect a new method of quotation, which is given in detail elsewhere.

Sheets.—The market now appears fully established at the first quarter prices announced several weeks ago. Except possibly on blue annealed sheets, neither orders nor specifications can now be taken for shipment between now and the end of the month, and the mills are quite generally imposing the first quarter prices on shipments to be made next

month. Users of automobile body sheets still are trying to get the mills to defer shipments on remaining fourth quarter tonnages beyond the year-end inventory date, and some of the same tendency is noted among consumers of other kinds of sheets, but commonly the mills are insisting upon shipment with the completion of orders and for specifications by Dec. 10 by one company and Dec. 15 by others on remaining fourth quarter contract tonnages. Shipments of the American Sheet & Tin Plate Co. this year will be the largest, with one exception, in the history of the company. Its combined sheet and tin plate shipments will set an entirely new high record.

Tin Plate.—Mill operations still are rising, notably those of the independent makers, two of which are running all of their mills, while another will next Monday put on a 12-mill unit, which has been idle for the past two months or so. Early 1929 requirements are being specified freely and there is some buying for early shipment by consumers who want to avoid the higher prices applying on first quarter and half contracts. This year will run in shipments well ahead of last year, but will not quite reach the total for 1926.

Cold-Finished Steel Bars and Shafting.—While some makers had somewhat heavier releases against contracts in the past week as compared with the previous week, the market still is best described as moderately active. Getting buyers under contract for the first quarter is not proving difficult; the fact that the prices remain unchanged means that not much price resistance is developing and there will be some unspecified fourth quarter tonnage to carry over.

Coke and Coal.—Spot furnace coke is commonly selling at \$2.75 per net ton, Connellsville ovens, and while occasional small-lot sales occur at a slight advance, the coke is not for blast furnace use. Producers are scaling production in keeping with the fact that demand is light; in view of the taking up of the excess production through resumptions by two or three blast furnaces between now and end of the month, it is believed a stronger spot situation is ahead. There is much first quarter and first half contracting in foundry coke at unchanged prices. The spot foundry coke market is amply supplied, however, and prices are no more than steady. The coal market is so weak that a number of mines have been obliged to suspend production because of the losses which present selling prices entail.

Old Material.—The market has developed renewed strength in heavy melting steel in the past week. Light offerings of this grade have made dealers with short orders to cover a little nervous, and on top of that came the award of a railroad list; the heavy melting steel and scrap rails were sold direct to a mill at \$17.50, while another railroad list developed a price

of \$18.25, delivered this district, for the heavy melting steel. The market appears in one week to have regained much of its decline of the previous month or so. Still higher prices seem probable, as in addition to dealer interest in supplies, several steel manufacturers are negotiating for first quarter coverage. Dealers seem indisposed to sell for that delivery at less than \$18, delivered this district, while in Youngstown the asking price is \$19. Machine shop turnings have had a sharp advance since last report, sales being reported up to \$13, although the purchaser immediately after buying imposed a suspension upon shipments, and there is doubt that this price could be repeated. The low side of the range on heavy melting steel is \$17.25, which dealers are paying for small lots.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$17.25 to	\$18.25
Scrap rails.....	17.50 to	18.00
Compressed sheet steel....	17.50 to	18.00
Bundled sheets, sides and ends	16.00 to	16.50
Cast iron carwheels.....	15.00 to	15.50
Sheet bar crops, ordinary..	17.00 to	17.50
Heavy breakable cast.....	13.00 to	13.50
No. 2 railroad wrought...	17.25 to	18.25
Hvy. steel axle turnings..	15.00 to	15.50
Machine shop turnings....	10.50 to	11.00
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	18.50 to	19.00
Railr. coil and leaf springs	18.50 to	19.00
Rolled steel wheels.....	18.50 to	19.00
Low phos. billet and bloom ends	20.50 to	21.00
Low phos., mill plates....	19.00 to	19.50
Low phos., light grade....	18.00 to	18.50
Low phos., sheet bar crops	19.00 to	19.50
Heavy steel axle turnings..	15.00 to	15.50
Electric Furnace Grades:		
Low phos. punchings.....	18.50 to	19.00
Hvy. steel axle turnings..	15.00 to	15.50
Blast Furnace Grades:		
Short shoveling steel turnings	12.00 to	12.50
Short mixed borings and turnings	12.00 to	12.50
Cast iron borings.....	12.00 to	12.50
Rolling Mill Grades:		
Steel car axles.....	20.00 to	21.00
No. 1 railroad wrought...	13.00 to	13.50
Sheet bar crops.....	17.25 to	18.25
Cupola Grades:		
No. 1 cast.....	14.50 to	15.00
Rails 3 ft. and under....	17.50 to	18.00

Detroit Scrap Market is Slightly Weaker

DETROIT, Dec. 11.—Prices on old material in the district have not changed in the past week, and, while there is some tendency toward a slight weakness in the market, this has not materialized to affect prices downward.

Shipments of pig iron are somewhat below November figures, but not to the extent that furnaces serving the district will be forced to pile iron during the month.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to	\$13.50
Borings and short turnings	9.00 to	9.50
Long turnings	8.50 to	9.00
No. 1 machinery cast....	14.00 to	15.00
Automobile cast	19.00 to	20.50
Hydraul. comp. sheets....	12.25 to	12.75
Stove plate	11.00 to	12.00
No. 1 busheling	11.00 to	11.50
Sheet clippings	8.00 to	8.50
Flashings	11.50 to	12.00

Warehouse Prices, f.o.b. Pittsburgh	
	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large.....	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms	
	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars	
	(Open hearth or Bessemer)
	Per Gross Ton
Pittsburgh	\$33.00 to \$34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00

Slabs	
	(8 in. x 2 in. and under 10 in. x 10 in.)
	Per Gross Ton
Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	\$33.00 to 34.00

Skelp	
	(F.o.b. Pittsburgh or Youngstown)
	Per Lb.
Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.

Wire Rods	
	(Common soft, base)
	Per Gross Ton
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron.....	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus.....	36c. to 38c.
Manganese ore, Brazilian, African or Indian, basic 50%	35c. to 37c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.40 to \$12.00
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.85
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines.....	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines.....	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines.....	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to 1.00

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$34.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$31.00
11%	33.00
12%	\$35.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$24.00
7%	25.00
8%	26.00
9%	27.00
10%	\$29.00
11%	31.00
12%	33.00

Other Ferroalloys	
Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. An-niston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick		
	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons.....	70
C.p.c. and t, square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 3/4 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets	
	(1/2-In. and Larger)
	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets	
	(3/8-In. and Smaller)
	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws	
	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)
	Per Cent Off List
Milled cap screws.....	80, 10 and 5
Milled standard set screws, case hardened, 80 and 5	80 and 5
Milled headless set screws, cut thread.....	75 and 10
Upset hex. head cap screws, U.S.S. thread.....	85
Upset hex. cap screws, S.A.E. thread.....	85
Upset set screws.....	80, 10 and 5
Milled studs	70

Chicago

Steel Mill Output Gains to 83 Per Cent and Orders Assure This Operation for Remainder of Year

CHICAGO, Dec. 11.—The Inland Steel Co. has blown in its No. 1 blast furnace, bringing the total number of steel mill stacks in active service to 24 out of 36 in the district. In October and November 23 were in blast. A merchant furnace at St. Louis also has been lighted. That pig iron capacity in the Chicago district is not now considered excessive is indicated by contemplated new construction, which includes two steel mill stacks and the rebuilding to larger capacity of a local merchant furnace.

Releases against steel contracts are in such volume that the present rate of ingot output seems assured for the remainder of the year. With production at 83 per cent, a gain of several points in the week because of heavier demands for prompt delivery of standard-section rails, sellers are slowly using up cold iron.

Total tonnage of ore, limestone and coal passed over Chicago steel mill docks in 1928 will establish a record for all time.

Following the lead by producers east of here, Chicago mills have named 2c. to 2.10c. per lb. for plates, shapes and bars to be delivered in the first quarter. Inquiry is brisk, which is taken by the trade as a reflection of consumers' estimate of general business in the early part of the new year.

Sales, including rails and track accessories, are a trifle larger than in the previous week, making the past two weeks the equal of any 14-day period this year.

Automobile parts manufacturers are setting a faster pace, and the steel industry already is feeling the impulse of the greater activity. Automobile building usually lags about 30 days behind the first improvement in specifications and orders from parts makers. Automobile frame makers are taking larger quantities of hot-rolled strip.

Pig Iron.—The Chicago market remains steady at \$20, notwithstanding that sales of boat iron and off grades from steel mills are reported at lower quotations. Sales, as gaged by recent weeks, are light, partly because of the lower foundry melt usually experienced during the holiday season and also because of the fact that most consumers are well covered for the remainder of the year. Malleable foundries are operating at close to capacity and occasionally find need of small additional purchases to meet immediate requirements. On the whole, the local foundry melt is well sustained. Silvery prices are not stable. Some producers recently named advances of \$1 a ton, while others asked increases of \$2. In the week sales have been made at prices prevailing before the advances.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus.....	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail) ..\$22.51 to	23.01
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent.....	30.79
Bess. ferrosilicon, 14-15 per cent...	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet from the standpoint of sales. Shipments are going forward at an undiminished rate.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Coke.—Forward contracting for the first half of the new year is practically completed at \$8 a ton, local ovens. Shipments remain at the high rate reached earlier this month.

Bolts, Nuts and Rivets.—Inventory taking has further reduced the total volume of specifications. Producers continue to hold to 65 per cent of output, and are stocking the margin between production and shipments.

Wire Products.—Western producers of these commodities are announcing advances of \$2 a ton, effective immediately. The usual differential of 25c. per 100 lb. for less than carload quantities will be continued, and terms are 2 per cent for cash in 10 days on mill invoice value of material. In naming new prices the leading producer is using dealers' quotations at \$2.80 for nails and \$2.65 per 100 lb., Chicago, for plain wire. The general practice of the trade, however, is to name carload prices to jobbers at \$2.75 for nails and \$2.55 for plain wire, representing a \$2 advance over recent quotations to the jobbing trade. Shipments from Western wire mills are steady, and output is close to 65 per cent of capacity. Little effort is being put forth by sellers to accumulate stocks. Inquiry from the manufacturing trade is more active, especially from automobile parts makers which are anticipating a rise in demand for their products soon after the turn of the year. Specifications are lighter from some sources because of the inventory period. The jobbing trade is unchanged except in the Northwest, where business slows down as severe winter weather approaches. Prices for wire and wire products are given on page 1527.

Sheets.—Prices are stronger. Local producers are accepting first quarter contracts at 2.25c. per lb., Chicago, for blue annealed sheets, 3c. for black and 3.75c. for galvanized. Forward contracting is more active, but users are conservative and the full swing of a buying movement has not yet been felt by producers. Specifications

in the first 10 days in December are measurably ahead of the corresponding period in the preceding month. Releases against old orders are coming from a wide circle of users, but individually they are smaller than a week ago. Output is steady at 80 per cent of capacity, and deliveries are from three to four weeks on galvanized, two to three weeks on black and two weeks on blue annealed. Roofing sheets may be had promptly.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Hot-Rolled Strip.—Automobile parts makers are entering heavier specifications for material that will be needed soon after the turn of the year. Several local mills are operating at capacity. Prices are steady at 2c. per lb. for hot-rolled strip wider than 6 in.

Cast Iron Pipe.—Winter buying is gaining momentum. Milwaukee will close Dec. 28 on 9000 tons of 6 to 16-in. Class C pipe and 450 tons of fittings. Racine, Wis., is in the market for 1800 tons, and several other municipalities in Wisconsin will soon come into the market. A contractor's job in Cincinnati will take 300 tons of 6-in. pipe. Inquiries in Illinois, Indiana and Western Michigan are slow in developing. The United States Cast Iron Pipe & Foundry Co. bid \$41.42 a ton, delivered, on 6000 tons of 24 to 48-in. pipe at Detroit. This figures back to \$33.50 a ton, Birmingham. A foreign maker bid \$39.90 a ton, delivered, on the 36-in. size. Other delivered quotations were \$42.25 by the American Cast Iron Pipe Co. on 1000 tons of 24-in. and \$40.65 by James B. Clow & Sons on 750 tons of 24-in. pipe. Prices have not been tested in the local market.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$46.20; 4-in., \$46.20 to \$50.20; Class A and gas pipe, \$4 extra.

Structural Material.—Awards during the week totaled 5000 tons, and fresh inquiry is for 1500 tons and an unstated amount of steel for an office building in Chicago for Swift & Co. Recent estimates of the steel needed for the Chicago Board of Trade Building now place the figure at 18,500 tons. Local shops are well engaged, but books have been greatly reduced during the late fall weeks of inactive buying. Producers of shapes are accepting first quarter business at 2c. to 2.10c. per lb., Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—The Baltimore & Ohio has closed for 88,000 tons of standard-section rails for delivery in 1929. This tonnage was divided among the Bethlehem Steel Co., Carnegie Steel Co. and the Inland Steel Co. Included in this business is 3000 tons for the Baltimore & Ohio Chicago Terminal. The Missouri Pacific has ordered 50,000 tons

of rails and a round tonnage of track accessories. Fresh inquiry for rails from Western railroads total 50,000 tons. Orders for track accessories total 20,000 tons and inquiry totals 18,000 tons. Output by local rail mills is heavier, not because of the opening of the 1929 rail-rolling program, but due to releases of tonnages not expected by producers. The iron tie plate market is quiet. Light rails are moving only in car-load lots.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Plates.—Of foremost interest in this market is an inquiry from the Missouri Pacific for more than 3000 cars, requiring in all not less than 38,000 tons of steel. The Missouri Pacific and the Chicago & North Western are in the market for locomotives. Specifications for car materials are reaching mills. The total volume to date, though small, is having an effect on rolling schedules, which have been gradually creeping ahead for the last two weeks. Many miscellaneous buyers, anticipating requirements after the turn of the year, are now making known their wants, which tend further to obligate local plate mills. Western Oil refiners are seeking 10,000 tons of plates for oil storage tanks. Although official announcements have not been made, it is known that local producers are accepting first quarter business at 2c. to 2.10c. per lb. Forward contracting has assumed fair proportions.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Tin Plate.—Prices are steady, and forward contracting is moderately active. Specifications against old low-priced contracts are heavy and hold mills close to capacity output.

Bars.—Demand for mild steel bars is turning upward. Shipments have grown a trifle in the week, and bar mill schedules are extended. Automobile parts makers, whose needs for

steel come three to four weeks ahead of the demands from automobile manufacturers, are specifying in larger quantities, and they have arranged shipping schedules well into January. Several Chicago mills are operating at capacity, and deliveries are not better than three to five weeks. Farm implement manufacturers continue to expand production facilities, and they are taking increasing tonnages of steel. Some observers estimate that steel used in farm implements in 1928 will exceed by 60 per cent that used in the preceding year. First quarter business in soft steel is being taken at 2c. to 2.10c. per lb. A liberal number of specifications for alloy steel bars for delivery after the turn of the year have come to producers. Forward contracting continues at a fair rate. Demand for iron bars is light. Forward buying of rail steel bars at 1.95c., Chicago Heights, is active. Current specifications are fully equal to output.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Reinforcing Bars.—Dealers are engaged in trying to close old quotations before Dec. 15, which is the dead line on bids made prior to price advances on Dec. 1. New quotations on billet steel reinforcing bars out of Chicago warehouses are 2.35c. a lb. for orders of more than 18 tons, 2.60c. for 5 to 18 tons and 2.85c. a lb. for smaller lots. Fresh inquiry is moderately active, but for the most part in small tonnages. Shop operations average 50 per cent of capacity and deliveries are reasonably prompt.

Old Material.—A steel company has bought 20,000 tons of heavy melting steel at \$15 a gross ton, delivered, and another has bought a tonnage at \$14.50. Carlot sales of cast iron wheels have brought 25c. a ton above prices quoted. However, the demand for this grade is light and yards are overstocked. Considering the interest shown by users, carlot sales are scarcely indicative of the market as a whole. Foundry grades are active in small lots. Railroad malleable is scarce; consumers outside of Chicago are willing to pay more than local users for this grade.

Dealers continue to pay from \$15 to \$15.25 a gross ton for heavy melting steel to be delivered against old contracts. The supply of this grade is more liberal from most sources. The Santa Fe, the Illinois Central and the Chicago & Alton have lists to sell.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:
Heavy melting steel.....\$14.50 to \$15.00
Shoveling steel..... 14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails 15.75 to 16.25
Hydraulic compressed sheets 13.00 to 13.50
Drop forge flashings..... 10.50 to 11.00
Forg'd, cast and r'd steel carwheels 17.75 to 18.25
Rail'd tires, charg. box size 17.50 to 18.00
Rail'd leaf spring cut apart 17.50 to 18.00

Acid Open-Hearth Grades:
Steel couplers and knuckles 16.00 to 16.50
Coil springs..... 18.25 to 18.75

Electric Furnace Grades:
Axle turnings..... 14.50 to 15.00
Low phos. punchings..... 16.50 to 17.00
Low phos. plate, 12 in. and under 16.00 to 16.50

Blast Furnace Grades:
Axle turnings..... 12.00 to 12.50
Cast iron borings..... 11.75 to 12.25
Short shoveling turnings.. 11.75 to 12.25
Machine shop turnings.... 8.00 to 8.50

Rolling Mill Grades:
Iron rails 15.00 to 15.50
Rerolling rails 16.50 to 17.00

Cupola Grades:
Steel rails less than 3 ft.. 17.25 to 17.75
Steel rails less than 2 ft.. 19.00 to 19.50
Angle bars, steel..... 16.50 to 17.00
Cast iron carwheels..... 14.25 to 14.75

Malleable Grades:
Railroad 16.50 to 17.00
Agricultural 12.50 to 13.00

Miscellaneous:
*Relaying rails, 56 to 60 lb. 23.00 to 25.00
*Relaying rails, 65 lb. and heav. 26.00 to 31.00

Per Net Ton
Rolling Mill Grades:
Iron angles and splice bars 14.50 to 15.00
Iron arch bars and transoms 20.50 to 21.00
Iron car axles..... 26.50 to 27.00
Steel car axles 15.50 to 16.00
No. 1 railroad wrought... 13.25 to 13.75
No. 2 railroad wrought... 13.00 to 13.50
No. 1 busheling..... 11.50 to 12.00
No. 2 busheling..... 6.00 to 6.50
Locomotive tires, smooth.. 13.25 to 13.75
Pipes and flues..... 9.50 to 10.00

Cupola Grades:
No. 1 machinery cast..... 15.50 to 16.00
No. 1 railroad cast..... 15.00 to 15.50
No. 1 agricultural cast... 14.50 to 15.00
Stove plate 12.25 to 12.75
Grate bars..... 12.50 to 13.00
Brake shoes..... 11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes..... 3.10c.
Soft steel bars..... 3.00c.
Reinforc'g bars, billet steel 2.10c. to 2.50c.
Reinforc'g bars, rail steel.. 1.85c. to 2.40c.

Cold-fin. steel bars and shafting—

Rounds and hexagons..... 3.60c.
Flats and squares..... 4.10c.
Bands 3.65c.
Hoops 4.15c.
Black sheets (No. 24)..... 3.80c.
Galv. sheets (No. 24)..... 4.65c.
Blue ann'l'd sheets (No. 10)..... 3.35c.
Spikes, stand. railroad..... 3.55c.
Track bolts 4.55c.
Rivets, structural 3.60c.
Rivets, boiler 3.60c.

Per Cent Off List

Machine bolts..... 60
Carriage bolts 60
Coach or lag screws..... 60
Hot-pressed nuts, sq., tap. or blank... 60
Hot-pressed nuts, hex., tap. or blank.. 60
No. 8 black ann'l'd wire, per 100 lb.. \$3.30
Com. wire nails, base per keg..... 3.10
Cement c't'd nails, base per keg..... 3.10

Aetna-Standard Acquires Tin Plate Pickling Process

YOUNGSTOWN, Dec. 11.—M. I. Arms, II, president Aetna-Standard Engineering Co., announces acquisition of American and Canadian rights to a new process in annealing and pickling tin plate, sheets and strip steel. The process, invented by William Hanby, London, England, metallurgist, will combine into one operation all the annealing and pickling processes now employed and it will reduce by 50 per cent the time required in such manufacture.

"Application of the new process will eliminate the necessity of expensive furnace installations now used

in annealing," said Mr. Arms. "The process can be adapted for continuous rolling. This is the first revolutionary change in the method of annealing and pickling tin plate, strips and sheets since the beginning of the industry."

Aetna-Standard engineers are now designing the machinery to be employed in the process.

The Aetna company is installing a new seamless pipe mill for the Timken Roller Bearing Co., Canton; is building complete equipment for eight new tin plate mills for the Columbia Steel Corporation, Pittsburg, Cal., and also has under way a new type expansion steel tube mill for the National Tube Co.

Philadelphia

Steel Buyers Slow to Make New Contracts—Pig Iron Buying Increases

PHILADELPHIA, Dec. 11.—Except for a small volume of forward buying by steel consumers who regularly contract for each quarter's requirements, few contracts have been closed for next year. Buyers seem satisfied that the present levels of 1.90c. to 1.95c., Pittsburgh, on bars; 2.05c. to 2.15c., Coatesville, on plates, and 2.05c., f.o.b. nearest mill to consumer, on shapes will be obtainable during the next quarter. This has developed a tendency among consumers to return to the former policy of buying material as needed. Specifications against last quarter contracts have diminished this month, and extension of present commitments into January is expected in many cases. Although prices for sheets in the next quarter show an advance, contracting lags and specifications to complete present commitments by the end of this month are light.

Pig Iron.—Occasional shading of the \$21 per ton first quarter price on foundry iron is reported, and in some cases requirements for next year have been placed with delivery specified to begin this month, so that the current delivery price of \$20.50 per ton would apply. Inquiry began to increase last week, and a number of desirable tonnages are in the market from eastern Pennsylvania consumers of foundry iron. The Lobdell Car Wheel Co., Wilmington, Del., is about to close on a carload of No. 2 foundry for prompt shipment and 300 tons of No. 3 foundry for January to March delivery. The Salem Brass & Iron Mfg. Co., Bridgeton, N. J., is inquiring for about 1500 tons of three grades for first quarter delivery, and the Ingersoll-Rand Co. is expected to enter the market this month for its first quarter requirements at Phillipsburg, N. J. Recent purchases have included 1500 tons of floor iron by the Baldwin Locomotive Works from a steel company furnace and 500 tons of foundry by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., divided between two eastern Pennsylvania furnaces. The Standard Steel Works Co., Burnham, Pa., has closed on about 5000 tons of low phosphorus, of which 2500 tons will come from England and 2500 tons from an eastern Pennsylvania steel company.

Bars.—Consumers show little interest in covering their requirements for first quarter, apparently satisfied that they can buy during the quarter as their needs develop. Quotations range from 1.90c. to 2c. per lb., Pittsburgh, or 2.22c. to 2.32c., delivered Philadelphia.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X.	22.26 to 22.76
Basic (del'd east. Pa.)	20.25 to 20.75
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Plates.—First quarter contracts are limited to the consumers who usually cover their requirements in advance. In many cases, buyers evidently intend to cover their needs as they arise. Quotations are unchanged at 2.05c. to 2.15c. per lb., Coatesville, or 2.15c. to 2.25c., delivered Philadelphia. Specifications against current contracts are light, and some extensions into the next quarter are expected. Mills expect some substantial tonnages early in the new year from shipbuilding contracts, on which bids are being submitted by shipyards.

Shapes.—Most of the current buying is at 2.05c. per lb., nearest mill to consumer, or 2.11c., delivered Philadelphia, based on Pencoyd, Pa. This price is shaded occasionally on desirable projects, but 2c., mill, is generally the minimum. Shipbuilding promises some good tonnages of shapes for next year. Elimination of grade crossings on the Reading Railroad at Manayunk will require 6000 tons or more of shapes.

Sheets.—Only a small number of first quarter contracts are reported closed, but black sheets are being maintained at 2.85c. per lb., Pittsburgh, or 3.17c., Philadelphia, and galvanized at 3.60c., Pittsburgh, or 3.92c., Philadelphia. Blue annealed sheets

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅝-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅝-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

have developed a slight tendency toward weakness in the narrower sizes, on which competition from continuous sheets is encountered, so that the market today is quotable at 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., Philadelphia, the lower price applying on sales of the narrow widths.

Warehouse Business.—Buying from stock has been better in the early part of this month than in the same period of November. On recent sales in Delaware, it is noted that the Philadelphia district size extras on bars and shapes, which are slightly higher than the mill differentials, have been applied.

Imports.—In the week ended Dec. 8, arrivals at this port consisted of 12 tons of galvanized steel strips from the United Kingdom, 9 tons of steel billets from Sweden and 29 tons of steel scrap, of which 21 tons came from Germany and 8 tons from the United Kingdom.

Old Material.—Except for the purchase of about 5000 tons of No. 1 heavy melting steel by a Claymont, Del., consumer and a similar tonnage by a Coatesville, Pa., mill, the market continues quiet. Yard grade has been bought by a Harrisburg, Pa., consumer at \$12 per ton, but shipments are still being made on contracts at \$12.50 per ton, delivered. Cast scrap still shows an undertone of weakness, but no sales are reported.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.00 to \$15.50
Scrap T rails	14.50 to 15.00
No. 2 heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Nineteen New Airports

Intention of establishing municipal airports was announced in 19 more cities during the latter part of November, according to the Department of Commerce.

The Truscon Steel Co., Youngstown, has removed its Cincinnati office to 1200 Fountain Square Building, 505 Walnut Street. J. L. Fink is district manager.

Cleveland

Steel Orders Holding Up Fairly Well—Automobile Companies Planning Large First Quarter Schedules

CLEVELAND, Dec. 11.—While there is some slowing down in the demand for finished steel, orders are holding up fairly well in view of the fact that with the reestablishment for the first quarter of the present prices on steel bars, plates and shapes buyers have no special incentive to get in specifications on existing contracts, and they want to have stocks reduced as much as possible by inventory time. An increase in specifications is expected later in the month for material to be delivered after Jan. 1. Not much contracting for the first quarter has been done in steel bars, plates and shapes, as mills are not pressing buyers for contracts and the latter are in no hurry to make commitments.

Mills are holding closely to the prices they named for the last quarter on the three products, the range being 1.90c. to 1.95c., Pittsburgh, the 2c. price usually applying only to small-lot buyers who do not contract. On steel bars, outside mills, when using the Cleveland base, are generally quoting 1.95c., Cleveland, both for local delivery and for shipment to other points in the territory. However, outside mills are holding strictly to a Pittsburgh base for less than car lots. Local mills continue to quote steel bars at 1.90c., mill. Some recent shading of this price developed in business from the implement manufacturers in competition with rail steel bars, which are quoted at 1.85c., mill, for uses other than for reinforcing work. Most of the buyers of alloy steel bars have covered for the first quarter. Present prices on bolts and nuts and wire rods have been reaffirmed for the first quarter, but a \$2 a ton advance has been announced on wire products.

Steel orders from the Michigan territory are reflecting the slowing down of the automotive industry for inventories and the bringing out of new models, but a heavier demand is expected from that source late in the month for January shipment. Motor car builders are planning large production schedules for the first quarter. Local plants engaged in making automobile forgings and springs continue fairly busy, but stamping plants have curtailed operations, as some of the automobile companies are not releasing specifications. The Chevrolet Motor Co. is getting under production on its new models more slowly than was expected.

Structural inquiry is light. Railroads in this territory have not yet come in the market for their 1929 rail requirements.

Pig Iron.—The buying movement continues to taper off. Sales by Cleveland interests during the past week were 18,000 tons, compared with 32,000 tons the previous week. Most of the large consumers appear to be covered for the first quarter and some have bought for the first half. Not a great deal of inquiry is pending. Prices are firm and unchanged. Most sellers have good order books for the first quarter, so that competition for business at competitive points is not

as keen as it was in the early part of the year. Cleveland furnaces are holding to \$18.50 for foundry and malleable iron for outside shipment, and another Lake furnace remains on an \$18.50 base for western Ohio and parts of Indiana. In Michigan, the market is firm at \$20. Some effort is being made to establish a 50c. differential on malleable iron over foundry iron by some furnaces that have been selling both grades at the same price. Shipments have started out well for December, but are expected to slow down during the latter part of the month. One large consumer in the automotive field is taking more iron this month than in November. On Ohio silvery iron, \$26 appears to have become the general price for 8 per cent iron, although one producer is asking \$27 in some cases.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	\$22.50 to 23.00
Malleable	19.50
Ohio silvery, 8 per cent	29.00
Basic Valley furnace	17.50
Stand. low phos., Valley	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-Finished Steel.—Wire rods have been re-established for the first quarter at the present price of \$42, Cleveland and Pittsburgh. A local producer has made a few round-lot sales of sheet bars at \$34, Cleveland. This mill is asking the same price for billets and slabs, or \$1 a ton higher than the prices quoted by Youngstown mills, but has made no sales of these products for the coming quarter.

Wire Products.—A \$2 a ton advance on nails and wire and on all other wire products, except fence, has been made by leading producers, which are

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.45c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

now quoting nails at \$2.65 per keg, Cleveland, and bright plain wire at 2.50c. per lb. Nails have been moving slowly, and the price advance may stimulate orders against outstanding contracts.

Fluorspar.—Some of the large consumers are negotiating for gravel fluorspar for next year. Producers are meeting with some price resistance to their recent \$1 a ton advance to \$18, mines, so that this price has not yet been established except on some small-lot sales.

Bolts, Nuts and Rivets.—Bolts and nuts have been reestablished at the present discount of 70 per cent off list for the first quarter and rivets have been established at the present prices for the coming quarter. Semi-finished hexagon nuts also have been reestablished at 70 per cent off list for the first quarter. Producers are now sending out contract blanks to their customers. Cap and set screws have been advanced 5 points, the new prices applying to current orders and to the first quarter. Railroad spikes have been reestablished at 2.80c., producing point. Large rivets are quoted at \$2.90 per 100 lb., Cleveland and Pittsburgh, and \$3, Chicago, and small rivets are 70 and 10 per cent off list at the three producing points.

Strip Steel.—Prices on hot-rolled strip have settled pretty generally to 1.80c., Pittsburgh, for material wider than 6 in. and to 1.90c. for 6 in. and narrower. There has been a moderate amount of contracting for the first quarter at these prices. Only small lots are bringing \$2 a ton higher prices, but the higher prices apply to very little contract tonnage. Cold-rolled strip contracts are being taken at 2.85c., Pittsburgh. A 2.95c. price applies to small lots and generally to consumers who do not contract. Specifications for both hot and cold-rolled strip have slowed down.

Sheets.—Specifications have declined, and some of the mills have reduced their backlogs considerably. Many consumers are evidently holding back orders against existing contracts until the deadline date, Dec. 15, with the expectation that mills will not make shipments until after Jan. 1 or after inventories. Many of the larger consumers probably will have enough material coming in at the old contract prices to last them through January. There has been a fair amount of contracting for the first quarter at the new prices, and mills have received liberal specifications for auto body sheets for January shipment, some being well filled up with that grade for next month. Mills able to accept orders for December shipment are still making sales at the old price, or \$2 a ton below the first quarter price. Some buyers are resisting the \$2 a ton advance on tin plate.

Warehouse Business.—Small-lot orders have fallen off, but jobbers report an increase of good-sized orders from buyers who need material for use during the remainder of the year

and who are turning to warehouses to take care of these early requirements.

Coke.—Domestic coke is moving a little better than recently. There is very little new demand for foundry coke, although specifications against contracts are holding up fairly well. Ohio by-product foundry coke is unchanged at \$7.75, Painesville, for December shipment.

Old Material.—The scrap market is firm but dull. There is no new consumer demand, and some of the mills are restricting shipments. Dealers are buying small lots at quoted prices to fill outstanding orders. They are able to pick up small lots of blast furnace scrap at \$11, or slightly higher, but would pay \$11.50 for round tonnages. While the demand for scrap has declined, the production also has fallen off somewhat owing to the slowing down of the automotive industry. In the Valley district, No. 1 heavy

melting steel is bringing \$16.50 to \$17 from dealers.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.50 to	\$15.00
No. 2 heavy melting steel.	14.00 to	14.50
Compressed sheet steel.	14.00 to	14.50
Light bundled sheet		
stamp'gs	12.00 to	12.50
Drop forge flashings.	12.25 to	12.75
Machine shop turnings.	9.50 to	10.00
No. 1 railroad wrought.	12.75 to	13.00
No. 2 railroad wrought.	14.50 to	15.00
No. 1 busheling	12.25 to	12.50
Pipes and flues	9.00 to	9.50
Steel axle turnings.	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops.	16.00 to	16.50
Low phos., billet, bloom		
and slab crops	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap.	16.50 to	16.00
Blast Furnace Grades		
Cast iron borings	11.00 to	11.50
Mixed bor'g and short		
turn'gs	11.00 to	11.50
No. 2 busheling	11.00 to	11.50
Cupola Grades		
No. 1 cast	16.50 to	17.00
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	16.00 to	16.50
Rails for rolling	16.25 to	16.50

5 tons or more, 3c. for lots of 2 to 5 tons and 3.25c. for less than 2 tons, all delivered at job.

Plates, Shapes and Bars.—Structural steel work is predominant in the local steel market, which otherwise shows signs of lagging far behind the

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.	3.30c.
Soft steel bars, small shapes.	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal.	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.	3.50c.
Flats and squares.	4.00c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.80c.
Standard tool steel.	12.00c.
Wire, black annealed.	4.50c.
Wire, galv. annealed.	5.15c.
Tire steel, 1½ x ½ in. and larger.	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
Per Cent Off List	
Machine bolts, cut thread:	
¾ x 6 in. and smaller.	60
1 x 30 in. and smaller.	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.	60
¾ x 20 in. and smaller.	50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.	60
1 x 16 in. and smaller.	50 to 50 and 10
Per 100 Ft.	
Boiler Tubes—	
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.	\$10.00 to \$11.00
IC—30-lb. coating.	12.00 to 13.00
IC—40-lb. coating.	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

Per Lb.	
Nos. 18 to 20.	3.80c.
No. 22.	3.95c.
No. 24.	4.00c.
No. 26.	4.10c.
No. 28*	4.25c.
No. 30.	4.50c.

Sheets, Galvanized

Per Lb.	
No. 14.	4.40c.
No. 16.	4.25c.
No. 18.	4.40c.
No. 20.	4.50c.
No. 22.	4.60c.
No. 24.	4.75c.
No. 26.	5.00c.
No. 28*	5.25c.
No. 30.	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

New York

Subway Requires 34,000 Tons of Fabricated Steel—Interest in Pig Iron Diminishes

NEW YORK, Dec. 11.—Sales of pig iron in this district totaled 6000 to 7000 tons, or only about one-third of the bookings of the previous week. Interest in the market is plainly diminishing as the holiday and year-end shutdowns approach. Shipments, although not so large as during the season of navigation, when the barge movement was under way, are holding up to recent levels. Foundry melt is being maintained, and the fact that users are taking all the iron due them indicates that they have no inventory problem. Contracting for first quarter has not been so heavy in this district as in some other sections of the country. Possibly three-quarters of the buyers have covered their estimated requirements, and there is no rush on the part of the remaining consumers to enter the market. The only new first quarter inquiry of any size that has appeared is one from the General Electric Co. for about 4000 tons for its eastern plants, including those at Bayway, N. J.; Schenectady and Elmira, N. Y.; Pittsfield, Lynn and Everett, Mass. The Burnham Boiler Corporation, Irvington, N. Y., has bought 600 tons of foundry iron for first quarter shipment to its Lancaster, Pa., plant. The A. P. Smith Mfg. Co., East Orange, N. J., has placed 150 tons of foundry. Buffalo foundry iron continues to range from \$17.50 to \$18, base furnace. Eastern Pennsylvania foundry iron for delivery in this section is weak at \$20, base furnace. First quarter quotations on Dutch and Indian foundry iron are \$22 for No. 1X and \$21.50, base, duty paid. The ocean freight

rate on Dutch iron has been advanced 89c. to \$3.81 a gross ton.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.	
N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—Sales of several lots of ferromanganese, totaling about 750 tons, for next year's delivery are reported. Quotations are unchanged at \$105, seaboard basis. Business in spiegeleisen is confined to sales of carloads and small lots and quotations are unchanged at \$34, furnace, for the 19 to 21 per cent alloy.

Reinforcing Bars.—The Carroll-McCreary Co., Inc., Long Island City, has been awarded 500 tons for a Pennsylvania Railroad bridge at Hackensack, N. J., and 200 tons for the Abraham Lincoln High School in Brooklyn. Several new projects of fair size are being figured, the largest being a building for the Hoffman Beverage Co. in Newark, calling for 800 tons, and two additional sections of the New York subways which will require about 750 tons. Prices are firm at 2c., Pittsburgh, for 40, 50 and 60-ft. lengths available for shipment direct from mill, and 2.25c., Pittsburgh mill warehouse, for the cut lengths. Out of New York warehouse, distributors are quoting 2.85c. per lb. for lots of

activity of October and November. Specifications for miscellaneous steel products are in fair volume, but new business is light. Plates are conspicuously dull, although some large tonnages are in prospect for early in the new year in shipbuilding and pipe lines. New York subway work is outstanding among pending fabricated steel jobs, bids having been called for on two sections of the Houston Street project requiring 34,000 tons of steel. A building for the Internal Revenue Bureau in Washington will take 10,000 tons. Among the larger awards of the past week was 5200 tons for a loft building at Seventh Avenue and Thirty-ninth Street. The Structural Steel Board of Trade of New York reports that lettings in the metropolitan district in November, exclusive of subways and bridges, were 27,500 tons, compared with 50,300 tons in October and 34,000 tons in November, 1927. As prices on plates, shapes and bars for the coming quarter are to be unchanged, contract buyers seem in no hurry to sign up for their forward requirements. Most of the steel companies' contracts require that specifications in full against fourth quarter contract shall be sent to the mills by Dec. 15, and it is expected that many buyers will provide for their January needs before making new contracts.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c., bar iron, 2.14c. to 2.24c.

Sheets.—Contracting for the first quarter has not been in large volume, but this is not surprising in view of the fact that many consumers will have sufficient tonnage coming to them on lower-priced fourth quarter contracts to provide for all or part of their needs in January. Some buyers are trying to escape shipment of their remaining fourth quarter tonnage until the last week of the month or early in January, but most mills insist on shipping at their earliest convenience.

Cast Iron Pipe.—Quotations of Northern makers of pressure pipe have shown further advances recently, and the market is now quotable at \$39.60 to \$40.60 per net ton, delivered New York. Inquiries are mostly for small tonnages. Yonkers, N. Y., opens bids Dec. 13 on about 300 tons of water pipe. Prices are being asked by Carlo Petrillo, Mount Vernon, N. Y., on about 150 tons of 3, 4, 6, 8, 12, 16, 20 and 42-in. pipe and about 25 tons of fittings for a section of subway in Brooklyn, for which he has received the contract. Some inquiry for gas pipe to be delivered next spring is reported from private corporations.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$39.60 to \$40.60; 4-in. and 5-in., \$44.60 to \$45.60; 3-in., \$54.60 to \$55.60; Class A and gas pipe, \$4 to \$5 extra.

Warehouse Business.—Most jobbers report the volume of orders, which was sizable earlier in the month, to be diminishing with the approach of the holidays. There is still

some structural steel business, but tonnages are smaller than in the season of greatest activity. Sheet prices are being maintained with little shading, despite a quiet market.

Coke.—Business is limited to shipments on contracts, orders for spot shipment being smaller than usual. The Connellsville market is unchanged at \$3.50 to \$3.75 per net ton, ovens, for standard foundry and \$2.85 to \$3.05, ovens, for standard furnace. Special brands are unchanged at \$4.85 per net ton, ovens. Delivered prices of these brands are \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn. By-product foundry coke prices are unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Prices of most grades of scrap show a slightly stronger tone, although the number of transactions with eastern Pennsylvania consumers has not increased appreciably. Brokers are offering \$14.50 to \$15 per ton, delivered, on No. 1 heavy melting steel and in some cases are reported to have paid as much as \$15.50 per ton, delivered to a Coatesville, Pa., mill. Some of the firmness that has developed in the past week is attributed to the purchase of 5000 tons each by con-

sumers at Coatesville, Pa., and Claymont, Del. At the recent opening of bids on the Pennsylvania Railroad list of about 60,000 tons of scrap, of which about 14,000 tons was heavy melting steel, \$18.10 per ton, is reported to have been offered for the steel. Bids were opened this week on about 3000 tons of scrap on the list of the Delaware, Lackawanna & Western and a like tonnage offered by the Lehigh Valley Railroad.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$11.50 to \$12.00
Heavy melting steel (yard)	8.50 to 9.50
No. 1 hvy. breakable cast	11.25 to 11.75
Stove plate (steel works)	8.00 to 8.50
Locomotive grate bars	8.50
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles	17.00 to 17.50
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.25 to 12.75
No. 1 yard wrot., long	11.25 to 11.75
Rails for rolling	13.00 to 13.50
Cast iron carwheels	12.00 to 12.50
Stove plate (foundry)	9.25 to 9.50
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

New Method of Quoting on Steel and Iron Boiler Tubes

A new mode of quotation is to be put into effect by makers of lap-welded steel and charcoal iron boiler tubes, effective as of Jan. 1. Weights and list prices used by manufacturers of seamless boiler tubes are to be used from that date. It will be observed in the new schedule that the carload lot base discounts on lap-welded steel tubes are the same as those now quoted on hot-rolled seamless tubes, but against a supplementary discount of 5 per cent on seamless tubes in lots of a carload or more, that on lapwelded steel tubes is two fifths. Also, that against less carload discounts of four points less than on carloads on seamless tubes, the basing discounts on lapwelded steel tubes are four points less than carload lots

on lots down to 10,000 lb. and six points less on lots of less than 10,000 lb.

Discounts as follows, on full carload lots, are being quoted from the revised list prices f.o.b. Pittsburgh:

Steel		Charcoal Iron	
2 in. and 2½ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3½ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3½ in. to 3¾ in.	18
		4 in.	20
		4½ in.	21

Beyond the above base discounts two fifths are being quoted on carload lots of lap-welded steel tubes.

On quantities 10,000 lb. to carloads basing discount is lowered four points and two fifths preferential are allowed.

On quantities less than 10,000 lb., basing discount is lowered by six points and one fifth preferential is allowed.

On charcoal iron boiler tubes the base discount is subject to 10 per cent preferential discount on full carload shipments. On shipments of 10,000 lb. to carload, five per cent preferential and on shipments of less than 10,000 lb., no preferential discount is allowed.

The price list to which the new discounts will apply follows:

External Diameter Inches	Standard Thickness Minimum		Price per Foot			
	Birmingham		Standard Thickness	One Extra Wire Gage	Two Extra Wire Gages	Three Extra Wire Gages
	Wire Gage	Inches		Wire Gage	Wire Gages	Wire Gages
1.....	13	0.095	0.32	0.35	0.38	0.41
1¼.....	13	0.095	0.30	0.33	0.36	0.39
1½.....	13	0.095	0.28	0.31	0.34	0.38
1¾.....	13	0.095	0.24	0.26	0.28	0.31
2.....	13	0.095	0.22	0.25	0.28	0.31
2¼.....	13	0.095	0.25	0.29	0.31	0.35
2½.....	12	0.109	0.32	0.35	0.39	0.43
2¾.....	12	0.109	0.35	0.39	0.43	0.47
3.....	12	0.109	0.39	0.42	0.47	0.52
3¼.....	11	0.120	0.46	0.51	0.56	0.63
3½.....	11	0.120	0.50	0.55	0.61	0.68
4.....	10	0.134	0.64	0.70	0.78	0.84
4½.....	10	0.134	0.72	0.79	0.88	0.95
5.....	9	0.148	0.88	0.98	1.07	1.20
6.....	8	0.165	1.18	1.29	1.45	1.56

St. Louis

Pig Iron Market Quiet Except for 15,000-Ton Sale of Basic—Steel Orders Fairly Good

ST. LOUIS, Dec. 11.—What otherwise would have been a very quiet week in pig iron was marked by the purchase of 15,000 tons of basic iron by an East Side melter from the St. Louis Gas & Coke Corporation for first quarter delivery. This maker's sales of foundry iron amounted only to 650 tons; the largest order was 200 tons for immediate shipment to a Belleville stove foundry and the remainder was first quarter delivery. The bulk of the foundry iron for first quarter consumption probably has been bought. Stove and jobbing foundries in the district are extremely busy, preparatory to closing down about Dec. 15 until after the holidays. The Granite City maker shipped 37,000 tons and sold 66,520 tons of pig iron during November, breaking all records for a month's shipment and sales. It is expected that the second furnace, which has been down for relining and other repairs for several months, will be blown in some time this week. The market is firm, with prices unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	20.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Domestic coke is in heavy demand as a result of the cold weather, and piles at by-product ovens in the district are being materially reduced. Dealers outside of St. Louis are taking liberal shipments, but those in the city continue to depend upon local piles for their stocks and are buying as they sell. Demand for industrial grades is good. Prices are unchanged.

Finished Iron and Steel.—The Granite City Steel Co. reports orders during the last week were greater than the volume for the same week

last year. Galvanized sheets were most in demand among a greatly diversified business. Buying is almost entirely for prompt shipment. Automobile manufacturers have indicated that strip steel requirements for first quarter will be much heavier than usual for this period, and business is expected to be placed within the next week. The low bidder on the River des Peres sewer project, requiring 2000 tons of reinforcing bars, previously reported as pending, is the W. E. Callahan Construction Co., Arcade Building. The large fabricators of structural steel report a dearth of business, while the smaller plants are in much better shape because of the number of small jobs being placed.

Old Material.—Dealers in old material expect a heavy buying movement soon; some believe it will arrive before the first of the year, while others predict it for the first week in January. There is no consumer buying now except of such items as may be needed for fill-in purposes. Dealers are buying only to cover contracts. The only change in prices is an ad-

vance of 25c. on railroad springs. Railroad lists include: Pennsylvania Lines, 57,440 tons; Chicago, Milwaukee, St. Paul & Pacific, 2600 tons; Wabash, 2642 tons; Southern Pacific, 3000 tons; Missouri-Kansas-Texas, 1500 tons; Louisville & Nashville, 691 tons; Kansas City Southern, 431 tons; Chicago, Rock Island & Pacific, 207 tons; Ann Arbor, 375 tons; Great Northern, 167 carloads; Chicago & Eastern Illinois, 17 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	9.00 to 9.50
Steel car axles	19.50 to 20.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	12.50 to 13.00
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machine cast	15.50 to 16.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Birmingham

Heavy Pig Iron Bookings for First Quarter—Steel Operations at a High Rate

BIRMINGHAM, Dec. 11.—The tone of the pig iron market is still buoyant. Purchases during the week were fairly heavy; the major portion was for delivery through the first quarter. Bookings for the next quarter are larger than for any previous quarter for some time. Only a few of the more important consumers remain uncovered. Radiator shops plan to resume operations shortly after the first of the year. One pig iron producer is still quoting \$17 on No. 2 foundry, while others are maintaining a \$16.50 base. All furnaces have been making heavy shipments, and very little iron has been stocked in the past several weeks. Of the 19 furnaces in blast, nine are on foundry, eight on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil.	17.00 to 17.50
Basic	16.50

Finished Steel.—Mills have adjusted prices on bars, plates and shapes, placing them in line with quotations elsewhere. Day to day business continues on a high plane, and the usual seasonal let-up has not developed. Specifications are coming in at a good rate for this season. Rail orders warrant steady operations for several months. Fabricated structural

steel schedules in the district are in good condition. The Nashville Bridge Co. has booked 800 tons for bridges for the Louisville & Nashville Railroad. The Tennessee company is operating nine open-hearths at Ensley, an increase of one in the week, seven are active at Fairfield and the Gulf States Steel Co. is working four at Alabama City.

Cast Iron Pipe.—Dallas, Tex., has awarded a project requiring more than 20,000 tons of pipe to the United States Cast Iron Pipe & Foundry Co. Decision has been pending for several weeks as to steel or cast iron pipe. Injunctions filed since the award have held the contract up but it is expected the matter will be cleared up shortly. This is the largest order placed in this district in several months. Other new business has been confined to a light aggregate of small orders. Inquiries are increasing as municipalities begin to estimate their requirements for the coming year. Some public utilities have asked preliminary figures for use in estimating budgets. Plant operations and forward bookings are the lightest in some time. Quotations are unchanged from the base of \$37 to \$38 on 6-in. and larger sizes.

Coke.—Consumers are maintaining an active interest in first quarter re-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

quirements and the total needed for this period is fairly well covered. Improved conditions in the pig iron market have influenced more extensive coverage in the coke market than is usual at this season. Domestic sizes are in better demand. The base price of \$5 is being maintained.

Old Material.—Consumers are buying for immediate requirements and keeping stocks low for approaching inventories. Shipments are consequently light. Dealers' stocks are

low in several lines. Prices have not changed in two weeks.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Pacific Coast

Standard Oil Co. Inquires for 58,000 Boxes of Tin Plate—Steel for Building Fairly Active

SAN FRANCISCO, Dec. 8 (*By Air Mail*).—Structural steel and reinforcing steel bars were the most active products during the past week. The largest award was 412 tons of bars for the East Bay Municipal Utility District at Oakland, placed with two San Francisco interests. Tin plate mill representatives are keenly interested in the inquiry of the Standard Oil Co., San Francisco, for 45,000 boxes of 14½ x 18½ in. and 13,000 boxes of 10 x 20 in.

Pig Iron.—Sales and inquiries involve relatively unimportant tonnages. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—A fair tonnage of reinforcing steel bars was placed this week. Included among awards were 300 tons for a power house at Renton, Wash., and 248 tons for the South Spillway, Oakland, placed with the Pacific Coast Steel Co. and 173 tons for the Jackson Creek Spillway and the Pardee Reservoir, Oakland, booked by Soule Steel Co. Pending business exceeds 5500 tons. New inquiries of the week include 355 tons for a rest home in San Francisco and 310 tons for a hotel at Fairfax, Cal. While merchant bar material continues fairly firm at 2.30c., c.i.f. Coast ports, out-of-stock prices in the Los Angeles and San Francisco districts remain at 1.80c., base. Imports of foreign reinforcing steel bars have fallen off almost to nothing.

Plates.—Plate sales and inquiries

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over.....	3.15c.
Small angles, under ¾-in.....	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, ½-in. and larger....	5.65c.
Com. wire nails, base per keg....	\$3.40
Cement c'd nails, 100 lb. keg....	3.40

are limited, with one exception, to lots of less than 100 tons. The Marin Municipal Water District, San Rafael, Cal., is calling for bids, to be opened Dec. 18, on a 2,000,000-gal. steel tank requiring 250 tons of plates. From present indications, the total plate tonnage for this year will be approximately 20,000 tons under the total booked last year. No change in prices has occurred, 2.25c., c.i.f., being general.

Shapes.—Although more than 5000 tons of structural shapes is being figured on, awards this week were limited to four projects in excess of 100 tons. The Baker Iron Works took 190 tons for an office building in Santa Monica, Cal., and the Isaacson Iron Works will fabricate 200 tons for a plant addition for itself in Seattle. The Judson-Pacific Co. took 150 tons

for the Grace Cathedral in San Francisco and the Golden Gate Iron Works secured 100 tons for a market building at San Jose, Cal. Quotations on plain material continue unchanged and firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe is by no means heavy and little new business is expected until after the first of the year. L. Coluccio, Seattle, secured an additional 400 tons of 24-in. pipe for the Volunteer Park improvement project for the city. Henry Sacco was low bidder on 209 tons of 8 and 12-in. Classes B and C pipe for the improvement of West Holden Street, Seattle. Bids were opened this week by Burbank, Cal., for 323 tons of 4 to 8-in. Class B pipe. Wilbur N. Edgley, Los Angeles, was low bidder on 548 tons of 2 to 12-in. Class B pipe for the improvement of Arlington Street, Los Angeles.

Steel Pipe.—Pipe mill representatives report a continuation of the rather heavy demand for oil country goods, and especially for well casing to take care of the new wells being brought in in the Santa Fe Hills fields. Stocks of standard pipe in distributors' hands are reported to be in good shape. With the approach of the inventory period, little business is expected during the remainder of the year.

Coke.—About 5000 tons of English beehive and by-product foundry coke has arrived on the Coast, most of it for foundries in the Los Angeles and San Francisco districts. Prices continue unchanged as follows: \$11.50 to \$13 a net ton, delivered incoming dock, on by-product coke and \$16 a net ton on beehive coke.

Canada

Pig Iron Prices Weak and Show Variations—Building Activities Large Despite Winter Weather

TORONTO, ONT., Dec. 11.—According to local blast furnace representatives, the demand for merchant pig iron in the Canadian markets has steadily increased during the past month or six weeks, while sales for the year show an advance of more than 20 per cent over those of 1927. Producers have opened books for first quarter contracts and already a fairly large number of melters have covered for the first three months of 1929. Inquiries for first quarter are appearing in large number, and indications are that contracts for that period will make a new quarterly record. While local interests believe that higher prices are warranted in the face of \$18 to \$19 Buffalo quotations, producers have been unable to agree, and while some have quoted \$24.10, others are naming \$23.60, and in some instances iron has been offered at \$23.10, Toronto. One Canadian producer is out of the market, declining to sell at the present level. United States producers are supplying the Canadian agricultural implement re-

quirements, but otherwise they are not strong in competition with Canadian furnaces at present. Imports of pig iron range from 4000 to 5000 tons a month, by far the greater part of which is from the United States. Only a limited tonnage of British iron has been piled in Canada against winter requirements.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	25.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Although the first snows of winter have appeared, building construction in Canada has not slowed down. The demand for structural steel and reinforcing bars for building and bridge construction continues in large volume. The Manitoba Bridge Co., Winnipeg, Man., has received an order for 3000 tons

of steel from the Canadian National Railways for a bridge over Minnewaskta Creek near Minnietta, Man.; the Eastern Canada Steel & Iron Works, Ltd., Quebec, Que., was awarded contract for 300 tons of steel for Scott Street bridge over the St. Charles River at Quebec for the Provincial Government Department of Public Works; the Dominion Bridge Co., Lachine, Que., received contract for 600 tons for Masonic Temple on Sherbrooke Street, Montreal; the Dominion Bridge Co., Toronto, has contract to supply 1250 tons of steel for office building at Bay and Adelaide Streets, Toronto, for the Canada Permanent Mortgage Corporation, and 50 tons for New Queen's Hotel at Belleville, Ont. Orders pending include 300 tons for bridge on St. Clair Avenue, to be constructed by the City of Toronto and York Township; 350 tons for normal school at Quebec, Que., for Rev. Ursuline Sisters.

Old Material.—In most cases, consumers are holding their orders as

low as possible to keep prices at a minimum and are leaving dealers somewhat in doubt as to what future requirements will be. Some consumers, however, have covered first quarter needs. While Toronto dealers have made no change in their buying price lists for the week, a few minor advances have gone into effect in Montreal.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$7.00 to \$7.50
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00 to 11.50
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	16.00 to	17.00
Stove plate	13.00	13.00
Standard carwheels	13.00	16.00
Malleable	13.00	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Boston

Everett Furnace Sells 12,000 Tons of Pig Iron to Heater Manufacturer—Scrap Exports Continue

BOSTON, Dec. 11.—The Mystic Iron Works has sold 12,000 tons of pig iron for first quarter delivery to a radiator and heater manufacturer, part No. 2 plain and part No. 2X, for delivery by barge and rail. Details regarding prices are withheld, but it is understood that quotations coincided with those of Buffalo furnaces. Sales of Mystic iron the past week otherwise were comparatively small. Numerous small tonnages were placed, however, at \$21 a ton, on cars Everett, Mass., for No. 2X, or \$23.27 delivered, and others at \$20 a ton, furnace, or \$23.65 a ton delivered. The company is well sold up to April 1. It has contracted to deliver between now and April 1 in excess of 36,000 tons for water shipment alone, 11,500 tons of which is for January shipment. In addition to the Mystic bookings the past week, a fair tonnage of Buffalo and east of Buffalo iron was sold, also some foreign iron. About 1000 tons of Lake charcoal iron has been booked the past three or four weeks for first quarter delivery at \$24 a ton, base furnace.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25...	\$22.91
*Buffalo, sil. 2.25 to 2.75...	23.41
East. Penn., sil. 1.75 to 2.25...	\$24.15 to 24.65
East. Penn., sil. 2.25 to 2.75...	24.65 to 25.15
Va., sil. 1.75 to 2.25...	26.91
Va., sil. 2.25 to 2.75...	27.41
Ala., sil. 1.75 to 2.25...	23.41 to 25.77
Ala., sil. 2.25 to 2.75...	23.91 to 26.27

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Coke.—Aside from a quickening in the movement of domestic coke, the result of colder weather, there is little change in the coke situation. By-

product foundry coke is still available at \$11 a ton, delivered within a \$3.10 freight rate zone.

Bars.—Edward A. Tucker Co., Boston, has been awarded 650 tons of reinforcing bars for the United Shoe Machinery Corporation's Boston building, the largest job let in this territory in several months. The market on small business is usually 3.10½c. per lb., base, from stock, and at 3.01½c. on 25 to 75-ton lots. A slight improvement in the demand for soft steel bars is noted, with the market 1.90c. to 2c. per lb., base Pittsburgh, depending on quantity.

Warehouse Business.—Wire nails have been advanced \$2 a ton. The movement of material out of warehouses is increasing, and is far ahead of that done in December, 1927.

Pipe.—Pawtucket, R. I., closed bids Dec. 4 on about 1200 tons of 6 to 16-in. pipe. The contract was awarded to a local concern, and it is reported the Warren Foundry & Pipe Co. will supply the material. Herbert Kennedy Co., New York, representing French pipe interests, submitted a bid approximately \$4 a ton under that of the Warren Foundry & Pipe Co., but the city officials announced they would use American-made pipe. Portland, Me., has closed privately on 650 to 700 tons of 6 to 16-in. pipe for spring delivery. It is understood the business was divided between two American makers. Kingston, Mass., has closed bids on 200 tons of pipe, but has made no award. Salem, Mass., will take bids on Dec. 11 for 100 tons of 12-in. pipe. Private business for prompt delivery is exceptionally good for this time of the year and totaled about

1000 tons the past week. Prices are stronger, 4-in. stock now being \$47.10 to \$48.10 a ton, delivered common Boston freight rate points, and 6-in. and larger, \$44.10 to \$45.10, with differentials of \$3 to \$4 a ton on Class A and gas pipe.

Old Material.—The market for the materials most in demand, namely, heavy melting steel and mixed borings and turnings, is firmer. Steel mill borings, forge flashings and shafting are easier. Dealers expect a further improvement in values of heavy melting steel based on the recent sale of Baltimore & Ohio Railroad and Pennsylvania Railroad scrap to consumers. New England scrap owners are reluctant to sell at present prices; consequently the movement out of New England is limited, although somewhat larger than a week ago. A steamer has completed loading 3500 tons of scrap for Danzig. One agent has a 3000-ton cargo to load, and it is intimated still another lot of 3000 to 5000 tons will be shipped within a month. It is probable that 1929 scrap exports from Boston will exceed those of 1928; most of the material has been consigned to Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$11.00 to \$11.25
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.25
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.25 to 6.50
Cast iron borings (steel works and rolling mill)	5.75 to 6.00
Bundled skeleton, long	9.00 to 9.25
Forge flashings	9.00 to 9.50
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	6.00 to 6.50
Shafting	13.50 to 13.75
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 4.75c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Tennessee Producer Advances Pig Iron 50c.—Sheet Mills in Better Position Than a Month Ago

CINCINNATI, Dec. 11.—A Tennessee furnace has announced an advance of 50c. a ton to \$17, base Birmingham, but Alabama pig iron producers, with one exception, still are quoting \$16.50. However, all Southern sellers are expected to be on the basis of \$17 within a short time. Transactions in the pig iron market in the past week were unimportant, total sales having been less than 3000 tons. Dealers are of the opinion that the present lull in buying will persist until after the annual inventory period. Inquiries are scarce; the only pending order of consequence is for 400 tons of Northern foundry for a Springfield, Ohio, consumer. Small lots of Valley iron are being sold by local brokers at or under \$18, Valley furnace. Southern Ohio foundry iron is nominally quoted at \$18.50, base Ironton.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$20.39
Ala. fdy., sil. 1.75 to 2.25	\$20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75	20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25	20.69
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Coke.—Shipments of by-product foundry coke are of fair volume, although demand from foundries connected with the automotive industry has been light. Sales of domestic grades are stimulated by the fact that an increase of 50c. a ton is to be made on Jan. 1. A local dealer has sold 1000 tons of beehive foundry coke to a nearby consumer. Wise County beehive foundry is quoted at from \$4.25 to \$5.25 and furnace coke at \$3.50.

Old Material.—The scrap market has been fairly firm. While there has been some letdown in specifications from district steel plants, consumption in general is satisfactory. Railroad lists closing this week include: Southern, 9000 tons; Norfolk & West-

ern, 5000 tons; Louisville & Nashville, 6000 tons, and Chesapeake & Ohio, 3000 tons.

Finished Material.—From the standpoint of unfilled tonnage, district sheet mills are in a much better position than a month ago, despite the fact that automobile makers concentrating on new models have failed to come into the market to any appreciable extent for their sheet requirements. The betterment is attributed to the healthy demand from diversified sources, and, as automobile manufacturers will soon be placing business in larger volume, sheet producers are confident of entering the first quarter well fortified with orders. Mill operations have been sustained at 100 per cent of capacity and no departure from this schedule is expected in the next two weeks. Prices are steady and considerable business has been taken at

2c. to 2.10c., base Pittsburgh, for blue annealed; 2.85c. for black; 3.60c. for galvanized, and 4.10c. for automobile body stock. Heavy steel products have been rather quiet, with quotations firm at 1.90c. to 2c., base Pittsburgh, for bars, shapes and plates. Rail steel reinforcing bars are priced at 1.90c. to 1.95c., base mill. Fabricating shops in this district are only fairly busy, and in most cases are in need of considerable work.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting....	13.25 to 13.75
Loose sheet clippings....	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings.....	9.25 to 9.75
Machine shop turnings....	8.75 to 9.25
No. 1 busheling	10.75 to 11.25
No. 2 busheling	6.25 to 6.75
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought...	13.00 to 13.50
Short rails	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast....	18.50 to 19.00
No. 1 railroad cast.....	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.25 to 10.75
Railroad malleable	14.25 to 14.75
Agricultural malleable	13.25 to 13.75

Youngstown

Demand Tapering in Most Steel Products

YOUNGSTOWN, Dec. 11.—Not much variation is observed in the rate of demand for pipe. Strip business has been swelled by the placing with local producers of one or two good-sized first quarter contracts, but in most other finished steel products business has lately been declining sheet mill operating schedules have become a little irregular, since many users of sheets are anxious to escape carrying sizable stocks at the end of the month and are specifying cautiously. November specifications were so large with most makers that backlogs were pretty well reduced; as an advance of \$2 a ton is sought on first quarter tonnages, buyers are disposed to go slowly in the matter of commitments for that period until they are entirely satisfied that the higher prices will hold. Yesterday was the final day for specifying on fourth quarter sheet contracts and this week will tell whether buyers released tonnages or elected to take their chances on paying \$2 a ton advance, which the mills threatened to do if January shipment was specified.

Tin plate capacity is becoming more fully engaged as tonnages are released on early 1929 requirements. Wire products are only moderately active, but there is the possibility of an early increase in demand in view of the fact that first quarter prices have been advanced \$2 a ton over those for the quarter now drawing to a close. In naming the new schedule, mills have adopted a new mode of quotation; instead of quoting jobbers'

carloads they are quoting as the "market" the prices named to retailers or consumers able to buy in carload lots. For several months, the mills have been trying to apply an extra of 10c. per 100 lb. on carload lots going to other than jobbers. The price of nails to the latter has been \$2.55, base, per keg, Pittsburgh, which would have meant \$2.65, base, on retailers' or consumers' carloads. The new schedule calls for \$2.75, base, and is for retailers' or consumers' carloads. Announcements contain no word as to jobbers' carloads, but it is assumed they will continue to go at 10c. less.

First quarter contracting as a whole has not yet developed much activity or volume. With bars at the same prices for that period as for this quarter, buyers do not seem to see any need for haste. With current buying and specifying on a moderate scale, mill rollings are a little hard to schedule. Ingot production holds pretty close to 80 per cent of capacity, but some recession is likely unless there is an early quickening in the demand for finished products.

Sharon Steel Hoop Co. is maintaining a good operation at its several plants in the district, notably at Sharon, where improvements have permitted not only increased output of hot and cold-rolled strips, but much more efficient operation. The cold strip mills, recently installed, comprising eight stands of cluster mills and 16 stands of two-high mills, now are in full and regular production. The company will begin installation soon of a new continuous hot strip mill and expects to have it in operation by next March. It will be used in rolling widths 12 in. and under. Some consideration was given to a mill for roll-

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

ing wide strips, but it was finally decided that there already was sufficient wide strip capacity in the country.

The furnace of the Struthers Furnace Co., Struthers, Ohio, is being dried out after its recent relining and

it will probably be blown in next Saturday; it will start with a backlog of basic, foundry and malleable grades of more than 25,000 tons, much of the two latter grades being for shipment to western Ohio and Indiana points.

Mill Co. of New York and then to its successor, the American Universal Mill Co., Scranton, Pa., which is a party to the suit.

The United States Steel Corporation in 1926 began reconstruction of its Carnegie mills at Homestead, Pa., for the rolling of H-sections, and in December of that year the first beam was produced.

Buffalo

Pig Iron Inquiry Light—Steel Mills Maintain 90 Per Cent Rate—Scrap Market Fairly Steady

BUFFALO, Dec. 11.—Inquiry in the pig iron market during the past week has been light. About 6000 tons has been sold, mostly in 100-ton and smaller lots. Producers believe there is still quite a tonnage to be placed for the first quarter. Prices are firm in the district, although there are some instances of 2X iron from Buffalo going to points eastward for the same price as No. 2 plain. Malleable foundries are considerably busier owing to a revision of policy on the part of some of the automobile makers. One large automobile company is beginning to use more malleable castings. A block of 10,000 tons of iron, which had been held by speculators, and which had been purchased by a producer, has been shipped to the buyer. The Tonawanda Iron Corporation is expected to place its stack in blast toward the end of December.

Prices per gross ton, f.o.b. furnace:
No. 2 fdy., sil. 1.75 to 2.25 \$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75 18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25 19.50 to 20.00
Malleable sil. up to 2.25 18.50 to 19.00
Basic 17.50 to 18.00
Lake Superior charcoal 27.28

Finished Iron and Steel.—Operations at Buffalo mills are being maintained at about 90 per cent of capacity. First quarter inquiry and specifications are coming in. The bar, shape and plate price is 2.10c., base Buffalo, but in some instances 2.05c. has been done. Sheets are firm at 2.85c. for black, 3.60c. for galvanized, 2.10c. for blue annealed and 4.10c. for automobile body. New hot-rolled strip prices are 2c., base, for 6 in. and under, and 1.90c. base, for wider than 6 in., but some of the larger buyers have been able to obtain as low as 1.90c. and 1.80c., respectively. Structural jobs show an increasing tonnage.

Old Material.—A comparatively small lot of strictly No. 1 heavy melting steel has been sold at \$16.50. Dealers expect another mill to come into the market soon for a substantial tonnage. A consumer of No. 1 machinery cast and stove plate, who is about to buy, does not expect to pay over

\$15 for the cast and \$14.50 for the stove plate. Some small sales of No. 1 machinery cast were made during the week at \$16, and several small lots of malleable were sold at \$16. Dealers report a scarcity of malleable. Sales of knuckles and couplers are reported at \$17.50. Machine shop turnings and borings and turnings from the central part of the State are going into Pittsburgh and Youngstown districts. The market appears to be steady; dealers have plenty of orders to fill.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades
No. 1 heavy melting steel \$15.50 to \$16.50
No. 2 heavy melting steel 13.25 to 14.00
Scrap rails 15.50 to 16.00
Hydral. comp. sheets 13.50 to 14.00
Hand bundled sheets 12.00 to 12.50
Drop forge flashings 13.00 to 13.75
No. 1 busheling 14.50 to 15.50
Hvy. steel axle turnings 13.50 to 14.00
Machine shop turnings 7.50 to 8.00
No. 1 railroad wrought 12.50 to 13.00

Acid Open-Hearth Grades
Knuckles and couplers 17.50 to 18.00
Coil and leaf springs 17.50 to 18.00
Rolled steel wheels 17.00 to 17.50
Low phos. billet and bloom ends 18.00 to 18.50

Electric Furnace Grades
Short shov. steel turnings 11.00 to 11.50

Blast Furnace Grades
Short shov. steel turnings 11.00 to 11.50
Short mixed borings and turnings 11.00 to 11.50
Cast iron borings 11.00 to 12.00
No. 2 busheling 9.00 to 9.50

Rolling Mill Grades
Steel car axles 18.75 to 19.25
Iron axles 21.00 to 22.00

Cupola Grades
No. 1 machinery cast 15.50 to 16.00
Stove plate 14.50 to 14.75
Locomotive grate bars 13.00 to 13.50
Steel rails, 3 ft. and under 17.50 to 18.00
Cast iron carwheels 13.00 to 13.50

Malleable Grades
Industrial 16.00 to 16.50
Railroad 16.00 to 16.50
Agricultural 16.00 to 16.50

Bethlehem Sues Corporation on Grey Beam Patents

The Bethlehem Steel Corporation has brought suit in the Federal District Court at Newark, N. J., against the United States Steel Corporation and its subsidiaries, the Carnegie Steel Co. and the American Bridge Co., for \$250,000,000 damages for alleged patent infringement and asks for a permanent injunction to restrain the corporation from manufacturing and selling the special structural beams known as Grey beams, to which the Bethlehem Steel Corporation claims exclusive rights.

The Grey patents were originally assigned to the American Universal

Hay Foundry & Iron Works Completes Record Job

The Hay Foundry & Iron Works, Newark, N. J., structural steel fabricator, has recently completed a building job in what is believed to be a record time. On Sept. 17, work was begun on the fabrication of 2200 tons of steel for an apartment building at Madison Avenue and Seventieth Street, New York, and erection was completed on Oct. 18. The building is 11 stories high, with 30,000 sq. ft. of floor space, and is being built for the Tishman Realty & Construction Co. The steel work represented the assembly of 9762 pieces of steel and the driving of 36,200 rivets in the field. Owing to the rapidity with which the steel was fabricated and erected, it is expected that the building will be ready for occupancy by May 1, 1929.

McMyler-Interstate Plant to Be Sold at Auction

The plant of the McMyler-Interstate Co., Bedford, Ohio, has been ordered sold under foreclosure proceedings. P. A. Connolly, receiver of the company since April 23, 1928, has been appointed special master to sell the property at public auction. The foreclosure proceedings resulted from an agreement of attorneys for the company and the Union Trust Co., Cleveland, holder of \$1,312,793 in McMyler-Interstate bonds secured by mortgage on the property and on which the company had failed to meet the last two interest payments. The chief reason for the receivership was that while assets were far in excess of liabilities the company was in debt in excess of \$2,000,000, and lacked money to continue its business. The McMyler-Interstate Co. was engaged in the manufacture of an extensive line of heavy equipment, including locomotive cranes, steam shovels and pile drivers. It also manufactured forgings.

The organization of Lee Wallis Gibbons, 70 East Forty-fifth Street, New York, has been appointed Eastern representative for the Globe Steel Tubes Co., Milwaukee, maker of stainless chromium steel tubes. All other territories are handled by the company's own district sales offices.

Quotations for equipment for chiling of cast iron bars are requested by Fabrique Nationale d'Armes de Guerre, Herstal, Belgium.

Warehouse Prices, f.o.b. Buffalo

Base per Lb.
Plates and struc. shapes 3.40c.
Soft steel bars 3.30c.
Reinforcing bars 2.75c.
Cold-fin. flats, sq. and hex. 4.45c.
Rounds 3.95c.
Cold rolled strip steel 5.85c.
Black sheets (No. 24) 4.20c.
Galv. sheets (No. 24) 4.85c.
Blue ann'd sheets (No. 10) 3.50c.
Com. wire nails, base per keg \$3.60
Black wire, base per 100 lb. 3.75

Non-Ferrous Metal Markets

Copper Quiet But Firm, Tin Active and Lower, Lead and Zinc Sales Light with Quotations Unchanged

NEW YORK, Dec. 11.

Copper.—Buying by both domestic and foreign consumers has shrunk decidedly, but prices continue very firm. In the past week domestic consumers have been purchasing small quantities for fill-in requirements and also some metal for February delivery. Moderate buying of March metal has also appeared. It is estimated that consumers must still buy considerable metal for February. Foreign consumers have by no means bought the metal they will need for December and for January and February. Electrolytic copper is quoted at 16c., delivered in the Connecticut Valley,

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY		Dec. 11	Dec. 10	Dec. 8	Dec. 7	Dec. 6	Dec. 5
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.....	49.50	50.12½	....	49.95	51.00	51.50	51.50
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.35	6.35	6.35	6.35	6.35	6.35	6.35
Zinc, New York.....	6.70	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis.....	6.35	6.35	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

and at 16.25c., c.i.f. European ports. Specifications on contract for domestic consumption continue heavy, but thus far there is no prospect of a scarcity, as production is gradually increasing. Lake copper is quiet but firm at 16c. to 16.12½c., delivered.

Tin.—Consumers of Straits tin have been quite active and dealers have also entered the market, so that the total sales of this grade for the week ended Saturday, Dec. 8, were about 1500 tons. Chief interest was in December-January arrivals. The London market has been fluctuating within rather wide limits. On Dec. 7, the market was down over £4 per ton, and yesterday it declined still further, or about £2, with an extreme fluctuation in the East of £9 10s. Today, however, London advanced £1 10s. and the Eastern price recovered £7 15s., so that quotations stood at £227 10s. for spot standard, £225 for future stand-

ard and £227 12s. 6d. for spot Straits, all about £12 below the quotations of a week ago. The Singapore market today was £230 5s., also about £12 less than a week ago. The market on this side this week has been moderately active, with spot tin quoted today at 49.50c., New York. Today's market closed weak. The first week on the new National Metal Exchange was active and sales were satisfactory.

Lead.—Demand is not so large as it has been recently, but several good-sized contracts for January-February have been put through in the last day or two. On the whole, the market is quiet with inquiry at St. Louis a little more active than in the East. Prices continue firm and unchanged at 6.35c., St. Louis, with a number of producers practically sold up for December and January. The contract price of the leading interest continues unchanged at 6.50c., New York.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	12.00c. to 13.00c.
Aluminum No. 1 ingots for remelting (guar't'd over 99% pure)	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy, 24.00c. to 25.00c.	
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½.....	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	56.50c.
Tin, bar	58.50c.
Copper, Lake	17.00c.
Copper, electrolytic.....	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	19.25c.
Babbitt metal, high grade.....	60.50c.
Solder, ½ and ½.....	34.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products are unchanged. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10.25c. to 10.50c.

List Prices, per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.

Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.

Rods—	
High brass	18.25c.
Naval brass	20.25c.

Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	
33.00c.	
Tubes, base	
42.00c.	
Machine rods	
34.00c.	

Old Metals, per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light.....	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings...	9.75c.	10.75c.
Lead, heavy	5.125c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	
Base per Lb.	
High brass	20.50c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	
18.25c.	
Brazed Brass Tubes.....	
28.50c.	

Zinc.—Quotations for prime Western zinc are firm at 6.35c., East St. Louis, or 6.70c., New York, for delivery through the first quarter. Buying has slackened decidedly, as might be expected after the heavy purchasing by consumers recently. They still, however, have considerable to buy for the first quarter. Contrary to expectations, the ore price at Joplin was unchanged last week at \$40 per ton, although purchases were large at over 14,300 tons, though less than those of the week before. Shipments were slightly in excess of 19,000 tons, but because the output for the week increased only about 200 tons to 12,400 tons, there was a marked reduction in stocks, which are now estimated at about 44,100 tons. Early in November these stocks were about 57,800 tons.

Antimony.—Demand for Chinese metal is less active and quotations are lower at 9.62½c., duty paid, New York, for all positions.

Nickel.—Ingot nickel in wholesale lots for this and next year's delivery is quoted unchanged at 35c., with shot nickel at 36c. Electrolytic nickel is held at 37c. per lb. for this year's delivery, but for 1929 the quotation will be on the same basis as asked for ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Dec. 11.—Prices of tin, copper and antimony are lower. Sales of non-ferrous metals in this market are little changed from a week ago. The old metal market is steady.

Prices, per lb., in carload lots: Lake copper, 16.25c.; tin, 51c.; lead, 6.45c.; zinc, 6.45c.; in less-than-carload lots: antimony, 10.75c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Newton Steel to Increase Sheet Capacity

From proceeds of new financing, the Newton Steel Co., Newton Falls, Ohio, will enlarge its capacity for rolling steel sheets by adding 10 hot mills and auxiliary equipment to the 20 mills which comprise the present plant. At a special meeting Dec. 10, stockholders ratified financing plans, whereby the company expects to raise \$1,750,000 for the improvements. The plan calls for an increase in the authorized common stock of no par value from 100,000 to 300,000 shares. Of this increase, 100,000 shares will be used to exchange the present common for new, on the basis of one new for one old. In addition, 40,000 shares will be issued and have been sold at \$43.75 per share to a banking syndicate.

Reinforcing Steel

Awards of 4300 Tons—4275 Tons in New Projects

AWARDS of 4300 tons reported during the last week included no jobs of outstanding size. New projects, amounting to 4275 tons, were also of small size, ranging from 100 to 800 tons. Awards follow:

BOSTON, 650 tons, United Shoe Machinery Corporation office building, to Edward A. Tucker Co.

BROOKLYN, 200 tons, Abraham Lincoln High School; from George F. Driscoll Co., general contractor, to Carroll-McCreary Co., Inc.

HACKENSACK, N. J., 500 tons, Pennsylvania Railroad bridge; from Foundation Co., general contractor, to Carroll-McCreary Co., Inc.

LOCKPORT, N. Y., 125 tons, addition to Harrison Radiator Co., to a Buffalo maker.

PITTSBURGH, 400 tons, Arlington apartment building, to Truscon Steel Co.

SOUTH BEND, IND., 120 tons, building for Sears, Roebuck & Co., to Concrete Steel Co.

CHICAGO, 300 tons rail steel bars, Northwest Lyons Club, to Calumet Steel Co.

CHICAGO, 150 tons, Harrington warehouse, to Concrete Engineering Co.

ST. LOUIS, 300 tons, Deaconess Hospital, to Laclede Steel Co.

NORTH LITTLE ROCK, ARK., 300 tons, high school, to Sheffield Steel Corporation.

STARKVILLE, MISS., 230 tons, several buildings for Agricultural and Mechanical College of Mississippi, to Connors Steel Co.

SAN FRANCISCO, 100 tons, Magnin's store, to Gunn, Carle & Co.

SAN FRANCISCO, 100 tons, two apartment buildings, Broadway and Octavia Street, to W. S. Wetenhall Co.

SAN FRANCISCO, 131 tons, Bekins storage warehouse, to Gunn, Carle & Co.

OAKLAND, CAL., 248 tons, South spillway, East Bay municipal utility district, to Pacific Coast Steel Co.

OAKLAND, 173 tons, Jackson Creek spillway and Pardee Reservoir, East Bay municipal utility district, to Soule Steel Co.

RENTON, WASH., 300 tons, power house for Puget Sound Power & Light Co., to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 170 tons, Massachusetts General Hospital addition.

NEW YORK, 750 tons, sections 1 and 2, route 103, Houston Street subway; bids Dec. 28.

RICHMOND HILL, N. Y., 175 tons, telephone building; White Construction Co., general contractor.

NEWARK, 800 tons, manufacturing building for Hoffman Beverage Co.

KEARNY, N. J., 225 tons, manufacturing building for Western Electric Co., Inc.

HACKENSACK, N. J., 275 tons, Pennsylvania Railroad bridge; Triest Contracting Corporation, general contractor.

CHAMPAIGN, ILL., 100 tons, Mantino State Hospital; English Brothers, low bidders on general contract.

CHICAGO, 300 tons, La Salle Club; K. M. Vitzhum, architect.

CHICAGO, tonnage being estimated, office building at 1 N. La Salle Street; John Griffiths Co., general contractor.

HOUSTON, TEX., 700 tons, building for Sears, Roebuck & Co., B. W. Construction Co., Chicago, general contractor.

BELLINGHAM, WASH., 100 tons, building for Washington Cooperative Egg & Poultry Association; bids being taken.

NEWPORT BEACH, CAL., 113 tons, two bridges; bids Dec. 17.

FAIRFAX, CAL., 310 tons, hotel, bids being taken.

SAN FRANCISCO, 355 tons, Rest Home for Christian Science Church; bids opened.

Forms Non-Ferrous Ingot Committee

A special committee of the American Society for Testing Materials to promote the general use of specifications for copper alloys in ingot form held a meeting in Cleveland late in November and organized. The chairman of the committee is Guillian H. Clamer, president Ajax Metal Co., Philadelphia.

The committee was appointed to undertake the solving of problems arising from the publication in technical and trade journals of prices of ingot metals which, it is stated, make no allowance for grade of material used, varying percentages of impurities or the tolerances permitted in composition. The following plan of action was decided upon by the committee:

1. To enlist the cooperation of the Non-Ferrous Ingot Metal Institute in educating consumers to standard alloys, standard requirements and specifications with as few variations as possible from these standards.

2. To obtain all possible specifications from consumers and producers of ingot copper alloys. These specifications will be compiled and tabulated, and as soon as possible a stand-

ard specification will be submitted to the proper committee of the A. S. T. M. with the recommendation that this be put through the regular procedure for the development of the standards.

C. L. Warwick, secretary-treasurer of the A. S. T. M., was made secretary of the new committee.

Pressed Metal Institute to Meet at Detroit

The December meeting of the Pressed Metal Institute will be held in Room 20-221 General Motors Building, Detroit, on Dec. 19. The morning sessions will consist of group meetings, the light stampings and heavy stampings groups meeting separately, while at the afternoon session both groups will meet as the Pressed Metal Institute. The members of the institute and other stamping manufacturers will be the guests of the Purchasing Agents' Association of Detroit, at dinner at 6.30, following which W. W. Galbreath, president Youngstown Pressed Steel Co., Youngstown, and also president of the Pressed Metal Institute, will speak on "Today's Problems and Today's Purchasing Agent."

PERSONAL

JOHN J. OTT, president and general manager B. Ott & Sons Co., LaCrosse, Wis., machine shop, severed his connections with the concern on Dec. 1 and will retire from active business. Mr. Ott served his apprenticeship as a machinist in what now are the Allis-Chalmers Mfg. Co. and Vilter Mfg. Co., Milwaukee, returning to LaCrosse in 1893 to become superintendent of his father's plant. He became president, upon the death of his father, Benedict Ott, in 1905.

J. MURRAY RIDDELL is now associated with Crowell & Murray, Inc., Perry-Payne Building, Cleveland, consulting mining engineer, chemist, assayer and metallurgist. For the past 10 years he has been employed by the Corrigan, McKinney Steel Co., Cleveland, as reporting engineer, assistant district superintendent of its Menominee Range iron ore mines and general superintendent of its Kentucky coal mines. He is a graduate of the Michigan College of Mines.

HARRY A. PRATT, purchasing agent Wilcox-Crittendon Co., Middletown, Conn., has been made assistant general manager. James O. Lord succeeds him as purchasing agent, and Henry Hanson has been made plant manager.

EARL R. STEWART, formerly president and general sales manager of the North Western Expanded Metal Co., has been made a member of the firm of the Dillaby Fireproofing Co., Boston.

H. B. KNOWLTON, metallurgist International Harvester Co., Fort Wayne, Ind., addressed the Indianapolis chapter of the American Society for Steel Treating on Dec. 10, his subject being "Steel Failures and How to Produce Them."

W. C. MACFARLANE, president of the Minneapolis Steel & Machinery Co., has been elected president of the Manufacturers' Association of Minneapolis. Other officers elected were S. V. Wood, president Minneapolis Electric Steel Castings Co., first vice-president; R. G. Mitchell, vice-president Dodson-Fisher Co., second vice-president; C. B. Mills, president Midland National Bank & Trust Co., treasurer, and Alexis Caswell, secretary and business manager.

ARTHUR J. TUSCANY, manager of the Gray Iron Institute, Cleveland, was recently presented with a marble and gold desk set by the Ohio Foundries Association, Inc., of which he was secretary and manager for nearly seven years prior to his connection with the Gray Iron Institute. The presenta-

tion was made by C. C. SMITH, Toledo Castings Co., Toledo, Ohio, president of the Ohio Foundries Association.

H. M. REED, who has been vice-president and general manager of factories for the Standard Sanitary Mfg. Co., Pittsburgh, has been named first vice-president and chairman of the executive committee, succeeding the late J. W. Oliver. THEODORE E. MULLER succeeds Mr. Reed. R. E. SARGENT, general sales manager, has been elected vice-president and a director. F. F. KAULBACH also is a new director of the company.



SAM TOUR

SAM TOUR, who resigned as metallurgist, Doehler Die Casting Co., several months ago, has established an office as consulting engineer at 123 North Street, Batavia, N. Y. He will devote attention to problems in die casting and heat treating (especially in salt baths). He is a graduate of University of Colorado, and received the degree of Master of Science from the University of Michigan. During the war and until 1921 he was attached to the Army Ordnance Department. Since 1921, as metallurgist for the Doehler company, he has discovered die steels of great serviceability and has pioneered in producing castings of high zinc content, with zinc of unusual purity. He has written and lectured widely on the salt bath method of heat treating and furnaces therefor. Mr. Tour has been chairman of both the Washington and New York chapters of the American Society for Steel Treating; is a member of the executive committee of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, and is secretary of the Committee on Corrosion of Non-ferrous Metals and Alloys of the American Society for Testing Materials.

L. B. GODFREY has been appointed Eastern sales manager for the Cuya-

hoga Steel & Wire Co., Cleveland, and will have offices at 70 North Beacon Street, Hartford, Conn. For the past 10 years he has been associated with the machine tool industry.

F. WARD COBURN has been elected a director of the E. & G. Brooke Iron Co., Birdsboro, Pa.

CALVIN E. BRODHEAD, formerly vice-president Scranton Bolt & Nut Co., Scranton, Pa., has been placed in charge of a sales office which has been opened at 393 Seventh Avenue, New York, by the Wrought Iron Co. of America, recently formed by a merger of the Lebanon Iron Co., Lebanon, Pa., and the Scranton company.

CHARLES A. LAMPARD has been appointed special sales representative in New England for the Poldi Steel Corporation of America, 245 West Eighteenth Street, New York. He was previously in charge of metallurgical work for the Yale & Towne Mfg. Co., Stamford, Conn., and also was for a time in charge of the heat treating departments of the Union Metallic Cartridge Co., Bridgeport, Conn., and furnace and metallurgical specialist for the General Electric Co., Schenectady, N. Y.

WALTER J. DONNELLY, trade commissioner at Montreal for the Department of Commerce, has been promoted to the position of commercial attaché at Bogota, Colombia.

REAR ADMIRAL W. A. MOFFETT, chief of the Navy Bureau of Aeronautics, was the guest of honor at a dinner given by the Detroit Aviation Society, Dec. 5. He predicted a bright future along commercial lines for lighter than air machines and added that, while the dirigible will eventually play an important part in transportation to Europe, its most fertile field now is between North and South America, where ideal weather conditions prevail all year around on the airways between the two continents.

New Direct Steel Process of W. H. Smith

A process for making sponge iron, or steel, direct from the ore "without the use of coal or coke," has been under development in the past few years by William H. Smith, Detroit, but nothing authentic regarding it has been obtainable. Mr. Smith, who was connected at one time with the Ford Motor Co., as head of its research department, has been perfecting his process through work at the University of Detroit, and at a small commercial plant located near Detroit. The company organized to handle the process is the General Reduction Corporation, which, it is emphasized, is not owned by Henry Ford or the General Motors interests. Rights to use the process have been leased to the Ford Motor Co. and negotiations are under way for use of the process in certain foreign countries.

Railroad Equipment

Missouri Pacific Will Buy 3000 Freight and 40 Passenger Cars—Lehigh Valley Inquires for 1000 Cars

NEW inquiries for freight cars which have come out during the week total nearly 5000, the largest being 3000 for the Missouri Pacific, 1000 for the Lehigh Valley and 500 for the Chicago Great Western. The Missouri Pacific will also buy 40 passenger train cars and 25 switching locomotives. The Chicago & North Western has ordered 200 ballast cars, and the Seaboard Air Line, 200 hopper cars. Details of the week's business follow:

Missouri Pacific has issued inquiries for 1000 50-ton box cars, 750 40-ton and 250 50-ton automobile cars, 500 70-ton hopper cars, 500 40-ton stock cars, 60 caboose cars and 20 air-dump cars. Road is also inquiring for 25 eight-wheel switching locomotives and 40 passenger train cars, including 13 mail and baggage, 13 baggage, 11 passenger coaches, one cafe club coach and two cafe lounge coaches.

Chicago & North Western has ordered 200 ballast cars from Rodger Ballast Car Co. and has made inquiry for 10 4-8-4 type locomotives.

Seaboard Air Line has ordered 200 70-ton hopper cars from Richmond Car Works.

Youngstown Sheet & Tube Co. has ordered 17 air-dump cars of 35-cu. yd. capacity from Koppel Industrial Car & Equipment Co.

Amtorg Trading Corporation, New York, has ordered 20 air-dump cars from Magor Car Co.

New York Central is inquiring for 100 70-ton, high-side gondola cars.

Chicago Great Western is inquiring for 300 automobile cars and 200 box cars.

Lehigh Valley has made inquiry for 500 50-ton hopper cars, 300 50-ton automobile cars and 200 70-ton gondola cars.

Utah Copper Co. is asking for bids on 100 90-ton ore cars and 20 air-dump cars.

Fruit Growers Express has made inquiry for 800 underframes for refrigerator cars in addition to 200 previously mentioned.

Louisville & Nashville has made formal inquiry for 2500 freight cars previously reported as authorized.

Atchison, Topeka & Santa Fe's total inquiries now include 4575 freight cars and 56 passenger cars. This road has placed two dining cars with Pullman Car & Mfg. Corporation and is also inquiring for 21 gas-electric rail-motor cars.

Chicago, Rock Island & Pacific is in market for six gas-electric cars.

Fabricated Structural Steel

New York Subway Will Take 34,000 Tons and Government Building at Washington, 10,000 Tons—Awards of 29,400 Tons

WITH two sections of the New York subway calling for a total of 34,000 tons, and a Government building at Washington for 10,000 tons, new projects reported during the week totaled 58,300 tons. Awards amounted to 29,400 tons, the largest having been 6000 tons for a telephone building at Cincinnati and 5200 tons for a loft building in New York. Awards follow:

NEW YORK, 5200 tons, loft building at Seventh Avenue and Thirty-ninth Street, to Hay Foundry & Iron Works.

NEW YORK, 1300 tons, apartment building at 144 West Eighty-sixth Street, to Easton Structural Steel Co.

NEW YORK, 1000 tons, public school No. 92, to Hay Foundry & Iron Works.

NEW YORK, 900 tons, apartment building at 4 East Seventy-second Street, to Hay Foundry & Iron Works.

NEW YORK, 600 tons, apartment building at Twelfth Street and Fifth Avenue, to Dreier Iron Works.

BALTIMORE & OHIO RAILROAD, 200 tons, bridge, to Fort Pitt Bridge Co.

PARR, S. C., 115 tons, turbine supports bought by W. S. Barstow Management Associates, Reading, Pa., from unnamed builder.

LOUISVILLE & NASHVILLE RAILROAD, 800 tons, bridge construction at Birmingham, to Nashville Bridge Co.

NIAGARA FALLS, N. Y., 800 tons, office building, to McClintic-Marshall Co.

NIAGARA FALLS, 187 tons, addition to National Carbon Co. plant, to R. S. McMannus Steel Corporation.

BUFFALO, 370 tons, reception building for Buffalo State Hospital, to Kellogg Structural Steel Co.

BUFFALO, 300 tons, coach shop for New

York Central Railroad, to Kellogg Structural Steel Co.

WASHINGTON, PA., 150 tons, Y. W. C. A. building, to Guibert Steel Co.

FLINT, MICH., 825 tons, Industrial Mutual Association auditorium, to American Bridge Co.

DETROIT, TOLEDO & IRONTON RAILROAD, 446 tons, bridge at Delta, Ohio, to McClintic-Marshall Co.

TOLEDO, OHIO, 495 tons, New York Central Railroad bridge, to McClintic-Marshall Co.

CLEVELAND, 290 tons, West 117th Street viaduct for New York Central Railroad, to unnamed fabricator.

CLEVELAND, 1250 tons, addition to Moreland Courts Apartments for Shaker Co., to McClintic-Marshall Co.

CLEVELAND, 200 tons, East Thirty-seventh Street bridge for Cleveland Union Terminals Co., to Bethlehem Steel Co.

CINCINNATI, 6000 tons, building for Cincinnati and Suburban Bell Telephone Co., to American Bridge Co.

CINCINNATI, 2000 tons, building for Union Gas & Electric Co., to American Bridge Co.

MICHIGAN CENTRAL RAILROAD, 400 tons, bridges in Indiana, to McClintic-Marshall Co.

CHICAGO, 250 tons, gymnasium for Uni-

versity of Chicago, to an unnamed bidder.

CHICAGO, 1300 tons, armory for 124th Field Artillery, to Mississippi Valley Structural Steel Co.

CHICAGO, 500 tons, addition to Washington Park race track, to United Boiler, Heating & Foundry Co.

MILWAUKEE, 700 tons, building for Allis-Chalmers Mfg. Co., to American Bridge Co.

ST. JOSEPH, MO., 500 tons, bins and sheds for Quaker Oats Co., to St. Joseph Structural Steel Co.

ROSITA, MEX., 1000 tons, buildings for American Smelting & Refining Co., to Ingalls Iron Works.

PARADISE, MONT., 570 tons, Clarks Fork bridge, to Virginia Bridge & Iron Co.

SAN FRANCISCO, 150 tons, Grace Cathedral, to Judson-Pacific Co.

SAN JOSE, CAL., 100 tons, market building, to Golden Gate Iron Works.

SANTA MONICA, CAL., 190 tons, Outlook Building, to Baker Iron Works.

SEATTLE, 200 tons, addition for Isaacson Iron Works, to be fabricated in company's own shop.

STATE OF WASHINGTON, 700 tons, power plant for Stone & Webster, to Pacific Coast fabricator.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARTFORD, CONN., 150 tons, building for Trinity College.

NEW YORK, 300 tons, Home for Aged on East Eighty-eighth Street.

NEW YORK, 15,000 tons, section No. 1, route 103 of subway for Houston Street line; bids Dec. 28.

NEW YORK, 19,000 tons, section No. 2, route 3 of subway for Houston Street line; bids Dec. 28.

BROOKLYN, 1000 tons, Pitkin Theater; Thompson-Starrett Co., contractor.

STATE OF NEW YORK, 150 tons, Neversink River highway bridge.

YONKERS, N. Y., 450 tons, showroom and service station.

READING RAILROAD, 6000 tons, steel superstructure for viaduct and bridges for Manayunk grade crossing elimination.

BALTIMORE, 600 tons, highway bridge.

WASHINGTON, 10,000 tons, Internal Revenue Building.

ERIE, PA., 200 tons, Jewish Temple.

SPRINGFIELD, ILL., 1500 tons, State highway bridges.

CHICAGO, 18,500 tons, Board of Trade Building; previously estimated at 15,000 tons.

CHICAGO, tonnage not stated, office building for Swift & Co.

KANKAKEE, ILL., 187 tons, Arcade Building.

SAN RAFAEL, CAL., 250 tons plates, steel tank for Marin municipal water district; bids Dec. 18.

The Timken Roller Bearing Co., Canton, Ohio, has established offices at 1361 Figueroa Street, Los Angeles, and 321 South Pine Street, Seattle, Wash., the former in charge of Roy Cross and the latter of Marshall Cooledge.

Manufacturing operations in motor car and truck factories is continuing at approximately the November rate with some tendency to increase as a larger number of companies swing into production of 1929 models, says *Automotive Industries* this week.

Lower Prices for European Steel

Rapid Resumption of German Mills After Lockout Relieves Tension

—British Pig Iron Demand Better

(By Cablegram)

LONDON, ENGLAND, Dec. 10.

DEMAND for Cleveland pig iron is maintained by domestic consumers asking prompt delivery and some furnaces cannot accept any more orders for delivery this year. Export inquiry is still poor, but prices are firm. In Scotland three Gartsherrie blast furnaces have been blown out, reducing the number of active Scottish furnaces to 20.

East-Coast hematite is moderately active, with stocks small. Prices are being maintained for domestic use, but export buyers are receiving concessions. Foreign ore markets are quiet.

Finished iron and steel business is quiet in the heavy industries, but shipbuilders now are placing many more ship orders, which eventually will benefit the steel makers. The po-

sition otherwise is unchanged and little revival is expected this year.

Tin plate demand has improved, but business generally is quiet. Most makers are well sold for the early months of next year and the position to the end of the current year is being eased by the stoppage weeks, being run off by certain works which are short of immediate specifications.

Galvanized sheet markets are fairly active in small parcels and makers generally are well placed up to January or February. Black sheets are quiet.

On the Continent of Europe

Continental markets are quiet and prices easing, as German production is resumed.

French production in October included 857,000 metric tons of pig iron and 834,000 tons of raw steel (ingots and castings).

however, are booked with sufficient tonnage to carry them through January and are not disposed to offer marked price reductions. Another factor favorable to the mills is the active demand for steel from foreign markets, which will not permit exporters to delay placing their orders for long.

Although the German lockout did not cause an appreciable increase in business, it undoubtedly diverted some business to Belgian mills from foreign buyers who were unable to secure early shipments from Germany.

The market on steel bars is somewhat irregular, as only certain mills are in need of tonnage and in most cases will accept only a limited number of sizes. This necessitates distributing a miscellaneous specification for bars to two or more makers. Prices for export range from £6 3s. to £6 4s. per ton (1.36c. to 1.37c. per lb.) for large orders and from £6 5s. to £6 6s. per ton (1.38c. to 1.39c. per lb.) for small lots and prompt delivery. Most mills are offering January-March shipment.

Corrugated reinforcing bars are quoted at £6 6s. per ton (1.39c. per lb.), and angles are slightly softer, ranging from £5 12s. per ton (1.24c. per lb.) for larger sizes to £6 2s. 6d. per ton (1.35c. per lb.) for small sizes. Hot-rolled hoops are quoted at £6 5s. per ton (1.38c. per lb.), f.o.b. Antwerp. The sheet market is quiet, but heavy gages of black sheets are firm. The light gages continue to encoun-

Belgian Mills Grant Concessions

Prices for First Quarter Delivery Shaded—British Sheets and Foundry Iron Being Imported

ANTWERP, BELGIUM, Nov. 23.—The lockout at the German steel mills failed to bring an increase of business to Belgian mills, which are offering prompt delivery on most products. For future delivery, buyers are pressing for lower prices, and a tendency

to offer concessions on first quarter tonnage is evident. Exporters with orders for future shipments are inclined to delay buying, apparently believing that the present willingness to make concessions presages a lower market level for early 1929. Mills,

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.24	
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.34	to \$5.46
Cleveland No. 1 foundry.	3 8½	to 3 9½	16.61	to 16.85
Cleveland No. 3 foundry.	3 6		16.00	
Cleveland No. 4 foundry.	3 5		15.76	
Cleveland No. 4 forge...	3 4½		15.64	
Cleveland basic (nom.)...	3 5		15.76	
East Coast mixed.....	3 10	to 3 11	16.98	to 17.22
East Coast hematite.....	3 10½	to 3 11½	17.10	to 17.34
Rails, 60 lb. and up.....	7 15	to 8 5	37.59	to 40.01
Billets	6 5	to 6 10	30.31	to 31.53
Ferromanganese	13 15		66.69	
Ferromanganese (export)	14 0		67.90	
Sheet and tin plate bars,				
Welsh	6 0		29.10	
Tin plate, base box.....	0 18	to 0 18½	4.37	to 4.39
Black sheets, Japanese				
specifications	13 7½		64.87	
Ship plates	7 12½	to 8 2½	1.66	to 1.76
Boiler plates	9 0	to 10 10	1.95	to 2.27
Tees	8 2½	to 8 12½	1.76	to 1.86
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.65
Round bars, ¾ to 3 in...	7 10	to 8 0	1.63	to 1.73
Steel hoops	9 0	to 10 0	1.95	to 2.16
Black sheets, 24 gage...	10 0		2.16	
Galv. sheets, 24 gage...	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage (nom.)	16 0		3.47	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):			
Belgium	£3 3½s.	to £3 6s.	\$15.39 to \$16.00
France	3 3½	to 3 6	15.39 to 16.00
Luxemburg	3 3½	to 3 6	15.39 to 16.00
Basic pig iron (a):			
Belgium	3 4½	to 3 5½	15.64 to 15.88
France	3 4½	to 3 5½	15.64 to 15.88
Luxemburg	3 4½	to 3 5½	15.64 to 15.88
Coke	0 18		4.37
Billets:			
Belgium	5 1½		24.61
France	5 1½		24.61
Merchant bars:			
Belgium	6 2½		1.33
France	6 2½		1.33
Luxemburg	6 2½		1.33
Joists (beams):			
Belgium	5 2½		1.11
France	5 2½		1.11
Luxemburg	5 2½		1.11
Angles:			
Belgium	6 1½		1.32
½-in. plate:			
Belgium (a)	6 12		1.43
Germany (a)	6 12		1.43
¾-in. ship plate:			
Belgium	6 7		1.38
Luxemburg	6 7		1.38
Sheets, heavy:			
Belgium	6 1		1.31
Germany	6 1		1.31

(a) Nominal.

ter keen competition from the British product.

Semi-finished material prices are firm, but transactions are few because of limited stocks. The scarcity of blooms has become acute since the German mills withdrew from the market, as previous to the lockout they were practically the only sellers. There is also a scarcity of billets, and prices are nominally £4 19s. to £5 3s. (\$24.06 to \$25.03) per metric ton. Sheet bars are steady in price, but the market is quiet. Transactions are usually at about £5 2s. per ton (\$24.79) for normal specifications.

The export price of No. 3 phosphoric foundry iron continues at 118 Belgas (\$16.40) per metric ton in the domestic market and £3 5s. to £3 6s. (\$15.80 to \$16.04) per ton, f.o.b. Antwerp for export. British Midland furnaces are offering foundry iron at about £3 6s. per ton, c.i.f. Antwerp, or about 116 Belgas (\$16.04), and are securing considerable tonnage from consumers not far removed from the port. Scrap iron and steel prices are firm at 105 Belgas (\$14.60) per metric ton for furnace grade, 104 Belgas (\$14.26) per ton for heavy melting steel for open-hearth and 128 Belgas (\$17.80) per ton for No. 1 cast.

German Tin Plate Output Increasing

HAMBURG, GERMANY, Nov. 23.—German output of tin plate was 13,259 metric tons, or 292,228 base boxes, in October, compared with 11,001 metric tons, or 242,462 base boxes, in the same month of 1927. The October production of tin plate established a new record and is explained in part by an increase in business with British merchants following the Welsh-American tin plate agreement. It is claimed that November would have shown a further increase in tin plate output but for the lockout. The Hoesch Steel Co. plans to increase its tin plate capacity by about 3000 tons, or 66,120 base boxes a month, because of its larger export trade.

German Works Seek South African Ore

HAMBURG, GERMANY, Nov. 24.—Considerable interest in South African manganese ore is being shown by Friedrich Krupp A. G., Essen, and Gutehoffnungshütte, Oberhausen, whose combined imports of manganese ore are about 120,000 tons annually. Both companies are interested in the Gloucester Mining Co., Postmasburg, South Africa, which controls manganese mines. With the completion of a railroad from the mines to the sea, it is planned to ship equipment and give engineering assistance to develop the fields.

Phillips Brothers, Philadelphia, iron and steel importers and jobbers, have moved their offices to the Middle City Building, 34 South Seventeenth Street, that city.

Prices of Imported Steel Recede

Quotations Still Too High for Sales Here—Hearing This Month on Steel Marking

NEW YORK, Dec. 11.—Prices on foreign bars and shapes, c.i.f. Atlantic ports, have registered a slight decline in the past week, following termination of the lockout at German steel mills. The reductions in quotations, however, have only amounted to 1.50c. to 2c. per 100 lb., so that the market is still too high to permit much business with American consumers. Shapes range in price from 1.83c. to 1.85c. per lb., and plain steel bars from 1.95c. to 2c. per lb., duty paid.

The recent decision of the Customs Court of Appeals upholding the lower court in classifying reinforcing bars as structural material, at 10c. per 100 lb. lower duty, has not yet resulted in any competitive offers by importers of Continental material. On a recent inquiry for a sizable tonnage of reinforcing bars, an importer bid about 2.05c. per lb. and the business was placed with a domestic mill quoting \$1.20 per ton higher. Another importer recently offered reinforcing bars on an inquiry for 1000 tons at 2c. per lb., duty paid, but did not receive the business.

Despite the order of the Treasury Department, classifying bar-sized shapes under the bar paragraph of the tariff, taking a 10c. per 100 lb. higher duty than when classified as structural material, importation of furring channels continues, although on a smaller scale. The new classification imposes a duty of 30c. per 100 lb. on furring channels, which cost more than 1.50c. per lb. After the Treasury Department issued its order on bar-sized shapes, domestic manufacturers of furring channels advanced their prices 10c. per 100 lb. to a range of 2.75c. to 2.80c. per lb., but Continental makers have evident-

ly absorbed part of the increased tariff and are meeting the domestic price in most cases.

Importers have entered a protest against the ruling of the Treasury Department on bar-sized shapes, but no date for a hearing has been set.

Several cases of domestic mills against importers intended to clarify the Treasury Department ruling on the marking of imported steel are scheduled for hearing before the Customs Court, New York district, Dec. 18 and 19. It is expected by importers that one such case will be selected as a test. The domestic mills are seeking to determine what products must be marked with the country of origin and how the marking is to be applied.

Export business with the Far East shows some evidence of improvement, but merchant buying continues light, especially from Japan. It is pointed out by Japanese trading companies here that merchants are permitting their stocks to decline because they expect the Government to lift the gold embargo early in the coming year. The resulting increase in the exchange value of the yen would leave them with stocks bought when the yen was low. Consumers, however, are in need of material and are beginning to issue inquiries to the importers. A substantial volume of inquiry for rails is in the market from Japan. The Kongosan Railroad in Chosen is inquiring for 12½ miles of 75-lb. rails, with an alternate inquiry for 60-lb. sections; the Shizuoka Railroad is in the market for five miles of 75-lb. rails, with an alternate inquiry for 60-lb. sections, and two privately owned railroads are asking for rail tonnages, one for 100 miles and the other for 60 miles of 60-lb. rails.

American Machines Bought in Germany

Good Market for Specialized Equipment, But Sellers Must Grant One to Three Months' Credit

A STATEMENT of trade conditions in Germany as they affect the American exporter and manufacturer is given in a communication from John E. Kehl, the United States consul at Stuttgart, to the Merchants Association of New York. The letter says, in part:

"In case you should wish to inform your members as to trade possibilities in the Stuttgart consular district, you may state, on the authority of information from this consulate, that there is a good demand here for articles of all kinds involving or expressing new ideas in design, or for filling purposes not previously fulfilled. The Germans are very quick to appreciate the merits of something new in the market, something which

accomplishes a purpose not previously met or which is an improvement over articles of like kind. This is especially true of machinery and automotive equipment which embodies new ideas in design or efficiency.

"The German manufacturers of machinery are usually able to produce their machines more cheaply than American machines of similar kind can be delivered in this district. However, the great interest manifested in Germany in the highest possible degree of mechanization of industry makes the German market particularly receptive to offers of any kind of machines that will do something for which there are no German machines available, or which will do the work better or faster or more cheaply

than any German machine. This is especially true in the wood-working and metal-working branches. To a certain extent it is true in the textile industry, which is highly important in this district. The Daimler Motor Works at Stuttgart-Undertuerkheim has perhaps 20 or 30 large and expensive machines imported from the United States. A considerable number of knitting mills in Württemberg and Baden have American machines.

"The general practice in sales of goods in Germany is for the dealer to receive from the manufacturer from 30 to 90 days' credit without interest and a discount of 2 to 4 per cent if he pays within 10 to 30 days. These terms are somewhat more lenient than American manufacturers are accustomed to giving. It often happens, therefore, that prospective German customers lose interest in American offers when they find that they must pay cash against documents in the United States for any goods they buy. This means for them paying for goods about 30 days in advance of receipt. Where it is possible for American exporters to offer terms in compliance with the practice in Germany it will be advisable for them to do so. It is all very well to insist on prompt payments or short credits in a market which is accustomed to it, but when the same insistence is used in approaching merchants in a territory like this, where long credits are the usual rather than the exceptional thing, there is a great danger that the foreign merchant will take this insistence as a reflection on his good standing. There is also a strong possibility that such insistence will end all likelihood of doing business with him."

French Pig Iron Entente To Be Renewed

WASHINGTON, Dec. 11.—It is reported that the entente composed of the several producers of phosphorus pig iron in France, which was to expire Dec. 31, is to be renewed for two years under unchanged terms, according to a cablegram received by the Department of Commerce from Commercial Attaché H. C. MacLean, Paris.

It has also been reported that the international phosphorus pig iron entente, embracing producers in France, Belgium and Luxemburg, will, in all probability, be renewed for a similar period.

Henry Ford has purchased machine shop and business of Charles E. Angell, 223 Aborn Street, Providence, R. I., and will install some of the equipment and records of the Providence firm in his museum of varied Americana at Dearborn, Mich. The shop is probably one of the oldest in New England, but was of particular value to Mr. Ford because of early records pertaining to motive power engine parts which were made by Mr. Angell.

New Arbitrator in German Dispute

Minister of Interior Accepted by Both Factions—Mills Rapidly Resuming Operations

TERMINATION of the lockout in the Ruhr steel mills did not settle the questions at issue; it merely indicated that both the mills and the unions again accepted Government arbitration. The original decision of the Government arbitrators granted an increase of 6 pf. (1.50c.) per hr. to time workers and 2 pf. (0.50c.) per hr. as a "time supplement" to piece workers. The mills refused to accept this finding, contending that it was invalid, as it did not come from a properly constituted authority. The mills were upheld by the courts, and the lockout did not come to an end until Dec. 3, following the appointment of Minister of the Interior Severing as the new arbitrator and his acceptance by both sides. A decision by the new arbitrator is not expected for at least one week, and a number of weeks may elapse before his investigation is completed.

According to a cabled report to the Department of Commerce from Commercial Attaché Fayette W. Allport, Berlin, the Federal Labor Court will, at a later date, bring in a verdict as to the legality of the decision of Minister of Labor Wissell, who, on Oct. 31, held that the wage awards that precipitated the lockout were binding on both parties.

The German steel industry is rapidly resuming activity. About four-fifths of the mills affected by the lockout are operating, more men are being employed daily, and new furnaces are being started. The resumption of production has affected Continental steel prices. The trend of export prices is downward, after a slight advance during November when the lockout was effective. It is reported that the volume of orders on the books of German steel works is sufficient to sustain operations for the next three months.

Neither the mills nor the unions have changed their attitude regarding the issues that caused the lockout. Employers continue to protest that they wish to avoid a new advance in prices, which would be the third this year in the domestic market, and that a wage increase would make such an advance inevitable. The average wage of skilled workers in the metal industries is 48.89 m. (\$11.65) per week. This is the minimum, as most steel workers receive extra payments, if married, or for overtime work. The increase in wages of 15 pf. (4c.) per hr. originally demanded by the unions would cost the metal industry about 90,000,000 m. (\$21,438,000) a year.

Annual reports of leading mills, however, do not substantiate the employers' claim that their finances are unsatisfactory and that they are unable to pay an increase with their present income. The turnover of business at the Gutehoffnungshütte at

Oberhausen increased 10 per cent in 1927, but its gross profits increased 25 per cent. Other corporation reports also show satisfactory financial conditions. The average dividend of the heavy iron and steel corporations is slightly higher than the average for all corporations in Germany.

World Engineering Congress Plans Outlined

The World Engineering Congress, to be held in Tokio, Japan, next year, was given a decided impetus by a dinner meeting of the American committee on Dec. 6 at the Engineers' Club, New York, at which Dr. Masawo Kamo, professor of mechanical engineering at Tokio Imperial University, was the guest of honor. Doctor Kamo, who is chairman of the organizing committee of the congress, told in detail what is being arranged for the entertainment and comfort of visitors and outlined active participation of some principal countries of Europe.

It was, however, in the reports of the chairman of the American subcommittees that the information became available as to the growing interest being shown within the United States toward the congress and the numbers who are planning to participate. Among those committees reporting were: Finance, John W. Lieb, chairman; publicity, James H. McGraw, chairman; transportation, F. B. Jewett, chairman; promotion and attendance, George W. Fuller, chairman. Elmer A. Sperry, chairman of the American committee and now president of the American Society of Mechanical Engineers, presided, and details were also explained by Maurice Holland, executive secretary of the committee, 29 West Thirty-ninth Street, New York. The American Express Travel Bureau will have charge of the arrangements and one of the Dollar Line steamships leaving San Francisco has been chartered.

Manitowoc Ship Building Corporation, Manitowoc, Wis., has been given a contract by the Pere Marquette Railroad to construct two new car ferries at a cost of \$2,500,000. The new ferries will be the first on the Great Lakes to employ turbo-electric drive. It will make them the fastest ferries and among the fastest ships on the Lakes, with a speed of 18 miles an hour specified.

The turntable of permanent molds shown on page 1223 of THE IRON AGE of Nov. 15, in an article devoted to the manufacture of electric heating appliances by the Edison Electric Appliance Co., Chicago, carried molds made by the Holley Permanent Mold Machine, Inc., Detroit.

Working on Small Tool Standardization

Progress was reported by 12 technical committees and new projects were discussed at a meeting of the sectional committee on the standardization of small tools and machine tool elements, which was held Dec. 6 at the Engineering Societies Building, New York. The sectional committee is organized under the procedure of the American Standards Association, and is sponsored by the National Machine Tool Builders Association, Society of Automotive Engineers and the American Society of Mechanical Engineers.

H. E. Harris, consulting engineer, Bridgeport, Conn., chairman of the committee, presided at the meeting, which was well attended. Brief addresses, dealing for the most part with the desirability of the standardization projects in hand, were made by J. B. Armitage, chief engineer Kearney & Trecker Corporation, Milwaukee, representing the N. M. T. B. A.; D. W. Oviatt, chairman of tool standards committee, General Motors Corporation, representing the S. A. E.; and J. R. Shea, superintendent of manufacturing development, Western Electric Co., New York, representing the A. S. M. E.

Technical committee No. 1 has completed its work, standards for T-slots, their bolts, nuts, tongues and cutters having been approved March, 1927. Tool holder shanks and tool post opening standards have passed the sectional committee and sponsor organizations and are now before the American Standards Association. The preliminary work of the milling cutter committee, which is made up of eight sub-committees headed by C. W. Machon, Brown & Sharpe Mfg. Co., Providence, has been practically completed.

Progress in Taper Shank Standards

Standardization of machine taper shanks and sockets, an outstanding project, has made considerable progress. This committee, headed by E. F. DuBrul, general manager of the National Machine Tool Builders Association, is in a position to submit two propositions to industry: a taper of $\frac{3}{4}$ -in. per ft. for all sizes, and a compromise, with Morse taper for smaller sizes and $\frac{3}{4}$ -in. taper for larger sizes. The committee on designation and working ranges of machine tools held its first meeting Dec. 5, with H. W. Dunbar, Norton Co., Worcester, chairman. Mr. DuBrul, reporting for the committee, pointed out that the grinding machine group of the N. M. T. B. A. has been working on this for a number of years and has standardized on many classes of grinders. Milling machine, lathe and other groups have also worked along this line.

Standardization of chucks and chuck jaws will be taken up by a technical committee headed by J. R. Lovely, Jones & Lamson Machine Co., Spring-

field, Vt. The committee, composed largely of chuck manufacturers, is made up of two sub-committees, one on scroll chucks and the other on air chucks. Another sub-committee will take up bolt holes on air cylinders, and connections on piston rods, etc. The main committee is working in chuck jaw standards.

The committee on spindle noses and collets for machine tools, of which J. B. Armitage, Kearney & Trecker Corporation, Milwaukee, is chairman, reported progress. S. Diamant, president of the Diamant Tool & Mfg. Co., Newark, N. J., is permanent chairman of a committee on punch and die holders, and a committee on circular forming tools is being organized with T. A. Anglada, Anglada Motor Corporation, New York, chairman. This standardization project was suggested by the S. A. E.

Simplification and standardization of drill sizes is to be undertaken by a committee headed by C. J. Oxford, National Twist Drill Co., Detroit. At the first meeting, held Dec. 5, a sub-committee was appointed to prepare a tentative list of drill sizes. A drill jig bushing committee, with C. E. Rundorff, Buick Motor Co., Flint, Mich., chairman, has also been organized.

Standardization of machine tool colors and paint materials was suggested for consideration by the sectional committee, this project being introduced by E. F. DuBrul. After some discussion as to whether the project is within the scope of the committee, it was voted to refer the matter to the American Standards Association. Standardization of location of serial numbers on machine tools was also suggested.

The consensus of opinion was that this project does not come within the scope of the committee and it was voted to refer the matter to the N. M. T. B. A. Standardization of dies for electric spot welders was suggested by R. S. Burnett, manager standards department of the S. A. E., at the request of a large maker of motor trucks. Users of such equipment are to be circularized and if a substantial interest is found, the executive committee will add this to the list of standardization projects. Butt, as well as spot, welding dies will be included.

Julian Kennedy Awarded A.S.M.E. Medal

Julian Kennedy, Pittsburgh, was awarded the A.S.M.E. medal for 1928 for "services and contributions to the iron and steel industry." The presentation was made as a feature of the dinner of the American Society of Mechanical Engineers, New York, Dec. 5. He was presented to the members for the award by Charles M. Schwab, past-president of the society, and the actual presentation of the medal was made by President Alex Dow. Mr. Kennedy, in an interesting acceptance speech, which re-

counted some of the conditions which used to obtain in the industry, emphasized something of the difficulties, particularly in the early days, of introducing new methods of equipment into the mills, saying that "it was harder to get them in use than to work them out."

Scrap Institute Holds First Meeting and Dinner

The first meeting and dinner of the recently organized board of directors of the Institute of Scrap Iron and Steel was held Dec. 5, at the Hotel Pennsylvania, New York. Announcement was made by Benjamin Schwartz, director of the Institute, of the organization of arbitration machinery to settle disputes within the iron and steel scrap industry, available to members and non-members upon application for the service. The rules adopted conform to the arbitration laws of the State of New York and other states which have passed such statutes and were prepared with the aid of the American Arbitration Association. According to these rules, the director of the Institute will be the impartial chairman in every arbitration, two arbitors being selected from a fixed panel by the parties to the dispute.

In addition to the seven chapters of the Institute already organized in Pittsburgh, Buffalo, Philadelphia, New York, Newark, N. J., Reading, Pa. and Hartford, Conn., it was decided to establish new chapters in Cleveland, Detroit, Chicago, St. Louis and Boston. The board of directors also voted to organize four departments of service devoted to trade relations, arbitration, insurance and traffic.

At the dinner, Dr. Hugh P. Baker of the Chamber of Commerce of the United States, Washington, spoke on trade associations and their growth in the United States, explaining how the trade association department of the Chamber of Commerce of the United States is extending aid to recently organized associations.

The following officers were elected to serve until the annual meeting in March: Joseph G. Hitner, Henry A. Hitner's Sons Co., Philadelphia, president; David Strauss, Continental Iron & Steel Co., New York, B. Cohen, Louis A. Cohen & Sons, Wikes-Barre, Pa., Stanton Dreifus, S. Snyder Corporation, New York, J. V. S. Bishop, Bishop Co., Philadelphia, and David Pollock, Mayer Pollock, Pottstown, Pa., vice-presidents; Herman D. Moscowitz, M. Samuel & Sons, New York, secretary, and Thomas F. Kelly, Brooklyn, treasurer.

The executive committee includes: Max Meltzer, Hausman & Wimmer Co., Pittsburgh; Michael Bonomo, L. Schiavone & Bonomo Brothers, Jersey City, N. J.; Allan Hoffer, Allan Hoffer Co., Philadelphia; N. Jacobs, Buffalo House Wrecking & Salvage Co.; I. Wilkoff, Wilkoff Co., Youngstown, and Morris Spear, Rotter, Spear Co., Cleveland.

Machinery Markets and News of the Works

December Business Lighter

Machine Tool Buying Affected by Year-End and Holiday Considerations—Outlook Still Promising

MACHINE tool buying this month has declined in all markets. Although the volume of inquiry has dropped off along with a reduction in sales, the outlook continues promising for good business early in the new year. Year-end inventory considerations, the approach of the holidays and the desire of many manufacturers to await the new year for the formulation of business plans are perhaps responsible for the check in purchases.

It is apparent that the final month of this year will run ahead of December, 1927, but this comparison loses some force in view of the fact that sales throughout all of this year have outstripped those of corresponding months in the previous year.

New York

NEW YORK, Dec. 11.—Inquiries for machine tools continue in fair volume, although scattered and for the most part for single tools. An inclination to delay buying until next year is beginning to develop in some cases. Except for the purchase of a few tools by the New York Central Railroad, including two upright drills, the railroads are inactive. The General Electric Co. has closed on several tools including three 12-in. engine lathes for use at Schenectady. No action has been taken as yet on the list of 16 tools for the Department of Public Instruction, Schenectady, N. Y. With shipbuilders bidding for the construction of more tonnage than for a number of years, some sellers of machine tools foresee the possibility of small business from this source in lathes, planers, drills and milling machines.

Post Radio & Electric Corporation, New York, has leased space in building at 135 Bleeker Street, to manufacture radio equipment and apparatus.

Weihl Brothers, Brooklyn, care of Tobias Goldstone, 26 Court Street, architect, have asked bids on general contract for new foundry, to cost about \$27,000 with equipment.

Board of Education, 500 Park Avenue, New York, is said to be planning instal-

Requirements of automobile companies in the first quarter are expected to be substantial. At Chicago, the International Harvester Co. and the Allis-Chalmers Mfg. Co. are still buying, and lists of the Buda Co. and the Whiting Corporation, both of Harvey, Ill., are active. At Cleveland, the Eaton Axle & Spring Co. is adding to recent heavy purchases.

Several hundred used machine tools have been thrown on the market at Detroit through the consolidation of Dodge Brothers with the Chrysler Corporation. The old equipment is being disposed of to balance production.

An order for 10 turret lathes for a manufacturer in Sweden was placed with a Cleveland builder.

lution of manual training department in three-story John Adams High School to be erected at Woodhaven, L. I., to cost about \$2,000,000, for which bids have been asked on general contract. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Bushwick Can Co., 86 Butler Street, Brooklyn, manufacturer of tin cans and boxes, etc., has awarded general contract for one-story factory, to cost about \$45,000 with equipment. V. A. Lacerenza, 26 Court Street, is architect.

Anaconda Copper Mining Co., 25 Broadway, New York, has plans for two central power plants for mining properties in Butte, Mont., district, replacing a number of stations now used for this service.

James W. Garside, president, DeForest Radio Co., 139 Franklin Street, Jersey City, N. J., and associates, have organized Jenkins Television Corporation, with capital of \$10,000,000, to manufacture television and radio equipment and devices. Company will take over Jenkin's Laboratories, Inc., Washington, manufacturer of motion picture projectors, and equipment for transmission of motion pictures by radio or wire. It is understood that plant will be established in New York district. Mr. Garside will be president and general manager; C. Francis Jenkins is vice-president in charge of research. Company has arranged for stock issue to total \$2,500,000, portion of fund to be used for development.

Port of New York Authority, 75 West Street, New York, will soon begin super-

structure for new multi-story testing laboratory for structural steel and other steel products in connection with proposed Hudson River bridge, between Fort Lee, N. J. and Fort Washington Park, and bridge over Kill van Kull, between Bayonne, N. J., and Port Richmond, S. I. It will be located at West Side Avenue and Fox Place, Jersey City, N. J., and will cost about \$300,000 with equipment.

Eastern New Jersey Power Co., Asbury Park, N. J., operated by Utilities Power & Light Corporation, 327 South La Salle Street, Chicago, has acquired 45 acres at Sayreville, N. J., and plans new steam-operated electric power plant with initial capacity of 60,000 kw., to cost about \$5,000,000 with turbo-generators and auxiliary equipment. Later capacity will be increased to 180,000 kw. A coal storage plant of 60,000 tons capacity, with mechanical handling facilities, will be provided.

U. S. Hammered Piston Ring Co., 1222 South Grove Street, Irvington, N. J., has plans for new works near Paterson, N. J., for production of piston rings for aircraft engines, to cost more than \$350,000 with equipment. It is understood that present works will be removed to new location. Company has work under way on new plant at St. Petersburg, Fla., for production of piston rings for automobile engines. Sale of stock amounting to \$800,000 has been arranged, portion of fund to be used for expansion. Albert W. Wenzel is president.

Metals Disintegrating Co., Townley, near Elizabeth, N. J., has approved plans for two-story and basement addition, 53 x 100 ft., to cost about \$40,000 with equipment. William L. Finne, 91 Broad Street, Elizabeth, is architect.

National Aero Corporation, care of Perth Amboy Airplanes Corporation, Market Street, Perth Amboy, N. J., has leased plant of last-noted organization, now in course of construction, for manufacture of air-cooled aircraft motors, including parts and assembling departments. Buildings are scheduled for completion early next year and will provide about 50,000 sq. ft. floor space. National company was formed recently with capital of \$1,000,000 and is headed by Everett S. Cameron, president, and Eldridge M. Roberts, secretary.

Koppen Metal Products, Inc., formerly at Union City, N. J., is now located in new plant at Carlstadt, N. J., and may be addressed at P. O. Box 37.

William H. Nicholls Co., Inc., formerly at 4 College Street, Brooklyn, has removed to Ninety-first Avenue and 126th Street, Richmond Hill, N. Y.

Severin Machinery Corporation, 30 Church Street, New York, has taken over good will and business of Severin-Strafer Machinery Corporation.

National Flue Cleaner Co., Inc., Groveville, N. J., maker of soot blowers and fire tube boilers, has appointed the following representatives: McGee Sales Agency, 75 Fremont Street, San Francisco; Flickinger, Meyers & Rudolph, 129 West Second Street, Los Angeles; Manufacturers Sales Service, Box 655 Salt Lake

The Crane Market

OVERHEAD crane buying continues small and current inquiries are in most cases for single pieces of equipment. Sellers of electric and hand power hoists report continued good demand, but no large lists. Interest in locomotive cranes has slackened with the approach of winter weather, but contractors are still in the market for power shovels for tunnel and other contracts. Standard Oil Co. of Louisiana will buy a 150-ton, 30-ft. span overhead electric crane with two 25-ton auxiliary hooks for an experimental station at Baton Rouge, La. Nashville

Bridge Co., Nashville, Tenn., is planning installation of 25 ton, 60-ft. span electric traveling crane.

Among recent purchases are:

American-Chatillon Co., 393 Seventh Avenue, New York, nine small overhead cranes for Rome, Ga., six 1-ton hand power cranes with electric hoists, one 2-ton hand power crane, one 4-ton and one 6-ton crane with electric hoists, from Florandin Equipment Co., New York, agent for H. D. Conkey & Co., Mendota, Ill., and American Engineering Co., Philadelphia.

Amtorg Trading Corporation, 165 Broadway, New York, 10 50-ton locomotive cranes for export to Russia from Industrial-Brownhoist Corporation.

Missouri Pacific has ordered an overhead electric crane from Harnischfeger Corporation.

Western Electric Co., Chicago, has placed order for an overhead traveling crane with Whiting Corporation.

White Motor Crane Service, Detroit, has purchased a gasoline-operated crawler type crane from Orton Crane & Shovel Co.

City, Utah, and W. A. Ramsey, Ltd., Honolulu, Hawaii.

Lockstrip Mfg. Corporation, 36-09 Vermon Boulevard, Long Island City, N. Y., has been organized to take over manufacture of T. M. C. lockstrips for terrazzo and cement work. Plant is built and fully equipped and company is in operation.

National Cash Register Co., Dayton, Ohio, is permitted to acquire all capital stock of Ellis Adding Typewriter Co., Newark, N. J., under order of United States District Court in southern Ohio. Court held that transaction would not violate injunction decree against company granted in 1916 in Federal Government's anti-trust suit.

Gesswein Boat Corporation, Bergen Beach, Brooklyn, has been organized to operate boat building and repair works and has taken over plant of Paul S. Gesswein Boat Co. It will manufacture outboard motor boats and will be in market for equipment and supplies, including brass fastenings, lumber and deck fittings. Robert M. French is treasurer and general manager.

New England

BOSTON, Dec. 10.—The majority of local machine tool dealers report little current business. The most important transactions included four machines with an aggregate value of \$35,000, four lathes and four single-spindle sensitive drills. Used tools sales included about a dozen tool room lathes, three shapers, and other equipment. Unquestionably more machine tools have been sold, but because of keen competition among dealers details are lacking. Firms which have bought equipment have more tools under consideration. A Connecticut machinery maker in November bought at least \$105,000 of machine tools, a machinery maker in Rhode Island purchased heavily last month and another Rhode Island company bought three Brown & Sharpe milling machines. It is also reported that a Worcester, Mass., machinery maker placed substantial orders.

New inquiries are coming in slowly, partly because of the nearness of inventory time and also because most users needing equipment cannot secure prompt deliveries and have decided to await developments. Machine tool dealers, however, feel certain that business will be good in January and possibly in later months.

That New England plants are busier than in many months is indicated by the increase in consumption of small tools. December started with prospects

of a new high monthly sales record and has kept up the pace.

Cutting Die & Machine Co. of America, a Massachusetts corporation with 25,000 shares of no par value stock outstanding, has been organized to take over business of Joseph E. Knox & Co., Inc., Lynn, Mass., O. M. Savels & Co., Worcester, John Dewes-Gumbs Die Co., New York, and Boston Die Co. and Hub Schrivving Knife Co., Boston. These companies manufacture cutting dies for shoes and leather, rubber, celluloid, collars and shirts, envelopes, etc., perforating dies for shoe novelties, rubber trimming knives and extruding rubber form dies. James V. Knox, president Joseph E. Knox & Co., Inc., is president and general manager of new company. Present plants will be operated without change in management and will be expanded.

Work has started on a new plant for American Tube & Stamping Co., Stratford Avenue, Bridgeport, Conn.

Everett Auto Parts Co., 234 Everett Avenue, Chelsea, Mass., has awarded a contract for a one-story machine shop, 40 x 100 ft.

Plans are in progress for a new coal yard for John R. White & Son, Gano Street, Providence, R. I., to replace one destroyed by fire last week. Hoisting and other equipment will be required.

Brooks-Skinner Co., Adams Street, Quincy, Mass., wood and steel portable and permanent buildings, has started work on an addition. Plans for 1929 call for an increased production of about 25 per cent.

Wallace Barnes Co., Bristol, Conn., manufacturer of springs, special screw machine products, etc., is arranging an expansion program, with new buildings to total about 200,000 sq. ft. additional floor space. New unit will also be built at branch plant at Forestville, providing about 16,000 sq. ft. floor space. Project will cost over \$400,000 with equipment.

American Paper Tube Co., Hazel Street, Woonsocket, R. I., has asked bids on general contract for one-story addition, to cost about \$45,000 with machinery. W. F. Fontaine, 285 Main Street, is architect.

Sikorsky Mfg. Corporation, College Point, L. I., N. Y., manufacturer of airplanes and parts, will soon take bids on general contract for new plant at Lordship, Stratford, Conn., consisting of main one-story unit, 300 x 400 ft., with adjoining two-story building, 50 x 150 ft., to cost more than \$400,000 with machinery. Company is said to be planning removal of College Point works to new location. Fletcher-Thompson, Inc., Bridgeport, Conn., is architect and engineer.

Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., architect and engineer, has plans for one-story automobile service, repair and garage building, 65 x 250 ft., at Norwalk, Conn., to cost about \$120,000 with equipment.

Wilcox Crittenden & Co., Middletown, Conn., manufacturers of marine hardware, inform THE IRON AGE that they have not let contract to Lockwood Greene Engineers, Inc., for plant addition, as reported in our issue of Nov. 15.

Philadelphia

PHILADELPHIA, Dec. 10.—Contract has been let by Atwater Kent Mfg. Co., Philadelphia, to William Steele & Sons Co., for one-story sawtooth roof addition, with part three stories, 515 x 900 ft., to cost over \$1,000,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Thomas Halton's Sons, Mascher Street, Philadelphia, manufacturers of silk mill machinery, parts, etc., have awarded general contract to E. E. Hollenback, Inc., 1910 North Marshall Street, for one-story machine shop, 69 x 240 ft., to cost more than \$100,000 with equipment. W. E. S. Dyer, Land Title Building, is architect and engineer.

Philadelphia Air Terminal, Inc., care of Andrew S. Webb, president, S. B. & B. W. Fleisher, Inc., Twenty-fifth and Reed Streets, Philadelphia, recently organized by Mr. Webb and associates, has acquired 125 acres at South Philadelphia as site for new airport, to consist of hangars, machine and repair shops, oil storage and other units, project to cost about \$2,500,000.

Philadelphia Nonferrous Foundry Co., Philadelphia, recently organized by Edward W. Taylor, Jr., 3030 Queen Lane, and associates, has acquired two-story factory at 811-15 Fairmount Avenue, 56 x 125 ft., for production of aluminum, brass and other metal castings.

Pennsylvania Flexible Metallic Tubing Co., Broad and Race Streets, Philadelphia, has asked bids on general contract for an addition to plant at Seventy-third Street and Elmwood Avenue, to cost over \$50,000 with equipment. William H. Cookman, 420 West Price Street, is architect.

Crew Levick Co., 219 North Broad Street, Philadelphia, refined oils, gasoline, etc., will rebuild part of refining still department on Pettys Island, Delaware River, destroyed by fire Dec. 4.

American Dredging Co., foot of Division Street, Camden, N. J., has acquired waterfront property at Gloucester, N. J., and plans construction of new barge and dredger shipyard, primarily for repairs to

company equipment, including general mechanical works, one-story machine shop, and marine drydock railroad, to cost over \$150,000 with equipment. Present works will be removed to new location and capacity increased.

T. J. Cope, 2114 Sansom Street, Philadelphia, manufacturer of electrical equipment, has purchased two-story factory on site, 41 x 110 ft., for new plant.

Board of Education, Allentown, Pa., is said to be planning installation of manual training equipment in three-story addition to Raub junior high school, to cost \$200,000, for which plans will be drawn by Jacoby & Everett, Commonwealth Building, architects.

York Heating & Ventilating Corporation, Sixteenth and Sansom Streets, Philadelphia, manufacturer of heating and ventilating equipment, is considering new plant unit at Bridgeport, Pa., to cost about \$50,000.

Hobson Flatware Co., Lansdale, Pa., manufacturer of nickel-plated and chromium-plated ware, has awarded general contract to Bailey Brothers, Doylestown, Pa., for new plant on 3-acre tract at Lambertville, N. J., recently acquired, consisting of two units, one story, 120 x 160 ft., and two stories, 40 x 160 ft., to cost more than \$75,000 with equipment.

Pennsylvania Forge Co., Philadelphia, has removed main office to new plant at Milnor and Bleigh Streets, Tacony, Philadelphia.

Hindley Gear Co., Philadelphia, has removed offices and shop from 1105 Frankford Avenue, to 508 North Nineteenth Street.

Art Metalabel Corporation, Baptist Avenue and Pennsylvania Railroad, York, Pa., has been organized to manufacture metal seals and name plates. Company has leased manufacturing building and initial materials have been purchased. Production is expected to begin first of year.

Pittsburgh

PITTSBURGH, Dec. 10.—Machine tool sales are in smaller volume than in November, which is not unusual at this time of year when the tendency among buyers is to let purchases go over into a new year. Prices are out on many inquiries and it is believed that the majority will materialize into orders.

Property has been acquired at Meadville, Pa., by Erie Railroad Co., 50 Church Street, New York, for new locomotive terminal, including mechanical coaling plant and other facilities, to cost about \$150,000.

Mackintosh-Hemphill Co., foot of Twelfth Street, Pittsburgh, manufacturer of rolling machinery, parts, etc., has awarded general contract to Hughes-Foulkrod Co., Schoff Building, for one-story unit at Wooster, Ohio, to cost about \$80,000 with equipment.

Standard Seamless Tube Co., 313 Sixth Avenue, Pittsburgh, is said to have plans under way for addition to mill at Ambridge, Pa., to cost over \$350,000 with equipment. H. M. Wharton is company engineer.

Sinclair Glass Co., Vanvoohis, W. Va., manufacturer of automobile and flashlight lenses, etc., has leased building at Huntington, W. Va., totaling about 50,000 sq. ft. floor space, for new branch plant.

Armstrong Cork Co., Twenty-fourth Street, Pittsburgh, is said to be planning

three-story addition to plant at Gloucester, N. J., to cost more than \$75,000 with equipment. H. Boettcher is company architect and engineer.

McCoy-Brandt Machinery Co., 50 Penn Avenue, Pittsburgh, has changed name to Brandt Machinery Co.

Detroit

DETROIT, Dec. 10.—Federal Motor Truck Co., 5780 Federal Avenue, Detroit, will soon take bids for two-story addition, to cost over \$200,000 with machinery. F. J. Winter, Book Tower Building, is architect.

Hutto Engineering Co., 515 Lycaste Avenue, Detroit, manufacturer of grinding machinery, has awarded general contract to H. C. Wright Building Co., Detroit, for one-story addition, to cost about \$50,000 with equipment.

Continental Ice Co., 7744 Jeffery Avenue, Chicago, has plans for new two-story ice-manufacturing and refrigerating plant, 85 x 340 ft., at Port Huron, Mich., to cost more than \$175,000 with machinery.

Muskegon Motor Specialties Co., Muskegon, Mich., recently organized to take over company of same name and L. O. Gordon Mfg. Co., both with local plants, specializing in production of cam shafts for internal combustion engines, has arranged for a stock issue of about \$1,943,000, part of proceeds to be used for merger and expansion in production.

City Council, Cadillac, Mich., has secured tract of 160 acres for municipal airport, and plans early construction of hangars, machine and repair shop, oil storage building and other units.

Robinson Marine Construction Co., West Main Street, Benton Harbor, Mich., has awarded general contract to M. W. Stock Construction Co., St. Joseph, Mich., for branch ship repair yard at St. Joseph, consisting of two units, 50 x 100 ft., and 50 x 65 ft., and auxiliary structures, to cost about \$70,000 with equipment.

Defender Mfg. Co., Allegan, Mich., manufacturer of automobile bumpers, has authorized an expansion program to double present capacity, to cost about \$50,000 with equipment.

Foster Airways, Inc., Lafayette Building, Detroit, is considering extensions in airport near Dearborn, Mich., including construction of additional hangars and mechanical buildings, to cost about \$150,000. F. M. Foster is president.

Consumers Power Co., Jackson, Mich., has arranged for a bond issue of \$11,415,000, part of proceeds to be used for expansion and improvements.

City Council, Allegan, Mich., has completed plans for municipal hydroelectric generating plant on Kalamazoo River, to cost about \$400,000 with transmission system, and is said to be planning early call for bids. Ayres, Lewis, Morris & May, Cornwall Building, Ann Arbor, Mich., are engineers.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, manufacturer of two and four-wheel motor trailers, has awarded general contract to Edward Butler, Detroit, for two additional stories on present factory, to cost more than \$85,000 with equipment.

La Salle Tool & Gauge Co., Inc., 1310 Maple Street, Detroit, has been organized to manufacture jigs, fixtures, fine tools and gages. At present manufacturing will be done by contract and later com-

pany will be in market for additional machinery and equipment. Charles F. Lau is general manager.

Cleveland

CLEVELAND, Dec. 10.—While machine tool sales show a little slowing down this month, December has started with an exceedingly good volume of business. There was considerable scattered buying of single machines in the northern Ohio territory during the week. An export order for 10 turret lathes for Sweden was placed with the Warner & Swasey Co. by a large electrical manufacturing company in that country. The Eaton Axle & Spring Co., Cleveland, which recently was a heavy buyer of machinery, has some additional equipment to place. The Murray Ohio Mfg. Co., Cleveland, during the week purchased a large toggle drawing press. The volume of business in presses recently has been heavy, although orders mostly are for single machines.

The merger of Dodge Brothers plant in Detroit with the Chrysler Corporation has resulted in the placing on the market of several hundred used tools in the Dodge plant, which are being disposed of with a view of balancing production. This surplus machinery is being offered by a Detroit dealer.

Swartwout Co., Cleveland, has purchased plant of Cleveland Milling Machine Co., 18511 Euclid Avenue, part of which it has been occupying as a tenant, and will shortly occupy entire plant, providing 90,000 sq. ft. of floor space and covering a 7-acre site. Company has moved to Cleveland business of S-C Regulator Co., Fostoria, Ohio, which it has purchased, and plans in the next few months to move its Orrville, Ohio, plant to Cleveland, thereby centralizing its production at one point. Company's products include industrial ovens and ball bearing ventilators. D. K. Swartwout, Sr., is president; D. K. Swartwout, Jr., vice-president, and W. E. Clement, secretary and treasurer.

Ideal Bronze Co., 1265 East Fifty-fifth Street, Cleveland, has been consolidated with Wellman Bronze Co., 6017 Superior Avenue, Cleveland, giving latter company an annual capacity of 2,000,000 lb. of rough, finished and semi-finished bronze and aluminum castings. Plant of Ideal company will be closed. F. H. Zwilling, president-treasurer and E. V. Coulston, secretary of Ideal company, have become associated with Wellman organization.

W. S. Tyler Co., Cleveland, has acquired a 15 acre site at St. Catherine's, Ont., for erection of a plant to supply its Canadian trade. Company's products include woven wire screens, ornamental wire and bronze.

National Lamp Works of General Electric Co., Nela Park, Cleveland, is planning one-story addition, 80 x 100 ft., to cost about \$50,000 with equipment.

National Acme Co., Coit Road and East 131st Street, Cleveland, manufacturer of automatic screw machines, etc., is said to be planning one-story addition to cost over \$75,000 with equipment.

City Board of Control, Akron, Ohio, has authorized immediate construction of new municipal airport, to cost more than \$750,000 with hangars, repair and reconditioning shops and other units.

Lee Krueger, president, Superior Holding Co., Fidelity Building, Cleveland, has approved plans for two-story automobile service, repair and garage building, 65 x 150 ft., to cost about \$150,000 with equipment.

Board of Education, Fremont, Ohio, is said to be planning installation of manual training equipment in new two-story junior high school, to cost about \$225,000. S. H. Shively, Logan Block, is architect.

Cincinnati

CINCINNATI, Dec. 10.—Machine tool bookings have declined somewhat in the past week and indications are that business in December will fall considerably short of that in each of the three previous months. However, the flow of orders has been fairly substantial and the month is certain to make a better showing than December, 1927. The volume of inquiries has slackened, but still holds up to a good level. Although sales in the Detroit district have fallen off, automobile companies are buying some equipment, and their requirements in the next few months are expected to reach large proportions.

Machine tools executives are of the opinion that purchases of tools are likely to be only fair until after the holiday season. Local plant operations have been well sustained and in some cases night shifts are necessary to satisfy demand for reasonably early deliveries.

A Philadelphia company is in the market for six 24-in. and four 20-in. lathes. A Cincinnati builder has taken an order for two engine lathes to be shipped to Persia. The Norfolk & Western is reported to have bought additional tools on its recent list, but the Southern has not yet closed on its inquiry.

G. & G. Mfg. Co., 3116 Spring Grove Avenue, Cincinnati, manufacturer of dies, stamps, etc., has acquired property, 85 x 100 ft., heretofore held by Hilbert Machine Co., and will remodel for new plant. Adjoining site has been secured for an addition.

National Cash Register Co., Dayton, Ohio, has taken bids on general contract for addition to plant No. 2, to cost about \$30,000.

Union Gas & Electric Co., Fourth and Plum Streets, Cincinnati, is having plans drawn for a new steam power plant, to cost about \$1,500,000, with equipment, pipe lines, etc. Columbia Engineering & Management Corporation, 61 Broadway, New York, is engineer.

Sparta Spoke Works, Sparta, Tenn., has begun work on new one-story plant, to cost about \$45,000 with machinery.

Mengel Co., Louisville, operating Mengel Body Co., manufacturer of automobile bodies, has arranged for new stock issue to total about \$2,000,000, a portion of fund to be used for expansion at Louisville and branch mill at Baton Rouge, La.

Officials of Mead Pulp & Paper Co., Chillicothe, Ohio, have organized a new subsidiary, to be known as Harriman Co., to construct new paper mill at Harriman, Tenn., to cost over \$800,000 with machinery. Mead Fiber Co., Kingsport, Tenn., another subsidiary, has work under way on expansion program to cost more than \$150,000.

Memphis Natural Gas Co., Memphis, Tenn., is disposing of a stock issue to total about \$1,000,000, part of fund to be used for pipe line construction and other work. Company is building 210 mile line from Monroe, La., gas fields to Nashville and vicinity.

Board of Education, Middletown, Ohio, is said to be planning installation of manual training equipment in new junior

high school, to cost about \$400,000, for which bids are being asked on general contract until Dec. 18.

Board of Trustees, Wilberforce University, Wilberforce, Ohio, is asking bids until Dec. 27 for power plant, 50 x 85 ft., to cost about \$100,000 with equipment. H. B. Briggs, Ohio-Hartman Building, Columbus, is architect.

McCarthy-Jones & Allen Co., Inc., 111 First Avenue, South, Nashville, Tenn., has been appointed distributor for the Botfield Refractories Co., Philadelphia.

Chicago

CHICAGO, Dec. 10.—Further recession in machine tool buying is noted, but the tone of the market is still encouraging in view of the fact that business in the last month of the year is usually far below the present volume. So far in December purchases are well ahead of a year ago for the corresponding period. Inquiry is active, but from an ever widening circle of miscellaneous users.

A local specialty manufacturer has ordered six presses and a general machine shop has purchased three radial drills and two lathes. A maker of builders' hardware has bought a 14-in. x 6-ft. cone-head lathe. List for Buda Co. and Whiting Corporation, both of Harvey, Ill., are active and Allis-Chalmers Mfg. Co., and International Harvester Co., continue to buy equipment. Prices for good second-hand machine tools are higher and the supply is inadequate for current demand.

Illinois Tool Works, 2501 Keeler Avenue, Chicago, will build an addition, 120 x 120 ft. to cost \$40,000. P. Jenkins, 400 North Michigan Avenue, is architect.

Mount Vernon Furnace & Mfg. Co., Second and Watson Streets, Mount Vernon, Ill., has awarded general contract to W. N. Atkinson, 114 North Johnson Street, for one-story addition, largely for enameling, to cost about \$50,000.

Fox River Valley Boat Co., McHenry, Ill., J. J. Rothermel, manager, has approved plans for new two-story boat-building and repair works, 50 x 65 ft., to cost about \$30,000 with equipment.

Sprague Iron Works, 4400 Addison Street, Chicago, has asked bids on general contract for a one-story addition, to cost more than \$35,000 with equipment. E. G. Johnson is company engineer in charge.

Common Council, Coggan, Iowa, has authorized installation of a municipal electric light and power plant, including 600-hp. Diesel engine unit and auxiliary equipment.

Board of Education, Virginia, Minn., plans installation of manual training equipment in new junior high school to cost \$500,000, for which bids have been asked on revised plans. J. A. Coddling, First National Bank Building, is architect.

Greenlee Brothers, Inc., Twelfth Street, Rockford, Ill., manufacturer of wood-working machinery, saws, etc., has awarded general contract to John M. Anderson, 1235 Jackson Street, for one-story foundry addition, 120 x 350 ft., to cost over \$75,000 with equipment.

City Ice & Fuel Co., Cleveland, has merged with Continental Ice Co., 33 South Clark Street, Chicago, with plants in Illinois, Iowa, Michigan and other states. Work has been started on additions to plants of Continental company at Oakwood and Port Huron, Mich., to include installation of new machinery.

South Atlantic

BALTIMORE, Dec. 10.—Bids will soon be asked by Joseph E. Sperry, Calvert Building, Baltimore, architect, for six-story automobile service, repair and garage building, to cost \$500,000 with equipment.

Draper Corporation, Hopedale, Mass., manufacturer of cotton mill machinery, will soon take bids for two-story branch mill, 100 x 265 ft., at Spartanburg, N. C., to cost over \$65,000 with equipment. J. E. Sirrine & Co., Greenville, S. C., are architects and engineers.

B. F. Goodrich Co., Akron, Ohio, manufacturer of automobile tires and other rubber goods, has purchased Martha Mills, Thomaston, Ga., for branch plant. Plans are under way to treble capacity, to cost more than \$2,000,000 with machinery. T. G. Graham is vice-president in charge.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, is considering extensions and improvements in branch oil refinery at Brunswick, Ga., to cost more than \$350,000 with equipment.

Commercial Mfg. Co., Athens, Ga., recently organized by T. M. Tillman, Athens, and associates, plans early operation of local factory to manufacture store fixtures, show cases and kindred products.

Board of Directors, McDonough School for Boys, Pikeville, Md., has authorized rebuilding of school, recently destroyed by fire, to cost more than \$400,000. Manual training department is planned. William H. Emery, 18 East Lexington Street, Baltimore, is architect.

L. E. Martin, president, Dominion Land & Development Corporation, Times-Despatch Building, Richmond, Va., is at head of project to establish and operate new plant for production of wood alcohol and wood-chemical products. Inquiries are being made for equipment.

King Hardware Co., Atlanta, Ga., will soon begin construction of a new storage and distributing plant at Buckhead, to cost over \$50,000 with equipment. Work will be carried out in name of King Holding Co., an affiliated organization. A. Ten Eyck Brown, Atlanta, is architect.

Shenandoah Valley Canning Corporation, Harrisonburg, Va., is planning enlargements and installation of additional machinery. It is also contemplating new branch plant for vegetable canning, to cost about \$50,000 with equipment. C. E. Dovel is general production manager.

Buffalo

BUFFALO, Dec. 10.—Michael Hayman & Co., 856 East Ferry Street, Buffalo, metal products, have awarded general contract to H. F. Stimm, Inc., Elliott Square, for one-story foundry addition, to cost about \$25,000 with equipment. N. H. Study, Prudential Building, is engineer.

C. M. Keys, head of Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, and associates, have organized North American Aviation, Inc., with capital of 2,000,000 shares of stock, to operate aircraft properties, including purchasing of interest in going airplane and airplane motor companies. New organization has arranged for sale of stock to total \$30,000,000, part of fund to be used for initial operations. Mr. Keys is head of new company.

Sprague-Sells Corporation, 523 Cornwall Avenue, Buffalo, manufacturer of canning

and other machinery, has merged with John Bean Mfg. Co., San Jose, Cal., manufacturer of kindred equipment, agricultural machinery, etc., under last-noted name. In addition to Buffalo plant, Sprague-Sells Corporation has branch factories at Hoopeston, Ill., and Hayward, Cal. Expansion is planned. John D. Crummey is head of John Bean company.

Universal Wireless Communication Co., care of G. Morton Wolfe, 1377 Main Street, Buffalo, architect and engineer, has plans for new radio station at Scobeyville, N. J., to cost about \$100,000 with power equipment. Company also plans construction of series of such stations in different parts of country, with second plant now projected at Philadelphia, to cost about \$125,000.

Michel Presutti, 1152 La Salle Avenue, Niagara Falls, N. Y., and associates, have organized La Predow Construction Co., to operate local plant to build and repair barges, trucks, etc.

Plant and equipment of former Standard Turbine Corporation, Scio, N. Y., will be sold at public auction Dec. 20 by Industrial Plants Corporation, New York. Equipment includes lathes, shapers, planers, milling machines, drills, cranes, boring mills, turbines, generators, etc.

Emil Steinhorst & Sons, Inc., Utica, N. Y., maker of sheet metal products, has arranged for purchase of Kendall mill property for expansion.

Gulf States

BIRMINGHAM, Dec. 10.—Plans are under way by American Cast Iron Pipe Co., Birmingham, for one-story addition to foundry, reported to cost over \$45,000 with equipment.

Lufkin Ice Co., Lufkin, Tex., has plans for a one-story addition to cost about \$100,000 with machinery.

Board of Education, San Antonio, Tex., is considering installation of manual training equipment in new two-story junior high school to cost \$125,000. Morris & Noonan, Builders' Exchange Building, are architects.

Firestone Tire & Rubber Co., Akron, Ohio, is completing plans for new factory branch and distributing plant at Jacksonville, Fla., to cost about \$300,000 with equipment. Mark & Sheftall, Jacksonville, are architects. Company is also having plans drawn for a branch at Fort Lauderdale, Fla., to cost about \$35,000. H. S. Harvey, Guaranty Building, West Palm Beach, Fla., is architect for latter building.

State Building Commission, New Capitol Building, Jackson, Miss., is having plans drawn for new power plant at Alcorn Agricultural and Mechanical College, Alcorn, to cost about \$40,000 with equipment. Bids to be taken in January. Claude H. Lindsley, Lamar Life Building, Jackson, is architect.

Texas Corporation, Houston, Tex., has authorized construction of new oil refinery on 75-acre tract at El Paso, Tex., to cost over \$650,000 with equipment. Storage and distributing facilities will be provided.

Board of Works, Jacksonville, Fla., has begun construction of municipal repair and equipment shops, including two one-story units, to cost about \$55,000. One building will be equipped as machine shop.

Central Power & Light Co., San Antonio, Tex., is planning an expansion and improvement program during 1929 to cost

about \$5,000,000, including additions in generating facilities, transmission lines, power substations and other extensions.

City Council, Fort Worth, Tex., has authorized appropriation of \$30,000 for extensions in municipal airport, including new hangar, 80 x 160 ft., with repair facilities, for which bids will soon be asked. W. G. Fuller is manager of airport.

United Public Service Co., 100 West Monroe Street, Chicago, has purchased plant of Texas Ice & Refrigerating Co., Fort Worth, Tex. Plans are under way for extensions and improvements, including construction of new refrigerating unit, to cost about \$80,000 with equipment.

Automatic bottling machinery, mechanical conveying, packing and handling equipment will be installed in new two-story factory of Houston Coca Cola Bottling Co., 1210 Washington Street, Houston, Tex., 110 x 120 ft., to cost about \$70,000. Company will also erect one-story automobile service, repair and garage building for motor trucks, 50 x 93 ft., on adjoining site. Alfred C. Finn, Bankers' Mortgage Building, is architect.

Pan-American Transport Co., Jacksonville, Fla., has plans for one-story automobile service, repair and garage building, to cost about \$100,000 with equipment. C. B. Schoeppl, Theater Building, is architect.

Bain Beaird Co., Inc., Shreveport, La., has changed name to Beaird Corporation and removed offices from Texas and Reynolds Streets to plant on Atkins Avenue. New office building, machine shop and oxygen plant are being erected and machinery is being installed to double capacity of oxygen department. Company manufactures oxygen and acetylene gas, operates machine shop and engages in car repairing and structural steel work. J. B. Beaird is vice-president and general manager.

St. Louis

ST. LOUIS, Dec. 10.—Revised plans are being drawn by Swift & Co., Union Stock Yards, Chicago, for extensions and improvements in branch plant at South Vandeventer and Papin Streets, to cost about \$500,000 with equipment.

A. & B. Spring Co., 719 West Main Street, Oklahoma City, Okla., manufacturer of steel springs, etc., is considering one-story plant unit, 75 x 140 ft., to cost more than \$50,000 with equipment.

Missouri Pacific Railroad Co., Missouri-Pacific Building, St. Louis, has approved plans for power plant at Wichita, Kan., to cost about \$40,000 with equipment. E. A. Hadley is chief engineer.

Arkansas Cold Storage Co., Little Rock, Ark., will soon take bids for two-story cold storage and refrigerating plant, to cost over \$150,000 with machinery.

White Oak Refining Co., Tulsa, Okla., has work under way on extensions and improvements in gasoline refinery at Allen, Okla., including installation of additional equipment, to cost more than \$100,000.

Gasconade River Power Co., 1015 Baltimore Avenue, Kansas City, Mo., is planning construction of hydroelectric power plant on Gasconade River in Phelps County, to cost about \$250,000 with transmission line.

American Eagle Aircraft Corporation, 2800 East Thirtieth Street, Kansas City, Mo., has awarded general contract to W. K. Martin, Dwight Building, for new plant in Fairfax industrial district, con-

sisting of one- and two-story buildings, 100 x 300 ft., and 30 x 70 ft., to cost more than \$80,000 with machinery. Chester E. Dean, Reliance Building, is architect.

Commonwealth Utilities Corporation, Oklahoma City, Okla., operating electric light, power and ice properties in several States, is disposing of bond issue of \$2,500,000, part of proceeds to be used for extensions and improvements.

Coffman Aircraft Co., Oklahoma City, Okla., has acquired local plant of Midland Motor Car Co. for manufacture of monoplanes. Company has also secured property of Southwest Airways Co., including flying field, and will build hangar, repair shop and other units. D. J. Marshall is president.

Barnsdall Refineries, Inc., Barnsdall, Okla., has broken ground for one-story repair shop to cost about \$35,000 with equipment.

Milwaukee

MILWAUKEE, Dec. 10.—Machine tool business in the first week of December was on about the same level as that in November. Inquiry also was well maintained. Indications point to a relatively large amount of business in the immediate future. Meanwhile most tool builders are fully occupied and to complete the orders on the books of some will require 60 days or longer. The Dec. 1 labor report again shows a substantial gain in foundries and machine shops.

Minneapolis, St. Paul & Sault Ste. Marie Railway Co., Fifth and Marquette Avenues, Minneapolis, has placed contracts for new work at its division headquarters at Ashland, Wis., to cost \$400,000. Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago, have been awarded contract for a new coaling shed and cinder pit, 100 ft. high. General contract for a new roundhouse, 102 x 125 ft.; a boiler house and an oil house, has been placed with Frank Tomlinson, Prentice Avenue, Ashland.

Aluminum Goods Mfg. Co., Manitowoc, Wis., which has broken ground for a seven-story addition, 115 x 302 ft., to its main plant, is having plans drawn by Lockwood, Greene & Co., consulting engineers, Chicago, for an extension of its branch works at Two Rivers, Wis., to cost \$450,000.

Board of Vocational Education, Waukesha, Wis., has purchased a site on Maple Avenue for vocational training school to be built early in 1929 at a cost of \$75,000 for first unit. An architect will be selected at once. H. L. Horning, president Waukesha Motor Co., is chairman of board.

Nash Sales, Inc., Broadway and East Wells Streets, Milwaukee, will build a five-story service and storage addition, 30 x 120 ft., to its present five-story headquarters building, 120 ft. sq., according to plans by M. Tullgren & Sons Co., architect, 20 Prospect Avenue. Investment will be about \$80,000. Rudolf Hokanson is president.

Common Council of Racine, Wis., has engaged Alvord, Burdick & Howson, consulting engineers, Chicago, to draft plans and supervise construction of new sewage disposal plant to cost \$2,500,000. Contracts will be let about Feb. 1. The project calls for extensive pumping and engine equipment, pipe, etc. Charles Beaugrand is city engineer.

Hoffmann & Billings Mfg. Co., 100 Second Street, Milwaukee, manufacturer of plumbers' and steamfitters' materials and supplies, has disposed of its jobbing business to Crane Co., Chicago, but states that it will continue manufacturing in its plant at 220 Becher Street.

Wisconsin Screw Co., Racine, Wis., maker of screw machine products, has removed its plant to larger quarters and will be in market for additional equipment.

Indiana

INDIANAPOLIS, Dec. 10.—DeLuxe Tire Co., Fort Wayne, has plans for one-story plant at Clay and Wayne Streets, 60 x 145 ft., to cost about \$50,000 with equipment.

Northern Indiana Public Service Co., 112 East Wayne Street, Fort Wayne, has awarded general contract to Henry Wehrenberg & Son, 618 South Calhoun Street, for a one-story machine shop.

Marmon Motor Car Co., 1039 North Meridian Street, Indianapolis, is arranging for a new stock issue of 60,000 shares, to net about \$3,000,000, a considerable part of fund to be used for expansion in production.

Chrysler Motor Corporation, Detroit, has awarded contract to Kanzler & Son, Furniture Building, Evansville, for one-story addition to motor truck plant at Evansville, to cost about \$250,000 with equipment. Thol & Legeman, American Trust Building, Evansville, are architects.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to Henry Hedde, 309 Seventh Street, Logansport, for factory branch and distributing plant for motor truck division at Logansport, to cost about \$55,000.

American Steel Foundries, 410 North Michigan Avenue, Chicago, has awarded general contract to Sumner-Sollitt Co., 307 North Michigan Avenue, for one-story addition at East Chicago, Ind., 75 x 100 ft., to cost about \$50,000 with equipment.

Claude S. Gordon Co., Chicago, high temperature industrial engineer, on Jan. 1 will remove its Indianapolis office to 505 Merchants Bank Building.

Pacific Coast

SAN FRANCISCO, Dec. 5.—Crané Co., 836 South Michigan Avenue, Chicago, has acquired tract of 10 acres at Los Angeles, and will have plans drawn for new plant for Pacific Coast trade, to cost more than \$500,000 with equipment.

Shell Oil Co., 200 Bush Street, San Francisco, has approved plans for two-story storage and distributing plant at Oakland, Cal., to cost about \$200,000 with equipment. Engineering department of company is in charge.

Douglas Aircraft Co., Inc., recently organized, has taken over Davis-Douglas Co., Santa Monica, Cal., manufacturer of military airplanes. New company plans expansion in facilities, with installation of equipment for production of commercial aircraft, including parts and assembling facilities. Arrangements have been made for issue of 300,000 shares of stock.

Tacoma Utilities Department, Electric Light Division, Tacoma, Wash., J. L. Stannard, chief engineer, has authorized extensions in Cushman municipal hydro-electric power project, providing for about 30,000 hp. additional capacity, and will soon ask bids. New unit will cost about \$2,000,000 with transmission lines.

City Council, Long Beach, Cal., H. S. Callahan, city manager, is considering construction of three-story municipal service, repair and garage building, to cost about \$225,000 with equipment.

Lockheed Aircraft Corporation, Burbank, Cal., is arranging an expansion program at local plant and branch factory at Chicago, to include new buildings and installation of machinery. Company is planning an increase in capital from 25,000 to 150,000 shares of stock.

Wickwire Spencer Steel Co., Inc., New York, will erect warehouse at Portland, Ore., for Pacific Northwest trade, formerly handled through dealers. Building is expected to be ready for occupancy in February. W. J. Coleman is manager of branch.

Oregon Welding & Machine Works, formerly at Fifth and Glisan Streets, Portland, Ore., has moved to larger quarters at Park and Everett Streets, formerly occupied by Eureka Carriage & Auto Works. Company has purchased equipment of Eureka organization and will enlarge field of operations.

Canada

TORONTO, Dec. 10.—Replacement purchases have stimulated machine tool sales the past week or two. A strong diversified demand has developed and several small lists for half a dozen tools have been issued. Manufacturers of railroad rolling stock have made extensive purchases lately and some good orders also have been placed by automobile manufacturers, garages and repair plants.

Mundet Cork & Insulation Co., Ltd., 51 St. Lawrence Avenue, Toronto, has purchased site at corner of Booth Avenue and Keating Street for erection of a plant to cost \$100,000.

Smith Brothers, 183 Duke Street, Toronto, manufacturers of truck and motor car bodies, have purchased a site at Logan Avenue and Keating Street and will erect a plant to cost \$150,000.

Yardley & Co., Ltd., 358 Adelaide Street West, Toronto, manufacturer of soap, etc., has purchased a site, 100 x 233 ft., at York and Fleet Streets, Toronto, and will erect a five-story factory and warehouse to cost \$200,000. General contract for construction has been awarded to De Jonckheere Construction Co., Toronto.

J. J. McSweeney, president Equitable Securities Corporation, Ltd., Montreal and Toronto, has purchased for himself and associates MacKinnon Steel Co., Sherbrooke, Que., one of Canada's leading structural steel companies, which has been owned and operated as a family concern for 20 years. It is understood that plans are under way for additions to works and equipment. Associated with Mr. McSweeney are: D. H. McDougall, director McIntyre Porcupine Mines, Ltd.; Walter G. Mitchell; J. B. Woodyatt, president Southern Canada Power Co.; John Irwin, president McColl-Frontenac Oil Co.; J. T. McCall, president Drummond, McCall & Co., Ltd.; and George D. MacKinnon, president Rutherford Lumber Co., Ltd.

Dominion Road Machinery Co., Ltd., Goderich, Ont., has started work on an addition to increase manufacturing facilities 75 per cent.

Queen City Dental Manufacturers, Ltd., 112½ Carlton Street, Toronto, contemplate erection of a new plant.

Canada Metal Co., Ltd., 29 Fraser

Avenue, Toronto, has purchased a site on Fraser Avenue, 220 x 266 ft., and will erect an addition.

McColl-Frontenac Oil Co., Ltd., 114 Don Esplanade, Toronto, has purchased Bladwin Steel premises on Ashbridges Bay, Toronto, and will remodel building in spring for a refinery.

Corrugated Paper Box Co., Ltd., 189 Geary Avenue, Toronto, has awarded contract for excavations and foundations for its plant at Leaside, Ont., to John Gunn & Sons, Winnipeg. Building will be one story and basement, 180 x 700 ft. G. C. Treloar, 11 Leader Lane, Toronto, is engineer.

Electrolier Mfg. Co., 5849 Boyer Street, Montreal, has awarded contract to E. Barabe, 1442 St. Dominique Street, for a two-story factory, 70 x 94 ft., to cost \$15,000.

Foreign

PLANs are being arranged under direction of Soviet Russian Government, Moscow, for extensions and improvements in iron works and smelting plant at Makeevsk to increase capacity 19 per cent. Existing works have annual output of 250,000 metric tons pig iron, 220,000 metric tons of steel, and 179,000 metric tons of rolled steel. Information regarding project at office of American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Dortmund Municipal Utilities, operated by City of Dortmund, Germany, comprising three separate interests, Dortmund Gas Co., Dortmund Water Works and Dortmund Street Railways Co., are disposing of bond issue of \$3,000,000 in United States, large part of proceeds to be used for extensions and additional equipment.

German General Electric Co., Berlin, Germany, has secured concession from Government of Mexico for construction and operation of high power radio station near Mexico City, including steel towers; power plant, machine shop and other units to cost about \$650,000.

Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has purchased controlling interest in Venezuelan Petroleum Co., 55 Liberty Street, and will merge its oil properties in Panama, Colombia and Venezuela with those of acquired company, which will be continued as a subsidiary. Plans are being made for increase in capital of Venezuelan company from \$5,000,000 to \$10,000,000, part of proceeds to be used for development of oil properties, installation of equipment, storage and distributing facilities.

A company at Helsingfors, Finland, is arranging with municipality for guarantee of loan of \$1,000,000, fund to be used for construction of new warehouses and installation of elevating, conveying and other loading equipment. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Finland No. 293054.

Soviet Russian Government, Moscow, has approved plans for construction of Bogomolovsk copper smelting plant near Tagil. Information at office of American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Ford Motor Co., Detroit, is planning construction of plant in Brazil to manufacture automobile tires, to be operated in conjunction with rubber plantations now being developed. A site will be selected, it is said, in vicinity of Para, near plantation base, entire project to cost more than \$600,000.

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Has Tin Plate a New Competitor?

BY DR. C. L. MANTELL*

ALUMINUM producers, particularly on the European Continent, are actively looking for new markets and possible uses for their metal. Recent development work has been along the lines of substitution, for tin plate used in the canning industries, of aluminum as aluminum-coated steel plates.

About 40 per cent of the world's production of tin goes into tin plate, and of this from 60 to 75 per cent is used for food containers or tin cans. In the United States efforts have been made to reduce the amount of tin used in plating, and at present this is about 34.94 lb. per ton of tin plate, against 38.83 lb. used in 1922. In England and on the Continent, the quantity of tin used per ton of tin plate is somewhat more than 34.94 lb.

The employment of aluminum plate as a substitute for tin plate was the subject of research in Germany during the war, but no success was obtained, due to the fact that the quality of the aluminum of that time was much inferior to that of the virgin aluminum manufactured today. It was discovered that aluminum, to replace tin plate for food containers, must possess particularly high mechanical and chemical properties.

The Aluminum Advisory Bureau in Berlin caused this question to be further investigated. The influence of aluminum of 99 to 99.5 per cent purity on preserved food of different kinds, and the influence of these foods on the aluminum, were tested, with the result that drawn aluminum plate of the above degree of purity was found to be well suited for food containers and, compared with tinned plate, was very slightly attacked by the foodstuffs. Vegetables, fruit, and other materials were not found to depreciate in aluminum containers.

Germans Planning to Erect Plants

In recent months, at periodic intervals, reports have been circulated of German plans to make aluminum-coated sheets to compete with, and perhaps eventually replace, tin plate. The Aluminum Research Institute in Germany has devoted some attention to the application of aluminum sheets according to the patents of a German engineer by the name of Serger. These reports have aroused considerable interest among tin plate manufacturers.

The Eisen & Stahlwerk Hoesch at Dortmund has completed a program of development toward working out the kinks in rolling aluminum on steel. Krupps and Stockheide are reported to be building a large sheet rolling mill in

Aluminum-Coated Sheets Advocated in Germany, But Some Question of Their Early Achieving Popularity—How the Aluminum Is Put On

which aluminum-plated steel sheets will be turned out at the rate of about 100,000 tons annually. It is interesting to note that the Eisen & Stahlwerk Hoesch is reputed to be building a works for the production of these Feran Bleche with a capacity of 30 tons per hour, which would be an annual production of 220,000 tons. This is twice as much as the

whole of the German tin sheet production.

The aluminum and the steel sheets are sweated together. In commercial operation, aluminum-coated hoop steel has been a commercial article for a considerable time. It is claimed that these aluminum-coated sheets are 11 per cent lighter than tin sheets, and that they have better corrosion resistance. The latter part of this statement must be taken with a large grain of salt, in view of the extensive and satisfactory application of tin plate in its multiplicity of uses, and the well-known tarnishing of aluminum with the formation of a protective oxide coating as a result of atmospheric conditions.

Aluminum-Coated Sheets Light

Considered on a theoretical basis, assuming tin plate to contain approximately 1.6 to 1.8 lb. of tin per base box, and in view of the fact that aluminum is a much lighter metal than tin, the same weight coating of aluminum should allow a coating three times as thick. With tin at approximately 48c. and aluminum at 24c., the coating on a metal basis only should cost but half as much.

Any reasoning from this basis is fallacious and conclusions illusory. The cost of tin in place of tin plate is very little more than the metal cost, inasmuch as the tin needs undergo no fabrication. The same, however, does not hold true for aluminum in its application on steel sheets, for the coating must bear the fabrication cost of putting the aluminum metal into such shape that it can be sweated on, or rolled with, steel plate. There is practically no manufacturing data as yet of an authoritative nature which will allow a comparison of costs between aluminum-coated sheet and tin plate.

Technology of the Coating Process

Sheet steel, coated with aluminum by a mechanical sweating or welding method, has been produced previously. The aluminum layer is always relatively thick. Material of this kind has shown high resistance to accelerated corrosion tests. It is to be noted, however, that aluminum and iron alloy rapidly. It would seem then that the fundamental conditions for successful coating by hot dipping were ful-

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filled. Iron and aluminum are completely miscible in the liquid state. In the aluminum rich mixtures, the iron precipitates from the solution upon solidification as the compound FeAl_3 , containing 41 per cent iron. This compound forms only very slightly below the melting point of aluminum.

Success in hot dipping of iron and aluminum is attained with difficulty and only after special preparation of the surface of the iron. Much of the difficulty is to be attributed to the tightly adhering film of aluminum oxide, which forms very rapidly, as well as to the occurrence of a large amount of iron-aluminum compounds. When iron is coated with aluminum, either by hot dipping or by mechanical rolling methods, there is a rapid alloying action occurring between the two metals. This usually results in a very brittle layer adjacent to the steel or iron base. The uses to which such material could be put would be limited to those which did not involve bending or any other form of severe deformation.

From the relative positions of aluminum and iron in the electrochemical series, it might be concluded that aluminum would be a more desirable coating metal for the protection of iron and steel than tin, inasmuch as aluminum would be anodic in its reaction to iron. The behavior of coatings in service, however, does not fully support such a conclusion. The protective oxide film, which readily forms on a fresh surface of aluminum on exposure to the atmosphere, entirely masks the anodic behavior of an aluminum coating toward iron. The coating then becomes essentially neutral in its electrochemical reaction toward iron.

Tin and Aluminum Coatings Compared

In a number of its applications, tin plate is used for decorative purposes, and the tin coating on iron markedly improves its external appearance. It is very doubtful whether aluminum-coated sheets can be made in the near future on a commercial basis so that they will have the pleasing appearance of silvery white tin plate. The tech-

nology of tin plate manufacture is exceedingly well developed. In contrast, the manufacture of aluminum-coated sheets has practically no technology.

In one of its major applications, that of tin cans, tin plate has been found to be an all-round satisfactory container for almost all foods. Modifications, such as enameled plate, have been developed to adapt the material specifically to the preservation of certain foods in the best possible manner. The toxicology of tin and tin salts has been widely studied. Cases of tin poisoning are almost unknown. In contrast, there is considerable dispute as to the toxicology of aluminum and its salts.

It is yet to be shown on a commercial basis that aluminum-coated sheets can be produced so that the coating of the aluminum on the iron is free from pinholes and perforations, or at least equal to the quality, as far as uniformity of covering is concerned, of good grade tin plate.

Little Cause for Worry for Tin Plate Makers

At the present moment there is very little cause for worry on the part of the tin plate maker in reference to this development. Tin plate and tin cans are exceedingly well established. Aluminum-coated sheets may become important in the future, but at the present time the application is still largely in its development stages.

Many substitutes for tin plate have been tried out, but in practically every case it has been proved beyond question that the tin can makes the best hermetically sealed package for the preservation of all kinds of food. True enough, in a number of cases the tin can has been modified to make it more satisfactory for certain foods, and even now it is unsatisfactory for foods like cider, cranberries, apple butter, apples, rhubarb, and some berries.

As the country develops and the population grows, the demand for tin plate would be expected to increase. Such has been the case, and the manufacturers of tin plate see a boom nearly every year on account of the very large and growing demand.

Chrome-Tungsten Steel Excellent at High Temperatures

CONTINUING their work on boiler materials, Prof. A. E. White and C. L. Clark, Department of Engineering Research, University of Michigan, now report on the "Effect of Alloying Elements upon the Stability of Steel at Elevated Temperatures." A standardized short time tensile test was used to enable them to explore a number of promising alloys at 1000 deg. Fahr. and above. Confirmatory long-time creep tests were made on those giving best results in the preliminary investigation.

From the large mass of data secured, the authors se-

are, however, much more expensive. On this same basis, several high-alloy steels in the annealed condition showed good but not unusual properties. (See Table I.)

The last mentioned steel seemed to show such marked superiority that tensile tests were made at 1000 deg. Fahr. after various heat treatments. A proportional limit of 100,000 lb. per sq. in. was secured with little ductility, but other treatments gave 50,000 lb. with elongations of 17 per cent. (See Table II.)

Such a steel is not easy to machine or otherwise fabricate, but Messrs. White and Clark believe it to be very

Table I—Annealed High-Alloy Steels Tested at 1000 Deg. Fahr.

Composition	Proportional Limit, Lb. per Sq. In.	Ultimate Strength, Lb. per Sq. In.	Elongation in 2 In., Per Cent	Reduction in Area, Per Cent
0.15 C, 19 Cr, 8.5 Ni...	9,500	55,650	32.5	64.8
0.3 C, 8 Cr, 20.6 Ni...	11,500	62,350	30.2	56.4
0.5 C, 9 Cr, 3.5 Ni...	15,190	63,850	26.8	69.9
0.4 C, 8 Cr, 8 W.....	17,500	60,475	24.0	68.2

Table II—Heat Treated Chrome-Tungsten Steel Tested at 1000 Deg. Fahr.

Heat Treatment	Proportional Limit	Ultimate Strength	Elongation in 2 In.	Reduction in Area
Annealed 1700 deg.....	17,500	60,475	24.0	68.2
Normalized 1800 deg....	50,000	More than 140,000	Not broken	
Normalized 1800, Drawn 1200	32,500		17.5	51.7
Normalized 1700, Drawn 1200	45,000	118,000	17.0	57.0
Quenched 1700, Drawn 1200	52,500	119,150	14.5	52.8
Quenched 2250, Drawn 1200	100,000	125,000	2.0	3.9

lected the proportional limit at 1000 deg. Fahr. as the best index of merit. On this basis a 2 per cent and a 5 per cent nickel steel gave little better figures than a plain carbon steel. Low-manganese steels have already been shown to be superior to either carbon or low-nickel steels, although the present investigators are unable to secure proportional limits at 1000 deg. Fahr. within 20,000 lb. per sq. in. of those reported by Krivobok and his associates to the Mining Engineers in 1927. Low chrome-nickel steels are classed in the same category as the low-manganese steel as far as proportional limit at 1000 deg. Fahr. is concerned; they

promising for high-temperature, high-pressure work. A sample normalized at 1700 deg. Fahr. was loaded at 35,000 lb. per sq. in. while heated constantly at 1000 deg. Fahr. The extension gradually increased to about 0.0023 in. per

(Concluded on page 1616)

Grain Size Controls Toughness

McQuaid-Ehn Test Necessary to Distinguish Between Heats of Steel with Same Chemical Analysis Yet Responding Differently in Mass Production

BY THOMAS W. HARDY*

IN the thirty years which have elapsed since Kjellin, Stassano and Heroult gave the steel maker the electric melting furnaces, the electrical engineer has come to realize that electrical considerations must be subordinated to metallurgical, and the metallurgist has learned that the process is not a simple cure-all. With the elimination of the early misconceptions, the art and practice of steel making has had a phenomenal development and electric steels are finding wider and wider application.

Still there are limitations. As long as pig iron is converted into steel, it is doubtful if the electric furnace can ever displace the Bessemer converter and the open-hearth furnace for common steels, since the first mentioned is neither an efficient nor an economical apparatus in which to carry out the strongly oxidizing reactions necessary.

Yet for producing light and medium weight castings, the acid electric furnace has displaced the crucible and is making inroads on the small Bessemer converter. The chief reason is economic; but it is also true the product is sounder, more uniform and generally of higher quality than converter castings.

For tool steels the story is much the same. In the United States almost entirely, and in Europe to a large extent, the old crucible process has been supplanted by the basic electric process; the steel is equal in quality to the best crucible steel and the cost is considerably less.

It is in the production of engineering steels that electricity seems destined to play the dominant part. Engineering steels include simple and alloy steels for automobiles, aircraft, locomotives and similar machines requiring high quality and reliability. Rapid expansion for such purposes may be ascribed to two main causes; first, higher specialization by the automotive and other industries; and, second, a smaller price differential between open-hearth and electric steels from large tonnage, high-powered furnaces. Perhaps it would be better to state that the large tonnage, high-powered electric furnace has been developed to meet the demand for a reasonably priced high-grade steel made

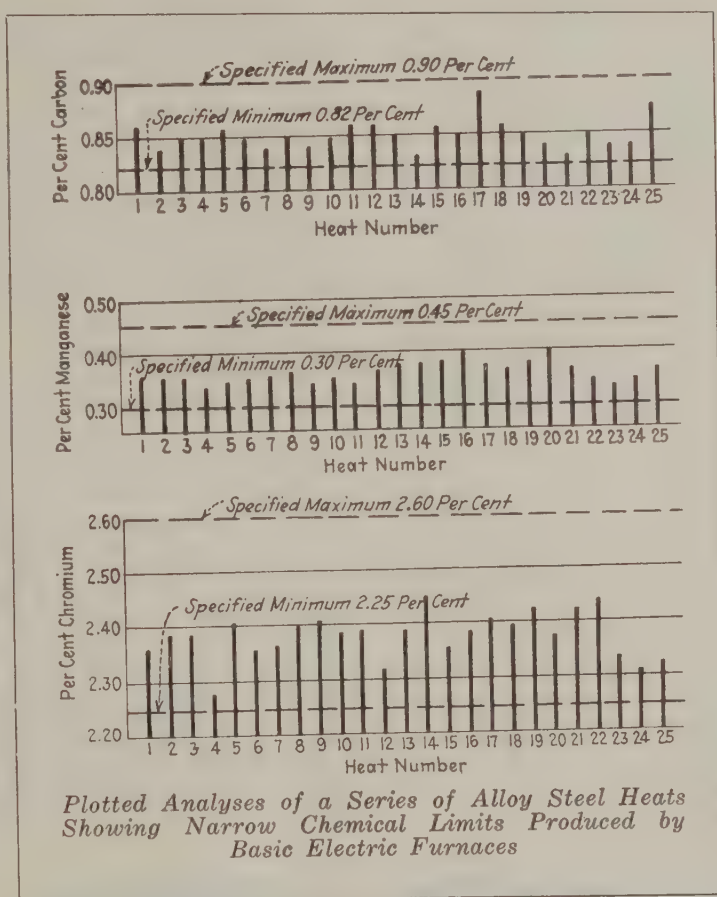
to closer chemical limits and more uniform physical characteristics.

Close Chemical Control in the Basic Electric Process

Until recent years the necessity for close chemical control was not urgent. The steels in common use were made

to specifications permitting a carbon range of 10 points and correspondingly wide ranges for other elements. Furthermore, the Society of Automotive Engineers' specifications were so framed that, should the melter miss the carbon range he was aiming at, the heat would still be within some other specification and would therefore be marketable.

Recently, large customers have begun to specify 5-point carbon ranges, and also to narrow and change the conventional ranges of alloying elements to suit their own ideas. In addition, special purpose steels are bought sometimes containing three or more alloying elements to close limits, compositions that are so different from any S.A.E. alloy as to make them unsaleable should the heats be "off" chemically. Close chemical control has thus become an absolute necessity.

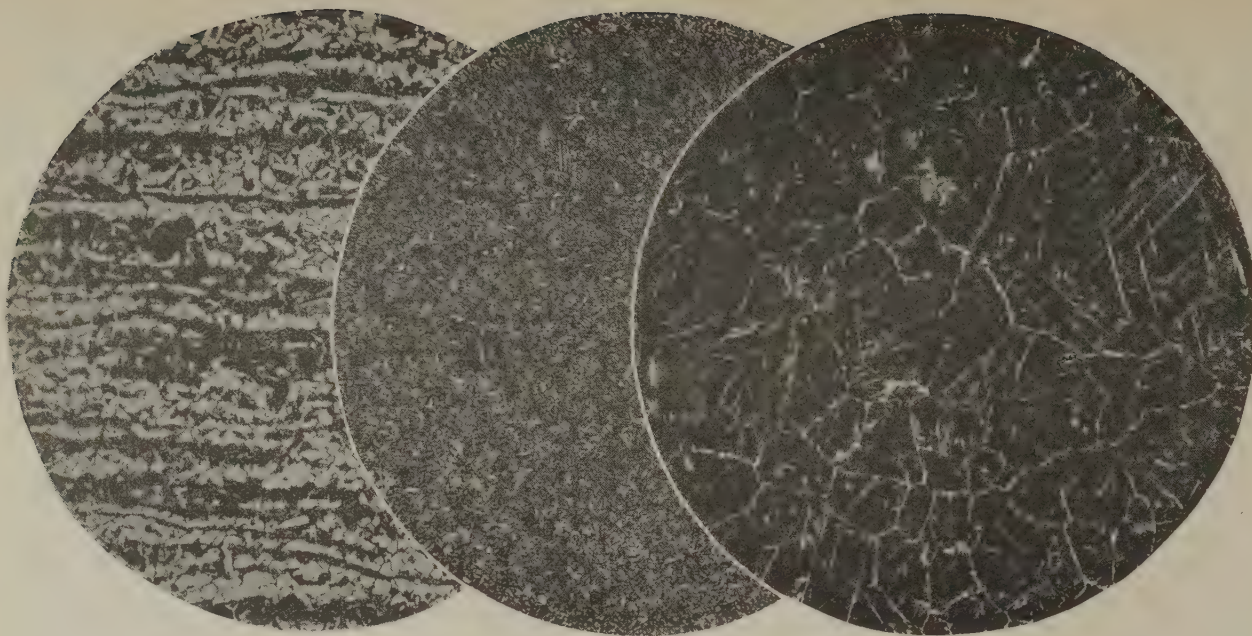


Fortunately the basic electric process permits such close control. The reasons are fundamental. With the older processes, the molten metal is in contact with a more or less oxidizing slag which is constantly removing oxidizable constituents such as carbon, manganese and chromium. In the basic electric process, however, the slag is not merely non-oxidizing, but is actually reducing in character, so that oxidizable elements may be held in the bath without loss until the chemical laboratory has made an exact analysis. Additions may then be made on a mathematical basis and the chemical composition of the finished steel controlled with exactitude.

As an illustration see the accompanying graph of the composition of a series of high-chromium heats. These were made consecutively in three different furnaces by routine methods and the graphs include every heat made during that particular campaign.

But a specified chemical composition does not insure definite physical characteristics. It is well known that

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*Low - Mangan-
ese Steel 26
MC at 100 Di-
ameters. Left
to right;
As rolled
Heat treated
to 269 Bri-
nell
McQuaid-Ehn
test*

heats of steel of practically the same analysis do not always respond similarly to forging and machining, nor will they always develop the mechanical properties that might reasonably be expected. Such conditions have led some users to specify, in addition to chemical composition, that the steel must be capable of developing certain minimum physical properties when subjected to certain mechanical and thermal treatments. The reason for this double requirement is that special treatment has to be devised for "off" heats; in many instances heats are returned to the maker as hopeless. Automatic machine tools and continuous annealing and heat treating equipment are not flexible enough to admit of more than minor adjustment to take care of variables in machining quality and response to heat treatment, even if it were known just what changes would produce the desired results.

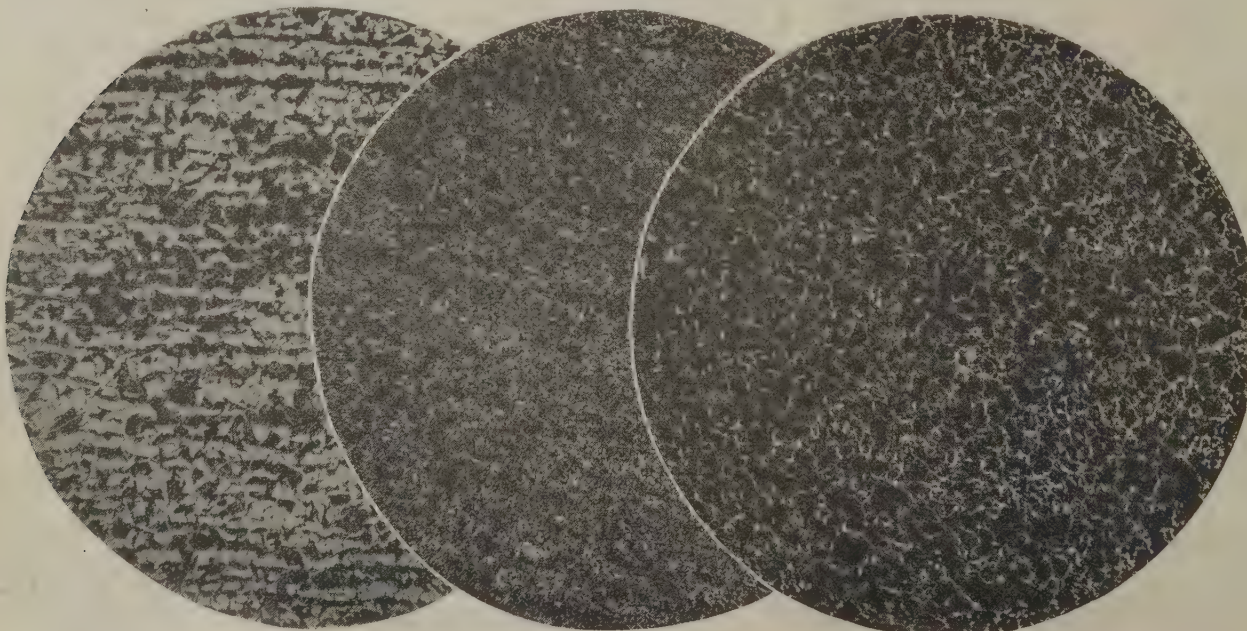
Probable the most valuable outcome of the McQuaid-Ehn test is the attention it has drawn to the physical characteristics of steel as distinguished from its chemical composition. Originally devised to distinguish between heats of steel that would respond normally to routine case hardening operations and heats that would not, the test is probably more often used as a means of predicting the manner in which a heat of steel will respond to subsequent annealing, machining and heat treating operations.

It is well known that different heats of steel of the same chemical analysis will develop widely differing grain sizes when carburized under standard conditions. The latter op-

eration consists of packing the sample in a highly energized carburizer, heating to 1700 deg. Fahr., holding at this temperature for eight hours, and cooling the pot and its contents in still air. A steel sample thus treated, after suitable polishing and etching, will exhibit in the case a structure consisting of pearlitic grains, the boundaries of which are made sharp and distinct by the network of excess cementite. Grain-size charts are used, showing photomicrographs at 100 diameters of steels that have developed different but fairly definite grain sizes in this carburizing test, and the unknown sample is classified as, say a No. 5 or a No. 8, according to its similarity to one or other of the photomicrographs on this chart.

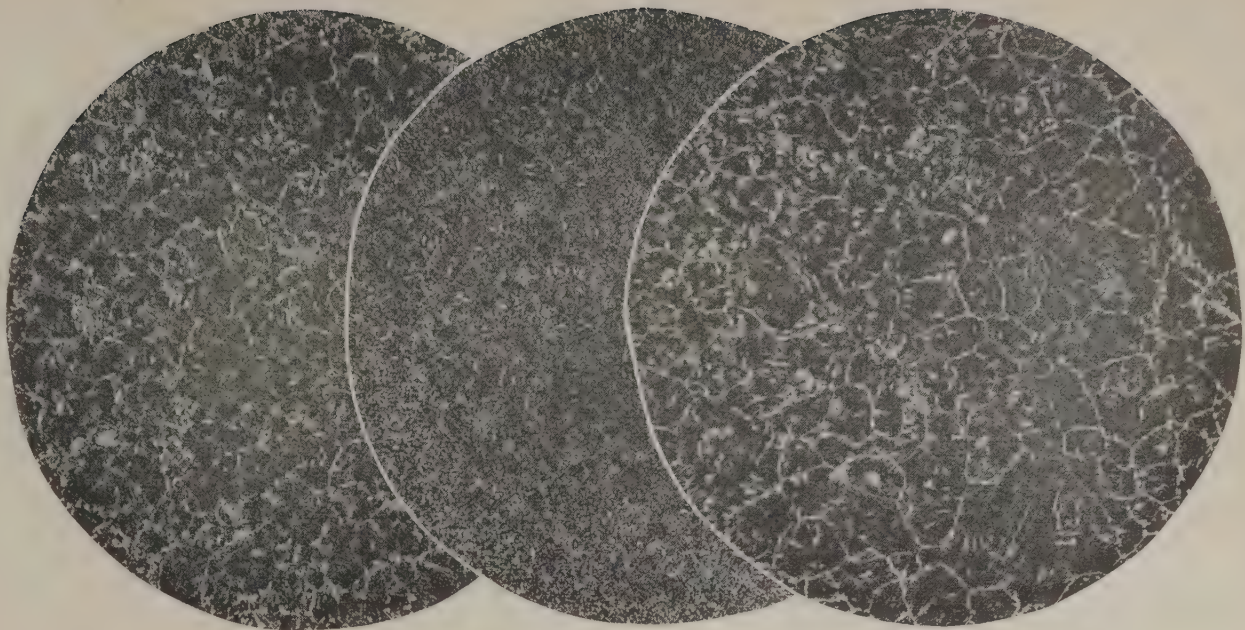
This McQuaid-Ehn carburizing test is being applied not only to carburizing steel but also to medium and high carbon, simple, and alloy steels, and experience has shown that the physical characteristics are considerably different in a steel that develops a coarse grain in the carburizing test and in a chemically similar one that develops a fine grain. This difference is so great that it sometimes accounts for the difference between success and failure in mass production.

Three of the most important physical characteristics are hardenability, machinability and mechanical properties. That these are definitely influenced by the same conditions that determine whether the steel will be coarse or fine grained in the carburizing test will be seen from the following data, selected from a large number available, not be-



*Steel 26 MF.
Similar in
chemical com-
position to 26
MC above but
responding dif-
ferently to
carburizing
test*

Low-Manganese Steel 40 MC at 100 Diameters. Left to right:
As rolled
Heat treated to 269 Brinell
McQuaid-Ehn test



cause they show the extreme variables, but because they are the results of tests made under strictly comparable conditions.

Hardening Power of Fine Grained Versus Coarse Grained Steels

Many observations have led to the generalization that, other things being equal, steels that are coarse grained in the McQuaid-Ehn test harden more intensely and deeper than those that are fine grained. This difference in hardness is most pronounced in plain carbon and low alloy steels and becomes negligible in the higher alloys. The following data on 1-in. rounds illustrate these points:

In order to treat the fine grained steel and its companion coarse grained steel to the same Brinell hardness at the center of the bar, a considerably lower drawing temperature had to be used for the fine grained steel, because it has lower hardness after quenching.

Here it will be noted that the deep hardening action caused by molybdenum has been sufficient to overcome the effect of grain size on the hardenability of steel and the two steels respond exactly the same to a given heat treatment as far as Brinell hardness is concerned.

Machinability

The writer regrets that he is unable to present concrete figures to illustrate the superior machining quality of coarse grained steel. That this superiority exists cannot be doubted

in the face of actual production results independently obtained by several large users who worked steels of known grain size.

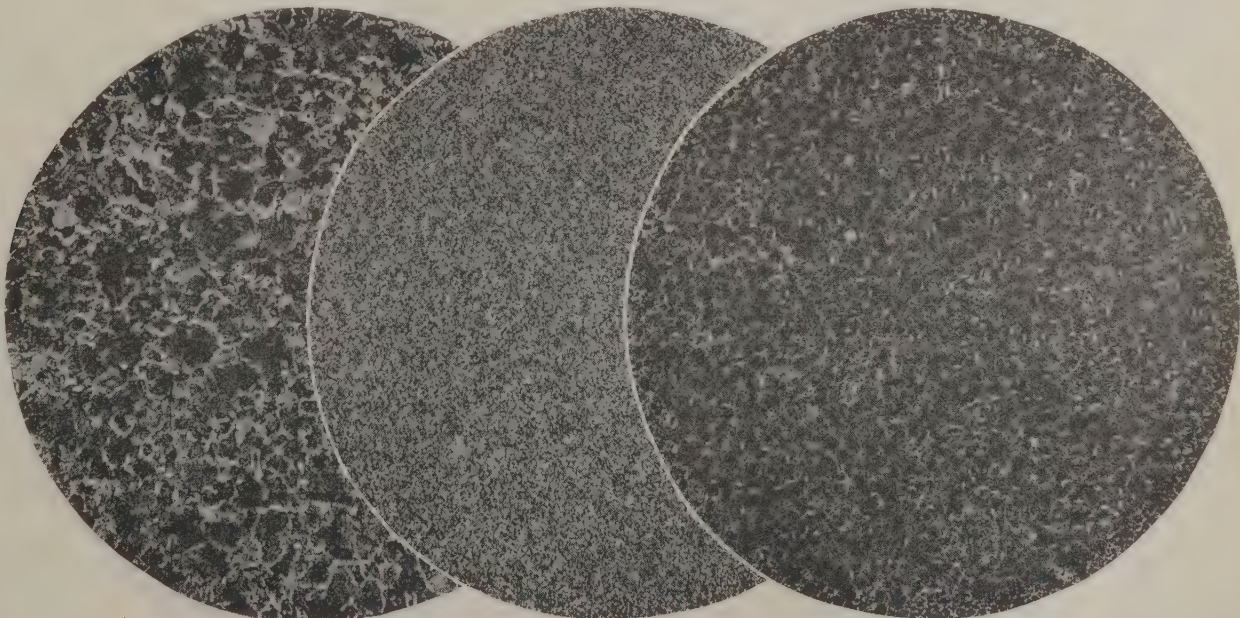
Mechanical Properties of Fine Grained Steels

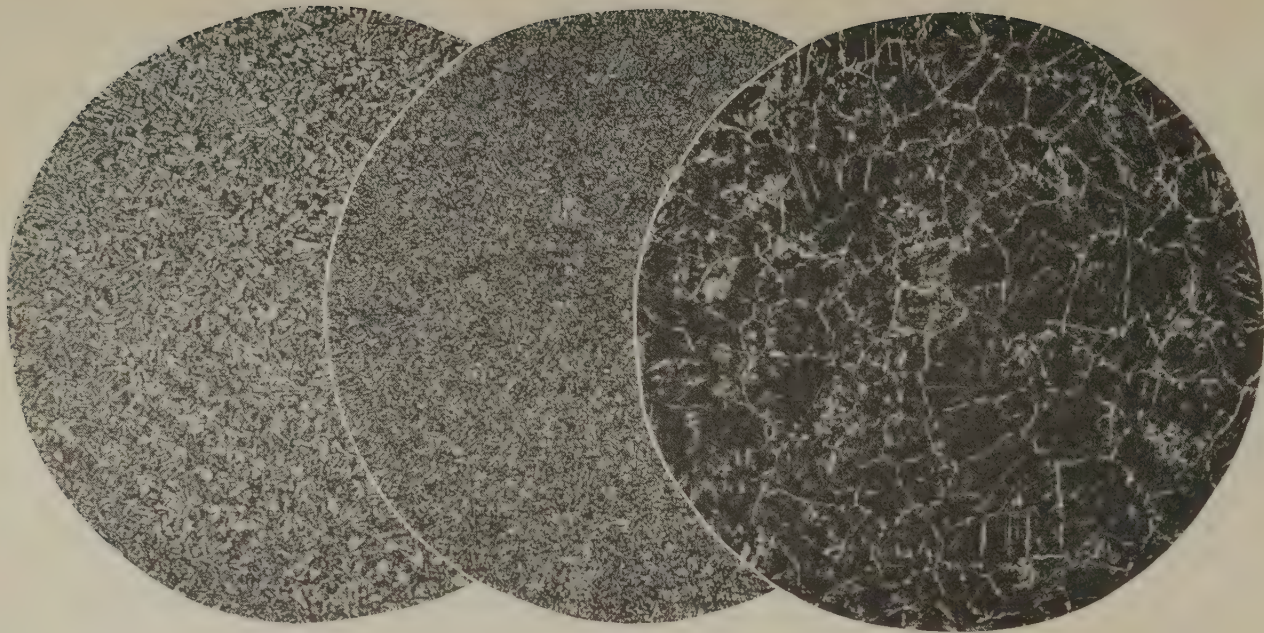
Ready machinability, important though it may be to the man interested in rapid and economic production, is not the

Low-Manganese Steels				
Heat No.	26 MC	26 MF	40 MC	40 MF
Carbon	0.26	0.26	0.40	0.39
Manganese	1.58	1.46	1.71	1.60
Phosphorus	0.018	0.017	0.019	0.016
Sulphur	0.017	0.018	0.018	0.018
Quenching temperature..	{ 1525 deg.	{ 1525 deg.	{ 1500 deg.	{ 1500 deg.
Medium	{ Fahr.	{ Fahr.	{ Fahr.	{ Fahr.
Drawing temperature ...	{ Water	{ Water	{ Water	{ Water
	{ 900 deg.	{ 800 deg.	{ 1000 deg.	{ 850 deg.
	{ Fahr.	{ Fahr.	{ Fahr.	{ Fahr.
Grain size	{ No. 6	{ No. 10	{ No. 6	{ No. 10
	{ (coarse)	{ (fine)	{ (coarse)	{ (fine)
	{ Fig. 1	{ Fig. 2	{ Fig. 3	{ Fig. 4
Brinell hardness:				
Surface as quenched...	534	514	555	534
Center as quenched....	534	477	555	495
Surface after drawing..	269	311	321	341
Center after drawing..	269	269	321	321

main concern of the designing engineers. To them the group of attributes generally called "mechanical properties" are of fundamental importance, since upon these values the design is based.

Steel 40 MF. Similar in chemical composition to 40 MC above but responding differently to carburizing test





Manganese-Molybdenum Steel 26 MMC at 100 Diameters. Left to right: As rolled Heat treated to 269 Brinell McQuaid-Ehn test

The results of a large number of tests on various types of steel show clearly that while the tensile properties of a given steel are practically independent of the grain size after the carburizing test, the dynamic strength as measured by the Izod impact test is decidedly greater in fine grained than in coarse grained steels.

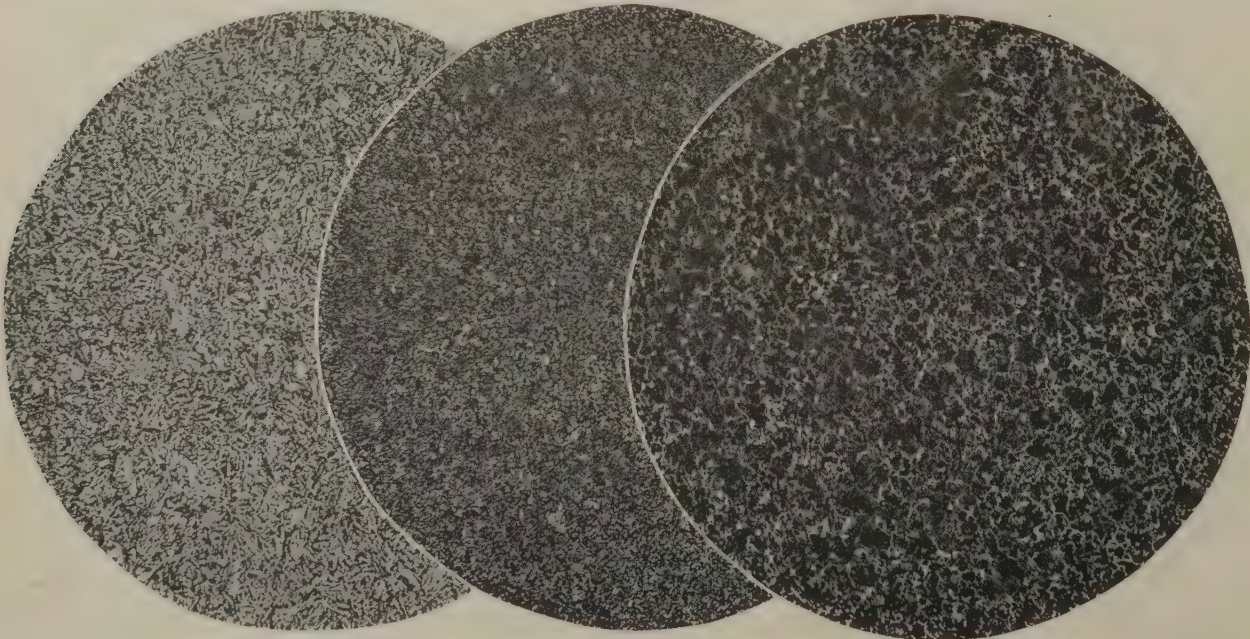
To illustrate this characteristic difference in the steels already described when heat treated to the same Brinell hardness, the appended test results are submitted. Each pair of steels was made and tested under comparative conditions and the figures presented show general tendencies that have been confirmed with other types of steel. The fig-

ures given are the average of four tensile tests and 12 impact breaks from each heat.

A consideration of these data leads to several conclusions the more important of which may be summarized as follows:

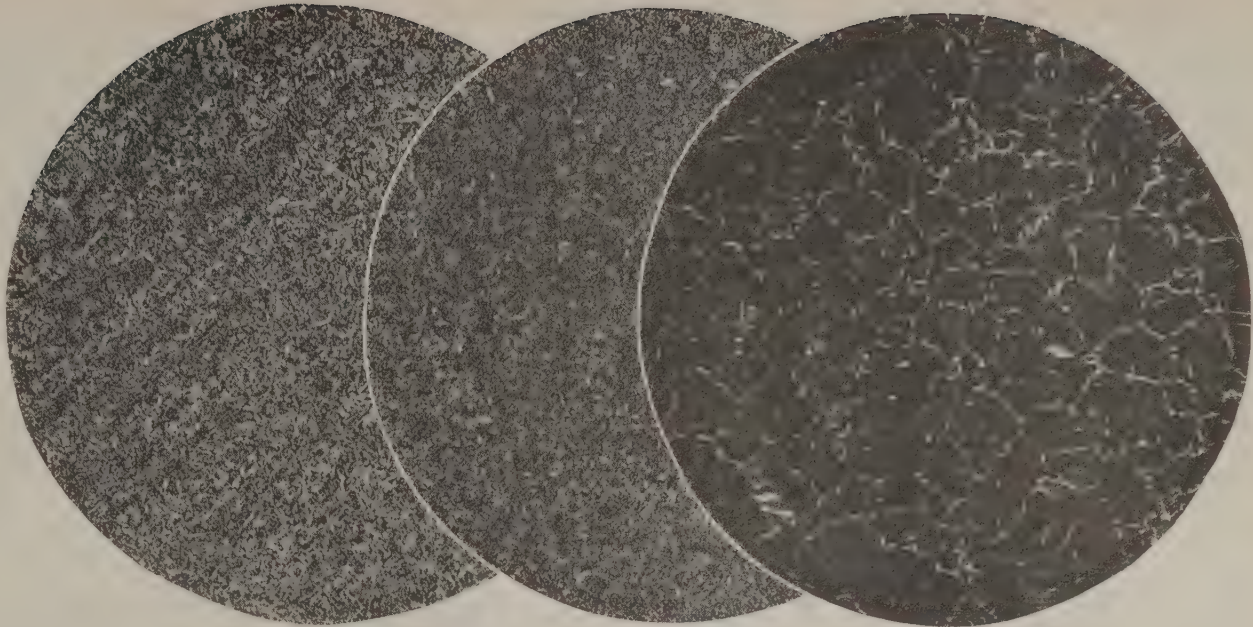
1. Other things being equal, the resistance to shock, as measured by the Izod impact value of a steel that is fine grained in the carburizing test, is distinctly greater than that of a steel that is coarse grained.
2. This greater toughness of fine grained steels is also reflected to some extent in the figures for reduction in area.
3. The values for yield point, ultimate strength and elongation appear to be unaffected by the grain size in the carburizing test.
4. Other things being equal, the addition of molybdenum to a straight manganese steel, be it coarse grained or fine grained, results in greater impact strength.
5. The importance of grain size to the impact resistance of steel is clearly brought out by the fact that the fine grained manganese steels of both carbon contents developed approximately the same Izod values as the coarse grained manganese-molybdenum steels, indicating that as regards Izod value, the existence of a fine grain in the carburizing test is as important as the presence of 20 to 25 points of molybdenum. The combination of molybdenum and fine grain is, of course, still more desirable.

Manganese-Molybdenum Steels				
Heat No.	26 MMC	26 MMF	40 MMC	40 MMF
Carbon	0.25	0.28	0.39	0.39
Manganese	1.47	1.59	1.74	1.77
Molybdenum	0.24	0.27	0.26	0.24
Phosphorus	0.016	0.016	0.017	0.018
Sulphur	0.013	0.017	0.017	0.016
Quenching temperature...	1525 deg. Fahr.	1525 deg. Fahr.	1500 deg. Fahr.	1500 deg. Fahr.
Medium	Water	Water	Water	Water
Drawing temperature....	1100 deg. Fahr.	1100 deg. Fahr.	1030 deg. Fahr.	1030 deg. Fahr.
Grain size	No. 6 (coarse) Fig. 5	No. 10 (fine) Fig. 6	No. 6 (coarse) Fig. 7	No. 10 (fine) Fig. 8
Brinell hardness:				
Surface as quenched...	534	534	555	555
Center as quenched...	534	534	555	555
Surface after drawing..	269	269	321	321
Center after drawing..	269	269	321	321



Steel 26 MMF. Similar in chemical composition to 26 MMC above but responding differently to carburizing test

Manganese-Molybdenum Steel 40 MMC at 100 Diameters. Left to right:
As rolled
Heat treated to 269 Brinell
McQuaid-Ehn test



A property of fine grained steels which has not yet been mentioned is wide temperature range in heat treatment. Since they resist grain growth, such steels may be heated

considerably above the minimum temperature required for complete hardening without coarsening, with its attendant brittleness.

In practical heat treatment this point is of great importance. By virtue of it, "single treating" carburizing steels are made possible, in which a commercially satisfactory refinement of both case and core may be effected by a single heating and quenching operation. The single treatment possesses two advantages over "double treatment," namely, minimized distortion and lower cost by eliminating the first or core refining treatment.

In other than carburizing grades, fine grained steels are more "fool proof" in heat treatment—an equally advantageous characteristic. Such steels lack the extreme sensitivity that necessitates working within narrow limits of temperature and time. One may therefore safely adopt quenching temperatures well above the critical range, since errors due to non-uniformity of temperature in the furnace or minor errors in the pyrometer system will not be accompanied by overheated or underheated structures.

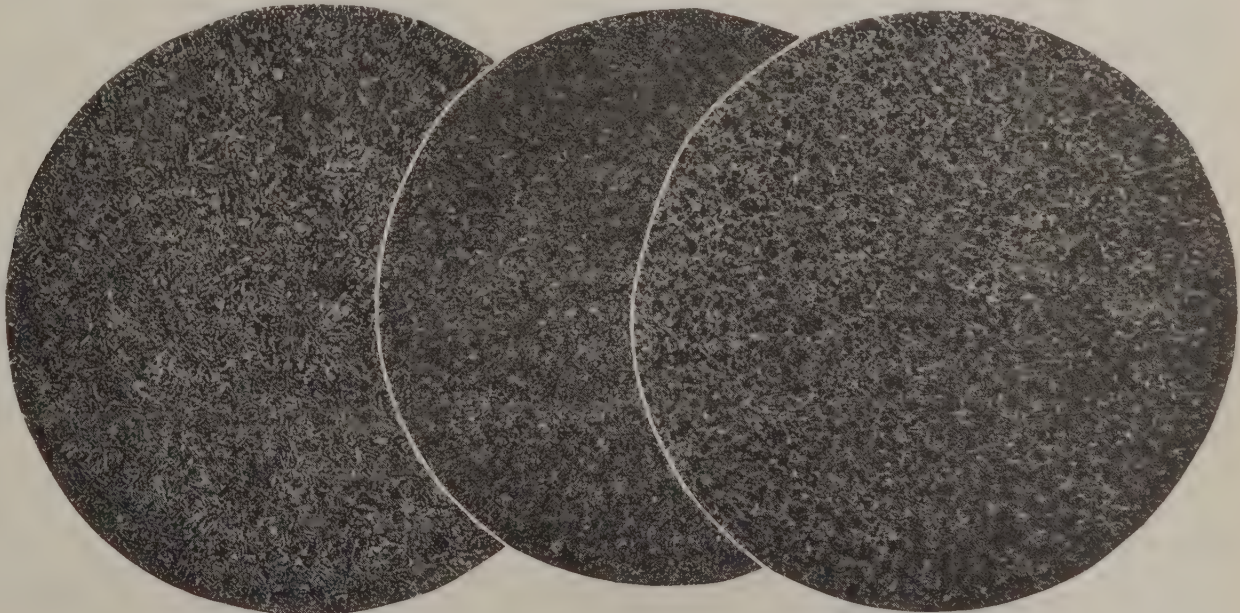
General Considerations

It has been pointed out that many of the important physical characteristics of steel, including machinability, hardenability and mechanical properties, are definitely affected by grain size in the McQuaid-Ehn test. It might reasonably be anticipated that these differences would be explained

Low-Manganese Steels				
Heat	26 MC	26 MF	40 MC	40 MF
Quenching temperature...	{ 1525 deg.	{ 1525 deg.	{ 1500 deg.	{ 1500 deg.
Quenching medium.....	{ Fahr.	{ Fahr.	{ Fahr.	{ Fahr.
	{ Water	{ Water	{ Water	{ Water
Drawing temperature....	{ 900 deg.	{ 800 deg.	{ 1000 deg.	{ 850 deg.
	{ Fahr.	{ Fahr.	{ Fahr.	{ Fahr.
Yield point.....	110,400	107,100	140,000	143,300
Ultimate strength.....	132,800	129,900	156,000	159,300
Elongation in 2 in.....	18.5	21.0	16.5	15.5
Reduction of area.....	58.8	65.1	50.7	57.8
Brinell hardness.....	269	269	321	321
Grain size.....	{ No. 6	{ No. 10	{ No. 6	{ No. 10
	{ (coarse)	{ (fine)	{ (coarse)	{ (fine)
	{ Fig. 1	{ Fig. 2	{ Fig. 3	{ Fig. 4
Izod value.....	67 ft.-lb.	78 ft.-lb.	14 ft.-lb.	53 ft.-lb.

Manganese-Molybdenum Steels				
Heat	26 MMC	26 MMF	40 MMC	40 MMF
Quenching temperature...	{ 1525 deg.	{ 1525 deg.	{ 1500 deg.	{ 1500 deg.
Quenching medium.....	{ Fahr.	{ Fahr.	{ Fahr.	{ Fahr.
	{ Water	{ Water	{ Water	{ Water
Drawing temperature....	{ 1100 deg.	{ 1100 deg.	{ 1030 deg.	{ 1030 deg.
	{ Fahr.	{ Fahr.	{ Fahr.	{ Fahr.
Yield point.....	115,300	116,000	144,100	145,000
Ultimate strength.....	128,800	129,000	159,300	159,500
Elongation in 2 in.....	20.5	21.0	18.0	18.0
Reduction of area.....	63.2	66.7	56.6	57.1
Brinell hardness.....	269	269	321	321
Grain size.....	{ No. 6	{ No. 10	{ No. 6	{ No. 10
	{ (coarse)	{ (fine)	{ (coarse)	{ (fine)
	{ Fig. 5	{ Fig. 6	{ Fig. 7	{ Fig. 8
Izod value.....	74 ft.-lb.	91 ft.-lb.	55 ft.-lb.	64 ft.-lb.

Steel 40 MMF. Similar in chemical composition to 40 MMC above but responding differently to carburizing test



by difference in the microstructure in the "as rolled," and more particularly in the heat treated or "as tested" conditions. A study of the pictures, which show the microstructures in the "as rolled," "as tested" and "after McQuaid-Ehn test" conditions of the manganese and manganese-molybdenum steels we have used in the work to illustrate our remarks, shows that in the "as rolled" and "as tested" conditions there is little to distinguish a given coarse grained steel from its companion fine grained steel. The McQuaid-Ehn test, however, brings out fundamental differences in an obvious manner.

The carburizing test thus provides a simple and positive method of distinguishing between steels with a certain group of characteristic physical qualities and those with another but equally characteristic group. One may therefore predict with a considerable degree of confidence the suitability of a particular steel for a given application. It

is also clear that, for some applications, the group of attributes characteristic of coarse grained steels is desirable, if not essential, while other applications require fine-grained steels.

In view of these considerations it is inevitable that large users of steel, to whom definite physical characteristics are of prime importance, will use this test as a means of control, and perhaps incorporate grain size limits in the purchase specifications. This in turn would make it necessary for the steel maker to control the grain size of the steels he produces. For such work, the basic electric process offers peculiar advantages and has yielded excellent results. As was pointed out at the beginning, the ability of the large tonnage, high powered basic electric furnace to produce steels to close chemical and physical limits at a reasonable cost has led to an expansion in the use of electric steels which is most significant.

Business Press an Agent of Progress

President of United States Chamber of Commerce Points to
Valuable Services of Trade Publications

RAPID current changes in the business world demand that the trade press play an even more important role than in the past, according to William Butterworth, president of the United States Chamber of Commerce and head of Deere & Co., Moline, Ill., who addressed the Associated Business Papers at New York, Nov. 16. His remarks, in part, follow:

Enlightened business, eager to fulfill its destiny in the world, asks freedom of initiative. Properly so. But even paramount to individual right is the public right, and the individual who forgets that larger right must bring upon himself and his enterprises, and indeed more or less upon the entire business community, outbursts of public wrath in terms of legislative and Governmental regulation that may hamper and hamstring a legitimate liberty of business initiative.

Lawless, destructive initiative must be curbed. It must be curbed in the public interest and it must be curbed in the interest of lawful business. Organized business must and is lending a willing hand to this curbing through its own efforts at self-restraint and self-regulation. This aspiration is most worthy, and it is to the credit of the business press that it is bringing its influence more and more into aid of such efforts.

Moreover, in the solution of many of our business problems involving the public responsibilities of business, the sympathetic attitude of Government is necessary. This does not mean that business is—or should become—a petitioner for paternalistic legislation. But it is right and proper that business seek support for legislative policies that open the way for the collective wisdom of business to work out its own welfare, mindful that its largest good is always the public good. As the exponent of such aspirations the business press has before it an opportunity for most distinguished and most effective service.

Thus the success of business in measuring up to its public responsibilities depends in no small measure upon the courage of its organizations and the vision of its press. The organization is the business forum; the business senate. Here business canvasses and clarifies its opinion and arrives at its decisions. The business press—if it fully measures up to its opportunity—is the "guide, philosopher and friend," valued in counsel because it is as free to caution and to admonish as to approve and acclaim.

Let me elaborate that idea. I am a thorough believer both in business organization and in the business press.

Both are potent allies of business and industry. But let me say that the business press should not content itself merely with reporting business deliberations and business decisions. It should take part in them. And in saying this I have no thought to detract from the value of the reporting function. That I know to be most valuable—that interchange of business experience. It enables me as a manufacturer in Illinois to profit by the successful methods of others, and it enables me to avoid errors that have been discovered elsewhere. That, I repeat, is a service of the highest order.

But as a business man, as a manufacturer, as a member of trade and business organizations, I need, too, the candid advice of the business press. The business paper with its trained observers scanning the business horizon naturally has a wider view and an even better perspective upon the inter-relation of business events and movements than either the trade association or the individual business man. The value of this detached viewpoint and of the frank and friendly counsel of the business press cannot be too highly estimated. The business press has universal contact with business, it has the opportunity to mirror business to itself, and fearlessly to advocate sound policies and win for them the approval of both business and the public.

Moreover, never was the opportunity greater than now for the business press to make itself indispensable to business and industry. Never had it a like opportunity to stimulate leadership. For our business world is a rapidly changing world. In all its phases its processes are undergoing almost revolutionary readjustments. These require a new strategy, new tactics, new methods and, above all, unflinching fortitude and courage.

Standard Colors for Steel Foundry Patterns

According to a code of acceptable trade customs, adopted in 1928 by the Steel Founders' Society of America, the following colors should be used on patterns:

Surfaces to be left unfinished are to be painted black.

Surfaces to be machined are to be painted red. Seats of and for loose pieces are to be striped red on a yellow background.

Core prints and seats for loose core prints are to be painted yellow.

Stop-offs are to be indicated by diagonal black stripes on a yellow base.

Heavy-Duty Anti-Friction Bearings

Advantages Due to Power Savings, Reduction in Maintenance and Continuity of Operation—They Permit Some Things Otherwise Unattainable

BY SIDNEY G. KOON*

THERE are few machines the running of which may not be improved by anti-friction bearings. The action of articulations and of mechanical movements of any kind is improved by proper bearings, and the highest type of these is anti-friction. Even for bearings occupying a minor part in the machine, some form of anti-friction bearing may be said to be better and cheaper in the end. Our automobile development is largely predicated on ball or roller bearings.

In most cases the initial cost of an anti-friction main bearing may well be less than that of the plain bearings, when everything is considered. The plain bearing requires expensive white metal or brass; there is much scraping labor at high cost; and then in the installation in the machine the bearing has to be run in at further skilled-labor cost. With the anti-friction bearing, on the other hand, none of this cost is entailed; the bearing is finished in the plant where it is made, and it is then put into the machine ready to operate.

Roller bearings are designed with the expectation that they will last as long as the machine. While it cannot be claimed that they are free from trouble and occasional breakage, in general they are so much more dependable than the plain bearing that the maintenance cost of the latter is almost wholly an unbalanced charge, when the two are compared. Maintenance is the largest item with regard to a plain bearing. When such a bearing or a part which it serves becomes too hot, it may cause the shutting down of a whole train of equipment, with interruption of service, and involve a heavy loss of revenue.

Uniform Sheets Made Possible

Only three-tenths of the power originally employed on a sheet mill was required for rolling the product and overcoming what friction remained after roller bearings were installed.

Even this great economy in power, however, was not a compelling element in dictating the use of anti-friction bearings in sheet mills. The one item which did effect it was the fact that it was found extremely expensive to obtain uniform thickness to close limits across the width of sheets rolled on mills with plain bearings. And lengthwise of the sheet the uniformity often was so poor that measurements taken in fractions of one-thousandth of an inch showed that the material could not be used for certain exacting purposes.

This illustrates something which has been observed time and again in the installation of anti-friction bearings, namely, that the major economy or improvement is almost always not the one which is anticipated to have major value.

Life of Apparatus Prolonged

An installation in a tube mill operating on the Mannesmann principle is a case in point. A tailstock holding a mandrel bar was fitted with a multiple-collar bearing of the

marine type similar in appearance to the thrust bearing on a propeller shaft. The mill was producing about three tubes a minute. Sometimes this bearing was run only half an hour before renewal of the lining was necessary. The loss on the mill due to lack of production, expensive equipment idle, and ingots getting overheated became a very serious proposition.

Roller bearings were put in to replace the multiple-collar bearings. These are grease-lubricated and have been standing up for six months at a time, or longer, between adjustments.

A great economy here, however, in addition to overcoming the difficulties mentioned previously, was in the prolongation of the life of the piercer point. This point wore away very rapidly under the original conditions, because of the retardation to rotation, caused by friction. With the roller bearings the mandrel quickly rotates up to full speed, and saves wear on the point. The whole cost of this change-over was defrayed by the savings of a few weeks of operation.

Benefits Obtainable

Benefits to be expected from the use of roller bearings in mills are fourfold. They may be classified as (1) power savings; (2) reduction in maintenance; (3) practical elimination of repair costs; and (4) continuity of operation of the mills.

Much heat is generated in the journals when plain slide bearings are used. A considerable portion of this heat travels from the roll neck into the body of the roll and tends to swell it or otherwise to distort its shape. This makes it difficult to maintain exact sections or thickness in rolling. Roller bearings completely eliminate this source of trouble. While the working surface of the rolls becomes slightly heated by friction against the material being rolled, the influence of this heat can be readily controlled. In any case, it occurs equally whether the bearings be solid or anti-friction.

Considerations Regarding Design

MANY formulas have been developed by manufacturers engaged in designing and producing roller bearings for various purposes. Other formulas have been developed by theorists in dealing with the forces involved. But inasmuch as material such as steel distorts in use under heavy loads, the mathematical theory cannot apply directly to the specific case. Consequently, although a manufacturer may use the formulas in the preliminary stages of his design, he generally checks them against his accumulated experience, and almost always departs from them to suit varying conditions to be met. Any ball or roller bearing can carry a greater load than the theoretical formula provides.

As an instance of this may be cited the design of a roller bearing for a 400-ton revolving crane for pier use, in which the outreach over the edge of the pier was 50 ft. or more. Tests made with the bearings designed for this crane, under a load somewhat greater than that to which they would be subjected in practice, showed the surface of contact de-

*Associate editor THE IRON AGE. This is abstract of a paper read before the Iron and Steel Division at the annual meeting, New York, Dec. 7, of the American Society of Mechanical Engineers.

veloped between the cylindrical roll and a flat surface plate to be no less than 5/16 in. in width. Of course, neither roll nor plate—hardened tool steel as they were—was stressed to its elastic limit, both resuming their original shapes when the load was removed. Careful microscopic examination failed to show any remaining deformation in either element. But elastic compression in the material had provided adequate bearing area.

Because of this great width of contact line, in contrast with the hair-line of the theoretical formula, it became possible to load this particular set of rollers to as great as 19,000 lb. for each inch of length.

Revamping Old Mills Not Adequate

In designing a roller-bearing mill, the first idea is simply to put roller bearings on the necks of existing or conventional rolls. Where the problem has not been thought out more carefully than this, there have been many cases of failure. Study of the failures has shown either too high a pressure or too great a speed, or that the neck of the roll was too weak. This latter condition resulted from reducing neck diameters to permit the bearings to go into the limited space available.

High speed introduces serious complications in roller bearings as well as in other types. Small thrust bearings made some years ago for a machine which was to operate at 3600 r.p.m., and which were made at a tolerance of only 0.0001 in., gave a peculiar sort of musical note when up to speed. It happened that the rotative speed of the machine corresponded with the natural harmonic-vibration cycle of the bearing, with the result that at that exact speed the sound was caused. Several of these harmonic points may be reached by such a machine in getting up to speed, whereas a slight variation in some of the parts may remove any cause of trouble resulting from harmonic vibration at the designed speed.

Reversed Stresses Are Severe

Rapidly alternating tension and compression in the material of roller bearings constitute more severe usage than is customarily experienced in the working parts of other machinery in which the alternate application and relieving of only one kind of stress is encountered, either tension or compression. It is well known that the extremely rapid repetition of stress alternating from tension to compression produces early fatigue. On account of this severe nature of stressing, the loading of roller bearings is frequently limited to only 1 per cent of the static load which could produce rupture of the parts.

Three essentials characterize the building of roller bearings today: The first is steel of proper composition and properly manufactured for both rollers and races. The second is accurate temperature in the heat treatment of the finished parts, which customarily must be kept within plus or minus 8 deg. of the specified temperature, and should be kept within 3 deg. The third is the extreme precision of the final finishing on the grinding machine.

For speeds as high as 400 or 500 r.p.m., it is strongly felt that the inner races should be locked in position on the roll neck. This may be done by clamping, by a shrink, press, or tapered fit, or by a combination of these methods. If this is not done, wear and scoring may result between inner race and journal. But with any type of bearing requiring endwise adjustment, the race must be free to slide on the neck.

Tapered and Cylindrical Rollers

Both tapered and straight cylindrical roller bearings are likely to find a place in rolling-mill work, for each presents certain advantages. But the results so far are not in sufficient detail, and particularly not yet in definite enough contrast to make possible intelligent selection of the one rather than the other.

In either case it probably will pay to install over-capacity anti-friction bearings for this service. Though they are costly, mill delays are far more so. And it is much better to face a high initial investment in bearings which will stand up for a long period than to have expensive mill delays and the more frequent replacements which might naturally follow the installation of bearings of smaller capacity.

Heavy Guns Use Anti-Friction Bearings

Anti-friction bearings have been introduced widely into the mechanism of gun carriages. The lower pintle thrust bearing for the United States 14-in. railroad mount—by far the most powerful gun used by either side on any front during the World War—has 34 balls 4 in. in diameter in hardened steel races having a diameter of 51½ in. at the center of the balls. The traveling weight of this mount is 730,000 lb.

Both races and balls are made of chrome-bearing steel, hardened and ground, with a Shore scleroscope hardness of 90 or above. The races are capable of carrying a sustained load of 100,000 lb. on one ball, applied at any point in the circumference of the groove. Each ball will stand a load of 100,000 lb. when placed between the finished races without showing any permanent deformation or surface cracks.

Some of the pressure tests on bearings have shown the maximum loads to which the roll neck may be subjected in operation. As the maximum load may occur only at long intervals, and, further, as it may be only momentary in application, it does not furnish a wholly satisfactory figure for the designer to use. Neither, in fact, does the average load, for the bearing must be fully capable of taking an overload which may in some cases be severe. Just where, between the maximum and the average, lies the load proper to use for designing is for future experiments and experience to determine.

Vital factors in designing bearings stated recently in connection with bronze bearings for heavy duty, will apply also for the most part to roller bearings. These include the following:

- Horsepower to be transmitted
- Revolutions per minute
- Load per square inch of bearing area
- Character of workmanship in machining parts
- Type of material used and its hardness
- Whether grinding to accurate measurement is to follow hardening
- Proper allowance for oil film
- Kind of lubrication to be used
- Lubricating device (if any) to be employed
- Type of service—intermittent or continuous
- Consideration of the heat to be developed by friction, and its proper radiation and control.

Operating Conditions and Requirements

CONTINUITY of manufacturing operation is today one of the most important elements in our industrial fabric. Continuous processes, particularly where operating with a long train of equipment, give economies not possible under the old conditions. Interruption to this continuity is bound to be exceedingly expensive. A large plate mill installed in Eastern Pennsylvania, for instance, has a charge of \$90 an hour for interest, etc., against every operating delay. It is evident that even a 15- or 30-minute shutdown to replace a brass on a \$3,000,000 mill, if recurring frequently, is something which industry cannot permit.

In rolling sheets or strips any change in the shape of the roll due to heat is important. Heat is conveyed to the roll from the material being rolled, and from the heat generated in brass or babbitt bearings. By the use of anti-friction bearings on supporting rolls, the heat in the necks is reduced to a more or less fixed quantity and the operator has only to shape his rolls so that they will adjust themselves to the accumulated heat derived from the material

being rolled. This tends to make it easier for the operator to maintain the shape of his mill. Because of the thinness of the product, this matter is of a greater importance than when rolling heavier sections.

Backed-Up Rolling Mills

Large-diameter backing rolls on cluster mills and four-high mills are depended upon to stiffen the working rolls and to limit their deflection, so as to produce a rolled strip or sheet with a minimum amount of variation between center and edge. When the supporting rolls are equipped with roller bearings, less adjustment is required to maintain the gage of the strip, as the operator has only to watch the wear on the roll surfaces, and does not have to make allowance for wear on the neck bearings.

With this equipment, properly designed, it is possible to roll strip or sheet steel practically without a "high center" and without crowning the rolls. The great diameter of the backing-up roll in relation to its length minimizes deflection of the working roll and enables the mill to produce the desired result. Roller bearings on the backing-up rolls make possible a high uniformity of gage, longitudinally, on many pieces rolled in succession, because the wear in the bearings is negligible.

There seems to be no question that a sleeve bearing, when first installed, will turn out material equally close in tolerance to that made when anti-friction bearings are employed. But the wear on the plain bearings is so much more rapid than on the anti-friction type that its tolerance changes more rapidly. Under these conditions the mill with the sleeve bearing demands a great deal more attention and adjustment. Plain bearings, of course, do not wear down equally, and some retain their forms longer than others. Nevertheless the general statement that they wear much faster than roller bearings probably will not be disputed.

Developed Side by Side

Thus the small-diameter working roll, backed up by one or more larger rolls, has been adopted for rolling wide, thin materials. By their very design and construction mills thus built avoid the space limitations around roll necks existing in regular two-high and three-high mills. It was quickly recognized by mill builders and roller-bearing manufacturers that here was an ideal opportunity for them to cooperate in applying roller bearings. And thus the activity of the bearing manufacturers in applying roller bearings to mill necks coincided with the reintroduction of backed-up rolls for mills rolling sheets and strip steel.

Backing-up-roll diameters may be established without regard to any factor except the space requirements of the roller bearing. In fact, the greater this diameter the better suited is the big roll to hold the working roll from deformation. It was the perfection of this combination which started the recent and remarkable change from the long-established practice for producing wide, thin metal products.

Older Types Still Useful

There still is a wide range of products which can be rolled satisfactorily on the older type of two-high mill without undue power drafts. In such cases, particularly under present steel-mill operating conditions of frequent roll changes, brought about by the "short orders" of "hand-to-mouth" buying, the installation of roller bearings might not be justified. Against their manifest advantages must be set the higher cost of roll changes in sets where they are employed. If analysis shows that the latter is likely to exceed the savings expected from their use, the lower initial cost of present equipment may well be decisive.

Freedom from shutdowns for repairs is one of the chief advantages derived from the use of heavy-duty roller bearings. On some mills it has been found necessary to re-babbitt bearings as often as every 8 hours, while properly applied roller bearings frequently do not have to be replaced

more than once a year. When rolling continuously it is essential that the bearings stand up to their work to avoid having to shut down the whole mill for replacements.

Savings in Power Consumption

COMPARATIVE power-consumption tests on mills run alternately with anti-friction bearings and plain bearings have yielded valuable data. Variations in temperature of the steel being rolled have made the tests less directly comparable than might be wished, but the information available is being augmented from time to time by additional test data. The earliest, and possibly the most complete, of these tests were made on a three-high 16-in. bar mill in Canton, Ohio. Records of the rolling of 279 billets, in tests made two and a half years ago, showed average savings of about 48 per cent.

In another case a two-high 10-in. rod mill was tested both with plain bearings and with roller bearings. With plain bearings the power needed without load was 95 hp., increasing to 170 hp. while rolling steel. With roller bearings the no-load requirement was only 20 hp., and 95 hp. while rolling steel. Here the saving of 75 hp. represents 44 per cent of the previous full load of 170 hp.

Questionnaire

UNDER the auspices of the Association of Iron and Steel Electrical Engineers a questionnaire was sent out last spring to determine the position of steel-mill engineers with regard to the application of anti-friction bearings to roll and pinion necks. Some of the results of that questionnaire are given in the following paragraphs.

Roll necks, in general, can be reduced in size if anti-friction bearings are applied. The point of application of roller bearings is closer to the body of the roll than in the case of plain bearings.

Backlash presents quite a problem because its elimination by means of drags would materially reduce the power savings afforded by anti-friction bearings. Ordinary coupling-box fits in many cases cause serious backlash. Better-fitted finish on coupling boxes and wabblers would help but not cure this condition. Such fits would have to have clearances estimated variously at from 1/16 to 1/2 in., with 3/8 in. generally favored. Universal couplings would be preferable to finished boxes and wabblers, except perhaps for small bar mills.

Freedom from Dirt Important

Prevention of dirt working its way into the bearings is one of the most serious problems. Proper lubrication of the bearings must be worked out in a simpler, yet reliable, manner.

That there is virtually no wear on roller bearings, either transverse or longitudinal, will, it was reported unanimously, eliminate much trouble in mill operation and prove of great value. It will help the mills to roll more accurate products. That it will lengthen the time between roll dressings is doubted.

The chief limitations to the installation of anti-friction bearings for this service were given as lack of necessary space on old mills, limits to roll dressing, high cost of equipment, and—mental inertia. Some of the disadvantages of such bearings were listed as increase in time required for changing rolls, inability to take end thrust, and inability to obtain full life out of rolls on small three-high shape mills.

General Conclusions

APPLICATION of roller bearings to the backed-up strip mill is still too close to the experimental stage to permit drawing any definite conclusions as to what its final form will be.

How much load a roller bearing will carry, and how long it will carry that load satisfactorily, are not yet known.

It is comparatively easy to determine the load which ordinarily comes on a roll neck. But there are excessive momentary loads far higher than this, and it is a very difficult matter to design a bearing which will carry these loads satisfactorily for a considerable time. The trend has been along the line of making bearings larger and larger with each new mill.

That this is an empirical method of attacking the problem, no one can deny. But it has resulted in developing equipment better suited to long life and inexpensive main-

tenance than would have been obtained by less bold design. So far we have not been able to determine exactly what does fix the size of a roller bearing.

Steel-mill engineers who have adopted roller bearings for rolls on backed-up mills, and who recognize their great utility for that purpose, do not favor their indiscriminate use elsewhere. As one such engineer puts it: "The present state of development in roller bearings for main mill rolls does not warrant our consideration of them except in cases beyond the limits of the two-high mill."

Limitations on Use of Anti-Friction Bearings

OPENING the discussion on the paper on Heavy-Duty Anti-Friction Bearings, F. C. Biggert, Jr., chief engineer, United Engineering & Foundry Co., Pittsburgh, who presided at the meeting, pointed out some of the limitations to the use of such bearings. There is a constant tendency to keep down their size, both on the score of cost and on that of convenience in handling. There are distinct limitations in regard to their use on two-high or three-high mills, because of the lack of adequate space between the roll necks in which to place the bearings. Where the material going through such a mill is narrow, as bars, they may work in these cases, but for broad material, heavy draft and large loads they are inadmissible.

Rarely do the rollers of such bearings give trouble; the races may do so because of the difficulty in obtaining uniform heat treatment on units of the size which the races take. They are frequently 30 in. or more in diameter and allowance must be made for the excessive loads sometimes placed upon them by reason of accidents. Mr. Biggert told of one instance in which a race of 18 in. in diameter was taken from the mill in a badly scored condition over the full 10 in. of width and for nearly one-third the circumference. There were minute particles of steel within the bearing but it did not give particular trouble, in spite of the damage it had received. This sort of damage was reported as customarily progressive, and usually the bearing gives no sign of distress until long after it has been seriously hurt.

Semi-annual or annual inspection of bearings were reported as inadequate by C. W. Bennett, vice-president American Sheet & Tin Plate Co. He advocated much more frequent inspection and said that with this it might be possible to obtain warning of internal troubles. Power savings were reported by Mr. Bennett to vary considerably with the type of mill and the character of product being rolled.

Heavy Savings from New Bearings

Referring to advantages not looked for when anti-friction bearings are installed, G. W. Weckstein, industrial equipment engineer Timken Roller Bearing Co., Canton, Ohio, said that his company has been able to get a more nearly concentric tube on a seamless mill after the new bearings were put in. The annual cost for brass and labor, in replacing or renewing plain bearings on this mill, had been \$6,059, without any allowance for overhead. The cost of a set of bearings for two rolls was given as about \$1,000. These were placed on the necks of the Mannesmann piercer rolls.

Mr. Weckstein referred particularly to the relation between cost of anti-friction and plain bearings on spindles of machine tools. He stated that the roller bearing in operating condition on the tool represented considerably less expense than was entailed after all the scraping and fitting had been done with the other type.

Complete study of pressures and power consumption is about to be undertaken by the Timken company, said the speaker. All three of the pressure measuring methods

mentioned in the paper are to be used, partly to learn their limitations and how they check each other.

Use of grease in excess quantities for the purpose of keeping foreign matter out of the bearings was advocated. In particular it was regarded as essential to retain the grease in the bearing and to keep water out. Because of the wear concentrated on one portion of the race of such a bearing, if it is fixed in position, the speaker said that longer life could be obtained from the equipment if, after a certain period, the race were turned 180 deg., so that the load might come elsewhere. He suggested a "creeping fit," whereby the loaded area might be shifted.

Oil-film bearings were warmly defended by H. A. S. Howarth, vice-president and general manager Kingsbury Machine Works, Philadelphia. He referred to the oil-film bearing as the best type of plain bearing, and described steel men generally as exceedingly conservative and hesitant to put in new devices. He said that the frictional coefficient at the moment of starting a piece of equipment is high with the oil-film bearing. Later on, however, this becomes much lower and approaches its best at the upper limits of speed. This type has great overload capacity.

Grease Under Pressure Keeps Bearings Cool

Positive grease lubrication on the necks of rolls on a 32-in. reversing mill rolling rounds was referred to by George T. Snyder, chief engineer National Tube Co., Lorain, Ohio. This mill has plain bearings and considerable water was formerly run on the necks to keep them cool. The grease lubrication installed provided for a pressure of 2000 lb. to the sq. in. and pockets around the necks were provided to hold the grease. The equipment is so adjusted that a little grease is supplied from the system every time the mill is reversed. No water is now needed on necks.

Strain gages in conjunction with steel blocks used well within the elastic limit of the steel was stated by Alvan L. Davis, research engineer Scovill Mfg. Co., Waterbury, Conn., to be the best method of measuring rolling pressures. He reported experiments upon a small sized mill placed under a large testing machine. The results were expanded mathematically from the 4-in. width in the experimental mill to 20 in. Strain gages now on the market were reported as sensitive and working beautifully.

Anti-friction bearings have been developed and pushed by their friends, according to William L. Batt, president S K F Industries, New York. Information has been pooled and all have benefited in the way the bearings have been improved and developed. This has not been the case with the plain bearing. No one in particular was engaged in pushing it. What was everybody's business became nobody's business and development of that type of bearing unquestionably has suffered in consequence.

A plea for using larger rolls with anti-friction bearings was made by W. Trinks, professor of mechanical engineering, Carnegie Institute of Technology, Pittsburgh. He recommended adding an inch to the diameter of small rolls, 2 in. to medium-size rolls, and 4 in. or thereabouts to larger rolls, when these bearings are to be applied. The

recommendation was based largely upon the inadequate room between roll necks for installation of anti-friction bearings on two-high and three-high mills.

Bearings Fellowship Suggested

At a luncheon meeting following the presentation of this paper and the discussion upon it, it became the consensus of opinion of those present that the work of the subcommittee on bearings could best be promoted from a

collection of all existing data, a survey of peak loads experienced in mills, and a study of means for avoiding the occurrence of these peak loads. A fellowship in the Carnegie Institute was recommended, the work to be done under the supervision of Professor Trinks, but with consultation with experienced men in and around Pittsburgh regarding methods and many other details. Representatives of bearing manufacturers, present at this meeting, offered to obligate their companies to share in the expense.

Functions of the Executive in Industry

Strong Plea Made for More General Adoption of Budget Control System in Manufacturing Plants

THREE main tools—men, money and materials—must be coordinated for best work in any manufacturing organization. The budget by which this coordination takes place is the most efficient tool known to modern industry, in the opinion of Robert T. Kent, engineering and sales manager Divine Brothers Co., Utica, N. Y., in a paper read Dec. 6 before the American Society of Mechanical Engineers, New York. It coordinates all four of the principal activities of a plant—finance, purchasing, production and sales. One of its chief advantages is that it permits comparisons of performance with the budgeted expectation, and thus points out where variations occur and to what extent. Hence, it shows where improvements can be made and how much room there is for them. The budget shows

- 1. The volume of business that can be expected
- 2. The volume of purchases, both of labor and material, that must be made
- 3. The production schedule that must be maintained
- 4. The probable inflow and outgo of funds
- 5. The financing that may or may not be necessary to carry on the business.

Budgets are of little use, according to Walter N. Polakov, engineer, New York, unless an executive can thereby measure the success of his efforts. He must compare with his postulates that which is accomplished. Any charted budget means more than merely a budget of money. It compares performance in various ways, accidental happenings, turnover of labor, etc.

Illustrating by an example drawn on the blackboard, which roughly is reproduced here, Mr. Polakov showed results which were obtained in a certain period in a plant employing 340 men. The monthly output of products was about \$200,000. The amount of stock carried was about \$100,000 and the monthly payroll, \$36,000. This was worked out on the dollar basis, partly because there were six different products made, which could not otherwise be grouped over any common denominator.

As will be seen in the chart, the plotting for any one month showed visually whether the volume of production was up to the bogey, or, if beyond that, by how much. The heavy black line indicates the quarterly accumulation of the three months in the quarter.

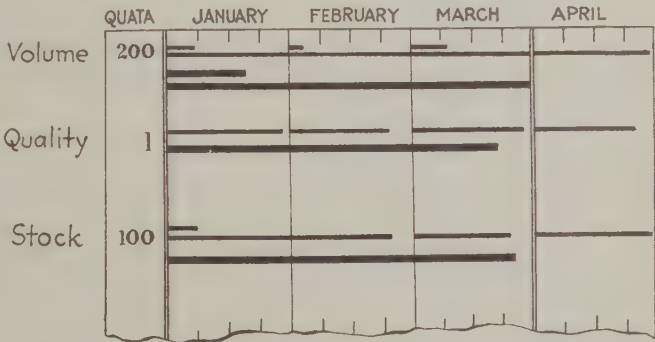
Quality was measured on the basis of spoiled work, allowances to customers for defectives and other items which could be placed on this same general basis. The allowance here was \$1,000 a month or ½ per cent of the product. As plotted, it will be noted that this did not quite reach the allotted bogey in any of the months, and the quarterly total thus fell below what was permitted. Stock and other items can be plotted in the same manner.

Method of Subdivision

While the manufacturing budget is necessarily tied up to the main financial budget of the company, Mr. Kent said,

it is at the same time broken down for plant control into materials, labor and indirect costs. This is done by departments and the individual figures are accumulated into the total. The material figures are taken from the purchase orders. The labor is predicated upon the estimated machine-hours for the month's production. The indirect labor is a percentage of the direct or a unit based on the machine-hours. For the most part, in the shop the units of the shop are utilized and the amounts are not expressed in dollars.

Nevertheless, the department heads are kept acquainted



Illustrating One Graphic Method of Budget Control as Applied to a Plant Employing 340 Men

with the situation as to how much money they can spend for various purposes. This is subdivided into labor and other items and is given either monthly or quarterly. Each department head is thus made the manager of his own department.

Trying to Improve on Past Performance

Another speaker, reporting that he had never used a budget as such, stated that he has applied the general principles. In doing this, he took the best figures obtained for each department and endeavored to improve upon them. No limits to this process have yet appeared, as progress has been continual. He made a definite plea for not forgetting the human element in any budget making.

Dollar values can be carried down to the shop in their relation to the budget, according to the chairman, Thomas R. Jones, Cincinnati Milling Machine Co., Cincinnati. In plants with diversified products particularly, the materials, labor and other items have no other common denominator. While it is always possible to allow so much oil or waste for each 1000 ft. of pipe, or whatever else is made, the matter cannot be evaluated in a managerial sense without translating everything into dollars.

Skids for Interplant Shipments

Symposium Covers Economic Aspects, Railroad and Steamship Viewpoints and Development of Methods and Equipment

SIX papers were read before the Materials Handling Division of the American Society of Mechanical Engineers, at the recent annual meeting, dealing with the use of skids in shipments to distant points, as distinguished

from use of that form of equipment within the confines of a plant or between neighboring plants. Brief abstracts of the papers, and the discussion which they evoked, are given in the following paragraphs.

Developments in Materials Handling

IN the period from 1890 to 1910 a revolution was accomplished in methods of handling bulk goods, according to R. L. Lockwood, Division of Simplified Practice, Department of Commerce, Washington. This period saw the greatest development in the power shovel, the huge unloading and loading machines for railroad cars and ships, the great bridge and gantry cranes, the continuous conveyor and many other devices. During the early years of the twentieth century engineers made rapid progress in developing new methods for handling materials of construction, and an equally intensive development went on in methods of handling goods in process in factories.

Up to the time of the World War little attention had been paid to handling finished goods. During the period in which the skid and lift truck were extensively developed, a parallel development took place in connection with industrial tractors and trailers.

Materials-handling equipment of every kind can be counted upon to save its full cost within a definite period of time. Savings due to labor and time-saving equipment in many fields are sometimes partially offset by collateral losses in changed methods, inconvenience, or some other form of unavoidable waste. Handling materials is almost in a class by itself in this respect, in that savings made represent net gains shared by all elements in industry.

A fundamental economic principle has been concisely expressed in a form which might well become a slogan for the materials-handling industry: "Handling materials adds cost, but adds no value." It is to reduce this cost to the lowest possible measure that materials-handling equipment is employed.

Skids Are of Ancient Vintage

One of the oldest devices in the whole history of moving objects, the sled or sledge, had unrecognized possibilities, and after a long lapse of years was brought to life in the form of the modern skid platform or "skid." All sorts of objects could be loaded on it, and by the use of the lift truck the loaded platform could be picked up, taken to any desired place, and set down again.

Lift trucks grew in size and capacity, power being

applied to them in many cases. More and more plants began to use this method for handling a wide range of commodities. Loads increased steadily to a point where lift trucks are now made to handle loads up to 10 tons, although the average is 2½ to 3 tons. Once the ancient sled and the modern lift truck had been brought together, their use in combination spread so rapidly that it is estimated that about 9,000,000 skids and 110,000 lift trucks are in service in the United States.

During the period in which the skid and lift truck were extensively developed, a parallel development took place in connection with industrial tractors and trailers, particularly for use in railroad freight stations, warehouses and steamship terminals. Numberless forms of hand- or power-drawn trucks and trailers rapidly came on the market, all designed to reduce the time and the labor cost of handling miscellaneous goods.

Large Reductions in Cost

Handling costs in railroad freight stations were reduced from 25 to 75 per cent. A study made by the Transportation Division of the Bureau of Foreign and Domestic Commerce, covering miscellaneous commodities, showed that, of every dollar spent to get these commodities from the final machine or factory process into the hands of the consumer ready for use, 10c. represented the actual rail or water transportation cost and 90c. the cost of packing, handling, loading, unloading, rehandling, unpacking, etc., including the cost of packing materials.

This study, together with others of a specific nature, attracted wide attention on the part of engineers and executives, as indicating the vast and untouched possibilities for saving money in this field. This knowledge, together with the constantly narrowing opportunity for saving money in production processes, further accelerated the effort to reduce costs in handling finished commodities.

It was obvious that, if the same degree of engineering, inventive and administrative genius were applied to distribution that had already been applied to production, the results would be similar to those accomplished in production in this country.

Economic Aspects of Skid Shipments

SOME of the economic aspects of the skid method, viewed purely from the standpoint of the shipper or receiver of the material, were presented by C. B. Crockett of the Society for Electrical Development, New York. The method is described both as to equipment and its uses, and to its relation to the manufacturing processes. A comparison is made between the total cost of physical distribution and

the cost of freight transportation only, pointing out the small influence of the latter factor in the total cost. The field of savings is then discussed, including labor costs, speed of car loadings, the container or skid, and the damage to material. These are illustrated, with actual instances which have occurred in various industries.

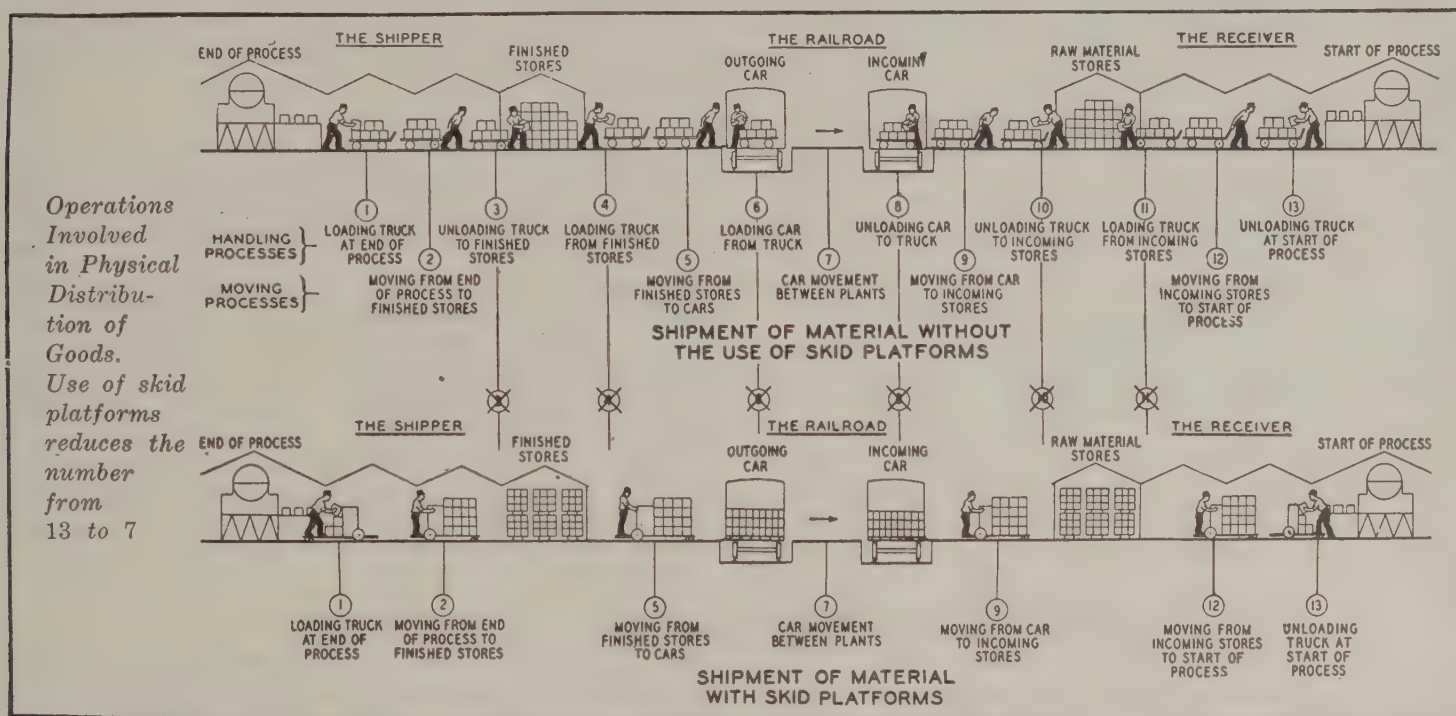
The paper concludes with a treatment of the possible

growth of the system and the four main factors which may influence its more general adoption: namely, (1) breadth of application to different commodities, (2) coordination of the system with methods of handling within the plant, (3) attitude of the railroads and other carriers, and (4) degree of interchangeability developed in the design of the equipment.

The essential factor in this method is the introduction of a container for shipment which adapts itself to mechanical handling in and out of box cars. Even with the use of portable conveyors there is still a large amount of

"load-carrying" truck (either hand or powered) in that they pick up the load mechanically and in the minimum time. The requisite for handling with this type of equipment is that the load be carried in a container that has a clear space underneath, which will allow inserting the platform of the truck underneath the load.

A packing case with legs becomes a skid box. The general practice today is to load the skid platform or skid box at the completion of the manufacturing process, storing the material in the same container, and upon shipment transfer the loaded skid to the car. If a platform is used for such



hand labor in the placing or removing of material in or from its location in a car. The only practical means (or at least the most generally accepted means) of mechanical handling in and out of box cars is by hand, electric or gasoline-powered industrial lift trucks.

Capacity of Laborer Multiplied

All of these types of lift trucks have a common characteristic in that they multiply the capacity of the workman and have the improvement over the fixed-platform or

material as kegs or small boxes, these are generally wired or strapped together, but do not have to be secured as strongly as one would suppose, because the entire load is generally secured after the car is loaded.

Many specific instances of savings made by this method of shipping, and of other opportunities for further savings, were cited by the speaker. He threw on the screen a diagram showing steps in shipping semi-finished goods from producer to the plant where further work is to be done upon them. This diagram is reproduced herewith.

Use of Skids for Water Shipments

ECONOMICAL handling of commodities in bulk has been highly developed, but great reductions in costs are possible with other classes of cargo by the use of advanced methods and equipment and the application of principles which have accomplished so much in manufacturing. The principles of greatest importance are the reducing of handling to the minimum and increasing the production of equipment to the maximum, according to H. E. Stocker, resident manager McCormick Steamship Co., New York.

In the shipping industry handling may be reduced by keeping freight off the floor of the pier and the deck of the ship. The best method of accomplishing this is to receive the freight from the manufacturer, already loaded on a skid. It broadens the application of the principle by extending it back to the mill where the goods are manufactured. Savings are increased not only by reducing handling at the mill and at point of consumption but by reducing packing expenses.

Saves Four-Fifths of Labor Cost

With a pier floor in good condition, one man and a tractor will handle skids averaging 3600 lb. with a total labor cost saving, as compared with shipments in cases, of

over 80 per cent. Even more important from the standpoint of net profit is the fact that additional business has been brought to the line by accepting shipments on skids.

In addition to the economy resulting from handling skids on the pier with lift trucks, the average sling load will be increased approximately 300 per cent, the ship's dispatch will be expedited, and the claims reduced. Total savings will be the equivalent of more than a 50 per cent cut in cargo-handling expenses.

Advanced principles of materials handling will add greatly to these benefits by reducing cargo-handling costs. The principles of most importance are:

- 1—Avoid unnecessary movement—i.e., straight-line production,
- 2—Maximum use of mechanical equipment,
- 3—Entire operation planned carefully to the last detail,
- 4—Select the one best machine, etc., for each particular job,
- a Be familiar with all equipment on the market,
- 5—Select the one best method for each particular job,
- 6—Emphasize unit cost rather than first cost, and finally, emphasize net profits,

7—Provide for ease of movement

- a Ball-bearing or roller-bearing trucks, trailers, etc.
- b Good floors
- c Movement by power

8—Minimum of handling

- a Economy in moving material is obtained by not handling it,

9—Maximum production obtainable from the equipment and plant.

Savings in Handling Railroad Stores

TREMENDOUS quantities of stores are handled by every American railroad. These stores are to a large extent received in a central store room and are then forwarded as needed to local storerooms in various centers. Under ordinary conditions this procedure involves considerable re-handling, according to J. V. Miller, assistant general storekeeper, Chicago, Milwaukee, St. Paul and Pacific Railroad, Milwaukee.

During the past few years the C. M. St. P. & P. R. R. has succeeded in cutting down this rehandling by storing many of its supplies on skid platforms. When shipments are made up to send out to the local centers the supplies are thus to a large extent picked up directly on the original platforms by means of lift trucks, moved into the railroad cars, transported to their destination and there unloaded by lift trucks. Three handlings are thereby eliminated.

Vast Movements Involved

Approximately \$1,000,000,000 worth of materials annually must be handled by railroad stores departments.

Some railroads carry in stock 65,000 different items of material; some carry over 100,000 items. The supply department, more commonly called the stores department, of each railroad orders stores and distributes them to the using departments in much the same manner as a large wholesale house serves its customers.

Not less than 75 per cent of the work of the stores departments is that of handling materials, yet until a few years ago the major efforts toward more economical operation were directed along lines other than those of materials handling.

Taking up in order the subjects of brake shoes, air pumps, brake beams, locomotive tires, air hose, journal brasses and other items of large use in railroad work, the author showed to what extent each such item fitted into the general scheme of handling on skids. In some cases the "adherence" is 100 per cent, but some items prove difficult to take in that manner and here less benefit is obtained from the new methods. Particularly is it found impossible to handle long items on skids.

Skid-Platform Shipment of Commodities

AFTER outlining the development of the use of lift trucks for interior factory transportation, F. J. Shepard, Jr., chief engineer and treasurer, Lewis-Shepard Co., Watertown, Mass., briefly discussed their possibilities for inter-plant transportation and for use between cities through freight and motor-truck shipments. He showed how the methods of packing and transporting paper have been radically changed in the past two years through the use of skid platforms for shipment, and gave figures of savings effected in a number of instances.

One has only to go back 20 years to the starting of the lift-truck system. Up to that time everything was handled on wheel trucks. Lift trucks were first used on flat stock such as paper, lumber cut to size, etc. The only type of platform used was the flat-top type made of wood.

Every use for lift trucks developed since that time has been the result of applying a proved principle to a particular problem. And when it is considered that lift trucks are used today to handle over 300 different products and in loads from 300 to 10,000 lb. (20,000 lb. in the case of power-

lift trucks) with platform sizes ranging from 3 sq. ft. up to 48 sq. ft., we can appreciate how unlimited the possibilities are.

Saved 3 Per Cent on Selling Price

One large paper mill estimates that \$30,000 invested in returnable skids paid a 100 per cent dividend at the end of ten months' use, and since that time has shown a saving of better than \$120 for each working day, or \$36,000 a year. The direct saving at the mill, through this method of shipping, amounts to about \$5 a ton, or, roughly, 3 per cent of the selling price of the paper.

Manufacturers of lift trucks and platform skids are anxious to cooperate fully, not simply to make sales but to build better transportation systems; for they realize that if they do that, or help to do it, sales will result as a matter of course. They have a wealth of material along various lines, plus the experience gained in working out problems, and in most cases are able to offer helpful suggestions to those who may be considering special handling problems.

Skid Shipments of Materials on the Lakes

SKID platforms, stock skid boxes, power-lift and hand-lift trucks in the handling of cargoes in Great Lakes navigation were discussed by George B. Wright, freight traffic manager Detroit & Cleveland Navigation Co., Detroit. He pointed out that the greatest problem to be faced is the practicability of interchange between carriers and between carriers and industrial plants. The solution he believes can be arrived at only through discussion between representatives of industries, steam railroads, electric lines, steamer lines, city transfer trucking companies and storage warehouses.

Cargo carried by the combination passenger and package-freight side wheelers, ranging from 360 to 535 ft. long, is perhaps more diversified than that of other similar car-

riers on the Great Lakes. It ranges from packages a few ounces in weight to iron and steel articles and machinery weighing several tons—literally, everything from "a needle to an anchor."

In addition to this miscellaneous freight many thousands of automobiles are carried on their own wheels. To carry maximum loads of automobiles the miscellaneous freight must be stowed from deck to deck, with proper regard to the utilization of space in which an automobile cannot be placed.

Skids of Goods Can Be Stacked

It was found that skid platforms and boxes when evenly loaded with heavy, compact freight could be so placed on

the boat decks as to form in reality a deck of themselves, and that quantities of lighter freight could be loaded on top of their loads, so that the only space really lost was that between the legs, which was negligible. The scope of the work was then enlarged by employing power-lift trucks to do the work between the boats and the docks and using hand-lift trucks for moving the equipment only short distances. Today the company has in service about 400 skid platforms and skid stock boxes, which are interchanged between ports carrying local port-to-port freight only.

Interrogating himself, the author tries to answer these questions.

Many Points Raised and Answered

SKID platforms were first used for outside shipments in the pulp and paper industry about 12 years ago, according to Prof. Frank L. Eidmann of Princeton University, in opening the discussion. Two factors, however, have retarded the rapid adoption of this method. The first is a lack of interchangeability in the skid platforms and the second, the failure of management to appreciate the savings which may be achieved through their use. One thing not commonly noted is the reduction on demurrage charges, based on more rapid handling of goods into and out of freight cars.

Interchangeability of platforms between the carrier and the manufacturer must be possible for best results, according to James E. Mix of the Excelsior Lift Truck Co. Consequently, all such platforms must be made to the same standards. Illustrating the result of a lack of standards, Mr. Mix pointed out that his company makes more than 80 sizes of lift trucks—not from choice, but because there is specific demand for each size. He believes that the number should be cut to 12 or 15.

Handling stores in the general storehouse of the Illinois Central Railroad is done about 95 per cent on skids, as reported by W. S. Morehead, assistant general storekeeper. There are something like 47,000 items in stock. Such of this as cannot be skidded is the material of long length, such as pipe, steel bars, etc. Skids are used for this purpose by this railroad for three reasons: the saving in labor, in storage space and in stock investment.

When to Buy Skid Equipment

As a general guide in this connection, Mr. Morehead said that a lift truck and 200 skids should be installed whenever the working force reaches six men. With this equipment, the force of six may be cut to four and the work done more expeditiously and at less expense.

One interesting suggestion made by Mr. Morehead with regard to the locating of skids on a narrow aisle was that they be placed herringbone fashion (as shown in the sketch), so that the lift truck can get at them. Under this arrangement, a 6-ft. aisle will be just as easy to work as a 12-ft. aisle, which is required if the skids are placed rectangularly.

Taking up five questions propounded in the paper by George B. Wright, Matthew W. Potts of the Alvey-Ferguson Co., New York, gave categorical answers to each question. As to who will furnish the equipment—the shipper or the carrier—he said that this comes down to a question of which one will save the most money. In any case, the major portion of the saving will or should be passed on to the consumer, and the ownership of the skid becomes matter for mutual arrangement between shipper and carrier.

Wire-Mesh Container Suggested

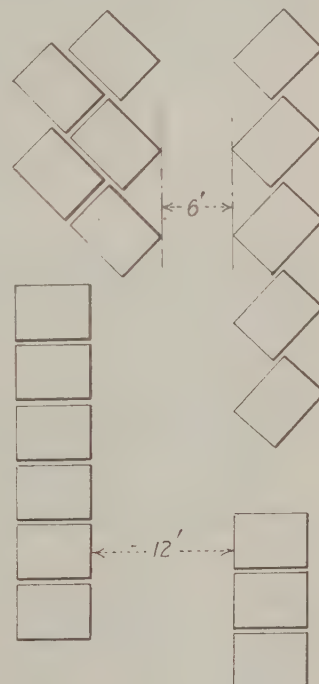
Checking loose freight going through several hands sometimes involves drastic precautions. Mr. Potts suggested a wire-mesh container erected on a skid and fitted

- 1—Who is going to furnish the equipment, the shipper or the carrier?
- 2—How is the freight going to be checked by the carriers? This involves the checking from shipper to first carrier, first carrier to second carrier, and so on, and last carrier to consignee, or last carrier to drayman to consignee.
- 3—How is the owner of the equipment going to get it back?
- 4—How are the repairs going to be handled? There is a constant upkeep on this type of equipment.
- 5—Where the loads are preponderantly one way, how is the equipment going to be equalized?

with a lock or other form of seal. The shipment then can be handled as a unit without necessity for checking over a multitude of small items to ascertain whether pilferage has occurred.

As to how the owner of the equipment (skids) can get it back after shipping out goods on it, this is handled in many cases by shipping the skids back as a separate freight item. As a matter of fact, much of the work of the Department of Commerce on standardizing skids paves the way for re-use of the equipment in many places and makes it possible to make a definite charge for the skid, which

Illustrating Locating of Skids Herringbone Fashion, to Permit Use of a Narrow Aisle. Owing to the full turn needed by the lift truck for the usual method of location, a 12-ft. aisle is required, whereas 6 ft. will do, with 45-deg. angle of "parking"



charge is refunded or canceled if and when the skid comes back.

Repairs on a type of equipment on which continual upkeep is a factor will naturally be made by the owner. Where the loads are preponderantly one way, equalization of the equipment again takes the form of making a charge for each skid and a credit on its return.

Interchangeability Has Been Fostered

It was pointed out by R. L. Lockwood of the Division of Simplified Practice, Department of Commerce, Washington, that standards for skids have been discussed by the department but not yet adopted. The general feeling is that standards should result in making skids of multiple sizes, wherein the larger is twice the area of the smaller, etc. Opinion is about crystallized on sizes so that two of the large ones or three of the small ones can be placed abreast in a box car.

However, great progress in interchangeability of skids

has been made without standardizing the over-all dimensions. Standard heights have been widely adopted, so that the tables of lift trucks can be inserted comfortably, and clearance widths between legs have been broadly accepted for the same purpose. This makes it possible to handle a wide variety of skid sizes with such variety of lift trucks as the market affords.

Shipments of steel on skids, particularly in the form of cold rolled sheets, was referred to by B. F. Neidinger, Singer Mfg. Co., Elizabethport, N. J. Because of danger of corrosion from the elements, this steel is shipped in box cars. The speaker asked whether it could not just as well be put in open cars, with enough protection from the weather, and then handled from the car by a crane and put on the company's own skids for working through the plant.

Costs of Unloading Cut Heavily

Unloading costs on box cars were referred to by F. D. Stemp of the General Electric Co., Bloomfield, N. J. With sheets unloaded by hand, the cost was placed at 65c. a ton. Upon using a dolly this cost became only 8 to 14c. a ton, depending somewhat on the way it is packed in the car. This question of packing in the car was referred to by C. N. Bonnell, Jr., of the American Railway Association, New York, chairman of the meeting. He stated that frequently, owing to bumps which the car receives in transit, the material gets shot over until some of it is directly in the doorway. It then frequently becomes impossible to use skids in unloading until the doorway is cleared, which may take three or four men a period of three or four hours.

Reducing the height of the legs of skids was advocated by W. C. Brinton, president Terminal Engineering Co.,

New York. He referred particularly to a reproduction shown on the screen by one of the speakers, wherein skids of goods were stacked three high. The space between bottom of leg and the platform on which goods rested was, in this instance, about 25 per cent of the total height of skid and goods. If the handling equipment used were confined to power equipment with an over-hung end, the height of the skid could be reduced, Mr. Brinton said, from about 12 in. to 4 in., with consequent saving in storage space.

Undue Concentration of Load

Continuous runners on the bottom of the skid were referred to by this speaker as an aid, where material is stacked one skid above another. The legs concentrate the loads enormously on small bearing areas, compared with the way the runners would distribute those loads more equally.

Several examples of return of skids from user of material to the shipper were reported by Mr. Clark of the Clark Equipment Co., Buchanan, Mich. These instances were shipments in carload lots. They covered automobile brakes sent out by the Bendix Brake Co., South Bend, Ind., axles supplied by the Clark company on a specially designed skid, and automotive engines shipped by the Continental Motors Corporation, Muskegon, Mich.

Under-hung trucks with less than 2 in. clearance have been introduced this year by his company, said the speaker. He stated that all the leading manufacturers of power-driven hauling equipment maintain laboratories to study these problems of materials handling, and stand ready to send out experienced engineers to solve the handling problems of their prospective customers.

Tool Alloys Containing No Carbon

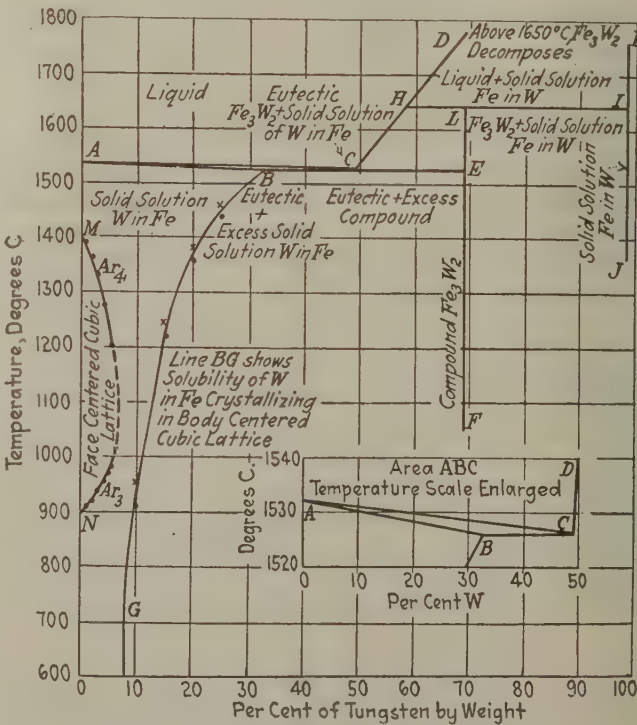
A RECENT announcement from the War Department that cutting tools containing molybdenum but no tungsten have been used at Watertown arsenal, revives interest in the theoretical studies of the iron-tungsten system published by W. P. Sykes before the American Institute of Mining and Metallurgical Engineers in 1926. These alloys contained less than 0.005 per cent carbon, and produced the equilibrium diagram illustrated.

It will be observed that tungsten in such an alloy has the property of lowering the temperature A_r , at which delta iron changes to gamma iron, and also raising the temperature A_r , at which gamma changes to alpha iron. These two transformations are eventually suppressed and no gamma iron is found in carbon-free alloys containing more than 7 per cent tungsten at any temperature. An alloy containing 7 to 9 per cent is permanently austenitic, and cannot be hardened or tempered by any heat treatment. Similar changes in the transformation temperature of pure iron are caused by other metals; permanently austenitic alloys are formed with high chromium, silicon, tin, vanadium, or molybdenum.

As shown by the diagram, the alloys with higher tungsten contain a second phase: the compound Fe_3W_2 , whose solubility decreases with the temperature (line BG), but which is precipitated throughout the metal only at a slow rate. To harden an alloy with 20 per cent tungsten, then, it is necessary to anneal or "age" it at a temperature somewhat below 1400 deg. C. for several hours or days. In the paper quoted Mr. Sykes gave the hardness of a carbon-free solid solution alloy containing 80 per cent iron and 20 per cent tungsten as 160 Brinell, and the same after aging as 330 Brinell.

In discussing this paper, Dr. Zay Jeffries said that carbon free iron-molybdenum alloys would develop even higher hardness on aging, quoting 530 Brinell for the hardness of

a 22 per cent molybdenum, 78 per cent iron alloy. "Alloys of the iron-tungsten and the iron-molybdenum systems, as hardened by aging, have been recently used in place of high-speed steel for certain purposes at the Cleveland Wire Division of General Electric Co. The results have been most satisfactory in that the useful life of these alloys is from 10 to 40 times that of high-speed steel," said Mr. Sykes, in the closing paragraphs of his paper.



Iron-Tungsten Equilibrium Diagram

What Magnetic Testing Reveals

More Knowledge of Uniformity and Continuity of Steel— Facts Which Other Methods of Test Bring Out— Limitations of All Tests

BY A. V. DE FOREST*

IT is a pleasant belief that there is a pot of gold buried beneath the end of every rainbow. Many have been disappointed when they set out to dig because, however definite appeared the location of the rainbow, when they finally reached the spot it had unaccountably moved further away.

If the gold digger happened to be a philosopher, he would study the nature of rainbows and discover that they are really circular and therefore have no end, and therefore that the story is not true at all. Thereafter he would refrain from studying the mechanical properties of steel, their chemical constituents, their microscopic appearance and particularly their magnetic characteristics. Each of these methods has been developed by workers who believed that complete knowledge of the mechanical behavior of steel could be reached with their tools; whereas it seems probable that the closer the search and the more accurate the method pursued, the further the rainbow recedes.

Early Claims for Chemical and Mechanical Tests

In the days when chemical analysis was first applied to steel all the peculiarities of that material were going to be explained by its ever varying proportions of carbon, manganese, silicon, phosphorus and sulphur. When Stead first examined steel through the microscope and discovered almost as many strange things as did Galileo with his telescope, a new explanation of mechanical properties developed. When the physical chemists started to teach Gibb's phase rule to metallographers, another series of facts in regard to steel was uncovered. The anatomists of the mechanical school, who sacrifice hecatombs of specimens to their testing machines, still impose their solution of all problems and in spite of the absurdity of specifying ultimate strength in cases where repeated impact is important or elongation when hardness is needed, they logically control the court of last resort on mechanical materials.

With all the methods of study, chemical, microscopic and mechanical, not to speak of the X-ray and magnetic analysis, our pot of gold seems as good as in hand—at least many of us on the scientific fringe are busy selling it. I take it our goal will be reached when we can predict the behavior of any individual piece of steel under definite conditions.

Success Depends on Mechanical Test Selected

The extent to which we are successful depends largely upon the mechanical test which we choose as a criterion of behavior. Take, for instance, a property such as the tensile strength of hot-rolled steel. Depending as it does on the average behavior of enormous numbers of separate grains, it is fairly well known for varying compositions and mechanical treatments. We can be reasonably sure that the strength of one specimen will be very closely equal to that

of other specimens cut from either side. In a test in which the properties of a much smaller volume of metal is involved, as, for instance, in a notched bar impact test, the variation would be more marked, and when we come to a really difficult case such as predicting the exact spot in a length of several feet of steel bar, of uniform section and treatment, which will break in the testing machine, we are at the present time almost helpless.

Assume Uniform Materials

Our methods of test are all based on the assumption that our materials are sufficiently uniform from one elementary volume to the next, so that the mechanical properties of a specimen destroyed in the testing machine may be assumed similar to all other parts of the same bar or even the same heat or grade of steel. The accuracy of this theory of vicarious test depends on the elementary unit of volume assumed. If it is large, the average results will be correct, but it would inspire greater confidence in the individual case if there were a non-destructive method of assuring the identical properties of the material and the test specimen representing it. It is this assurance which we unconsciously seek when we improve our steel making, our rolling mill practice, our heat treatment, and our methods of test, all devoted to the production of greater and ever greater uniformity.

The attempt to estimate this uniformity by a non-destructive test implies that whatever property is tested and found to be uniform will also indicate a sufficient uniformity of the desired mechanical properties.

Neither Magnetic nor Mechanical Tests Accurately Developed

In the case of the magnetic characteristics, there is much evidence that very close relationships exist between the two sets of phenomena. Unfortunately, however, neither magnetic nor mechanical tests have been developed to the point at which accurate comparisons can be made, involving the properties of small volumes. For instance, in a fatigue test the mechanical properties along a single plane will determine the life of the specimen. It is a simple matter to magnetically test the general properties of a considerable mass of metal and obtain good correspondence with other properties involving the whole volume, but in this case so far it is impossible to test magnetically the properties of a single plane.

We may, therefore, conclude that our test is a failure, whereas in reality we have translated a test involving a volume of metal in terms of a property involving only an area, and committed the same error which would occur in attempting to translate from the tensile strength of our specimen to the fatigue life. In both cases the average of a large number of tests will show good correspondence, but the life of the individual is still problematical. The disposition of the fatal plane is accidental and will average out in case of a large number in individuals. As in the case of life insurance tables—the mortality of a group may be

*Based on the author's comments when presenting his motion pictures of magnetic tests before the American Iron and Steel Institute in October, 1928. Mr. de Forest is research engineer American Chain Co., Bridgeport, Conn.

known with great accuracy, whereas the life of a single individual is largely a matter of chance.

The properties along this single plane or section may be covered by the term "continuity." This thought involves quite different conceptions from those involved in the term "uniformity," meaning uniformity of a property belonging to a large group of particles. The microscope has shown us that our steels are always more or less discontinuous and that the distribution of these sonims of other planes of weakness may have extremely serious consequences. Larger disturbances such as blow-holes, seams, segregations and piping become so apparent as to even affect the uniformity of the mass itself rather than merely the continuity from element to element of the material.

Testing Continuity Magnetically

Much work has been done on magnetic methods of testing continuity. In most of these cases we are really testing the uniformity of smaller and smaller volumes of metal in the expectation that the discontinuity on a single plane will be sufficiently marked to detect. As might be expected,

however, the smaller the area involved the greater becomes the difficulty in measurement as well as the variation from section to section both mechanically and magnetically. Neither side of the problem is complete. It is the latter difficulty which makes the development of magnetic methods so exceedingly slow and laborious in practice, although apparently so simple and straightforward in the laboratory.

Materials in use usually fail from impact, repeated impact, fatigue and wear. Failure from corrosion is obviously not included. Our mechanical methods of test for all of these, particularly fatigue, are inconceivably slow and crude; and in the case of wear there does not appear to be even the hope of a definition of this property, and yet the successful magnetic test must be capable of mechanical interpretation.

In spite of these difficulties magnetic methods frequently offer a simple method of assurance that a particular product is substantially uniform throughout its length, is without major discontinuities, and has the average mechanical properties of other specimens which have been studied to destruction.

Efficiency of Industrial Electric Furnace

AT a recent meeting of the fuel division of the American Society of Mechanical Engineers, held in Cleveland, James H. Herron of the James H. Herron Co., engineer, delivered a paper on "Industrial Furnace Efficiency, Economic Consideration." The paper dealt with the subject in a general way and discussed loss of heat in waste gases, regeneration, recuperation and certain other phases of the subject. The part of the paper dealing with electric furnaces was of special interest and is reproduced here.

Owing to the increased interest in the use of electricity in supplying heat for industrial purposes, this paper would not be complete without some reference to such furnaces for heat-treating and other industrial purposes, together with a consideration of their efficiencies.

Electric furnaces have been used for laboratory work for 20 years or more. The early furnaces were of the muffle type, the heating element being of platinum ribbon wound upon the muffle. With the introduction of the nickel-chromium alloys, either a nickel-chromium wire or ribbon was used as a substitute for the platinum.

Granular Carbon Resistances

The early industrial furnaces utilized the resistance offered by a quantity of granular carbon, usually contained in a refractory trough. These furnaces, while expensive both in construction cost and operation, became, due to their greater efficiency of operation, popular not only in the heat-treating of materials, but in the annealing of steel castings and the melting of non-ferrous metals.

Applying the laboratory form of resistor to the industrial furnace, and improving this resistor, has resulted in a comparatively low cost, high-efficiency, electric furnace which is rapidly succeeding the granular carbon resistor type, until at the present time the application of electric heating in industrial furnaces has become a matter of such general interest that, in all cases where current is available at a reasonable figure, such installation should be seriously considered.

Factors Affecting Economy of Operation

As in the fuel-fired furnace there are certain factors which affect the economy of operation of the electric furnace and therefore must be taken into consideration. These are as follows:

The loss of heat around door openings and loss due to

opening doors for charging and removal of materials to be heated.

The loss of heat through the sides, ends, top and bottom of the furnace with subsequent radiation from these surfaces.

The storage of unavailable heat.

The principal source of loss common to the fuel-fired furnace, namely, the loss of heat in the waste gases, is entirely eliminated in the electric furnace. In the electric furnace there is no air required for combustion, therefore there is no need of introducing into the furnace a large amount of air which must be heated to the temperature of the furnace and discharged at a high temperature.

In view of this one item, and the loss due to excess air used for combustion the cost of operation of the electric furnace compares very favorable with the fuel-fired furnace, and in some cases this cost is less. This is especially true where it is possible by use of an electric furnace to correct a low power factor. The saving in penalty may offset the cost of the required current.

Efficiencies Vary Between 60 and 80 Per Cent

The nicety of regulation of the electric furnace and the cleanliness of operation appeal to many and these are points decidedly in its favor. In considering the electric furnace, the efficiency will vary between 60 and 80 per cent, depending on the conditions of operation. The gross efficiency extending back through the generating station may be, and frequently is, as high as the fuel-fired furnace. The electric furnace has the same drawback as the fuel-fired furnace where the operation is intermittent, namely, the heat required to bring the furnace to the required temperature of operation known as unavailable heat.

In view of the progress made in such design it is therefore desirable for the prospective purchaser of an industrial furnace to give careful consideration to the electric furnace, since it may be the most economical for his particular application.

Merchants' Association Year Book

Classification of the membership of the Merchants' Association of New York is made in the Year Book for 1928. More than 6300 individuals, firms and corporations are listed, about 1000 of which have their plants elsewhere than in New York. The membership includes 186 concerns listed under the heading of Iron and Steel, Metals, Machinery. This is the eighth largest of the classifications.

Some Principles of Fixture Design

Fixtures for Machining Should Be Tied in with Gaging System—
Many Details Can Be Standardized

BY JOSEPH W. ROE*

JIGS and fixtures have been developed empirically and there is much less technical literature covering them than there is on power machinery and its utilization, or even on the very machines on which fixtures are used. Judging only from the literature available, one would gain no idea of their economic importance. However, the competitive technical advantage of one manufacturing plant over another will usually lie more in the better quality of its small tools, jigs, and fixtures than in differences between the types of machine tools in the respective plants.

The principles of good work-holder practice have grown up in the tool rooms and been handed down from man to man. Due to the multiplicity and variety of articles manufactured, there is a great diversity of fixtures and holding devices, so great as to preclude treatment of all their details in a paper such as this. But through all fixtures there run certain principles which have been developed gradually and come to be recognized as good practice. Many of these principles can be brought together, and it is the purpose of this paper to do this.

Before a set of fixtures can be designed the dimensions of the article to be manufactured must be definitely determined. This means that clearances and allowances must be made on certain dimensions for running, sliding, or driving fits. Furthermore the tolerances, or permissible deviations, must be established. These tolerances set the high and low limits for each dimension, which can not be exceeded without encroaching on the allowances necessary for proper functioning or destroying the interchangeability of the parts. In general the smaller the tolerances the greater the cost of production, consequently they should be as liberal as is consistent with the requirements of the product, and accuracy should be centered on those dimensions on which it is essential. The closeness of the tolerances governs the design and workmanship of the jig or fixture quite as much as the required rate of production.

When the drawings of the article to be manufactured have been checked and approved, a model should be made to within the tolerances given on the drawings. When this has been tested and pronounced satisfactory, any changes found necessary in allowances, tolerances, etc., should be incorporated into the drawings. The model and drawings can then be used as the basis for design of the jigs and fixtures. If during the building of the tools any discrepancy should develop between the model and the drawings, the approved working model should govern, and the drawings corrected to agree with it. When actual model parts are not available, wooden models of such parts as drop-forgings, with the location of the sprue and flash line painted on them, may be helpful.

Production and Gaging Operations Should Be Listed

In tooling up for the manufacture of a piece, an operation sheet should be prepared which includes every operation on the piece, both of production and of inspection or

gaging, showing them in a single list in the order of their application. The preparation of such a list focuses attention not only on the best sequence of production operations, but on the number of inspections needed, the dimensions they should cover, and the best points in the sequence at which they should occur. It also brings out the best grouping of operations and their reduction to the least possible number.

An authority consulted contributes the following as the procedure used by one large manufacturer having agencies throughout the world: "When a new machine has been developed to a stage where it functions satisfactorily the agencies are informed, and inquiries are instituted to determine the probable sales for the machine. During this inquiry period the machine is going through a process of refinement. Drop-forgings, stampings, grades of metal, hardness and finishes are being determined. When the approximate yearly sales have been determined manufacture starts by ordering all drop-forgings, blanking and bending dies, as these take the longest time to construct. Parts which are odd in shape or difficult to hold are assigned for tooling up, starting in the usual manner, with operation sheets which are provisional, as it is often necessary to revise the sequence of operations. Quality and interchangeability are the main requirements. While quantity will influence the type of fixtures it is possible to make cheaper tools at first with provision for the future if unexpected sales should develop."

The fixtures should be tied in with the system of gaging. The same points or surfaces should be used for locating the work in the fixtures and for reference points in the gages. Only by so doing are the gages a direct check on the fixtures. Some deviation is made, however, as when inspection gages are made to cover a sub-assembly of parts in order to insure that certain collective deviations do not exceed permissible tolerances. In some cases, also, as with pistons, it may be desirable to provide lugs especially for holding and driving during manufacture, which are removed in the last operation.

The same working points should be used on the two parts which go together in the manufactured output. This better insures interchangeability of the finished product.

In selecting the working points the functioning of the product and those dimensions which are most important to its operation should be given most careful thought.

Same Working Points Used for Many Operations and Gagings

It is of fundamental importance that, once settled upon, the same working or locating points be used for as many operations and gagings as possible. Preferably they should be permanent and remain in the piece when finished. If this cannot be done they should be retained as long as may be. If first one point and then another be used, an accumulation of errors creeps in which may exceed the tolerances. It is tempting at times to shift the locating point, as the fixture and gage might then be made more cheaply, but to do so is poor practice, and in the long run, poor economy. As an example of the above, in a set of fixtures recently built for a military rifle, 62 out of 67 operations on one piece, with their gagings, were located from one point.

It may be wise to shift the reference point, but it should be done only for good and sufficient reasons. For instance, the position of two holes A may be referred to a main reference point. The important requirement of a second hole B may be exact distance from holes A without regard to the

*Professor of industrial engineering, New York University. From a paper on "Jig and Fixture Practice," presented by Professor Roe before the American Society of Mechanical Engineers, at New York, Dec. 3. Formulas for determining the probable profit on proposed jigs and fixtures, for given costs and performance, also a feature of the paper, were given in THE IRON AGE of Dec. 13, page 1489.

original reference point. In such case both the fixture and the gage would very properly locate *B* with reference to the holes *A*.

If a multiple fixture is to be used, of either the reciprocating or indexing type, the question of the time required for removing and inserting pieces is of fundamental importance, as the clamping means must be so designed that the pieces can be handled in the time taken for the cut.

In general it is desirable to machine as many surfaces, or drill as many holes, as possible at one setting. This makes for accuracy, lessens tool expense, and cheapens production, but is subject to some limitations, as, for instance, the combination of a very large and very small hole in the same jig. It may be better to use two jigs on different sized machines. In some cases all the holes can be drilled in the same jig on one machine, and the larger holes then redrilled on another machine without a jig. This eliminates the cost of one jig.

In using a fixture equipped so that several tools perform the same operation on several pieces simultaneously, the parts from each tool should be kept separate. By so doing if the product from one tool is defective, the parts will not become mixed and the trouble is more easily located and remedied. However, the additional cost of handling the parts separately may sometimes more than offset the advantages of easily locating trouble.

How far it is desirable to make a fixture adaptable to various pieces and operations is a matter of judgment in each case. It usually does not pay except where the runs are very small. In general specialization is better than adaptability, because the latter, while it lessens tool expense, permits errors in settings and "monkeying" with the set-up.

Fixtures Should Be Interchangeable on Various Machines

Fixtures should be interchangeable on the various machine tools on which they can be used. Care in this particular allows greater flexibility in scheduling work through the shop. This principle calls for the standardization of slots on milling machines, machine tables, and of keys and keyways on the fixtures. So far as possible these should conform to the standards adopted by the American Engineering Standards Committee, and sponsored by such bodies as the A.S.M.E., the National Machine Tool Builders' Association, and others.

All jigs and fixtures should be clearly marked, preferably by stamping into the body where it can be done, the

operation, part number, etc., for which it is intended and any other information needed to identify it, also on all loose or bolted parts that may be separated from it. In very accurate fixtures stamping might be harmful. In such cases a brass plate should be screwed on, or the necessary marking may be etched.

All small parts, such as clamps, special wrenches, etc., should preferably be permanently attached to the jig or fixture to prevent their being mislaid or lost.

Despite the wide variety in jigs and fixtures many details may be standardized such as bushings, latches, handles, thumb-screws, etc. This lowers costs not only by making approach to quantity production possible in the tool room, but by making it possible to purchase them from firms specializing in such parts. It is amazing in going through large tool storages to see how many types of handles, etc., there are, differing from each other in unessential details in ways which run up costs without any compensating benefit.

The object of good fixtures is furthered by good work holders or racks for handling the work between operations. Throwing work promiscuously into tote boxes mars the finished surfaces and may cause misalignment in locating in succeeding operations.

Nine Things a Jig or Fixture Should Do

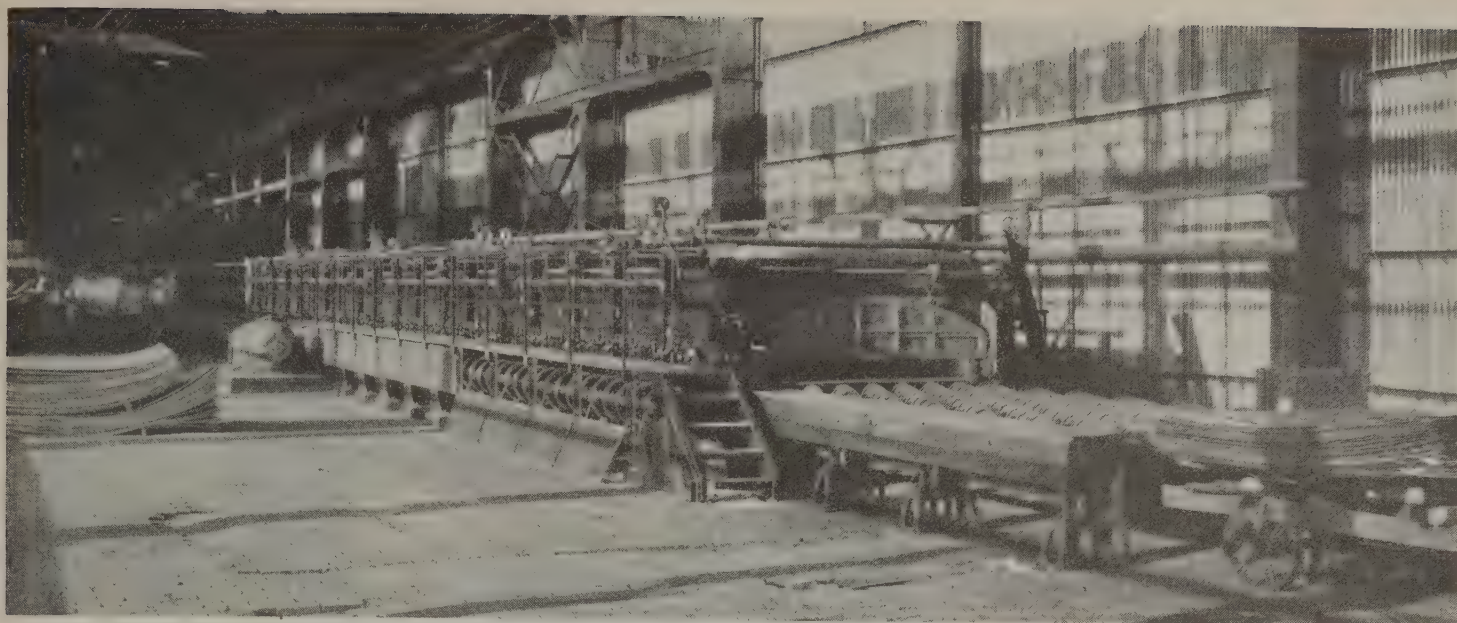
A jig or fixture should:

- (a) Locate the work quickly and positively
- (b) Preclude insertion of the work in any but the position correct for cutting
- (c) Provide rapid and positive clamping without undue effort
- (d) Allow no spring in the work, fixture, or machine table from either clamping or the pressure of the cutting tools
- (e) Allow no slipping, vibration, or chatter during the cut
- (f) Have ample clearance for chips, and be easily cleaned
- (g) Allow free access and egress for cutting oil or compounds
- (h) Be as light as is consistent with strength and rigidity, and easy to handle. In the long run the employer always pays for weariness, necessary and unnecessary. It is good design therefore to eliminate all unnecessary fatigue
- (i) Be safe for the operator. Production should be sacrificed, if necessary, rather than have a tool which is dangerous.



Houses a Works' Hospital, Library, Auditorium and Recreation Facilities

THE new service building of the Yale & Towne Mfg. Co., Stamford, Conn., which was recently dedicated, was provided for through a special bequest in the will of the late Henry R. Towne, for many years chairman of the board of the company. The building houses a works' hospital, dental clinic, the company's industrial relations bureau, a library and an auditorium seating 400. Bowling alley, pool room and other recreational facilities for employees of the company are included.



Very Large Normalizing Furnace, for Steel Sheets, Installed by Otis Steel Co.

Sheets Normalized on a Large Scale

Continuous Furnace for Wide Automobile Body Sheets— Heating and Cooling Stages Automatically Regulated

CONTINUOUS normalizing furnaces have been installed in a number of sheet mills making full finished sheets during the past few years. The object is to produce a finer grain structure and to improve the drawing qualities. A late type of normalizing furnace, and one of the largest ever built, was recently placed in operation by the Otis Steel Co., Cleveland. It is used to normalize extra deep-drawing automobile body sheets. It was built by the Surface Combustion Co., Toledo, Ohio.

This is a natural gas-fired furnace, 140 ft. long including loading and unloading tables, and has a heating chamber 100 ft. in length and a cooling chamber 40 ft. long. It is 84 in. wide or sufficient to handle sheets 80 in. in width. The furnace has a capacity of 140 tons in 24 hr., but it has been decided to augment this by replacing the present burners with larger ones increasing the heat, so that the sheets can be moved through the furnace at a faster rate. With the larger burners the capacity will be 200 tons in 24 hr.

The furnace is top and bottom-fired, having 60 burners at the top and 60 at the bottom in the heating zone. The burners are located on each side. The sheets are carried through the furnace on roller disks mounted on hollow water-cooled shafts that are insulated with high heat-resisting alloys. There are also burners on each side of the cooling zone for use when slow cooling is desired. Usually the sheets are made with a Rockwell hardness of 51 to 52. If quick cooling of the product is desired to increase the hardness and secure a fine grain, the cooling zone burners are not lighted, but if a lower hardness is desired the burners in the cooling zone are lighted to bring up the tem-

perature of that zone and thus to secure a less rapid cooling. A temperature of 1700 deg. to 1750 deg. Fahr. is maintained in the heating zone to assure a 1650 deg. temperature of the product when annealing low-carbon steel.

The temperature in the heating zone is controlled by four pyrometers. In addition to pyrometric temperature control, there are two thermometers, or radiation type pyrometers, located between the heating and cooling zone that record the temperature of the sheets as they leave the heating zone. The minimum temperature of the sheets to effect proper normalizing should be 1650 deg. Fahr. and the

thermometer readings indicate to the operator whether the sheets move through the furnace too rapidly or too slowly to maintain them at the proper temperature. The heating period depends on the gage of the sheets, light material moving through the furnace at a faster speed than the heavier gages. The temperature is controlled by regulating the speed of the roller disks.

Before the normalizing furnace was installed the extra deep drawing automobile body sheets were given two box annealing operations each of 30 hr. With the use of the normalizing furnace they are given only one box anneal after normalizing, the annealing period being 48 to 50 hr. The sequence of operations is normalizing, pickling, cold rolling, box annealing, then one pass through the cold rolls to relieve the surface strains and finally roller leveling.

Johns-Manville Corporation Buys Celite Products Co.

The Johns-Manville Corporation, 292 Madison Avenue, New York, manufacturer of roofing materials, has purchased the Celite Products Co., Los Angeles, maker of insulating materials. The executive and sales personnel of the Celite have been absorbed by the Johns-Manville organization.

Studies the Elements of Metal Cutting

Prof. O. W. Boston, head of the engineering shops of the University of Michigan, at Ann Arbor, is the author of a bulletin entitled "The Elements of Metal Cutting," published recently by the university's Department of Engineering Research. With the help of funds contributed by manufacturers in the Detroit area, Professor Boston has been making a

series of studies in the ancient art of cutting and forming metals.

Milling cutter action, drilling and straight line motion, such as that of the planer, have been the subject of Professor Boston's investigations thus far. Part of the research has been directed toward a study of the varying hardness of the cutting tools used, which include a plain, high carbon steel, high-speed steel and "Stellite." These studies will be given a wider scope and usefulness as soon as the funds available warrant greater expenditure.

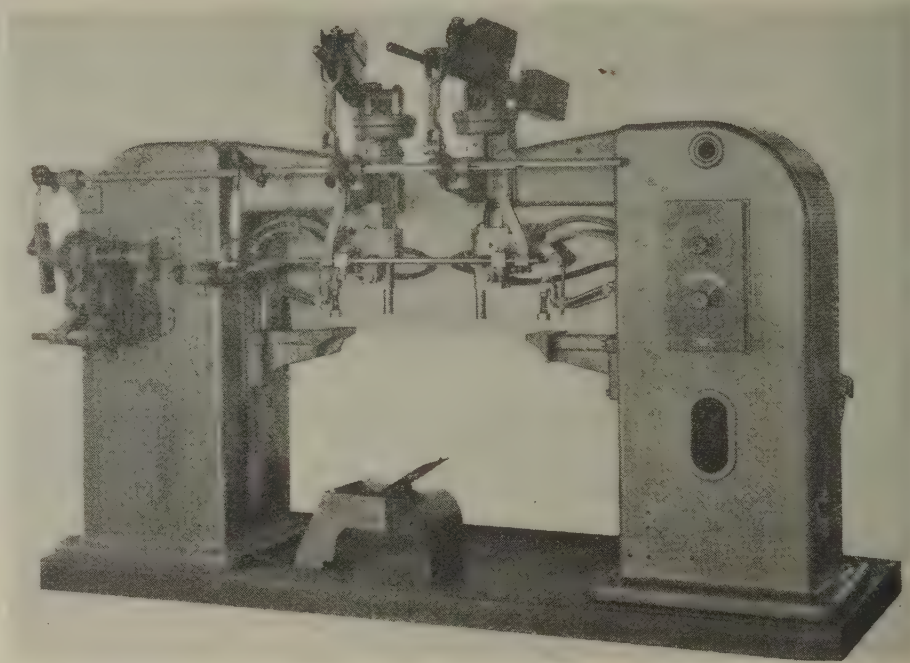
The Federal Specifications Board, Washington, last week issued proposed specifications for aluminum-manganese tubes with a view to obtaining comments or suggestions as to changes which may be thought to be desirable. The specifications are the basis for purchases by the various departments and establishments of the Government.

Two Special Electric Welding Machines

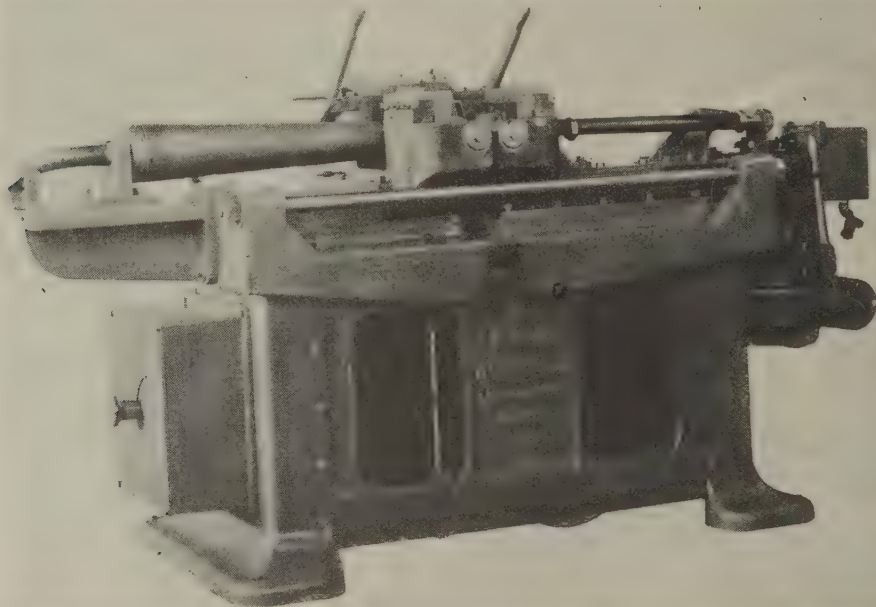
TWO special welding machines, one a butt welder for use in the fabrication of automobile mufflers and the other a spot welder that makes two rows of spot welds in metal door assemblies simultaneously, are shown in the accompanying illustrations.

Automobile mufflers of various wall thicknesses are welded by the butt welding machine, which is the product of the Taylor-Winfield Corporation, Warren, Ohio, and is designated as the type B II special. The machine is motor operated. Timing of the current and upsetting of the weld are accomplished by adjustable cams. Uniformly accurate welds with minimum of labor expense is claimed. The particular machine illustrated welds the heads of the muffler to the body and the intake and outlet tubes to the head, making a completely electric-welded muffler.

The special spot welding machine, built by the Thomson Electric Weld-



The Thomson Welder, Which Makes Two Rows of Spot Welds Simultaneously, Is Shown Above



Automobile Mufflers Are Welded on the Taylor-Winfield Butt Welder at the Left

ing Co., Lynn, Mass., is made up of two standard welding machines mounted face to face on a sub-base that is adjustable to accommodate work of various widths between the electrodes. One driving motor operates both machines and the welds are made at the rate of 100 a minute.

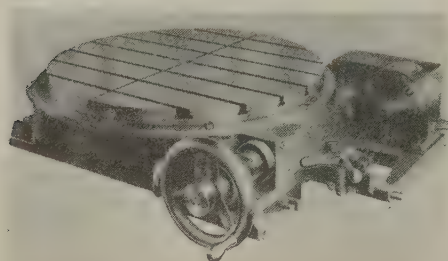
Auxiliary Indexing Tables for P. & W. Jig Boreers

TWO new indexing tables, one of tilting rotary type, have been brought out by the Pratt & Whitney Co., Hartford, Conn., for use on its jig boring machines.

The tilting rotary table is used to advantage in boring holes that must be accurately spaced and accurately located at an angle, and is said to save considerable time and simplify many difficult jobs. It has a scraped

surface 12 in. in diameter and is designed for clamping to the regular table of the machine. The rotary part of this table is similar to the rotary table which has been a standard jig borer accessory for some time. The outer edge is graduated in degrees

for approximate indexing, which is accomplished by means of a large handwheel through a hardened and ground steel worm and large worm-wheel. The latter is integral with the cast-iron table and is cut by a special process to assure high accu-



The Tilting Rotary Table, at Right, Clamps to the Regular Table of the Jig Borer. The rotary indexing table at the left has 30-in. diameter working surface and is equipped with motor drive



racy. One revolution of the hand-wheel rotates the table 9 deg. Exact settings are made by a small slow-motion handwheel which connects through gearing to the same shaft as the large handwheel. The large dial on the small shaft is subdivided so that the table may be indexed accurately to 5 sec. Binders lock the table in position during the boring operation.

The table is hinged at one side and is raised and lowered by means of a crank handle through a worm and a gear segment. Graduations facilitate setting the table at any angle with the horizontal from 0 to 90 deg. and a vernier permits settings to 5 sec. Heavy binders are provided for

clamping the table securely in place.

The second table, also illustrated, is a rotary indexing table, which, with a working surface 30 in. in diameter, is much larger than previously supplied for the company's No. 2 jig borer. The outer edge is graduated in degrees for rough setting, finer settings being made by means of a handwheel and a vernier. An added feature is a small motor drive by means of which the table may be moved rapidly under power, thereby saving cranking by the operator. This motor drive can be operated in either direction and is controlled by a convenient lever. An adapter plate is used to mount the large rotary table on regular table of the jig borer.

Steel Roof Sheathing for Factory Use

LIGHT-WEIGHT steel sheathing for roofs is being put out by the Blaw-Knox Co., Pittsburgh, under the trade name of Blawsteel. It consists, as the

This sheathing when installed can be insulated against heat loss or penetration to any degree desired. It is said that $\frac{1}{2}$ in. of insulated material

Illustrating the Placing of Galvanized Steel Roof Sheathing, Its Insulation and Final Weatherproof Covering

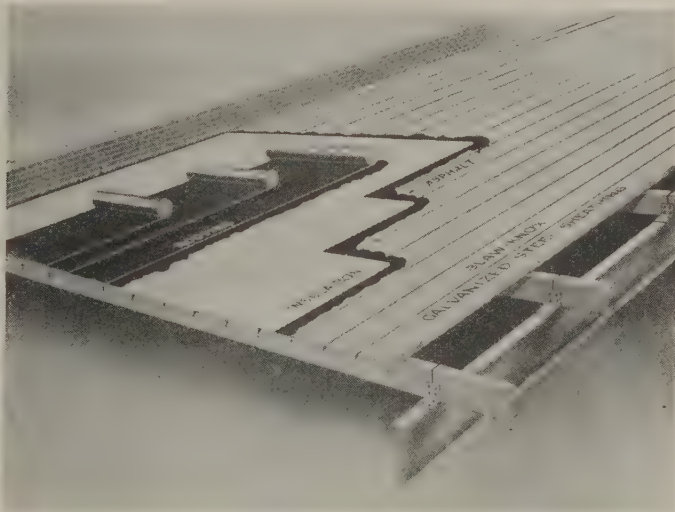


illustration shows, of ribbed, galvanized steel sheets of 20, 22 and 24-gage material. This is designed to go over purlins spaced 3 ft. 10½ in., and will, it is said, carry a roof load of 65 lb. to the sq. ft. on this spacing, with a factor of safety of 4 and with so little deflection as not to affect plaster ceilings. Deflection of 3/16 in. is said to result from loading of 100 lb. to the sq. ft.

will satisfy usual requirements. Any type of built-up roofing can be applied on top of the insulation.

Longitudinal integral reinforcing ribs are pressed into the sheathing on 4-in. centers. These ribs are placed downward when the roof is built, and the sheets are fastened to the purlins by special anchors. Each course of sheets laps 3 in. over the preceding course, the ribs telescoping.

American Radiator to Merge With Standard Sanitary

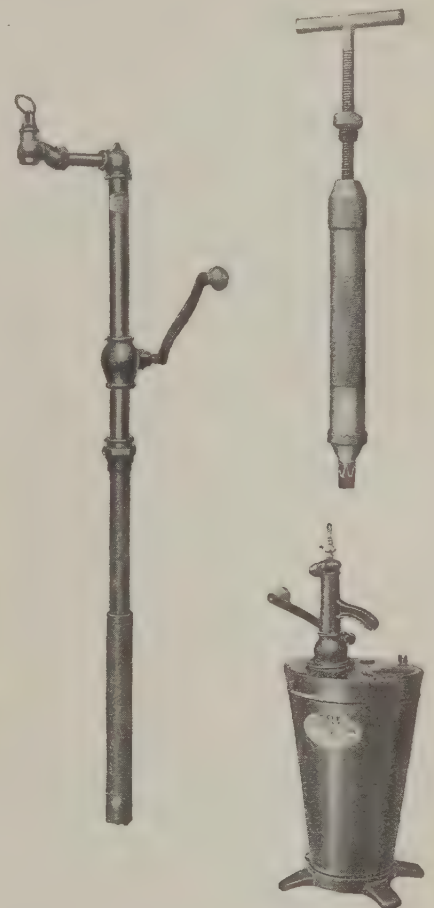
Negotiations are under way for a merger of the American Radiator Co., 40 West Fortieth Street, New York, the country's largest maker of radiators and heating equipment, and the Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, the leading producer of enameled iron sanitary ware and plumbing equipment. Merger plans call for an exchange of stock in the two companies, the details of which have not yet been worked out, and it is probable that

the organizations of the companies will remain unchanged.

The Radiator company operates more than 30 plants in the United States and subsidiaries in Canada and in a number of European countries. Its most recent acquisitions have been the Kewanee Boiler Co., Kewanee, Ill., and the American Blower Co., Detroit. The Standard Sanitary company operates eight plants in this country, and through its subsidiary, the Standard Sanitary Mfg. Co. of Canada, Ltd., two Canadian plants. Combined assets will amount to about \$500,000,000.

Hand-Operated Lubricating Device

THE Dot Lubricating Equipment Co., Division Carr Fastener Co., Cambridge, Mass., is offering the improved Nozzle-Fil lubricating equipment illustrated, which, in providing a "sealed journey from lubricant storage to bearing," permits the proper quantity of clean grease to be pressed into bearings to be lubricated. A barrel pump, portable filling tank and a hand gun comprise the equipment. The portable tank, which holds 25 lb. of grease, is filled in the lubricant



Grease in the Portable Tank Is Applied to Bearings by Means of the Hand Gun

storage room by means of the barrel pump. This tank is airtight and dust-proof and is shaped so that it may be carried without barking the shins of the greaser. In filling the hand gun the plunger in the gun is first released by loosening a locknut. After the nozzle is applied to the nipple on the portable tank, the gun is hand-pumped full of grease, which is accomplished in a few seconds.

The filled gun is then applied to Dot nipples or Dot-O-Matic pressure cups on the bearings of the machine to be lubricated and the handle of the gun twisted until the bearing flushes or the telltale at the top of the pressure cup reaches its extreme height.

The Climax Molybdenum Co., New York, has removed its Detroit office from 611 Donovan Building to 2807 Book Tower Building. W. P. Woodside is district representative.

Steel Demand Shows Seasonal Decline

Large Volume of Consumption Is Nevertheless Indicated—There Have Been Few Signs of Overproduction of Steel

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

STUDY of the potential steel requirements of the chief consuming industries shows that until November they continued at record levels for the post-war period. Such requirements amply support the recent high rate of steel ingot production. No overproduction is indicated. If anything, the output of steel until November was hardly up to the indicated current requirements.

In November, however, all indications showed a rather sharp decline in our composite demand line. The statistics are not complete as yet, but they indicate the sharpest drop that has occurred since December, 1926, at least. Fortunately the rate of steel production moderated in November also, so that the output is still in line with requirements. But the November decline, both in the activity of consuming industries and in steel production, suggests the possibility of some further recession.

November Recession Indicated

COMPOSITE steel demand showed a slight rise in October, due chiefly to gains in the railroad, construction and mining industries, and in exports. Drilling of oil wells and production of oil also increased. These factors were not quite offset by declines in automobile production, general manufacturing activity and farm purchasing power.

The situation changed considerably in November. In that month railroad freight traffic showed a decline that was fully up to the usual seasonal drop. Building and construction contracts were off rather sharply, falling back to about the same annual rate as in July. Automobile production reached the lowest annual rate since last January. The data are incomplete, but the factors mentioned are so important that the November final index will doubtless approximate that shown in the first chart.

It should be noted that October had about 4 per cent extra working time this year. This probably makes the October index a little too high, which in turn emphasizes unduly the decline shown for November. Probably the chart would give a more correct picture if the composite demand line were portrayed as rounding off in October, with a more moderate decline in November—somewhat similar to

the movement shown in the steel production curve.

Conditions in Particular Lines

As to the outlook for the next month or two, we find the *railroads* showing improvement. Net operating income in October made a good gain. Freight traffic increased considerably in that month and, considering the season, the November traffic was well sustained, promising a good gross for the month. If expenditures continue as low as in recent months, net income should make a good showing. It must be remembered, however, that the decline in expenses is partly the result of economy in buying. Purchases of rails have been below last year and, while demand for equipment has improved somewhat, it is none too good. In short, the outlook is for some improvement, but only a fair volume of railroad buying.

Building contracts are still large, being sustained by the construction of roads and subways, which, while they require considerable steel, are not indicative of the ordinary commercial building trend. In fact, building permits continue their downward trend and in November were about 16 per cent under a year ago. Contemplated new construction increased sharply, but this was largely due to a \$100,000,000 project for roads in Iowa. On the whole, the building outlook suggests further declines, which should affect certain kinds of pipe, nails, sanitary enameled ware, etc.

Automobile production fell off more than usual for the season last month, and the future seems uncertain. The industry is set for a heavy production schedule in the early part of 1929. High activity is probable. Many, however, look for increased severity of competition and less favorable conditions after the usual spring spurt.

General manufacturing activity (aside from automobile and iron and steel) has shown a decline. No large recession, however, is indicated, though it seems probable that the peak has been passed. Farm purchasing power appears to be not much different from a year ago. The value of the chief crops is about 6 per cent under last year, but dairy products show a large increase.

We conclude that the demand for steel has reached a peak and that a

little recession is likely. It may well be that a short spurt will occur early next year, but this would probably be followed by a decline. The trend of the P-V line has been downward for two months.

Freight Cars More Freely Bought

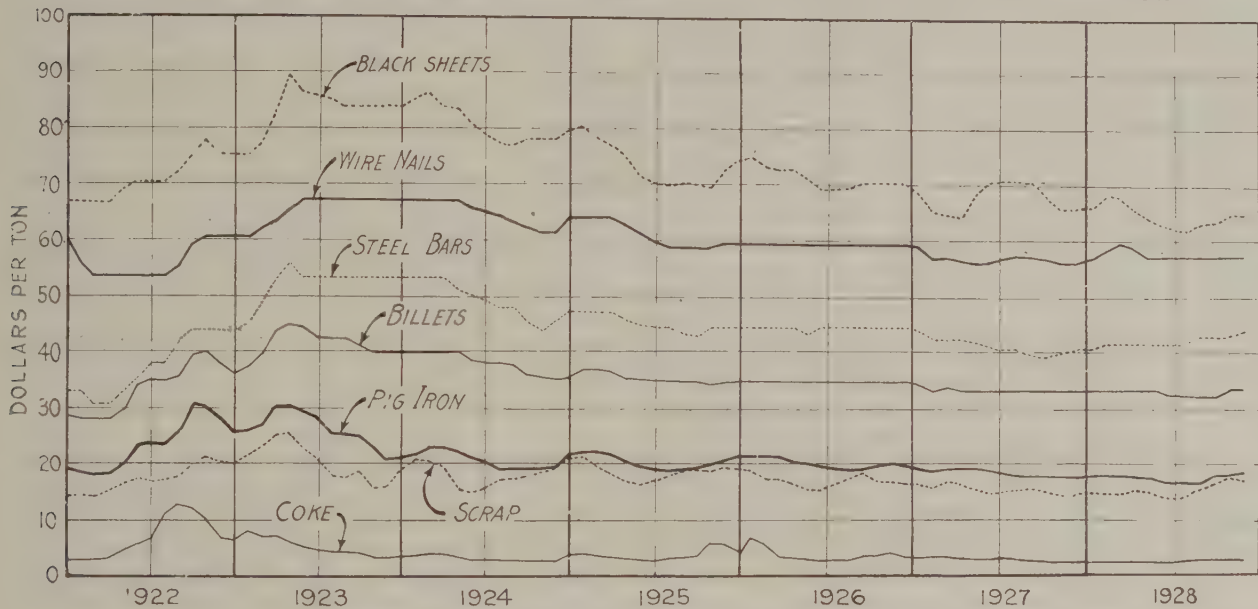
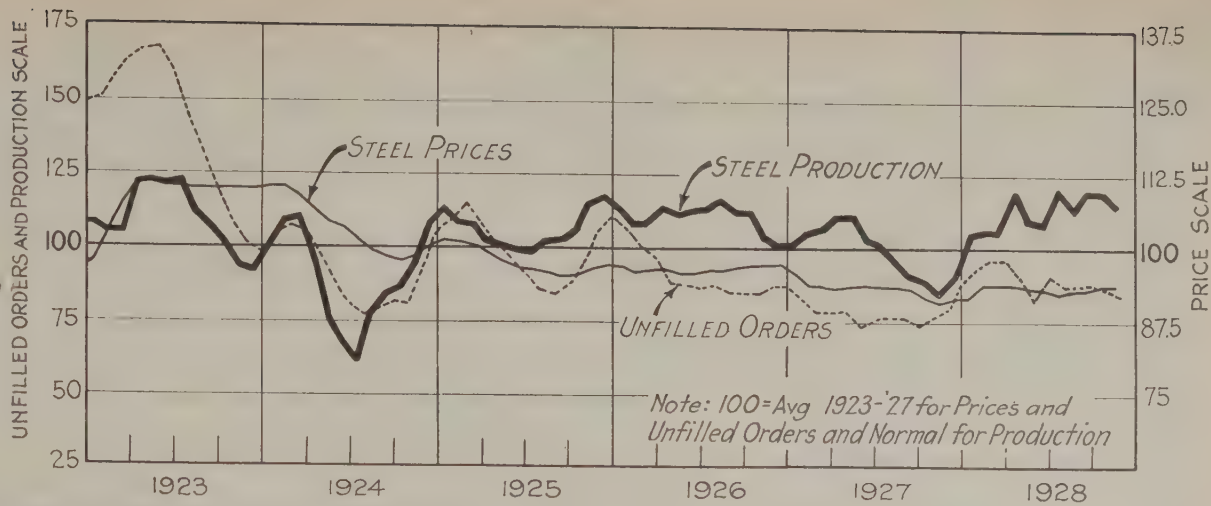
A CONSIDERABLE increase has occurred in the purchase of railroad freight cars and a good-sized volume of inquiries is reported. Briefly, the facts as to equipment buying are as follows: In November, 6100 freight cars were ordered, which is the largest November business since 1925. The freight car surplus of the railroads is small in comparison with a year ago. Freight traffic in November was heavier than in any recent year except 1926. A moderate improvement in freight car buying is thus indicated. It is noteworthy that employment in railroad equipment repair shops in the East increased sharply in November and was above a year ago.

There has, however, been little change in the locomotive business. Only 41 steam locomotives were ordered by domestic railroads in November and no upward trend is evident. Total shipments of steam and electric locomotives declined in November, and unfilled orders were lower. This indicates a decrease in new orders. The business during the last four months has been at the lowest level since 1921-1922.

Moderate Recession in Ingot Production

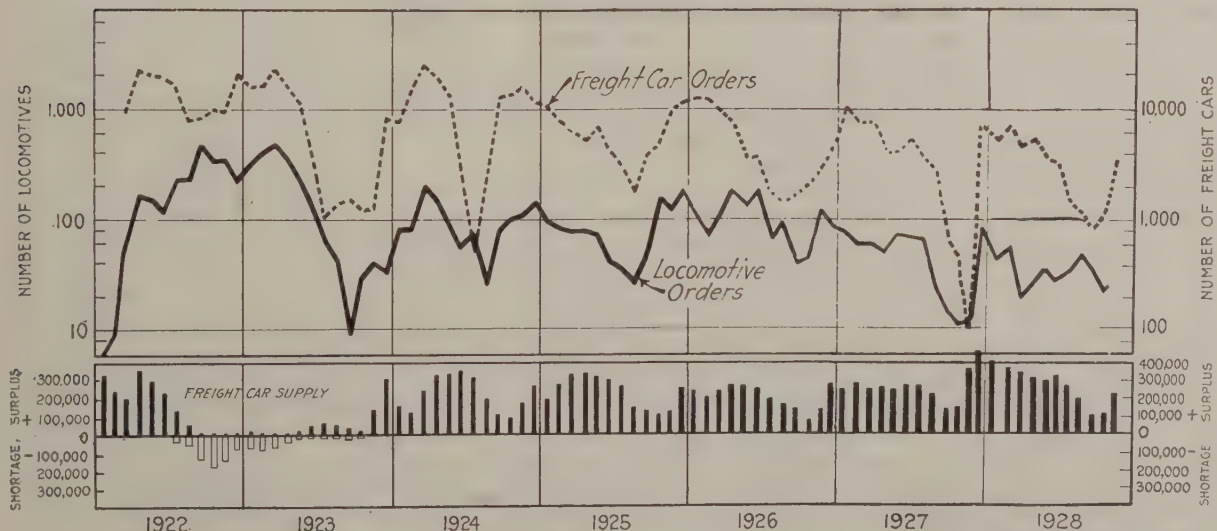
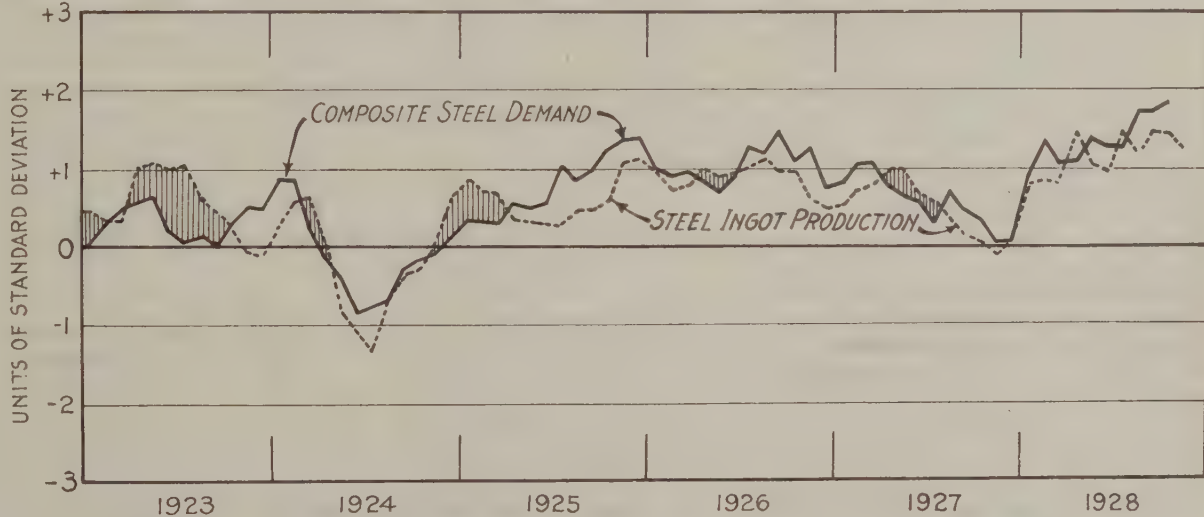
AVERAGE daily production of steel ingots (adjusted to eliminate seasonal changes), after rounding off in October, declined in November. Our index for the month is 114.6. This means that steel production was 14.6 per cent above normal. The index in October was 118.8 and a year ago 85.1. The year's peak of 119.2 was reached in September. This is beginning to look like a cyclical peak. Steel production has recently been far above a normal level, and declines in the P-V line and in the composite demand line indicate further moderate recession. At least, the seasonal increase that usually occurs between

Steel Production in November Was 14.6 Per Cent Above Normal Requirements. Prices held well but little further advance is probable. Unfilled orders showed a decline instead of the usual November rise



Improved Finished Steel Prices (in Particular, Sheets and Bars) May Hold for Some Time. Scrap prices appear to be ready for further decline and pig iron should hold present levels for a month or two

Steel Ingot Production (Adjusted) Showed a Decline in November. Composite demand showed a slight rise in October, but November indicates a falling off



Railroad Car Orders Are Improving, While Locomotive Orders Continue Low. But the surplus of cars is so large that there is no indication of immediate need for heavy purchases

January and March is likely to be less than usual.

The unfilled orders of the Steel Corporation declined 78,000 tons in November and were 700,000 tons lower than last March. They were only 220,000 tons above a year ago. Except for last year, this is the lowest November figure in many years. Usually there is an increase in November.

The average price of finished steel in November showed a small increase. It was 93.8 per cent of the average for 1923-1927, compared with 97.2 per cent in November, 1926. The situation in some respects resembles that found in the latter part of 1926. It does not seem that much further advance in steel prices is probable.

Overproduction of pig iron is in sight. The November average daily output was 115.5 per cent of normal, compared with steel production at 114.6. This is the first time that pig iron production has been in excess of a normal relationship with steel production since December a year ago. At that time both were at low levels, while now both are above normal. Pig iron production is at a level which in the past has always brought price weakness in a short time.

Pig iron prices, however, averaged higher in November, THE IRON AGE index for the month being \$18.49, which is 86.4 per cent of the average for 1923-1927, against 84 per cent in October and 82.3 per cent a year ago.

Ohio Employment High in Manufacturing

Industrial employment in Ohio during November showed the first decline since January, according to the current bulletin of the Bureau of Business Research of Ohio State University. The decrease, however, was caused entirely by the falling off of 25 per cent in construction employment, whereas general manufacturing employment increased slightly. The number of industrial wage earners last month was 12 per cent greater than in November, 1927, and average employment during the first 11 months of 1928 was 1 per cent greater than during the same period last year.

In the iron and steel group, the November employment index of 102 was the same as in October, but was 17 per cent higher than in November, 1927. Of the 171 reporting companies, 75 showed increases from October, 85 decreases and 11 no change. Employment in the machinery industries of Ohio continued its upward climb during November and reached its highest point since December, 1926. The November index of 113 was 3 per cent greater than the October index and 11 per cent greater than the November, 1927, index. The improvement in the machine tool group is notable, the November index of 120 being 4 per cent above the October index and 48 per cent above the November, 1927, index. In the material handling and power ma-

The situation bears some resemblance to that found in January, 1926. A decline in prices within the next month or two is indicated.

Prices Not Far Out of Line

AS to the general price structure in the iron and steel industry, it may be said that sheets are low, while nails, bars, billets and pig iron are in fairly good adjustment. If anything, the steel items are a little high in comparison with pig iron, though not much. Heavy melting steel scrap is high, especially in comparison with pig iron. The average of finished steel prices appears to be about right in comparison with the general level of commodity prices.

We might reason that sheets and nails will hold their recent gains, that scrap (following the current tightness at Pittsburgh) will decline further, and that the other chief items, including pig iron, should hold about stable. Our pig iron barometers, however, indicate that the prices of this commodity will soon reach a peak and are likely to decline. The clearest indication given by the statistics is that there will be an early end to the advance in the pig iron market. The scrap barometer, also, has not yet indicated any sustained recovery.

Perhaps this tangle of factors suggests what the market writers call "irregular stability" for a time—certainly, irregularity.

chinery group, the November index of 107 reflected no change from October, but was 25 per cent above that in the corresponding month last year. In all cases an average month of 1923 represents 100.

Would Extend Powers of Tariff Commission

A subcommittee of the National Conference on Tariff Adjustment has been appointed to draw up a plan to "take politics out of the tariff" by making the Tariff Commission a more practical and helpful adjunct of Congress. This body of men will confer with members of the House Ways and Means Committee, President Coolidge and President-elect Hoover and others specifically interested. The names of the members of the subcommittee have been announced by John E. Edgerton, president of the National Association of Manufacturers, under whose auspices the National Conference on Tariff Adjustment was brought together. Among them are James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown; J. W. Hook, president Geometric Tool Co., Bridgeport, Conn., and W. W. Nichols, assistant to president, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

In explaining the purposes of the subcommittee Mr. Edgerton states that the national conference favors extending the powers of the Tariff Commission so that it will be more

immediately operative in meeting contingencies, making it a semi-judicial and non-partisan body. Adequate appropriations for research and fact-finding would be necessary, and actual powers of rate adjustment (not rate making) would make it a more practical working adjunct of Congress. It is not intended, he explained, to ask Congress to abrogate or relinquish any of its constitutional prerogatives. The plan would still leave Congress with the establishment of tariff policies and the fixing of the general standard of rates, but would give the Tariff Commission the power to adjust those rates in the light of commercial pressures of the moment.

Greater Iron Production in Canada

Pig iron production in Canada for November is reported by the Dominion Bureau of Statistics at 95,426 gross tons. Except for the August output of 97,879 tons, this was the largest monthly figure for the year. It exceeded the October total of 93,186 tons by 2½ per cent, and was 2½ times as great as the 37,989 tons of November, 1927.

For the first 11 months the production of 934,085 tons is 43 per cent greater than the 646,500 tons of the corresponding period of last year, and is almost as far ahead of the first 11 months of 1926 (683,532 tons). There were eight furnaces in blast Nov. 30, compared with seven a month earlier.

Production of ingots and steel castings in November was 108,463 gross tons; this was ½ per cent lower than the 108,987 tons of October, but was 34 per cent in excess of the 80,730 tons of November, 1927. Included in the current figures were 104,501 tons of ingots and 3962 tons of castings.

For the first 11 months, ingots and castings amounted to 1,137,160 tons; this showed an increase of 40 per cent over the 811,390 tons for the first 11 months last year, and of 58 per cent over the 718,395 tons in the first 11 months of 1926. This year's output included 1,097,977 tons of ingots and 39,183 tons of castings.

Ferroalloys produced in November amounted to 4532 tons, compared with 2127 tons in October. For the first 11 months, however, there has been a decline of 24 per cent from 52,161 tons last year to 40,073 tons this year.

W. J. Rainey, Inc., has acquired from the Hillman Coal & Coke Co. approximately 3000 acres of coal, adjoining the Clyde Coal Co. property which was bought by the Rainey interests earlier in the year. The latest purchase is for the purpose of consolidating the Clyde properties, which were separated by the Hillman lands. It is understood in the trade that coal from the Clyde mines will be shipped by river to the Davison Coke & Iron Co., which is building a 35-oven by-product coking plant there.

Quiet Rules in European Markets

Approach of Holidays Noticed—Better Shipbuilding Orders in England—Far East Stagnant

(By Cablegram)

LONDON, ENGLAND, Dec. 17.

PIG iron demand is quieting as the holiday season approaches, but most Cleveland furnaces now are quoting with January as the earliest delivery to date. Stocks have been reduced, during the past three months, by 60,000 tons, and an increase in the rate of output is anticipated in the new year.

Hematite is firm. Foreign ore markets are firm, but business is practically idle.

Finished iron and steel demand has improved, largely on account of recent increases in shipbuilding orders, which, on the North-East Coast, have totaled 500,000 tons during the past two months. Hence steel makers are looking for an increased demand for heavy material.

General export sales are still quiet. Vickers, Ltd., Sheffield, Sir William G. Armstrong, Whitworth & Co., Newcastle-on-Tyne, and Cammell, Laird & Co., Sheffield, have combined as to certain departments and have formed the English Steel Corporation.

November exports of iron and steel amounted to 399,400 gross tons. Of this amount 37,800 tons was pig iron, of which only 100 tons was consigned to the United States.

Tin plate markets are quiet, but inquiry is improving. Makers are well sold for the early part of next year and there is talk of price ad-

vances. Current output is about 65 per cent of capacity, owing to the fact that several mills are idle, working off the agreed stoppage period of a few weeks.

Galvanized sheets are moderately active, in small parcels, but black sheets are quiet.

On the Continent of Europe

Continental iron and steel markets are quiet on both sides of the channel and prices are tending to easier levels.

British users of semi-finished material are concentrating on British steel, as Continental forward deliveries are subjected to too great delays. Export demand, for traders in England, is poor.

German November production of pig iron was only 267,400 metric tons, a decrease of 74 per cent. Blast furnaces operating at Nov. 30 were 48.

South Africa is to ask for 40 new locomotives, costing about £300,000 (\$1,455,000).

Far Eastern Merchants Not Buying Chinese Await New Tariff and Japanese Expect Lifting of Gold Embargo—Test on Steel Marking Postponed

NEW YORK, Dec. 18.—Export trade with Far Eastern markets continues small. Chinese merchants are evidently delaying all but necessary purchases of material until the new Chinese tariff has become effective and Japanese buyers are awaiting the expected end of the Government's gold embargo. Inquiry from China for wire shorts and second hand material, such as plate cuttings and bar crops, continues fairly active, but only occasional transactions are reported with sellers here. American wire mills and exporters to the Far East have evidently lost interest in selling wire

shorts, even at the Chinese offering prices of today, which are sometimes as much as \$50 per ton, c.i.f. Chinese port. The tonnages sold are small and the profits as a rule negligible. Some business in plate cuttings is reported when Chinese merchants are willing to pay \$30 per ton, or more, c.i.f. Shanghai.

In addition to rail inquiries from Japan, mills are bidding on the usual quarterly tin plate requirements of the Nippon Oil Co. While the present inquiry is for only 35,000 base boxes of oil can sizes, it is suggested by exporters to Japan that this ton-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd.....	£0 17 ½s.		\$4.24	
Bilbao Rubio ore*.....	1 2	to £1 2 ½s.	5.34	to \$5.46
Cleveland No. 1 foundry.	3 8 ½	to 3 9 ½	16.61	to 16.85
Cleveland No. 3 foundry.	3 6		16.00	
Cleveland No. 4 foundry	3 5		15.76	
Cleveland No. 4 forge...	3 4 ½		15.64	
Cleveland basic (nom.)...	3 5		15.76	
East Coast mixed.....	3 11		17.22	
East Coast hematite.....	3 11 ½		17.34	
Rails, 60 lb. and up....	7 15	to 8 5	37.59	to 40.01
Billets	6 5	to 6 10	30.31	to 31.53
Ferromanganese	13 15		66.69	
Ferromanganese (export)	14 0		67.90	
Sheet and tin plate bars,				
Welsh	6 0		29.10	
Tin plate, base box.....	0 18	to 0 18 ½	4.37	to 4.39
Black sheets, Japanese				
specifications	13 7 ½		64.87	
		C. per Lb.		
Ship plates	7 12 ½	to 8 2 ½	1.66	to 1.76
Boiler plates	9 0	to 10 10	1.95	to 2.27
Tees	8 2 ½	to 8 12 ½	1.76	to 1.86
Channels	7 7 ½	to 7 17 ½	1.60	to 1.71
Beams	7 2 ½	to 7 12 ½	1.55	to 1.65
Round bars, ¾ to 3 in...	7 10	to 8 0	1.63	to 1.73
Steel hoops	9 0	to 10 0	1.95	to 2.16
Black sheets, 24 gage...	10 0		2.16	
Galv. sheets, 24 gage...	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage (nom.)	16 0		3.47	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)				
Foundry pig iron (a):				
Belgium	£3 3 ½s.	to £3 6s.	\$15.39	to \$16.00
France	3 3 ½	to 3 6	15.39	to 16.00
Luxemburg	3 3 ½	to 3 6	15.39	to 16.00
Basic pig iron (a):				
Belgium	3 4 ½	to 3 5 ½	15.64	to 15.88
France	3 4 ½	to 3 5 ½	15.64	to 15.88
Luxemburg	3 4 ½	to 3 5 ½	15.64	to 15.88
Coke	0 18		4.37	
Billets:				
Belgium	5 1 ½		24.61	
France	5 1 ½		24.61	
Merchant bars:				
Belgium	6 2 ½		1.33	C. per Lb.
France	6 2 ½		1.33	
Luxemburg	6 2 ½		1.33	
Joists (beams):				
Belgium	5 2 ½		1.11	
France	5 2 ½		1.11	
Luxemburg	5 2 ½		1.11	
Angles:				
Belgium	6 1 ½		1.32	
½-in. plate:				
Belgium (a)	6 12		1.43	
Germany (a)	6 12		1.43	
¾-in. ship plate:				
Belgium	6 7		1.38	
Luxemburg	6 7		1.38	
Sheets, heavy:				
Belgium	6 1		1.31	
Germany	6 1		1.31	

(a) Nominal.

nage may be doubled when the order is placed.

Importers of Continental steel in New York are taking some small business in certain special products, such as furring channels and chromium alloys of steel. Occasional transactions are reported in imported shapes and bars, but in most cases purchases are from importers' stocks or represent old orders on which delivery from Continental mills has been delayed. Prices are slightly lower than a few weeks ago, but shapes still range from 1.83c. to 1.85c. per lb., duty paid, New York, and bars are about 2c. per lb., duty paid, New York.

Customs Court hearings on the marking of foreign steel with the country of origin have been postponed to the middle of January from Dec. 18 and 19, when the first cases of domestic steel companies against importers of steel were scheduled. Importers are understood to be prepared to aid the Treasury Department in defending its ruling on marking and are also reported considering appearing at the hearings on the tariff beginning next month in Washington.

British Exports Up, While Imports Decline

WASHINGTON, Dec. 15.—Exports of iron and steel products from the United Kingdom increased to 399,447 gross tons in November, from 377,390 tons in October, while imports dropped to 232,767 tons from 261,404 tons, according to a cablegram received by the iron and steel division, Department of Commerce, from William L. Cooper, commercial attaché, London. Production of both pig iron and steel ingots and castings showed a gain. Pig iron output rose to 544,400 tons from 543,600 tons, and ingots and castings increased to 762,500 tons from 756,000 tons. At the end of November 135 blast furnaces were lighted, against 136 at the end of October, while the number of open-hearth furnaces in operation had increased to 287 from 264.

Increases in exports in November were reflected in 14 of the 22 classes, losses being made in the remaining eight. The principal gains were in rails, which increased 16,568 tons to

40,243 tons; wrought tubes, pipes and fittings, which increased 7143 tons to 27,388 tons; "other manufactures of iron and steel," which increased 6092 tons to 37,741 tons; galvanized sheets, which increased 2831 tons to 73,862 tons, and railroad material, other than rails, which increased 2748 tons to 14,103 tons.

Of the 19 classes in the import trade, 13 reflected losses. The decrease of ingots and semi-finished steel, amounting to 16,167 tons, accounted for more than one-half of the total decline of 28,637 tons.

German Rail Rates Reduced on Exports

HAMBURG, GERMANY, Nov. 23.—Railroad freight rates on iron and steel and non-ferrous metals for export are to be reduced by the German Railroad Directory. The present rates, which are lower than the domestic charges, are to be reduced 1.10 m. (26c.) per 100 km. As the average distance to seaboard from the Rhenish-Westphalian plants is 280 km., this amounts to a cut of about 3 m. (72c.) per ton. The reduction will be about 6 m. (\$1.43) per ton on shipments from works in Upper Silesia. The rate revision will not apply to shipments to Belgian or Dutch ports.

Austrian Home Demand Continues Active

VIENNA, AUSTRIA, Nov. 29.—The lockout at steel mills in Germany resulted in a slight increase in demand for steel products from Austrian sellers, but only a limited tonnage was available. Domestic business is active, and there is a fair volume of export tonnage. The latest report of the Alpine Montan A.G. shows a decided increase in the number of unfilled orders on its books, particularly in bars and structural material.

In October steel mills operated at practically full capacity, but pig iron output was only about 75 per cent. Automobile builders are active, and there is a good tonnage of business in special grades of steel and wire. Output of iron ore in the second quarter

of 1928 was 475,369 metric tons, compared with 424,955 tons in the first quarter. Export business has been good in recent months, particularly in iron and steel bars. Sheet and tube exports were considerably smaller than imports of those products.

So-called "rationalization" in industry is proceeding, and since 1926 improvements in production methods have resulted in a reduction of about 40,000, from a total of about 1,000,000 employed in the Austrian metal industry. While wages have been advanced, wages as an item of cost in production have declined. In the automobile industry wages have risen about 6 per cent, but the wage cost per car has gone down 4 per cent.

German Exports and Imports Show Drop

WASHINGTON, Dec. 14.—Exports and imports of iron and steel in the German international trade showed declines in October as compared with September, while production of pig iron and steel ingots showed increases, according to a cablegram received by the Department of Commerce from Commercial Attaché Fayette W. Allport, Berlin.

October exports totaled 345,439 metric tons as against 407,563 tons in September, a decrease of 62,024 tons or 15.3 per cent and imports declined to 148,561 tons as compared to 156,596 tons, a drop of 5.1 per cent. Pig iron output was 1,025,895 tons as against 985,413 tons and steel ingot production was 1,306,338 tons as compared to 1,189,521 tons.

German Reparations Shipments Large in October

HAMBURG, GERMANY, Dec. 1.—The total value of steel and machinery shipments on reparations account in the first 10 months of this year was 101,000,000 m. (\$24,068,300). There has been a fairly steady increase in such shipments during the year, and the total for October was considerably larger than for September. October shipments included 5,000,000 m. (\$1,191,500) of industrial machinery, 1,700,000 m. (\$405,110) of electrical equipment, 4,700,000 m. (\$1,120,010) of steel products, 1,100,000 m. (\$262,130) of non-ferrous metals and 13,300,000 m. (\$3,169,390) of hardware.

German Steel Tariff Reduction Possible

HAMBURG, GERMANY, Dec. 1.—Reduction in the duties on certain iron and steel items appears probable in a new tariff to be considered by the Reichstag early next year. The proposed schedule lowers the duties on about 130 items, including certain iron and steel products and machinery. These reductions in duty would be applied only on imports from countries with which Germany has a commercial treaty, such as the United States.

BRITISH FOREIGN TRADE IN IRON AND STEEL PRODUCTS
(In Gross Tons)

	Imports		Exports	
	October	November	October	November
Pig iron and ferroalloys.....	6,283	5,596	43,439	43,530
Ingots, blooms, billets and slabs.	119,914	103,747	3,035	2,543
Iron bars, rods and angles.....	11,714	15,706	2,147	2,753
Steel bars, rods and angles.....	38,417	30,432	28,170	29,911
Structural steel.....	15,956	12,333	7,214	8,021
Hoops and strips.....	14,236	12,685	5,356	5,495
Plates and sheets.....	17,670	19,668	45,798	44,148
Galvanized sheets.....	.....	.....	71,031	73,862
Tin plate.....	.....	.....	54,210	41,204
Cast tubes, pipe and fittings.....	3,835	3,492	11,915	10,954
Wrought tubes, pipe and fittings	7,515	4,951	20,245	27,388
Rails.....	1,137	542	23,775	40,243
Other railroad material.....	578	268	11,355	14,103
Wire.....	5,938	5,365	8,072	7,569
Wire cable and rope.....	.....	.....	2,309	2,327
Wire nails, including staples.....	5,266	5,771	218	237
Other wire manufactures.....	493	356	2,402	1,670
Nails, tacks, rivets and washers...	759	1,109	1,706	1,856
Bolts, nuts and metal screws.....	1,315	1,352	2,986	3,681
Iron and steel castings.....	1,251	1,382	292	197
Iron and steel forgings.....	905	746	66	14
Other manufactures.....	8,222	7,266	31,649	37,741
Total.....	261,404	232,767	377,390	399,447

Controlling Fuel in Steel Plants

Oil and Gas Fuel for Open-Hearths Before British Fuel Institute—Systematic Scheme for Rolling Mills—Pre-mixing Burners for Hot-Blast Stoves

(Special Correspondence)

LONDON, ENGLAND, Nov. 30.—The autumn meeting of the (British) Institute of Fuels was held in London late in November, and one of the sessions was devoted to a discussion of the value of scientific control in the fuel-consuming operations in the steel industry.

An American Engineer's Opinion

Martin J. Conway, fuel engineer to the Lukens Steel Co., Coatesville, Pa., stated that fuel oil to be used economically must be correctly atomized, which means primarily that the oil at the point of atomization, which is usually the burner, must have the right viscosity, and as viscosity is a function of temperature the fuel oil system should be so designed that the proper oil temperature can be maintained at all rates of flow.

The success of fuel-oil used on open-hearth furnaces depends upon constant pressure and constant temperature. Constant pressure can be maintained by the use of a pressure unloading valve or pressure regulating valve placed at some point on the delivery line beyond the most distant furnace in the shop where it will discharge the surplus oil into the return line.

Constant temperature can be maintained by thermostatic control of the oil leaving the heater and the steam entering the heater, this heater being preferably situated on the discharge side of the pump, utilizing the low pressure exhaust from the pump turbines with a high pressure connection for starting up or emergency purposes, should the spare pumping unit be electrically driven. The temperature of the oil required to produce the best viscosity for atomization is usually not more than 160 deg. Fahr. at the burner for the heaviest liquid fuel.

It is unnecessary to heat the liquid fuel beyond this point for several reasons, one being the unnecessary waste of steam because the drop in viscosity is very small compared with the increased temperature.

Some of the advantages to be obtained by the use of liquid fuel were given by Mr. Conway as follows:

"It does not deteriorate or lose its fuel value in storage. It is easy to store and easy to convey to the point of consumption. It burns with a very high flame temperature, but on account of ready control of flame direction it permits greater refractory life and simpler furnace design. Checkers remain clean longer with fuel oil than with producer gas.

"On account of the smaller volume of waste gases to be handled, stack capacity requirements are reduced 35 per cent when compared with producer gas.

"Due to the fact that liquid fuel can be metered, individual furnace performance can be readily measured, thereby allowing the executive to compare the efficiency of his furnace operators."

Constant High-Quality Gas Necessary

"Fuel Control in Open-Hearth Practice" was discussed by J. Lloyd Bentley of Robert Heath & Low Moor, Ltd., who stated that the first essential to secure economy of fuel was constant high quality of producer gas composition. Another essential, he said, was that the air supply should be controlled so as to secure a high flame temperature and the least oxidizing atmosphere. Control of gas quality and pressure to the furnace, control of air supply through the valves, and control of draft, were all essentials for economical working of the furnace.

Mr. Bentley advocated continuous recording by suitable graphs, allowing operators to note the results of control side by side with results obtained in furnace operation of output and of fuel consumption. He urged that the fuel engineer must gain the confidence of managers and men of the particular units under investigation, and said that personality and tact were important essentials.

Fuel Control in Forge and Rolling Mill Practice

The subject of fuel control was dealt with by H. C. Armstrong of John Brown & Co., Ltd., who stated that the most important duty of the fuel officer was to watch that no more fuel was burnt than was necessary to perform the required heating operations successfully, and to satisfy the temperature requirements of the forge master. The first step was to recognize the necessity of measuring the amount of fuel used over a definite period; a considerable saving has invariably followed the adoption of a practice of making a systematic weekly return from each shop.

The weekly data required for systematic control are not great, and need not consist of more than:

- (a) Fuel used.
- (b) Material heated or produced.
- (c) Furnace hours during which the heating continues.

From these are calculated:

- (d) Fuel per unit weight (ton) of output.
- (e) Output per furnace hour.
- (f) Fuel per furnace hour.

It is on the last of these items, i.e., the fuel burnt per furnace hour, that Mr. Armstrong has built up his methods. Fuel consumption figures are frequently taken as impossible of improvement without thought to the true significance of the manner in which they are presented. The almost universal habit of speaking of fuel per ton is entirely misleading unless output figures are given at the same time. Low fuel per ton figures are glibly quoted to illustrate the "high" efficiency of some particular furnace without mention being made of the highly favorable load conditions that have contributed to the result. Similarly, when discussing the matter with the shop manager, it is usual for him, not unnaturally, to speak of a figure which represents the best practice of his furnaces. Any other result is brushed aside as not typical, and as being obtained under unsatisfactory conditions, notwithstanding the fact that those conditions may be the most prevalent.

Fuel Control in Hot Blast Stoves

J. B. Fortune of the New Cransley Iron & Steel Co., Ltd., said that, to improve the combustion and the efficiency of any battery of hot blast stoves, scientific control should proceed along the following lines:

The gas supply should first of all be rendered fit for satisfactory burning by some method of gas cleaning. The existing burning arrangements should be brought up to their highest efficiency by checking the combustion from flue gas analyses, and reducing the excess air as much as possible. If the working conditions are such that flue gas tests indicate a fair efficiency, then the provision of continuously recording CO₂ meters on all the stoves is recommended.

To obtain the best results in combustion control, a good type of pre-mixing burner should be installed and operated in conjunction with CO₂ recorders. Very variable pressure conditions in the gas supply should be leveled out by means of an automatic regulator. The utmost refinement in combustion control necessitates the supply of combustion air under pressure, automatic control to maintain a constant ratio of gas and air, an efficient pre-mixing burner, and continual checks upon combustion by the use of CO₂ and CO continuous recorders coupled up to the stove connection to the chimney flue.

Milwaukee Company Buys Eller Mfg. Co.

The Milwaukee Corrugated Co., Milwaukee, maker of sheet metal building products, has purchased the Eller Mfg. Co., Canton, Ohio, maker of corrugated steel awnings and other products, and will take over its management on Jan. 1. The Eller company will continue to serve its customers without change in personnel, but its manufacturing activities will be extended and machinery added for new products. Later the company will make metal lath, corner bead, channels, road strips, stove pipe, furnace pipe and all types of conductor, furnace and stove pipe elbows. The plant will be used largely to serve Eastern and foreign customers of the Milwaukee company.

Republic Brass Corporation Combines Six Companies

Organization of the Republic Brass Corporation, combining six large brass manufacturing companies, with assets of \$39,000,000, has been practically completed with the ratification of the consolidation by stockholders of the constituent companies. As mentioned in THE IRON AGE of Dec. 6, page 1474, the new corporation will acquire the assets, business and good will of the Rome Brass & Copper Co., Rome, N. Y.; the Michigan Copper & Brass Co. and the Higgins Brass & Mfg. Co., Detroit; the Taunton-New Bedford Copper Co., Taunton and New Bedford, Mass.; the Dallas Brass & Copper Co., Chicago, and the Baltimore sheet mill of the General Cable Corporation, Baltimore. Through stock ownership in the Michigan Brass & Copper Co., the American Smelting & Refining Co. will have a substantial common stock holding in the new corporation.

Barton Haselton, president Rome Brass & Copper Co., will be chairman of the board of the new corporation, and George H. Allen, president Michigan Copper & Brass Co., will be president. Directors will include Walter C. Baylies, chairman of the executive committee Edison Electric Illuminating Co., Boston; Francis H. Brownell, chairman of the finance committee American Smelting & Refining Co.; Walter P. Chrysler, president Chrysler Corporation; H. T. Dyett, vice-president General Cable Corporation; Samuel L. Fuller of Kissel, Kinnicutt & Co., New York investment bankers; C. S. Mott, vice-president General Motors Corporation; W. H. Peirce, vice-president American Smelting & Refining Co.; Walter Robbins, president General Cable Corporation; Alfred P. Sloan, Jr., president General Motors Corporation, and Roger W. Straus, vice-president American Smelting & Refining Co.

The capitalization of the new corporation will consist of \$10,000,000 first mortgage 6 per cent bonds, \$10,000,000 7 per cent preferred stock,

250,000 shares of no par value Class A stock and approximately 510,000 shares of no par value common stock. Kissel, Kinnicutt & Co. will soon make a public stock offering.

Rolling Mill to Be Built at Calgary

WASHINGTON, Dec. 18.—The Manitoba Bridge & Iron Works, Ltd., Winnipeg, which operates a rolling mill at Selkirk, Man., is planning to erect a plant at Calgary, according to a report received by the Department of Commerce from Trade Commissioner J. Bartlett Richards, Winnipeg. The new unit, which will produce light structural steel, bars, rods, plates and castings, will employ about 160 men and when completed will represent an initial outlay of approximately \$400,000. The greater part of the equipment will be taken from two rolling mills, one at Medicine Hat and the other at Redcliff, Alta., which the company purchased last summer and which are about to be dismantled. The new mill will constitute the second steel company in Calgary, the Riverside Iron Works, Ltd., being in operation there, producing shapes, iron castings, machinery, etc.

Inland Company Organizes Limestone Subsidiary

The Inland Steel Co., Chicago, has organized a new corporation for the production of chemical and metallurgical limestone to be known as the Inland Lime & Stone Co. The project will be located in the eastern end of the northern peninsula of Michigan, about 25 miles east of Manistique. The business of the Manistique Lime & Stone Co. will be taken over and continued, and its stockholders will retain an interest in the new company. During the past year diamond drilling has been conducted on the lands owned or held under option by the Manistique company and George J. Nicholson, and a large tonnage of high calcium limestone has been proved up. In developing the project a large quarry will be opened, a railroad will be constructed to Lake Michigan, and a crushing and screening plant with suitable harbor and dock facilities will be constructed in the vicinity of Seul Choix Point, making the limestone available for transportation in lake vessels. Stone will be produced not only for use in the steel industry, but also for chemical purposes such as the paper industry, in which the Manistique company has already built up a substantial business.

That phase of the project will continue to be managed by George J. Nicholson and his assistants, Gordon Hughes and Walter Moon. The opening of the new quarry and the construction and operation of the new plant will be in charge of A. J. Cayia, for the past four years superintendent

of the Wakefield Mine of the M. A. Hanna Co. on the Gogebic Range in Michigan. The directors of the new company will be P. D. Block, L. E. Block, David P. Thompson, Clarence B. Randall, George J. Nicholson, Gordon Hughes and I. N. Bushong. The officers will be: David P. Thompson, president; Clarence B. Randall, assistant to the president; George J. Nicholson, vice-president; and W. D. Truesdale, secretary-treasurer. It is expected that the new plant will be put into operation during the latter part of 1930.

Standard Steel Building Manufacturers Organize

The Standard Steel Building Institute, composed of manufacturers of standard steel buildings, has been organized for cooperative trade extension. At a meeting held in the Stevens Hotel, Chicago, Dec. 6, the constitution and by-laws were adopted and the following officers were elected: C. I. Auten, Truscon Steel Co., Youngstown, president; W. A. Knapp, Butler Mfg. Co., Kansas City, Mo., vice-president; H. O. Davidson, Blaw-Knox Co., Pittsburgh, Pa., secretary-treasurer.

Representatives were present also from the Stefcu Steel Co., Michigan City, Ind.; Maryland Metal Building Co., Baltimore, and International Derrick & Equipment Co., Columbus, Ohio.

It will be the aim of the institute to acquaint American industry with the unusual merits of standard steel buildings, such as low first cost, speed of erection, durability, portability, ease of alteration, fire safeness and lightning protection.

Chattanooga Shop Builds Large Steel Drum

Combustion Engineering Corporation reports that its affiliated company, the Hedges-Walsh-Weidner Co., Chattanooga, Tenn., recently shipped to the Gulf States Creosoting Co. an unusually large steel drum for pressure creosoting. The shell is 140 ft. long, 8 ft. in diameter and has a plate thickness of 1 in. This is believed to be the largest steel drum ever shipped as a completely assembled unit. It weighs between 150 and 200 tons and required five flat cars for shipment.

Another shipment recently made from this plant was a car tank for nitric acid, said to be the first nitric acid car tank built in this country. This tank is 6 ft. 1½ in. inside diameter and 31 ft. 9 in. long. The top two-thirds of the shell is made of 5/16-in. steel, the bottom is made of 7/16-in steel and the heads are made of 9/16-in. steel. This tank has a capacity of 7000 gal. and is first of seven stainless steel tanks to be built for the E. I. du Pont de Nemours & Co.

Trade Practice Rules Adopted at Chicago

Woodworking Manufacturers Draw Up Regulations in Conference with Trade Commission Representatives

AT a trade practice conference held Dec. 12 at the Hotel Sherman, Chicago, a set of 15 rules was adopted, for submission to the Federal Trade Commission, by representatives of manufacturers who make approximately 90 per cent of the woodworking machinery produced in this country and who comprise about half the number of companies in that industry. The meeting was sponsored by the Association of Manufacturers of Wood Working Machinery.

G. S. Ferguson, commissioner, and M. M. Flannery, director of trade practice conferences of the Federal Trade Commission, presided. The rules adopted are as follows:

1. Inducing of employees of competitors to violate contracts, or enticing away of employees of competitors in such numbers or under such circumstances as to constitute a conversion and an appropriation of the value created at the expense of the said competitor, is unfair trade practice.

2. The willful interference by any person, firm or corporation by any means or device whatsoever, with any existing contract or firm order between a seller and a purchaser of any product of the woodworking machinery manufacturing industry, such interference being for the purpose or with the effect of dissipating, destroying or appropriating in whole or in part the patronage or business of another engaged in such industry, is unfair trade practice.

3. Manifestly exaggerated or false statements by a manufacturer, agent, dealer or seller concerning the size, weight, working range, design, material, condition or performance of any of his own machines or parts thereof is unfair trade practice.

4. Manifestly exaggerated or false statements by a manufacturer, agent, dealer or seller concerning the size, weight, working range, design, material, condition or performance of any competitor's machine or part thereof, or the circulation of false statements or false reports of a disparaging nature concerning the personnel or the financial standing of competitors is unfair trade practice.

5. The payment or allowance to any customer of secret rebates, refunds, credits or unearned discounts, whether in the form of money or otherwise, is unfair trade practice.

6. The payment or promising to pay to any employee of a customer or prospective customer of a commission or consideration of any character is unfair trade practice.

7. The granting of either a selling commission or dealer's discount to any concern or individual other than an established woodworking machinery dealer or salesman is unfair trade practice.

8. As much confusion has arisen in the industry, resulting in many instances in price discrimination, as a result of members of the industry selling their product on a basis of free delivery in some instances and in others selling the same f.o.b. factory, we agree that all selling shall be based on delivery f.o.b. point of manufacture and that when delivery at any other point is necessary the proper transportation and handling

charges shall be added to the f.o.b. factory price; and that any variation from such practice shall be deemed to be an unfair method of competition.

9. Any discrimination in price between purchasers of the same class, (not including discrimination in price on account of the difference in grade, quality or quantity of the product sold, or which makes only due allowances for difference in cost of selling and transportation), or discrimination in price in the same or different communities not made in good faith to meet competition, where the effect of such discrimination may be to substantially lessen competition or tend to create a monopoly, is an unfair trade practice: *Provided*, however, that nothing in this resolution shall be construed to prevent the use, when published, as defined in Rule 10, of a special quantity price applicable to a definite quantity of goods which are placed in one order and are shipped as promptly as possible.

10. The members of the woodworking machinery industry, both manufacturers and dealers, while maintaining absolute freedom in the issuance of price schedules from time to time, in conformity with the established trade practices, do adopt as a cardinal principle that there shall be no discrimination as between purchasers of their product, and that all published prices as issued by any member shall set forth plainly the price and terms and conditions, and that such published prices shall truly represent the sales price in all cases where the goods sold and conditions and terms are set forth in the member's price schedule, and any deviation from the principle expressed herein shall be deemed an unfair trade practice.

11. The industry recognizes the fact that where the customer for a new machine is also disposing of an old machine, there are two distinct transactions involved, one being the sale of the new machine and the other being the purchase of the old machine. Therefore, the industry agrees that these two transactions shall be held distinct.

The industry further agrees that no price in excess of its fair market value shall be paid or allowed for on any used machine thus offered for sale by the prospective customer for a new machine.

12. The sale or offering for sale of any product of the woodworking machinery industry under any form of guarantee to the purchaser or prospective purchaser against either advance or protection against the decline in the price of said product is an unfair trade practice.

13. The industry hereby records its approval of the practice of distributing and circulating, to the entire industry, published current price lists, including all notices of advance or decline in prices made by any individual manufacturer, either by the manufacturer or by the association or group he may be identified with.

14. The industry hereby records its approval of the practice of making the terms of sale a part of all established price schedules, and the failure on the part of manufacturers or manufacturers' agents or dealers to strictly adhere to such terms of sale, or to willfully fail to enforce the collection under such, shall be termed an unfair trade practice.

15. The sale or offer for sale of a new machine as a repossessed or rebuilt ma-

chine, with accompanying price discrimination to favored buyers, is an unfair trade practice.

These rules will be studied as to their legality by the Federal Trade Commission. Those that are acceptable will be printed and distributed by the association to all manufacturers in the industry with the request that they adopt the practices recommended.

Lakewood and Jaeger Companies to Merge

A merger of the Jaeger Machine Co., Columbus, Ohio, and the Lakewood Engineering Co., Lakewood, a Cleveland suburb, has been approved by directors of the two companies and will be submitted to stockholders for their approval shortly. This merger will bring together two of the large manufacturers of concrete mixing, handling and placing machinery. The Jaeger company makes concrete and plaster mixers of various types and the Lakewood Engineering Co., in addition to the manufacture of concrete mixing and handling machinery for use in road construction, also makes industrial trucks and trailers. Each plant will continue to have its sales and distribution departments.

Under the merger plans the assets of the Lakewood company will be transferred to the Jaeger company and the stockholders of the former company will receive two shares of Jaeger stock for each share of Lakewood stock after there has first been declared to Jaeger stockholders a cash dividend equivalent to approximately \$5 per share.

Midwest Power Conference to Convene in February

The fourth Midwest Power Engineering Conference will be held at the Palmer House, Chicago, Feb. 12 to 15. Power plant substructure problems will be discussed on Feb. 12. On Feb. 13 there will be sessions on metallurgical and chemical problems and electrical engineering problems. The former will be featured by a paper on "Metallurgy of Material Used in Power Equipment," by A. E. White, University of Michigan, Ann Arbor, Mich., and a paper on "Researches in Corrosion" by K. H. Logan, electrical engineer Bureau of Standards, Washington. In a session on Feb. 14 devoted to power plant operation. H. H. Moss, Linde Air Products Co., New York, will deliver a paper on "Welding in Power Plant Construction and Maintenance," and P. J. Gaudy, Sessions Engineering Co., Chicago, will discuss "Coordination of Industrial Plant and Station Power." Other sessions will take up power plant economics and problems in heating, ventilating and refrigeration will have attention.

Building Promises to Increase Says C. N. Fitts

Charles N. Fitts, New England Structural Co., Boston, the newly-elected president of the American Institute of Steel Construction, Inc., on Dec. 13 met with the engineering staff of the steel fabricators' organization. Among those present were the district engineers of the institute, to whose work Mr. Fitts especially addressed himself. In the course of his remarks, Mr. Fitts said:

"Structural steel sales during 1928 were generally larger than last year. The money market has somewhat deterred bonded investments during the past month, but we find that only a temporary check on building. Orders now coming out indicate that our business promises to go forward at a fair increase."

Merger of New York Dry Dock Companies

The United Dry Docks Corporation, New York, has been organized to take over and consolidate the properties of the Morse Dry Dock & Repair Co., Brooklyn; the New York Harbor Dry Dock Co., Tompkinsville, S. I.; James Shewan & Sons, Brooklyn; Staten Island Shipbuilding Co., Mariners Harbor, S. I.; the Theodore A. Crane Sons Co., Brooklyn; and the W. & A. Fletcher Co., Hoboken, N. J. Officers of the present companies will be identified with the new organization, which plans expansion programs at the different plants. The merger may include two or three other shipyards in the New York territory and will probably be headed by E. P. Morse, president of the Morse company.

Productive Efficiency of Industry Increases

WASHINGTON, Dec. 14.—Between 1925 and 1927 there was a further increase in production per worker in both manufacturing and agricultural industry, said the annual report of E. Dana Durand, chief of the Division of Statistical Research, Department of Commerce, in discussing progress in national efficiency. In a table it was shown that as compared with the annual average for the period 1898 to 1900 the average for the two calendar years 1926 and 1927 showed an increase of approximately 55 per cent in the output of farm products, 280 per cent in the output of minerals (an exceptionally large figure owing particularly to the immense expansion in petroleum production), about 180 per cent in factory output, and over 200 per cent in the volume of rail transportation.

These figures compare with an addition of about 55 per cent to the population of the country. It is obvious, the report said, that there is produced for each person in the population a far greater volume of goods and ser-

vices than at the beginning of the century, which means, of course, a great advance in living standards. In the case of every one of these four major branches of industry the increase in output since 1898 and 1900 has been far greater than that in the number of workers. In agriculture, manufactures, and railroads the product of goods or services per worker engaged has increased from 50 to 60 per cent.

Automobile Companies Are Increasing Production

Steadily increasing production by manufacturers introducing new models, with a generally high rate of output in practically all car and truck factories, gives promise of bringing the December total in excess of 300,000, according to *Automotive Industries*. The holiday season probably will have less effect on factory operations than in any year in the industry's history. Demand for deliveries of new cars has fallen to the low point of the year, so much so that Ford dealers in many parts of the country are able to make immediate deliveries, though still carrying large banks of orders for deliveries after Jan. 1. Much of the selling in all lines during December is for delivery after Jan. 1, resulting in some accumulation of new car stocks.

Would Study Plans of War Needs

WASHINGTON, Dec. 14.—Discussing reserve stocks of war material, Assistant Secretary of War Charles B. Robbins, in the Department's annual report, says the preparation of a definite plan to supply information as to what are the requirements in mobilization of material is the greatest need now confronting the army. The plan would be a specific forecast of the effort required adequately to defend the nation from invasion during the period of industrial transposition. With executive approval of such a plan and legislative sympathy in such a plan, it will be possible for the first time, it is stated, to submit for the attention of Congress a definite program for peace-time accumulation and maintenance of essential stocks.

Assistant Secretary Robbins repeated a recommendation that a board be appointed to determine war-time munition needs. If the appointment of such a board is not deemed advisable, he said, it is strongly recommended that the War Department and the Navy Department jointly prepare for the approval of the President and presentation to Congress a specific project for defence of the country from attack by any enemy or coalition of enemies which might arise.

Such a project, it was declared, should take into account the country's geographical isolation, the initial resistance of the navy, the present size of the army, the strength of the nation's man power and the stage of

industrial development. It should give consideration to the time needed for training troops, the initial rate of production of munitions, the period required for industry to come into mass production for war and the necessary war reserves of finished articles. The Assistant Secretary of War also again recommends passage of the bill providing for educational orders to be placed with industries during peace-time.

November British Iron and Steel Output Higher

LONDON, ENGLAND, Dec. 14 (*By Cable*).—November pig iron production was 544,400 gross tons and that of steel ingots and castings was 762,500 tons, both larger than in October.

A comparison of the November output with October and with the monthly rate for the first nine months of this year, as well as with the rates for previous years, is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly...	855,000	638,600
1920—Av. monthly...	669,500	755,600
1922—Av. monthly...	408,500	490,100
1923—Av. monthly...	620,000	706,800
1924—Av. monthly...	609,900	685,100
1925—Av. monthly...	519,700	616,400
1926—Av. monthly...	203,500	296,700
1927—Av. monthly...	607,800	758,200
1928—To Oct. 1, monthly....	552,800	702,700
1928—October.....	543,600	756,000
1928—November....	544,400	762,500

To Dec. 1, the monthly rate of pig iron output has been 551,200 tons and that of steel 713,000 tons—both lower than in 1927.

Packard Company Has Made Large Plant Additions

The Packard Motor Car Co., Detroit, the factory program of which now amounts to nearly \$10,000,000 a year for new machinery and equipment and the rebuilding of many departments, recently included a new aluminum foundry, a large addition to the stamping factory and the rebuilding of the power plant. Building No. 21, which is one of the 79 structures comprising the Packard plant, was completed recently in 60 days. It is three stories high, 190 x 382 ft. and embraces a glass covered court 60 x 320 ft. This building, which brought the floor space of the Packard plant up to 3,200,000 sq. ft., was built to carry several additional floors when needed and contractors are now adding two floors, which, when completed, will afford nearly 300,000 sq. ft. of floor space.

The new \$1,000,000 plant of the General Motors Corporation at Regina, Saskatchewan, which will employ about 800 men, was opened this week. It is expected that bodies for two General Motors cars will be produced in this plant, the primary purpose of which is the assembling of cars destined for western Canada.

Youngstown-Ohio River Rail Link Favored

Interstate Commerce Commission Admits Need for Lower Rates on Coal to Youngstown District— Allows Further Hearings

WASHINGTON, Dec. 18.—Iron and steel manufacturers in the Youngstown district were favored in a decision announced today by the Interstate Commerce Commission in passing upon the application of the Pittsburgh, Lisbon & Western Railroad for authority to construct two branches which would give Youngstown rail connection with the Ohio River.

The commission said that public convenience and necessity require rail transportation between the Ohio River and the Youngstown district in connection with transportation on the river and connecting waterways. However, the record was held open and further hearing was assigned to secure evidence bearing upon the practicability of providing such rail transportation over existing lines.

This indicates that the trunk lines, the Pennsylvania and Pittsburgh & Lake Erie railroads, will have to afford lower rates by water and rail on coal from the Pittsburgh and Connellsville districts to the Youngstown district or new construction will be permitted. Thus, regardless of whether the P. L. & W. finally is allowed to build the lines, it is evident that Youngstown will be given lower rates on incoming shipments of coal. Reduced rates by the Trunk Line carriers might be arranged by establishing rail-and-water connection with the Youngstown district by the Pennsylvania water connection at Rochester, Pa., and by the Pittsburgh & Lake Erie water connection at Monaca, Pa.

Possible Cut of 70c. a Ton on Coal Rate

The present all-rail rate on coal to the Youngstown district from the Pittsburgh district is \$1.34 a ton, while from the Connellsville district it is \$1.43 a ton. It was estimated that the proposed water-and-rail rates through use of the proposed P., L. & W. lines would be a minimum of 50c. a ton and a maximum of 75c. a ton, with a possible average of 60c. The Youngstown district consumes approximately 8,000,000 tons of bituminous coal annually, and based on a possible cut of 70c. a ton in the rate on coal, it is estimated that the Youngstown iron and steel industry would save about \$5,600,000 annually. This would reflect itself in reduced cost of making pig iron and steel. Moreover, connection with the Ohio River would give the Youngstown district a rail-and-water outlet for shipment of steel to the South and Southwest by way of the Ohio and Mississippi rivers, cheapening transportation costs and placing Youngstown in a better position to compete with the Pittsburgh, Wheeling and

Steubenville districts, which now have access to water shipments.

Railroads Must Clarify Position

"Authority to construct the proposed new line," the commission's report said, "will not be granted until we are fully satisfied that a use of the existing rail routes between the Ohio River and the Youngstown district, which will produce substantially the results proposed by the applicant (P., L. & W. Railroad), is impracticable." It was added that the Pittsburgh & Lake Erie and the Pennsylvania will be expected to make their position in regard to the proposed use of their lines entirely clear so that the commission may be fully advised in the matter.

Objects to Operation by Coal Company

The P., L. & W. Railroad is owned by the Pittsburgh Coal Co., which would ship much of the tonnage of coal over the proposed lines. The commission said that the practical control and operation of a common carrier by its principal shipper is a condition to be avoided. It also pointed out that it is proposed that the transfer facilities at the Ohio River shall be under control of either the Lisbon Railroad or of the Youngstown Sheet & Tube Co. The commission added that, should the new construction be permitted, consideration will be given to the imposition of a condition that the P., L. & W. shall not be under the control, direct or indirect, of the Pittsburgh Coal Co., "or any other industry or industries, and the further condition that terminal facilities shall be provided on the Ohio River which shall not be under such control and shall be open to the free use of all shippers."

Says Prosperity Factors Are Still Present

WASHINGTON, Dec. 18.—All of the basic factors which have contributed to the healthy state of business during recent months, among which may be mentioned more efficient production and distribution with a smaller accumulation of stock and the well-sustained confidence in the stability of existing conditions, are still present with no visible signs of receding, according to Secretary of Commerce Whiting. It was pointed out that a slight recession in the output of some commodities may be expected as the time for inventory taking nears. Available statistics were declared to show that trade and industry generally are in record volume with retail trade showing an expansion over recent months due largely to the holiday demands. The recent fluctua-

tions in the stock markets, Mr. Whiting said, are now generally believed to have strengthened business by bringing stock prices nearer to their intrinsic value.

"Any forecast of future conditions, of course, can only be based upon the forces in motion," it was stated. "Most of the basic industries for which statistics are available have been active throughout the entire year. Automobile production, estimating for the month of December, will doubtless exceed the previous high record of 1926, when 4,299,000 passenger cars and trucks were produced; steel production during the year promises to increase over 1927, when the output totaled 43,041,000 tons; available statistics indicate that the output of copper will advance over last year, when mine production amounted to 829,978 short tons.

"Exports of merchandise during the first 11 months of 1928, according to preliminary figures, were valued at \$4,655,459,000, being higher than for any corresponding period since 1920 and \$197,724,000 in excess of exports for the corresponding period of 1927. This larger volume of export trade has contributed greatly to our domestic activity.

"A further note of stability is added by the fact that exports of merchandise for October and November of this year, \$550,866,000 and \$546,000,000 (preliminary figures), respectively, were larger than for any previous month since January, 1921, when exports were valued at \$654,300,000."

High Shipments of Fabricated Structural Steel

WASHINGTON, Dec. 18.—Orders for fabricated structural steel in November totaled 187,331 tons, or 65 per cent of the 289,975-ton capacity of the 195 reporting firms, according to the Department of Commerce. Orders reported in October were 192,854 tons, or 64 per cent of the capacity of the 215 reporting firms. Computed orders in November aggregated 243,750 tons, against 240,000 tons in October, while shipments were 288,750 tons, or 77 per cent of capacity, compared with 322,500 tons, or 86 per cent of capacity.

Except for October, the computed tonnage of new orders was the smallest since last April. Shipments, however, were above the average of the previous 10 months, having been exceeded, this year, only by October and August. November orders were 3 per cent above last year; shipments were 17 per cent higher than in 1927.

Computed orders for the 11 months of the current year totaled 3,041,250 tons, or 74 per cent of capacity, against 2,805,000 tons, or 68 per cent of capacity, for the corresponding period of last year. Computed shipments were 2,902,500 tons, or 70 per cent of capacity, against 2,655,000 tons, or 64 per cent of capacity, for the corresponding period of last year.

Fabricated Structural Steel

Awards Decline to 17,200 Tons—New Projects Call for 23,250 Tons

INCLUDING 8000 tons for two car ferries for the Pere Marquette Railroad, awards reported during the week amounted only to 17,200 tons, one of the lowest totals of the year. Outstanding among new projects, which will require 23,250 tons, were a bank building at Minneapolis, calling for 6000 tons, a section of the New York subway, which will require 4200 tons, and grade elimination work in connection with the new Cleveland station, calling for 4000 tons. Awards follow:

NEW YORK, 800 tons, apartment building in West Seventy-second Street, to Taylor-Fichter Steel Construction Co.
STATE OF NEW YORK, 125 tons, highway bridge, to American Bridge Co.
LEHIGH VALLEY RAILROAD, 400 tons, building work at Jersey City, to Bethlehem Steel Co.
CENTRAL RAILROAD OF NEW JERSEY, 125 tons, bridge at Bartley, N. J., to Phoenix Bridge Co.
DOVER, N. J., 1550 tons, Picatinny Arsenal buildings, to Bethlehem Fabricators, Inc.
WARNER, N. J., 300 tons, power house for American Cyanamid Co., to American Fabricators Steel Co., Philadelphia.
ATLANTIC CITY, N. J., 250 tons, Park Lane Hotel, to McClintic-Marshall Co.
CHARLESTON, W. VA., 200 tons, building for Libby-Owens Plate Glass Co., to Pittsburgh Bridge & Iron Co.
RALEIGH, N. C., 500 tons, bank building, to Dietrich Brothers.
DETROIT, 422 tons, *Detroit Times* Building, to McClintic-Marshall Co.
BUFFALO, 270 tons, platform for New York Central depot, to Lackawanna Steel Construction Co.
LOUISVILLE & NASHVILLE RAILROAD, 200 tons, bridge work, to American Bridge Co.
SOUTH BEND, IND., 350 tons, building for Building and Loan Association, to Duffin Iron Co., Chicago.
PRAIRIE DU CHIEN, WIS., 1800 tons, toll bridge across Mississippi River, to Austin Bridge Co., Austin, Tex.
SUPERIOR, WIS., 700 tons, coal bridge, to American Bridge Co.
CHICAGO, 190 tons, field houses for Northwest Park Board, to Duffin Iron Co., local.
GREEN BAY, WIS., 400 tons, hotel, to Vulcan Iron Works, Fond du Lac.
PERE MARQUETTE RAILROAD, 8000 tons, two ferry boats, to Manitowoc Shipbuilding Co.
STATE OF WASHINGTON, 700 tons, power house for Stone & Webster, Inc., to Pacific Car & Foundry Co.; reported last week to unnamed fabricator.
SEATTLE, 250 tons plates, outlet pipes for Diablo Dam, to Willamette Iron & Steel Works.
SEATTLE, 129 tons plates, standpipe for Lake Youngs, to Chicago Bridge & Iron Works.
SACRAMENTO, CAL., 170 tons, crossing at Benham, to unnamed fabricator.
TIBURON, CAL., 100 tons, shop building for Northwestern Pacific, to Judson-Pacific Co.
OAKLAND, CAL., 150 tons, packing plant for Kings County Packing Co., to Herick Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 1000 tons, Massachusetts General Hospital unit.
NEW BRITAIN, CONN., 500 tons, high school.

NEW YORK, 4200 tons, subway section 5, route 106; bids Dec. 21.
NEW YORK, 1000 tons, Schemerhorn Laboratory for Columbia University at 118th Street and Amsterdam Avenue.
WARNER, N. J., 200 tons, building for American Cyanamid Co.
DETROIT, 350 tons, building for Motor Product Corporation; bids in.
WINDSOR, ONT., 2500 tons, Canadian approach to Detroit tunnel.
CLEVELAND, 4000 tons, grade elimination work in connection with new union station.
CINCINNATI, 600 tons, library at University of Cincinnati.
FORT WAYNE, IND., 200 tons, municipal power house.
CHICAGO, 1500 tons, MacChesney & Rubens-Wolbach Building; Holabird & Roche, architects.
MINNEAPOLIS, 6000 tons, bank building; Graham, Anderson, Probst & White, Chicago, architects.
KANSAS CITY SOUTHERN, 1200 tons, bridges.

Form \$150,000,000 Merger in Airplane Industry

The United Aircraft & Transport Co. has been organized as a holding company, which will acquire all the stock of the Pratt & Whitney Aircraft Corporation, Hartford, Conn.; the Chance Vought Corporation, Long Island City, N. Y., and the Boeing Airplane & Transport Corporation, Seattle, Wash. As one of the largest consolidations yet undertaken in the airplane industry, the new company will have a market value of approximately \$150,000,000 and will embrace the three major lines of the industry, namely, engine manufacture, plane construction and transportation.

More than half the common stock of the Pratt & Whitney company, which manufactures Wasp and Hornet air-cooled airplane motors, is owned by the Niles-Bement-Pond Co., New York, and stockholders in that company will receive two and one-eighth shares in the new corporation for each share of Niles-Bement-Pond. The Chance Vought Corporation manufactures Corsair observation planes, and its entire common stock will be acquired by exchange of stock in the new company. The preferred and common stock of the Boeing company, which is engaged in airplane manufacture and commercial air transportation on the Pacific Coast, will be exchanged share for share for the securities in the new corporation. The United Aircraft & Transport Co. will have an authorized

capitalization of 1,000,000 shares of 6 per cent preferred stock of \$50 par value and 2,500,000 shares of common stock.

All the subsidiary companies will be continued with their present managements and personnel, and with no changes in policy. William E. Boeing, president of the company bearing his name, will be chairman of the board of the new company; Frederick B. Rentschler, president of Pratt & Whitney, president; Chance Vought, vice-president, and Charles W. Deeds, secretary and treasurer. The directorate will include Philip G. Johnson, president of Boeing Air Transport, Inc., and the Boeing Airplane Co.; Charles F. Kettering, vice-president General Motors Corporation; Kenneth R. Kingsbury, president Standard Oil Co. of California; Charles K. Knickerbocker, vice-president Griffen Wheel Co.; William B. Mayo, chief engineer Ford Motor Co.; George J. Mead, vice-president and chief engineer Pratt & Whitney company, and Orville W. Tupper, secretary and treasurer Boeing Airplane & Transport Corporation.

Carnegie Bust Unveiled in Pan-American Union

WASHINGTON, Dec. 18.—A bronze bust of Andrew Carnegie, the gift of Mrs. Carnegie, was unveiled last Saturday in the Hall of the Americas of the Pan-American Union in the presence of the delegates of the American republics to the International Conference of American States on Conciliation and Arbitration, the diplomatic representatives of the republics of Latin America, members of the Cabinet and other high Government officials. The presentation address was made by Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching. The bust was unveiled by the nine-year old granddaughter of Mr. Carnegie, Louise W. Miller, and was accepted on behalf of the governing board of the union by Frank B. Kellogg, Secretary of State, and chairman of the board. Mr. Carnegie contributed \$850,000 toward erection of the building, which is the permanent home for the organization representing the international union of the American republics.

Los Angeles Fabricators To Be Merged

The Consolidated Steel Corporation, Los Angeles, has been organized to take over and consolidate the Llewellyn Iron Works, the Baker Iron Works and the Union Iron Works, all of that city. All these companies are fabricators of structural steel buildings and other products and the Llewellyn and Baker organizations also manufacture elevators. The new company will be capitalized at \$6,000,000 and plans extensions and improvements to the three plants to coordinate manufacturing facilities.

This Issue in Brief

To reduce production costs, prepare an operation sheet before tooling up. This sheet should include every operation, both of production and inspection or gaging. Show them on a *single list*, in proper order. Thus attention is focused on the best sequence, on the number of inspections needed, on the best grouping of operations, and on their reduction to the least possible number.—Page 1575.

* * *

Prices forecast by Dr. Haney. Early end to advance in pig iron market is indicated by statistics, says economist. Scrap barometer has not yet shown any sustained recovery. Finished steel prices appear to be about right in comparison with general level of commodity prices.—Page 1582.

* * *

Original cost of anti-friction bearings may well be less than that of plain bearings, says engineer. Having no expensive scraping-in labor, installation cost of the former is considerably lower.—Page 1563.

* * *

Carburizing costs are reduced and possibility of distortion is lessened by "single treating." Fine-grained steels may be treated considerably above the minimum temperature required for complete hardening, without coarsening. Thus both case and core may be satisfactorily refined by a single heating and quenching operation.—Page 1561.

* * *

Will tin plate find a competitor in aluminum-coated sheets? The latter is lighter than tin plate, according to Germans, who are reported to be planning for quantity output. Although aluminum is only half the price of tin, production costs may be higher, as the aluminum and the steel sheets must be sweated together.—Page 1555.

Oil-film bearing is the best type of plain bearing, says manufacturer. Though frictional coefficient is high at the moment of starting, later on it becomes much lower and approaches its best at the upper limits of speed. This type of bearing has great overload capacity.—Page 1566.

* * *

For economical manufacture, install a budget system. The three main tools—men, money and materials—must be coordinated. The budget enables an executive to measure the success of his efforts. It shows where improvements can be made.—Page 1567.

* * *

High uniformity of gage of rolled products is obtained by use of anti-friction bearings in rolling mills. Less adjustment of rolls is required and heat in the roll necks is considerably reduced, to a more or less fixed quantity.—Page 1565.

* * *

Magnetic testing offers a simple method of assurance that a particular product is substantially uniform throughout its length, says metallurgist, that it is without major discontinuities and that it has the average mechanical properties of other specimens which have been studied to destruction.—Page 1573.

* * *

Fixtures should be tied in with system of gaging. The same points or surfaces should be used for locating the work in the fixtures and for reference points in the gages. Only by so doing are the gages a direct check on the fixtures.—Page 1575.

* * *

Superior machining quality of coarse-grained steel is proved by production results of several large users who worked steels of known grain size, says metallurgist.—Page 1559.

If six or more men do your material-handling, you can cut your handling costs by using skid equipment. Cost will be reduced one-third, says truck manufacturer.—Page 1571.

* * *

Shock resistance of steel that is fine-grained after carburizing test is higher than coarse-grained, according to Izod impact test. But values for yield point, ultimate strength and elongation appear to be unaffected by grain size in the carburizing test, says metallurgist.—Page 1560.

* * *

"Fool proof" in heat treatment is a characteristic of fine-grained steels, says metallurgist. They are not so sensitive and therefore do not have to be worked within narrow limits of temperature and time.—Page 1561.

* * *

For high-temperature, high-pressure work, chrome-tungsten steel is well suited, investigators declare. A proportional limit of 100,000 lb. per sq. in. was secured, with little ductility, at 1000 deg. Fahr., after various heat treatments.—Page 1616.

* * *

Profits by successful methods of others and avoids errors discovered elsewhere, by utilizing business papers. Farm equipment manufacturer and head of United States Chamber of Commerce finds trade papers of great value in efficient operation of his business.—Page 1562.

* * *

Where lift trucks must operate in narrow aisles, arrange the skids in herringbone fashion. Then the truck need turn only a 45-deg. angle instead of 90 deg., and considerably narrower aisles can be utilized without inconvenience.—Page 1571.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Steel Far Outstrips Pig Iron

ITS surprisingly high production of ingots has already had much attention in comment on the various contributions of 1928 to the steel industry. Noteworthy in that connection is the unprecedented "spread" between pig iron production this year and steel ingot production. Estimating pig iron at 38,000,000 tons and steel ingots at 50,000,000 tons, we have steel exceeding pig iron by no less than 12,000,000 tons. In the past ten years the difference has ranged between 2,680,000 tons in 1919 and 7,564,000 tons in 1926. In 1927 it was about 7,200,000 tons.

All along it has been known that steel companies were making a much larger use of scrap in the production of open-hearth steel, but it will no doubt be a surprise even to those who have closely watched this development to find that the pig iron-ingot gap in 1928 has been nearly 4,500,000 tons more than in any other year.

It has been said for some years that pig iron is no longer a barometer of the steel trade, so large a place has scrap taken in steel-making, with the remarkable expansion of the open-hearth. Concurrently the increasing use of scrap in the blast furnace has destroyed the parallelism that was once fairly uniform between pig iron production and Lake Superior iron ore production, Lake ores being 80 to 85 per cent of the country's production of iron ore. Without now elaborating the subject, which has several points of interest to producers of iron ore and pig iron and to dealers in scrap, we append figures for 1928 and the year 1913, which is commonly taken in making comparisons with pre-war conditions. They represent production of Lake iron ore, and the country's output of pig iron and steel ingots in the two years:

	Lake Ore	Pig Iron	Steel Ingots
	Gross Tons	Gross Tons	Gross Tons
1913	52,377,362	30,966,152	30,280,130
1928	54,500,000	38,000,000	50,000,000

In 1913 steel ingot production was just overhauling pig iron production, which it passed in 1915. The figures are an impressive comment on much that was written 25 years ago of a doubling of pig iron production every ten years, and of an impending scarcity of Lake Superior ores in view of a ten-year doubling of demand for ore, to keep up with pig iron. With little more than a 2,000,000-ton gain in Lake ore output, there is a pig iron increase equivalent to 14,000,000 tons of ore, and an ingot increase equivalent to more than 22,000,000 tons of pig iron. The steel industry has been drawing increasingly on its above-ground stores of raw material, as each year sends a larger

tonnage to the discard. This and producers' "own" scrap now figure in our steel-making economy to an extent never dreamed of by the prophets of an approaching famine in Lake ores.

Criticism of Foreign Loans

SOME of those who criticize our loaning so much money abroad have aimed at a symptom instead of looking at the cause. The size of the item naturally attracts attention but mere bigness is not in itself adequate reason for attack except upon one line, the difficulty of repayment or of taking care of interest. With such criticism we are not here dealing. As to size, a fair measure is supplied by the summary in the last "Balance of International Payments of the United States," which make American long-term investments abroad 11½ to 13½ billion dollars at the end of 1927. For a convenient conception we may take 13 billions at the present time, with a billion-dollar range either way.

A familiar criticism argues that it is not good economics to export merchandise and get gold in return, because merchandise is useful, being productive of comfort and well being, while gold is not, and that it is still worse to secure not gold but merely promises to pay.

Granting this fully—what is there to do about it? The criticism is leveled squarely against our lending abroad, not against the conditions that conduce to our doing so. There is merely an inference, so delicate that the absurdity is not brought out, that if the capital were not exported it would be spent at home. Now, we do not export goods which can be sold at home and similarly no domestic demand for capital goes unsatisfied.

If something is wrong, it is that there is not so much domestic demand for capital as it would be well to have. The practical view is that already we have more investment in productive enterprise than we can employ by our own wants. We export the surplus product. If we had more investments there would be still more surplus product. One of these critics, writing in a highly esteemed medium, opines that we should be better off if we had built a score more hydroelectric plants or a million new homes. Well, the hydroelectric plants would displace coal miners and to be useful would result in still more goods to be worked off somewhere, and where else but in the export market? The million homes would have to be sold or rented, and to whom?

The fallacy lies in the assumption that capital exposed for sale will make its market. The market must

first be provided, to attract the capital. Our difficulty is that the present market is supplied. All told, we are well provided with coal mines, power plants, steel mills, automobile factories and the like. As we need more there is no difficulty in finding the capital. We do need additional markets for capital, just as new things, phonographs, automobiles, radio, have in recent years been supplying markets. Airplanes are now entering, but we are told television is unlikely to become commercial for several years. We could not force capital into the old things merely by keeping it from going abroad nor should we want to do so.

The answer is that we need still more research work, to find new things to make and to do, so that there will be perfectly new demand for goods and services, and capital will be called for to put the things into practice. The recent Carnegie Institute coal conference at Pittsburgh disclosed wide possibilities along several lines. We need new opportunities, not a forcing of growth in things that are already highly competitive.

Enlarging the Panama Canal

GROWING congestion of traffic through the Panama Canal has raised the question of enlarging the capacity for passing ships between the Caribbean and the Pacific. Though only fourteen years old, in point of service, the canal at Panama already is overtaking "de Lesseps's big ditch" at Suez in annual tonnage of ships making the transit, and 1927 showed more than four times the figures of eight years earlier. The Suez Canal, in that same interval, did not quite double its traffic but both canals made new, high records last year.

	Panama Canal	Suez Canal
1927, tons	28,610,984	28,962,048
1923-27 average	25,310,916	25,924,881
1919	6,943,087	16,013,802

Much thought has been given to the subject of location. It is claimed by engineers that a third flight of locks, three at each end, would double the practical capacity of the present canal. This may well be so, though it would necessitate a better average flow of traffic and better control of transit peaks. But the element of strategy would seem to suggest that new facilities, if and when they must be provided, should be located at some distance from Panama. "All the eggs in one basket" may be perfectly satisfactory nineteen times out of twenty. On the twentieth, prudence might best be served by a separation of the eggs into two or more containers.

In the days when the present canal was but a dream—aside from the abandoned French workings—Mr. Bunau-Varilla effectively spiked the guns of those who advocated the Nicaragua route (Mr. Roosevelt, among them) by circularizing Congress, and others interested, with postage stamps of Nicaragua, showing active volcanoes where proponents declared there were none. Nevertheless, it appears to be thought that a duplicate route via Lake Nicaragua, now that we have the Panama Canal as an entity, might serve strategy and commerce equally well and properly distribute our eggs.

In any case, wherever the new facilities be built, certain details of dimensions, learned from more than a decade of operation at Panama, may well be considered. The locks in the present canal—twelve in all—are of uniform size: 1040 feet long and 110 feet width

of entrance. It is possible, often, when a small vessel is to be put through, to shorten the effective length by means of an intermediate set of lock gates, and thus to employ less water in locking the vessel up at one end and down at the other. But frequently conditions do not permit this, in which case it requires as much water to transit a motorboat as for a dreadnought, and in the dry season water already is at a premium.

As we now have facilities for ships as large as have ever been built, it would seem wise, in a new set of locks, to save much of a huge expense, both for construction and for operation, by building them much smaller than those at Panama. If they were 600 feet long and 80 feet broad they could handle nine-tenths of the ships now using the canal, and at a saving of perhaps one-half on the cost of locks duplicating those now in use.

At the same time there is a demand for a greater capacity, because certain ships now built and building tax the present locks to the utmost. Their width has hampered design in the Navy Department, where more than the 106 feet now considered maximum beam of ships, for safe passage, is wanted for the purpose of adding torpedo protection "bulges" to the sides of capital ships. It was at the insistence of the Navy that the width of the present locks was made 110 feet, in place of the 100 feet of the earlier design. When the Kaiser Wilhelm or Kiel Canal was enlarged; shortly before the World War, the narrowest passage was made 131 feet. Transatlantic liners now being built will be 1000 feet long. Such mammoth ships may not soon enter into Pacific trade, or, more particularly, into trans-Isthmian routes. But we are planning for the future. And our experience of many years tells us that considerable expansion may be expected. The largest ship sent through the Suez Canal in 1870 was of 4414 tons; in 1927, nearly 27,000 tons.

Hence a flight of large locks, measuring perhaps 130 feet wide and 1200 feet long, would seem to be indicated. Putting this flight alongside our suggested smaller one—80 by 600 feet—would supplement the Panama Canal in a dual sense. It would permit passage of ships much larger than can now use the canal; it would permit passage at much reduced cost of such ships as constitute today, and will tomorrow, the great bulk of all that make the transit.

Integration in Non-Ferrous Metals

AN increasing tendency is seen among our metal-producing companies to carry forward the integration of their business into the manufacturing end, so that the copper, lead and zinc from their refineries may go largely to their own factories. Of course this condition has previously existed to a considerable extent. The Steel Corporation for many years has been consuming all of its own spelter for its own galvanizing, and the Matthiesen & Hegeler Zinc Co. and the Illinois Zinc Co. have used the major part of their product for their own rolling. The New Jersey Zinc Co. has become more and more a manufacturer of products of diverse character. More recently Anaconda acquired extensive copper and brass manufacturing interests. The American Smelting & Refining Co. and Phelps, Dodge & Co. have been doing likewise.

The manufacture of brass in the United States amounts to about 540,000 tons a year, whereof about

240,000 tons is made by the division classified as founders, who produce castings; and the other 300,000 tons by the division described as fabricators, who make rods, wire, sheet, tubes, etc. These are the largest and most profitable concerns. There are only 16 of them. That is to say, about 300,000 tons of brass is made annually by sixteen fabricators, while the other 240,000 tons is made by founders, large and small, whose number runs to more than 1000.

This gives some idea of the market for high-grade zinc. The brass founders do not use any of that. The brass fabricators use it to a considerable extent, but their practice in this respect is not uniform. Probably the American Brass Co. uses a larger proportion than any other concern.

Phelps, Dodge & Co. recently acquired an interest in the Bridgeport and Bristol brass companies. The American Smelting & Refining Co. has just taken a large interest in the Republic Brass Corporation that has been organized to take over the Dallas, Michigan, Rome and Taunton-New Bedford plants.

In the present alignment Anaconda is interested in about 42 per cent of the brass fabrication, the American Smelting & Refining Co. in about 15 per cent and Phelps, Dodge & Co. in about 7.5 per cent. The large independents are Scovill and Chase, which together do about 28 per cent of the business. Scarcely any of these fabricators limit themselves to brass. The same concerns do practically all of the fabrication of copper into rods, wire, plates, sheet, tubes, etc.

In lead the American Smelting & Refining Co. has an important interest in the recently formed General Cable Co. that does a large part of the manufacture of lead covered cables.

On the other hand some of the manufacturing companies have integrated themselves backward. Thus both the National Lead Co. and the Eagle Picher Lead Co. produce a considerable portion of their own lead.

A few large consumers have neither their own production nor manufacture, but buy directly the refined metals they need and have them manufactured on toll. The General Electric Co. and the Electric Storage Battery Co. are the most important examples of this practice.

That Airplane Industry

AIR transport by heavier-than-air machines has completed its first quarter century and speculation is now rife as to its future. Lurid pictures have been painted, as usual, for the commonplace would not satisfy. It remains that airplane manufacture is now getting under way in this country at a tremendous rate, and the succeeding years will surely show large consumption of iron, steel and other metals and further stimulate metallurgical investigations. While it may doubtless be true, as those best positioned to prophesy say, that the airplanes of a few years hence would not now be recognized, no one fails to acknowledge dependence, past and future, on researches among special metals and alloys.

The anniversary of the discoveries made by the Wright brothers at Kitty Hawk, N. C., twenty-five years ago, is still so recent that one may recall readily the ponderous tomes published in Europe, particularly in France, discussing seriously the scientific and engineer-

ing basis of flying, but at the same time always bringing the easy smile in general engineering circles. Yet in only a matter of a few months it will be clear to the man on the street that we already have a new and lusty industry.

Funds for Future Pensions

THE cost of an industrial pension system should be provided for during the productive years of the men who are to benefit from it after their years of usefulness have ended. According to Ingalls Kimball, director of group annuities of the Metropolitan Life Insurance Co., it should be considered in the same light as depreciation or any other item of overhead or operating expense.

This, however, is not the common practice. One reason is that almost every pension plan contains a provision permitting its alteration or withdrawal, no legal liability being assumed, no contract existing. Another reason in many cases is that the growth of industry has been so rapid that until within recent years pension payments (arising, of course, out of the very limited number of employees remaining from the relatively few who made up the early working force) have been so small, when compared to the active payroll, that they have scarcely seemed worth serious consideration.

Those strong companies that have been operating a pension system through good years and bad for a considerable period appear to be satisfied with results attained, without troubling with established funds. Their pensions are paid as a supplementary payroll, and enter into current costs and into prices charged for products. But a company whose forces are growing apace, planning to establish a pension system, might very well heed Mr. Kimball's argument. Conditions are changing.

It is well recognized as a not inconceivable eventuality that industrial pensions will become, as generally compulsory as workmen's compensation and so be a fixed charge. A certain percentage of the working forces of today will be the pensioners of a future not very far distant, and the sum total of the benefits paid them will constitute an item by no means negligible.

Mr. Kimball in fixing the basis of his theory said: "Last year the Pennsylvania Railroad paid to retired employees approximately \$6,000,000; yet from no one of these pensioned employees did the railroad receive a penny's worth of value. This \$6,000,000 when charged, as under the Interstate Commerce regulations it must be, to operating cost, increased the cost of transportation without improving it. It was paid because of service rendered to the railroad during the active years of the former employees who are now pensioners. It was paid, in other words, as partial recompense for work done—for man power expended—years ago." Yet the railroad would hardly enter in its operating cost of today an item of \$6,000,000 paid this year for coal burned or electric power consumed during years that have gone by.

Apparently there is ample experience upon which to base an annual charge for pension account. Industries have carried on these systems for sufficiently

long periods to determine what percentage of workers may be expected to fulfill requirements, such as length of service at the given retirement age, say 65 years. Actuarial figures are available as to what the life expectancy may be among those who become pensioners.

These problems can be solved with a close approach to accuracy. With a predetermined pension rate, based perhaps on previous earnings and length of service, it does not seem a difficult task to determine the annual charge to pension account.

Italy Lacks Adequate Natural Resources

Fascist Rule Born of Chaotic Conditions—Continuance Depends on Success in Solving Country's Economic Problem

BY EDWIN C. ECKEL*

SOMEWHERE IN ITALY, Nov. 11.—It is the tenth anniversary of Armistice Day, and it is also the King's birthday, so all Italy is in holiday. And since Oct. 28 it has been the seventh year of Fascist rule in Italy.

Both in France and England the government has been, for some years past, in extremely conservative hands; and the best opinion seems to be that at the next general elections there will be little shift in control in either country. Yet it must be borne in mind that in each case the control is in the hands of what is really a minority group, carried into power at the moment by popular fear of worse things from its opponents. In England the Labor Party casts the largest single block of votes and can undoubtedly come into power whenever it is united on its own policies, provided those policies are not so extremely socialistic as to alarm all the other classes of the population. In France the largest single party is also one that is much more radical than the group now in power, and it too could easily take over the government under corresponding conditions. The present very conservative administrations in both countries owe their positions to two factors—the flirtations of the extreme Labor people with red Moscow and the rapid fall of the franc and the pound some years ago. Everyone in either France or England who had any money, or hoped ever to have any, was brought to back extreme conservatism as a protest against those two things.

Fascism a Reaction from Extreme Conditions

In Italy conditions had become far worse and the resulting reaction went past conservative parliamentary rule into the pure absolutism of Fascism.

After the war Italy had drifted rapidly toward what was practically anarchy. The old political "leaders" had shown themselves entirely incapable of leadership in any real sense, and they simply bowed before the socialistic storm that broke out in northern Italy. Strike followed strike; factory after factory was seized by its laborers with the idea of operating a Soviet or exercising trade-union control of industry—and still the politicians at Rome did nothing. Another year or so and Italy might easily have surpassed Russia in the adoption of Red doctrines.

It was only after this chaotic condition had continued for four years that the Fascist reaction against it broke out suddenly and triumphed with equal suddenness. It has now lasted for six years and it still gives the country a strong and efficient government. And that, after all, is what Italy needed most from 1914 to 1922.

The Fascists' régime is a very strong rule, and it has the defects, as well as the advantages, of that strength. It is nationalist to the core, it is chauvinist at times, it may at times be looked upon as a menace by neighboring countries. But from the purely Italian point of view it has succeeded in making the Italians respect themselves, and by

consequence has forced other countries to respect the Italians. That, as I say, is from the purely Italian viewpoint; but, after all, any government must be judged first of all in its effects upon its own people.

In accomplishing all this it has been necessary to suppress political action, speech and press. In 1920 there were 11 political parties in the legislature at Rome, and no one could ever get agreement on any subject whatever. Today there is only one political party and its program is carried out without opposition or discussion.

The Fascist rule is based upon certain ideals as to state unity. Its support was primarily derived from the soldiers who had fought for Italy and who returned to find the politicians looking on while the socialists prepared to sovietize the country. With all this came also support from the bourgeoisie—the middle classes and the industrialists, who were unfavorable to a Soviet régime. Fascism offered a preferable alternative, and it was accepted by these powerful classes.

It will be seen that I agree entirely with all of my Italian friends who say that Fascism was born of cold necessity, and that it has given them a clean, strong and efficient government, for the first time in many years.

Italy's Poverty Hardest Fascist Problem

The past and present of Fascism are clear enough; its future is still not clear. And that, not judging from political theories, but from economic facts. Italy is a poor country, not only financially, but as regards natural resources. There is no coal whatever in Italy; there is practically no petroleum; there are no lead, zinc or copper mines; there is only one important iron mine, whose reserves may be figured in millions of tons. As against these deficiencies there are water-power, sulphur and some 10 or 20 million tons of aluminum ore.

The real Fascist problem is one of making it possible for a large population to live in Italy. That may be done by development of water-power and of industries using the power produced. And a solution of this type, if practicable, would mean that Fascism had proved its worth and might remain in power indefinitely. Other than that possible solution there are only two alternatives: to decrease the population by emigration or deliberate reduction in the birth rate, or to acquire new grain or coal lands by settlement, treaty or war.

My data on Italian labor conditions are too incomplete to be taken too seriously. Ten days in a country does not give a very clear idea of average conditions. But at one large group of mills the average pay of common labor is now 18 lire per 8-hr. day, or about 95c. a day. At other mills and factories I find rates from common to skilled labor ranging from 2 to 3 lire an hour, equivalent to 85c. to \$1.20 a day. These are all in the Northern industrial district and probably represent well over the average working income in the country at large.

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Iron and Steel Markets

Steel Output Gains at Chicago

Increased Production in West Offsets Declines Elsewhere—
Another Advance in Scrap—New Prices
on Plates and Shapes in East

DESPITE holiday and inventory considerations, steel ingot output for the country at large is more than holding its own, although declines are reported at some plants.

Specifying, in most districts, has been heavy in sheets, tin plate and wire products and cautious in lines where a price incentive has been lacking, while new business has been in unimpressive volume. At Chicago, however, total specifications are second only to those of the first week of January, and sales, influenced by orders for rails and track supplies, are well up to the average of the past six weeks.

Pig iron demand has diminished with the approach of the year-end, and price weakness has appeared. Valley foundry iron has declined 50c. a ton to \$17.50, furnace, and a softer market has developed along the Eastern seaboard. A Tennessee furnace has withdrawn a recent advance of 50c. a ton.

Scrap, on the other hand, shows further strength. Heavy melting steel at Pittsburgh, now \$18 a ton, has recovered in two weeks the peak position it held in October.

Sectional contrasts are evident in steel output. Operations of a leading Buffalo district producer have declined to 60 per cent of capacity, but the average for the Greater Pittsburgh district is unchanged at 80 per cent, and production at Chicago has risen to 85 per cent, compared with 83 per cent a week ago. Open-hearth operations in Alabama are at the highest rate of the year. The average output of Steel Corporation subsidiaries, estimated at 85 per cent, compares with a recent rate of 84 per cent.

The production situation also emphasizes contrasts among products. Heavy releases of sheet tonnage prior to the mid-month deadline on contract specifications have given producers backlogs that will carry them well into January. Mills are operating virtually full and Christmas shutdowns will probably be limited to two days. Tin plate output continues at 87 per cent and also promises to carry through the month with a minimum interruption. Rail output is at an ascending rate, as a result of specifications against 1929 contracts.

In wire products, releases against contracts expiring Jan. 1 have been stimulated by the recent advance in prices. Since these specifications will be accepted until the end of the month, a test of the new quotations is necessarily deferred.

The market situation in bars, plates and shapes is quieter in most districts. Many buyers did not specify fully against their fourth quarter contracts and, not being apprehensive regarding prices, are in no haste to

commit themselves for the next quarter. At Chicago, however, bar bookings for the week exceeded shipments. A feature of the Western market is the increasing demand from the farm equipment industry, which has temporarily forged ahead of automobile manufacturers as the largest user of bars.

First quarter prices on bars, plates and shapes at Eastern mill basing points, announced by the Bethlehem Steel Co., include minimum quotations on the last two products that are \$1 a ton lower than had been commonly conceded as representative of the market. The move is interpreted as an effort to stabilize prices named to the largest buyers by substituting a single open quotation for varying preferentials. To compete for Eastern business of this category mills using a Pittsburgh base will have to quote 1.80c. to 1.85c.

A gas line from Baxter Basin, Wyo., to Ogden, Utah, requiring 33,000 tons of plates, has been placed with a Milwaukee fabricator. That company is also reported to have taken an order for 200 miles of 16-in. pipe for the El Paso Natural Gas Co. Line pipe business placed this year is estimated at close to 1,000,000 tons.

Rail bookings have been augmented by a 15,000-ton order from a Western road. Although fewer roads have bought than had placed contracts up to this time in 1927, mills look for no decline in total tonnage booked when the rail buying movement is completed.

Fabricated steel orders for November, computed at 243,750 tons, were 3 per cent above the total for the same month last year, but were the smallest, except for October, since April.

Although sales gained, there was a slowing down in both production and shipments of steel sheets in November, according to reports compiled by independent mills.

Ohio River shipments of steel in November, at 137,000 tons, established a new monthly record. The total for the 11 months of this year, at 1,162,000 tons, exceeds by 150,000 tons the combined movement for the two previous years. Eastbound shipments of pig iron on the New York State barge canal also reached a new high, totaling 122,500 tons for the 1928 navigation season.

Iron ore receipts at Lake Erie ports this year totaled 36,959,000 tons, a gain of 406,000 tons over 1927. A much larger increase was shown in shipments to other than Lake Erie ports—mainly to the Chicago district—for which the total was 16,490,000 tons, or 2,447,000 tons more than in the previous year.

THE IRON AGE composite price for pig iron has declined from \$18.59 to \$18.46 a ton, its first drop since July. The finished steel composite remains unchanged at 2.391c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 18, 1928	Dec. 11, 1928	Nov. 20, 1928	Dec. 20, 1927
No. 2 foundry, Philadelphia.....	\$21.26	\$21.26	\$21.26	\$19.76
No. 2, Valley furnace.....	17.50	18.00	17.50	17.25
No. 2, Southern, Cin'ti.....	20.19	20.19	20.19	19.69
No. 2, Birmingham.....	16.50	16.50	16.50	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	20.25	20.25	19.75	19.50
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh....	20.01	20.01	20.01	19.26
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.25	18.25	18.25	17.50
Gray forge, Pittsburgh.....	18.76	19.26	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Dec. 18, 1928	Dec. 11, 1928	Nov. 20, 1928	Dec. 20, 1927
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.80

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.95	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.29	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17 1/2	2.22 1/2	2.22 1/2	2.12 1/2
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14 1/2	2.19 1/2	2.19 1/2	2.09 1/2
Steel hoops, Pittsburgh.....	2.10	2.10	2.20	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 18, 1928	Dec. 11, 1928	Nov. 20, 1928	Dec. 20, 1927
	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.85	2.85	2.75	2.80
Sheets, black, No. 24, Chicago dist. mill.....	2.95	2.95	2.85	2.90
Sheets, galv., No. 24, P'gh....	3.60	3.60	3.50	3.65
Sheets, galv., No. 24, Chicago dist. mill.....	3.70	3.70	3.60	3.70
Sheets, blue, 9 & 10, P'gh....	2.10	2.10	2.00	2.10
Sheets, blue, 9 & 10, Chicago dist. mill.....	2.20	2.20	2.10	2.15
Wire nails, Pittsburgh.....	2.65	2.65	2.55	2.50
Wire nails, Chicago dist. mill..	2.70	2.70	2.60	2.55
Plain wire, Pittsburgh.....	2.50	2.50	2.40	2.40
Plain wire, Chicago dist. mill..	2.55	2.55	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.30	3.30	3.20	3.20
Barbed wire, galv., Chicago dist. mill.....	3.35	3.35	3.25	3.25
Tin plate, 100 lb. box, P'gh....	5.25	\$5.25	\$5.25	\$5.25

Old Material, Per Gross Ton:	Dec. 18, 1928	Dec. 11, 1928	Nov. 20, 1928	Dec. 20, 1927
Heavy melting steel, P'gh....	\$18.00	\$17.75	\$17.00	\$15.00
Heavy melting steel, Phila.....	15.00	15.00	15.50	13.50
Heavy melting steel, Ch'go....	14.50	14.50	14.50	12.25
Carwheels, Chicago.....	14.00	14.25	14.25	13.50
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	14.50	14.50
No. 1 cast, Philadelphia.....	16.25	16.25	16.25	16.00
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	14.00
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)..	13.25	13.25	13.00	10.50

Coke, Connellsville, Per Net Ton at Oven:	Dec. 18, 1928	Dec. 11, 1928	Nov. 20, 1928	Dec. 20, 1927
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.85	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12 1/2	16.12 1/2	16.12 1/2	14.25
Electrolytic copper, refinery...	15.75	15.75	15.75	13.75
Zinc, St. Louis.....	6.35	6.35	6.25	5.67 1/2
Zinc, New York.....	6.70	6.70	6.60	6.02 1/2
Lead, St. Louis.....	6.35	6.35	6.17 1/2	6.30
Lead, New York.....	6.50	6.50	6.35	6.50
Tin (Straits), New York.....	49.62 1/2	49.50	51.12 1/2	58.12 1/2
Antimony (Asiatic), N. Y.....	9.87 1/2	9.62 1/2	10.25	11.25

Pittsburgh

Heavy Sheet Specifications—Steel Business Generally Is Good for December—Foundry Iron Off 50c.

PITTSBURGH, Dec. 18.—While the close proximity of the holiday season occasions some slowing up of demand, the flow of specifications as a whole is not materially lighter than it has been, and it has been really heavy in sheets as a result of the mid-December deadline on the acceptance of specifications on fourth quarter contracts. At least two manufacturers lately have found it necessary to work an extra turn on some of their sheet mills, and the problem now is whether they can limit in mill operations the observance of Christmas to merely the day before and the holiday itself. Tin plate manufacturers also have sufficient business to want to suspend mill operations only on next Monday and Tuesday.

There has been no decrease in ingot production in this and nearby districts, and, though next week may see some recession, it is commonly expected that December will round out a succession of good months in output.

Rail mill engagement is increasing, but, as an offset, pipe mills show a tendency to a declining operation. Two good-sized line pipe orders went West recently. Some of the large pipe furnaces are down as a result of completion of old orders.

There is much interest in the price announcement of the leading Eastern producer of bars, plates and shapes, especially as it means that on Eastern business local mills will now have to

do 1.80c. to 1.85c., Pittsburgh, on plates and shapes to compete with Eastern mills.

The test of the new wire schedule is somewhat delayed by the fact that makers still owe considerable tonnages to distributors on old contracts.

The inside prices on hot-rolled strips are not being strictly confined to the so-called round tonnage buyers, and there are reports that some makers of cold-rolled strips of lim-

ited capacity have found it necessary to go under the regular price of 2.85c., base, to secure orders. In the latter case, however, there is no general recognition of the concession, since those making it account for so little of the total production.

Some large users of bars seem to think they should be given preferential price treatment when their orders are of sufficient size to enable the mills to cut producing costs.

The scrap market has a very strong undertone and presents some rather unusual price movements and relationships. A sale of a round tonnage of heavy breakable cast scrap to a melter that has used it very infrequently in the past was at \$2 or more a ton above the last previous sale of importance. As much as \$19 has been paid for compressed sheets by a melter using no other grade to any considerable extent; that grade is very scarce and at \$19 is at a premium of 50c. a ton over the highest price actually paid in this district for heavy melting steel.

A reappearance of \$17.50, Valley furnace, for No. 2 foundry iron, a drop of 50c. a ton, stands out in a dull and uninteresting pig iron market. This came on a tonnage that has

presented the only real test prices have had recently.

Pig Iron.—A price of \$17.50, Valley furnace, again has appeared on No. 2 foundry iron, one fair-sized tonnage for shipment over the first quarter of next year having been placed at that price. The small-lot market remains quotable at \$18 for this grade. It had been observed in these reports recently that the test of large inquiry was lacking. Business in iron generally is slow, as it usually is at this time of the year. Some producers report a slackening of specifications on old orders, owing to the approach of the holiday period, but generally shipments are holding up well, and most producers find the outward movement exceeding production. There is little interest in the steel-making grades, although one melter has taken prices on a round lot of basic iron. This inquiry does not appear to have produced lower prices than \$17.50, Valley furnace. That this grade should show some resistance to pressure is probably due to the fact that the scrap market lately has shown considerable strength and with it is the possibility that steel makers will be obliged to use more pig iron and therefore will have less for market. Struthers furnace, Struthers, Ohio, went into blast Sunday night.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	\$18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Shipments of billets, slabs and sheet bars still are large on fourth quarter contracts, but no considerable amount of first quarter tonnage yet has reached makers' books, nor have negotiations for that period assumed much activity. Since an advance of \$1 a ton over this quarter's price is sought for the next quarter on sheet bars, detached mills are specifying on existing arrangements, especially as it will be well past the turn of January before fourth quarter sheet business can be

completed. Fairly good business is reported in wire rods, and no great trouble attends the efforts to line up buyers for their first quarter requirements. Rods extras have been revised, but the only changes are in the carbon range limits.

Bars, Plates and Shapes.—Buyers are specifying steadily and, while demands provide no tax either on the productive capacity or on the ability of the mills to make prompt deliveries, they are sufficient to sustain the recent rate of operations. Contracting for the first quarter also is steady rather than active, buyers generally taking the position that as higher prices are not likely in the near future there is no need of haste about commitments. In bars, some large users talk of seeking more favorable price terms; on orders for 200 or 300 tons of a size, for one rolling and one shipment, they feel entitled to some of the saving that such orders permit in rolling costs. Plate business locally suffers from light railroad car and river barge business, and, while pipe line business is heavy, it is going largely to a central Western maker, and local mills are not much benefited. Structural awards to local shops are few and small, and there are no outstanding pending projects in this area.

Rails and Track Supplies.—Operations of the local standard-section rail mill are expanding, with the specifying of 1929 rails for January delivery. Local makers of spikes, track bolts and tie plates have the promise of a share in the requirements of the New York Central Lines, but there has been no formal distribution of orders. This is the most recent inquiry of a size to test prices, and it is said that it brought out no deviations from the regular quotations. Suggestions of lower prices for tie plates from the West find no verification here.

Wire Products.—Mills still owe customers considerable quantities of nails carrying the prices ruling prior to Dec. 5. The effect of the recent advance has been to stimulate specifications. In a general way, no great re-

sistance to the new prices is being encountered, and first quarter contracting is said to be fairly heavy. Some jobbers, who, on account of the size of their purchases, are included in the class getting only 5c. per 100 lb. under the published schedule, do not like the new sales plan and are protesting.

Tubular Goods.—Line pipe and seamless oil country pipe still are active, but good demand for the former is not helping Pittsburgh district mills, as the 287-mile line of 14-in., 16-in. and 18-in. pipe for the Western Public Service Corporation gas line to run from Wyoming to Salt Lake City and Ogden, Utah, went to the A. O. Smith Corporation, Milwaukee, and that interest also is said to have taken 200 miles of 16-in. for the El Paso Natural Gas Co. line from Lea County, N. M., to El Paso. Several of the large pipe furnaces of makers in this and nearby districts are down for want of orders, while the Milwaukee producer is said to have 1600 miles of various sizes on its books. Lapwelded oil country pipe is very dull, but there is a fairly good demand for butt welded pipe for the time of year. In the new boiler tube price schedule, announced in THE IRON AGE last week, manufacturers have made a slight amendment in discounts on lots of less than 10,000 lb. of charcoal iron tubes, on which the basing discount is lowered two points, with no preferential discount allowed. In the seamless tube price list, against which the new discounts on charcoal iron and lapwelded steel tubes apply, the Birmingham wire gage on 2¼-in. tubes has been changed to No. 12 gage, or 0.109 in., and the price for standard thickness is 29c. per ft., 31c. for one extra wire gage, 35c. for two extra wire gages, 38c. for three extra wire gages and 42c. for four extra wire gages.

Sheets.—Not a little sheet business was driven in by the fact that last Saturday was the closing date on specifications on four quarter contracts, and prices for the next quarter are \$2 a ton above those ruling on

THE IRON AGE Composite Prices

Finished Steel

Dec. 18, 1928, 2.391c. a Lb.

One week ago.....	2.391c.
One month ago.....	2.369c.
One year ago.....	2.314c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1928	2.391c., Dec. 11;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Dec. 18, 1928, \$18.46 a Gross Ton

One week ago.....	\$18.59
One month ago.....	18.54
One year ago.....	17.54
10-year pre-war average.....	15.72

Based on average of basic iron-at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.59, Nov. 27;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.22c. to 2.32c.
Del'd New York.....	2.24c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 1.95c.
F.o.b. Cleveland.....	1.90c. to 1.95c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.I.F. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist....	1.85c. to 1.95c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.10c. to 2.20c.
F.o.b. Coatesville.....	2.00c. to 2.10c.
F.o.b. Sparrows Point.....	2.00c. to 2.10c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.17½c. to 2.27½c.
C.I.F. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.00c. to 2.10c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.14½c. to 2.24½c.
C.I.F. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base per Lb.
6 in. and narrower, P'gh.....	1.90c. to 2.00c.
Wider than 6 in., P'gh.....	1.80c. to 1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.10c.
Cooperage stock, Chicago.....	2.20c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.85c.
Strips, Cleveland.....	2.85c. to 2.95c.
Strips, del'd Chicago.....	3.15c. to 3.25c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails.....	\$2.65 to \$2.75
Galvanized nails.....	4.65 to 4.75
Galvanized staples.....	8.35 to 8.45
Polished staples.....	8.10 to 8.20
Cement coated nails.....	2.65 to 2.75

Base per 100 Lb.

Bright plain wire, No. 6 to No. 9 gage.....	\$2.50 to \$2.60
Annealed fence wire.....	2.65 to 2.75
Spring wire.....	3.50 to 3.60
Galv'd wire, No. 9.....	8.10 to 8.20
Barbed wire, galv'd.....	3.30 to 3.40
Barbed wire, painted.....	3.05 to 3.15

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, W. Va., or Reading, Pa.....	\$2.75
Less carloads, Wheeling or Reading.....	2.85

Woven Wire Fence

Base to Retailers per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh.....	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.29c.
Nos. 9 and 10, del'd Philadelphia.....	2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.95c.
No. 24, del'd Cleveland.....	3.04c.
No. 24, del'd Philadelphia.....	3.17c.
No. 24, f.o.b. Birmingham.....	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade.....	4.00c.
No. 24, f.o.b. P'gh, No. 2 grade.....	3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.70c.
No. 24, del'd Cleveland.....	3.79c.
No. 24, del'd Philadelphia.....	3.92c.
No. 24, f.o.b. Birmingham.....	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.00c.
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Vitreous Enamelling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20.....	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00.....	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.80.....	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.	Alloy	Net
S.A.E. Series	Differ-	Price 100
Numbers	ential	Lb. Bars
2000 (½% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.80
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.80
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
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4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
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4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
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5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.85	3.10
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5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
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5100 Chromium Spring Steel.....	0.20	2.95
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6100 Chromium Vanadium Bars.....	1.20	3.95
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6100 Chromium Vanadium Spring Steel.....	0.95	3.70
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9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
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Rounds and squares.....	0.50	3.25
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Chromium Nickel Vanadium.....	1.50	4.25
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Carbon Vanadium.....	0.95	3.70
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Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¼c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel		Iron	
Inches	Black	Inches	Black
1½.....	45	1½ to ¾.....	+11 +39
1½ to ¾.....	51	¾.....	22 2
¾.....	56	¾.....	28 11
¾.....	60	1 to 1½.....	30 18
1 to 3.....	62	50½.....	

Lap Weld

2.....	55	43½.....	23 7
2½ to 6.....	59	47½.....	26 11
7 and 8.....	56	43½.....	28 18
9 and 10.....	54	42½.....	26 11
11 and 12.....	53	40½.....	

Butt Weld, extra strong, plain ends

1½.....	41	24½.....	1½ to ¾.....+19 +54
1½ to ¾.....	47	30½.....	½.....21 17
¾.....	53	42½.....	¾.....23 12
¾.....	58	47½.....	1 to 1½.....30 14
1 to 1½.....	60	49½.....	
2 to 3.....	61	50½.....	

Lap Weld, extra strong, plain ends

2.....	53	42½.....	2.....23 9
2½ to 4.....	57	46½.....	2½ to 4.....29 15
4½ to 6.....	56	45½.....	4½ to 6.....28 14
7 to 8.....	52	39½.....	7 to 8.....21 7
9 and 10.....	45	32½.....	9 to 12.....16 2
11 and 12.....	44	31½.....	

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2½ in..	40	1½ in.	1
2½ in.—2¾ in..	48	1¾ in.	8
3 in.	54	2 in.—2½ in..	13
3½ in.—3¾ in..	56	2½ in.—2¾ in..	16
4 in.	59	3 in.	17
4½ in. to 6 in..	48	3½ in. to 3¾ in..	18
		4 in.	20
		4½ in.	21

Beyond the above base discounts two fives are being quoted on carload lots of lap-welded steel tubes.

On charcoal iron boiler tubes the base discount is subject to 10 per cent preferential discount on full carload shipments.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1½ to 1¾ in..	55	3½ to 3¾ in..	50
1¾ in.	39	4 in.	53
2 to 2½ in..	34	4½, 5 and 6 in..	42
2½ to 3 in..	42		

Hot Rolled

2 and 2½ in..	40	3½ to 3¾ in..	56
2½ and 2¾ in..	48	4 in.	59
3 in.	54	4½, 5 and 6 in..	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

this quarter's commitments. As a result, mills are well supplied with orders in almost all finishes that will carry them well into next month, but a good many buyers, by the same token, will secure no small part of next month's requirements without being obliged to pay any advance in prices. It is not helpful to the early 1929 market that a good deal of roofing material lately released will hardly enter consumption until along in February. Mill operations are approximately full this week, and except for such recession as is occasioned by the observance of Christmas, there will be full operation next week. Manufacturers generally plan to suspend at noon the Saturday before Christmas and will not resume until the second turn on Wednesday following the holiday.

Tin Plate.—Complete suspension of a Chicago district independent tin plate plant is planned for all of next week, but generally manufacturers are so well supplied with business that a strong effort will be made to confine observance of Christmas in the mills to Monday and Tuesday. The course of the Chicago mill is dictated by a belief that it will be hard to keep the crews intact during the holiday week. Spot demands still are good and specifications for early 1929 requirements are pouring in freely. This week's mill engagement is about 87 per cent of capacity.

Cold-Finished Steel Bars and Shafting.—Real activity is lacking, although specifications are being made steadily and no resistance is encountered in getting consumers to sign up for their first quarter needs. Present automobile production is moderate, and early 1929 plans wait on the results of the showing of new models.

Old Material.—Surface activity is not great, but under the surface the market is boiling as a result of the

growing realization that supplies of the steel works grades are none too large and a belief that between now and the end of the year steel makers will have to buy. Heavy melting steel has been sold at \$18.50 in this district, and none seems available at less than \$18, while up to \$19 has been paid by one consumer for compressed sheets for shipment from the Detroit district. There is sympathetic strength in railroad specialties and in low phosphorus scrap. A sale of 10,000 tons of heavy breakable cast scrap to a Pittsburgh district steel company is noted at \$15.50. The last previous sale of this grade of any importance was at \$13.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

Heavy melting steel.....	\$17.50 to \$18.50
Scrap rails	18.00 to 18.50
Compressed sheet steel....	18.00 to 19.00
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary..	18.50 to 19.00
Heavy breakable cast.....	15.00 to 15.50
No. 2 railroad wrought....	18.00 to 19.00
Hvy. steel axle turnings...	16.00 to 16.50
Machine shop turnings....	11.50 to 12.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Rolled steel wheels.....	19.00 to 19.50
Low phos. billet and bloom ends	21.00 to 21.50
Low phos., mill plates.....	19.50 to 20.00
Low phos., light grade....	18.50 to 19.00
Low phos., sheet bar crops	19.50 to 20.00
Heavy steel axle turnings.	16.00 to 16.50

Electric Furnace Grades:

Low phos. punchings.....	19.00 to 19.50
Hvy. steel axle turnings..	16.00 to 16.50

Blast Furnace Grades:

Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings.....	12.00 to 12.50

Rolling Mill Grades:

Steel car axles.....	20.00 to 21.00
No. 1 railroad wrought....	13.50 to 14.00
Sheet bar crops.....	19.00 to 19.50

Cupola Grades:

No. 1 cast.....	14.50 to 15.00
Rails 3 ft. and under.....	19.50 to 20.00

Hot-Rolled Flats.—Hot-rolled strips still are quoted at the recent price range, but while it is said that no further concessions have been made to large consumers, it is admitted that the inside prices are extending to the small-tonnage buyers. Specifications are fairly steady on old orders, and a fair amount of first quarter business has been written, although some of the very large users are yet to close for their requirements.

Cold-Rolled Strips.—Makers generally are holding firmly to 2.85c., base, although a few deviations from that price are said to have been made by producers whose capacity is limited. Specifications are coming in fairly freely and much first quarter business has been written at the full quotations.

Coke and Coal.—Two blast furnaces, expected to go in this month, have not been lighted and this has left the spot supply of furnace coke a little too large for requirements.

Prices still are easy, although producers have not been obliged to go below \$2.75 per net ton at ovens. First quarter coke for a Buffalo furnace and a central Pennsylvania furnace was placed recently at prices ranging from \$2.80 to \$2.85. Foundries generally are under cover for their coke requirements for the first quarter and half of next year. Production of slack coal has decreased and now is more in line with demand, with the result that prices are slightly firmer; the market otherwise is as dull and weak as ever.

Urges Free Clinic as Safeguard to Workers' Health

Edward N. Hurley, chairman of the board Electric Household Utilities Corporation, Chicago, has offered to assist in raising funds for the construction of a community clinic on McKinlock Campus of Northwestern University, Chicago, if that institution will provide the site. In a letter to Walter Dill Scott, president of the university, Mr. Hurley states that business losses from technical and managerial incompetence are of minor importance compared with the loss from preventable bodily defects and breakdowns among the nation's workers. The present annual loss of time caused by preventable illness of 42,000,000 workers employed in gainful occupation, he said, is 350,000,000 hours.

The plan contemplates giving periodical physical examinations free to those without means, but fees would be charged those who can afford them.

Railroad Traffic in First Nine Months

Freight traffic in the first three-quarters of 1928 reached 349,164,000,000 net ton-miles, according to figures of the Bureau of Railway Economics, Washington. This shows a decrease of about 2¼ per cent compared with 1927 and also with 1926.

Improved operating performance has been achieved in many ways. Freight cars in the first nine months have moved an average of 30.7 miles a day, representing an almost continuous increase from 27.6 miles in 1923. This includes all cars in service, either in transit or standing still. Net tons per freight train have increased from 718 in 1923 to 787 in 1928. Freight train speed has risen consistently from 10.8 miles an hour in 1923 to 12.9 miles in 1928. Gross ton-miles per freight train-hour have increased consistently from 16,607 in 1923 to 23,537 in 1928.

Fuel consumed for each 1000 gross ton-miles in freight service has improved progressively from 161 lb. in 1923 to 126 lb. in 1928. Similarly, fuel consumption in passenger service has improved from 18.2 lb. per passenger train car-mile in 1923 to 14.9 lb. in 1928.

Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.

Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to \$34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars

	(Open hearth or Bessemer)	Per Gross Ton
Pittsburgh		\$33.00 to \$34.00
Youngstown		33.00 to 34.00
Cleveland		33.00 to 34.00

Slabs

	(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh		\$33.00
Youngstown		33.00
Cleveland		\$33.00 to 34.00

Skelp

	(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Grooved		1.90c. to 2.00c.
Universal		1.90c. to 2.00c.
Sheared		1.90c. to 2.00c.

Wire Rods

	(Common soft, base)	Per Gross Ton
Pittsburgh		\$42.00
Cleveland		42.00
Chicago		43.00

Prices of Raw Material

Ores

	Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron.....		\$4.55
Old range non-Bessemer, 51.50% iron.....		4.40
Mesabi Bessemer, 51.50% iron.....		4.40
Mesabi non-Bessemer, 51.50% iron.....		4.25
High phosphorus, 51.50% iron.....		4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore		Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....		10.00c.
Iron ore, low phos., Swedish, average 68% iron ..		10.00c.
Iron ore, basic Swedish, average 65% iron.....		9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus.....		36c. to 38c.
Manganese ore, Brazilian, African or Indian, basic 50%		35c. to 37c.
Tungsten ore, high grade, per unit, in 60% concentrates		\$11.40 to \$12.00
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard		\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered		50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.85
Foundry, by-product, Chgo ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines.....	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines.....	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$34.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
10%	\$31.00	12%	\$35.00
11%	 33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
6%	\$24.00	10%	\$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey ...	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons....	70
C.p.c. and t, square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. .70	
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	(1/2-In. and Larger)	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....		\$2.90
F.o.b. Chicago		3.00

Small Rivets

	(7/8-In. and Smaller)	Per Cent Off List
F.o.b. Pittsburgh		70 and 10
F.o.b. Cleveland		70 and 10
F.o.b. Chicago		70 and 10

Cap and Set Screws

	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)
	Per Cent Off List
Milled cap screws.....	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread.....	75 and 10
Upset hex. head cap screws, U.S.S. thread.....	85
Upset hex. cap screws, S.A.E. thread.....	85
Upset set screws.....	80, 10 and 5
Milled studs	70

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 3/4 in. x 6 in. take 10 per cent lower list prices.

Chicago

Steel Releases Indicate Heavy Shipping Volume Early in New Year—Ingot Output Up to 85 Per Cent

CHICAGO, Dec. 18.—Demand for most of the grades of finished steel products remains at a high level, and, with rail mills now rolling on 1929 schedules, ingot output in the Chicago district has advanced to 85 per cent of capacity. Rail mill production has been stepped up 10 points to 60 per cent of capacity in the past week.

A sense of security has taken hold of buyers and sellers. There is less hesitancy in placing forward orders, with the result that books are growing and release orders point to a heavy shipping volume after the turn of the year. Building construction in Illinois in 1928 will exceed the figure for the previous year by not less than 15 per cent. This, however, is not a true reflection of structural steel demand because there was a decrease in small structures, whereas there has existed in the past 12 months a large demand for tall steel frame structures, industrial buildings and railroad and highway bridges.

Railroad equipment contracts are slow in maturing, but the pending volume is large and additional inquiries are in the making. Car shops are reacting slowly to the prospect of an increasing volume of business. It is evident that shop organizations will be built cautiously until a better perspective is to be had of the proportions the car buying movement will attain.

Sales of finished steel products, again influenced by new orders for rails and track supplies, are well up to the average of the past six weeks. Specifications are second only to those of the peak week of the year, which came in the first week in January, following a quiet period in December. Release orders are 50 per cent heavier than in any seven-day period since early in March. This is a reflection of the relatively high consuming demand in December, this year, and it promises shipments in the coming month that will exceed the volume sent from mills in the first month of 1928.

Pig Iron.—Buying of Northern pig iron is light, being confined to odd lots for immediate use. Shipments are well sustained, but a slower rate is expected during the holidays. First quarter coverage is unusually complete, and specifications for release after Jan. 1 are large. In general, melters covered well for the fourth quarter, and spot buying, particularly in the past three weeks, has been in smaller volume than usual at this time of year. Shipments of charcoal iron are heavy, and prices are steady at \$24 a ton, furnace. Shipments of Southern iron into this district in December give promise of being the largest for any month so far this year.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail) ..	\$22.51 to 23.01
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent.	30.79
Bess. ferrosilicon, 14-15 per cent...	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The price of ferromanganese is steady at \$105 a ton, seaboard. The spiegeleisen market is quiet.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Coke.—Shipments of by-product foundry coke are heavy and equal to production. Producers' stocks are light. Prices are firm at \$8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets.—Specifications are heavier, but for the most part for delivery after the turn of the year. Producers, finding shipments lighter, are building stocks against deliveries to be made after Jan. 1.

Wire Products.—Forward contracting is sluggish and spot purchases are dull as the end of the year approaches. Orders from the jobbing trade in the South are in good volume, but in the Northwest orders are lighter. Specifications from the manufacturing trade are smaller. Producers, anxious to hold stocks in most lines at their present size, have curtailed output, the average now being about 62 per cent of capacity. Shipments of road mesh are light, but deliveries of woven wire fencing are in good volume and give promise of bringing the total tonnage for 1928 in line with that of 1927. Jobbers' stocks of nails are said to be small, and current orders are more numerous than usual at this time of year.

Reinforcing Bars.—Buyers of reinforcing bars have been unusually inactive, considering that a round tonnage is pending. Architects are busy, so must dealers attribute the lull in business to the holiday season and expect a more active market soon after the turn of the year. Shipments from shops are in good volume for this time of the year. Backlogs are shrinking and ship operations are tapering. Warehouse prices now being named are 2.35c. a lb. for the billet bar product and 2.20c. for rail steel bars. Protections on old quotations expired Dec. 15.

Sheets.—This market is quiet. For the most part, users have specified in full against fourth quarter contracts,

but insist that much of the tonnage be held for shipment after the turn of the year. Producers get reports that stocks in the hands of most consumers are light and on that score they anticipate a sharp upward turn in specifications and new buying after Jan. 1. Among the more active users of sheets at this time may be named car builders, who are in the market for roofing sheets; the agricultural implement trade and manufacturers of furnaces. Sales are unusually light and do not afford a satisfactory test of the market.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has taken 1800 tons of pipe for Racine, Wis., at \$35.75 a ton, Birmingham, or \$44.25 a ton, delivered. This price is \$2.25 a ton above the lowest quotation by an American maker last week at Detroit. Producers have not named winter buying prices, and so far local conditions and the character of orders seem to be the determining factors in setting prices for orders to be delivered in the spring. Car lots are moving in this district at \$37 to \$38 a ton, Birmingham. Several public utilities are preparing schedules for 1929. Deliveries are prompt on practically all common sizes.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$46.20; 4-in., \$46.20 to \$50.20; Class A and gas pipe, \$4 extra.

Structural Material.—Reports are persistent that the Chicago Board of Trade Building, requiring 18,500 tons of steel, has been placed with a local fabricator. As a general thing, the local market is quiet. Awards for the week total 2000 tons and fresh inquiry is for 1200 tons of bridges for the Kansas City Southern. The bulk of the steel needed for the Mercantile Mart, 38,000 tons in all, has been shipped here by boat and the work of fabrication in local shops will soon be under way. Shops are operating at a fair winter rate, and the anxiety to maintain present schedules leads to keen competition, with no improvement in prices. Deliveries on shapes are improved, mill promises now being from two to three weeks. Forward contracting is moderately active at 2c. to 2.10c., Chicago. Following the custom in recent years, fabricators are not inclined to make blanket contracts, but prefer to buy against actual awards.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Plates.—Outstanding among orders for plates this week is 33,000 tons placed by a Milwaukee welded pipe maker for a 287-mile gas transmission line from Baxter Basin, Wyo., to Ogden, Utah. An oil producer in Texas has ordered storage tanks to be fabricated in this district that will take 6000 tons of plates. Miscellaneous inquiry for similar projects in the Southwest will take 8000 tons. Or-

ders for railroad equipment total 200 gondolas, requiring 3000 tons of steel. It is reported that the Santa Fe is making revisions to its recent inquiry for passenger train equipment. Although specifications against recent car orders are now being sent to mills by shops, the total tonnage is not of large proportions. Builders of railroad equipment operated at very low capacity all through the fall months, and they are moving cautiously in the matter of building larger organizations than needed at this time for work in hand. This is tending to make orders move slowly through shops. Deliveries on plates range from two to three weeks, and it is generally estimated that car shops will not increase operations until late in January. Prices for plates in Chicago are steady at 2c. to 2.10c. per lb.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Hot - Rolled Strip.—Forward contracting in and near Chicago in hot-rolled strip is making rapid headway among the smaller users. Some large buyers, notably those in Detroit, are staying out of the market. Current specifications are in good volume.

Rails and Track Supplies.—Chicago rail mills have started to roll against 1929 contracts, and, as a result, output has been advanced to 60 per cent of capacity. A Western railroad has closed for 15,000 tons of standard-section rails, and inquiry stands at 70,000 tons. The Illinois Central, the Burlington and the Rock Island are among the large Western lines that have not yet made 1929 commitments. Miscellaneous purchases of track supplies total 18,000 tons, and fresh inquiry is for a like amount and includes 8000 tons of iron tie plates. Although the general market for steel tie plates holds at \$43 a ton, there are reports of concessions on several recent orders.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—The Chicago scrap market is less active as the holiday season approaches. Large consumers

of the heavy tonnage grades will still take shipments on contracts and small users continue to hold stocks to the minimum and enter the market for carloads as required. It is said that the Illinois Central obtained \$17.05 a ton on track for 1000 tons of rerolling rails. The supply of borings appears to be a trifle short of demand and dealers are paying \$12.25 to \$12.30 a ton delivered. The cast iron car wheel market is quiet and prices are easier, as gaged by a recent sale of several hundred tons. Shortage of the malleable grades is not relieved, and prices are strong. Shipments by railroads are well sustained, but cold weather and snow may hamper the gathering and preparation of scrap, with resultant lighter shipments.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$14.50 to	\$15.00
Shoveling steel	14.50 to	15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to	16.25
Hydraul. compressed sheets	13.00 to	13.50
Drop forge flashings.....	10.50 to	11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to	18.25
Railr'd tires, charg. box size	17.50 to	18.00
Railr'd leaf spring cut apart	17.50 to	18.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.00 to	16.50
Coil springs	18.25 to	18.75
Electric Furnace Grades:		
Axle turnings	14.50 to	15.00
Low phos. punchings.....	16.50 to	17.00
Low phos. plate, 12 in. and under	16.50 to	17.00
Blast Furnace Grades:		
Axle turnings	12.00 to	12.50
Cast iron borings.....	11.75 to	12.25
Short shoveling turnings..	11.75 to	12.25
Machine shop turnings....	8.00 to	8.50
Rolling Mill Grades:		
Iron rails	15.00 to	15.50
Rerolling rails	16.50 to	17.00
Cupola Grades:		
Steel rails less than 3 ft..	17.25 to	17.75
Steel rails less than 2 ft..	19.00 to	19.50
Angle bars, steel.....	16.50 to	17.00
Cast iron carwheels.....	14.00 to	14.50
Malleable Grades:		
Railroad	17.00 to	17.50
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00

Per Net Ton

Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and transoms	20.50 to	21.00
Iron car axles.....	26.50 to	27.00
Steel car axles.....	15.50 to	16.00
No. 1 railroad wrought...	13.25 to	13.75
No. 2 railroad wrought...	13.00 to	13.50
No. 1 busheling.....	11.50 to	12.00
No. 2 busheling.....	6.00 to	6.50
Locomotive tires, smooth..	13.25 to	13.75
Pipes and flues.....	9.50 to	10.00
Cupola Grades:		
No. 1 machinery cast.....	15.50 to	16.00
No. 1 railroad cast.....	15.00 to	15.50
No. 1 agricultural cast.....	14.50 to	15.00
Stove plate	12.25 to	12.75
Grate bars	12.50 to	13.00
Brake shoes	11.50 to	12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Buying is active, and for the week totals more than shipments. Deliveries of mild steel bars range from three to five weeks. Now that the automobile manufacturers have dropped to a lower rate of output,

farm machinery makers are again in the lead as the largest single group of bar users. A review of the year brings to light more forcibly than before the rapidly spreading use of steel bars, not only in total tonnage, but in a much wider circle of consumers. Specifications for alloy steel bars are in fair volume, and prices, with forward contracting practically completed, are steady. The local iron bar market is quiet. Most users of rail steel bars are committed for the first quarter at 1.95c. per lb., Chicago Heights. Specifications have dropped sharply for bars that are to be delivered before the first of the year, but releases are large for shipments after Jan. 1.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Ohio River Steel Tonnage Mounting

Steel products moved on the Ohio River made another high record mark in November, the monthly report of the United States Corps of Engineers, Pittsburgh office, reports, with a total of 137,019 net tons. The best previous record, made in October, was bettered by almost 7000 tons.

Total tonnage for the year to Nov. 30 was brought to 1,162,445 tons. This also is a record figure and approximately 150,000 tons in excess of the combined movement for the entire years of 1926 and 1927. For the 11 months last year the movement was 628,790 tons, of which November contributed 70,863 tons.

Large Automotive Parts Makers to Be Merged

The Borg-Warner Corporation, Chicago, and the Galesburg Coulter-Disc Co., Galesburg, Ill., large manufacturers of automobile and agricultural implement parts, will be consolidated through an exchange of stock, probably on a share for share basis. The Borg-Warner Company was formed this year by a merger of the Borg & Beck Co., the Marvel Carburetor Co., the Warner Gear Co., and the Universal Joint Co., and manufactures carburetors, transmission gears and universal joints. Its plants are at Chicago, Rockford and Moline, Ill.; Indianapolis and Muncie, Ind., and Flint, Mich. The Galesburg Coulter-Disc Co. last year absorbed the Indiana Rolling Mill Co., Newcastle, Ind., and manufactures sheet steel shovels, blades for farming implements, and discs for automobile clutches, with plants at Galesburg and Newcastle.

Messrs. C. P. Sandberg, consulting and inspecting engineers, London and New York, have removed their offices in the latter city to the Cunard Building, 25 Broadway.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.35c.
Reinforc'g bars, rail steel.....	2.20c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List

Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.20
Cement c't'd nails, base per keg.....	3.20

Philadelphia

Minimum Prices on Plates and Shapes Reduced \$1 a Ton—Contracting Light

PHILADELPHIA, Dec. 18.—Eastern Pennsylvania producers of plates and shapes expect to follow the action of the Bethlehem Steel Co. in reducing prices on plates to a minimum of 2c., Coatesville, and shapes to 2c., mill. The revision on shapes formally recognizes prices that have prevailed on desirable business for some time. Some first quarter plate contracts, however, have been closed at the former level of 2.05c., Coatesville, and on such business it may be necessary to rewrite the contracts to the new level, which had previously been granted only to certain large users. Bar quotations are unchanged at 1.90c., Pittsburgh, and 2c., Lackawanna, for first quarter contracts. Black and galvanized sheet prices are quite firm for first quarter, but blue annealed sheets range from 2c. to 2.10c., Pittsburgh. The holidays and the year-end inventory are beginning to affect the iron and steel markets, so that almost no new tonnage is being booked, and specifications for shipments on current contracts have shown a decline.

Pig Iron.—Standard foundry iron continues at \$20.50 to \$21 per ton, furnace, the higher quotation being for first quarter. While some small orders for the next quarter have been placed at the top price, substantial quantities have generally brought out \$20.50, the price for delivery to the end of this year. In the past week some contracts have been closed. About 300 tons of No. 3 foundry for the Lobdell Car Wheel Co., Wilmington, Del., went to an eastern Pennsylvania furnace and about 2000 tons of foundry grade for the Salem Brass & Iron Mfg. Co., Bridgeton, N. J., was distributed among four eastern Pennsylvania makers. The National Radiator Co., which closed a few weeks ago on a substantial tonnage of foundry iron for New Castle, Pa., has also bought 500 tons for its Trenton, N. J., plant. This order, in addition to iron still to be shipped on contracts at Trenton, is expected to be sufficient to carry the company through most of the next quarter. Low phosphorus pig iron consumers in this district are in most cases covered for their requirements in the next few months. The Virginia pig iron interest has sold about 17,000 tons of pig iron in the past week to Virginia cast iron pipe foundries. This sale has reduced the total unsold tonnage of the furnace by half.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to	
2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to	
2.75 sil.	21.76 to 22.26
East. Pa. No. 1X,	22.26 to 22.76
Basic (del'd east. Pa.)...	20.25 to 20.75
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b.	
N. Y. State furnace)...	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b.	
furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to	
2.25 sil.	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Prices are firm at 1.90c. to 2c., Pittsburgh, or 2.22c. to 2.32c., delivered Philadelphia. A moderate tonnage of bars has been entered on first quarter contracts, and no recession from the present price level seems to be expected by the mills.

Shapes.—Announcement last week of first quarter prices by the Bethlehem Steel Co. established the shape market at 2c. to 2.10c., Bethlehem, or nearest mill to consumer. While this is a \$1 a ton reduction from the recent quotation of 2.05c., f.o.b. mill, it openly recognizes the level prevailing for some time on desirable business. A substantial tonnage of fabricated steel is in prospect, and pending shipbuilding contracts should provide some good orders next year.

Plates.—Revision of the market on plates to a range of 2c. to 2.10c., Coatesville, represents a decline of \$1 a ton from 2.05c., Coatesville, at which most contracts have been made for first quarter. All eastern Pennsylvania plate mills have not yet adhered to the price announced by the Bethlehem Steel Co., but expect to do so in a few days and probably will rewrite some contracts to the lower level. Specifications have diminished as the year end approaches, but some substantial tonnage is in prospect for next year.

Warehouse Business.—Orders for steel products from stock are maintained at a good level and prices are firm.

Sheets.—Contracting for the next

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier	2.70c.
Plates, 3/8-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforce. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats.	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to 1/8-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
1/4-in.	5.30c.
3/8-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

quarter has not yet developed in the proportions expected, but consumers are taking shipments quite freely on present contracts. Mills are maintaining prices firmly at 2.85c. per lb., Pittsburgh, or 3.17c., Philadelphia, on black sheets, and 3.60c., Pittsburgh, or 3.92c., Philadelphia, on galvanized. Blue annealed sheets continue to range from 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., Philadelphia, the lower price being for the narrower widths, on which there is competition from the continuous sheet mills.

Imports.—In the week ended Dec. 15, steel arrivals at this port consisted of 210 tons of structural shapes and 55 tons of steel bars from Belgium, 36 tons of shapes from Germany, 22 tons of steel scrap from the United Kingdom and 10 tons of ferrochrome from Switzerland. No pig iron or ore importations are reported.

Old Material.—The week has been quiet, with transactions confined to purchases by brokers filling contracts with mills. In the absence of any buying of consequence prices are unchanged. Dealers report some difficulty in obtaining No. 1 heavy melting steel at the prices they have offered, and in some cases are paying up to \$15.25 per ton for material to fill \$15.50 per ton contracts with eastern Pennsylvania mills.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$15.00 to \$15.50
Scrap T rails.	14.50 to 15.00
No. 2 heavy melting steel.	12.00 to 12.50
No. 1 railroad wrought.	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)...	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars.	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under.	19.00 to 20.00
Couplers and knuckles.	17.50 to 18.00
Rolled steel wheels.	17.00 to 17.50
No. 1 blast f'nace scrap.	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire.	12.00 to 12.50
Cast iron carwheels.	16.50
No. 1 cast.	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling.	16.50 to 17.00

German Interests Plan Argentine Wire Mill

HAMBURG, GERMANY, Dec. 1.—The Allgemeine Electricitäts Gesellschaft and the Felton & Guillaume interests, which have acquired joint control of the Sociedad Electro Metalurgico Argentina at Buenos Aires, Argentina, plan the construction of a modern wire mill in Buenos Aires. The plant will cost close to \$1,500,000 and will produce insulated wires and cables, and some barbed wire and wire netting.

Cleveland

Steel Moving in Fair Volume for December—Some Hold-up of Shipments to Automobile Companies

CLEVELAND, Dec. 18.—Specifications against outstanding contracts for steel bars, plates and structural shapes continue to come out in fair volume, although there is no special incentive, in view of the fact that prices for the next quarter will not be higher. Some of the mills have closed first quarter contracts with most of their regular customers, but others, which have not been pushing contracts, have not made many commitments for that delivery.

While 1.95c., Cleveland, is the usual quotation on steel bars by outside mills, when using Cleveland as a basing point, some of the mills have gone to 1.90c., Cleveland, thus meeting the Cleveland mill price. Structural shapes and plates are steady at 1.90c. to 1.95c., Pittsburgh, the lower price for large-lot buyers. Small plate consumers are placing first quarter contracts with their regular sources of supply usually at 1.95c., Pittsburgh.

Sheet and strip steel are moving rather slowly to the automotive industry, although probably as well as could be expected at this time of the year. There has been some holding up of deliveries on auto body sheets, also failure to issue releases against other grades of sheets and strip steel because of delay by one automobile manufacturer in getting under production on new models. However, it is expected that a large production on these cars will be started early in January. Some automobile manufacturers have placed contracts for round tonnages of sheets and hot-rolled strip steel for the first quarter, but others have not come into the market. Most hot-rolled strip users in this territory have already contracted.

Structural material is moving well in small lots. New inquiries include 4000 tons for grade crossing elimination work in Cleveland. The hangar for the Goodyear-Zeppelin Co., Akron, requiring 6500 tons, may be placed this week.

Pig Iron.—The market has quieted down materially, although Cleveland interests sold 18,000 tons in foundry and malleable iron during the week, or the same tonnage as during the previous week. Very little of this business came from the immediate Cleveland territory. Inquiry is subsiding, and little is now pending. Most of the larger consumers have covered for the first quarter and few show any inclination to place second quarter contracts. With inventories close at hand, shipments are tapering off, as quite a few foundries are holding up shipments until the first of the year. Stocks in consumers' and furnace yards are low, but some of the furnaces will accumulate iron for their stock piles by the end of the month. Furnaces have fairly good order books for the first quarter and are holding firmly to recent prices. They do not look for any weakening in the market through surplus output, unless the demands of the steel industry should fall off to an extent that steel makers would have iron to sell. Cleveland furnaces quote foundry and malleable iron at \$18.50 and another Lake furnace interest is holding to \$19.50. The Michigan mar-

ket is unchanged at \$20. Low phosphorus iron is inactive, although a few car lot sales are reported at \$27. Some business has developed in the Chicago territory, but a \$26.50 price quoted by a Valley producer appeared too high to take the order.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	\$22.50 to 23.00
Malleable	19.50
Ohio silvery, 8 per cent.	29.00
Basic Valley furnace.....	17.50
Stand. low phos., Valley..	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—While specifications from the automotive industry, which fell off early in the month, gained slightly the past week, releases from that industry are still rather slow. Some of the automobile manufacturers during the week released fair tonnages of auto body sheets for January production. One of the body plants has accumulated a large stock because of the delay in starting production on new models of a low priced car, and sheet shipments are backing up at the mills. Not many of the larger consumers in the automotive field have as yet contracted for the first quarter. Prices lower than those regularly named for the first quarter have pretty generally disappeared.

Semi-Finished Steel.—The leading local producer has closed with all its consumers for sheet bars, billets and slabs for the first quarter and reports that all its business was taken at \$34, Cleveland and Youngstown. This mill is still operating at capacity.

Wire Products.—The price advance

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	5.95c.
Black sheets (No. 24).....	3.50c.
Galvanized sheets (No. 24).....	4.45c.
Blue ann'd sheets (No. 10).....	3.25c.
No. 9 ann'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

*Net base, including boxing and cutting to length.

is bringing out a good volume of specifications for nails and wire against contracts that expire Jan. 1. These specifications will be accepted to the end of the month. As buyers will have good stocks bought at the old prices, it may be some time before there will be much test of the higher prices.

Reinforcing Bars.—Several fair-sized jobs that came out recently are still pending. The only award of size is a 400-ton lot in Akron. New inquiry is light. Prices are still irregular, both for mill and warehouse orders.

Iron Ore.—Approximately 500,000 tons less ore was on Lake docks Dec. 1 than on the same date a year ago, the amount having been 6,454,126 tons, against 6,944,350 tons on Dec. 1, 1927. Receipts at Lake Erie ports during the present year were 36,958,626 tons, compared with 36,552,791 tons last year. Shipments from these docks during the year to Dec. 1 were 26,136,092 tons, against 26,046,404 tons last year. The gain in Lake shipments this year compared with last year was shown largely in an increased movement to Lake Michigan ports. Shipments to other than Lake Erie ports, the bulk of which went to South Chicago, Gary and Indiana Harbor, were 16,490,048 tons this year, compared with 14,042,807 tons in 1927. Cleveland led as a shipping port, receiving 9,375,764 tons. Conneaut came second with 8,437,401 tons and South Chicago was third with receipts of 7,090,786 tons.

Strip Steel.—Specifications for hot and cold-rolled strip have slowed down. While some of the larger consumers in the automotive field have placed contracts for the first quarter, others have not yet made commitments for that delivery. On hot-rolled strip, 1.80c., Pittsburgh, for material wider than 6 in. and 1.90c. for 6 in. and narrower are now being commonly quoted. Prices \$2 a ton higher usually apply to less than car lots. Cold-rolled strip is firm at 2.85c., Cleveland and Pittsburgh.

Bolts, Nuts and Rivets.—Buyers are placing contracts quite freely for the first quarter, following the reaffirming of present prices for that delivery. With inventory time approaching, bolt and nut specifications have declined considerably. Rivets continue to move fairly well.

Coke.—Specifications for foundry coke are holding up fairly well for this time of the year, but very few consumers have as yet placed first quarter contracts. By-product foundry coke is unchanged at \$7.75, Painesville.

Old Material.—The market shows a firmer tone, and prices have advanced 25c. to 50c. a ton on heavy melting steel, machine shop turnings, blast furnace scrap and on some other grades. While there is little new consumer demand, mills are taking shipments rather freely and the price stiffening seems due to the demand from

dealers who have short orders. Dealers are holding for \$15.25 for No. 1 heavy melting steel, and there does not seem to be much available at a lower price. They are paying as high as \$11.75 for blast furnace scrap, or 25c. a ton above the recent maximum quotation. A Youngstown mill purchased a small tonnage of heavy melting steel at a reported \$18 price and dealers are offering \$17.50 to cover against this order.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.75 to \$15.25
No. 2 heavy melting steel.	14.25 to 14.75
Compressed sheet steel.	14.50 to 15.00
Light bundled sheet stamp'gs	12.00 to 12.50
Drop forge flashings.	12.25 to 12.75
Machine shop turnings.	10.00 to 10.50
No. 1 railroad wrought.	12.75 to 13.00
No. 2 railroad wrought.	14.50 to 15.00
No. 1 busheling.	12.50 to 12.75
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.	16.00 to 16.50
Low phos., billet, bloom and slab crops.	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap.	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings.	11.25 to 11.75
Mixed bor'g and short turn'gs	11.25 to 11.75
No. 2 busheling.	11.25 to 11.75
Cupola Grades	
No. 1 cast.	16.50 to 17.00
Railroad grate bars.	11.00 to 12.00
Stove plate.	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable.	16.00 to 16.50
Rails for rolling.	16.25 to 16.50

Sheet Steel Shipments Dropped in November

Shipments of steel sheets fell off sharply during November, having been 307,790 tons, compared with 354,925 tons in October, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. The lessened demand evidently resulted from the curtailment in the automobile industry. However, production declined only slightly, having been 358,402 tons, compared with 369,243 tons during the previous month. Production exceeded shipments by slightly over 50,000 tons. While both shipments and production indicated a little slowing down in the industry, sales gained slightly during November. Unfilled orders on Dec. 1 were 40,000 tons larger than on Nov. 1. This increase seems due to the fact that, while shipments declined, there was a slight increase in sales. The November report and comparisons in net tons follow:

	Nov.	Oct.	Sept.
Total number of mills....	726	724	721
Capacity per month....	487,280	508,000	450,500
Percentage reporting....	70.2	70.2	70.1
Sales.....	346,041	344,614	370,936
Production...	358,402	369,243	318,907
Shipments...	307,790	354,925	322,876
Unfilled orders.	565,739	525,161	539,960
Unshipped orders.....	111,014	100,800	102,313
Unsold stocks.	63,014	49,800	44,519
Percentages to Capacity			
Sales.....	101.1	96.6	117.5
Production...	104.8	103.5	101.0
Shipments...	89.9	99.5	102.2
Unfilled orders.	165.3	147.3	171.0
Unshipped orders.....	32.4	28.3	32.4
Unsold stocks.	18.4	14.0	14.1

New York

Bethlehem Steel Co. Announces First Quarter Prices on Plates, Shapes and Bars—Pig Iron Quiet

NEW YORK, Dec. 18.—Pig iron buying is adversely affected by the approach of the holidays. Bookings in this district for the week barely exceeded 5000 tons, and inquiries are fewer. Suspensions of shipments are rarely reported, however, and in some instances expedited deliveries are asked for. Indications point to sustained foundry melt, with holiday shutdowns held down to the minimum. Prices on Buffalo foundry iron range from \$17.50 to \$18, base furnace; eastern Pennsylvania producers quote \$19.50 to \$20, base furnace. The General Electric Co. has closed against at least part of its inquiry for 5500 tons for its Eastern plants. Another inquiry now current, for approximately 5000 tons for first quarter, calls for deliveries outside of this district. The New York Central is in the market for 200 tons of foundry, 50 tons of charcoal and 35 tons of silvery for shipment to Frankfort, N. Y., or Elkhart, Ind. The Delaware, Lackawanna & Western wants 150 tons of No. 2 plain and No. 2X for delivery at Scranton, Pa. Barge shipments of pig iron on the New York State barge canal, originating at Buffalo and points westward totaled 122,456 gross tons for the 1928 season of navigation.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75
to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.	
N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil.	
2.75 to 3.25	21.89 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Ferroalloys.—Signs of a possible scarcity of spiegeleisen are discernible. The leading producer in this country has blown out one furnace for relining and another producer has made purchases of foreign alloy to fill contracts. One British producer is out of the export market for first quarter. Sales of about 300 tons of foreign spiegeleisen were made during the last week. Quotations for the domestic alloy are unchanged at \$34, furnace, for the 19 to 21 per cent alloy in carload lots. A few carloads of ferromanganese have been sold at \$105, seaboard basis, for delivery this month.

Plates, Shapes and Bars.—The Bethlehem Steel Co. surprised the trade late last week by an announcement of first quarter prices on these products, which in the case of plates and shapes at Eastern mill basing points are \$1 a ton below the levels which have recently been recognized as the market. The Bethlehem announcement puts plates and shapes at 2c. to 2.10c.,

Eastern basing points, or 2.17½c., New York, for plates and 2.14½c., New York, for shapes. Eastern plate mills had made a considerable number of first quarter contracts with regular customers at 2.22½c., New York, and a few at 2.27½c., New York, and the probability is that some of these will be rewritten to the new minimum base. Some large structural fabricators in the New York district are understood to have been getting prices below 2c., mill, but the majority of users have been paying 2.05c., and some small buyers have not been getting less than 2.10c. For shipment from the Cambria works, prices remain at 1.90c., Pittsburgh, for all three products, but Buffalo prices are \$1 a ton lower than those recently prevailing, the range now being 2c. to 2.10c., against 2.05c. to 2.10c. which had applied on a good deal of the fourth quarter business. The Bethlehem company amplifies its first announcement by saying that 2.14½c., New York, on shapes and 2.17½c., New York, on plates are the firm minimums "on the very largest tonnages," while prices on "customary tonnages" will be \$1 higher. December business has fallen off considerably. Many contract buyers did not specify their fourth quarter contracts in full by Dec. 15, which was the last day that some companies would accept specifications. Some contracts have been extended, but generally new first quarter contracts have been prepared and the old contracts cancelled.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.17½c. to 2.27½c.; struc. shapes, 2.14½c. to 2.24½c.; bar iron, 2.14c. to 2.24c.

Sheets and Strip.—Specifications against fourth quarter contracts for sheets and strip were fairly good, but were not as heavy as the trade expected in view of the fact that prices announced for first quarter are higher than those prevailing on expiring contracts. Sheet prices are holding, but producers of hot-rolled strips have not been able to get all that they set out to charge. The price for strips wider than 6 in. was to be 1.90c., Pittsburgh, for all but the very largest users and that for narrower strips, 2c., but nearly all contract buyers, large or small, have been able to cover at \$2 a ton under these prices.

Reinforcing Bars.—The Turner Construction Co. opened bids last week on the 8500 tons of bars for the Delaware, Lackawanna & Western terminal warehouse at Jersey City, and it is understood that the job will be placed this week among three or more distributors. The volume of pending work continues to increase, but the tonnage being placed is not large and there is little prospect for increased activity before the first of the year. Prices are unchanged.

Warehouse Business.—Thus far December has compared favorably with November in the volume of orders, but business is beginning to diminish as the holidays approach. Demand for black and galvanized sheets is light, and slight shading of prices is reported occasionally. Mild weather has contributed to a fairly active demand for structural material, and small orders for prompt delivery are being received by local warehouses.

Cast Iron Pipe.—Inquiries for gas

Warehouse Prices, f.o.b. New York

Base per Lb.

Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter	
hard.....	5.15c. to 5.40c.
Hoops.....	4.50c.
Bands.....	4.00c.
Blue ann'l'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent
¾ x 6 in. and smaller.....	Off List
1 x 30 in. and smaller.....	50 to 50 and 10

Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10

Coach screws:	
¾ x 6 in. and smaller.....	60
1 x 16 in. and smaller.....	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass

	Per Lb.
Nos. 18 to 20.....	3.80c.
No. 22.....	3.95c.
No. 24.....	4.00c.
No. 26.....	4.10c.
No. 28*	4.25c.
No. 30.....	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.40c.
No. 16.....	4.25c.
No. 18.....	4.40c.
No. 20.....	4.50c.
No. 22.....	4.60c.
No. 24.....	4.75c.
No. 26.....	5.00c.
No. 28*	5.25c.
No. 30.....	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

pipe from public utility companies are beginning to appear and some tonnage has been closed. The American Construction & Securities Co., New York, is understood to have bought several thousand tons of water pipe and 10,000 to 15,000 tons of gas pipe for other companies is pending. Yonkers, N. Y., has closed for 300 tons of water pipe with a Birmingham maker. Quotations of Southern foundries are unchanged. Northern pipe makers show a tendency to advance prices on water pipe. On sales of gas pipe, the full \$4 to \$5 differential is not always applied and when sizable tonnages are involved the base price is sometimes slightly lower than on water pipe.

Prices per net ton deliv'd New York:
Water pipe, 6-in. and larger, \$39.60 to \$41.60; 4-in. and 5-in., \$44.60 to \$46.60; 3-in., \$54.60 to \$56.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Demand for foundry and furnace coke is beginning to increase, but Connellsville prices are unchanged at \$3.50 to \$3.75 per net ton, ovens, for foundry and \$2.85 to \$3.05 per net ton, ovens, for furnace grade. The West Virginia producer of by-product foundry coke is renewing contracts for first half of next year at no change in price. By-product foundry coke is quoted at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn. Special brands of beehive coke are unchanged at \$4.85 per net ton, ovens, or \$8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn.

New York Canal Shipments of Pig Iron 122,456 Tons

Total pig iron shipments from Buffalo and points westward through the New York State barge canal during the canal navigation season of 1928 were 122,456 gross tons, according to the Division of Canals and Waterways, Department of Public Works, Albany. The records of the department do not show what proportion of this tonnage originated at points other than Buffalo, but the pig iron trade understands that at least 30,000 tons of the total was shipped from Cleveland furnaces.

Smaller Production of Steel Barrels

WASHINGTON, Dec. 18.—Production of steel barrels in November totaled 563,647 units, or 48.8 per cent of operating capacity, against 656,021 barrels, or 56.4 per cent of capacity, in October, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. Shipments were 568,353 and 661,009 barrels respectively, while stocks at the end of the months were 46,062 and 50,071 barrels respectively. Compared with last year, November showed a gain of 12½

Old Material.—Consumers of scrap still show little interest in making new contracts, but prices of all grades are strong and brokers are paying up to \$15.50 per ton for No. 1 steel, delivered on \$15.50 contracts with eastern Pennsylvania mills. Meanwhile, some heavy melting steel is being shipped to Midland, Pa., at \$17.50 per ton, delivered, or \$12.20 per ton, New York. A substantial tonnage of heavy melting steel is still being exported, principally to German ports, and during the present month a total of about 6000 tons is scheduled for export to German dealers.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.....	\$11.75 to \$12.25
Heavy melting steel (yard).....	8.50 to 9.50
No. 1 hvy. breakable cast.....	11.25 to 11.75
Stove plate (steel works).....	8.00 to 8.50
Locomotive grate bars.....	8.50
Machine shop turnings.....	7.25 to 7.50
Short shoveling turnings.....	7.25 to 7.50
Cast borings (blast furn. or steel works).....	6.75 to 7.00
Mixed borings and turnings.....	6.75 to 7.00
Steel car axles.....	17.00 to 17.50
Iron car axles.....	24.00 to 24.50
Iron and steel pipe (1 in. dia., not under 2 ft. long).....	10.75
Forge fire.....	8.00 to 8.50
No. 1 railroad wrought.....	12.25 to 12.75
No. 1 yard wrot., long.....	11.25 to 11.75
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.50
Stove plate (foundry).....	9.50
Malleable cast (railroad).....	10.00 to 10.50
Cast borings (chemical).....	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.).....	14.50

per cent in production and of 14 per cent in shipments.

Unfilled orders at the end of November, for delivery within 30 days, amounted to 319,699 barrels, compared with 301,782 barrels at the end of October. Unfilled orders at the end of November for delivery beyond 30 days were 631,798 barrels, compared with 522,090 barrels at the end of October.

Production during the 11 months ended November totaled 6,846,672 barrels, or 53.9 per cent of capacity, against 6,186,342 barrels, or 50.7 per cent of capacity, for the corresponding period of 1927. Shipments were 6,853,813 and 6,170,115 barrels respectively.

Bausch & Lomb to Offer Stock to Employees

The Bausch & Lomb Optical Co., Rochester, N. Y., has announced a plan whereby employees who have been with the company for two years or more may purchase stock in the company. The plan allows each employee to purchase preferred stock equivalent to one year's salary, on the deferred payment plan if necessary. The Bausch & Lomb organization has been a closed corporation for more than 75 years.

Pacific Coast

Diminishing Activity in Steel—Reinforcing Steel Awards in Week Total 1800 Tons

SAN FRANCISCO, Dec. 15 (*By Air Mail*).—With the approach of the holiday season and inventory taking period, activity in the Coast iron and steel markets is diminishing and few large tonnages are being placed. The greatest activity this week was in reinforcing steel, of which more than 1800 tons was booked, including 900 tons for an apartment in Los Angeles, 300 tons for a hotel at Bellingham, Wash., and 385 tons for an office building in Los Angeles.

Pig Iron.—Inquiries for and sales of foundry pig iron have not been heavy. Importations in September fell considerably below the August total. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—The price situation on out-of-stock material in Los Angeles and San Francisco continues unsettled. While mild steel merchant bars in Los Angeles and here are firm at 2.30c., c.i.f., reinforcing bars continue to be quoted around 1.80c., base. A fair volume of new business is before the trade for figures, the largest inquiry calling for 300 tons for an opera building in San Francisco. Bids on 209 tons for a bridge at Tacoma have been postponed until after the first of the year.

Plates.—The Willamette Iron & Steel Works secured the largest plate award of the week, which was 250 tons for steel outlet pipes for the Diable Dam in Seattle. The Chicago Bridge & Iron Works took 129 tons for a steel tank at Lake Youngs, Wash., and 135 tons for tanks for three companies in Tacoma. The largest pending inquiry calls for 250 tons for a tank at San Rafael, bids on which will be opened Dec. 18. Plate prices continue firm at 2.25c., c.i.f. Imports of plates on the Coast in September totaled less than 100 tons, and the aggregate so far this year has been only 736 tons.

Shapes.—While fabricators are fairly busy figuring on new work, most of which involves small tonnages, actual bookings this week were

less than 500 tons. The Judson-Pacific Co. secured 100 tons for a shop at Tiburon, Cal., for the Northwestern Pacific, and the Herrick Iron Works took 150 tons for a packing plant in Oakland. Prices on plain structural shapes from domestic mills are firm at 2.35c., c.i.f., while around 1.60c., duty paid, c.i.f., can be obtained on foreign material.

Cast Iron Pipe.—A slight increase in demand for cast iron pipe is noted, and awards this week exceeded 900 tons. Henry Sacco, Seattle, was awarded 209 tons of 8 and 12-in. Classes B and C pipe for the improvement of West Holden Street, Seattle. Los Angeles placed 548 tons of 2 to

12-in. Class B pipe for the improvement of Arlington Street with Wilbur N. Edgley, Los Angeles. The American Cast Iron Pipe Co. took 194 of 4 to 10-in. Class B pipe for the improvement of Burbank Boulevard, Burbank, Cal. New inquiries include 1350 tons of 2 to 10-in. Class B pipe for the improvement of Lomita District No. 13, Los Angeles, bids on which will be opened Jan. 7. San Diego will open bids on Dec. 31 for 144 tons of 6 and 8-in. Class B pipe for the improvement of Catocin Drive, 103 tons of 2 to 6-in. Class B pipe for the improvement of Meade Avenue and 140 tons of 4 to 16-in. Class B pipe for the improvement of Taylor Street. That city is also asking for figures direct on 324 tons of 6-in. Classes B and C pipe. Imports of cast iron pipe for September totaled 1440 tons, compared with 2174 tons in August and 2301 tons in September, 1927.

St. Louis

Pig Iron Sold for Second Quarter—Demand for Sheets Keeps Mills at Full Rate

ST. LOUIS, Dec. 18.—The first sale of pig iron for second quarter delivery by the St. Louis Gas & Coke Corporation was made last week; it was 1000 tons of foundry iron to a machinery manufacturer at the price prevailing now. Other sales by this maker during the week, which was marked by quite a slump in buying, included 300 tons of malleable to an Illinois melter, 200 tons of foundry grades to a stove plant, and 100 tons to a Kansas City engine builder. The Granite City maker blew in its second furnace on Tuesday, having had it closed down for several months for relining and other repairs. Its shipments so far this month have averaged more than 400 tons a day in excess of those in the same month last year. Melters in the district are expected to be closed a shorter period than usual for the holidays on account of a heavy order file.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	.....	\$20.00
Granite City, Ill.	.....	20.50
Malleable, f.o.b. Granite City	.....	22.16
N'th'n No. 2 fdy., deliv'd St. Louis	.....	20.92
Southern No. 2 fdy., deliv'd	.....	22.16
Northern malleable, deliv'd	.....	22.16
Northern basic, deliv'd	.....	22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—The buying of domestic coke has picked up considerably, and the demand of dealers outside of St. Louis has enabled local by-product ovens to reduce their stock piles. Colder weather also has resulted in much heavier buying by local dealers. Foundry coke business is good.

Finished Iron and Steel.—The Granite City Steel Co. is now operating at full capacity on black, galvanized and blue annealed sheets, the demand for

these items holding up remarkably well. There is a seasonal lull in the demand for tin plate, in which production is at about 80 per cent of capacity. Plates are dull, although demands from car builders are expected to be considerable after the first of the year. Business in structural steel fabrication is confined almost entirely to small jobs. The Missouri Highway Commission let highway contracts Friday which will require about 1000 tons of reinforcing bars.

Old Material.—The market for old materials is quiet, and there has been no buying of anything except a few specialties by the mills for several weeks, nor is there likely to be any buying movement until after the first of the year. However, the market is firm. No. 2 heavy melting and shoveling steel are 25c. higher, and machine shop turnings are 50c. higher.

Warehouse Prices, f.o.b. St. Louis

Base per Lb.

Plates and struc. shapes	.....	3.25c.
Bars, soft steel or iron	.....	3.15c.
Cold-fin. rounds, shafting, screw stock	.....	3.75c.
Black sheets (No. 24)	.....	4.10c.
Galv. sheets (No. 24)	.....	4.95c.
Blue ann'l'd sheets (No. 10)	.....	3.45c.
Black corrug. sheets (No. 24)	.....	4.15c.
Galv. corrug. sheets	.....	5.00c.
Structural rivets	.....	3.75c.
Boiler rivets	.....	3.75c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more	.....	65
Less than 100 lb.	.....	60
Machine bolts	.....	60
Carriage bolts	.....	60
Lag screws	.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	.....	60
Less than 200 lb.	.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	.....	60
Less than 200 lb.	.....	50

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	.....	3.15c.
Soft steel bars	.....	3.15c.
Small angles, 7/8-in. and over	.....	3.15c.
Small angles, under 7/8-in.	.....	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.	.....	3.75c.
Spring steel, 1/4-in. and thicker	.....	5.00c.
Black sheets (No. 24)	.....	5.00c.
Blue ann'l'd sheets (No. 10)	.....	4.00c.
Galv. sheets (No. 24)	.....	5.40c.
Struc. rivets, 1/2-in. and larger	.....	5.55c.
Com. wire nails, base per keg	.....	\$3.40
Cement c't'd nails, 100 lb. keg	.....	3.40

Otherwise the list is unchanged. Railroad lists: Louisville & Nashville, 6152 tons; Atchison, Topeka & Santa Fe, 5300 tons; Chicago, Burlington & Quincy, 4145 tons; Chesapeake & Ohio, 3548 tons; International-Great Northern, 650 tons; Frisco Lines, 15 carloads; Pullman Co., 11 carloads; Nickel Plate, 8 carloads; Chicago, Milwaukee, St. Paul & Pacific, 5 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$12.50 to \$13.00
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires...	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart...	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought...	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings.....	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling.....	15.50 to 16.00
Machine shop turnings...	9.50 to 10.00
Steel car axles.....	19.50 to 20.00
Iron car axles.....	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought...	12.50 to 13.00
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.50 to 15.00
No. 1 machine cast.....	15.50 to 16.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

The Abrasive Co., Philadelphia, manufacturer of grinding wheels and supplies, held its annual sales conference in that city, Dec. 3 to 5. The program, which was under the direction of S. M. Hershey, sales manager, included an inspection of the new factory at Bridesburg and a grinding demonstration in the company's mechanical laboratory.

New Extras on Wire Rods Announced Dec. 7

Extras on wire rods have been revised under date of Dec. 7. Compared with the former list, dated March 1, 1928, only the carbon extras have been changed, and in this case it is chiefly an extension of the range limits.

The list of extras follows:

	Extra per Gross Ton
Less than carload, but not less than 5 tons of a size.....	\$2.00
Less than carload and less than 5 tons of a size.....	4.00
Cleaned, line-coated and baked.....	2.50
Annealed	5.00
Screw stock	5.00
Special rods (low in all elements, not exceeding 0.30% in all impurities)...	20.00
CARBON EXTRAS	
When maximum of carbon range is 0.08%.....	3.00
When maximum of carbon range is reduced below 0.08%, add per point carbon	1.00
When maximum of carbon is 0.09 to 0.19%.....	Base
When minimum of carbon range is 0.20 to 0.40%.....	3.00
When minimum of carbon range is 0.41 to 0.55%.....	5.00
When minimum of carbon range is 0.56 to 0.75%.....	7.50
When minimum of carbon range is 0.76 to 0.90%.....	10.00
When minimum of carbon range is 0.91 to 1.00%.....	15.00

The above carbon extras to apply when other elements are in normal proportion.

A minimum carload of rods is 25 gross tons. When shipped in less than carload quantities the freight rate on wire applies.

HOT-ROLLED RODS STRAIGHTENED AND CUT IN 2 TO 24-FT. LENGTHS

No. 5 gage and heavier—25c. per 100 lb. extra to be added to base price of hot-rolled rods in coils reduced to 100 lb. basis.

Longer lengths than 24 ft. can be furnished, but at additional expense. The bar steel rate of freight is added to make a delivered price on straightened and cut rods either on carloads or less-than-carload lots.

Birmingham

Cast Iron Pipe Order for 24,000 Tons Awarded—Steel Business in Good Volume

BIRMINGHAM, Dec. 18.—Pig iron sales were light during the past week. This was not unexpected, in view of the heavy buying movement of the few weeks preceding, during which first quarter requirements were largely covered. Current sales are all spot, with orders ranging from 50 to 150 tons. One company is taking spot business at \$17, while the others quote \$16.50, base, for foundry iron. Shipments have eased off slightly owing to the usual holiday lull, but the strength they have shown for the month so far has been sufficient to reduce stocks to the low point of the year. Stocks on the yards of one company are equal to about three weeks make at the present rate. No changes in furnace operations have occurred during the past three weeks. Nine furnaces are on foundry, eight on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil..	\$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil..	17.00 to 17.50
Basic	16.50

Finished Steel.—Prices on bars, plates and shapes are firm at 2.15c. Sheet demand is strong, with prices the same as for the past several weeks. Both inquiries and new business continue to develop at a good rate. Mills will begin the new year with better schedules than in any recent year. Structural steel fabricating shops are operating on full schedules, with a large tonnage in prospect. The Alabama State Bridge Corporation has placed contracts in this district for approximately 3680 tons of reinforcing bar steel. Open-hearth operations are the highest of the year, with the Tennessee company working

nine at Ensley, eight at Fairfield, and the Gulf States Steel Co. four at Alabama City.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has been awarded a contract by Knoxville, Tenn., for 400 tons of cast iron pipe. The United States Cast Iron Pipe & Foundry Co. has received an order for 125 tons of 10-in. pipe for Memphis, Tenn. The Dallas, Tex., project requiring approximately 24,000 tons, reported in these columns last week, has been definitely awarded to this company. The only inquiry of consequence was for 3000 tons for Detroit. Gas line syndicates and water companies are estimating next year's requirements. Plants are securing a few small orders from day to day. Quotations are \$37 to \$38 on 6 in. and larger sizes.

Coke.—Demand for foundry coke is fair, in view of the large amount of first quarter coke under contract. No second quarter coke is being sold. Considerable coke is being shipped outside the district. Prices are unchanged.

Old Material.—Sales to foundries have been gradually easing up in the past two weeks owing to lighter operations and approaching inventories. Steel mills continue to take scrap in fairly good quantities.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Pearlitic Iron Castings to Be Made at Newark

The manufacture of pearlitic iron castings will be begun early next year at the plant of the Eastern Steel Castings, Newark, N. J., according to a statement of its president, W. D. Sargent, who has just returned from a visit to Germany.

While there he secured from the large German firms of Heinrich Lanz, Mannheim; A. Borsig, Berlin, Thyssen, Gelsenkirchen, and the Esslingen Machine Works, the American sales right for this process, which, it is understood, is now being extensively used abroad. Licenses have been reported given to 45 companies for the manufacture of this metal in Germany, England, France, Holland, Italy, Switzerland, Rumania, Denmark, Sweden and Japan. The product by this special process is known as "Perlite" castings.

Buffalo

Bethlehem Announces First Quarter Prices—Its Operations at Lackawanna Reduced to 60 Per Cent

BUFFALO, Dec. 18.—Only small orders for pig iron were booked by local furnaces during the past week. Most of the larger consumers are covered for the first quarter. It is estimated that not more than 20 per cent of the first quarter requirements is still to be purchased. The Bethlehem Steel Co. has taken off one blast furnace, reducing its active total from seven to six. Three other furnaces may go in before the first of the year or soon after—one Hanna, one Donner and the Tonawanda stack of the American Radiator Co.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—The Bethlehem Steel Co. has announced that first quarter prices for bars, shapes and plates will be 2c. to 2.10c., Lackawanna. The minimum presumably is to apply on contracts with large buyers, but it is a reduction of \$1 a ton from the prices at which many first quarter contracts had been made by other producers. Operations at the Lackawanna plant of the Bethlehem company have dropped during the past week to about 60 per cent; 15 of the 24 open-hearths are active. Some sizable structural projects are pending, including a new warehouse for the Cleveland & Buffalo Transit Co., but tonnage figures are not yet available.

Old Material.—The principal transaction of what otherwise was a light week was the purchase of 9000 to 10,000 tons of No. 1 machinery cast and stove plate at prices reported to be \$15 and \$14.50, respectively. This purchase will probably take the buyer out of the market for about two months on these commodities. One of the mills has suspended further shipments, and the chances are it will not resume until after the first of the year. The largest buyer is expected to come in shortly. There is considerable competition among dealers for No. 1 heavy melting steel, No. 2 heavy melting steel, hydraulic compressed sheets and machine shop turnings for Pittsburgh and Youngstown delivery. A very active demand exists for blast furnace scrap to apply on orders taken for delivery to local furnaces. A shortage exists for No. 1 heavy melting steel and it is likely

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100 lb.	3.75

that the next large purchase will be at 50c. over present prices. Some sales of knuckles and couplers at prices ranging between \$17.50 and \$18.50 are reported.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$15.50 to \$16.50
No. 2 heavy melting steel	13.25 to 14.00
Scrap rails	15.50 to 16.00
Hydraul. comp. sheets	13.50
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	13.00 to 13.75
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	12.50 to 13.00

Acid Open-Hearth Grades	
Knuckles and couplers	17.50 to 18.50
Coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50

Electric Furnace Grades	
Short shov. steel turnings	11.00 to 11.50

Blast Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	9.00 to 9.50

Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00

Cupola Grades	
No. 1 machinery cast	15.00 to 15.50
Stove plate	14.50 to 14.75
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50

Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Canada

Pig Iron Buyers Covering for First Quarter

TORONTO, ONT., Dec. 18.—Renewed interest has developed in pig iron. Advance contract placing was strongly featured in transactions of the week. First quarter business already closed is estimated at close to 20,000 tons, and inquiries are out for a still larger tonnage for shipment up to the end of March. Despite the fact that there has been considerable talk of higher prices, no advance has gone into effect. First quarter contracts are being closed at the same prices as on iron for immediate delivery.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00

Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Numerous inquiries are appearing for old material for delivery to the end of the year. Some first quarter buying also is reported, but so far only a few of the larger consumers have come into the market.

Heavy melting steel and turnings are moving freely to consumers in the Hamilton, Ont., district. Foundries are buying machinery cast, malleable scrap and stove plate more extensively. Montreal dealers report a stronger demand for wrought iron and steel axles, and there is also more demand for heavy melting steel for export. Toronto and Montreal prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$7.00 to \$7.50
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00 to 11.50
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	16.00 to	17.00
Stove plate		13.00
Standard carwheels		16.00
Malleable		13.00

Per Net Ton

No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Detroit

December Lull Becomes More Pronounced

DETROIT, Dec. 18.—The December lull becomes very pronounced, as indicated by a falling off last week of 3473 in the labor barometer of the Detroit Employers' Association. Previous to last week, the weekly decrease was only about 2500. This condition is usual for this time of year, and is due largely to inventory taking and readjustments for new models.

The Ford Motor Co., during the first year of manufacture of the new model, has sold 704,699 units. The first week of this month showed a daily production of 6435 units, an increase of 400 units a day over the first week of November. Total November production was 121,037 cars and trucks. The estimates for 1929 production are being based on a record of 2,100,000, the 1924 peak. At least 1,800,000 cars and trucks are expected to be sold in the United States and Canada.

The scrap market has shown a slightly stronger tone during the past week, with heavy melting and shoveling steel and hydraulic compressed registering advances of 50c. per ton.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.50 to \$14.00
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.75 to 13.25
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.50 to 12.00

Boston

Good Cast Iron Pipe Business Is in the Making—Buffalo Iron Prices Mixed

BOSTON, Dec. 18.—Pig iron sales in this territory the past week were the smallest for any similar period in months. The largest sales by any furnace were less than 3200 tons. In the aggregate, bookings did not run more than 4500 tons. A Vermont foundry, inquiring for 1000 tons No. 2X first quarter iron, withdrew from the market. The Buffalo price situation is mixed. Most of the furnaces in that district are holding to \$18 a ton, furnace, for No. 2 plain and \$18.50 a ton for No. 2X. One stack, however, has accepted and is soliciting business at \$17.50 a ton, base furnace, and within the last day or two another furnace has solicited business on the same base, but so far as known has made no bookings. Buffalo No. 1X iron is openly quoted at \$19.50 a ton on cars furnace, but offers of \$19 have been common of late. Requests for deferred shipments on contract iron so far this month have been fewer than in any December for many years.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.41 to \$22.91
*Buffalo, sil. 2.25 to 2.75..	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25..	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.77
Ala., sil. 2.25 to 2.75.....	23.91 to 26.27

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Coke.—New England by-product coke makers have not only caught up with contract specifications, but are pushing foundries for anticipated wants. Melters, however, are specifying only as requirements necessi-

tate. Indications are New England foundries will go into 1929 with more business on their books than on Jan. 1 in any recent year. Foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone.

Cast Iron Pipe.—The outlook for pipe business before Jan. 1 is bright. One of the largest New England utility companies is inquiring for 4000 tons, and it is expected at least two and possibly three others will place substantial tonnages this month. Salem, Mass., has awarded 100 tons of 12-in. pipe to the National Cast Iron Pipe Co., the first New England business placed with an Alabama foundry since early in 1928. New Bedford, Mass., has placed 100 tons of pipe with the United States Cast Iron Pipe & Foundry Co. Kingston, Mass., has yet to close on 200 tons. Private business is exceptionally good for December. Boston will close bids at noon, Dec. 26, on 2000 tons of pipe, consisting of 1000 8-in., Class B, 150 tons of 10-in., 500 tons of 12-in., and 350 tons of 16-in. The city is also calling for bids on 30 tons of special 24-in. to 48-in. castings and approximately 668 tons of various water department castings. Prices quoted openly on pipe are: 4-in., \$47.10 to \$48.10 a ton, delivered common Boston freight rate points; 6-in. and larger, \$44.10 to \$45.10. Differentials of \$3 and \$4 a ton are asked on Class A and gas pipe.

Fabricated Steel.—The fabricated steel market is quiet. The outlook is encouraging, however. Approximately 6000 tons of steel has been figured and several 1000 and 2000-ton jobs will come up for bids within the next fortnight.

Warehouse Business.—In addition to the recent advance of \$2 a ton in local warehouse prices on wire nails, a similar rise is noted on other wire

products, such as barbed wire, cable, staples, etc. Instead of curtailing business, the new prices have bolstered up buying. Bars, structural steel, plates, bands and kindred mill products have moved out of warehouses so far this month in much larger volume than a year ago. Further, there is comparatively little price cutting, except with preferred customers and on moderately large contracts.

Old Material.—Higher scrap prices in the Pittsburgh territory are reflected here. The movement of material out of New England is somewhat larger than a week ago. The market is by no means active, however. Quite an improvement in forge scrap values is noted, and this material is leading in activity. Early in the week, sales at \$7.50 a ton, on cars shipping point, were reported; since then sales at \$8 to \$8.50 a ton have been made. Most current business in mixed borings and turnings is at \$6 a ton, on cars, but occasionally brokers add 5c. or 10c. a ton. The market for heavy melting steel and steel mill borings is easily 25c. a ton higher, and rails for re-rolling are up 50c. a ton on limited transactions. Railroad wrought is quoted higher, yet there appears to be little sale for the material. Scattering sales of axles are reported at former prices.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$11.00 to \$11.50
Scrap T rails.....	10.50 to 11.00
Scrap girder rails.....	10.00 to 10.25
No. 1 railroad wrought....	11.50 to 12.00
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings....	6.25 to 6.50
Cast iron borings (steel works and rolling mill)...	6.00 to 6.25
Bundled skeleton, long....	9.00 to 9.25
Forge flashings.....	9.00 to 9.50
Blast furnace borings and turnings	5.75 to 6.10
Forge scrap	7.50 to 8.00
Shafting	13.00 to 13.50
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long) ..	9.50 to 10.00
Rails for rolling.....	11.50 to 12.00
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates 3.365c.

Structural shapes—

Angles and beams..... 3.365c.

Tees 3.365c.

Zees 3.465c.

Soft steel bars, small shapes..... 3.265c.

Flats, hot-rolled..... 4.15c.

Reinforcing bars..... 3.265c. to 3.54c.

Iron bars—

Refined 3.265c.

Best refined 4.60c.

Norway rounds 6.60c.

Norway, squares and flats..... 7.10c.

Spring steel—

Open-hearth 5.00c. to 10.00c.

Crucible 12.00c.

Tie steel 4.50c. to 4.75c.

Bands 4.015c. to 5.00c.

Hoop steel 5.50c. to 6.00c.

Cold rolled steel—

Rounds and hex..... *3.55c. to 5.55c.

Squares and flats..... *4.05c. to 7.05c.

Toe calk steel 6.00c.

Rivets, structural or boiler..... 4.50c.

Per Cent Off List

Machine bolts 50 and 5

Carriage bolts 50 and 5

Lag screws 50 and 5

Hot-pressed nuts..... 50 and 5

Cold-punched nuts..... 50 and 5

Stove bolts 70 and 10

*Including quantity differentials.

Wrought Iron Co. Formed; Charles Hart, President

The Wrought Iron Co. of America, embracing the Lebanon Iron Co., Lebanon, Pa., and the Scranton Bolt & Nut Co., Scranton, Pa., merger of which was announced last August, has been incorporated under the laws of Pennsylvania. Authorized capital stock of the new company is 1,250,000 shares of 7 per cent cumulative preferred stock with \$100 par value and 265,000 shares of common stock of no par value.

The president of the new company is Charles Hart, who is also president of the Delaware River Steel Co., Chester, Pa. On the board of directors are: A. A. Corey, Jr., Vanadium Corporation of America; Burrows

Sloan, president General Refractories Co.; Charles P. Lineweaver, vice-president Bank of North America & Trust Co., Philadelphia; Frank Hummler, Scranton National Bank, Scranton, Pa.; Howard Longstreth, formerly president Lebanon Iron Co.; Thomas D. Smith, Harrison, Smith & Co., bankers, Philadelphia; T. H. McKoy, Jr., Kidder, Peabody & Co., New York, and C. B. Hibbard.

Wide grooves, giving large chip area, and shearing cut, with graduated taper, are features of a spiral three-groove structural reamer which has been placed on the market by the Morse Twist Drill & Machine Co., New Bedford, Mass. The tool is designed for service under difficult conditions.

Cincinnati

Advance on Tennessee Pig Iron Does Not Hold—Sheet Mills Busy—Scrap Strengthens

CINCINNATI, Dec. 18.—After advancing its price to \$17, base Birmingham, a week ago, a Tennessee melter again is soliciting business at \$16.50. The reestablishment of the former schedule came as a result of the failure of Alabama producers, with one exception, to raise their prices above \$16.50. Local brokers have participated in the market to the greatest extent in several years. They have been active in selling small lots of Valley iron to Ohio and Indiana consumers and also have purchased practically all of the remaining stock of the Marting Iron & Steel Co., Iron-ton, Ohio. They are reselling the southern Ohio iron at \$18.50 to \$19, base furnace, an advance of 50c. a ton from previous quotations. Northern Ohio furnaces have such substantial order books that they are reported to be inactive so far as the solicitation of fresh orders in this territory is concerned. Sales in the past week have amounted to about 4000 tons. Bookings included 1000 tons of Northern foundry for a Kokomo, Ind., company, 1000 tons for a central Ohio melter and 500 tons for a Hamilton, Ohio, user.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$20.39 to \$20.89
Ala. fdy., sil. 1.75 to 2.25... 20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75... 20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25 20.19
S'th'n Ohio silvery, 8 per cent 27.89 to 28.89

Freight rates, \$1.89 from Iron-ton and Jackson, Ohio; \$3.69 from Birmingham.

Coke. — Movement of by-product foundry coke has held up surprisingly well this month, but a considerable decrease in shipments is expected during the remainder of December on account of the approaching inventory period. Despite unfavorable weather, domestic grades have been in fair demand. While no announcement has been made by district makers, by-product foundry coke probably will remain at \$7, ovens, during January, whereas all domestic sizes will go up 50c. a ton. A local dealer has closed an order with a Wisconsin melter for

6000 tons of Wise County beehive foundry coke to be delivered during the first half of next year.

Finished Material. — Sheet steel specifications have continued in liberal volume and have been sufficiently diversified to insure operation of district mills at 100 per cent of capacity during the remainder of the year. Demand from automobile makers has picked up somewhat and a further increase in bookings from the Detroit district is expected the coming week. Jobbers have been taking moderate tonnages of sheets, while electrical equipment manufacturers have been buying freely. In the South, the roofing season has been fairly good, although considerable price shading on galvanized sheets is reported. The new schedule of quotations is holding well, with blue annealed selling at 2.10c., base Pittsburgh, black at 2.85c., galvanized at 3.60c. and automobile body sheets at 4.10c. Common wire nails have gone up \$2 a ton and now are quoted at \$2.79 per keg, delivered Cincinnati, or \$2.65, Iron-ton. Bars, shapes and plates are steady

at 1.90c. to 2c., base Pittsburgh, but sales have been light.

Old Material.—The scrap market has an underlying tone of strength, which has had a stimulating effect on prices. Heavy melting steel has advanced 25c. a ton, and cast iron borings and machine shop turnings are also higher than a week ago. Increased demand for malleable scrap has forced dealers to pay 50c. a ton more for railroad and agricultural malleable. Railroads are reported to have obtained from 25c. to 45c. a ton more for their material this month than in November. While users are buying little at the moment, inquiries are plentiful and indications are that the market will be active immediately after the turn of the year.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.25 to \$13.75
Scrap rails for melting....	13.25 to 13.75
Loose sheet clippings.....	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings.....	9.75 to 10.25
Machine shop turnings....	9.00 to 9.50
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling.....	7.00 to 7.50
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires....	14.00 to 14.50
No. 2 railroad wrought....	13.25 to 13.75
Short rails	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.25 to 10.75
Railroad malleable	14.75 to 15.25
Agricultural malleable....	13.75 to 14.25

Germany to Export Steel Houses

HAMBURG, GERMANY, Dec. 1.—A company is being formed in Germany to export steel houses. The staff of the new export organization will include engineers familiar with steel dwellings of all types and able to advise foreign buyers as to the most satisfactory design for their purposes.

Cast Iron Pipe Freight Rates Justified

WASHINGTON, Dec. 18.—Passing upon a complaint of the Krupp Foundry Co., Lansdale, Pa., Attorney-Examiner Howell, in a proposed report announced today, recommended that the Interstate Commerce Commission find that rates on cast iron pipe, in carloads, from Lansdale and Quakertown, Pa., to New York Harbor and northern New Jersey stations are not unreasonable. Dismissal of the complaint was proposed. The rates to New York and Jersey City are \$1.70 and \$1.80 per net ton, respectively.

Tutein-Hudson Valley Case Begun and Postponed

Hearings in the arbitration proceedings between E. Arthur Tutein, Inc., Boston, and the Hudson Valley Coke & Products Corporation, Troy, N. Y., involving an alleged breach of contract for the sale of pig iron and coke, were begun on Monday, Dec. 17, in the trial room of the

New York Bar Association's building at 42 West Forty-fourth Street, continued for one day and then were postponed until Dec. 26 because United States Senator Wagner, arbitrator for the Hudson Valley company, announced that he must go to Washington to attend the sessions of the Senate. Sherman Whipple, Boston, is arbitrator for E. Arthur Tutein, Inc., and the third arbitrator, appointed by Charles M. Schwab, as president of the American Iron and Steel Institute, is Louis K. Comstock of New York.

Duff Mfg. Co. Acquires A. O. Norton, Inc.

The Duff Mfg. Co., Pittsburgh, has acquired the business and assets of A. O. Norton, Inc., Moline, Ill., and its Canadian subsidiary, A. O. Norton, Inc. Both companies are in the manufacture of industrial and railroad jacks and have a substantial drop forgings business. A new company, the Duff-Norton Mfg. Co., has been formed with former Duff company officials holding the principal offices.

Czechoslovakia Keeps Machinery on Free List

HAMBURG, GERMANY, Dec. 1.—The Czechoslovakian list of duty-free machines has been extended to the end of 1929, except for tractors, which are reported to be produced in sufficient numbers domestically to satisfy present requirements.

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinf. bars.....	3.15c.
Rail steel reinf. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55

Net per 100 Ft.

Lap-weld. steel boiler tubes, 2-in....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in....	19.00
4-in.	39.00

Non-Ferrous Metal Markets

Copper Firm and Quiet, Tin Moderately Active and Easy, Lead and Zinc Steady with Sales Light

NEW YORK, Dec. 18.

Copper.—Because of a desire to keep down stocks and also because of the approach of inventories, domestic consumers are not active buyers. However, there have been some good purchases the past week, the largest having been 1400 net tons by the Western Union Telegraph Co. Most of the buying is for February delivery with a little for March and some for January. Foreign buying has been light and it is estimated that consumers abroad must still buy about two-fifths of their January and four-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	12.00c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar't'd over 99% pure)	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar	56.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	19.25c.
Babbitt metal, high grade.....	58.50c.
Solder, ½ and ½	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 18	Dec. 17	Dec. 15	Dec. 14	Dec. 13	Dec. 12
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.....	49.62½	49.37½	49.62½	49.62½	49.85	49.75
Lead, New York.....	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.35	6.35	6.35	6.35	6.35	6.35
Zinc, New York.....	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis.....	6.35	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

fifths of their February requirements. Prices continue very firm at 16c., delivered in the Connecticut Valley, and 16.25c., c.i.f. usual European ports, for electrolytic copper. No changes in these prices are indicated for the immediate future. Production has increased considerably and statistics for November show that stocks of copper, in the refined and blister condition, increased about 10,000 tons over October, with about 6500 tons of this in the refined form. Specifications on contract are reported exceedingly heavy, with all December metal being regularly taken. Demand for Lake copper is satisfactory with prices firm at 16c. to 16.12½c., delivered.

Tin.—In a quiet market, sales of Straits tin amounted to about 1000 tons for the week ended Saturday, Dec. 15. Purchases were confined to nearby or December-January delivery,

with consumers taking about one-half of the total. As is usual at this time of the year, the market is becoming quieter and thus far this week very little business is reported. Today spots Straits tin was quoted at 49.62½c., New York, and prices in London were somewhat lower than a week ago, with spot standard quoted at £224 17s. 6d., future standard at £223 17s. 6d., and spot Straits at £225. The Singapore market today was £226 15s.

Lead.—Following the heavy buying recently, the market has turned quiet, but sales in the last two days have been fairly substantial at the firm price of 6.35c. St. Louis. The deliveries involved have been mostly January, with some December metal, but sales for February have been very light. Producers are in a very comfortable position and are not in-

Non-Ferrous Rolled Products

Brass and copper mill prices have not changed since Oct. 29. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10.25c. to 10.50c. since Nov. 15.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.

Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.

Rods—	
High brass	18.25c.
Naval brass	20.25c.

Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls.....	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings... ..	9.75c.	10.75c.
Lead, heavy	5.125c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	20.50c.	
Copper, hot rolled	25.00c.	
Copper, cold rolled, 14 oz. and heavier	27.25c.	
Zinc	10.00c.	
Lead, wide	10.55c.	
Seamless Tubes—		
Brass	26.87½c.	
Copper	27.87½c.	
Brass Rods	18.25c.	
Brazed Brass Tubes.....	28.50c.	

clined to force the market. The contract price of the American Smelting & Refining Co. is unchanged at 6.50c., New York.

Zinc.—Purchasing of prime Western was so heavy in November that producers are in a somewhat independent position so that, with demand rather light at present, quotations continue decidedly firm at 6.35c., East St. Louis, or 6.70c., New York, for delivery through the first quarter. Consumers, however, have considerable metal yet to buy for that period. Interest in the ore market continues unabated, with the ore price unchanged at \$40, Joplin. Stocks were further reduced last week by about 5500 tons, with the total now estimated at about 38,600 tons. On Nov. 3 stocks were a little over 57,800 tons. Ore output is being curtailed, the estimate for last week being about 12,500 tons, with sales at 13,320 tons and shipments at a little over 17,900 tons. The last two items were a little less than the preceding week, but are regarded as impressive.

Antimony.—Demand for Chinese metal is light, but quotations are a little higher at 9.87½c., duty paid, New York, for all positions.

Nickel.—Wholesale lots of ingot and shot nickel for this and next year's delivery are unchanged at 35c. and 36c., respectively. Electrolytic nickel is held at 37c. for this year's delivery, but for 1929 the quotation will be on the same basis as for ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Dec. 18.—This market is quiet, with prices unchanged except for tin. Specifications for all grades are lighter. The old-metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 16.25c.; tin, 50.50c.; lead, 6.45c.; zinc, 6.45c.; in less-than-carload lots: antimony, 10.75c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

New Steel Corporation Directors Elected

At a meeting of the board of directors of the United States Steel Corporation held on Dec. 18, Junius S. Morgan, Jr., of J. P. Morgan & Co., and Walter S. Gifford, president of the American Telephone & Telegraph Co., were made directors of the corporation succeeding the late William P. Palmer and John S. Phipps, who has retired. Thomas W. Lamont, who was elected to the board earlier in the year, was made a member of the finance committee.

Railroad Equipment

Boston & Maine Orders 500 Hopper Cars

OUTSTANDING orders placed during the week were 500 hopper cars for the Boston & Maine, 200 automobile cars for the Chicago & Eastern Illinois and 200 composite gondola cars for the Great Northern. The Louisville & Nashville has placed 24 locomotives. Inquiries included 250 gondola cars for the Elgin, Joliet & Eastern. Details of the week's business follow:

Boston & Maine has ordered 500 steel hopper cars from Standard Steel Car Co.

Chicago & Eastern Illinois has ordered 200 automobile cars from Mount Vernon Car & Mfg. Co.

Great Northern has ordered 200 composite gondola cars from Pressed Steel Car Co. and six dining cars from Pullman Car & Mfg. Corporation, and is inquiring for six gas-electric cars.

Fruit Growers Express has ordered 196 refrigerator car underframes from Ryan Car Co. This company has yet to pur-

chase 800 underframes through its subsidiary, Western Fruit Express.

Pacific Fruit Express has ordered 600 refrigerator car underframes from Pacific Car & Foundry Co.

Akron, Canton & Youngstown has ordered four air-dump cars from Magor Car Corporation.

International Railways of Central America are inquiring for 25 stock cars.

United Fruit Co. has ordered 50 cane cars from Magor Car Corporation.

Elgin, Joliet & Eastern is inquiring for 250 70-ton gondola cars and 75 flat car bodies.

Chicago, South Shore and South Bend has ordered two caboose cars from American Car & Foundry Co.

New York Central is inquiring for 22 steel coaches, five steel observation coaches and four smoking cars, all 70 ft. long.

Chicago & North Western is inquiring for 10 70-ft. baggage cars.

Louisville & Nashville has ordered 24 locomotives from Baldwin Locomotive Works.

Chicago, Rock Island & Pacific is now asking for eight gas-electric cars instead of six.

Reinforcing Steel

Awards of 4400 Tons—3650 Tons in New Projects

AWARDS of 4400 tons, reported to THE IRON AGE in the last week, included no jobs of outstanding size. Among the projects to take 3650 tons were a group of State hospital buildings at Orangeburg, N. Y., which will require 1000 tons. Awards follow:

NEW YORK, 400 tons, subway section 4, route 106; from Slattery-Baino & Co., general contractors, to National Bridge Works.

PHILADELPHIA, 500 tons, warehouse at Sixth Street and Glenwood Avenue, to American Steel Engineering Co.

AKRON, OHIO, 400 tons, Goodyear-Zepelin Co. hangar, to Hardware & Supply Co., West Virginia Rail Co. to furnish the steel.

OAK PARK, ILL., 100 tons, school, to Concrete Steel Co.

CHICAGO, 400 tons, apartment building, to Concrete Steel Co.

CHICAGO, 100 tons, Harlem Avenue bridge, to Concrete Engineering Co.

CHICAGO, 250 tons, apartment building near Loyola Station, to Concrete Engineering Co.

CHICAGO, 100 tons, naval armory, to Concrete Engineering Co.

CHICAGO, 125 tons, Jorgenson apartments, to Concrete Engineering Co.

CHICAGO, 100 tons, Nurses' Home for city of Chicago, to Concrete Engineering Co.

BELLINGHAM, WASH., 300 tons, hotel, to Northwest Steel Rolling Mills.

SACRAMENTO, CAL., 188 tons, crossing at Benham, to unnamed interest.

LOS ANGELES, 385 tons, office building, Eighth and Hill Streets, to unnamed interest.

LOS ANGELES, 900 tons, apartment building, 414 North Rossmore Boulevard, to unnamed interest.

LOS ANGELES, 120 tons, hospital, Glendale Boulevard, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 250 tons, New York State Hospital building.

ORANGEBURG, N. Y., 1000 tons, several buildings for New York State Hospital; Niewenhaus Co., general contractor.

JERSEY CITY, 150 tons, Margaret Maternity Hospital.

WEST NEW YORK, N. J., 100 tons, manufacturing building for Brinkerhoff Electric Co.; Auf-Der-Heide Construction Co., general contractor.

DOVER, N. J., 240 tons, buildings for Picatinny Arsenal; bids in.

APPLE CREEK, OHIO, 200 tons, buildings for the Ohio Institute for Feeble Minded.

CINCINNATI, 144 tons, library at University of Cincinnati.

CINCINNATI, 200 tons, Loretta Guild.

HAMILTON, OHIO, 193 tons, Hamilton High School.

WOLF POINT, MONT., 121 tons, Missouri River bridge; bids Dec. 19.

TACOMA, WASH., 209 tons, Tacoma Avenue bridge; bids postponed.

SAN FRANCISCO, 300 tons, foundations for War Memorial; bids Jan. 5.

LOS ANGELES, 160 tons, apartment building, South Detroit Street; bids being received.

LOS ANGELES, 190 tons, apartment building, Occidental Avenue; bids being taken.

SAN FRANCISCO, 191 tons, paving Laguna Honda Boulevard; bids Dec. 26.

PERSONAL

H. A. HOUSTON has been appointed works manager of the R. D. Nuttall Co., Pittsburgh, maker of Westinghouse-Nuttall gears, and a subsidiary of the Westinghouse Electric & Mfg. Co. Mr. Houston is a graduate in mechanical engineering of Purdue University, and a post-graduate of the railroad department of the University of Illinois. Before joining the Westinghouse company he had been engaged in mechanical and engineering capacities with the St. Louis-San Francisco and the Chicago, Rock Island & Pacific railroads. Since 1920 he has been manager of mechanical parts, railroad equipment engineering department, Westinghouse company. During the World War, he was a major in the Engineers Corps.

HERBERT C. RYDING, vice-president Tennessee Coal, Iron & Railroad Co., Birmingham, has been elected president of the recently organized Birmingham Board of Industrial Development.

JOHN E. KELLEY, general sales manager Simonds Saw & Steel Co., Fitchburg, Mass., will retire from that position on Dec. 31, after an association of 33 years with the company. He began as a salesman and was later advanced to branch manager and finally general sales manager and secretary. At present Mr. Kelley plans a rest at his Florida home, 740 Beach Drive, St. Petersburg.

W. E. LEWIS, recently resident manager at the Anniston, Ala., plant of the United States Cast Iron Pipe & Foundry Co., has been made resident manager for the company at Addyston, Ohio, succeeding the late CHARLES SEITZ.

C. E. FOUST, vice-president and general sales manager of the Kentucky Fire Brick Co., Chicago, has been appointed representative of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., in the Chicago district, with headquarters at 208 South La-Salle Street.

F. J. PHILLIPS, for several years with the Concrete Steel Co. at Boston, is representing the General Fireproofing Co., Youngstown, in the Philadelphia territory.

HENRY C. OSBORN, president American Multigraph Co., Cleveland, has been appointed chief of the Cleveland Ordnance District of the United States Army, succeeding COL. FRANK A. SCOTT, chairman of the board of the Warner & Swasey Co., who recently resigned. ALEX C. BROWN, president Industrial Brownhoist Corporation, Cleveland, has been made assistant ordnance chief of the district. Colonel

Scott has been appointed on Mr. Osborn's advisory committee, which also includes SAMUEL MATHER, chairman, and HENRY G. DALTON, both of Pickands, Mather & Co., JAMES A. CAMPBELL, president Youngstown Sheet & Tube Co. and ALLYN F. HARVEY, president Pittsburgh Steamship Co.

WILLIAM W. SWAYZE, formerly plant manager for the American Manganese Steel Co., New Castle, Del., and previously associated with the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has been made superintendent of the Deemer Steel Casting Co., New Castle, Del. After Jan. 1 the Deemer company will be



W. W. SWAYZE

equipped to manufacture manganese steel castings and will continue its production of carbon-and alloy steel castings as heretofore.

F. H. BUTTERFIELD has been appointed chief engineer of the Laclede Steel Co., St. Louis, succeeding H. H. WOOD, who has resigned.

HARRY SCULLIN, president Scullin Steel Co., St. Louis, and EARL C. BROWN, vice-president and general manager Mississippi Valley Structural Steel Co., St. Louis, have been elected to the board of directors of the Merchants and Manufacturers Association of that city.

H. J. KELLEY, for five years general manager of steel plants for the British Empire Steel Corporation, Ltd., Sydney, N. S., and previously associated for many years with the Lackawanna Steel Co., Buffalo, has been appointed general manager of the British Empire corporation, with headquarters at Sydney. He will be in charge of all the company's activities, including coal mines, railroads,

docks and steamships, and succeed J. E. McLURG, vice-president, who has been transferred to the Montreal office. F. W. GRAY, for five years assistant to the president, with headquarters at Montreal, who has been in the service of the company for 24 years, has been appointed assistant general manager, with office at Sydney.

CHARLES L. RICE, manager Hawthorne works, Western Electric Co., Inc., Chicago; WILLIAM H. MEESE, manager of the company's Point Breeze plant, Baltimore, and S. S. HOLMES, of the Kearny works, Kearny, N. J., have been elected vice-presidents of the company.

M. H. LUND, Middletown, Ohio, will be in charge of a foreign office to be opened on Jan. 1 at Oslo, Norway, by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

LEROY P. ROBINSON, New England representative of the Sterling Wheelbarrow Co., Milwaukee, has resigned to become sales manager of the Werner G. Smith Co., Cleveland. He will be succeeded by RAY HUNTER, for many years with White & Brother, Inc., Philadelphia, and the Niagara Falls Smelting & Refining Co. Mr. Hunter will retain his association with the White organization.

D. C. CURTIS, purchasing agent for the Chicago, Milwaukee, St. Paul & Pacific railroad, was the guest of the New England Railroad Club on Dec. 11, at Boston, and discussed the budget system in railroad administration.

H. M. LANE, president of the H. M. Lane Co., Detroit, was the guest of the New England Foundrymen's Association at the Exchange Club, Boston, on Dec. 12. He discussed recent improvements in melting of iron, his talk being accompanied by illustrations. Later he exhibited sample castings and told of methods employed in making them and results obtained in stress, machinability, etc. At a business meeting preceding Mr. Lane's address, H. P. BLUMENAUER, Arcade Malleable Iron Co., Worcester, Mass.; HENRY S. CHAFFEE, Builders Iron Foundry, Providence, R. I., and R. F. HARRINGTON, Hunt-Spiller Mfg. Corporation, South Boston, were appointed to a nominating committee for officers to be elected at the association's annual meeting on Jan. 9. CHARLES A. REED, Rogers, Brown & Crocker Brothers, Inc., Boston, was made chairman of the entertainment committee for the annual meeting. The association, cooperating with the Associated Brass Founders of New England, voted to tender a dinner on Dec. 19, at the Engineer's Club, to LEROY P. ROBINSON, Sterling Wheelbarrow Co., Boston, who is to locate shortly in Cleveland.

Obituary

WILLIAM CHASE GREENE, vice-president and works manager of the Builders Iron Foundry, Providence, R. I., died in that city on Dec. 13, following a long illness. He was born at Marietta, Ga., Dec. 16, 1852.

EDWARD PRESTON CLIFFORD, vice-president Bell Telephone Laboratories, Inc., New York, died at his home in that city on Dec. 17, aged 53 years. He became associated with the Western Electric Co., Inc., 35 years ago and in 1911 was made manager of the New York office. In 1917 he became Eastern district manager, and the following year, office manager of the company's engineering department. When the Bell Telephone Laboratories were incorporated in 1925 he was elected vice-president.

GEORGE F. HUTCHINS, for many years general superintendent of the Crompton & Knowles Loom Works, Worcester, Mass., died Dec. 12, aged 87 years. He was widely known as a mechanic and as an inventor in the development of weaving, particularly in connection with the fancy loom. He was born at Hepburn, Pa., but later moved to East Douglas, Mass., and learned his trade in the works of the Douglas Axe Co.

OTTO J. DORN, manager of the Automatic Sprinkler Co., Chicago, died suddenly Dec. 12 at his office in that city, aged 65 years.

Chrome-Tungsten Steel Excellent at High Temperatures

(Concluded from page 1556)

in. in 400 hr. but remained substantially constant at that figure after 600 hr.

L. W. Spring, Crane Co., Chicago, confirmed the good report on this steel by describing his "long-draw" tests. He places round samples in drilled holes in a cast iron block, and heats them continuously at 900 deg. Fahr., testing them for hardness at given intervals, and inferring a change in related properties from the change in hardness. An 8 per cent chromium, 8 per cent tungsten steel with 0.60 per cent carbon gave 590 Brinell when quenched. After 300 hr. at 900 deg. Fahr. the Brinell increased to 630, which figure was maintained for 1800 hr. more, then it gradually fell to 510 after a total time of 2900 hr. (4 months).

The same alloy with 0.30 per cent carbon acted similarly, but the decrease in hardness started 500 hr. earlier, and it fell faster. Mr. Spring thought that White and Clark neglected high-speed steel, which gives good high-temperature service. No decrease in hardness occurs after 2100 hr. at 900 deg. C. Also he cited the austenitic steels containing 24 per cent nickel and 7 to 17 per cent chro-

mium which will not creep more than 1 per cent in one year at working loads and temperatures. It should also be remembered that large grain size is probably desirable for steels for this duty, despite the fact that fine grain is associated with toughness at atmospheric temperatures. In other words, a casting may resist loads better than a forging at and above 900 deg. Fahr.

Milwaukee Forms Chapter of Welding Society

Temporary organization of a Milwaukee chapter of the American Welding Society has been effected through the efforts of S. H. Smith, manager Milwaukee branch Universal Oxygen Co., at a meeting attended by 37 representatives of 22 Milwaukee companies engaged in the industry. I. A. McIntyre, Milwaukee Steel Foundry Co., is temporary president, and W. E. Van Dreser, local manager C. H. Hollup Corporation, temporary secretary. A permanent organization will be made at a second meeting on Dec. 18. D. W. Lunn of Chicago, who addressed the organization meeting, declared that Milwaukee might soon claim the distinction of being the welding center of America because of

the remarkable work accomplished by the A. O. Smith Corporation and other plants. Six plants in Milwaukee manufacture welding equipment, and a much larger number use it.

To Build Memorial Bridge Machinery

Contract for the operating trunnion and lock machinery for the Arlington Memorial Bridge has been awarded to Gears & Forgings, Inc., Cleveland, by the Phoenix Bridge Co., Phoenixville, Pa., the general contractors. This bridge, which will span the Potomac River at Washington, is a Strauss double-leaf bascule draw span. Each leaf is driven by two motors through inclosed herringbone reducing and equalizing double reduction gear units and the lock mechanism drive is through inclosed worm gear reductions. All gears, including the main operating rack, have cut teeth.

Operating machinery for two double-leaf bascule bridges of the Waddell Hardesty type, one of which will span the Northeast River and the other the Cape Fear River at Wilmington, N. C., is also being built by Gears & Forgings, Inc. This contract was awarded by the Vincennes Bridge Co., Vincennes, Ind.

New Trade Publications

Excavating Equipment.—Marion Steam Shovel Co., Marion, Ohio.—Four bulletins devoted to different types of excavators of 1½ and 2-yard capacity. Bulletin 334, 16 pages, illustrates and describes type 480 with electric rheostatic control. This is on a crawler tread and has a 2-yard bucket. Bulletin 335 of 16 pages illustrates the same type with Ward-Leonard control. Bulletin 336, 16 pages, illustrates the same type of excavator, but with steam operation rather than electric. Bulletin 337 illustrates and describes type 450 with gas-electric operation. The gas engine runs on constant speed, driving a d.c. generator and providing current for three motors.

Ingot Molds.—Gathmann Engineering Co., Baltimore.—Booklet of 30 pages, entitled "Big End Up vs. Big End Down." It illustrates and describes molds of various designs and shows sections of ingots cast in them. An argument is made for the use of molds with the big end up and recommendations are made as to best methods of handling molds in practice.

Ventilation for Air Painting Booths.—Paasche Airbrush Co., 1923 Diversey Parkway, Chicago.—Folder describing and illustrating an explosion-proof ventilating unit for an air-finishing booth. This is made in four sizes and for either a.c. or d.c. service.

Non-Corroding Pumps.—E. F. Doty Pump Co., 401 Ellicott Square, Buffalo.—Folder describing centrifugal pumps particularly adapted to handle corrosive and viscous fluids and solids. They can be equipped with

impellers of non-clogging type to handle solids in suspension and stringy or fibrous substances.

Texrope Drives.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1228-H of 16 pages illustrates and describes the use of belts of trapezoidal cross section for handling drives where the centers are close together. Most of those illustrated are multiple. The power is transmitted by the wedging contact between the belts and the V-shaped grooves.

Induction Motors.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1118-E of 16 pages illustrates and describes a line of polyphase induction motors of the sleeve and roller bearing types, built with steel frames. Many details of construction are shown.

Metal Edge Boxes.—National Metal Edge Box Co., Philadelphia. 28-page booklet of special shape showing the superiority of packages made with metal reinforcement strips at vertical corners, and containing a discussion of other factors which enter the problem of rugged packing boxes.

Furnace Insulation.—Celite Products Co., New York. Bulletin 103, containing 30 sectional drawings and 20 exterior views of electric and fuel-fired furnaces for diverse heat treating and baking operations.

Bearing Metal.—Invincible Bearing Metals Corporation, Sandusky, Ohio. Folder describing performance of "Eureka Metallon" bearings, made of leady bronze, so processed that the lead is uniformly dispersed in unusually fine particles.

Machinery Markets and News of the Works

Outlook Continues Promising

Some Let-up in Machine Tool Buying This Month but Increase Is Expected in the First Quarter

MACHINE tool buying has declined somewhat this month, as was to be expected, but the falling off is smaller than usual for the last month of the year. At Chicago sales have been on a par with those of the two previous months. The large amount of business in prospect assures a good first quarter business, barring untoward developments.

Aircraft companies are expected to become a more important factor in machine tool buying. The Curtiss Aeroplane & Motor Co., Buffalo, has bought 12 milling machines and other tools; the Glenn L. Martin Co., which has sold its Cleveland plant and will equip a new plant on the Eastern seaboard, has bought about \$35,000 worth of tools, and the Sperry Gyroscope Co., Brooklyn, has bought a number of tools. A great many aircraft and engine-building plants contemplate expansion during 1929. The Wright Aeronautical Corporation, Paterson, N. J., has announced that it will build Gypsy airplane motors for a light plane at some point in the Middle West.

New York

NEW YORK, Dec. 18.—Business in machine tools is still good, although the approach of the holidays has apparently caused some curtailment in the volume of new inquiry. Increases in prices of about 10 per cent have been made by some builders and others are reported considering similar price advances. No action on its list of tools has been taken by the New York, New Haven & Hartford Railroad, but the New York Central is still buying and closed on some tools the past week. The General Electric Co., Schenectady, continues an active buyer, closing on several pieces of equipment recently and has inquiries in the market for a number of tools, including three lathes, a screw machine and milling machine.

Railroad buying shows signs of improving. The Missouri Pacific and the Cotton Belt have each ordered several machines at St. Louis; the Southern has bought the tools on a recent list, and the Norfolk & Western still has some to order against an inquiry issued early in the fall. The New York, New Haven & Hartford has received bids on a list.

Export business is gaining, and the machine tool industry looks for substantial orders from abroad during the coming year. One Cincinnati company is reported to have orders on its books for \$250,000 worth of tools for France, as well as sizable orders from Germany and Italy.

The National Machine Tool Builders' Association reports that orders continued their upward trend during November, making the twelfth consecutive month of progressive increase. The association sees no signs of a recession for months to come, although a seasonal slackening may be looked for this month.

The Austin Mfg. Co., Harvey, Ill., has issued a sizable list.

No fresh buying by local aircraft manufacturers is reported, but the Curtiss Aeroplane & Motor Co., Buffalo, continues to buy against a list of machine tools estimated to be close to \$250,000, and is understood to have closed on a number of milling machines. The Sperry Gyroscope Co., Brooklyn, has bought a number of tools, including several lathes.

Recent sales by Niles Tool Works included a steam hammer, carwheel borer, carwheel lathe, journal turning and axle lathe, boring mill and three engine lathes. Machinery department of company reports sale of one radial drill, six grinders, six engine lathes, a bolt cutter, upright drill, milling machine, screw machine, gate shear and power hack saw. Pratt & Whitney Co. has booked orders recently for 11 sensitive and deep-hole drilling machines, 13 engine lathes, four vertical surface grinders, six jig boring machines, three profilers, three die sinkers, two bench lathes and a bench milling machine.

Pure Oil Co., 420 Lexington Avenue, New York, has taken bids on general contract for one-story unit, 120 x 175 ft., at Brooklyn, to cost about \$200,000 with equipment. William Higginson, 101 Park Avenue, New York, is architect and engineer.

National Lead Co., 111 Broadway, New York, has taken bids on general contract for one-story unit, 120 x 175 ft., at Brooklyn, to cost about \$200,000 with equipment. William Higginson, 101 Park Avenue, New York, is architect and engineer.

American Sugar Refining Co., 117 Wall Street, New York, is reported arranging addition to refinery at New Orleans, to cost more than \$150,000 with equipment.

Maxwell Schantz, 25 Spruce Street, New York, architect, has plans for two-story automobile service, repair and garage building on West Thirty-fifth Street, Brooklyn, to cost about \$100,000 with equipment.

Central Supply Co., 255 Pearl Street, New York, manufacturer of plumbing and heating equipment, is said to have plans for new plant at Radburn, a new industrial settlement near Paterson, N. J., to cost more than \$50,000 with equipment.

Schnell Penselpen Corporation, 130 West Forty-second Street, New York, manufacturer of a combination fountain pen and pencil, has purchased property at Arlington, N. J., for new plant, to cost more than \$70,000 with machinery.

Acme Metal Goods Mfg. Co., 2 Orange Street, Newark, manufacturer of metal products for domestic service, has purchased property, 60 x 100 ft., at Nassau Boulevard and 215th Street, Queens, L. I., for new factory.

John Polachek and other officials of Polachek Bronze & Iron Co. and Renaissance Bronze & Iron Co., affiliated organizations, both with plants at Long Island City, have organized Polachek Bronze & Iron Corporation and Renaissance Bronze & Iron Corporation, to take over and expand present companies. Erwin R. Geiger will be an official of both companies.

Electric Servidor Corporation, 147 West Twenty-ninth Street, New York, manufacturer of electric service specialties, has leased part of building at 357-9 Ogden Street, Newark, for branch plant to manufacture electric roasting machines.

Best Mfg. Co., 1200 Grove Street, Irvington, N. J., manufacturer of electrical and radio equipment, has awarded general contract to Kiegel & Spieler, Irvington, for two-story addition, 35 x 127 ft., to cost about \$40,000 with equipment. V. H. Strombach, 1234 Springfield Avenue, is architect.

Morrison Machine Co., 204 Van Houten Street, Paterson, N. J., manufacturer of textile machinery and parts, has acquired about 2½ acres, with one-story building of about 100,000 sq. ft. of floor space, from American Locomotive Co., for new factory for increase in output.

Kullman Dining Car Builders, Inc., 61 Empire Street, Newark, Samuel Kullman, president, has acquired two-story factory at Frelinghuysen Avenue and Queen

Street, 50 x 300 ft., for expansion. It is understood present works will be removed to new location.

F. H. Koenigsberger, 48 Walnut Street, Newark, architect, will soon take bids on general contract for three-story automobile service, repair and garage building at Kearny, to cost about \$100,000 with equipment.

Rhodia Chemical Co., Jersey Avenue, New Brunswick, N. J., manufacturer of patented wire glass, etc., is planning construction of two one-story additions, to cost more than \$35,000 with equipment.

Paramount Welded Aluminum Products Corporation, Brooklyn, manufacturer of airplane fuel and oil tanks, engine cowlings, pilot seats and other aircraft products, has removed from 429 Kent Avenue to 195 Morgan Avenue. Company has recently purchased shop materials, machines, tool stands and other equipment. J. Billig is president.

New England

BOSTON, Dec. 17.—The past week was quiet with the majority of machine tool dealers. Several thousand dollars worth of heavy production tools were sold by a Boston dealer to Vermont manufacturers, and a used tool dealer shipped a 16-in. x 8-ft. lathe, a large number of hand millers and miscellaneous bench equipment. New England machine tool builders are busy, some maintaining night shifts. A shortage of skilled workers still exists.

Small tools are selling freely, December sales greatly exceeding those for the same period last year.

Cone Automatic Machine Co., Windsor, Vt., has started work on an addition.

Walter Atherton and Carroll Tiffany, architects, 148 State Street, Boston, have closed bids for a two-story trade high school at Medford, Mass., to cost \$125,000 without equipment. P. S. Ferguson is chairman of building committee.

Frank B. Perry, 44 Franklin Street, Providence, architect, closed bids Dec. 15 for a two-story and basement, 60 x 400 ft. jewelry manufacturing plant for Cohn & Rosenberger, Inc., Providence.

Ernest J. Batty, 13 Temple Street, Quincy, Mass., closed bids Dec. 15, on a one-story and basement school addition, 32 x 64 ft., at Braintree, Mass., to contain a manual training department.

Reed-Prentice Corporation, Worcester, Mass., has recently added to its machine shop equipment four Warner & Swasey and two Gisholt turret lathes, one Bickford and one Carlton 5-ft. radial drills, and a number of other machine tools. Considerable new foundry equipment has also been purchased.

Bird & Son, Inc., Washington Street, East Walpole, Mass., manufacturer of roofing, has asked bids on general contract for one-story addition, including improvements in present unit, to cost about \$45,000 with equipment.

Indian Motorcycle Co., Springfield, Mass., is said to be arranging to use part of plant for production of new type of aircraft motors, including parts and assembling.

Rhode Island Malleable Iron Works, Hillsgrove, R. I., has purchased plant and business of Rhode Island Fittings Co., Providence, and will consolidate with organization. Merged company will have a capital of \$1,000,000 and plans expansion.

The Crane Market

IN the past week to 10 days there has been an increase in the number of inquiries for overhead cranes, especially electric and hand power equipment of small capacity. One of these inquiries asks for prices on eight small hand power and electric cranes and another recent request for prices is from the American Enka Corporation, 114 East Thirty-second Street, New York, in the market for a 10-ton hand power and a 20-ton electric traveling crane for a plant at Asheville, N. C. Business in locomotive cranes continues limited.

In the New England district, Stone & Webster, Inc., Boston, is inquiring for a 100-ton electric overhead crane for the Puget Sound Electric Railway.

Among recent sales are:

Sutton & Suderly Brick Co., Coeymans, N. Y., 2-ton, 30-ft. span, 3-motor overhead crane from Shepard Electric Crane & Hoist Co.

New England Gas & Electric Association, Worcester, Mass., is disposing of bond issue of \$6,000,000, part of proceeds to be used for extensions and improvements, including transmission lines.

Central Maine Power Co., Augusta, Me., is completing plans for construction of hydroelectric generating plant on Kennebec River, near Bingham, Me., with initial output of 60,000 hp., to cost more than \$500,000 with transmission system.

Bridgeport Brass Co., Bridgeport, Conn., is said to be planning new one-story unit, to cost over \$75,000 with equipment.

Acme Metal Treating Co., Inc., 108 Beachview Avenue, Bridgeport, Conn., has been organized to engage in metal treating, including pack, die, high-speed steel cyanide hardening and annealing. Company's charter also calls for machine shop which will be installed at some future time.

Pittsburgh

PITTSBURGH, Dec. 17.—The prospect for the early part of next year is exceptionally bright. Steel manufacturers have taken up projects that they have had in blueprints for a year or more and builders of rolling mills are counting on some heavy releases after the turn of the year. These programs will mean purchases of machine tools and of cranes. At least 11 cranes will be wanted for the Youngstown Sheet & Tube Co. Indiana Harbor improvements, while another large lot will be wanted in the new construction of the A. M. Byers Co.

Liberty Dairy & Products Co., New Kensington, Pa., plans rebuilding part of machine shop and ice plant, destroyed by fire Dec. 7.

Spang, Chalfant & Co., Inc., Union Bank Building, Pittsburgh, manufacturer of pipe, tubing, etc., has asked bids on general contract for one-story addition to plant at Etna, 240 x 800 ft., to cost more than \$400,000 with equipment.

Libbey-Owens Sheet Glass Co., Charleston, W. Va., has asked bids on general contract for additions in cutting division at branch plant at Kanawha, W. Va., to cost more than \$80,000 with equipment.

W. A. Harriman & Co., 39 Broadway, New York, bankers, have acquired S. R. Dresser Mfg. Co., Bradford, Pa., manufacturer of pipe couplings, sleeves, fittings, etc. New company has been organized under same name and stock issue of \$4,800,000 is being sold, part of fund to be used for expansion. Fred A. Miller is president.

United States Chromium Corporation, Wilksburg, Pa., has plans for one-story plant unit, 75 x 100 ft., to cost over \$50,000 with equipment.

Philadelphia

PHILADELPHIA, Dec. 17.—Contract has been let by Thomas S. Gassner Co., 4545 Wayne Avenue, Philadelphia, manufacturer of metal sash, etc., to John N. Gill Construction Co., 121 North Broad Street, for two-story addition, to cost about \$45,000 with equipment.

Board of Education, Keystone Building, Philadelphia, is asking bids until Jan. 3 for steel lockers, hardware, equipment, supplies, etc. Edward Merchant is secretary and business manager.

Schneider-Bowman Co., Van Dyke Street, Philadelphia, plans rebuilding part of foundry and pattern shop destroyed by fire Dec. 11 with loss over \$70,000 with equipment.

General Refractories Co., 106 South Sixteenth Street, Philadelphia, is arranging for increase in capital from 225,000 to 300,000 shares of stock, no par value, for expansion.

M. A. Regan, 5903 Cobbs Creek Parkway, Philadelphia, and associates have organized Philadelphia Metal Works, and plan early operation of local plant to manufacture machine equipment and metal products. Rudolph Weber, 4445 North Third Street, is also interested in company.

Frederick H. Levey Co., 222 Forty-fourth Street, Brooklyn, manufacturer of inks, etc., has acquired six-story factory, 95 x 216 ft., at Washington Avenue and Thirteenth Street, Philadelphia, heretofore held by General Electric Co., and will remodel for new plant.

Crescent Insulated Wire & Cable Co., Olden and Taylor Avenues, Trenton, N. J., has awarded general contract to Karno-Smith Construction Co., Broad Street Bank Building, for two-story addition, 110 x 115 ft., to cost about \$85,000 with equipment. J. Osborne Hunt, Hunt Building, is architect.

Central Airport, Inc., Philadelphia, care of Black & Bigelow, Inc., 551 Fifth Avenue, New York, consulting engineer, has plans for airport at Camden, N. J., consisting of hangars, repair and reconditioning shops, oil storage and other buildings, to cost about \$1,750,000.

Phoenix Horse Shoe Co., Joliet, Ill., is concluding negotiations for purchase of plant and business of Bryden-Neverslip Co., Catasauqua, Pa., manufacturer of horse shoes, pliers, etc., with branch plants at New Brunswick, N. J., and Montreal, effective Jan. 1. Purchasing company plans expansion in eastern district.

Standard Tractor Co., Harrisburg, Pa., care of Harrisburg Commercial and Industrial League, Charles K. Stevenson, president, now being organized by local interests, headed by O. E. Williams, is arranging for purchase of property for new plant to manufacture farm tractors and kindred agricultural equipment, including parts and assembling department.

ments, initial units to cost more than \$85,000 with machinery.

American Steel & Wire Co., South High Street, Allentown, Pa., has awarded general contract to American Bridge Co., 30 Church Street, New York, for one-story addition to local plant, to cost over \$50,000 with equipment. Headquarters are at 208 South LaSalle Street, Chicago.

City Council, Coatesville, Pa., is planning municipal airport, including hangar, repair shop and other units, to cost more than \$65,000. Frank Breuninger, member of council, is chairman of committee in charge.

Cincinnati

CINCINNATI, Dec. 17.—While machine tool buying has shown a further recession the past week and few purchases of importance are expected until after the first of the year, business this month is considered good compared with December in recent years. It is likely, however, that bookings will be substantially less than the monthly average for the previous six months. Machine tool manufacturers are confident that the first quarter of 1929 will be an active period. Prospects in the automobile industry are promising for the purchase of considerable equipment, and business from the general industrial field probably will remain at or near its present high level. Most executives are of the opinion that buying by railroads next year will not much exceed the rather meager volume of the past 12 months.

That foreign trade may be expanded somewhat in 1929 is the belief of some local machine tool companies. A few manufacturers, building single-purpose tools for the automobile and other highly specialized industries have secured a liberal amount of business from European countries this year. One company is reported to have bookings totaling more than \$250,000 from France alone, as well as good-sized orders from England, Germany and Italy. In the past week a Cincinnati builder secured a substantial percentage of its business from European countries.

Southern Railway has bought the tools on its recent list, but Norfolk & Western still has a few items to purchase. Local plants continue to operate on heavy production schedules, although this activity is not equally distributed among the various machine tool companies.

Bids will soon be asked by Jaeger Machine Co., 518-20 Dublin Road, Columbus, Ohio, for one and two-story addition, to cost about \$50,000 with equipment. Bassett & Tresselt, 217 East Broad Street, are architects.

Leland Electric Co., 222 North St. Clair Street, Dayton, Ohio, manufacturer of fractional horsepower motors, parts, etc., has awarded general contract to C. H. Shook, Inc., Dayton, for one-story addition, 165 x 485 ft., and boiler plant, to cost about \$225,000 with equipment. Baling Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Avey Drilling Machine Co., 25 East Third Street, Cincinnati, has awarded general contract to B. T. Wisenall, Covington, Ky., for one-story addition to Covington plant, to cost about \$28,000 with equipment.

Samuel Stamping & Enameling Co., Chattanooga, Tenn., is planning expansion program at North Chattanooga, to cost about \$100,000 with equipment. It is

proposed to more than double present capacity.

Murray Corporation of America, Inc., Detroit, has purchased tract of 45 acres at Memphis, Tenn., for new plant to manufacture automobile bodies, consisting of main one-story unit, 575 x 640 ft., and auxiliary buildings, to cost over \$1,500,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Hardwick Stove Co., Cleveland, Tenn., has approved plans for construction of four-story unit, to cost about \$100,000 with equipment.

Gem Metal Shield Co., 199 Bacon Street, Dayton, Ohio, plans new one-story factory totaling about 25,000 sq. ft. floor space, to cost over \$60,000 with equipment.

Plant and business of W. J. Savage Co., 912 West Clinch Avenue, Knoxville, Tenn., manufacturer of equipment for coal mines, quarries, etc., have been acquired by new interests, headed by W. M. Fulton, 820 Temple Avenue. New owners plan expansion, including other branches of machinery manufacture.

LeBlond Aircraft Engine Corporation, Cincinnati, has announced that LeBlond engine has passed United States Navy 50-hour endurance test and company has been granted United States Department of Commerce type certificate No. 12. Production soon will be increased to four engines a day.

Cleveland

CLEVELAND, Dec. 17.—Machine tool sales held up well through the first half of December, which is usually a quiet month in the machinery trade. Considerable slowing down is expected during the remainder of the month. There was a fair volume of scattered business the past week, which was well distributed, a moderate portion coming from industries outside of the automotive field. A local manufacturer of turret lathes, whose sales were exceptionally good in November, reports that its business so far this month has exceeded the previous month.

Glenn L. Martin Co., Cleveland, during the week purchased six machines aggregating about \$35,000 for partly equipping a new plant. Company will erect a plant in the East to manufacture airplanes for Navy Department, but pending selection of a permanent site it will equip a plant for experimental work at Baltimore, Curtiss Aeroplane & Motor Co., Buffalo, has placed an order with Kearney & Trecker Co. for 12 new type Milwaukee millers, several other milling machines and special fixtures aggregating \$82,000.

Kelley Reamer Co., 3705 West Seventy-third Street, Cleveland, has awarded general contract to Julius Linder, 15615 West Delaware Avenue, Lakewood, for one-story addition to cost \$35,000 with equipment. Edward W. Putnam is president.

Gluntz Brass Foundry Co., 3301-5 East Fifty-fifth Street, Cleveland, has plans for one-story plant to cost \$70,000 with equipment.

American Steel & Wire Co., Rockefeller Building, Cleveland, has plans for new one-story rod mill at Cuyahoga Works, to cost more than \$150,000 with equipment.

Jordan Motor Co., 1070 East 152nd Street, Cleveland, has awarded general contract to Hunkin-Conkey Construction Co., Hunkin-Conkey Building, for one-

story addition, 45 x 100 ft., to cost about \$45,000 with equipment.

Dart Boats, Inc., 2215 Collingwood Avenue, Toledo, Ohio, W. C. Hayes, president, has awarded general contract to Comte-Nauman Co., 912 Summit Street, for one-story boat-building and repair plant, 65 x 300 ft., to cost about \$75,000 with equipment.

McKinley Aeroways, Inc., Canton, Ohio, recently organized, has acquired McKinley airport on Louisville Road and plans development of air terminal, including construction of hangars, repair and reconditioning shops, and other mechanical units, to cost more than \$60,000.

Sandusky Cement Co., Sandusky, Ohio, has authorized change of name to Medusa Portland Cement Co., and will increase capital from 75,000 to 225,000 shares of stock, no par value, part of proceeds to be used for expansion. Mills are operated at Bay Ridge, near Sandusky; Silica, Ohio; York, Pa., and Dixon, Ill.

Youngstown Sheet & Tube Co., Stambaugh Building, Youngstown, Ohio, is having plans completed by Allen & Garcia Co., 332 South Michigan Avenue, Chicago, consulting engineer, for new coal mining and washing plant in western Pennsylvania, to cost over \$850,000 including machinery.

Detroit

DETROIT, Dec. 17.—Contract has been let by Ajax Bolt & Nut Co., 5623 Gratiot Avenue, Detroit, to Alois LaPeirre, Grosse Pointe Park, Mich., for rebuilding part of two-story plant recently destroyed by fire, to cost close to \$50,000 with equipment.

Michigan Smelting & Refining Co., 7885 Joseph Campau Avenue, Detroit, has awarded general contract to Kreighoff Construction Co., Detroit, for an addition to cost over \$70,000 with equipment. Christian W. Brandt, Kresge Building, is architect.

Zenith-Detroit Corporation, Hart Avenue, Detroit, manufacturer of carbureters, etc., has awarded general contract to F. N. Cooper, 6370 Gratiot Avenue, for two-story and basement addition, 62 x 120 ft., to cost about \$60,000 with equipment.

Grasselli Chemical Co., 629 Euclid Avenue, Cleveland, subsidiary of E. I. duPont de Nemours & Co., Wilmington, Del., has acquired 20 acres at Ecorse, Mich., for new plant to manufacture sulphuric acid, initial unit to cost about \$1,000,000 with machinery, and ultimate plant about five times that sum.

Timken-Detroit Axle Co., Clark Street, Detroit, has awarded general contract to C. O. Barton Co., 1900 East Jefferson Avenue, for two-story addition, to cost about \$55,000 with equipment.

Wilcox-Rich Corporation, Detroit, manufacturer of valves, piston rings, etc., for automobile engines, is completing arrangements for purchase of plant and business of Rich Tool Co., 1501 East Ferry Street, manufacturer of kindred equipment, and will merge with its organization. Consolidated company will operate plants at Marshall, Saginaw and Battle Creek, Mich., and plans expansion.

Board of Education, Coloma, Mich., contemplates installation of manual training equipment in new two-story grade and high school to cost about \$130,000, for which bids will soon be asked on general contract. Warren, Holmes & Powers Co., 820 Michigan Avenue, Chicago, are architects.

Star Tool & Die Works, 2520 Twenty-fourth Street, Detroit, is arranging gen-

eral expansion program, including installation of machine tools and other equipment.

National Moulding Co., 675 Richmond Avenue, Northwest, Grand Rapids, Mich., has been organized to manufacture special steel and brass shapes, such as automobile garnish moldings, window channels, etc. Equipment has been purchased and plant is expected to be in operation this month.

Columbia Tool Steel Co., has moved its Detroit office from 144 East Woodbridge Street to 1718 Howard Street.

Chicago

CHICAGO, Dec. 17.—Sales in the first half of December equalled the average of the two preceding months, a situation unparalleled in previous years with the possible exception of the war period. Fresh inquiry remains at a high level, but indications are that in the next two weeks considerable business will be held for placement after Jan. 1.

The Missouri Pacific and the Cotton Belt each have ordered several machine tools at St. Louis. At Chicago a demand for presses is noted, and at Harvey, Ill., the Buda Co. is closing its list. Purchases against the Fort Wayne list of the International Harvester Co. have been delayed, but orders will probably be placed soon after the first of the year. The Nash Motors Co., Racine, Wis., and the Marmon Motor Car Co., Indianapolis, are said to be planning extensions.

Illinois Power & Light Co., 231 South LaSalle Street, Chicago, is planning construction of a gas plant at Decatur, Ill., to cost \$300,000. T. J. Lucas is engineer.

General Engineering Works, 340 West Huron Street, Chicago, manufacturer of screw machine products, has plans for one-story plant to cost about \$55,000 with equipment. Weiss & Niestedt, 53 West Jackson Boulevard, are architects.

Baker Stove Co., 818 Church Street, Belleville, Ill., is having plans drawn for new three-story plant, 115 x 120 ft., to cost about \$60,000 with equipment. Gill & Jackson, 1328 Walnut Street, Murphysboro, Ill., are architects.

Studebaker Sales Co., 45 West Twenty-fourth Street, Chicago, has asked bids on general contract for new multi-story service, repair and sales building, to cost \$350,000 with equipment. Loewenberg & Loewenberg, 150 West Monroe Street, are architects.

Andrews Wire & Iron Works, 1802 Preston Avenue, Rockford, Ill., has work under way on one-story addition, 100 x 125 ft., to cost over \$50,000 with equipment.

Great Northern Railway Co., St. Paul, Minn., will soon begin construction of addition to engine house and repair shops at Whitefish, Mont., to cost \$70,000 with equipment. J. R. W. Davis, St. Paul, is chief engineer.

Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has plans for an addition to plant at Aurora, Ill., to cost over \$40,000 with equipment.

Board of Education, Blue Island, Ill., is said to be planning installation of manual training equipment in new two-story addition to high school to cost \$350,000, for which plans have been drawn by Perkins, Chatten & Hammond, 160 North LaSalle Street, Chicago, architects.

Des Moines Steel Tank Co., Des Moines, Iowa, will soon erect two buildings to manufacture steel tanks, small

buildings, baskets and other livestock equipment. Company recently acquired factory at East Des Moines for tank production. New units, which will cost \$60,000, will double present capacity. John M. Albrecht is owner.

Herman Nelson Corporation, Eighteenth Street and Third Avenue, Moline, Ill., manufacturer of heating and ventilating devices and equipment, will soon begin work on two-story addition to factory and extension to office building to cost about \$60,000.

Dreis & Krump Mfg. Co., 7416 Loomis Boulevard, Chicago, maker of sheet metal machinery, has purchased Kutscheid Mfg. Co., Chicago, maker of power shears, and will extend manufacturing of latter company.

Milwaukee

MILWAUKEE, Dec. 17.—The first half of the month produced a substantial volume of new business for machine-tool builders in this locality, although sales were hardly as numerous as in previous weeks. Inquiry, however, gives promise of a good demand after the turn of the year, the present slackening being more or less seasonal, but less pronounced than in former years. Machine tool executives regard the future as bright, and look for a new year probably as active as 1928.

Plans for expenditure of approximately \$1,000,000 for erection and equipment of a new steel stamping unit have been made public by Charles W. Nash, president Nash Motors Co., Kenosha, Wis. This is in addition to a \$3,000,000 enlargement program now under way at Kenosha, Racine, Milwaukee and Pine Bluff, Ark., factories. Location of the steel products plant is contingent upon the closing of Phillips Avenue, Racine, by action of Common Council. David M. Averill is general manager Racine division.

General Refrigeration Co., 108 East Shirland Avenue, Beloit, Wis., manufacturer of railroad and commercial refrigerating systems, contemplates extension early in 1929, for which plans are now being prepared. T. E. Swords, Rockford, Ill., is president, and J. J. Tyndal, Beloit, secretary.

Modine Mfg. Co., Racine, Wis., manufacturer of radiators and cooling systems for internal combustion engines, automotive, industrial, etc., expects to start work after Jan. 1 on an extension to its plant to cost \$100,000.

Fish Rotary Oven Co., Walworth, Wis., manufacturer of bakery equipment and machinery, will move its plant and headquarters to Beloit, Wis. A site at Henry Avenue and Chicago, Milwaukee, St. Paul & Pacific Railway in Beloit has been purchased, and construction will start about March 1.

F. M. Harbach, secretary and business manager Milwaukee Board of School Directors, 1002 McKinley Avenue, Milwaukee, closes bids Jan. 3 on a \$400,000 addition to Boys' Trade and Technical High School, at Virginia, Greenbush and Hanover Streets. G. E. Wiley is school board architect.

Rockton Electric Co., Rockton, Ill., subsidiary of Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., will place contracts late this month for a \$150,000 hydroelectric generating unit, 32 x 65 ft., designed by Mead & Seastone, consulting engineers, Madison. Equip-

ment orders will be placed shortly. E. J. Kallevang is chief engineer.

Western Metal Specialty Co., Milwaukee, manufacturer of sheet metal parts for automotive and industrial trade, has placed contracts for addition and new office. This is third addition made within year, which will increase manufacturing facilities 25 per cent.

South Atlantic

BALTIMORE, Dec. 17.—Contract has been let by Chemical & Pigments Co., St. Helena, Baltimore, to Price Construction Co., Maryland Trust Building, for new units, including storage and distributing building and power plant, to cost about \$85,000 with equipment.

Qvens, power equipment, conveying and other machinery will be installed in three-story plant to be constructed at Washington by General Baking Co., 420 Lexington Avenue, New York, for which bids will be received on general contract until Dec. 27. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

City Council, Charleston, S. C., is planning municipal airport, to include hangars, repair and reconditioning shops and other units, to cost over \$50,000. Tract of 800 acres at Ten Mile Station has been secured. Caspar S. Chisholm, 50 Broad Street, is chairman of committee in charge.

Virginia Barrel Co., Winchester, Va., has acquired property at Mariners Harbor, Staten Island, N. Y., formerly held by Downey Shipbuilding Corporation, and plans construction of new plant for Eastern trade, to cost more than \$65,000 with equipment.

Georgia Power & Light Co., Valdosta, Ga., is planning extensions in power plant to cost about \$80,000 with equipment. One-story unit will be built, 100 x 200 ft., and present station removed to building, with installation of additional machinery.

Albemarle-Chesapeake Corporation, Inc., West Point, Va., has awarded general contract to John T. Wilson Co., Inc., Richmond, Va., for new mill to manufacture kraft papers, to cost more than \$1,000,000 with machinery. Ellis Olsson, vice-president, is engineer in charge.

Public Improvement Commission, Municipal Office Building, Baltimore, will soon take bids on general contract for two-story polytechnic institute, to cost about \$1,000,000 with equipment, including manual training facilities. C. H. Anderson, 9 East Pleasant Street, is architect. Henry Adams, Calvert Building, is consulting engineer.

Asiatic Petroleum Co., Ltd., 65 Broadway, New York, will begin work on new storage and distributing plant at Wagners Point, Baltimore, with facilities for handling about 130,000 gal., to include boiler house, machine shop and other units, to cost more than \$150,000 with equipment.

Provision Co., Columbus, Ga., T. G. Strange, head, has plans for new meat-packing plant, with mechanical handling facilities, including conveying equipment. Refrigerating plant will be installed. Project will cost more than \$75,000 with equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects.

Locke Insulator Corporation, Charles and Cromwell Streets, Baltimore, manufacturer of high-tension electrical insulators, has engaged W. S. Austin, Maryland Trust Building, architect and

engineer, to prepare plans for additional units, including testing building, and storage and distributing extension, to cost \$55,000.

Gulf States

BIRMINGHAM, Dec. 17.—Goodyear Tire & Rubber Co., Akron, Ohio, has acquired tract of 275 acres at Gadsden, Ala., for new mill. Initial unit will comprise several buildings, and is estimated to cost more than \$1,500,000 with machinery. Four such units are projected, with entire cost of \$6,000,000. Company is also considering new fabric mill at same location.

Richard T. Wilson, 218 Sixth Avenue, North, Nashville, Tenn., and associates have acquired property at Birmingham for new plant to manufacture railroad equipment, including rail joints, etc., initial unit to cost about \$100,000 with machinery.

Houston Natural Gas Co., Houston, Tex., is disposing of bond issue of \$2,000,000, not less than \$500,000 to be used for extensions and improvements in properties, including pipe line construction.

Rushton Corporation, 2124 South Fourth Avenue, Birmingham, has approved plans for one-story ice-manufacturing plant in Mount Brook Village district, to cost about \$50,000 with equipment.

Tampa Shipbuilding & Engineering Co., Tampa, Fla., has plans for floating dry-dock to handle large vessels, including shops and equipment for construction and repair work. Project is reported to cost more than \$1,000,000.

Texarkana & Fort Smith Railway Co., Texarkana, Tex., with headquarters at Kansas City, Mo., is planning new engine terminal and repair shops at Dowling, Tex., including engine house, machine shops, compressor building, power house and other structures, to cost more than \$150,000 with equipment.

El Paso Natural Gas Co., El Paso, Tex., care of White, Weld & Co., 14 Wall Street, New York, recently formed, is planning construction of 16-in. pipe line from Lea County, N. M., oilfields to El Paso and vicinity, about 200 miles for natural gas supply, to cost about \$3,000,000. Company is arranging for sale of bond issue of \$3,500,000.

City Council, Montgomery, Ala., has acquired 800 acres for municipal airport, to include hangars, repair and reconditioning shops, oil storage and other buildings. An aeronautical school on portion of site is under consideration. Project is reported to cost more than \$90,000.

Pullman Car & Mfg. Corporation, 79 East Adams Street, Chicago, has purchased car building works of Tennessee Coal, Iron & Railroad Co., Birmingham, and plans enlargement.

Planters' Cotton Oil Co., El Paso, Tex., care of George E. Moore, 3419 Madison Avenue, recently formed by Mr. Moore and associates, with capital of \$300,000, is said to be planning early operation of local mill.

Dubus & Atwood Co., Crowley, La., has been organized to take over and operate local plant of Acadia Iron Works. Plans are under way for expansion. Wilton Dubus and Frank Atwood head new company.

A. C. Burton & Co., 1402 Main Street, Houston, Tex., local representatives for Chrysler automobile, have purchased property at Milan and Bell Streets and

plan four-story service, repair and garage building, to cost about \$225,000 with equipment. Joseph Finger, Keystone Building, is architect.

J. E. Morgan, San Juan, Tex., and associates plan construction of new cold storage and refrigerating plant at Donna, Tex., to cost over \$70,000 with equipment.

Buffalo

BUFFALO, Dec. 17.—Exolon Co., Commercial Avenue, Blasdell, N. Y., manufacturer of abrasives, has acquired adjoining tract of nine acres and plans addition, to cost more than \$75,000 with equipment, work to begin early next year.

National Carbon Co., 3625 Highland Avenue, Niagara Falls, N. Y., manufacturer of storage batteries, etc., has awarded general contract to Wright & Kremers, Inc., Main Avenue and Pine Street, for one-story addition, to cost about \$50,000 with equipment.

Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, has acquired properties and assets of Reid Aircraft Co., Ltd., Montreal, and will operate in future as a Canadian subsidiary, with name of Curtiss-Reid Aircraft Co., Ltd., capitalized at 350,000 shares of stock, no par value. It is also planned to increase output of Montreal factory and use for distributing center for Curtiss airplanes. J. A. B. Smith is treasurer of new company.

Binghamton Light, Heat & Power Co., Binghamton, N. Y., has arranged for bond issue of \$1,000,000, part of proceeds to be used for expansion, including transmission lines. Company is operated by General Gas & Electric Co., 50 Pine Street, New York.

G. L. F. Exchange, Phelps, N. Y., H. E. Babcock, general manager, operating local fertilizer manufacturing plant, has acquired former plant of Universal Gypsum & Lime Co., at Batavia, N. Y., and will remodel for mechanical-mixer plant. Portion of structure will be given over for storage and distribution, with mechanical handling equipment.

William Schall & Co., 160 Broadway, New York, bankers, have purchased plant and business of Brown-Lipe Gear Co., Syracuse, N. Y., manufacturer of automobile gears and transmissions, for about \$3,400,000. Company will be reorganized and expanded.

Department of Public Works, Municipal Building, Buffalo, George F. Fisk, commissioner, will receive bids until Jan. 3 for metal furniture and equipment for new city court building, as per specifications on file.

St. Louis

ST. LOUIS, Dec. 17.—General Aero Co., Wichita, Kan., has been organized to take over and operate Swallow Airplane Co. and Cessna Aircraft Co., both with local plants. Expansion is being arranged. General company will also acquire a company which manufactures airplane propellers, and an aircraft motor manufacturing company, names to be announced later.

St. Louis Public Service Co., 3869 Park Avenue, St. Louis, has filed plans for two-story addition to equipment and mechanical shop at 577 DeBaliviere Avenue, 27 x 100 ft., to cost about \$40,000 with tools, etc.

Wagner Electric Corporation, 6400 Plymouth Street, St. Louis, manufacturer of motors, will soon take bids on general

contract for five-story unit, 80 x 120 ft., and one-story extension, 120 x 375 ft., to cost over \$500,000 with equipment. Three crane runways will be installed for 30, 5 and 2-ton capacity traveling cranes. Condon & Post, 53 West Jackson Boulevard, Chicago, are architects.

Little Rock Refining Co., 505 A. O. U. W. Building, Little Rock, Ark., has plans for new oil refinery near city, with capacity of about 1000 bbl. crude oil per day. Initial unit will cost about \$100,000. William Bruick is company construction engineer, address noted.

Charles M. Dunning Construction Co., 420 North Hudson Street, Oklahoma City, Okla., has secured award for eight-story and basement automobile service, repair and garage building, 76 x 150 ft., for local interests, to cost \$265,000 with equipment.

Knoll Aircraft Corporation, 471 West First Street, Wichita, Kan., T. N. Thomas, president, is said to be planning new airplane manufacturing plant near municipal airport, to cost about \$85,000 with equipment.

Titanium Pigment Co., 1 Sidney Street, St. Louis, has awarded general contract to Fruin-Colnon Construction Co., Merchants Laclede Building, for power plant at factory, to cost \$40,000 with equipment.

City Council, Muskogee, Okla., is arranging for extensions and improvements at municipal airport, known as Hatbox Flying Field, for which bonds in amount of \$195,000 have been approved, including hangars, repair shop and other buildings.

J. I. Case Threshing Machine Co., Racine, Wis., has awarded general contract to John Mehuron, 1045 South Twenty-sixth Street, Lincoln, Neb., for one-story factory branch and distributing plant at Lincoln, 75 x 90 ft., to cost about \$25,000 with equipment.

Camden Furniture Co., Camden, Ark., is arranging an expansion program, to cost over \$85,000 with equipment.

Indiana

INDIANAPOLIS, Dec. 17.—Board of Education, Gary, plans installation of manual training equipment in new high school to cost about \$900,000. William B. Ittner, 911 Locust Street, St. Louis, is architect.

Globe-Bosse-World Furniture Co., Evansville, is planning to rebuild part of plant destroyed by fire Dec. 11, with loss reported over \$250,000 including machinery.

Ross Caldwell, 239 Cumberland Street, Anderson, architect, is completing plans for two-story automobile service, repair and garage building, to cost about \$100,000 with equipment.

S. F. Bowser & Co., Fort Wayne, manufacturers of gasoline pumps, etc., are carrying out an expansion program, including establishment of new chromium plating department to cost \$50,000, for development of new line of production.

Board of Trustees, Purdue University, West Lafayette, is having plans drawn for new engineering building, to cost about \$150,000 with equipment. Walter Scholer, Painters' and Decorators' Building, Lafayette, is architect.

John Deere Plow Co., 216 South Senate Avenue, Indianapolis, has awarded general contract to Indiana Engineering & Construction Co., Central Building, Fort Wayne, for four-story storage and distributing plant, 100 x 100 ft., at Fort

Wayne, to cost about \$125,000 with equipment. Headquarters are at Moline, Ill.; O. A. Eckerman is company architect at last-noted address.

Municipal Electric Light & Power Works, Fort Wayne, is having plans prepared for a power house to cost \$300,000. Froelich & Emery, Toledo, Ohio, are engineers.

Goble Gas Regulator Co., Anderson, is building an addition, 40 x 100 ft.

Pacific Coast

SAN FRANCISCO, Dec. 12.—Los Angeles Can Co., Los Angeles, subsidiary of Continental Can Co., 1 Pershing Square, New York, has awarded general contract to Scofield-Twaits Co., Pacific Finance Building, for one and two-story plant, main unit, 300 x 500 ft., to cost about \$1,000,000 with machinery. Francisco & Jacobus, Pershing Square Building, New York, are architects and engineers.

Anaheim Co-Operative Orange Growers' Association, Anaheim, Cal., is planning new three-story pre-cooling plant and packing house addition, to cost about \$85,000 with equipment.

Southern Sierras Power Co., Riverside, Cal., is having plans drawn for new equipment storage, distributing and repair plant, consisting of six one-story units, with main shop, 100 x 140 ft., including outside crane runway, 40 x 140 ft., to cost over \$100,000 with equipment. C. A. Kelly is purchasing agent, in charge.

California Art Tile Co., Main and Twenty-seventh Streets, Richmond, Cal., is planning an expansion and improvement program, to cost about \$400,000 with equipment.

Ballard Drop Forge Co., 1145 West Forty-sixth Street, Seattle, has begun construction of one-story unit, 56 x 120 ft., to replace building recently destroyed by fire.

Inland Power & Light Co., Portland, Ore., is planning hydroelectric power development on Lewis River, in Clarke, Cowlitz and Skamania Counties, Wash., with total capacity of 233,000 hp., to cost more than \$5,000,000 with transmission system.

Pacific Coast Borax Co., Wilmington, Los Angeles, has asked bids on general contract for one-story storage and distributing plant, 50 x 800 ft., to cost about \$100,000 with equipment. A. C. Martin, Higgins Building, is architect.

Union Ice Co., San Francisco, has plans for new plant at Torrance, Cal., to cost over \$75,000 with equipment.

Northwestern Pacific Railroad Co., 64 Pine Street, San Francisco, has approved plans for one-story equipment repair shop at Tiburon, Cal., to cost about \$35,000 with machinery. Engineering department, address noted, is in charge.

Northwestern Electric Co., Portland, is planning enlargements in steam-operated electric power plant, to cost over \$1,000,000 including extensions in transmission lines.

General Petroleum Corporation, Higgins Building, Los Angeles, has authorized construction of pipe line from properties in Kettleman Hills field to Lost Hills and vicinity, about 35 miles, to cost about \$300,000. W. B. Pyles is company superintendent, in charge.

Empire Development Co., care of H. L. Haehl, Humboldt Bank Building, San

Francisco, is planning hydroelectric power development on Kern River, Tulare County, to cost more than \$20,000,000 with transmission system.

Canada

TORONTO, Dec. 17.—While builders and dealers report a large prospective demand for machine tools, sales the past week were below the average of former weeks. The curtailed buying, however, is due to the approaching holiday season. A number of buyers are considering lists for replacement and new works, but most of this business will be carried over into the new year. The chairman of the committee on public utilities, Winnipeg, is buying machinery, tools, supplies and equipment for the Slave Falls power development.

Modern Table Co., 934 St. Catherine Street, Montreal, is having plans prepared by Gravel & Laliberte, 180 Ontario Street East, for a three-story factory, 20 x 72 ft., to cost \$35,000.

Matthews Conveyor Co., Port Hope, Ont., is arranging for an addition to cost \$20,000.

Canada Cement Co., Phillips Square, Montreal, contemplates spending \$1,000,000 on a plant at Quebec.

W. S. Tyler, 3615 Superior Avenue, N. E., Cleveland, Ohio, has purchased a site on Ontario Street, St. Catharines, Ont., for erection of a factory to manufacture woven wire screens, screening equipment, ornamental iron, bronze, etc.

Toronto Iron Works, Ltd., foot of Cherry Street, Toronto, is having plans prepared by D. Brouse, 514 King Street East, for a plant to cost \$500,000.

Curtiss-Reid Aircraft Co., 347 Craig Street West, Montreal, is contemplating erection of an airplane manufacturing plant at St. Laurent, Que.

Western Canada

Bids will be received by chairman of Committee on Public Utilities, Winnipeg, until Dec. 31, for manufacture, delivery and erection at Slave Falls, Man., of one 100-ton main lift and 20-ton auxiliary lift electric traveling crane complete.

Ingmika Mines, Ltd., Prince George, B. C., is having plans prepared by its own engineers for a hydroelectric power plant at Black Canyon, Finlay Forks, on Omineca River.

Manitoba Rolling Mills Co., Ltd., 875 Logan Avenue, Winnipeg, is having plans prepared by its own staff for a plant at East Calgary, Alta., to cost \$400,000.

Dominion Bridge Co., head office, Montreal, has acquired control of Riverside Iron Works, Calgary, Alta. Dominion company expects to spend \$300,000 on Calgary plant next spring.

Foreign

BIDS are being asked by Ministry of Public Works, Bogota, Colombia, to be received between Jan. 4 and 17, for machine tools and a locomotive turntable.

Municipal Government, Tokyo, Japan, is arranging for city improvements to cost 108,512,000 yen (about \$54,256,000), including construction at Tokyo Bay harbor, with docks, wharves, mechanical conveying and handling equipment, etc., to cost 27,900,000 yen (about \$13,950,000); extending and modernizing slaughter houses, with installation of equipment, to cost 1,500,000 yen (\$750,000); sewage

construction and improvements, including pumping and other machinery, to cost 33,300,000 yen (\$16,650,000) over 10-year period; and new commercial school at Kyobashi within 36 months, to cost 812,000 yen (\$406,000).

Government Railways of New Zealand, Wellington, will receive bids until Feb. 18 for machine tools, autogenous welding equipment, and a freight elevator.

Ford Motor Co., Ltd., London, England, recently organized to manufacture and distribute Ford automobiles in that country, is disposing of stock issue to total about \$14,000,000, part of fund to be used for new plant on 300-acre tract at Dagenham, England, to have initial output of 200,000 cars per annum; expansion in Manchester plant, to be used in future for assembling of new cars and manufacture of replacement parts for former models, and development of tractor plant at Cork, Ireland, for annual output of 30,000 tractor units. Henry Ford, Detroit, will be an official of new company; Hon. Roland D. Kitson, 3 Victoria Street, London, director of Bank of England, is also prominent in new organization.

Representing Government Railways of Colombia, Baldwin Locomotive Works, 500 North Bridge Street, Philadelphia, N. W. Semple, Jr., in charge, is said to be arranging for early purchase of machine tools and other equipment for locomotive repair and reconditioning shops at Cali, to cost more than \$1,500,000.

Officials of Union Oil Co. of California, Union Oil Building, Los Angeles, have organized a subsidiary, Compania Mexicana de Petroleo Union, S. A., to take over and operate oil properties in Miahaupon district, Mexico, to include installation of drilling and other machinery, pipe lines, loading facilities and other equipment.

La Union Metalurgica, Sociedad Anonima, Castillejos, 111, Barcelona, Spain, wishes to get in touch with makers of machines for threading augers such as are used by coopers, the augers being of the type which have a gimlet point.

A company at Warsaw, Poland, is completing plans for new soap manufacturing plant, to cost about \$2,500,000 with machinery, to be completed next summer. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Great Britain No. 76089.

New Trade Publications

Tractors.—Atlas Engineering Co., Clintonville, Wis. Folder of six pages, illustrating and describing a tractor with driving and steering on all four wheels. Heavy lugs on the wheels are used on soft ground, whereas rubber shoes can be fitted for city work.

Cranes and Trolleys.—H. D. Conkey & Co., Mendota, Ill., Catalog No. 110. Contains 50 pages of illustrations and text describing types of trolleys and wall bracket and mast type jib cranes, push cranes, underhung and standard hand power and electric cranes and hoists. Specifications of standard equipment and the list prices subject to discount are given in each section. The booklet is printed in color and presents an attractive appearance.

Small Motors.—General Electric Co., Schenectady, N. Y. Bulletins GEA-71B and 81B illustrate and describe respectively wound-rotor induction motors of $\frac{3}{4}$ to 10 hp. and double squirrel-cage motors of 3 to 15 hp. Both are for three-phase or two-phase circuits and may be had for 220, 440 or 550 volts.

THE IRON AGE

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7500 All-Steel Toys a Day

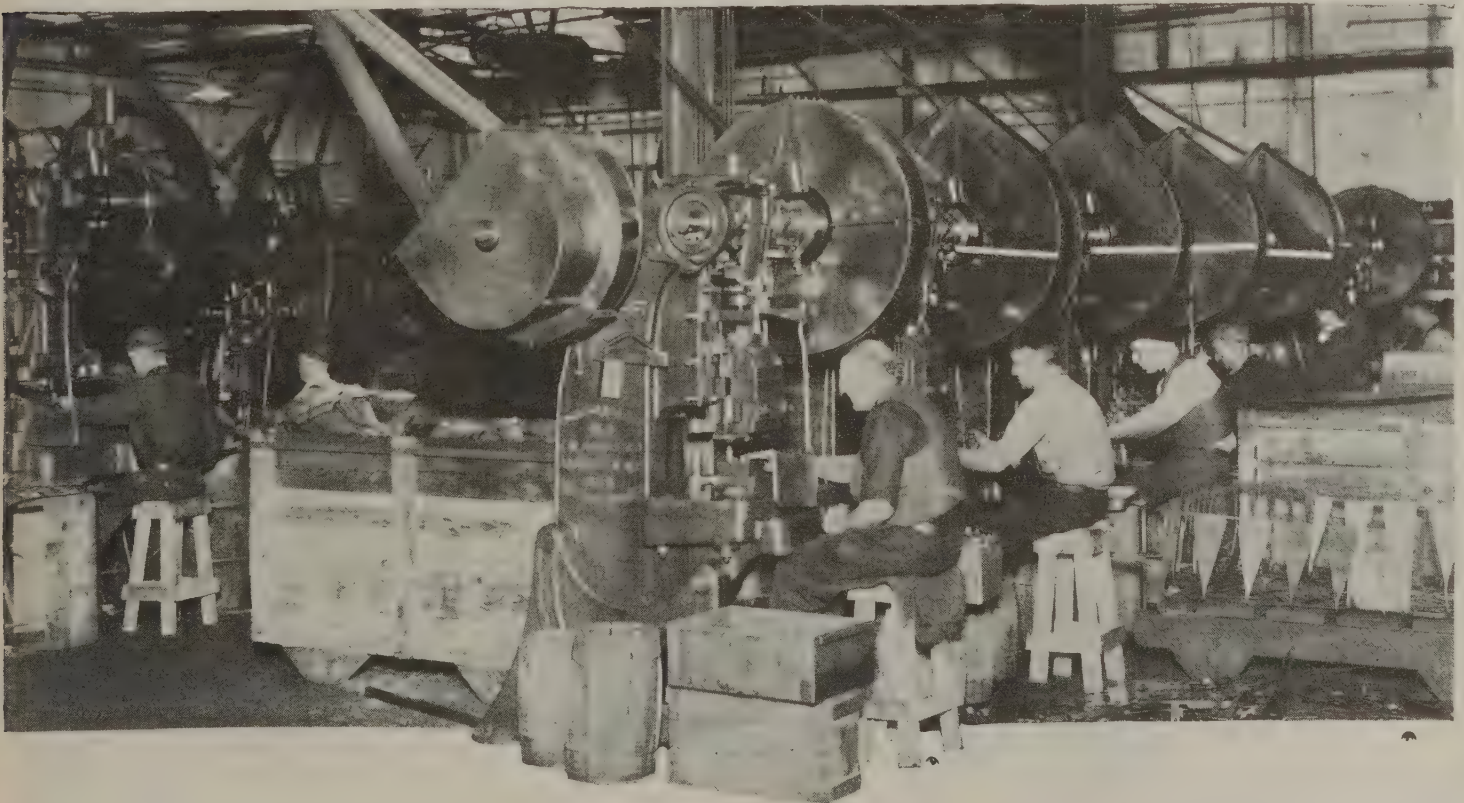
Production Saves Auto-Body Scrap and Occupies Parts Manufacturer During Slack Season for Automobiles

AUTOMOBILES for grown-ups and for kindergartners form a combination that has solved two problems in the plant of Murray Ohio Mfg. Co., Cleveland. One was to find some way to keep the plant busy during seasonal lulls in demand for automobile stampings. The other was to find some use for the large quantity of high-grade sheet scrap that was being bundled and sold at a low price.

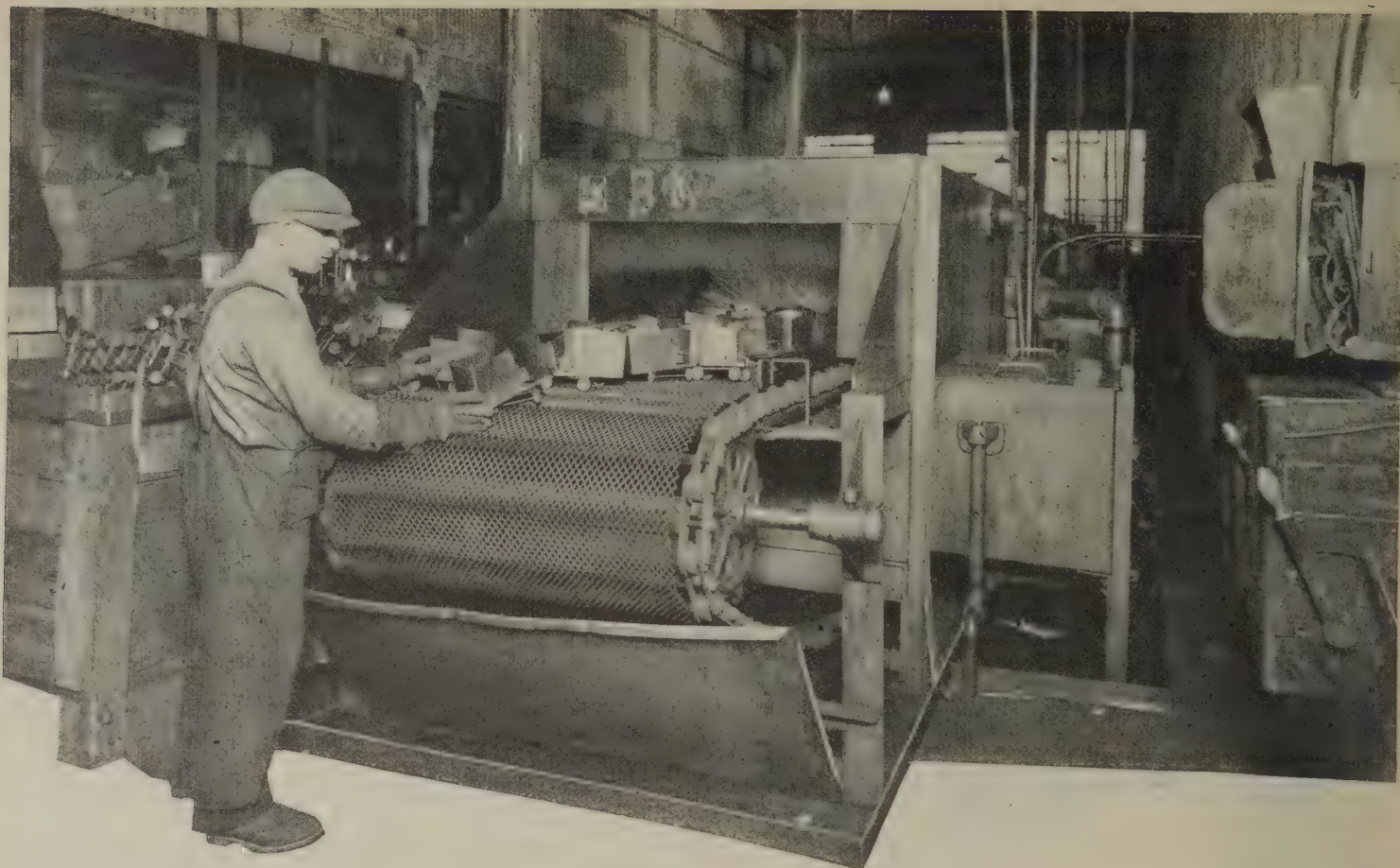
Pressed steel juvenile vehicles, manufactured as a side line, seemed to be a solution of these two problems. At the start, five years ago, only scrap metal was used for

these products, but the company's business in this side line has grown to such an extent that considerable auto body seconds now has to be purchased for toy manufacture. At present salvaged scrap represents about 30 per cent of the amount of sheet steel consumed in the toy plant.

From the standpoint of seasonal demand the two lines fit together admirably. A rising demand for automobile stampings usually starts in January but tapers off in June. During the following month toy manufacturing begins its seasonal activity, reaches its prime during August



First Steps in Making Steel Toys. Bigger stampings are made on presses at other times used for automobile doors or panels; this battery of small machines is used exclusively for minor toy parts



Spray Machine for Cleaning. Parts to have same color are sub-assembled, then cleaned, enameled and baked on continuous machinery adopted from best auto-body practice

and ends with November. Nearly all toys must leave the factory not later than Dec. 1 to reach retail stores for holiday trade.

In the past few years the public has been buying better and more lasting toys, toys that will stand up under hard usage. This tendency has favored American makers, who have to face the competition of inferior imported toys. American pressed steel toys also occupy a distinct field, as the German toy makers, who in the past have been the strongest competitors, center their efforts largely on what are known as mechanical toys.

Another favorable factor is the American mass production of pressed steel toys, as exemplified in the Murray Ohio plant, which results in a marked decrease in the cost of making a high-grade article. Thus the manufacturers have kept pace with the demands of the youngsters for toys that are equipped with most of the extras they see on grown-ups' vehicles. Some of the higher grade juvenile automobiles and trucks have such refinements as ball bearings on the rear axles, roller bearing front wheels and carbon steel springs, as well as the numerous accessories found on modern types of passenger cars.



Santa Claus's Assistants. Youngsters, rather than gray beards, having a good time building motorized "hook-and-ladders"

Starting to make juvenile vehicles five years ago as a side line, the Murray Ohio Co. has increased production of "Steelcraft" toys to an output of 850,000 pieces a year. These range from a sturdy all-steel coaster wagon or a juvenile automobile down to a tiny red cart a baby finds delight in pulling around the living room floor, and include all-steel juvenile trucks, airplanes, scooters, wheelbarrows and steam shovels. The company's maximum daily output is 7500 toys and shipments reach 6 to 7 carloads per day.

The scrap used in the toy department is largely 20 to 22-gage auto-body stock, although material as thick as 12 gage finds its way into front axles. Thus the \$5 toy automobile is made in considerable part of as good quality steel as a high-priced passenger car.

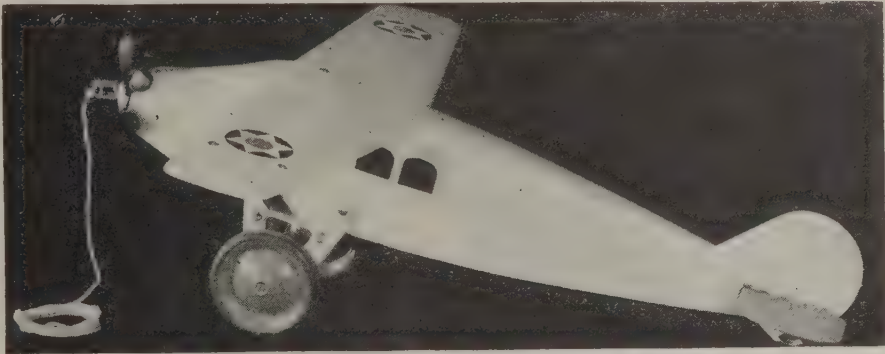
Scrap from automobile stampings goes from the blanking presses to a shear, where the pieces of sufficient size to salvage are cut off and the remainder goes to the baling press. Some of the scrap is left in a form difficult to handle and has comparatively small sections that can be used, so that it is not worth the time required to salvage it. However, from 50 to 75 per cent of the sheet material that was formerly scrapped is salvaged for the manufacture of toys.

The heavier stampings, such as frames, hoods and body parts for juvenile vehicles and tops for coaster wagons, are formed on the same large presses that are used in making automobile stampings, thus keeping the equipment busy when automobile manufacturing is slack. This is supplemented by a number of small presses for blanking and forming minor parts.

Stamped parts for toys all go from the presses to a stockroom or clearing house, and from there they are delivered to the sub-assembly department. Usually there are two or more colors on a toy vehicle, and the parts are sub-assembled according to the finish they are to have, in order that each portion may be enameled as a unit. Both

spot welding and riveting are used in joining the individual parts, welding being preferred. Power riveting machines of the tubular type are used.

The sub-assembly units are washed in a machine where they are first sprayed with a caustic solution, then cleaned and dried. Work is carried through this machine on a woven wire belt. After cleaning they go to the enameling department, where the parts are dip painted in enamel and hung on racks that carry them through a continuous baking oven. This is a double chamber oven having one chamber for black work and the other for red, green and blue. The black enamel is baked for two hours at a temperature of 450 deg. Fahr. Other colors pass through at a lower temperature and at a somewhat slower rate. The oven is equipped with automatic temperature control, and was built by Young Brothers Co.



Sometimes there is further finishing in colors, or striping is put on by hand. The sub-assemblies go to the final assembly room after painting, and when completed the toys are boxed and moved to the shipping department.

Some special equipment has been installed. The most interesting is a special welding machine for affixing tires. These tires, of solid rubber cut to length, have a wire running through the center and extending slightly beyond the ends. In one operation the tire is pulled tightly around a disk wheel and the protruding wire ends are welded in their lapped position. While this is being done the ends of the rubber are held back an inch or two from the joint. When the weld is completed and the wheel leaves the machine the two ends of the rubber tire spring together.

Toy airplanes are made in a separate department equipped with spot welding and riveting machines, a power hammer for driving on the wheels, and a special baking oven for drying the 20 parts after they are dip painted a light gray enamel. This enameling is done before assembling.

Fatigue Strength of Steam Turbine Blades

A STUDY of turbine blading has been made by Moore, Lyon and Alleman, University of Illinois Engineering Experiment Station, for Allis-Chalmers Mfg. Co. (Bulletin 183.) Short lengths of the blades were mounted in special chucks and rotated under load until failure developed from the alternating bending stresses. Failure started at the tips, usually at the thicker one, where the highest stress in bending occurred. Owing to the unsymmetrical shape of the cross sectional area, there were certain harmonic inertia effects to be evaluated; furthermore, the ordinary beam formulas required modification. After such corrections had been applied, the endurance limits of the drawn blades were found to be nearly as high as that of larger bars, machined to the standard round specimen. This conclusion is verified by experience with steam turbines.

Blades tested were of cupro-nickel (80:20), monel metal, and cyclops metal No. 17 (a 0.50 carbon steel containing 19 per cent Ni, 75 per cent Cr, and 1 per cent Si). Since there is a fairly close relationship between hardness and fatigue resistance, this ratio was computed for previously made tests on materials of this analysis. Fatigue strength of the blade material in round specimens was then computed by means of such ratios and hardness tests taken

on the blades. (The blades were too small to produce round specimens.) Numerical results are given in the adjoining table.

Fatigue Strength of Steam Turbine Blades

Metal	Brinell Hardness	Ratio Endurance to Hardness	Computed Endurance of Blade Material	Actual Endurance Limit of Blades
Cupro-nickel	117	166	19,400	20,000
Monel metal	212	190	40,200	37,000
Cyclops metal	171	250	42,800	42,500

Graft in Selling and Purchasing

Boycott is the best remedy which can be found to cure that commercial bribery which yet exists between unscrupulous selling organizations and purchasing agents (or those who specify purchases), in the opinion of M. Q. MacDonald, writing in *Purchasor*. If honest purchasing agents (which means 99 out of 100) would refuse to do any business on any price basis with concerns offering bribes to them, and cut off all commercial relations with concerns which have been publicly exposed or admit such practices, the selling graft would rapidly lose popularity because it would cost too much in lost and unapproachable business.

Progress in Iron and Steel Work

Engineering Features Receiving Most Present Attention
Are Outlined Before A. S. M. E.

SPEAKING for the executive committee of the Iron and Steel Division of the American Society of Mechanical Engineers, George T. Snyder, chief engineer National Tube Co., Lorain, Ohio, and chairman of the committee, presented on Dec. 7, at the annual convention, his report of the year's progress. It was in part as follows:

Open-Hearth Furnaces

Development in open-hearth practice has not shown any radical departure in general design of furnaces or equipment. It is rather along the line of refinements, such as preheating air, insulating walls of chambers, sloping back-walls, greater recovery from waste heat in gases, and, of course, continued efforts to improve quality. As one writer puts it, "future trends will be toward larger furnaces aiming at greater tonnages and lower costs, efforts to secure more refractory linings, better utilization of present sources of heat, and better control of atmospheric conditions." There is also the question of mixing blast-furnace and coke-oven gas to secure enormous volumes of a gas sufficiently rich to serve the open-hearth as well as other metallurgical furnaces.

Multiple pouring of ingots is being used to a greater extent, and advantages are claimed. The equipment for multiple pouring requires careful mechanical designing, to be safe and effective. It is sometimes difficult to accomplish in existing plants, for lack of headroom or other clearances.

Tilting open-hearth furnaces are preferred in many cases and are being advocated for the well-known advantages of slag control, tapping, control of steel quality, and ability to patch bottoms. The mechanical equipment controlling the tilting of these furnaces seems to be entirely satisfactory.

Insulation of checker chamber walls has been much discussed, and there are many advocates. It is to be hoped that, where applied to old furnaces, these will be analyzed in all cases by careful tests prior and subsequent to the installation. The use of fans at each end of the furnace to secure better combustion control is being tried, and satisfactory results are claimed.

In England at the Merchant Iron Works Co., Middlesbrough-on-Tees, Benjamin Talbot installed an auxiliary hearth to an open-hearth furnace. This device is used to preheat the metal, be it scrap or hot iron, before it is discharged into the main hearth. It is claimed that a material increase in the output of the open-hearth furnace is thereby obtained.

Bessemer

Many mechanical improvements are possible in a new Bessemer plant, such as electric tipping, scrap charging, provision for double pouring, delayed teeming, and incidental equipment needed to reduce loss. A small amount of study and attention might increase the proportion of steel made in converters. That there are many uses for this kind of steel is well known, and improvements in the practice might readily extend these uses.

Duplex Plants

While satisfactory steels are being made in duplex plants there does not seem to be much development in the way of additional plants. The large tonnages possible make this manner of making steel attractive, although there are

numerous difficulties to be encountered and great care must be taken in the selection of metal, fuel, temperature control and preliminary blowing.

Sheet Mills and Sheet Bar Mills

Continued interest is shown in the new mills which have been built during the past two or three years. F. C. Biggert, Jr., says: "If present indications are borne out by actual experience, we may expect to see sheet steel selling at prices sufficiently reduced to make possible its use for a multitude of new purposes. It should be noted, however, that this has not yet been accomplished. The new mills represent large investments and require large tonnages and large individual orders to make their operation profitable."

From an operating standpoint they are still in an experimental stage, and it is doubtful if any of them has yet shown costs lower than can be made by established methods. The following pertinent statement has been made: "Another phase of interest in this portion of the steel industry is that most of the inventions and discoveries necessary for the successful operation of the new method have been covered by patents, possibly to a greater extent than any single industry save perhaps that of wire. The rolling process and machinery and the subsequent processing, annealing, pickling, etc., all come within the scope of this protection. It would be unfortunate indeed if the situation were handled in any but the broadest, fairest manner, for which the leaders of the American steel industry are eminently fitted."

Of passing interest is the rolling in one of the American Sheet & Tin Plate Co. plants of 48-gage tin plate which "can be torn easily between thumb and forefinger." The field for the use of this very thin material is said to be limited, but its availability may develop additional uses.

The importance of progress in the art of rolling sheets is shown by the progressive development made by Weirton Steel Co. in the three periods, 1916-1920, 1920-1925, and 1925-1927, in which horsepower progressed 4900 hp., 6300 hp., and 8500 hp., respectively, and monthly tonnages, also respectively, 8365 tons, 11,386 tons, and 13,658 tons, rolling 18-gage 5 to 6½ in. to 11-gage 5 to 22 in.

Coke Plants

Dry-quenching of coke has not made much headway in this country during 1928. The claim of a saving of 5 per cent or over 2,000,000 tons of coke per year should encourage further investigation and, if established, promote this project of cooling by continuous passage of inert gases through the coke and reclaiming the heat so absorbed by producing steam.

Rolling Mills

Additional items of interest in regard to the new mills at the Homestead works of the Carnegie Steel Co. are available. It has been pointed out that the construction of these large and modern mills on sites occupied by old mills that continued to operate called for what may be termed "emergency engineering" and for great resourcefulness upon the part of all who had anything to do with this project.

There is a dual set of mills running parallel, with motor room between and soaking pits at the end, arranged so that ingots can, when required, be fed to either mill. The buildings covering these mills are said to weigh nearly 27,000

tons and cover more than 1,000,000 sq. ft. The weight per square foot of floor space covered seems to figure out over 47 lb., which denotes very substantial construction for buildings of this type.

While this group of mills was designed for 26,000 tons a month, it is expected this will be greatly exceeded, which is not surprising, since designed tonnages in all kinds of rolling mills seem always to be exceeded, and sometimes soon after they are placed in operation.

Seamless and Welded Tube Mills

Development of this branch of the iron and steel industry has been rapid, and competition is keen. Whether to build pilger mills or some other kind seems still to be a question, and advocates of both types can undoubtedly point to finished production that satisfies customers. The combination of piercing and expanding mills followed by the usual equipment points to still larger diameters than are now being made. The enticing features of pilger mills, while calling for some elaboration in the open-hearth plants, will continue to attract attention and probably promote more mills of this type.

By-passing soaking pits, a blooming mill, and a bar mill for rolling rounds is an attractive idea that will continue to be alluring. Mr. Stiefel, however, who should be an authority in the whole field of seamless-tube making, says: (1) Output in tons with plug mill is two or three times greater; (2) cost of installation about the same; (3) tool cost of pilger mills two or three times greater; (4) rolls and mandrels for the pilger mills call for special steels; (5) maintenance and tool equipment less costly for plug mills; (6) plug-mill product is of better quality; (7) pilger mills can roll longer lengths; and finally, (8) plug mills will probably be built that can produce tubes 24-in. in diam-

eter. The controversy, if there is one, must resolve itself into the question of cost to produce from start to finish.

Blast Furnaces

The large furnace up to about 25 ft. diameter hearth is considered good practice, and satisfactory operation of these stacks, as large or nearly as large as this, at about 850 to 900 tons of iron a day (average), is not unusual. No important improvements to stack, skip, or stoves have been noted, the changes, if any, being in details. Considerable attention has been given by blast-furnace operators and designers to the matter of gas cleaning. This matter and the ever-present problem of flue-dust production and disposition are sufficient to occupy the minds of furnace operators between casts and deserve much thought and study.

Blast furnace practice must improve, according to various authorities, through the use of better burdens, large furnaces to secure low costs, better gas cleaning to secure good results at consuming units, and the recovery of the iron content now lost in wasted flue dust. Improvements in equipment for the recovery of the iron content in blast-furnace flue dust, either by sintering or by some other method, point to the possibility of large blast-furnace operators facing a penalty, in addition to the yield loss, for all dust wasted beyond the amount known to be recoverable.

Attention was called early in the year to the German achievement of operating a blast furnace at 1000 tons a day, largely through selected burdens. They have used sintered fines from the ores, a practice which may show results in this country far beyond present conjecture. Quoting from an article printed in February this year: "Large American furnaces, if supplied with rich sintered ores, would produce far more than anything yet achieved here or abroad."

Management Engineering in Small Plants

Problems of Production Control and Grouping and Classification of Equipment; Importance of the Operating Personnel

BY J. E. DYKSTRA*

MAN POWER in industry can be directed to its highest state of efficiency only by proper guidance and proper planning. Production methods have received more attention from management engineers than have methods of selling and distribution and design. Standardization in design may well be given some consideration by plant managers, especially in plants where the product is greatly diversified and quantities are limited. If standardization of parts is given the attention it deserves, it will at once have a tendency of bringing parts through the plant in greater quantities.

Certain factors which make for efficient operation, in the order of their usefulness in establishing a workable system not entailing too great a cost to the average small industry, are:

1. Production control;
2. Grouping of equipment and its classification and possibilities of modern equipment;
3. The personnel or man power that makes successful operation possible.

Production Control

Production control can be separated into such main items as proper scheduling, routing, stores control, costing and purchasing. Many obstacles are frequently encoun-

tered in the smaller shops due to the limited quantities and the dissimilarity of parts that must often be produced by the same machinery, but machine-tool builders have demonstrated that many standard machines have built into them the possibility of caring for greatly diversified products, simply by equipping the machines with suitable fixtures and jigs. Proper scheduling can frequently be enhanced, however, by noting the requirements of the sales department over a few months.

To determine the production capacity of various departments it is essential to study in considerable detail the suitability as well as the grouping of the equipment to produce the desired part. In most cases similar equipment can be grouped together profitably for lighter machining operations. In our present age of specialization, better supervision is obtainable if lathes, turret lathes, screw machines, milling machines, etc., are grouped in their respective classes. On the heavier classes of work it is best to arrange the necessary equipment in the same sequence as the operations to be performed; in this manner the operations can usually be completed in the smallest space, with elimination of unnecessary moves.

Proper Routing

Proper routing of parts through the factory is obtainable only by keeping in mind the fact that material, when once it has left the stockroom, should travel in the gen-

*Factory manager, Champion Co., Springfield, Ohio. This is abstract of a paper read Dec. 6, at the annual meeting, New York, of the American Society of Mechanical Engineers.

eral direction of the assembly or finished-stores department, accompanied by an identification tag showing the sequence of operations as well as the departments that are to perform the work. This can most easily be accomplished by placing at the production-department's office a set of master route cards which show the sequence of operation and the various operations themselves.

To aid the department foreman as much as possible it is highly desirable to furnish the departments with proper descriptions of all operations to be performed on any one piece. These operations, readily designated by their numbers, should appear on the operation card in logical sequence. A full description of the operations to be performed should be on this card and the tool numbers of the fixtures and tools needed should be given.

Proper Costing

Almost every factory manager will agree that proper costing is a prime necessity in all departments of his plant. The mainstay of proper costing is the establishment of a time study to determine (1) best possible tooling requirements obtainable with production requirements, (2) methods of determining the time required to perform the various operations with the equipment available, and (3) an accounting of all time spent on any job.

Minimum costs are obtainable only through a system which accounts for every minute of the day that is spent by the employee in the shop. The psychological effect of knowing that every minute is recorded is generally conducive to the best effort. A simple job ticket giving the symbol of the part, together with a lot and shop order number, can be made out in the office at the time the material is ordered. It then is necessary for the department foreman only to fill in the name of the employee and the number of the machine used for the operation. This ticket, stamped at the beginning and completion of the work by the employee himself, can then be used for both progress report and costing purposes.

In considering the tooling possibilities it is always necessary to consider the tools available and the time required with these tools. With this factor known it becomes comparatively easy to determine the possible savings with more elaborate fixtures. While the more elaborate fixtures are invariably considered from a cost-reducing standpoint, it is well also to bear in mind the increased accuracy which such fixtures usually bring about, thereby frequently reducing the assembling cost of the product.

Grouping and Classification of Equipment

With any well-thought-out scheme of production control it is always necessary to provide for such emergencies as "breakdowns" of equipment. Almost every machine tool in any plant carries a designation number and these machine numbers should be carried on the departmental operation sheet as well as the time-study sheets. This at once guides the department foreman in distributing his work on hand in the departments. By grouping the machines of similar capacity and adaptability to certain work it provides at once a means for him, in case of necessity, to shift the work on hand to other machines that fall under the same classification. This gives a desired flexibility of operation not otherwise obtainable.

The possibilities of modern equipment are usually not well enough known to many factory executives. It is difficult for the department head of a factory where quantities are small to show a sufficient saving on any one product to justify the expenditure required for the purchase of modern equipment.

Many pieces of equipment in the average smaller industrial plant would be replaced by modern tools if the executive but knew their production possibilities. Many tools would be discarded as readily as the car model of a year or two ago if modern equipment were considered in terms

of saving of man-hours, instead of saving in dollars and cents per unit produced, as is most generally the case.

A new up-to-date machine tool will usually save a considerable amount of time, compared with a machine a few years old, and the accuracy obtainable with the more modern machine tool is always reflected to a considerable degree in the erection or assembly costs. In spite of this common knowledge regarding modern machine tools, many shops have entirely too much equipment which, while useful, is not profitable when compared with the producing possibilities of the new machine.

While the saving possible in actual labor cost on a given product may not loom large, the fact remains that wherever a new machine is 20 or 30 per cent more efficient than the old one, the operator's effectiveness is increased to that extent. If, therefore, the average machine tool in a shop is 20 per cent less efficient than the new tools, it follows that a 20 per cent reduction in payroll could be effected by the use of the new tool.

Executives of many smaller plants fail to realize the fact that the best modern equipment pays well, even if it is difficult to show up beforehand in dollars the resulting savings, not only in the machining, but also in the subsequent assembling operations. Facts bear out the assertion that in general new equipment materially reduces the departmental overhead, through the absence of repair costs and shutdowns, but also usually decreases the general unit overhead by increasing sales that the better product often makes possible.

Man Power

Engineers should remember that the human element is not subject to the rule of cold figures. While the analysis of possibilities of the human element involved should be and is one of the mainstays of our planning as management engineers, we should ever bear in mind the fact that those directed by us can be taken over many obstacles if properly led. Industry on the whole and engineers as well have been slow to recognize the value of competent leadership.

While there are, no doubt, many men who work neither for money nor fame, but for the joy of the working, as Kipling put it, facts amply testify that in general all human endeavor is directed toward the reward that it brings. A cost-reducing plan, therefore, which does not bring its rewards and its encouragements to those who carry it out, will never attain its full possibilities.

Improvements Possible in Most Plants

Many opportunities for improvement in operating conditions in plants are neglected because of inertia in the management, according to George E. Hagemann, associate editor *Manufacturing Industries*, New York, who led the discussion on Mr. Dykstra's paper. Evidently, if best results are to be obtained, delegation of authority is essential. A company employing 300 or 400 men was cited, in which each foreman has a capable assistant who can run his department at any time it is necessary. This not only provides for accident, both physical and otherwise, but it permits the foreman to go out, when occasion arises, to inspect machinery or appliances and other equipment which are on order for the plant, and shortly will have to be used in that foreman's department.

Improvements in production control, while perhaps more to be expected in the small plant than in the large, are by no means so confined. The large plant has great opportunities for improvement, in almost every instance.

Another speaker stated that engineers in charge of design have not yet reached that peak of efficiency in their designs which is needed by progressive management. Especially is this true with regard to the standardization of parts, such as can be used for a variety of purposes by a concern doing what is essentially a jobbing business.

Adds Cold-Rolled Strip Department

Sharon Steel Hoop Co., as Part of Its Modernization Program, Completes Cold-Rolling Plant

ABOUT a year ago the Sharon Steel Hoop Co. acquired approximately 11 acres of ground adjacent to its Sharon, Pa., plant. This area now is largely occupied by modern mill buildings housing new pickling and galvanizing departments and a cold-rolled strip plant. The new construction marks the first major step in a complete modernization of the Sharon plant, and when, a short time ago, the first cold-rolled strip steel came off the new mills, the company entered the ranks of manufacturers of that product. As its name suggests, the company first was engaged in the manufacture of hoop steel and in the days of the wooden barrel was a large factor in the production of the narrow flat bands used by the cooperage industry. When the Southern cotton grower depended largely upon Northern mills for ties for baling, the company was one of the important sources of supply.

The plant, since its construction in 1900, has been devoted exclusively to the rolling of flat light-gage steel. With the rise of the motor vehicle industry, with its numerous and increasing uses of light-gage flat steel, the decline in the use of similar steel for cooperage purposes, and, on account of foreign competition, the passing of a profitable market in cotton ties, it is to be taken as an evidence of a forward looking management that the company several years ago stopped making cotton ties and went more strongly into the production of the steel called for by the automotive industry.

Out of the effort to distinguish the requirements of the motor car builders from those of other consumers developed the term "strips." The company still is a producer of hoops and bands, but with its new productive facilities, it is to be reckoned as essentially a maker of strips. Its entry into the field of cold-rolled strip steel has the backing of a record of 28 years in the rolling of hot-rolled flat steel.

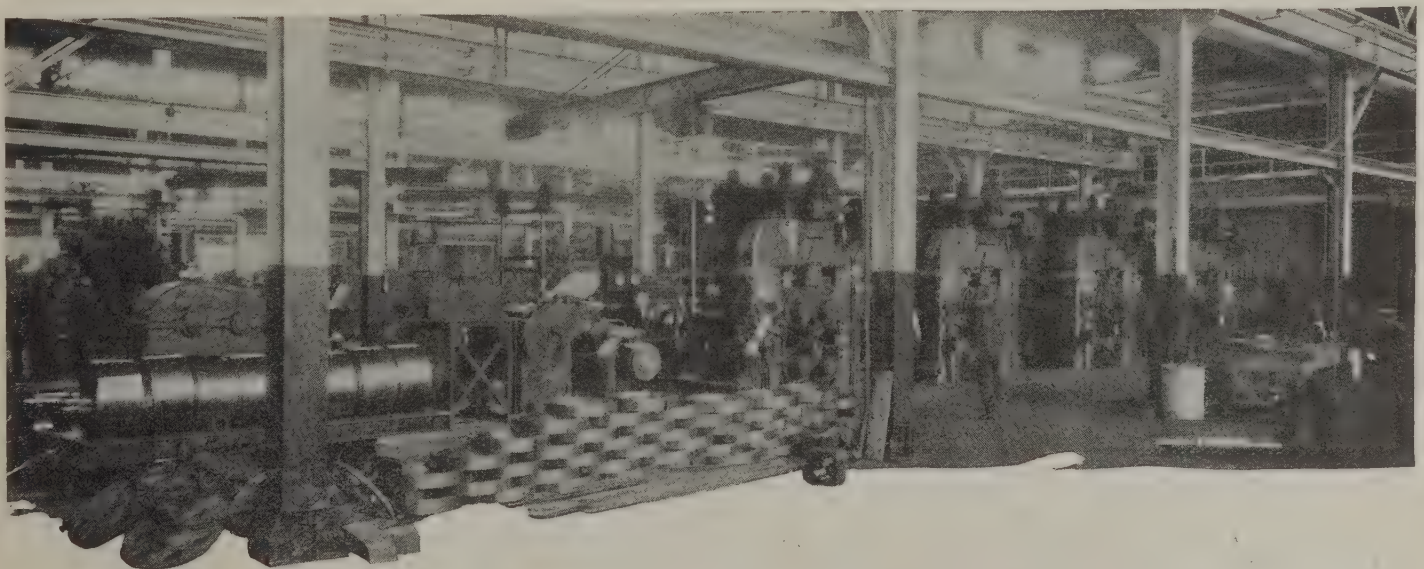
Under construction at present as part of the moderniza-

tion program is a continuous, electrically driven, hot strip mill, which is expected to be in operation by next March. Electrification of the plant has been another important development. One of the impressive features of the new plant is its skillful tie-up with the older sections of the works and the remarkable ease with which steel coming from the hot mills is transferred either to railroad cars for shipment or to the pickling department preliminary to further finishing.

The new structures are of notably solid construction, the columns being almost wholly of heavy single piece H beams. On account of the closeness of the plant to the Shenango River, there was a soil condition which had to be met to insure solid foundations. Besides the use of concrete piles, there is a 4-ft. bed of tamped slag topped by concrete in which have been laid creosoted wood block floors. There is an air of solidity and permanence to the new structure, and lighting and ventilation are of the character which helps to make the working place attractive. The efficiency of the plant has gained appreciably, as the records of the plant since completion of the new section show that a larger tonnage is being turned out with one less working turn per week.

The 8-in., 9-in., 10-in. and 14-in. hot strip mills, which have been in operation for a number of years, parallel each other, as shown in the accompanying plan. These mills discharge their strip, either in cut lengths or coils, into the No. 1 loading building. From this building the strip is either loaded directly into the cars or taken to the No. 2 loading building or the pickle shop storage building, by roller bearing trucks and tractors.

From the pickle shop storage, the coils in sizes up to 10 in. wide are fed through continuous pickling tanks, washers, dryers, and then to multiple head coilers. The wide coils and the cut strip are put on special Monel racks



Stands of the 10½ and 21¼ x 26-In. Cluster Mills, Together With Reel and Coiler

and handled by cranes into pickle and wash tanks, then to dryer or roller levelers and oiling machines.

There are two sets of continuous pickling tanks. The first set will handle eight rows of strip in widths up to 6 in. This set consists of one long pickle tank, water, muriatic acid and lime tanks. There is also a pull-up machine for galvanizing, and a galvanizing pot, which is fired with natural gas.

From the galvanizing pot the strip is fed to an eight-head coiler. Each head is provided with a small roller leveler, which takes out any corrugations that may have developed in the strip in the hot mills or during the pickling. The heads on this coiler are driven with individual motors, which have a variable speed of 6 to 1 and there is also a 2 to 1 gear shift, giving a total speed change of 12 to 1. The strip is pulled through the tanks by this coiler at a constant speed by means of an automatic control which slows the motors down as the coils increase in diameter.

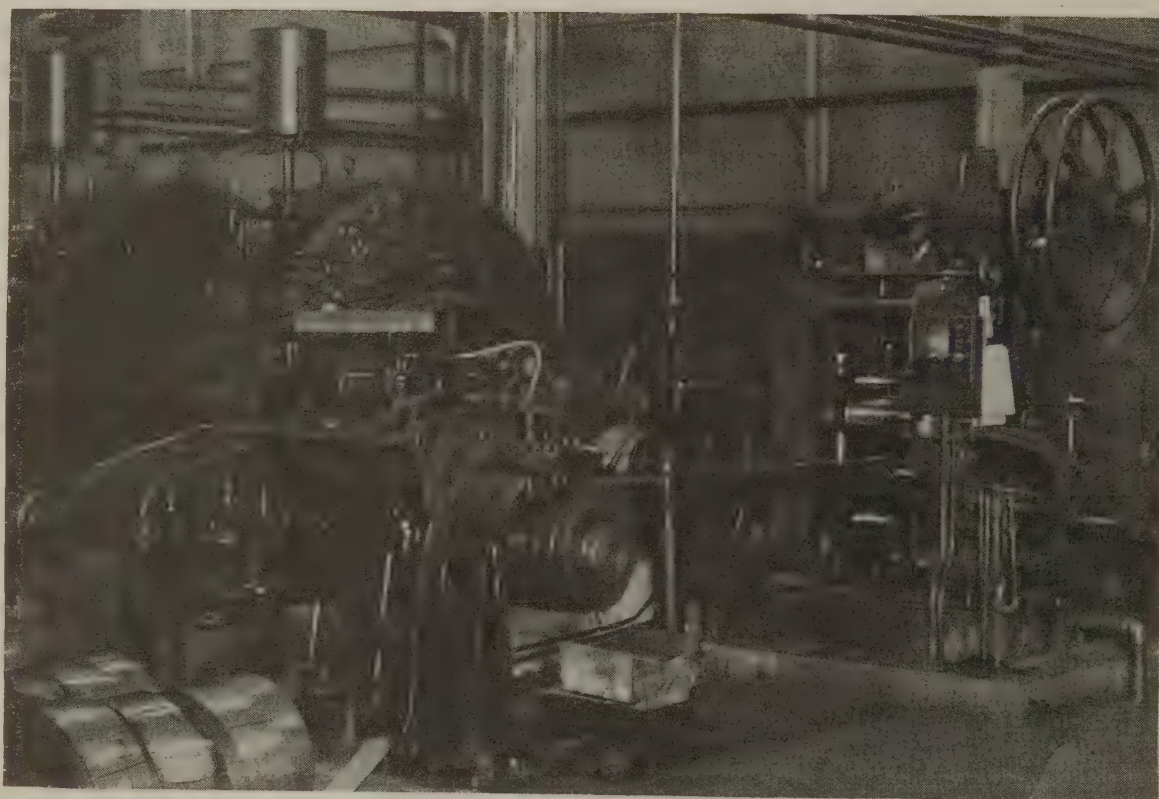
rewinders, polishing machines, oiling machines and shears.

The first roughing mill consists of four stands of 10½-in. and 21¼-in. by 26-in. cluster mills set tandem, about 15 ft. center to center of stands. These mills are driven by 200-hp. variable speed motors, on each pass, and the delivery speed ranges from 125 to 375 f.p.m. It is possible to control the complete mill from any stand, by means of push buttons.

The reel and coiler are driven by variable speed motors and are synchronized with the mill. The reel on the cluster mills mentioned can be adjusted for a maximum pull of 4600 lb. The other reels have maximum pulls in proportion to the sizes of the mills.

The coilers are of the five-roller type, with special guide rollers for holding the coil in place, during the coiling operation.

The second roughing mill includes three stands of 8½-in. and 16½-in. by 18-in. cluster mills, set tandem at about



A 10½ x 18-In. Finishing Mill With Accompanying Reel

The second set of continuous pickling tanks are about the same as the first except that they are wider and will handle 16 pieces of strip. There is no galvanizing pot in this set. The coiler has 16 heads. Every other head will coil strip up to 10 in. wide and the alternate heads up to 6 in. wide.

The coils are loaded on trucks by cranes at the coilers and then taken either to the cutting up machines, to the cars for shipping, or to the cold-roll plant.

There is a loading dock along the east side of the pickle and cold-roll plants over 1000 ft. long. Part of this loading building has a crane runway for open car loading. Between the pickle and cold-roll plants there is a covered runway so that the pickled strip is never exposed to the weather.

The cold-rolling plant is about 250 ft. north of the pickle shop. This intervening space is reserved for extensions to either of the plants. The rolling equipment consists of three sets of tandem roughing mills with reels and coilers and complete handling equipment for material and rolls. There are seven sets of finishing mills with auxiliary equipment the same as the roughing mills. Other finishing equipment consists of slitters, roller levelers, edging mills,

15 ft. center to center of stands, and with reel and coiler. A fourth stand about 35 ft. from the third, with 8½-in. and 16½-in. by 26-in. rolls, is set in tandem, so that it can be used with the other three stands or can be used as a single mill. It also has a reel and coiler. This mill is driven with 150-hp. motor on each stand.

The third roughing mill is a three-stand tandem, two-high, mill with 10½ x 10 in. rolls. This mill has a set of driven edging rolls before the second and third stands for the purpose of producing square edge material. This mill has a reel and coiler, the same as the other mills.

The finishing mills comprise two stands of 13 x 18-in. rolls, two stands of 10½ x 18-in. rolls, two stands of 8½ x 10-in. rolls and one stand of 18 x 26-in. rolls. These mills are all equipped with variable speed motors. The reels are also driven with variable speed motors with adjustments for variable tension on the coils. Six of these mills are equipped with edgers which are driven from the mill motor.

All of the mills are equipped with roller bearings. The cluster mill bearings are Timken and the two-high mills are Rollway. The cluster mills and the 18 x 26-in. finishing mills have motor driven screwwdowns, with a motor on



Multiple Head Coiler Used in Connection With the Continuous Pickling

each screw, and a magnetic clutch between the drives, so that the screws can be operated separately or together, as desired, by a system of push button control.

The auxiliary equipment consists of slitters, portable coilers, polishers, roller levelers, portable shears, oiling machines and scrap bundling machine. All of this equipment, which, with the mills, was built by the E. W. Bliss Co., has a capacity for making cold-rolled strip any gage up to $\frac{1}{4}$ in. thick and any width up to 22 in.

A roll grinder, furnished by the Norton Co., has equipment for grinding the barrel of the rolls either straight, concave or convex.

There are three flying shears, built by the Hallden Machine Co., which will straighten and cut the finished strip in any length up to 16 ft.

The annealing department equipment consists of four double, box annealing furnaces, which are hand fired. There are cast steel annealing boxes and bottoms, and the necessary equipment for drying and handling the gas to the boxes. A 50-ton crane serves an annealing bottom with the charge and cover complete.

In the annealing furnace building there are two Leif Lee heaters, which furnish the heat for the cold-rolling plant. These are located so that the coal and ash handling equipment can serve them in the same way as it does the annealing furnaces. This equipment includes a track hopper and coal elevator, which discharges coal into boxes or ashes from a bin into a standard car or truck. The coal boxes are moved by an overhead crane to the different furnaces and the ashes are taken from the furnaces by this same crane to a bin adjacent to the coal elevator.

Another addition to our rapidly growing list of technical handbooks is a 383-page volume just issued by the American Oil Burner Association, 342 Madison Avenue, New York. It was edited by Harry F. Tapp of the association. It is intended to supply to those interested authoritative information concerning problems of combustion and heating, as needed in the practical application of oil-heating equipment. The volume, which is priced at \$3, is in flexible binding and thin paper so that it will fit the pocket.



On the Right Is the Charging End of the Continuous Pickling Tank, While the Foreground Shows a Part of the Pickling Shop Storage

Reheating Furnaces for Alloy Blooms

Soaking Chamber Forms Part of Furnaces Designed by
Timken Company—Hearth Has Three Zones
—Refractory Recuperator a Feature

RHEATING high-quality alloy blooms on a quantity production basis has been provided for at the new mill of the Timken Steel & Tube Co., Canton, Ohio, by the installation of two large continuous reheating furnaces, especially designed for the work. The furnaces are of the triple-fired, recuperative type, using natural gas for fuel and having a capacity of 40 tons per hr. each.

Blooms are brought directly to the charging end of the furnaces by a live roll table running from the main transfer table and are pushed through the furnaces by means of a motor-driven pusher mechanism. Due to the quality of the steel, extreme care must be taken in the heating of these blooms, which accounts for some of the features in the design and construction of the furnaces. Upon entering the furnaces, the blooms are gradually warmed in a 10-ft. dead end, next passing through the channel and main heating chamber, and last receiving their final soaking at a temperature of approximately 2200 deg. Fahr. on a brick hearth. From this hearth the blooms are discharged by gravity directly to a second run-out table that carries them to the 28-in. mill which serves as roughing stand for subsequent rolling operations.

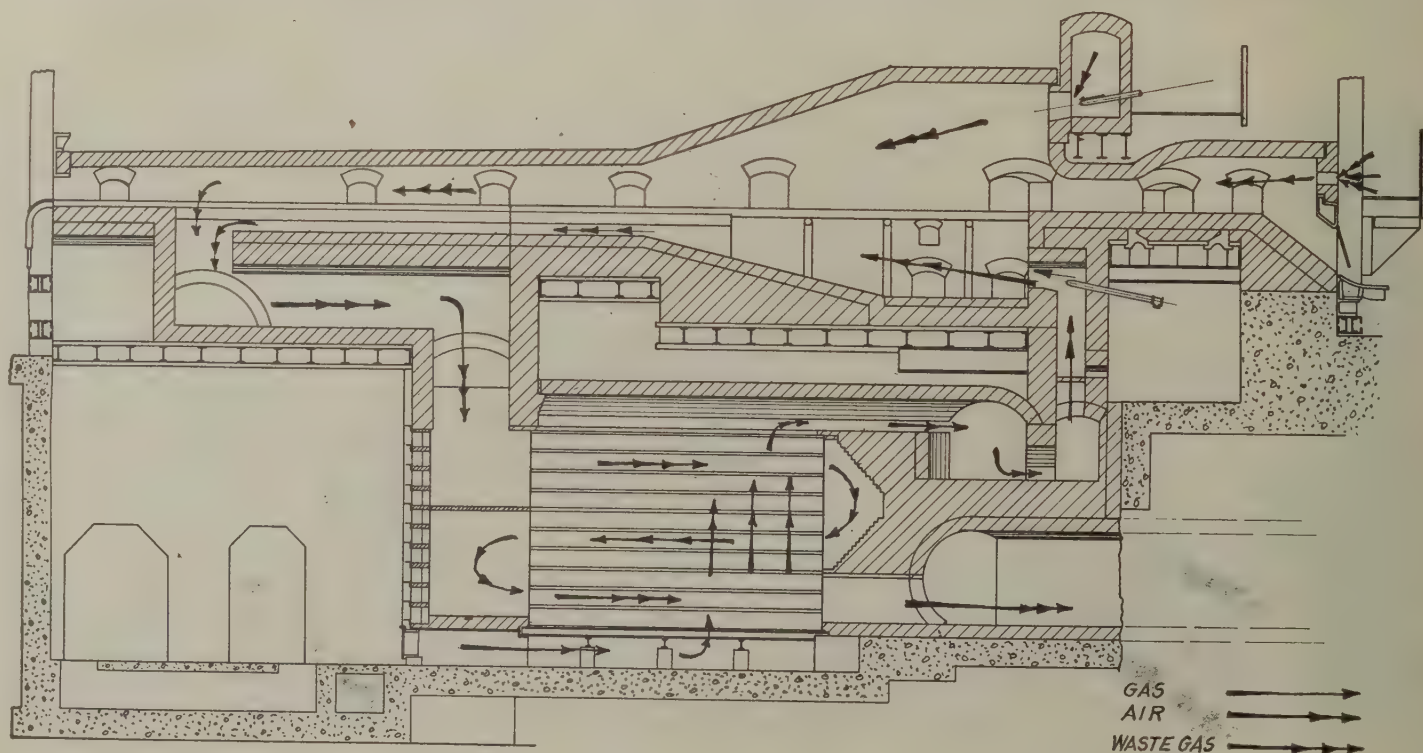
These furnaces are the first of their kind ever built and put in operation, and incorporate a number of interesting features in construction and design. As they are precisely alike in all details, a description of one will serve for both. In over all dimensions they are 67 ft. long, 33 ft. wide and 26 ft. high at one end and 27 ft. 9 in. at the other,

above foundations. The hearth is 63 ft. long and 20 ft. wide with a roof height that varies from 3 to 7 ft. The furnaces extend a maximum of 15 ft. below ground level.

The section shown in one illustration gives an idea of the construction and general arrangement of the furnace interior. The main furnace chamber is divided into three zones—the first for gradual warming, the second in which the main heating is done, and the third, which consists of a soaking chamber for equalizing heat throughout the bloom before discharging. The latter compartment, the soaking chamber, is one of the features in the design. In this chamber, only sufficient fuel is fired to supply radiation losses and maintain the entire soaking hearth, side-walls and roof at constant discharge temperature. Practically no heating is done here, this chamber being used to equalize the temperature throughout the steel and to soak the entire bloom to the same heat condition.

The soaking chamber accomplishes two important things. First, it serves to insure even heating of blooms, removing dark spots caused by contact with water-cooled skids in the heating chamber; and second, it makes independent of each other the temperature condition of the steel and the tonnage output. Due to the soaking chamber, tonnage output can be changed at will by adjusting the burners located back of the soaking hearth without in any way affecting the quality of heating found in the discharged blooms.

The roofs on all three chambers are of flat arch construction, supported from overhead girders. This type roof



Cross Section of Continuous Furnace, Showing Arrangement of Heating Compartments and Recuperator



General View of the Two 40-Ton Reheating Continuous Furnaces for Alloy Steel Blooms

for wide furnaces such as these is found to make for uniform flame distribution and heating throughout the 20-ft. width of the furnace.

The entire length of the furnace chamber is liberally provided with working and inspection doors located in both side walls, care having been taken, however, that the doors be thickly lined and tightly fitted, to eliminate heat losses from the furnace interior.

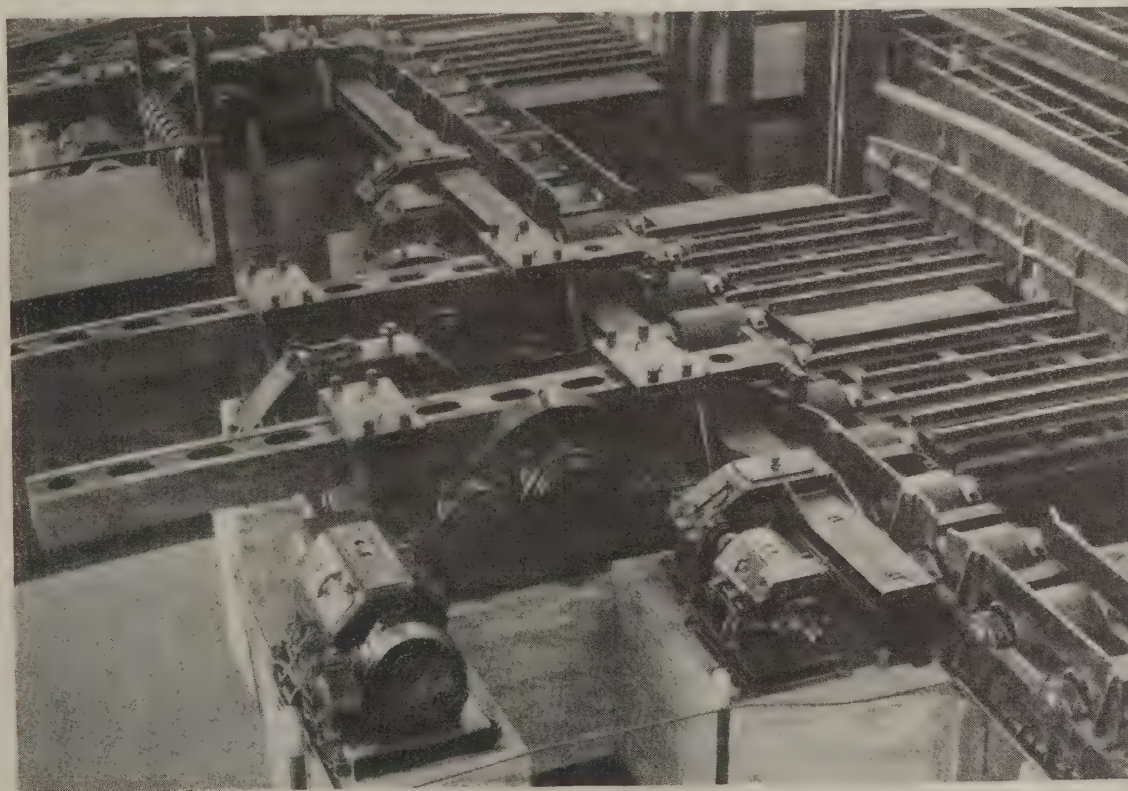
Hearth Construction of Three Sections

The construction of the hearth proper is also somewhat unusual. Taken as a whole, it may be considered as divided into three sections, according to construction. The first section, which extends from the charging door to a point 27 ft. into the interior, is of standard firebrick construction. Extending along its length are four firebrick piers, on which are mounted the skids on which the blooms slide. These skids are water-cooled, the skid proper consisting of two concentric steel pipes. The inner carries cooling water to

the extreme end, the return being made through the outer. The pipes are all connected to a common header, so that there is a continual circulation of water through the system.

In the second section of the hearth, as can be seen from the drawing, the brick supporting piers are dropped away from under the skids, which are supported by cross pipes bent to a rectangular form. These pipes are of the same construction as the skid pipes, and are supplied with water from the same header, forming part of the general closed circulating system. This hearth construction has been adopted to provide combustion space for the burners firing beneath the blooms and to permit ready circulation of the heat below the steel, so that the cooling effect of the skid pipes will be minimized and the soaking period reduced when the blooms reach the soaking chamber.

The hearth in the third section is of solid firebrick construction, steel bars set almost flush with the firebrick taking the place of the water-cooled skids. The lintel of



Motor - Driven Pusher Mechanism for the Two Furnaces. The centralized control is shown at upper left

the discharge door is also water cooled, to form a rigid front wall support across the 20-ft. span as well as to carry the hinged doors. The discharge doors consist of a number of hinged steel plates that are swung outward by the impact of the blooms against them.

Three Tiers of Burners Provided

As the triple-fired name implies, there are three tiers of burners incorporated in the heating system of this furnace. One tier is located at the discharge end for maintaining the soaking chamber at the desired temperature. The other two tiers are located behind the soaking hearth, one firing above the blooms near the roof of the main heating chamber and one located below the level of the hearth, firing beneath the blooms. These two latter tiers determine the tonnage output of the furnace, the intensity of the heat from this point back to the charging door being controlled to give the proper temperature for any desired tonnage output.

Between the two heating compartments the flat arch roof is lowered to form a restriction to the flow of gases from the soaking chamber into the main heating chamber. This restriction is a very important point in the design of these furnaces since it makes possible the maintenance of a slight pressure in the soaking chamber to prevent the infiltration of cold air up the discharge slope through the flap type discharge doors. It is extremely important that scale losses be kept low, due to the cost and quality of alloy steel. The infiltration of air and resulting oxidation so noticeable on the ordinary type of end-discharge furnace is reduced to a minimum by means of the lowered roof between the soaking and heating chambers.

Control to Be Made Automatic

The control of the main heating system is manual at the present time, but is to be changed over in the near future to an automatic fuel-air proportioning system working in conjunction with an automatic draft regulator.

The highest flame temperature obtained in this type furnace is found in the main heating chamber back of the hearth, where the steel is being rapidly heated and where the tonnage output is controlled. The main heating cham-

ber ports are so arranged as to use highly preheated air with the natural gas fuel. Since the steel is colder at this point of the furnace than in the usual design of end-discharge furnace, it is possible to adjust the temperature so as to bring about an extremely rapid heat transfer to the blooms, thus increasing the heating efficiency of the furnace without detracting from the high quality of the heated product.

Refractory Tile Recuperator Under the Furnace

The pre-heated air is delivered to both the main heating chamber tiers of burners under positive pressure by the refractory tile recuperator, which is situated beneath the furnace proper and is arranged in three units. The central recuperator unit furnishes its preheated air to the under-fired burners; the two outside recuperators deliver preheated air to the overhead firing ports by means of two steel ducts which are insulated and brick lined.

The waste gases travel through the furnace to the down-takes 10 ft. from the charging door where they are led beneath the hearth to the three recuperators. The heated gases travel horizontally through the recuperators, making three passes, each successive pass being at a lower level until the gases are discharged from the recuperator to the stack flue at a temperature of approximately 700 deg. Fahr. The heat given up by the waste gases in passing through the recuperator heats up the hollow refractory tile through which air for combustion is passing vertically upward.

A collecting chamber is situated at the top of each recuperator unit, where the air is collected from all the ducts of each recuperator and thence led to the main heating chamber firing ports.

Blooms are charged to the furnace directly from the runout table by a double rack type pusher. A general view of the pusher is shown in another illustration. The motive power is supplied by a 120-hp., 220-volt, direct current, mill type motor, which is directly connected to a reduction unit common to both rams. The total reduction of speed is 83 to 1, giving a ram speed of 17.4 ft. per min. The load capacity of each ram is 82,000 lb. horizontal push. The shafts of all pinions, gears, and idler gears throughout the drive including the rack pinion, are mounted in Timken bearings.

Diffusion of Solid Carbon Carburizes Steel

CARBURIZATION of iron and steel occurs when the metal is heated in contact with solid carbonaceous materials, or with carbon monoxide or methane gas or melted cyanide. Two theories have been advanced to explain this action. One is that a gas, such as carbon monoxide is the carbon carrier; it diffuses into the steel and reacts with the iron to form cementite according to the reversible reaction.



The other theory is that the gas is decomposed by contact with the surface of the metal, depositing carbon soot which then diffuses atom by atom into the hot iron, entering the solid solution as austenite.

Experiments Support Decomposition Theory

The latter theory is supported by recent experiments by G. Takahashi, published in *Science Reports*, Imperial University, Sendai, Japan, July, 1928. He finds that a pure iron tube with 1 mm. wall evacuated inside and stoppered, and then bathed outside in CO at atmospheric pressure, is carburized throughout to about 1.5 per cent carbon in 10 hr. at 1000 deg. C., but the gas pressure inside has crept up meanwhile to only 80 mm. Almost complete decarburization was effected in similar fashion with CO₂ but the interior pressure rose to only 92 mm. Other experiments showed that hydrogen diffuses through the hot tube walls readily, but CO, CO₂ and N hardly at all. If,

therefore, deep seated carburization readily occurs while CO gas is penetrating but slowly, the effect must be due in most part to diffusion of solid carbon. This conclusion is also in line with x-ray studies of austenite, which indicate that carbon is dispersed within the interspaces of the iron lattice as carbon atoms and not as the compound Fe₃C (cementite).

Eye Accidents and Industrial Eye Strain Increasing

"Safety first" has brought down the number of accidents in industry to a gratifying extent, but the most distressing kind—preventable eye accidents—still comprises the most serious industrial hazard, according to Lewis H. Carris, speaking before the Safety Congress, Syracuse, N. Y., Dec. 6. Furthermore, the number is on the increase. He estimates that American industry pays \$10,000,000 yearly compensation to blinded workmen, and the loss to them and their families is much greater. Eyestrain from dark working places or from glare is more prevalent, and represents an equal economic loss, although it does not figure in compensation statistics. The remedy is constant use of approved goggles, helmets, and scientific lighting, and an informed cooperative attitude between employers, workmen and the medical profession.

Causes of Failure of Coiled Springs

Corrections Determined for Design Tables—Rough, Decarbonized Surfaces Detrimental—Mild Corrosion to Be Avoided

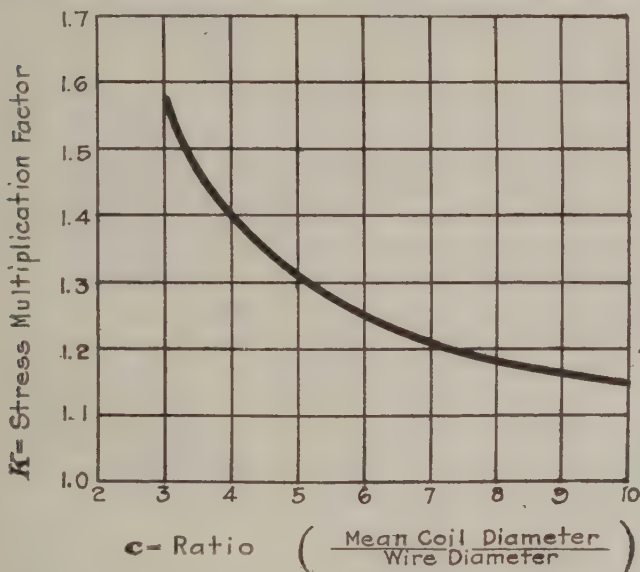
A SPECIAL research committee of the American Society of Mechanical Engineers, under the chairmanship of J. K. Wood, has fostered a number of researches into the properties of springs. Definite results have been obtained in some lines, and were reported at the general meeting early in December.

It is common experience that heavy, closely coiled helical springs—such as used in railroad rolling stock—frequently fail even though working under loads well within the supposed safe limit. The common type of failure is a detail fracture starting at the inside of the coil; it is usually attributed to faulty heat treatment. A. M. Wahl, research laboratory Westinghouse Electric & Mfg. Co., East Pittsburgh, analyzed the stresses by approximate methods, then performed tests on loaded springs and spring segments

in opinion many avoidable defects originate in a poor ingot surface (due to splashes, surface segregates or thermal stresses), persisting through to the round rod from which the spring was made. An even greater danger to the finished spring is the thin decarbonized surface left after rolling, coiling and heat treatment. The gross result is that the most highly stressed fiber in a spring is least able to withstand its load because of faulty mechanical and chemical conditions.

Corrosion Reduces Endurance Limit

D. J. McAdam, Jr., metallurgist United States Naval Engineering Experiment Station, Annapolis, Md., has co-operated with the committee in determining fatigue limits of spring materials under various conditions. His results confirm the general discoveries already made for other materials; namely, that the endurance limit (defined as the alternating load which can be withstood indefinitely without fracture) is proportional to the ultimate strength, but only when the metal is protected from corrosion. Since the strength of spring steel is much higher in its quenched and tempered condition than in the annealed state, it would be surmised that a properly heat treated spring could endure correspondingly higher vibrating loads without breakage than the metal would in a softer temper, and actual tests show this to be true. However, McAdam's experiments also show that this advantage is more than lost if the metal is subject to such mild corrosive action as running tap water; furthermore, that a notched specimen, hardened, has an equally low endurance limit to a notched annealed specimen. If a spring therefore is to withstand changing loads, as in railroad service, the importance of making it of a smooth bar and of protecting it from corrosion can hardly be overemphasized.



Correction Curve for Spring Tables

Divide coil diameter by wire diameter, run up on corresponding ordinate to curve, then across to left and read factor. Multiply stress given in spring table by this factor to get maximum stress actually existing in spring

which verified the theoretical results. Agreement was also close to the results of a much more rigorous mathematical analysis of the problem published 25 years ago in Germany, but generally neglected by designers, probably because there has been no experimental verification until Mr. Wahl's work. He now finds that the stresses at the outer diameter of the springs are materially less than those given in the accepted spring tables, while those at the inside of the coil may be as much as 2.5 times as large as at the outer diameter. Hence he concludes that failures in service are ordinarily caused by overloading at this critical region. He also suggests factors taken from the adjoining curve to convert the tables given in handbooks into safe design data.

Among several commentators who admired the elegance of Mr. Wahl's work, G. M. Eaton, Molybdenum Co. of America, Pittsburgh, said that the problem of spring breakage will not be solved until more attention is given to the steel manufacture and the spring fabrication. In his

Light-Weight Diesel Engines for Vehicles

Progress in Diesel engine building is along two distinct lines, according to *Industrial Bulletin* of Arthur D. Little, Inc. For one thing, it may be constructed so as to operate on any one of several different fuels, such as powdered coal, tar, fats, or vegetable oil, although heavy petroleum products will doubtless be its staple fuel for many years.

A second line of development is toward lighter weight. More horsepower per pound of engine is the result of improved design with stronger alloys and higher speed of operation. Diesel-driven trucks are giving excellent results in England; in fact, one of the new dirigibles being constructed for the British Government will be powered by engines of this type using heavy oil fuel. The Sperry Diesel, developed especially for airplanes, weighs about two pounds per horsepower. Diesel engines, burning heavy oil, are now operating on Russian railroads; oil-electric engines are fairly common in America.

The Diesel is preeminently a high-compression engine, but on account of its own distinctive methods of carburetion and combustion, it does not "knock." A difficulty not entirely overcome is the comparative inflexibility of the Diesel engine, which runs best at constant speed. Moreover, there is difficulty in starting, and high maintenance cost. All these problems nevertheless seem in a fair way toward solution.

Good Practice in Jig and Fixture Details

Principles Governing Locating, Clamping, Arrangement of Jig Legs, Bushings, Latches and Other Elements

BY JOSEPH W. ROE*

PRESSURE due to the feed and rotation of the cutter should be against the solid part of the fixture, not against the clamp. This principle is often violated, as the wrong way is usually more convenient. (Fig. 1.)

In general the feed should be against the rotation of the cutter, not with it. This avoids a tendency to dig in. This has been good practice for many years. There is, however, some tendency away from this of late years.

Locate the feed and cuts to throw the burrs for the various cuts on the same side, to reduce burring operations as far as possible. In order to be sure that burrs do not vitiate correct setting in subsequent operations, it is wise

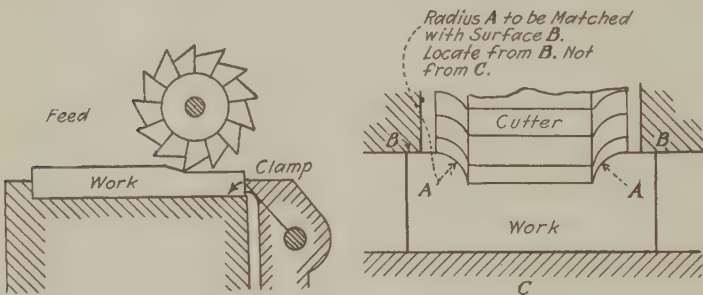


Fig. 1

Fig. 2

to provide clearance grooves on locating surfaces so that burrs cannot, even if left on, interfere with correct setting.

Locating Surfaces Should Be Small

Locating surfaces should be as small as consistent with proper support and wear. The larger the surface, the more care and time are necessary to keep it clean and free from chips which destroy proper setting.

If a surface is to be matched in a milling operation locate from that surface as at B, Fig. 2. It may be more convenient to locate from the opposite face, but locating from the matching surface, is correct and produces better work. A variation in the thickness of even a half of a thousandth

against the work during clamping and be locked in position after the work is set.

It should be easy to keep the locating surfaces clean, therefore, there should be ample clearance for chips. If possible accumulated chips should fall away from, rather than on to the locating surface when the work is removed. If possible keep the locating surfaces completely covered by the work, so that chips cannot collect on them.

All the locating surfaces of a jig or fixture should be fixed. Movable surfaces should be used for clamping only.

Buttons or pins, hardened and ground, are often better for locating than flat surfaces as they are easier to keep clean and afford easier adjustment for wear. They are better when acting endwise than sidewise, as there is no bending action and they are more readily set up for wear. (Fig. 4.)

It is better to support castings on buttons or pins than on flat surfaces. They position better and more definitely. Surfaces which locate drop-forgings should have clearance for the flash, and preferably should be located from one side of the flash only, as the dies which made the forging may not have been exactly matched. Locating from the upper side of the forging, or that above the flash, is preferable.

The clamping should not produce any horizontal sliding action across the locating faces as this causes wear.

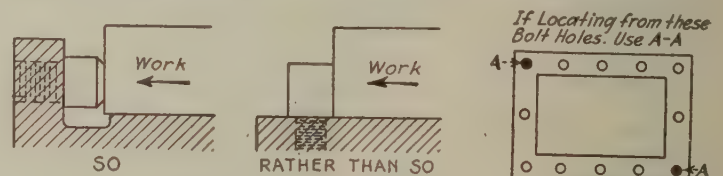


Fig. 4

Fig. 5

Locating and supporting points should be as far apart as the nature of the work will allow. (Fig. 5.)

The locating and support points should be visible and easily accessible to the operator.

Work Pieces Not to Be Stacked

Do not stack pieces one against another, if accuracy is required. In multiple work each piece should be located independently against fixed stops. In well-designed fixtures this is done, although several pieces may be clamped by one motion.

In multiple milling fixtures do not mill the pieces serially, with a single cutter, if the runs are long. Use multiple cutters, one for each piece and feed across the row. This reduces the length of feed and therefore the cutting time. This applies, of course, to fixtures with a reciprocating feed, not to those with rotary, continuous feeds.

Parts of the fixture requiring accurate location should be held by screws and dowels or splines. The screws should not have to perform the double function of locating and holding. (Fig. 6.)

When locating blocks are assembled into fixtures it is sometimes desirable to arrange the screws and dowels as shown in Fig. 7. When arranged this way, the contacting surface only is hardened, leaving the section carrying the

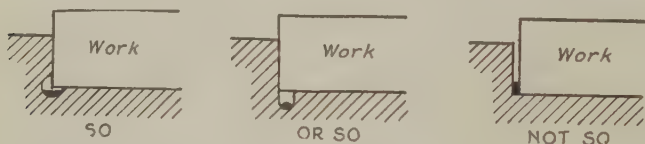


Fig. 3

will show, although it may not affect the operation of the piece.

Avoid sharp corners between locating surfaces. They catch dust and dirt and are hard to clean. (Fig. 3.)

The number of fixed supports should not be more than three. These should be as far apart as possible. If other supports are needed they should have only spring tension

*Professor of industrial engineering, New York University. The article is taken from Professor Roe's paper, "Principles of Jig and Fixture Practice," presented Dec. 3, at New York, before the American Society of Mechanical Engineers.

Formulas for determining the probable profit on proposed jigs and fixtures, as well as other tooling equipment, and some general principles of fixture design, were also features of Professor Roe's paper. These were given in THE IRON AGE of Dec. 13, page 1489, and Dec. 20, page 1575, respectively. The paper concludes with a bibliography of books, technical papers and magazine articles relating to jigs and fixtures.

dowel pins soft, so that the reaming of the holes and the alinement of the piece can be done after hardening.

Where the positioning need be only in one direction, the side of the piece or preferably a tongue and groove may

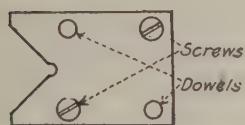


Fig. 6

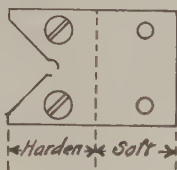


Fig. 7

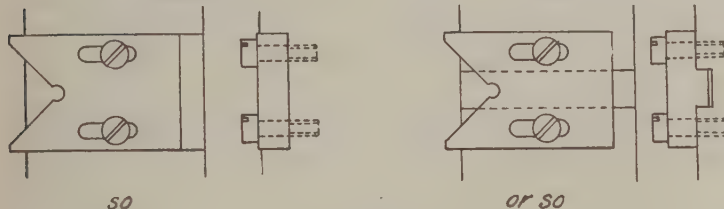


Fig. 8

The Tapered Pin works Faster and there is Less Likelihood of Sticking.

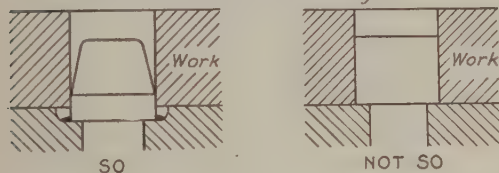


Fig. 9

be used for locating, and the screws go through slotted holes. (Fig. 8.)

If position pins are used for locating a previously drilled hole, that portion which is full diameter should be as short as is consistent with wear, and the rest or upper part of the pin tapering. (Fig. 9.)

Locating pins should be hardened and ground with clearance for burrs and chips. When used with counter-bored holes they should center on only one diameter.

When two pins are used for locating one should be flat-

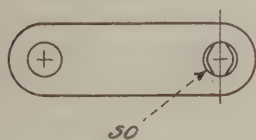


Fig. 10

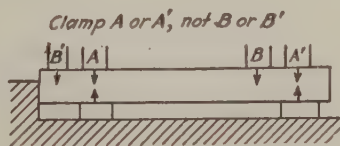


Fig. 11

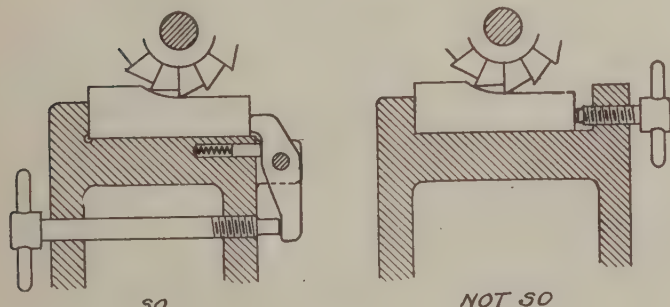


Fig. 12

tened, on the sides toward and away from the other pin. (Fig. 10.) Sometimes it is desirable to flatten both pins, the planes of the flattening being at 90 deg. as shown in the lower figure.

If one pin is higher than the other, preferably the larger one, the work can be seated more rapidly.

Principles Relating to Clamping

Under no circumstances should the line of clamping pressure come above the stop. If it did there would be a tendency to lift the work. Side clamps should press down-

ward as well as inward. (See Fig. 1.) By so doing the clamping tends to seat the work.

The clamp should be immediately opposite the supporting point, with solid metal between. Disregard of this leads to springing the work, or lifting of the work due to the support acting as a fulcrum. (Fig. 11.)

Clamps and adjusting points should be operated from the front or working side of the fixture. (Fig. 12.)

The tool thrust should be taken up by an adequate, fixed stop, not by the friction between the work and the clamp. Clamping jaws should, if possible, be at right angles to the direction of the cut, not parallel to it.

All the clamping strain should be cared for within the fixture itself. None of it should be transmitted to the table of the machine.

Cams or wedges, if used for clamping, should be so designed that the pressure and feed tend to tighten them, not to loosen them.

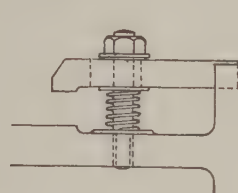


Fig. 13

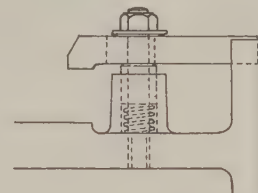


Fig. 14

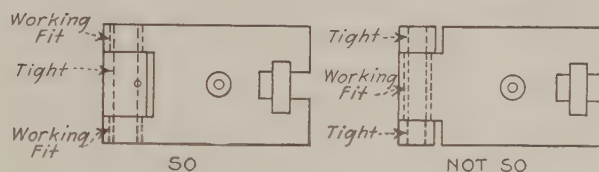


Fig. 15

Clamps should have springs and washers under them so that the operator will not have to hold them back while inserting the work. (Fig. 13.) A better form, with the spring concealed, so that chips cannot interfere with it, is shown in Fig. 14.

To save time in loading and unloading a fixture, clamps which have considerable motion should, in order to clear the work, have a rapid action when free from the work and a slow motion with increased power when they are brought into contact with it. A variety of devices are available, such as the toggle-joint, bayonet screw, interrupted thread, slotted clamp, etc.

Clamps holding castings and irregularly shaped surfaces should be on the floating principle to enable them to adapt themselves to the shape of the work.

Legs, Bushings and Other Jig Details

The center of gravity of the jig, with the work in it, and also the thrust of the drill should lie within the geometrical figure formed by the supports. This avoids a tendency for the jig to lift or tip.

A drilling jig should have four legs. With a three-legged support, it will rest stable on any surface. If a chip is under one leg of a three-legged support the fact will not be detected. With a four-legged support the jig will teeter if it is on an uneven surface or a chip is under one of the supports.

Supporting strips or lugs are sometimes better than legs as they are less likely to drop into T-slots or holes in the machine table.

Loose or screwed-in solid bushings should not be used where accuracy is important. Where screwed-in bushings are necessary they should center on cylindrical surfaces, not on the threads.

The length of bearing for the drill should, in fixed bushings, be about one and one-half to two times the diameter of the drill; in slip bushings about two to three times the diameter of the drill. If the bushing is longer than this,

the remainder of the length farthest from the work may be relieved.

Bushings should not be located close to the work with the object of carrying the chips up through the bushing except when the holes to be drilled are in a machined face that is clamped against a similar face in the jig. It is better, when the design will permit, to allow the chips to clear between the work and the bushing. About one drill diameter is usually sufficient. For small holes where great

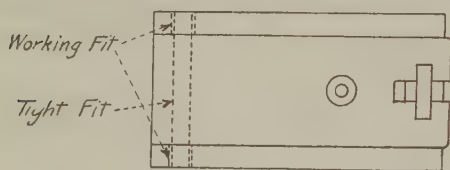


Fig. 16

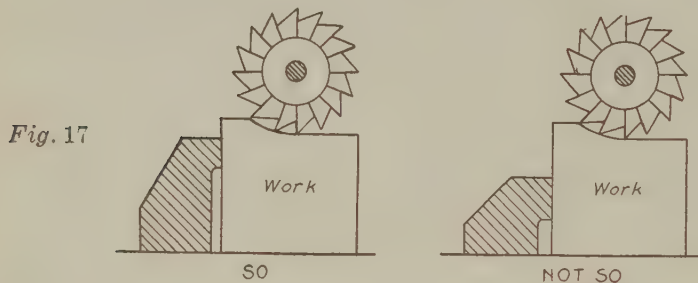


Fig. 17

accuracy is required the bushing should be brought down close to the work. For drills smaller than No. 31 this dimension may be approximately 1/64 in. with drills ground with a flat point.

In the joint of a latch give the latch the widest possible hold on the hinge-pin. (Fig. 15.)

A still better type of latch is shown in Fig. 16, which gives better side support when in working position. If possible avoid placing clamps in a latch which carries drill bushings, as any clamping pressure has a tendency to spring the latch and throw the bushings out of alinement.

Preferably a jig latch should have a support or stop to hold it when it is thrown back. This lessens the possibility of misalinement through use.

It may be of advantage to have the hinge pin tapered. This permits readier adjustment for wear, etc.

Thumb-Nuts and Levers Eliminate Wrench Handling

Thumb-nuts, fluted nuts, and levers should be used where the quantities are large, as the necessity of handling wrenches is thus avoided. They should be large enough to give the required pressure easily. When it becomes necessary for an operator to use a mallet, time is lost and either the work or the fixture is likely to be sprung.

Thumb-nuts and hand knobs should have ample clearance around them to permit their being manipulated properly and to avoid possibility of injury. Avoid knurling nuts and handles. When covered with cutting lubricant they are irritating to the operator's hands under constant use.

If it is necessary to use a wrench in setting the work, the various nuts should preferably be of the same size, so that change of wrenches is not necessary.

All exposed screws, nuts, and lugs, the motion of which might catch the operator, are to be avoided, and all sharp corners and edges should be removed.

The operator's hands must be well clear of the cutters during the insertion, clamping, and removal of the work.

There should be no danger of destruction of the work, tool, fixture, or machine through the over-running of the cutter.

It is desirable to have the cutting zone as close to the machine table as possible. If, for some good reason it must be high, then the surface taking the thrust of the cut should be high; i.e., as nearly in line with the cut as possible. (Fig. 17.)

It is desirable that parts subject to wear be renewable without destroying the jig or fixture.

Nature of "Blue Brittleness" in Steel

SHORTLY after the war a committee of the National Research Council presented a long report on "blue brittleness" of steel, embodying all the facts then known. The phenomenon shows itself in Armco iron as follows: if a series of tension tests is made at varying temperatures, the curve representing the way strength varies with the temperature shows a peak and the corresponding curves for elongation and contraction show a valley at 250 deg. C.

This abnormality is not associated with any crystallographic, magnetic, electrical or thermal changes. Consequently, Prof. K. Honda argued that it probably could be found in other metals which harden by cold work. When such a metal is stretched beyond the elastic limit, it is automatically hardened and strengthened, this action continuing as it necks down.

Annealing wipes out this work hardening and softens the metal, but moderate reheating relieves only the most unstable of these internal strains, and increases the hardness further (a fact proved by experiment). There should therefore be some temperature where the effect of heat and cold work are additive and result in an upward hump in the strength-temperature curve and the opposite condition in ductility.

Assuming that the shape of these curves is the criterion of blue brittleness, T. Inokuty studied the tensile properties and hardness of other metals from very low to moderately high temperatures. He finds similar inflections in the curves as follows: (*Science Reports*, Imperial University, Sendai, Japan, July, 1928) Aluminum from 100 below to 200 deg. C.; tin from 100 below to 30 deg. C.; zinc, in the vicinity of

120 deg. C.; copper, from 20 to 500 deg. C.; lead from 130 below to 40 deg. C.; brass from 100 to 500 deg. C. He concludes that "blue brittleness" is therefore not unique to iron and steel, but is characteristic of metals which can be work hardened and then softened by moderate heating.

Coke Oven Gas for Steel Plants

Asserting that coke oven gas excels most kinds of fuel used in iron and steel work as to its usefulness, composition, calorific value and the possibility of extracting its full heat value, G. Bulle of Düsseldorf, Germany, in a recent article in *Archiv für das Eisenhüttenwesen*, discusses some firing devices which have been developed in Germany. In his opinion coke oven gas can be and is used with advantage either alone or mixed with blast furnace or producer gas. For furnaces in steel works, rolling mills and forges, coke oven gas can be substituted without difficulty for coal, but in the case of shaft furnaces its use is somewhat limited.

Discussing firing devices, he states that some special technically perfect ones have been developed for using coke oven gas. There are a large number of coke oven gas burners, some of which merely lead in the gas while some others aim at a preliminary mixing of the gas with air. A series of them work also by a secondary stream of air or gas. He says gas burners fully depend on the possibility of regulating the flow of gas, on the short flame or the power consumption. In his opinion holders are required for storing this gas because the supply is regular while its consumption is more or less irregular.



BOOK REVIEWS



The Need for Efficiency in Consumption

Economics of Consumption. By Warren C. Waite. Published by McGraw-Hill Book Co., New York. Price, \$3.

If economic theory is to be of any use as a guide to industrial and trade policy today—and it is doubtful whether it has been of any such use in the last 50 years—the greatest need in economic literature is for an original, systematic treatise on consumption.

Economists, since the beginnings of political economy as a distinct field of systematic thought, have been preoccupied with questions of production of wealth and its distribution among the factors of production. Governmental policies, taxation, tariff protection, labor questions, international trade, money and banking, and nearly all of the more modern specialties in the field of economic discussion have been, and still are, approached from the point of view of production.

This has been a natural result of the "efficiency economy" in which most of human history so far has been passed. The main question, in most countries, practically up to the beginning of this century, has been how to turn out enough goods to supply basic human needs, and how to assure each class in society a fair share of them. Despite the unprecedented rapidity of industrial development in the Western nations, this is still true for the world as a whole, for there are vast sections of the human race who still live in a deficiency economy and whose main problem is to produce directly or by trade enough to satisfy even their barest wants.

But for the principal industrial nations, and particularly for the United States, the economic problem has changed its aspect. Our concern is not so much with products and processes, as with consumers and markets. Generally speaking, our technological equipment and resources enable us to satisfy any demand quickly and cheaply. In business language, industry and trade now operate in a buyers', not a sellers', market.

Some of our problems of production, particularly in their human aspect, have perhaps been solved rather by brute force than permanently and satisfactorily, but for the present they do not worry us. Give us a customer and we'll turn out the goods. Before the perplexities that capricious sovereign, the consumer, causes us, the relation of government to industry and other problems of production become insignificant. All our elaborate structure of economic theory explaining the best way to produce goods collapses or becomes purely academic, and we are driven back upon empirical or pragmatic principles of conduct, the rule of thumb and trial and error.

Not only are manufacturers, traders and advertisers forced to guess what people can and will buy and why, but for the economist and the statesman the complex relation between consumer purchasing power and business prosperity has become a vital question wrapped in obscurity, despite the efforts of those Gold Dust twins of American economics, Foster and Catchings, to clarify it. In this fog of uncertainty the searchlight of statistics, upon which we have come to rely so greatly for guidance in production policies, fails to penetrate far or is so dissipated and distorted that our faith in it as a measure of general business conditions is being shaken. In fact, in our understanding of the problems of consumption we are exploring an uncharted sea with only a rude compass, largely ruled by ethical or moralistic principles or prejudices.

A real treatise on consumption that would systematize our fragmentary knowledge and build up a coherent and

comprehensive theory of the market would be to the modern economic world what "The Wealth of Nations" was to the 18th century; but it must be written by someone who is not merely an economist, but also a biologist, a psychologist and an experienced observer of human nature and conduct, without any prejudices about it. Books like Professor Waite's will not serve the purpose, though they may stimulate or irritate others to do some original thinking about the subject. His work is a competent, routine textbook. Its contents list most of the topics that one would expect to be discussed under the head of "consumption," and the text says a little of this and a little of that about each one, but without illuminating or enlivening any of them.

The net result of the book is nothing approaching a fertile conception of the essential problems of consumption and their significance in our business system. Professor Waite, at the end, does indeed vaguely treat a few such ideas as "efficient consumption," and throws out a few promising chips of thought by the way, such as that "the nation with the more efficient consumption must eventually drive the less efficient from the markets of the world." But he does nothing with them, and after wandering around among bits of doubtful theory about the incidence of taxation, a few statistics of the cooperative movement and extravagant praises of standardization, he ends where most discussions of consumption end—on a pious note of hope that "the consumer may be educated to better modes of consumption and stimulated to a pride in efficient consumption."

Books like this are disappointing to the business man, whose interest in the puzzles of consumption is not academic but immediate, direct and concrete, and even to the professional economist, who today is hard put to it to maintain his reputation for knowing something more about the mysteries of business than the business man himself knows.

Virgil Jordan.

Covers Engineering in Concise Handbook

Handbook Encyclopedia of Engineering. Pages 1242, 4½ x 7 in., flexible binding. Published by the Industrial Press, 148 Lafayette Street, New York. Price, \$6.

Based on the same alphabetical arrangement as one or two other useful handbooks of the encyclopedic type, the first edition of Machinery's Handbook of Engineering, edited by Franklin D. Jones, associate editor of *Machinery*, has been published. Essential facts are given on about 4150 subjects in mechanics and engineering, including physical and chemical properties of structural materials and their applications, manufacturing equipment and processes, mechanical laws, rules and formulas, principles covering the design and use of apparatus for generation and transmission of power, metallurgy of iron and steel and non-ferrous metals, definitions of many words and expressions used in mechanical work and data important to designers and builders of mechanical and electric apparatus.

Divided into 24 alphabetical thumb-indexed sections, the book is handy for reference and the headings stand out in bold type for easy scanning. Cross-indexing is a valuable feature, of aid in locating many subjects. Illustrations in the shape of line cuts are used where they are beneficial to the full understanding of the text. Tabular matter is employed sparingly for giving data in connection with a number of the topics.

There is some use of mathematical expressions, but for the most part the work is away from the highly technical and leans strongly to the practical side of the matters discussed. The type is splendidly readable and the appearance

of the pages excellent. It should be of great assistance to engineers engaged in a wide variety of work and doubtless will take its place promptly alongside Machinery's Handbook of machine shop and allied practices.

S. G. K.

Industrial Safety from Many Angles

Industrial Safety Organization for Executive and Engineer.

By Lewis A. De Blois. Pages, 328, 6 x 9 in., 20 illustrations. Published by the McGraw-Hill Book Co., New York. Price, \$4.

"Safety first" not being a sufficiently comprehensive slogan, the author is helping expand its comprehensiveness to include "safety all the time" and "safety for all, everywhere." He goes into the questions of accident mortality, fatality (or frequency) rate, injury frequency rate proper, also injury severity rate; classifying accidents and injuries by causes; shows that investigation, analysis and prevention are increasing, and that they pay; gives the requirements for safety and places the responsibility for accidents; lays down the general qualifications for a safety engineer; takes up the purpose and structure of safety committees; points out the advantage of stimulating rivalry in the "game" of accident prevention.

Safety rules, which necessarily differ for various industries, as well as for different grades of intelligence in the workmen, and even for different races are treated minutely, as are the general protective principles of activities for securing safety appliances for buildings or equipment, and personal protection.

If I had written the book, I would have mentioned a method that I have employed, when the union would not prevent: namely, not merely refusing remuneration to the one causing an accident by contributory negligence, but fining him who caused it by carelessness.

The influence of distraction, fear and fatigue, as well as of youth and inexperience, is taken up in sufficient detail; those of lighting and inspection less thoroughly; that of temperature not at all.

The typical specimen Safety Committee reports given are good guides for the preparation of such documents.

R. G.

Properties and Uses of Metals and Alloys

Metallurgical Handbooks. "Werkstoff-Handbuch Stahl und Eisen," 200 loose leaves, 6 x 8 3/4 in., leather binder, edited by Karl Daeves for the German Iron Institute and published by Stahleisen, Dusseldorf, Germany. "Werkstoff-Handbuch Nichteisenmetalle," 185 loose leaves, 6 x 8 3/4 in., leather binder, edited by G. Masing, W. Wunder and H. Groeck for the German Society of Engineers and published by Beuth, Berlin S-14, Germany. Price, 18 gold marks each.

An exhibit of structural materials in Berlin a year ago had as one of its numerous features the issuance of two note-books on the properties of metals. One is on iron and steel, the other on non-ferrous metals and alloys. Together, they are a compendium of information on the properties of metals and alloys, methods of testing them, and practical applications and uses. The books are in the form of data sheets in loose-leaf note-books, and it is planned to issue additional and revised sheets at six-month intervals.

The two volumes are conceived along somewhat similar lines, outlining first the general properties of the materials, then uses and applications in practice and finally the various properties of particular alloys. The general plan seems logical and makes for ready reference.

The volume on iron and steel consists of five sections, one section on mechanical and physical properties of the metals and the methods or machines for testing them (in-

cluding 18 headings, such as strength, hardness, fatigue, magnetic, electric, wear and corrosion), one section on alloys of particular origin or composition (including 16 headings, such as carbon steels, austenitic steels, silicon steels, chrome-vanadium steels and cast iron), one section on materials for particular applications (including 23 headings, such as magnet steels, rustless steels, tool steels and locomotive steels), one section on heat treatment and microscopic examination and a final brief list of specifications, in form resembling those of the American Society for Testing Materials or of the Navy.

The books are, obviously, a compilation on the present state of the art in applying metals in industry. For the American reader, then, it will be convenient to indicate the scope of the books by comparing them with our most recent reference book on similar topics, namely, the handbook of the American Society for Steel Treating. The latter corresponds in manner of treatment rather closely with the German volume on iron and steel. Even the contents and the data themselves are quite similar.

It is indeed hardly surprising to find that the steels in use in the two countries are almost identical when used for similar purposes, since interchange of publications has made information mutually available. The rustless irons, the stainless steels, the silicon transformer sheets and dynamo sheets, the heat-treated alloy steels and indeed almost all special steels are recommended for essentially the same purposes, in the same compositions and the same conditions of heat treatment in the books from the two countries.

In the treatment of the subjects, however, there are certain differences. These differences in treatment suggest, and are probably the result of a difference in the position of metallurgical science in industry. It is generally held, and with much justification, that scientific thought and invention in metallurgy have in the past been more advanced in Germany than in the United States. Admittedly, the Germans have been masters of painstaking technique; and in the field of invention one must remember their priority, for example in stainless steels (Strauss, 1911) and duralumin (Wilm, 1910).

On the other hand, it would seem that in the metal trades the application of scientific thought has been much more widespread in the United States than in Germany. The variety of heat-treated alloy steels, the knowledge of details of applications in industry and the dissemination of knowledge to the so-called practical man is much more satisfactory in our country. Those who concede a superiority in scientific method and technique to Germany can still find comfort in the fact that the average refinements in manufacture are on a much higher level in the United States.

These relations of science to industry are reflected in the treatment of subjects in the German and the American handbooks. Many of the subjects in the German volume are discussed from the standpoint of the investigator in the research laboratory, and although they are never abstruse, they nevertheless often deal with the nature of the materials instead of stressing the practical results of these investigations. In other words, they are scientific books and (very properly) deal with principles.

Two instances serve as examples. The section on magnetism is a complete discussion of the properties and methods of test, and includes no less than nine wiring diagrams for test apparatus. The section on cast iron is a quite thorough treatise on the nature and properties of that material—not the method for making it, but an intimate study of its properties when made.

The advantages of such thorough scientific treatment are obvious. On the other hand, there is lacking in these volumes a sufficiently satisfactory practical treatment. Two instances from the American handbook will emphasize the point. For certain kinds of detailed practical directions, a "Recommended Practice Committee" has assembled the best

current thought on the state of the art, and has given details enabling any intelligent manufacturer to put the material into actual use at once. This is found in a number of instances in the American handbook. The other example is the article on cutting efficiency and tool performance, which finds no counterpart in the German handbook.

The examples illustrate a slightly different spirit in treatment, and it is felt that the German volume could to advantage improve its contents along the lines indicated, while at the same time preserving its own distinctive good qualities.

The volume on non-ferrous metals covers a wider field and is therefore necessarily less complete in its details. Nevertheless, a large amount of information is compiled. Section A is a general introduction. Section B treats the general mechanical properties including hardness, strength, wear resistance and machinability. Section C discusses microstructure, chemical analysis, corrosion tests, X-ray spectrometry and potentiometric measurements. Sections D to G cover the various properties of copper, brass, bronze and aluminum; section H treats of duralumin and related alloys; section J cast aluminum alloys; section K magnesium and its alloys; section L tin, lead and zinc; and section M nickel, manganese and chrome. In other sections are outlined the properties of the noble metals, silver, gold, the platinum metals, the amalgas, tantalum, bismuth and cerium. The final section gives a summary of alloys having specific properties—heat-resisting alloys, acid-resistant metals and alloys, bearing-metals, metallic coatings and the metal spray process.

The two volumes can be recommended as a highly useful summary of present-day metallurgical art.

Marcus A. Grossmann.

Value of College Education Analyzed

Relation of Education and Income. By Everett W. Lord. Pages, 32, 6 x 9 in. Published by Alpha Kappa Psi Fraternity, Indianapolis. Price, 50c.

In 1926 the author, who is director of education and research of the national professional fraternity in commerce, enlisted the aid of the various chapters of his organization, and secured uniform data concerning education and income from 7400 individuals in all walks of life. A study of the results (utilizing "medium" values rather than averages) indicates that elementary education adds \$64,000 to the life earnings of the grammar school graduate. High school adds a further \$24,000; a bachelor of arts degree adds \$56,000 more, while a professional degree adds a further \$94,000. Thus the fortunate owner of a LL.B. will (on the average) earn \$238,000 more than an uneducated day laborer during his life.

The International Labor Organization

"The Work of the International Labor Organization" is the title of a 198-page book, selling for \$2.50, published by the National Industrial Conference Board, New York.

Formed under the Treaty of Versailles, the International Labor Organization has been in existence nearly 10 years and is characterized as "in many respects the most vigorous and active section of the machinery of the League of Nations."

How this international body is organized and what it has accomplished is set forth in considerable detail. While some degree of world-wide standardization of labor conditions is regarded as inevitable as international relations become more interwoven, the author points out that the degree of uniformity to be aimed at and the features of employment conditions that should be regulated by international agreement are debatable questions.

The International Labor Organization is commended particularly as a clearing house of information. The data

it collects and distributes on the various phases of industrial employment, as well as on the character and effect of regulatory measures in force, may provide the basis for action by individual nations in dealing with their own particular problems.

Foreign Trade Bibliography

A selected bibliography of foreign trade, listing about 120 titles, has been published by the National Foreign Trade Council; copies may be had from the council, Hanover Square, New York, at 25c. each. The pamphlet is published as a guide to the standard books and reference works most widely used by American foreign traders. Theory, practice, merchant marine, trade with Latin America and with the Far East, and other topics are covered. A suggested "five-foot foreign trade book-shelf" of 40 essential books is listed.

The advantages of steel-frame buildings in resisting earthquakes is discussed in a paper entitled "Earthquake-Resistant Structures," by Wendell M. Butts, civil engineer, San Diego, Cal., which was presented in January, 1927, before a meeting of the Los Angeles section of the American Society of Civil Engineers, and has recently been made available in pamphlet form by the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York. Considerable engineering data are offered, as well as a chart showing the comparative resistance of different types of structures to recent earthquakes.

The annual of the association of French iron masters, the Comité des Forges de France, is again a formidable volume of 1360 pages. It contains a list of members of the association, which includes all of the metallurgical companies of France, with information as to the officers and nature of their products. As in earlier volumes, there is also a directory of the companies, by locality and by the nature of the products, and a classified directory of the suppliers of apparatus and equipment for the iron and steel industry. Reports are printed, also as usual, of the various organizations within the industry, working more or less under the patronage of the organization of iron masters. The headquarters of the Comité are 7, Rue de Madrid, Paris (8e).

New Books Received

Labor Management. By G. S. Watkins. Pages 726, 5¼ x 8¾ in. Published by A. W. Shaw Co., Cass, Huron and Erie Streets, Chicago. Price, \$5.

Production Design. By J. K. Olsen. Pages 212, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$3.

Book of Business Standards. Second edition. By J. George Frederick. Pages 255, 5 x 7½ in. Published by Commercial Standards Council, 19 Park Place, New York. Price, \$2.

Journal of the Iron and Steel Institute, No. 1, 1928. Pages 1023, 5½ x 8½ in., illustrated. Published by the Iron and Steel Institute, 28 Victoria Street, London, S. W. 1, England.

Iron and Steel Institute Carnegie Scholarship Memoirs. Vol. XVII. Pages 190, 5½ x 8½ in., illustrated. Published by Iron and Steel Institute, 28 Victoria Street, London, S. W. 1, England.

Keeping Fit by Easy Exercises. By Maj. George T. Everett. Pages 100, 5¼ x 8¾ in., illustrated. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$2.

New Sensitive Drilling Machines

ARRANGEMENT of the spindle, which automatically compensates for its own wear, is a feature of a model K sensitive drilling machine which has been brought out by the Demco Division of the Merit Equipment Co., Cleveland. The machine can be furnished for either belt or motor drive, with from one to six spindles and with hand or power automatic feed. All revolving parts are carefully balanced and are equipped with ball bearings.

spindle can be raised or lowered by hand while the power feed is in operation.

Tight and loose pulleys are provided for the standard belt-driven machine. The power is transmitted through a pair of hardened steel spiral bevel gears, which run in oil in a gear box, to the rear vertical shaft that is inclosed in a steel tube. On single-spindle machines a standard 1200-r.p.m. motor is substituted for the gear box and is direct connected

atically the moment the shift handle is turned, this being accomplished through a cam with spring tension. Belt tension can be adjusted by means of a small handwheel under the bracket. Cones and idler units can be removed by lifting their respective bearing caps at the top of the bracket.

Table clamping and elevating screws are extended to the front of the table. The base of the pedestal forms a lubricant tank and a standard pump, which may be belted to the rear of the drive shaft, can be furnished. Coolant is returned to the tank by a flexible tube.

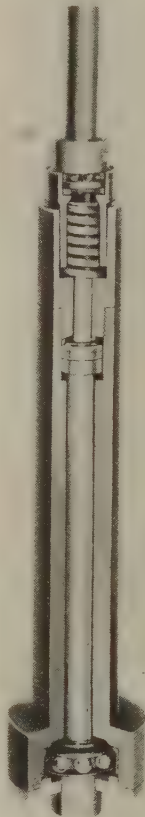
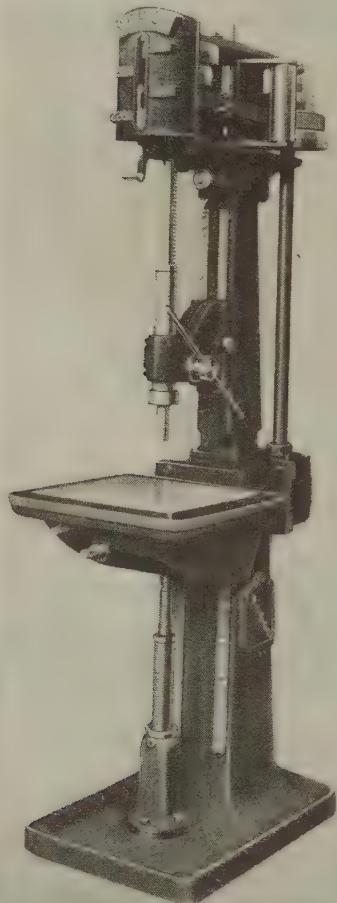
Adjustable Snap Thread Gages

FOR convenient and rapid gaging of external threads the Taft-Peirce Mfg. Co., Woonsocket, R. I., has placed on the market the thread gage illustrated, which is an application of the conventional snap gage principle.

This gage "gages a thread with a thread," the gaging members being true thread forms ground in the faces of hardened tool steel anvils and correct in all thread elements. Annular rolls or straight grooves are not employed. Elimination of moving parts, rotating, floating and sliding members, which might quickly become worn and inaccurate is emphasized as insuring lasting accuracy.

The gages may be accurately set with a reference plug gage or by means of wires and measuring blocks to any pitch diameter within their

When Motor-Driven, a Motor Replaces the Gear-Box Unit of the Belt-Driven Drilling Machine. Ball bearings in the spindle are automatically compensated for wear by means of a spring, the arrangement being shown in the sectional view at the right. The sliding head, belt shifter and automatic constant-pressure idler are other features



The patented spindle, a sectional view of which is shown, is accurately ground and is provided with two driving splines. The ball bearings are housed in a dust-proof quill, and are automatically compensated for wear by means of a spring. The sliding head which holds the spindle has a long adjustable bearing and is counterbalanced. It is clamped to the column by means of a single handle. The lever for hand feeding is adjustable.

The automatic power feeding mechanism is mounted on a sliding arm. The feed worm and gear are always in mesh and run in oil in a housing, which has a graduated dial plate upon which the depth to be drilled may be set and locked. When drilling is completed the feed disengages automatically, the spindle returns to the starting point, and immediately feeds down again. The feed can also be set for semi-continuous operation, the spindle being advanced by hand from its upper position and the automatic feed becoming operative when the hand feed lever is released. The

to the rear vertical shaft by means of a slip coupling. For multiple-spindle machines a standard 1200-r.p.m. motor may be mounted on a separate bracket at the base of the pedestal and belted to a single pulley on the jackshaft. Snap switches are regular equipment on motor driven machines, but push-button control can be furnished.

The top bracket, cast in one piece and braced front and rear, contains the bearings for the front and rear cones and also houses the belt shifting mechanism and the automatic belt-tension idler, each of which is a separate unit. The drive from the rear cone to the spindle cone is by means of endless flat belt. The belt shifter has two forks and is operated through a small crank handle at the front of the machine. One revolution of the handle produces a change of speed, the various speeds being indicated on the guard plate at the front of the top bracket. The idler is under constant pressure against the belt, the pressure being relieved auto-



Gaging Members Are True Thread Forms Ground in the Faces of Hardened Tool Steel Anvils

range. The threaded anvils can be furnished for any pitch and any percentage of thread engagement desired. Eight sizes are carried in stock, the smallest having a range of $\frac{1}{4}$ - $\frac{5}{8}$ in. and the largest, 3 $\frac{9}{16}$ -4 in. Standard "go" and "not go" anvils are $\frac{3}{4}$ and $\frac{5}{8}$ in. long, respectively. Special lengths can be furnished.

Sales of mechanical stokers in November totaled 116 units with 30,938 hp., as against 100 with 27,219 hp. in October, according to the Department of Commerce. For the 11 months ended with November, the total was 1388 stokers with 459,475 hp. as against 1291 stokers with 451,400 hp. for the corresponding period of 1927.

Automatic Flying Shear for Strip Steel

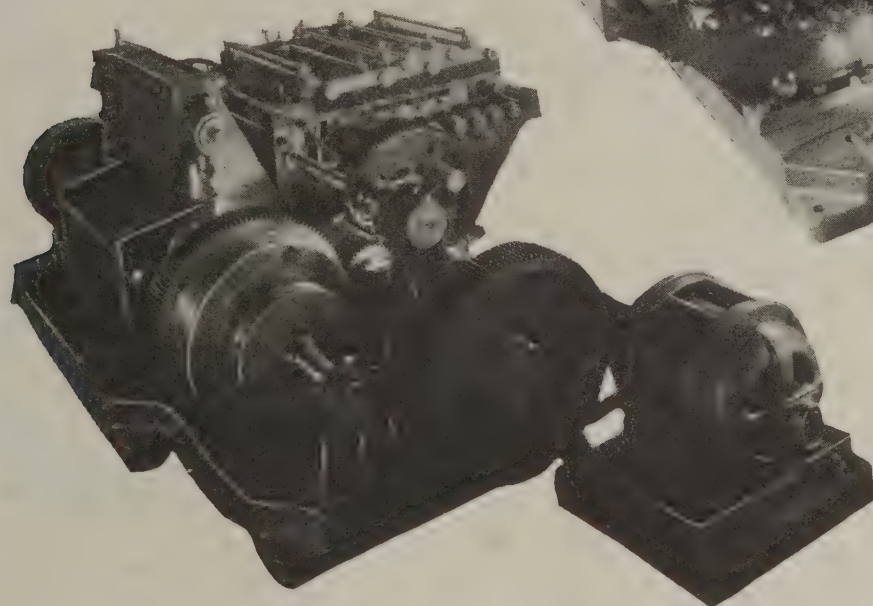
Straightener and Cutting Machine Takes Metal to 48 In. Width

DESIGNED to straighten and cut to length both hot and cold-rolled strip at a continuous uniform speed, a machine containing both straightening and cutting elements has been brought out by the Hallden Machine Co., Thomaston, Conn. The metal does not stop while it is being cut to length, because the shear unit moves forward, during the cut-off period, with the same speed as the metal feed. This continuous feed of the metal prevents the flattener rolls from

ated readily with unskilled labor. If it is desired to operate as a flattener only, the shear clutch can be disengaged. The machine is stopped and started readily by a Farrel-Birmingham clutch between the motor and flattening stand.

The flattening stand has nine-roll

Combination Flying Shear and Straightener Rolls. Shear is at left, below, and at right is other illustration



marking the metal during the cut-off period. Patents are pending.

No tripping mechanism in front of the machine is used, the length of cut being regulated by a special mechanism which indicates directly from the feed rolls. This makes it possible for the cut pieces to fall directly into a rack, which can be removed by a crane when full, or on to a conveyor or inspection table. A change in length of cut is accomplished merely by setting a pointer on a scale. The machine does the rest automatically.

This machine is now built in three sizes: No. 4 for 24-in. width of metal, No. 5 for 36-in. and No. 6 for 48-in. This model is suitable for anything from thinnest gages up to $\frac{1}{4}$ in. thick. The machine can be ganged up with a rolling mill, trimmers, slitters, etc., where a uniform, continuous feed is required. In this way an entire operation can often be saved, with its handling expense.

In design this is primarily a steel mill type machine—very heavy and rugged, with a low center of gravity. The height of the metal feed-line from the floor is very low, making it easy to gang up this machine with existing machines. The machine can be oper-

ated readily with unskilled labor. If it is desired to operate as a flattener only, the shear clutch can be disengaged. The machine is stopped and started readily by a Farrel-Birmingham clutch between the motor and flattening stand.

Foundrymen Announce Winners of Prizes

The board of awards of the American Foundrymen's Association announces that the committee appointed to select the three prize-winning convention papers for 1928 have chosen the following:

"Temperature Measurements of Molten Cast Iron," by H. T. Wensel and W. F. Roeser.

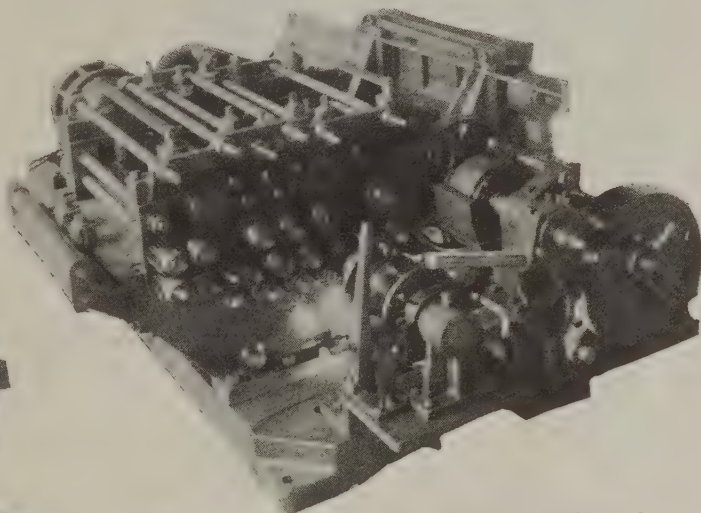
"The Effects of Lead on the Properties of a Complex Brass," by O. W. Ellis.

"Reducing New Sand Consumption in a Steel Foundry," by H. A. Mason.

H. T. Wensel is associate physicist and chief of the pyrometry section of the Bureau of Standards, Washing-

ton. W. F. Roeser is assistant physicist in the pyrometry section of the Bureau of Standards with Mr. Wensel. O. W. Ellis is metallurgical engineer in the research department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. H. A. Mason is assistant to the superintendent of the Gould Coupler Co., Depew, N. Y. The prizes are \$100 in cash.

The board of awards announces that the prizes will be presented at the 1929 convention. It also states



that similar prizes for papers presented at the 1929 Chicago convention will be awarded for papers on any of the following subjects: gray iron, steel, malleable cast iron, non-ferrous metals, sand control, general foundry practice. Only one paper in any class will be awarded a prize.

Spiegeleisen Imports Small This Year

Imports of spiegeleisen, according to official data obtained from the Bureau of Foreign and Domestic Commerce of the Department of Commerce, have been at a much lower rate this year than in 1927 despite an increase in consumption.

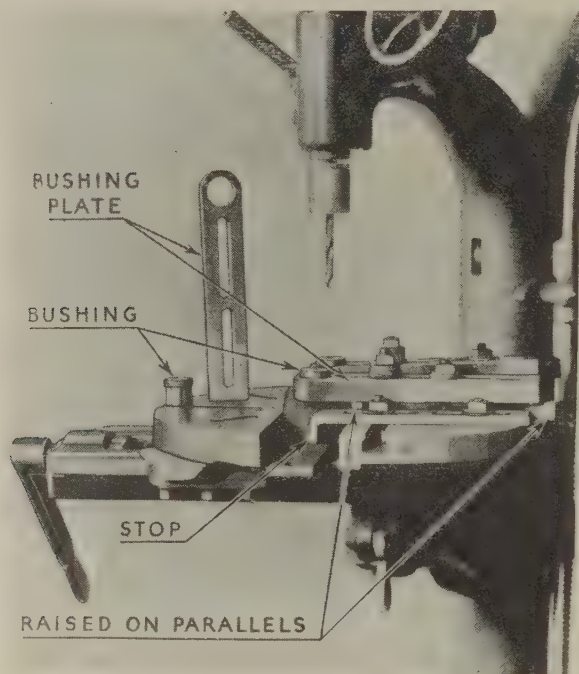
Last year, 7460 tons, or 621 tons per month, was received, the largest imports being 2195 tons in May. For the first 10 months of this year, or to Nov. 1, 1928, only 2820 tons, or 282 tons per month, had been received. The largest imports this year were 1130 tons in September. The total value of the 7460 tons imported in 1927 is given as \$223,463, while the 2820 tons imported for the first 10 months of 1928 is reported as having a valuation of \$79,588.

A drop of 10,012, or 8.7 per cent, in the total immigration for the current fiscal year is reported, as compared with the corresponding months of last year. All of the principal sources of present-day immigration show a decrease, but Europe is now contributing a larger proportion of the total. From July 1 to Oct. 31, 1928, the total number of immigrants was 104,545. Europe supplied 52,480, Canada, 25,901, and Mexico, 19,369.

Universal Jig for Drill Table and Vise

A SPECIAL slotted stop and bushing plates are offered by the Modern Machine Tool Co., Jackson, Mich., to be used as a universal jig in conjunction with the combination drill table and vise. The stop is

or they may be set on parallels to any height required by the work. By raising the bushings slightly out of bushing plates, the center distance between bushings may be easily determined with a micrometer. Bush-



Slotted Stop and Bushing Plates Used as a Universal Jig, with Combination Drill Table and Vise. This arrangement has great flexibility and the set-up may be repeated as required, a sample piece being used as a gage

bolted to the top of the combination and extends over the opening of the vise. The work is then placed in the combination, against the stop. Bushing plates, with bushings of proper size, are then located over the work as required, one to four bushings being used.

The plates may be bolted to the table, using the slots in the table,

ing plates are designed to fit standard bushings.

This enables users of the combination drill table and vise to use this jig for any class of work. In many shops, where repeat processes are necessary at frequent intervals, a sample piece clamped in the vise may be used to adjust the stop and bushing plates for drilling duplicates.

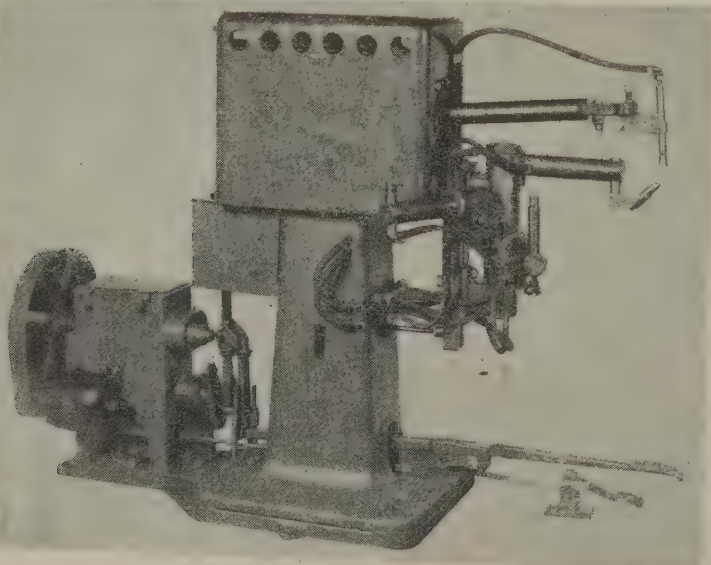
Special Equipment for Spot Welding Boxes

A MACHINE for welding boxes that require several different electrode combinations in order to reach all corners is shown in the accompanying illustration. The design includes a multiple electrode holder that swivels from one position to an-

other so that all parts of the assembly can be reached without extra handling.

The machine is built by the Thomson Electric Welding Co., Lynn, Mass., and is designated as the model 176-C special. It is rated 15 kw. and

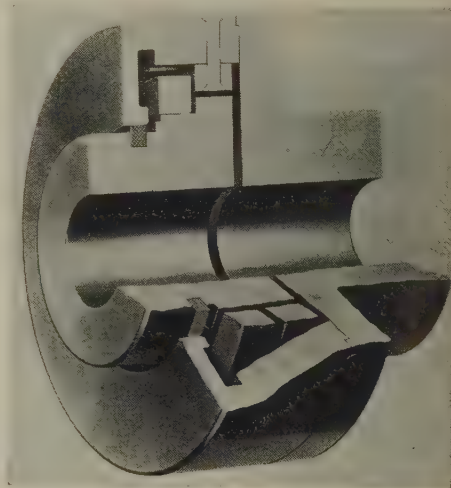
The Multiple Electrode Holder Swivels So That All Parts of the Boxes Are Welded Without Extra Handling



is either foot operated or power driven. The power drive is either by belt from the lineshaft or by motor and is through a six-speed gear box. The lower terminal post swivels to three positions and the horns and dies in the post are adjustable both horizontally and vertically. The upper die also swivels horizontally and may be adjusted vertically.

All-Metal Flexible Coupling

AN all-metal flexible coupling designed to take care of ordinary conditions encountered in a direct drive has been placed on the market by the T. L. Smith Co., Milwaukee. In this coupling, designated as the style B Flex-Ring, flexibility is furnished by means of two long ring-shaped springs, which, it is stated, permit end play of motor shaft without any sliding action and effectively smooth out the shocks and vibrations in the drive. The coupling is also said to compensate for a large amount of



Flexibility Is Furnished by Two Long Ring-Shaped Springs

both angular and offset misalignment without causing excessive bearing loads.

Arrangement of the coupling may be seen in the illustration. The cast steel hub has two projections machined to fit the gaps in the driving springs and is provided with a recess for the felt packing used to retain grease in the housing. The housing, of semi-steel and machined all over, carries two keys corresponding to the lugs in the hub. These keys are set into machined recesses in the housing and are riveted into place. The flange is also of semi-steel and is machined all over. The heat-treated springs are machined to fit over the projections on the hub and the keys in the housing. Flange and housing are bolted together and all inside parts are held in position without snap rings or bolts.

The 77 establishments engaged primarily in making saws reported products valued at \$22,627,990 in 1927, a decrease of 8.4 per cent under a production value of \$24,709,211 reported by 71 establishments in 1925, according to the Bureau of Census.

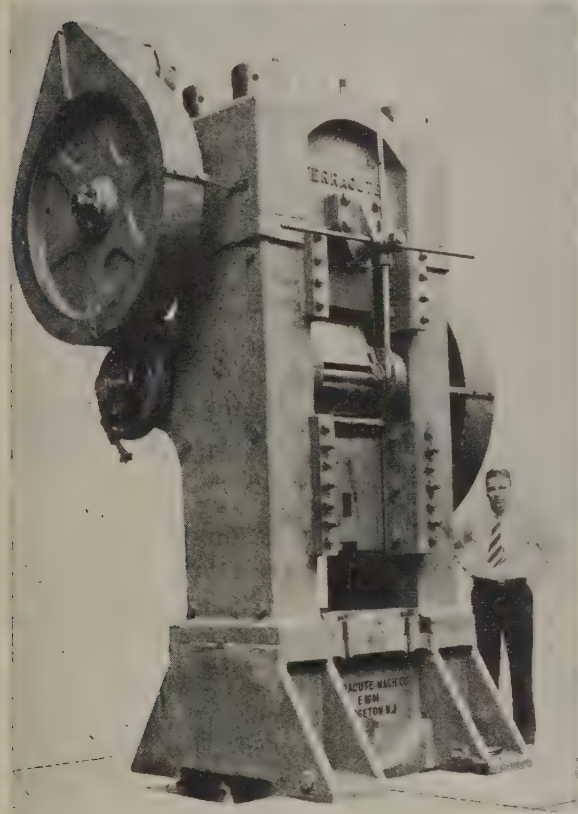
1000-Ton Upper-Toggle Coining Press

AN upper-toggle press capable of exerting 1000 tons pressure has been added to the line of the Ferracute Machine Co., Bridgeton, N. J.

Tensile stresses are taken by four 8-in. diameter vertical steel rods shrunk in the columns. The toggles are of cast steel and have hardened and ground steel bushings. The steel

and the moving mechanism is taken by two compression springs on the top of the press.

The main gear is a steel casting and the pinion a steel forging; both have cut teeth. Main and backshaft bearings are bronze bushed. The press is equipped with a jaw clutch and the ram with a knockout. Lubrication is by means of a force system. The press illustrated has 2½-in. stroke but the same machine with longer



At the Left Is Shown the Fan Which Forces Air Around and Across Parts Which Conduct the Heat from the Interior, an Inclosing Jacket Controlling the Path of the Cooling Air

Sturdy Construction Is a Feature of the 1000-Ton Toggle Press, Which Is Arranged for Direct Motor Drive

toggle-links are bronze bushed and the steel toggle pins are hardened and ground. The pitman is of cast steel and is bronze bushed. Vertical adjustment of the ram is obtained by a horizontal wedge which is operated by a screw and capstan hand wheel. The weight of the adjustable head

stroke can be furnished. The distance between columns, right to left, is 32 in., and the depth of bed, front to back, is 36 in. The height, bed to ram, at top of stroke and adjustment, is 20½ in., but this may be changed. The press has direct motor drive and makes 30 strokes a minute.

Germany Puts Non-Ferrous Semi-Finished on Free List

HAMBURG, GERMANY, Dec. 11.—Effective Feb. 1, the present duty on all non-ferrous metal scrap and on non-ferrous semi-finished material will be cancelled and these materials placed on the free list. Germany is a large buyer of brass, bronze and copper semi-finished products in the United States, and it is expected that elimination of the duty will serve to increase this business.

Foundry Equipment Orders Show Gain

The index of gross orders taken by 20 members of the Foundry Equipment Manufacturers Association was 197.8 in November, compared with 185 in October and 170 in September.

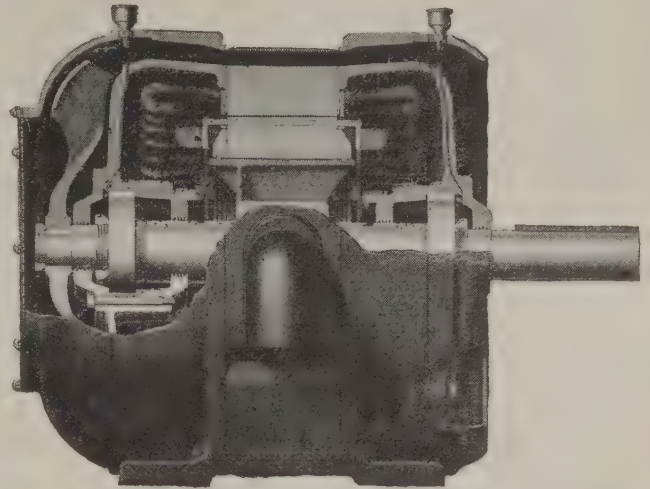
Net orders (after deducting cancellations) stood at 195.2. The November index of shipments was 264, against 254.3 in October and 129.7 in September. The index of unfilled orders on Nov. 30 was 403.9, compared with 462.6 one month previous and 529.5 on Sept. 30. The base for the indexes is the average of monthly shipments for 1922, 1923 and 1924, taken as 100.

Welded Chain Simplification

WASHINGTON, Dec. 24.—The Division of Simplified Practice, Department of Commerce, has sent copies of the proposed simplified practice recommendation for welded chain to manufacturers, distributors and users for acceptance. When the recommendation has been accepted by the industry as a whole it will become effective for new production on Feb. 1, 1929.

Inclosed Fan-Cooled Electric Motor

ANEW line of totally inclosed, fan-cooled motors, of 1 to 50 hp., has been developed by Allis-Chalmers Mfg. Co., Milwaukee. All of the active parts, such as stator core, stator winding and the rotor, are completely inclosed, preventing contact of outside air, dirt, dust, fumes, moisture, etc., with the interior or active parts.



Heat is carried away by a sufficient volume of cooling air forced around and across those parts which conduct the heat from the interior to the outer surfaces. A circumferential air jacket controls the path of cooling air.

Conference of Statisticians Sees Active First Quarter

"The year 1928 as a whole has been a year of industrial and commercial activity slightly higher than in the preceding year, but little if any above the normal annual rate of expansion of general business except for a few months in the last half of the year.

"The automobile and building industries have continued to be the leading factors in the business movement; the extraordinary expansion of stock exchange activity during the year, as in preceding years since 1923, stands in strong contrast to the general growth of industry and trade.

"Current momentum will probably sustain general business activity at a fairly high level through the first quarter of 1929."

That, in substance, is a collective interpretation of business statistics, gathered by statisticians and economists of organizations and corporations representing about 30 of the leading industries of the country and formulated at the first monthly meeting of "the Conference of Statisticians in Industry," a new organization operating under the auspices of and with the cooperation of the National Industrial Conference Board, New York.

The value of files produced in 1927 by the 36 reporting establishments was \$12,973,734, a decrease of 4.2 per cent under \$13,540,953 reported by 38 establishments for 1925.

Price Declines in European Markets

Germany and Belgium Face Falling Values—Better Shipbuilding Orders in Britain Expected to Stimulate Trade

(By Cablegram)

LONDON, ENGLAND, Dec. 24.

IRON and steel markets are quiet on the eve of the holidays, but the outlook is regarded as slightly more favorable, in view of the increase in shipbuilding orders placed in recent weeks. Northeast Coast producers are preparing to relight additional furnaces, as current Cleveland output is being absorbed by local consumers.

Thomas W. Ward, Ltd., Sheffield, has purchased the Low Moor Iron Works from the receiver, and will continue the business after reorganization and rearrangement of the plant.

John I. Thornycroft & Co., Southampton, have been awarded contract from the Canadian Government for two destroyers, costing about £670,000 (\$3,250,000) for the two, and calling for delivery in the spring of 1931.

Heavy steel makers are looking for

better times, but export business still is difficult. Foreign ore markets are idle.

Tin plate markets are quiet but the makers will begin the new year with well-filled order books, on the restricted output arrangement, for several months. Some are heavily committed up to June. Indications point to increase in world demand and the prospects for the tin plate trade are quite bright.

Galvanized sheets are quieter, but most mills are well placed over January and prices are firm. Black sheets are dull.

On the Continent of Europe

Continental markets are quiet and prices are weakening, on absence of buying. The works are reported as in need of orders.

to the lockout, and that suspension of German production merely retarded a definite downward movement.

When the present shortage of material in the domestic market is satisfied, there are indications that home trade in iron and steel will begin to slacken. The volume of bank credits to business have declined sharply. The import surplus of Germany has decreased recently, but this is largely the result of pressure for export orders to offset the decline in domestic business.

Export of machinery is considered satisfactory and in the first nine months of this year shipments of machinery to foreign markets reached a total value of 773,675,000 m. (\$184,135,000), compared with 612,300,000 m. (\$145,727,000) in the first nine months of 1927. The price per unit of weight of machinery exported this year has been 78 per cent greater than in 1913.

No agreement has been reached between the European Rail Makers' Association and Great Britain on exports of rails. The disagreement is on the proper handling by the association of excess British deliveries to British colonies. The excess since formation of the association has been 120,000 tons. The association favors suspension of rail deliveries until this excess has been eliminated, while Britain urges settlement by monetary compensation. No agreement as to

Germany Foresees Price Decline

Lockout Believed to Have Retarded But Not Stopped Lower Export Prices—More Scrap Used in Steel

BERLIN, GERMANY, Dec. 12.—The outlook in export trade is rather uncertain. Despite the lockout, German mills report few cancellations of export orders and are resuming operations as rapidly as possible. An early decline in export prices is expected

as a result of resumption of steel production here. As the export prices of bars registered a slight decline in November, during the period of the lockout, it is concluded by German observers that a price decline in international markets was due, prior

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd.....	£0 17½s.	\$4.24
Bilbao Rubio ore*.....	1 2 to £1 2½s.	5.34 to \$5.46
Cleveland No. 1 foundry.	3 8½ to 3 9½	16.61 to 16.85
Cleveland No. 3 foundry.	3 6	16.00
Cleveland No. 4 foundry.	3 5	15.76
Cleveland No. 4 forge...	3 4½	15.64
Cleveland basic (nom.)...	3 5	15.76
East Coast mixed.....	3 11	17.22
East Coast hematite.....	3 11½	17.34
Rails, 60 lb. and up ...	7 15 to 8 5	37.59 to 40.01
Billets	6 5 to 6 10	30.31 to 31.53
Ferromanganese	13 15	66.69
Ferromanganese (export)	14 0	67.90
Sheet and tin plate bars,		
Welsh	6 0	29.10
Tin plate, base box.....	0 18 to 0 18½	4.37 to 4.39
Black sheets, Japanese		
specifications	13 7½	64.87
C. per Lb.		
Ship plates	7 12½ to 8 2½	1.66 to 1.76
Boiler plates.....	9 0 to 10 10	1.95 to 2.27
Tees	8 2½ to 8 12½	1.76 to 1.86
Channels	7 7½ to 7 17½	1.60 to 1.71
Beams	7 2½ to 7 12½	1.55 to 1.65
Round bars, ¾ to 3 in...	7 10 to 8 0	1.63 to 1.73
Steel hoops	9 0 to 10 0	1.95 to 2.16
Black sheets, 24 gage...	10 0	2.16
Galv. sheets, 24 gage...	13 10 to 13 15	2.93 to 2.98
Cold rolled steel strip, 20		
gage (nom.)	16 0	3.47

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):			
Belgium	£3 3½s. to £3 6s.	\$15.39 to \$16.00	
France	3 3½ to 3 6	15.39 to 16.00	
Luxemburg	3 3½ to 3 6	15.39 to 16.00	
Basic pig iron (a):			
Belgium	3 4½ to 3 5½	15.64 to 15.88	
France	3 4½ to 3 5½	15.64 to 15.88	
Luxemburg	3 4½ to 3 5½	15.64 to 15.88	
Coke	0 18	4.37	
Billets:			
Belgium	5 1	24.49	
France	5 1	24.49	
Merchant bars:			
Belgium	6 1	1.33	C. per Lb.
France	6 1	1.33	
Luxemburg	6 1	1.33	
Joists (beams):			
Belgium	5 3	1.13	
France	5 3	1.13	
Luxemburg	5 3	1.13	
Angles:			
Belgium	6 1½	1.32	
½-in. plate:			
Belgium (a)	6 11	1.44	
Germany (a)	6 11	1.44	
¾-in. ship plate:			
Belgium	6 7	1.38	
Luxemburg	6 7	1.38	
Sheets, heavy:			
Belgium	6 1	1.31	
Germany	6 1	1.31	

(a) Nominal.

the amount of compensation has been reached.

Shipbuilding conditions are unsatisfactory. A strike involving about 45,000 shipyard workers has been in progress for more than two months and has caused some distress among shipbuilders. The Schiffswerke und Maschinenfabrik A. G., Hamburg, has suspended payments to its creditors, and the Vulcan company, the largest shipyard at Stettin, has been dismantled. The Tecklenborg shipyard in Bremerhafen and the Friedrichs yard in Einswarden have been closed. The Schickau yard at Elbing, which formerly built battleships on a

large scale, has suffered serious financial losses. Shipbuilding orders have declined to about 500,000 tons, while the capacity of German yards is about 900,000 tons.

A recent governmental survey of raw materials used by the iron and steel industry has reported that of 21,980,000 tons of ore and scrap used in 1913 in the territory of pre-war Germany, 15,330,000 tons was consumed in the present area of Germany. In 1926 consumption totaled 19,680,000 tons. In 1913, 73 per cent of the material was ore and 27 per cent scrap. In 1926, 59 per cent was ore and 41 per cent scrap.

Spot Export Prices Higher

German Mills Secure Premiums for Early Shipment But Grant Concessions for Next Year—Some Rod Inquiry

BREMEN, GERMANY, Dec. 11.—The rather unexpected end of the lockout at German steel mills has brought a flood of orders from European export buyers, but the Stahlwerksverband has informed the exporters that at present no export tonnages can be accepted as the extensive demand from the German heavy hardware industry must be satisfied first. Until about Dec. 19, no steel can be accepted for export, except medium gages and sizes of plates and tubes, available from mills in Upper Silesia and Saxony.

The current export market on steel is somewhat unusual, as concessions are obtainable on January-February shipments, while premiums are being offered for immediate delivery. The nominal price of steel bars is £6 4s. (\$30.13) per metric ton, f.o.b. Antwerp, but for shipment within three weeks as much as £6 8s. 6d. (\$31.23) per ton, Antwerp, has been paid. The usual quotation for 3/16-in. and 1/4-in. rounds is £7 7s. 6d. (\$35.84) per ton, Antwerp, but for early shipment offers of premiums have brought this price to as much as £7 15s. (\$37.67) per ton. About 580 tons of angles and tees, nominally worth £5 17s. 6d. (\$28.55) per ton, brought a price of £6 7s. 9d. (\$31.04) per ton, f.o.b. Antwerp, shipment being guaranteed on a steamer from Antwerp Dec. 19. These premiums are being secured by mills in the Saar, Czechoslovakia and Luxemburg.

Recently Japan has been actively inquiring for wire rods and about 15,000 tons of such business is pending at present. Otherwise Japanese merchants and importers have been unusually quiet in the past month. Most exporters have refrained from quoting on the wire rod inquiries as the available supply is apparently limited. Although the quotation is nominally £6 2s. 6d. (\$29.77) per ton, quotations to Japan for February shipment have been £6 7s. 6d. (\$30.98) per ton and as much as £6 10s. (\$31.59) per ton was asked

for January shipment. As Japanese buyers are apparently not inclined to pay such prices, it is believed in some quarters that some of this business may go to American or Canadian mills.

Business with Japan in light gage sheets has continued moderately active throughout the lockout as the sheet mills rolling these light gages were not affected. Recently quotations on these sheets have been advanced to a range of \$75.50 to \$76 per ton, c.i.f. Japanese port, and concessions from this level are reported unusual.

International Steel Cartel Quota Unchanged

WASHINGTON, Dec. 24.—By a decision of the central directing committee of the International Steel Cartel, meeting in Paris on Dec. 13, the cartel will continue to operate over the first quarter of 1929 with the same production quota as in each quarter of the present year, 7,321,750 metric tons or 29,287,000 tons per year, according to a cablegram received by the Department of Commerce from the commercial attaché in Paris.

Luxemburg Looks for Export Trade

LUXEMBURG, Dec. 10.—The iron and steel markets continue quite firm, termination of the German lockout having had no appreciable effect on business. Despite Germany's return as a competitor for steel business, the loss of production through the lockout will probably be a factor for some time.

Export trade is only of moderate proportions at present, but more settled conditions in China are expected to bring a revival of merchant buying in that country. Exporters here doubt that the Japanese Government will make any further increase in the

tariff on iron and steel, although the Japanese steel producers are still urging higher duties. A similar demand for increase of the steel tariff is under consideration in Canada.

On Nov. 1 there were 38 Luxemburg blast furnaces operating of a total of 47 in existence. October production totaled 236,429 metric tons of pig iron and 228,973 tons of steel ingots.

Imported Steel Prices Lower—Export Trade Quiet

NEW YORK, Dec. 24.—Continental steel prices have registered a further decline, so that quotations on shapes to importers in New York range from 1.75c. to 1.80c. per lb., duty paid. Consumers are only moderately interested at present, even though current prices represent a saving of several dollars a ton to the buyer. Prices of steel bars from European mills continue high and importers are unable to quote less than about 2c. per lb., duty paid, Atlantic port. Several hundred tons of steel piling for Port Arthur, Tex., is reported to have been awarded by the Texas Co. to the German manufacturer of piling.

Export business continues small, except for some buying by Chinese merchants handling plate cuttings and bar crops. Inquiry from Japan is confined to small lots of special material and some tin plate. The quarterly tin plate requirements of the Nippon Oil Co. are understood to have been awarded, a total of 35,000 base boxes of oil can sizes being placed.

Japan's Steel Production Put at 2,000,000 Tons

WASHINGTON, Dec. 25.—Japanese production of steel in 1928 is estimated at about 2,000,000 tons, according to a cablegram received from Commercial Attaché Halleck A. Butts, Tokyo, by the Iron and Steel Division, Department of Commerce.

Luxemburg Production Large

WASHINGTON, Dec. 24.—The record activity of the Luxemburg iron and steel industry in 1927 will be exceeded, or at least maintained, during 1928, according to reports received from Vice Consul James E. Parks, Luxemburg, on output for the first 10 months of the present year. The production of pig iron totaled 2,279,000 metric tons in contrast to 2,723,356 tons for the 12 months of 1927. Raw steel production was 2,135,876 tons compared with 2,458,439 tons in 1927.

Manhattan Rubber Mfg. Co., Passaic, N. J., maker of mechanical rubber goods, has paid a bonus to all employees, amounting to 2 per cent of yearly salary.

Defective Steel May Take Billet Freight Rate

WASHINGTON, Dec. 24.—Billet rates will be applied on a large number of defective steel products such as damaged sheets and plates throughout various points in Official Classification territory if the Interstate Commerce Commission approves a proposed report by Examiner E. H. Kerwin, made public last Wednesday. At present a number of products now take the fifth class rate or special iron and steel rates. The case was a consolidation of numerous complaints that had been filed against existing railroad tariffs. The protests included both consumers and producers, and the proceeding was known as that of the Wrought Washer Mfg. Co. vs. the Pere Marquette Railway Co., et al. The report represents a complete or partial victory for the complainants, who had asked for either billet, scrap or "reasonable" rates. The examiner further held that proposed changes in descriptions of and rates on waste sheets and plates were not justified and that if new tariffs are filed they must conform to the description he gave of these products.

More Workers and Larger Payrolls in Illinois

Employment in Illinois gained $\frac{1}{2}$ per cent during November, according to Sidney W. Wilcox, chief of the bureau of labor statistics, Illinois Department of Labor. This gain, with others made earlier in the year, placed the rate of employment in Illinois factories at 4.6 per cent above that of November, 1927. The total payroll for November was 1.4 per cent greater than in October, the increase in wages being nearly three times the gain in employment. The impetus in employment has come largely from farm implement manufacturers, makers of machinery, and producers of electrical appliances. Iron foundries have supported the upward movement with a pick-up of 1.5 per cent.

Steel Castings Orders Ahead of Last Year

WASHINGTON, Dec. 24.—Orders for commercial steel castings in November totaled 84,304 net tons, or 59 per cent of the monthly capacity of the 129 concerns reporting to the Department of Commerce. This compares with bookings of 78,082 tons in October, representing 54 per cent of capacity. Production in November was 81,913 tons, or 57 per cent of capacity, against 87,058 tons, or 60 per cent of capacity, in October. In November, 1927, production was 59,008 tons and orders 62,694 tons.

Of the November orders, 34,526 tons was for railroad specialties, being 51 per cent of this class of capacity, while 49,778 tons was mis-

cellaneous castings, being 65 per cent of such capacity.

For the 11 months ended November, 1928, total orders were 899,174 tons, against 841,756 tons for the corresponding period of 1927, the gain coming mainly from the miscellaneous class. Castings for railroad use aggregated 345,809 tons against 344,991 tons for the corresponding 11 months of 1927, while miscellaneous bookings were 553,365 tons and 496,765 tons respectively.

Production for the 11 months of 1928 totaled 934,911 tons, compared with 906,394 tons for the 1927 period. Of the 1928 output, 344,862 tons was for railroad specialties, against 351,296 tons for the corresponding period of 1927, and the output of miscellaneous castings was 590,049 tons and 555,098 tons respectively.

45 Government Ships Sold for Scrap

WASHINGTON, Dec. 24.—It is estimated that approximately 76,500 tons of steel scrap is contained in 45 vessels averaging 5000 deadweight tons each which the Shipping Board has sold to the Union Shipbuilding Co., Baltimore, with the understanding that the ships will be completely scrapped and dismantled within 18 months. The steel is divided about as follows: Plates, 57,375 tons; shapes, 15,300 tons and bars, 3825 tons. The sale price of the ships was \$423,600. The vessels are laid up as follows: James River, 23; New York, five; Philadelphia, two; Mobile, Ala., two; New Orleans, five; Orange, Tex., eight. The Shipping Board now has less than 450 vessels in its laid-up fleets.

Foundrymen's Apprentice Contests for 1929

The apprentice contests that have been held in connection with recent conventions of the American Foundrymen's Association, will be continued as an annual feature, and regulations are ready for distribution to those plants planning to have their apprentices take part.

The contests for 1929 will be held in three divisions—gray iron molding, steel molding and pattern making. Three prizes will be given in each division. The first prizes will consist of wrist watches valued at \$50; the second prizes will be cash awards of \$25, and the third prizes will be cash awards of \$10. Each apprentice receiving a prize will also be given an engraved certificate.

Local contests to determine the best castings and patterns to be submitted in the national contest can be held either by individual plants, local foundrymen's associations, or similar organizations conducting their contests to conform to the rules and regulations laid down by the A.F.A. apprentice contest committee. Local contests must be held in time to have

their entries in the national contest reach the Chicago convention by April 2. Copies of the regulations may be had upon application to the secretary of the A.F.A.

These contests, beginning with the Milwaukee convention in 1924 with only Milwaukee firms participating, have grown in extent until, at the 1928 Convention, 20 plants from six foundry centers had apprentice work entered in the national contest and many more had taken part in the local contests.

Mexican Steel Industry Making Progress

Considerable progress is being made by the steel industry in Mexico. There are two fairly large companies: the Monterey Iron & Steel Works, Monterey, and the Consolidated Rolling Mill & Foundry Co., S. A., Mexico City.

The Monterey company has recently changed its open-hearth furnaces to burn gas from producers instead of fuel oil. The company makes its own silica brick and produces ferromanganese, and also makes all the alloy rods and balls consumed by Mexican mines for grinding ores. The consumption of rods and balls for these purposes is said to be large.

The Consolidated Rolling Mill & Foundry Co. has just completed the installation of a rod mill, which is claimed to be the only one south of the Rio Grande. The company purchased the entire outfit for the mill from the Black Wire & Steel Co., Kansas City, Mo. The capacity is 6 tons of No. 5 rods an hour.

The mill is considered in Mexico as being a decided departure from the original merchant mill usually found in Latin-American countries. The company is also making manganese steel with considerable success, according to a statement by Harry Wright, president of the company, who also says that better results are being obtained from tool steels made by his company for its bolt and nut department than were ever secured from similar steels purchased from foreign countries. The company has installed a department for making automobile bumpers from silicon alloy spring steel.

Large Output of Copper in Canada

WASHINGTON, Dec. 22. — Copper ranks second among metals in Canada in value of production. Output in 1927 was 140,141,823 lb., or a little over 4 per cent of the world's total, according to a report from Consul H. T. Goodier, Vancouver, B. C., made public by the Department of Commerce. Production in 1923 was 86,881,537 lb. The output of British Columbia copper mines in 1927 was 91,685,843 lb., or 64 per cent of the Canadian total.

Low Profits a Challenge to Steel Industry

G. H. Charls, President Flat Rolled Steel Manufacturers, Says

Ignorance or Wilful Disregard of Costs and Straining for Tonnage Cause Inadequate Returns

"HOW long will the iron and steel industry permit its earning power to remain little better than the return on a safe Government bond?" asked G. H. Charls, president National Association of Flat Rolled Steel Manufacturers, in a recent address to the Malleable Iron Research Institute at Cleveland. "When will the steel industry," he went on, "recognize and regulate the causes behind the effect? Is not this a challenge to the ingenuity, sales instinct and will-to-do of all steel producers?"

"It is one thing," he said, "to know the causes that keep an industry from being prosperous; it is quite another thing to influence the membership of an industry to evolve a plan and make it work to rectify the situation."

"There is no short cut to stabilization of an industry. Facts and the causes of unsatisfactory conditions must be squarely faced, recognized and understood. Then unfalteringly the units of that industry must seriously unite and unremittingly cooperate to obtain a true knowledge of what is ethical and unethical, economical and uneconomical, and persistently strive for the attainment of the one and the elimination of the other. This is possible only through group action. The isolationist is a pre-war product."

Ignorance of Costs a Cause of Inadequate Profits

"The most pernicious cause of inadequate returns on invested capital in an industry, and the one which has been and should be emphasized, criticized and condemned most sharply, is an ignorance of the cost of doing business, or the wilful disregard of such cost as is known when a commodity is priced."

"Clearly allied with this prime cause is the absence of market research and analysis to measure demand, together with a blind, unthoughtful attitude which blocks the way to group effort to expand such demand."

"Abram F. Myers, chairman Federal Trade Commission, has said:

The proper pricing of products is naturally the first concern of the business man and one on which he needs all the information and help he can get.

It is a serious mistake for the individual or an industry to permit competition to price its products without any regard for the cost of producing such products.

"In these quandaries, the strong must guide and help the weak, or be crippled and perhaps destroyed by

their unintelligence and misbehavior. The strong must assume leadership, for only the strong can influence and dominate by precept and example and lead an industrial group out of the slough of jungle competition into the knowledge of the fundamental requirements of modern business principles.

"It must ever be kept in mind that a trade association is only a means to an end; that without the active participation of its members, their enthusiastic support, thought and effort, the association will become a joke.

"On the other hand, when the members become conscious of the necessity and the possibilities of group action and apply their intelligence vigorously to the problems of the industry, a trade association becomes the finest—in fact, the only—possible means of self regulation in industry—the fourth leg of the chair upon which an industry rests."

Government Attempting Help and Cooperation

"The Government is attempting to cooperate and to be helpful as never before. There is a momentous reversal of attitude on the part of the Federal Trade Commission toward association work. During the past year many successful trade practice conferences have been held."

"From our perusal and analysis of the decisions handed down in the Trade Practice Conferences with the millwork industry, hickory hand wood-turning industry, cottonseed oil industry and the flat glass industry, it seems obvious that a very constructive piece of work is being done. If these decisions are successfully sustained by law, they will constitute a new Magna Charta to industry throughout America."

"Insofar as we are able to determine from the regular and irregular sources of statistics, the answer to the question, 'How is business?' is: 'Good for the present and the first quarter.'"

"If this question was 'How are profits?' the answer would probably be that the iron and steel industry has been so irritated by auburn figures—5 per cent return may be termed 'auburn'—that it is beginning to shy like a colt when it sees a red-headed girl."

"May I call attention to a chart issued by the National Industrial Conference Board, for it tells a wonderful story of sales achievement."

"Note the automotive industry, operating at the rate of 68.8 per cent

of capacity in 1926; 70.3 per cent of capacity in 1927; earning at the rate of 22 to 30 per cent. Then note the steel industry, operating at the rate of 75.1 per cent in 1926; 68.8 per cent in 1927; earning 4½ to 5½ per cent on its invested capital."

"The question arises, 'What ought to be the profits in an average industry in normal periods of prosperity?' It is estimated that the average profit of all industries in the United States is 10 per cent."

Says Urge for Tonnage Destroys Steel Industry's Profits

"Is it any more than simple intelligence to aspire to such an ideal, such a vision of what so decidedly ought to be? Of course it is not, and yet otherwise intelligent executives seem astonishingly unaware of the ridiculous and really tragic attitude they manifest in the conduct of their business. In their madness and frenzy, they proceed to pull down the supporting pillar of the temple of prosperity, mumbling 'tonnage, tonnage, tonnage.'"

"Apparently possessed, they pursue the shadow of capacity operation and crucify the substance of a sane, average profit on the cross of unintelligent, unreasonable, destructive competition. All ethical and economical thoughts and ideas are thrown to the four winds. They seem to think that business is simply a warfare to eliminate competitors and to establish the survival of the fittest. They are living in the atmosphere of the jungle."

Assails "Ruthless Price Cutters"

"To conduct a profitable business in an industry, it is necessary for the industry to be manned by executives actuated by something loftier than the code of animals—not by ruthless price cutters who ridicule and deny a place to finer ethics and to collective economical judgment."

"The iron and steel industry must come to a fuller realization that only that industry will successfully prevail which resolves to correlate its effort in recognition of the principle that, 'The prosperity of the whole is the individual's greatest opportunity for progress.'"

The Tennessee Coal, Iron & Railroad Co., Birmingham, will install a Rust triple fired recuperative continuous furnace at its Fairfield Works. The furnace will have a capacity of 30 tons per hour of blooms or beam blanks.

Youngstown Assured Access to Waterways

Most Economical Use of All Forms of Transportation Called a Public Necessity—Shipper Ownership of Railroads Opposed

WASHINGTON, Dec. 24. — Long-sought access to river transportation seems assured to the Youngstown district. It is held to be of vital importance to the iron and steel industry of that section as a means of reducing freight costs on inbound raw material, such as coal and limestone, and on outbound manufactured products to the Southern and Southwestern markets. It is maintained that the district will thus be placed in a better competitive relationship with Pittsburgh and other surrounding districts that now enjoy water transportation. Iron and steel makers in the Youngstown district have contended that they have been forced to third place in steel output, being succeeded in second place by the Chicago district, and have assigned as the reason the high freight rates on inbound raw materials, especially coal from the Pittsburgh and Connellsville districts, and also on outgoing manufactured products.

The precise manner in which river transportation for the Youngstown district will be provided cannot be determined until the Interstate Commerce Commission passes finally upon the application of the Pittsburgh, Lisbon & Western Railroad for authority to construct two branches from its present line, one extending northward to Youngstown and the other southward to Smith's Ferry, Pa., on the Ohio River, the two branches, together with a short section of the existing line, forming a north and south line from the Ohio River to the Youngstown district. In its decision last week the commission specifically said that "public convenience and necessity . . . require the provision of rail transportation between the Ohio River and the Youngstown district in connection with the transportation on the Ohio River and connecting waterways." At the same time the commission held the case open and assigned further hearing for the purpose of securing evidence bearing upon the practicability of providing such rail transportation over existing lines.

The commission thus actually, in effect, ordered connection of the Youngstown district with the Ohio River, though it did not grant the Lisbon application. Rather, it has left it to the existing trunk lines, the Pennsylvania and the Pittsburgh & Lake Erie, to determine whether they will make the necessary connection. The Pennsylvania and Pittsburgh & Lake Erie already have land available, the former at Beaver, Pa., and the latter at Monaca, Pa., for the construction and operation of facilities

for the transfer of freight between barges and cars, which would afford rail-water-and-rail connection with the Youngstown district. At present coal carried over these lines to the Youngstown district from the Pittsburgh and Connellsville district is transported all-rail, the rate from the Pittsburgh district being \$1.34 per ton while the rate from the Connellsville district is \$1.43 per ton. The Lisbon railroad estimated that the average rate by use of its new lines would be about 60c. The Youngstown district consumes about 8,000,000 tons of coal annually from the two western Pennsylvania districts and the saving in the freight bill through such a reduced rate is readily seen. Limestone also would come into the Youngstown district from Ohio quarries over a rail-water-rail route.

It remains to be seen what the attitude of the trunk carriers will be or what step may be taken by the Lisbon railroad, owned and controlled by the Pittsburgh Coal Co., before the case is finally determined, or whether the new construction will be permitted. The commission said, however, that "the existence of low-grade lines operated by strong systems (the two trunk lines) between the mouth of the Beaver River and the Youngstown district suggests strongly that these lines should be used in preference to the construction and operation of an expensive new line. The utility of the proposed new line in the transportation of local traffic or in the development of the industrial territory at Youngstown would be relatively unimportant.

Commission Opposes Shipper Ownership of Railroad

The opinion prevails that the commission will not grant the Lisbon a certificate, provided the trunk lines establish the required water connection with the Youngstown district and grant reasonable rates on coal. Steel producers in the Youngstown district strongly supported the Lisbon application. The Youngstown Sheet & Tube Co. proposed to provide facilities at Smith's Ferry for unloading and loading purposes. The commission, however, said that the control of a common carrier by its principal shipper is to be avoided, thus implying that it would separate the Lisbon from control by the Pittsburgh Coal Co. It also declared it would consider, if further investigation were necessary, the matter of imposing a further condition that terminal facilities be provided on the Ohio River that are not under any industry or industries.

The apparent plan to separate a carrier from industrial control created considerable comment, and speculation went so far as to say that it indicated a policy of the commission that might affect industrial carriers and their owners throughout the country. Many industrial carriers and their ownership, notably the steel lines and the owning industries, have been the object of exhaustive investigations in the past. In the bulk of the cases, however, these "tap" lines were held to be common carriers, open to all traffic and not merely to that of the owning industries. Neither those cases nor the Lisbon case could come under the commodities clause of the act to regulate commerce because that clause prevents ownership by a railroad of an industry whose products it hauls and does not bear upon ownership by an industry of a railroad, though there has been some legal discussion as to the difference in effect.

Development of Waterways Favored

The commission decision in the Lisbon case was also taken to indicate growing determination to develop the waterways for transportation purposes as directed by Congress.

"The evidence shows that it is practicable and desirable that the Youngstown district should have access to the Ohio River by rail line or lines which will afford them substantially the transportation advantages, including rates, proposed by the applicants (Lisbon and Montour railroads) in this case," said the commission. "The advantages of the utilization of the Ohio and its connecting waterways have been amply demonstrated and the rail carriers should realize that they cannot continue to handle by all-rail routes much traffic which can be more economically transported by all-water or rail-and-water routes. The interveners express the fear that lower rates over a rail-and-water route will jeopardize the present rate structure, but, assuming such fear to be well founded, that fact would not justify us in withholding approval of any plant which promises to reduce substantially the cost of necessary transportation. It is also clear of record that the construction of the proposed new line would result in unnecessary duplication of facilities, if it is possible to make advantageous use of the existing lines of the Pennsylvania and the Pittsburgh & Lake Erie. The use of these lines between the Ohio River and the Youngstown district at reasonable rates would reduce the losses which the interveners apprehend through the diversion of their

traffic to the rail-and-water route proposed by the applicants."

At another point the commission said that public convenience and necessity, in the broader sense, require the combined use of all the agencies that can contribute to adequate and efficient transportation at the lowest cost. From the great and increasing use of the waterways of the Ohio River system, it was declared, it is clear that their development has been justified. It is also apparent, the commission added, that these agencies, which have been practically created by the Government, should as speedily as possible be made available to the public generally, through the establishment of common carrier service.

Youngstown Costs Have Risen

The commission briefly sketched changes in the iron and steel industry and rate adjustments over a period of years that had brought about a change in the competitive situation as between the Pittsburgh and Youngstown districts. Changes in rate adjustments and, apparently to a still greater extent, changes in the methods of manufacture of coke, it was stated, have impaired the ability of the Youngstown manufacturers to

market their products in competition with their rivals. Another important advantage of the Pittsburgh manufacturers, developed in recent years, is their ability to utilize the improved water transportation facilities on the Monongahela and Ohio rivers for transporting coal from mine to mill, as well as for moving their products in reaching territory to the south and southwest, said the commission. Replacing of beehive coke with by-product coke, it was pointed out, enabled manufacturers to dispense with rail transportation for coke, but the Pittsburgh manufacturers were declared to have gained the greater advantage by reason of the fact that they were able to move coking coal by barge. Coke, it was stated, does not lend itself to movement by water.

"To show the general effect of these changing conditions," said the decision, "it was testified that the transportation costs of assembling material for the manufacture of one ton of pig iron at Youngstown in 1913 amounted to \$2.37 and at Pittsburgh \$2.63. In 1918, with the use of by-product coke instead of beehive coke, these comparative figures had changed to \$3.28 for Youngstown and \$2.49 for Pittsburgh; and in 1928 they became \$4.44 and \$3.11 respectively."

British Machinery Makers May Oppose Steel Tariff

WASHINGTON, Dec. 24. — British makers of machinery and other engineering products, desirous of obtaining raw materials at the lowest possible prices to maintain their volume of exports in highly competitive markets, are expected to offer stiff resistance to the imposition of a tariff on imports of iron and steel products, according to a report received from Vice-Consul Wallace E. Moessener, Manchester, England. During the past year or more, the report stated, there has been considerable agitation in favor of imposing a tariff on iron and steel imports since foreign manufacturers in continental and other countries are able to undersell British manufacturers in the latter's home market. Reports that an import duty on machine tools may also be sought are heard from time to time, it was declared, but it does not appear that British tool makers will be able to obtain sufficient support to put such a duty in effect.

The report said that the United States is the principal supplier of British imports of air compressors, pneumatic tools, pumps, mining coal cutters, packing machinery, conveyors, cranes and hoists; machinery for grain milling, boot and shoemaking machinery, and glass working, wood-working, weighing papermaking and miscellaneous machinery. The United States occupies second place in supplying filter presses and ball and roller bearings. Germany leads in supplying hydraulic machinery and filter presses. Raw materials come principally from Belgium.

Enameled Metal to Be Considered

American Ceramic Society will meet Feb. 4 to 7 at the Stevens Hotel, Chicago. The latter three days will be devoted to divisional meetings wherein four symposiums and 95 papers are to be presented. Important groups of contributions relate to enameled cast iron products and to brick manufacture and testing.

By-Product Coke Output at Record Daily Rate

WASHINGTON, Dec. 20.—Amounting to 137,405 net tons, the daily rate of by-product coke production during the 30 days of November was the highest in the history of the industry, according to the Bureau of Mines. It showed a gain of 1 per cent over the daily rate of 136,105 tons for the 31 days of October. The total October output, however, exceeded that of November, having been 4,219,262 tons, against 4,122,150 tons in November.

Eighty-two plants active in November produced 88 per cent of their capacity. Total output of beehive coke in November was 416,000 tons, equivalent to a daily rate of 16,000 tons, compared with 15,593 tons in October. Production of all coke in November was 4,538,150 tons, of which 90.8 per cent was made in by-product ovens.

Quoting THE IRON AGE, the bureau pointed out that "pig iron production in November was 3,302,523 gross tons, a daily rate of 110,084 tons, the highest since early 1926. The November

production of pig iron was the highest for that month in any year since 1918."

Total coke was 1,374 net tons for each gross ton of pig iron in November, against 1,375 in October and 1,465 in November, 1927.

Institute of Metals Changes Date of Meeting

The council of the (British) Institute of Metals has found it necessary to change the date of the twenty-first annual general meeting and its "coming-of-age" celebrations from that originally announced, March 6 and 7, to March 13 and 14, 1929.

Following the sessions on March 13 there will be a dinner and dance at the Trocadero, and the next day will be featured by a conversazione and exhibition in the Science Museum, South Kensington. Objects of special interest in relation to the work of the institute will be displayed.

The annual May lecture of the institute is to be given on May 7 by Sir Oliver Lodge.

The annual autumn meeting will be held in Düsseldorf, Germany, next September. Offers of papers for that meeting are invited by the council, which, it is understood, will particularly welcome papers dealing with matters of practical interest. It is proposed also to hold at Düsseldorf a general discussion on laboratory methods in metallurgical research, in which speakers from many countries are expected to participate.

Applications for membership are now being submitted so freely, it is stated, that it is expected the total will reach the 2000 mark before Dec. 31.

Wholesale Prices Are Lower

November average prices of commodities, as reported by the United States Bureau of Labor Statistics, have an index of 96.7, compared with 97.8 in October. The November figure is identical with that of a year earlier. Reductions have occurred in six of the ten general groups. Textile products show no change, while there were slight advances in metals and metal products, building materials and chemicals and drugs.

Metals have reached 101.7, compared with 101 in October, because of increases both in the iron and steel classification, which went up from 95.1 to 96.1, and in the non-ferrous group, which advanced from 95.8 in October to 97.9 in November. There was no change in the three other subgroups under metals—agricultural implements, automobiles and other metal products.

A voluntary petition in bankruptcy has been filed by the Standard Crucible Steel Casting Co., 717 Thirtieth Street, Milwaukee. Schedules reveal liabilities of \$36,962, and assets of \$46,304 are claimed.

Program for Foundrymen's Convention

New Features Provided for Meeting at Chicago—Exhibit and Technical Sessions to Be Under One Roof

A DIVERSIFIED program has been arranged for the convention and exhibit of the American Foundrymen's Association, to be held at Chicago, April 8 to 11, 1929. All activities of the week—registration, technical sessions, dinners, banquets and exhibits—will be in the new Hotel Stevens, Chicago. All technical meetings will be on the third floor, with ample accommodations for simultaneous sessions. Registration headquarters and exhibits will be on the basement level, one flight down from the main lobby. All this will make it possible for members and guests to attend the meetings and inspect the exhibits without loss of time and the inconvenience always present when activities are scattered.

While exhibits will be limited as to space occupied, they will be as interesting as ever in character, with practically all regular exhibitors participating. The program as planned will be so full as to provide but little opportunity for general entertainment for the men, but the usual entertainment for ladies will be arranged for.

For Monday evening the annual exhibitors' dinner is scheduled. On Tuesday evening there will be a general session on foundry sands, preceded by a special dinner on the third floor. On Wednesday evening the annual banquet will be held, the social event of the convention. The usual provisions for plant visitation will be made under the auspices of committees of Chicago foundrymen. The tentative schedule for the convention program is as follows:

Monday, April 8

- 10 a. m. Registration.
- Opening of exhibits.
- 2 p. m. Committee meetings.
- 4 p. m. Cast iron and steel founding shop operation courses.

Tuesday, April 9

- 10 a. m. Foundry Costs.
- Steel Founding.
- Iron Founding.
- 12.30 p. m. Round Table—Non-Ferrous Cost Methods.
- Round Table—Steel Founding.
- 4 p. m. Sand Control.
- 6 p. m. Dinner gathering of those interested in sand control.
- 7 p. m. Foundry Sands.

Wednesday, April 10

- 10 a. m. Non-Ferrous Founding.
- Cast Iron Research.
- Materials Handling.
- 12.30 p. m. Round Table—Non-Ferrous Shop Practice.
- 2 p. m. Foreman Training.
- 4 p. m. Cast iron and steel founding shop operation courses.

Thursday, April 11

- 10 a. m. Malleable Iron.
- Apprentice Training.
- 12.30 p. m. Round Table-Malleable Founding.
- 2 p. m. High-Test Cast Iron.
- 4 p. m. Cast iron and steel founding shop operation courses.

Shop Operation Courses: The shop operation course on cupola practice, as tried out at the Philadelphia convention last May, proved to be of so much interest and value that the program committee has decided to broaden this type of meeting and conduct courses for both the gray iron foundrymen and the steel foundrymen at the coming convention. Each course will consist of four meetings and instruction in the fundamentals of shop practice will be given.

Round-Table Luncheon Meetings: Round-table meetings permitting informal discussion of shop problems have proved such a success in the malleable and non-ferrous branches that a similar meeting is being arranged for the steel foundrymen who attend the convention.

Foreman Training: Foreman training, a subject of increasing importance to foundrymen, will be given a place on the program this year. Several men prominent in foreman training have been secured to tell our members how training programs can be made worth while. Those who have consented to appear on this program are:

A. B. Pierce, director department of industrial education, National Metal Trades Association, Chicago; M. H. Mellen, superintendent of education General Electric Co., West Lynn, Mass.; A. D. Lynch, director of personnel Ohio Brass Co., Mansfield, Ohio; W. F. Coleman, W. A. Jones Foundry & Machine Co., Chicago; L. A. Hartley, director of education National Founders' Association, Chicago.

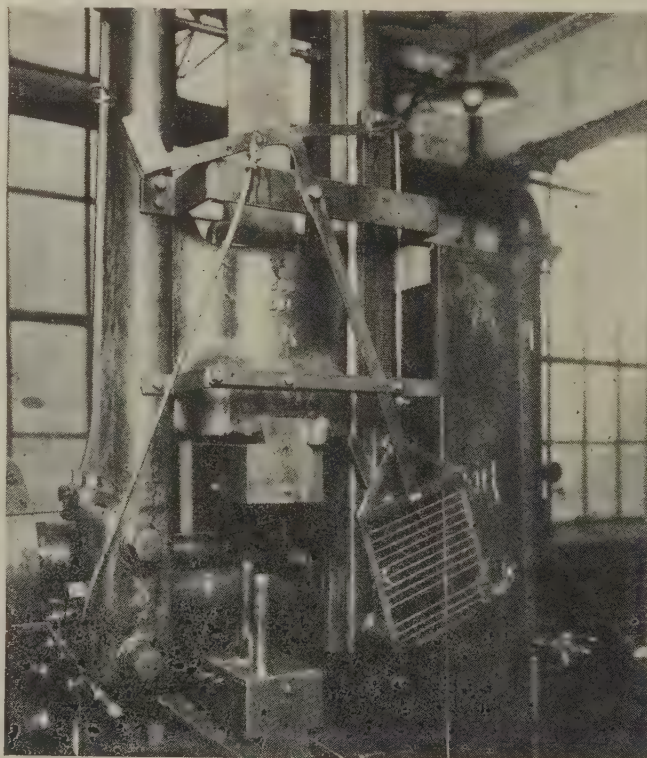
With such speakers this meeting is expected to be one of the outstanding sessions in the history of our association.

Apprentice Training: The "why" and the "how" of foundry apprentices will be brought out at the session on training foundry apprentices. J. A. Davies, general superintendent of the Philadelphia branch of the Westinghouse Electric & Mfg. Co., will explain the why and A. M. Cornell, vice-president Pettibone-Mulliken Co., Chicago, will show how training can be carried on. Other speakers will discuss further details.

Non-Ferrous Foundry Costs: As the gray iron, steel, and malleable cost methods have been given prominence at former cost sessions, the program calls for a consideration of ways and means of getting the non-ferrous foundry operators to consider the use of a uniform cost-finding method. Following the regular cost session, those interested in non-ferrous costs will get together at a luncheon meeting.

Sand Control: Breaking a precedent of many years' standing, a technical session will be held as an evening meeting. The subject to be discussed is that of sand control. The evening meeting was scheduled in order that all who are interested might attend without conflicting with their attendance at other sessions. Preceding the evening session, a meeting on sand control will be held at 4 p. m., which will be for the purpose of explaining the fundamentals of sand control and how sand control may be started in foundries.

Metallurgy and Shop Practice: The usual technical and shop practice sessions will be held covering developments in the iron, steel, malleable, and non-ferrous branches of the industry.



AMONG the numerous safety devices used on various classes of machines at the Bridgeport works of the General Electric Co. is the swinging gate guard for board or belt drop hammers, illustrated at the left. A single operating handle controls the gate guard as well as the safety dog just behind it, which prevents the large 500-lb. hammer from dropping. Thus with one motion the dog is thrown out of the way and the gate closed. The illustration shows the gate swung back to the right, with the safety dog just behind it.

This Issue in Brief

Wasted time is reduced by requiring employees to account for every minute of their time. The psychological effect of knowing that every minute is recorded is conducive to best effort, with resulting minimum costs. A simple job ticket suffices, the worker stamping it at beginning and completion of work. The ticket serves the double purpose of a progress report and cost record. — Page 1628.

* * *

Why some plants fail to avail themselves of the savings new equipment would earn. They consider only the reduction in machining cost when deciding whether to purchase a new machine, whereas time saved in subsequent assembling operations, as well as reduced repair cost, should be considered, also.—Page 1628.

* * *

In new strip mill, strip is pulled through galvanizing tanks at a constant speed by means of an automatic control. Motors are slowed down as the coils increase in diameter.—Page 1630.

* * *

Failure of coiled springs of the heavy, helical type is commonly due to overloading at the inside of the coil, metallurgist believes. He finds that stresses at the inside diameter of the springs may be 2.5 times as large as at the outer diameter.—Page 1635.

* * *

Inertia in management is responsible for neglect of opportunities for improvement in many plants. Improvements in production control, while perhaps more to be expected in the small plant than in the large, or by no means so confined. The large plant has great opportunities for improvement, in almost every instance, says journalist.—Page 1628.

* * *

Feed should be against the rotation of the cutter, not with it. Thus a tendency to dig in is avoided. This has been good practice for many years, but there is a tendency away from it of late years.—Page 1636.

Carburization is caused by diffusion of carbon soot, atom by atom, into the hot iron, entering the solid solution as austenite, according to experiments made by Japanese metallurgist.—Page 1634.

* * *

Even heating of alloy blooms is insured by soaking chamber which forms part of reheating furnace. The soaking chamber, the third of three zones of the main furnace chamber, is fired with only sufficient heat to offset radiation losses. It insures even heating and makes independent of each other the temperature conditions of the steel and the tonnage output.—Page 1632.

* * *

Work routing is simplified by giving every machine a number. Number should be carried on departmental operation sheet, as well as on time-study sheets. Machines of similar capacity should be grouped. This enables the department foreman to route work and shift work as necessity dictates.—Page 1628.

* * *

Fixtures should be designed so that the rotation of the cutter will be against the solid part of the fixture, not against the clamp. This principle is often violated, as the wrong way is usually more convenient.—Page 1636.

* * *

Spring strength is much reduced by even mild corrosion. Strength of spring steel is much higher in its quenched and tempered condition than in annealed state. But the advantage is more than lost if the metal is subject to even a mild corrosive action.—Page 1635.

* * *

To cut machining costs be sure that your fixtures may be loaded and unloaded quickly. To accomplish this, clamps which have considerable motion should, to clear the work, have a rapid action when free from the work and a slow motion with increased power when they are brought into contact with it.—Page 1637.

Shop efficiency is promoted if department foreman is furnished with a proper description of operations to be performed on any one piece. Operations, designated by number, should appear on operation card in logical sequence. Tool numbers of the fixtures and tools should be given, also.—Page 1628.

* * *

Makes automobile body scrap into toys. From 50 to 75 per cent of sheet material formerly scrapped in a Cleveland body plant is now used in making all-steel toys. As the first half of year is busy season in automobile body business and the second half in toy season, production curve has been smoothed out.—Page 1624.

* * *

Production increase is obtained by equipping open-hearth furnace with auxiliary hearth, says English steel-maker. The metal, be it scrap or hot iron, is preheated before being discharged into the main hearth.—Page 1626.

* * *

To realize the full possibilities of a cost-reducing plan, provide for a reward and encouragement to those who carry it out. For, in general, all human endeavor is directed toward the reward it brings.—Page 1628.

* * *

Condemns "jungle ethics" of price cutters. "They (price cutters in the steel industry) pursue the shadow of capacity operation and crucify the substance of a sane, average profit on the cross of unintelligent . . . competition," says association head.—Page 1649.

* * *

Sheet steel prices may be expected to be sufficiently reduced to make possible the use of sheets for a multitude of new uses, if present indications are borne out by experience, says machinery builder, speaking of sheet mill developments. The new method is heavily patented, and "it would be unfortunate indeed if the situation were handled in any but the broadest, fairest manner. . . ."—Page 1626.

A. I. FINDLEY
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THE IRON AGE

W. W. MACON
Managing Editor

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Appraising the Forecasts

WE are in the season of trade forecasts and the wise reader will endeavor to appraise them in the light of the working out of forecasting in past years. Judgment will be according to two points; whether forecasts have shown any consistent tendency to err on one side or the other, the brighter or the darker, and whether they have been borne out with sufficient closeness to justify much reliance being placed upon them in future. Reference of course is here made to forecasts by men who are well posted and whose main object is to tell the truth as they see it.

We have checked over forecasts made by some eminent authorities one year ago and two years ago, i.e., forecasts for 1927 and forecasts for 1928, and compared them with the outcome. On the whole the showing is favorable to the forecasters.

The year 1928 has been a good year and the forecasts a year ago had it so. There was a note of confidence in the utterances and that is made more noteworthy by the fact that this was a presidential year and there had long been a rather widespread opinion that being a presidential year is a distinct handicap.

The forecasts for 1927, on the other hand, had been rather unfavorable. Generally the forecasters spoke of the year as a whole and predicted that it would not be so good as 1926 had been. They were right, broadly speaking, in their statements, but they missed the important point of the two halves of 1927 being quite different. The first half was fairly good, while the second half was distinctly poor. Steel ingot production lost less than 1 per cent from the first half of 1926 to the first half of 1927, whereas from the second half of 1926 to the second half of 1927 it lost 13 per cent. Freight car loadings ran ahead until May, so that the half year showed a slight gain, while the second half was fully 6 per cent under the second half of 1927.

One may be disposed to set a mark against the forecasters for missing this point, but there is another way of looking at it. Apparently they did recognize the underlying conditions and properly appraise their outcome. It would seem that they did not realize how far ahead they were looking. One might say they did not make sufficient allowance for the momentum of business, the year 1926 having been a very good business year, setting up such a pace that it required time for adverse influences to work out into decreased trade. Now, the superficial way to predict is to look things over and predict more of the same, whether good or bad. That the forecasters did not do.

In no sense are the present remarks intended as a forecast, their sole object being to suggest how the

forecasts of authorities should be received; but it does seem that we have a set of conditions which while quite different in detail from those of two years ago have this in common, that there is much momentum while some adverse influences have arisen lately. The year 1928 was good in its first half and has been still better in its second half, which means that there has been a gaining in momentum. We shall see now whether the forecasters are disposed to distinguish between parts of the new year. It is convenient to consider a calendar year as a unit but there is no fundamental reason for a year to be uniform in coloring, yet different in coloring from an adjacent year.

Changed Buying in Steel

TWENTY years ago the steel trade of the United States was about to emerge from a very curious situation. In recalling it, the average man would be likely to mention it as "the Gary dinner period," but really the "Gary dinner" movement was simply a means of averting distress. The condition was that of a very light demand upon the steel mills, which in great part was due to the existence of large stocks of finished steel and of large stocks of manufactured wares, such as are sold or distributed, while there was in essence another stock, that of manufacturing and transportation equipment not needed for a time. Jobbers and manufacturing consumers had little occasion to buy steel because they had stocks; their customers had little occasion to buy because they had stocks, and manufacturers and transportation interests had no occasion to add to equipment because they had too much already.

It is the existence of these large stocks to which we wish to direct attention, for present-day methods of conducting business are so different. For several years past there have been virtually no stocks of anything. All along the line "service" is demanded. The average time between the casting of the steel ingot and the rendering of service by the thing produced is but a fraction of what it was twenty years ago.

Production of pig iron in 1908 was 38 per cent less than in 1907 or 1909, those two years having been approximately the same. According to THE IRON AGE blast furnace reports at the time, the steel companies produced 1,514,521 tons of pig iron in October, 1907, their record high, while two months later, in December, they produced only 659,459 tons, only 44 per cent as much. It was not until the following December (1908) that they got back to seven figures for a month's production.

Superficially the appearance was that the stoppage

of things was due to the financial and stock market panic of late October, 1907. As a matter of fact there had been evidence quite early in the year that altogether too strong a pace had been followed. The Steel Corporation's unfilled obligations had reached a maximum on Jan. 1, 1907, at 8,489,718 tons and fell quarter by quarter until they were only 6,425,008 tons on Oct. 1, more than three weeks before the panic occurred. Afterward they declined to 3,313,876 tons July 1, 1908.

There was no such decrease in general trade as in the production of steel. Undoubtedly the actual ultimate consumption of steel in 1908 was much greater than the production. The difference lay in liquidation of stocks of steel and of manufactures of steel.

One cannot conceive of trade nowadays ever working itself into such a position. Stocks are not being carried now and it is extremely improbable they ever will be. Sweeping changes in the manner of doing business would have to occur first, so that there would be ample warning.

It is evident how much better off we are today, how much more economically and efficiently manufacturing and distribution are conducted and how there is no chance of a great manufacturing industry being forced to cramp down simply to allow time for goods it has already produced to be put into use. Consumption will have its ups and downs, though smaller than in the past, but demand will vary only as consumption and not more widely as it used to do.

Misery in Mining Towns

TOGETHER with daily information about King George's illness, American newspapers are carrying stories about the poverty, even starvation, existing among British coal miners. As the culmination of four years of declining production, about 250,000 miners are now unemployed (one in every four), and the remaining workers are getting such meager wages they are demanding increases which an almost prostrate industry is unable to grant. Relief is being organized on a national scale to feed the unfortunates through the winter.

Our contemporary in London, *Metal Industry*, thinks that the causes for this situation date back several years, chief among them being that the mines have been "over-manned; the coal output superabundant, leading to great waste"; and that an unsuccessful attempt has been made by both the miner and employer to maintain "advantages in comfort and in leisure over his European fellows." The editor also sees similar forces acting in the steel and cotton industry, and fears for them a dark future.

Normally such a plight would bring financial help from coal miners in this country, but unfortunately the organization of mine-workers fitted to collect and forward such charity is in trouble itself, and for similar reasons, namely: too many miners, requiring too high wages, in an industry expanding slowly yet installing machines to save more and more of the high-priced labor.

While the distress so widespread now in England may exist in America only in isolated spots, we will be fortunate indeed if it does not get worse before it gets better. Most of our industries are working at good speed, and the miner who is adaptable and willing to

work at another job has a fair chance of earning a living. Unluckily, general industrial conditions in England do not afford a similar shift.

A counteracting influence on both sides of the ocean is inertia—a man no longer young has little desire to uproot his life and start out anew. But the sooner such changes forced by broad economic movements are made, the better it is for the individual, the industry, and the nation. We in America thus have the opportunity to avoid much misery if we are forehanded in this business of transplanting the idle miner.

Fancy Prices for Copper

COPPER purchasers are finding that hand-to-mouth buying, which has worked so well during the post-war years, has its limitations. It has been fine to let the producers carry the stocks, as long as the stocks were ample for prompt delivery. As a matter of fact, the statistics (which have been quite precise for nearly ten years) have indicated a continually shrinking reserve of spot copper, and a continually increasing consumption. Thus, whereas the stocks of refined copper in America at the end of 1920 amounted to about 25 per cent of the world's production for that year, the corresponding figure today is as low as 2¼ per cent. Nevertheless during the last five years the price has been low and relatively stable.

This refinery situation has gradually come about by the intelligent use of copper statistics by the producers, whereby each one has been able to regulate his volume of production to the expected consumption. The purchasers, however, did but very recently awake to the fact that all the spot copper in the American refineries would supply no more than three weeks' home needs. Thereupon they rushed to buy, and the price promptly jumped.

As 1928 ends copper and brass mills are paying the miners three cents a pound more than the average price for 1927. This three cents will have to be charged off as the cost of letting the refiner carry the stock of raw material, and eventually the public will pay for this purchasing attitude.

While the price seems to be stabilized for the present at about 16 cents, the situation has many elements of danger. It should be emphasized that there is no necessity for a runaway copper market, nor do the producers wish to see one. All the prominent factors are convinced that price stability is far better than violent fluctuations. If "hand-to-mouth" purchasing has successfully fed the consumers' production schedules for several years past, there is no need now to rush in a larger margin for future operations. It will cost more than the fancied insurance is worth.

Another thing to remember is this: that no matter what premium may be offered, refinery production cannot be expanded instantly. Lake copper might respond quickest; copper from South America comes out more leisurely. On the average, copper mined on New Year's day is not out of the refinery furnace until April.

Thirdly, there is sufficient capacity in mines, concentrators, smelters, and refineries to produce all the copper which will be fabricated in 1929. Even the refinery capacity is 10 per cent greater than the present rate of consumption.

Lastly, the present price of 16 cents is an ample incentive for the producer to supply every legitimate

demand for copper. Red metal from North and South America (which is 70 per cent of the world's production) is made at an average cost of 10.5 cents. As Arthur Notman points out, the 90-year history of the domestic industry proves that a surplus of 3.65 to 3.75 cents for bond interest and dividends is satisfactory to the owners and creditors. A fair conclusion, therefore, is that the copper industry would be maintained in very healthy condition with the metal selling around 14½ cents a pound.

These considerations, viz., that no one wants a fluctuating market, that expansion in production must be gradual, that there is no possibility of a famine, and that the present price is ample, all urge the necessity of calm and considered action in the copper market.

CORRESPONDENCE

Blast Furnace Metal for Castings

To the Editor: The interesting discussion in your Dec. 13 issue, by David Baker, of the use of hot metal from the blast furnace by the foundry, reopens a most important field of development in foundry practice. It is one that should attract the attention of every large foundry operator in this day of mass production and lowering costs.

The problem as it relates to the foundry is closely analogous to that of the use of hot metal by the steel mill. The blast furnace operation is a smelting one, while the processes in the rolling mill are chiefly mechanical. Today, the steel mills obtain the greater part of their pig iron requirements in the molten condition from adjacent blast furnaces. The gap between the metallurgical operation and mechanical operation is successfully bridged.

Iron founding is chiefly a mechanical art. The foundryman is a mechanic, not a melter. His paramount interests are the making of molds and the production requirements

pertaining to this effort. Therefore, it is only natural that he should give little thought to, or even resent, the introduction of changes in the conventional means by which his molten metal is provided. If it is necessary to provide facilities for holding, reheating or mixing the hot metal in order to adjust composition or temperature, they are already developed. In this connection it is interesting to note the comments of no less an authority than Henry M. Lane in his paper before the National Founders' Association, as reported in your issue of Nov. 29, on the application of indirect-arc type (Detroit) electric furnaces to the production of gray iron from borings. In view of the difficulties experienced in the use of this material in cupolas, it is hard to account for the fact that the development is only a recent one.

The foundryman's attitude toward the composition of his iron is often paradoxical. When things go smoothly, little attention is paid to the analysis, but when the percentage of scrap goes up, then is the time to question the effect of silicon or carbon. As a matter of fact about five per cent of foundry troubles are due to composition of the metal. We hold our malleable iron, an alloy in which composition is certainly more of a factor than most gray iron, so closely on analysis, that the monthly averages do not vary more than 0.05 per cent in silicon nor 0.15 per cent in carbon. Yet we still have scrap and can find some hard castings and "picture-frame" iron. If the tonnage warranted, I feel that equally satisfactory results could be obtained from direct metal with some adjustment of composition and temperature in an electric furnace.

Nevertheless, new advances will be made in the foundry art. The wasteful reheating of cold metal will be eliminated and the foundryman will lose his fear of the effect of the unknown element in his iron if the hot metal is provided from blast furnaces, run under proper metallurgical supervision. The mechanical and metallurgical viewpoints will be reconciled and the production of iron castings on a more economic basis will be undertaken.

As an international authority on blast furnace practice, Mr. Baker has brought to the attention of the iron foundry industry, a development in the art which should receive serious consideration.

W. F. GRAHAM,
Ohio Brass Co.

Mansfield, Ohio.

Boston Scrap Exporter Reports Good Business

One of the iron and steel scrap dealers in the New England district who has been exporting sizable tonnages of scrap during the year, the J. Lipsitz Co., Chelsea, Mass., states that it has shipped a total of 28,000 tons for export in nine months of 1928 and has 5000 tons which will be moved before Jan. 1. The company says: "The largest steamer we shipped was the Casmona, which went to Genoa, Italy, with 7038 gross tons. The rest of the material shipped during the year went to Danzig. The total of 28,000 tons was shipped in the first nine months of the year, beginning about March 10. The total amount of scrap shipped to Danzig from Boston, according to my records, is approximately 40,000 tons.

"This export business depends entirely upon the steamship market, whether or not steamers are available at reasonable rates. When the steam-

ships get the grain business during the fall, it prohibits the shipment of scrap, as they run up the rates because of easy loading and securing tonnages at a moment's notice during the fall.

"However, we feel that 1929 will surely see exports of fully 50,000 tons of scrap from Boston."

Armco Distributors Meet to Discuss Service

Methods of improving the service of distributors to sheet metal shops were discussed at the annual convention of the Armco Distributors' Association of America in Middletown, Ohio, Dec. 4, 5 and 6. Members who addressed the convention were Guy P. Bible, Horace T. Potts & Co., Philadelphia; D. S. Gaston, Follansbee Brothers Co., Pittsburgh; O. J. Arnold, Arnold & Co., Baltimore; J. O. Kilian, A. M. Castle Co., Los

Angeles; Bruce Haines, Hammond Sheet Metal Co., Fort Smith, Ark.; G. L. McKewin, Farwell, Ozmun, Kirk & Co., Minneapolis; F. O. Schoedinger, F. O. Schoedinger Co., Columbus, Ohio; and M. L. Wolfe, Berger Brothers Co., Philadelphia. G. W. Breiel, managing director of the association, discussed the organization's activities during the past year. Armco men who spoke at the business sessions were W. W. Sebald, vice-president; Bennett Chapple, vice-president; D. M. Strickland, manager development department; and G. F. Ahlbrandt, general manager of sales.

Officers elected for 1929 are: A. W. Howe, J. M. & L. A. Osborn Co., Cleveland, president; Quincy W. Wales, Brown-Wales Co., Boston, vice-president; George O. M. Johnston, McClure-Johnston Co., Pittsburgh, secretary-treasurer; and G. W. Breiel, Middletown, Ohio, managing director. Mr. McKewin, Mr. Haines and Mr. Johnston were elected directors.

Speeding Up Railroad Freight Service

"The results of operation in October show that the railway transportation machine of the country is working more efficiently than ever before," says the *Railway Age*. "The real test of each year comes in the last one-third of the year, and usually in October, because usually the peak of the traffic movement is reached in that month. The number of tons carried one mile in October exceeded 48,200,000,000 and was the largest in any month in history excepting October, 1926, in which it was exceeded by only two-tenths of one per cent. The total number of freight cars the railways had on their lines was about 46,500 less than two years previously, but the cars were moved an average of 36.2 miles per day, which surpassed all previous monthly records.

"It is owing to this record-breaking average daily movement per car that the railways, although having available a smaller number of cars, were able to handle the peak movement while maintaining about the same car surplus as two years before. It is interesting to note how completely, in actual performance, the railways have surpassed one of the standards of efficiency in operation that they formerly adopted. When the presidents of the railways, in the spring of 1923, adopted their comprehensive program for increasing the efficiency of operation and rendering an adequate freight service, one of the goals they set was an average daily movement of freight cars of 30 miles. Average miles per car per day in 1920 had been 25.1 and in October of that year 28.6. In the year 1922 it had been 23.5, and in October of that year 26.6. The average attained in the entire year 1923 was 27.8 miles per car per day, and in October of that year a new high record of 30.7 was set. The average mileage per car per day in the first ten months of this year was 31.2; and the new high record of 36.2 in October was 26 per cent better than in October, 1920, 36 per cent better than in October, 1922, and 18 per cent better than in October, 1923.

"The figures reflect prompter loading and unloading of cars by shippers as well as more rapid handling of them by the railways, and show that the freight of the country is being handled with constantly increasing speed. The result is that the length of time each ton of freight is in transit is being shortened, which not only reduces the length of time the investment in it is tied up, but also enables business concerns to reduce the stocks carried by them and the investment in these stocks.

"It has required a large investment by the railways and many improvements in operating methods to effect the speeding up of transportation service that has occurred, and this speeding up of transportation service has had numerous and far reaching effects

upon the industry and commerce of the country."

Mechanical Standards Council Organized

Sixty organizations interested in standardization in the mechanical engineering field were invited to join the Mechanical Standards Advisory Council, and a large percentage accepted and sent official delegates to the permanent organization meeting held Dec. 3 at the Engineering Societies Building, New York.

What, when and how to standardize, to the general economic advantage and without embarrassment to the financially concerned interests in the mechanical field, are the basic questions which the mechanical industries undertook to solve.

The functions of the Council, as outlined in the constitution adopted at the meeting, are as follows:

1.—To endeavor to obtain, at the request of any interested group, the desired cooperation of organizations in any standardization project in the mechanical field.

2.—To confer with any organization in the mechanical field interested in or carrying on work which eventually may be presented for action under the rules of procedure of the American Standards Association.

3.—To advise the American Standards Association on questions of policy relating to standardization applying to products of the mechanical industries.

4.—To serve as a general coordinating medium in the mechanical field, within the scope of the constitution, by-laws and rules of procedure of the American Standards Association.

5.—To consider (a) the desirability and practicability of standardization projects within its field; (b) the order in which standards shall be developed; (c) the scope of projects; (d) sponsorships for the necessary sectional committees; and (e) the adjustment of conflicts and the clearing up of ambiguities.

6.—To follow up and expedite work in the development of standards.

Representatives of the Society of Automotive Engineers, National Machine Tool Builders Association, American Standards Association, Manufacturers Standardization Society of the Valve and Fittings Industry, American Society for Testing Materials, and American Society of Mechanical Engineers were designated as the executive committee of the new Council.

The meeting held Dec. 3 was preceded by two conferences, held April 7, 1926, and June 20, 1928, respectively.

American Exports Gained Heavily in Some Lines

WASHINGTON, Dec. 24.—Some striking major trends in American foreign trade are shown in a bulletin, "Our World Trade," issued today by the Foreign Commerce Department of the Chamber of Commerce of the United States. These trends, as disclosed by a comparison of export and import figures for the first nine months of 1928 with the average figures for cor-

responding periods from 1923 to 1927, are:

"Nine-month exports by value this year are 8 per cent more than the five-year average, but imports are only 1.5 per cent greater.

"Exports of finished manufacturers by value gained 25 per cent, while foodstuffs exports fell 23 per cent.

"Canada, our best market, taking 19 per cent of our exports, gained 29 per cent over the average.

"Automotive exports by value are 77 per cent above the average; industrial machinery, 72 per cent; agricultural machinery, 54 per cent.

"Raw silk imports by quantity are 29 per cent above the average; wheat, 58 per cent; rubber, 12 per cent. Sugar is 11 per cent below the average.

"These trends, it is pointed out, clearly indicate that the foreign trade of the United States is forging ahead steadily, disproving predictions to the contrary made in 1921 and 1922—years of readjustment when uncertainty in American foreign trade gave rise to some doubts as to the permanency of enlarged international business.

"Our foreign trade for the first three quarters of 1928," the bulletin says, "totaled \$6,628,000,000, nearly 5 per cent greater than the average for the five corresponding nine-month periods of 1923-1927. Exports amounted to \$3,559,000,000, the largest since 1920, 1.4 per cent above 1927, and 8 per cent over the above-mentioned average. Imports amounting to \$3,070,000,000, though 2.7 per cent below the 1927 total, were still 1.5 per cent above the 1923-1927 average receipts. While our exports for the third quarter of 1928 exceeded one billion dollars for the seventeenth consecutive quarter, our imports for the quarter fell below one billion for the first time since 1924. Exports of foreign merchandise (re-exports), included with total exports, amounted to \$76,037,000, or \$4,830,000 lower than last year."

German Wire Rope Makers Form a Cartel

WASHINGTON, Dec. 18.—Certain German manufacturers of wire rope are reported to have formed a cartel for the regulation of the export trade with the Scandinavian and Baltic countries, according to a report received by the Iron and Steel Division, Department of Commerce, from Trade Commissioner James E. Wallis, Jr., Berlin. The cartel, organized in October, includes all of the large and medium-sized producers of wire rope.

A sufficient number of signed acceptances having been received from manufacturers, distributors and users of skid platforms, the Division of Simplified Practice of the Department of Commerce has announced that the simplified practice recommendation covering this commodity is now in effect.

Iron and Steel Markets

Production to Pass 50,000,000 Tons

Estimates of Steel Output for 1928 Revised Upward—

Holidays to Have Minimum Effect on Operations—

New Demands Promise Well for 1929

THE buoyancy of the iron and steel market is manifest in a minimum interruption of production for the holidays and in the welling up of new demands as the opening of the first quarter of 1929 draws near.

Railroad buying, structural steel contracts and inquiries, steel pipe orders, increased tonnage from farm equipment makers and renewed demand from the automobile industry stand out in the activity of the week. While new mill bookings, in toto, have shown some letdown in most districts, specifications are well maintained.

Chicago reports the month one of the best Decembers on record. Mill backlogs there are growing, notwithstanding heavy shipments and a production rate that holds at 85 per cent of ingot capacity. In other centers, some mills report larger shipping orders than in November and producers, generally, will have substantial tonnages still unfilled on Jan. 1.

The holiday interruption of mill operations will vary from one or two days to a full week, with the shorter shutdowns in the majority. Aside from this factor, plant engagement is holding its own, making it virtually certain that steel ingot output for the year will not merely approach 50,000,000 tons, but will exceed that figure by a comfortable margin. The previous record, in 1926, was 46,936,000 tons.

Buying interest in both the pig iron and scrap markets reflects a year-end lull. Old material remains strong, however, and at Pittsburgh heavy melting steel has advanced another 25c. to \$18.25 a ton, thereby passing the October peak. With heavy steel scrap commanding a higher price than pig iron, Pittsburgh district steel producers are using more iron in their mixtures and merchant furnace quotations on basic grade are strengthening.

Shipments of merchant pig iron are keeping up surprisingly well, in view of holiday and inventory shutdowns among foundries, and some sellers will start the new year with the smallest carryover of unspecified tonnage since the war. Furnace stocks are also low.

Railroad purchases include 2500 freight cars placed by the Louisville & Nashville. More than 11,000 cars (exclusive of about 6000 for Canadian roads) have been ordered in the past two months, or about 25 per cent of the total to date this year. The Delaware, Lackawanna & Western has placed 10,000 tons of rails and the Missouri Pacific has made formal distribution of 55,800 tons. Rails placed in the current buying movement are estimated at 1,000,000 tons. This total is

somewhat smaller than bookings at this time a year ago, but mills look for a compensating increase in purchases in coming months.

Fabricated structural steel awards, including 18,500 tons for the Chicago Board of Trade Building, total nearly 45,000 tons, and the pending list has been augmented by inquiries for 44,000 tons, featured by 32,000 tons for a Baltimore bridge.

A New Jersey aqueduct, tentatively awarded, calls for 38,000 tons of plates. A Milwaukee maker of electrically welded pipe has taken an order for a gas line requiring 40,000 tons, making a total of 174,500 tons recently booked by that company for five major pipe lines.

Farm equipment makers continue to increase their consumption of steel, and automobile parts makers are entering heavier specifications, particularly for forging bars, for delivery early in January. Motor car builders themselves are specifying more liberally for alloy steel bars and body sheets, and are preparing to increase operations, now at a reduced rate, after Jan. 1.

Bar specifications are reported gaining at both Chicago and Pittsburgh, with deliveries extending. The mid-month deadline on releases against fourth quarter contracts for bars, plates and shapes failed to hasten specifying because quotations for the coming quarter represent no advance in prices. In wire products and sheet bars specifications, which are being accepted until the end of the month, have been stimulated by price increases, but for the same reason first quarter contracting has been slow.

Stove bolts in packages, until recently quoted at 80, 10 and 2½ per cent off list, Pittsburgh, are now available at 80, 10 and 5 off, delivered Pittsburgh, Chicago and New England points.

Detroit has awarded 5700 tons of large-diameter cast iron pipe, of which 2800 tons of 36-in. was placed with a French maker at a price figuring back to \$31.98 a net ton, Birmingham. The remainder was let to a domestic producer at \$33.50, Birmingham.

Machine tool business in 1928 was the largest since 1919 and, for many manufacturers, the greatest since the war. The gain over 1927 ranges from 25 to 50 per cent. The automobile, aircraft and farm equipment industries were conspicuous buyers.

Both of THE IRON AGE composite prices are unchanged, that for finished steel at 2.391c. a lb., the highest level of the year, and that for pig iron at \$18.46 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 24, 1928	Dec. 18, 1928	Nov. 27, 1928	Dec. 27, 1927
No. 2 foundry, Philadelphia.....	\$21.26	\$21.26	\$21.26	\$19.76
No. 2, Valley furnace.....	17.50	17.50	18.00	17.25
No. 2, Southern, Cin'ti.....	20.19	20.19	20.19	19.69
No. 2, Birmingham.....	16.50	16.50	16.50	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	19.75	20.25	19.75	19.50
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh....	20.01	20.01	20.01	19.26
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.00	18.25	18.25	17.50
Gray forge, Pittsburgh.....	18.76	18.76	19.26	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	100.00

Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.24	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17½	2.17½	2.22½	2.12½
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14½	2.14½	2.19½	2.09½
Steel hoops, Pittsburgh.....	2.10	2.10	2.10	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Dec. 24, 1928	Dec. 18, 1928	Nov. 27, 1928	Dec. 27, 1927
Cents	Cents	Cents	Cents
Sheets, Nails and Wire, Per Lb. to Large Buyers:			
Sheets, black, No. 24, P'gh.....	2.85	2.85	2.75
Sheets, black, No. 24, Chicago dist. mill.....	2.95	2.95	2.85
Sheets, galv., No. 24, P'gh....	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill.....	3.70	3.70	3.60
Sheets, blue, 9 & 10, P'gh....	2.10	2.10	2.00
Sheets, blue, 9 & 10, Chicago dist. mill.....	2.20	2.20	2.10
Wire nails, Pittsburgh.....	2.65	2.65	2.55
Wire nails, Chicago dist. mill..	2.70	2.70	2.60
Plain wire, Pittsburgh.....	2.50	2.50	2.40
Plain wire, Chicago dist. mill..	2.55	2.55	2.45
Barbed wire, galv., P'gh.....	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill.....	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$18.25	\$18.00	\$17.00	\$15.00
Heavy melting steel, Phila....	16.00	15.00	15.50	13.50
Heavy melting steel, Ch'go....	14.50	14.50	14.50	12.25
Carwheels, Chicago.....	14.00	14.00	14.25	13.50
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	14.50	14.50
No. 1 cast, Philadelphia.....	16.25	16.25	16.25	16.00
No. 1 cast, Ch'go (net ton)....	15.75	15.50	15.50	14.00
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)..	13.25	13.25	13.25	10.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	16.12½	14.25
Electrolytic copper, refinery...	15.75	15.75	15.75	13.75
Zinc, St. Louis.....	6.35	6.35	6.35	5.65
Zinc, New York.....	6.70	6.70	6.70	6.00
Lead, St. Louis.....	6.35	6.35	6.22½	6.30
Lead, New York.....	6.50	6.50	6.35	6.50
Tin (Straits), New York.....	49.62½	49.62½	52.87½	58.25
Antimony (Asiatic), N. Y.....	6.75	9.87½	10.00	11.00

Pittsburgh

Steel Industry Well Satisfied With Immediate Outlook— Holiday Shutdowns Limited to a Few Days

PITTSBURGH, Dec. 24.—Observance of the holidays has caused some let-down in new business in steel products, but no material decrease in specifications. Plant engagement in this and nearby districts suffers only to the extent of a general shutdown of rolling mills extending from last Saturday noon until Wednesday morning. Order books in sheets, tin plate and rails are heavy, and in the past week or so specifications for bars have increased substantially. The final week of the year finds the steel industry well satisfied with the immediate outlook.

A Pittsburgh district railroad car builder recently booked the first worthwhile order in almost a year; it will require approximately 20,000 tons of rolled steel. With other centers reporting increased interest in rolling stock, it seems likely that the railroads will be larger factors in steel buying than they have in the past year.

The agricultural implement industry is taking steel freely. Larger releases against orders for rolled steel, notably sheets, are coming from the motor car builders. Another pipe line order, involving between 400 and 500 miles of 22-in. pipe, is believed to be nearing the closing stage. The trade is counting on more demand next year from the oil and gas industry. In steel construction, other parts of the country appear more active than this territory.

Steel prices show no special change. It is a little early to get a clear line on the recent advance in wire products; although difficulty is encountered in getting buyers to sign first quarter contracts, it is not forgotten that they still have considerable tonnage due them on old commitments. Sheets appear firm. No trouble has been experienced in getting the advance on tin plate. In plates and shapes, the quotations have again become largely local to the Pittsburgh district, in

view of the recent reduction announced by a large Eastern producer.

Scarcity of scrap is reflected in prices, and with scrap already commanding more money than pig iron, the use of the latter will be increased. Merchant producers are taking a firmer price stand on basic iron, which, it is believed, will be very sparingly offered by steel companies ordinarily having a surplus for the market.

Pig Iron.—Business remains very quiet, but if melters are indisposed to buy, there is an equal amount of indifference on the part of merchant producers about selling. Prices are firm. The strength of the scrap market is not without effect upon the views of the merchant iron producers, who see a possibility of a contraction in the amount of steel company iron for sale if heavy melting steel continues to become more valuable. The Steel Corporation in the past year has become an important factor in the local scrap situation and is taking so much of the supply that was formerly available for general market sale that it is seriously questioned whether, with a normally full engagement of steel-making capacity, there is enough

steel works scrap to go around. Steel works operations, which are high for this time of the year, promise to increase after the holidays, and it is certain that more scrap or more pig iron must be used. Heavy melting steel is not now to be had at under \$18, and even more is asked. Any advance from that price would tend to increase the use of pig iron as the cheaper material and reduce the amount available for market. There is also the possibility that some of the steel companies, ordinarily self-contained, will have to buy pig iron; one company, which has only enough iron production to meet its open-hearth furnace requirements, is faced with the possibility of having to blow out a blast furnace soon for relining. Inquiry recently made by one steel company for basic iron disclosed no lower prices than \$17.50, Valley furnace. Some important melters of foundry iron yet are not under cover for the first quarter of next year. In the meantime, while new buying of all grades is light, deliveries on old orders are heavy. Willingness on the part of buyers to take shipments is commonly interpreted as evidence that they do not look for lower prices.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	\$18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry.....	17.50 to 18.00
No. 3 foundry.....	17.00 to 17.50
Malleable	18.00 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—The holiday interruption to sheet and strip mill operations has meant no similar decline in specifications for billets, slabs and sheet bars. Indeed, in sheet bars buyers seem anxious to postpone paying the advance of \$1 a ton the makers have announced on first quarter contracts and are ordering freely on this quarter's commitments. There is a fair amount of first quarter contracting in sheet bars and not much resistance to the higher price. Contracting in billets and slabs also is developing a fair amount of activity.

With the price for the next quarter unchanged, no trouble is being encountered in getting wire rod consumers to sign up.

Hot-Rolled Flats.—Makers of strips are ending the year with fairly heavy order books as a result of specifications on this quarter's contracts driven in by a desire by buyers to save the price advantage of this quarter over the first quarter of 1929. Prices show some tendency to yield to the pressure of buyers, and the lower limits of the price ranges are more typical of the ruling levels than the higher ones.

Bars, Plates and Shapes.—Specifications on bars are good in spite of the holiday season. Automobile parts makers are specifying some good-sized January tonnages of cold-finished bars, and makers of the latter in turn are releasing hot-rolled bars. Demand from bolt and nut makers also is fairly active, and there is a fair amount of business from the jobbers. The market is quotable from 1.90c. to 1.95c., base Pittsburgh, on most of the Pittsburgh district business, 2c., base, being, for the most part, an asking price. Pittsburgh mills will get approximately 20,000 tons of plates, shapes and bars in the 1200 car order recently awarded the Pressed Steel Car Co. There is a fair degree of activity in plates and shapes; on local business, prices generally run from 1.90c. to 1.95c., but such prices cannot be obtained in competitive districts.

Rails and Track Supplies.—The Baltimore & Ohio Railroad has distributed the track accessories to go with the rails it recently placed. Local makers of spikes, track bolts and tie plates shared in the awards, which are reported to have been at full prices. Light-section rails are dull, but heavy rails are moving rather well on 1929 contracts.

Wire Products.—Manufacturers are well satisfied with the progress they have made in establishing the higher prices and the new method of sale recently announced on first quarter contracts. There has been a little

confusion here and there, and some disputes as to the price classification in which some distributors have found themselves, but, taken as a whole, not much resistance has been met in getting buyers to sign first quarter contracts. It is early for much specifying against them, since jobbers and large consumers have some tonnage still due them on this quarter's commitments.

Tubular Goods.—The pipe line to convey gas from the Monroe, La., field to St. Louis, requiring between 400 and 500 miles of 22-in. pipe, again appears likely to be closed soon. A subsidiary of the Standard Oil Co. of New Jersey is sponsoring this line. It is said to have secured a gas contract for a large plate glass plant now going up in St. Louis; one or two other industrial gas contracts will provide sufficient market for the gas to warrant the building of the line. In other directions, the market shows varying degrees of activity; butt-welded pipe is doing fairly well for the time of year, lapwelded pipe for oil country use is dull, but seamless oil country pipe is in demand.

Sheets.—The holiday season is accompanied by a rather substantial decrease in specifications for the common finishes of sheets, but has not affected the releases of those required in motor car and truck construction, and in the past few days there has been a notable gain in the orders for sheets for railroad cars. Mill operations have suffered from the holiday observance, but tonnage lately released will furnish substantially full operations for next month. Prices are holding well.

Tin Plate.—Several tests of the higher prices named on first quarter and first half tonnages have failed to shake them. Makers generally are well supplied with business, but mill operations are down somewhat since a week ago on account of the inability of mill managers to maintain full crews during the holiday season. Prices of tin plate for re-export are stronger by as much as 25c. per box, compared with those ruling on expiring contracts.

THE IRON AGE Composite Prices

Finished Steel

Dec. 24, 1928, 2.391c. a Lb.

One week ago.....	2.391c.
One month ago.....	2.362c.
One year ago.....	2.314c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1928	2.391c., Dec. 11;	2.314c., Jan. 3	
1927	2.453c., Jan. 4;	2.293c., Oct. 25	
1926	2.453c., Jan. 5;	2.403c., May 18	
1925	2.560c., Jan. 6;	2.396c., Aug. 18	
1924	2.789c., Jan. 15;	2.460c., Oct. 14	
1923	2.824c., Apr. 24;	2.446c., Jan. 2	

Pig Iron

Dec. 24, 1928, \$18.46 a Gross Ton

One week ago.....	\$18.46
One month ago.....	18.59
One year ago.....	17.54
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1928	\$18.59, Nov. 27;	\$17.04, July 24	
1927	19.71, Jan. 4;	17.54, Nov. 1	
1926	21.54, Jan. 5;	19.46, July 13	
1925	22.50, Jan. 13;	18.96, July 7	
1924	22.88, Feb. 26;	19.21, Nov. 3	
1923	30.86, Mar. 20;	20.77, Nov. 20	

This is partly explained by higher prices abroad.

Cold-Finished Steel Bars.—Current business is light, but makers are getting liberal releases on tonnage for shipment after the turn of the year. First quarter contracting is moving without a hitch, chiefly because consumers are being called upon for no advance over what they now are paying.

Cold-Rolled Strips.—Much first quarter business has been written at 2.85c., base Pittsburgh or Cleveland, and that price still is generally regarded as the market, despite the fact that there have been a few deviations from it. Consumers are not taking shipments freely for the present, but have much tonnage on order for shipment after Jan. 1.

Coke and Coal.—Spot supplies of furnace coke still are quite ample for the demand and producers find difficulty in maintaining prices. There has, however, been some curtailment of production and only in a few cases has it been necessary for oven operators to go below \$2.75 per net ton at ovens for standard Connellsville coke. Spot foundry coke is dull, but that is the usual condition at this time of the year. Most of the first half Connellsville foundry coke production now is under contract. The coal market presents no important change, except that slack coal is a shade firmer under smaller offerings.

Bolts, Nuts and Rivets.—Stove bolts are being offered at 80, 10 and 5 per cent off list in packages, delivered Chicago or New England points, and that appears as high now as can be done by Pittsburgh producers. Prices otherwise are unchanged. First quarter contracting is fairly active, but current specifications are rather light. Large rivets hold firm at \$2.90, base, per 100 lb., less 2½ per cent.

Warehouse Prices, f.o.b. Pittsburgh	
	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more	
bundles	3.70c.
Galv. sheets (No. 24), 25 or more	
bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to	
10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per	
square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	
60 per cent off list	
Machine bolts, 100 count,	
60 per cent off list	
Carriage bolts, 100 count,	
60 per cent off list	
Nuts, all styles, 100 count,	
60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base	
per 100 lb.....	\$3.00 to 3.10
Wire, galv. soft, base per 100	
lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—The market is very firm on the steel works grades. Consumer buying is light, but dealers, in covering on old orders, find offerings very limited, and they are not actively seeking new orders at current prices. No heavy melting steel appears available at less than \$18, and dealers would not sell a round tonnage at that price because so many former local sources of supply have been closed to them lately by direct mill purchases that dependence would be chiefly upon railroad lists or upon distant supply sources. Heavy melting steel cannot be had from either source now to be sold profitably at under \$18.50. This grade may be appraised at \$18 to \$18.50. Dealers are confident that even higher prices will be reached on the next large mill purchase, as available supplies are limited and neither the production nor the collection of scrap is as heavy at this season of the year as at others. The recent sale of compressed sheet scrap at \$19 has not been repeated, and in the past week \$18.50 has been the top on sales, with dealers reporting purchases at \$18 and \$18.25.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$18.00 to \$18.50
Scrap rails	18.00 to 18.50
Compressed sheet steel....	18.00 to 18.50
Bundled sheets, sides and	
ends	17.00 to 17.50
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary..	18.50 to 19.00
Heavy breakable cast.....	15.00 to 15.50
No. 2 railroad wrought....	18.00 to 19.00
Hvy. steel axle turnings...	16.00 to 16.50
Machine shop turnings....	11.50 to 12.00

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Rolled steel wheels.....	19.00 to 19.50
Low phos. billet and bloom	
ends	21.00 to 21.50
Low phos., mill plates....	19.50 to 20.00
Low phos., light grade....	18.50 to 19.00
Low phos., sheet bar crops	19.50 to 20.00
Heavy steel axle turnings.	16.00 to 16.50

Electric Furnace Grades:	
Low phos. punchings.....	19.00 to 19.50
Hvy. steel axle turnings..	16.00 to 16.50

Blast Furnace Grades:	
Short shoveling steel turn-	
ings	12.00 to 12.50
Short mixed borings and	
turnings	12.00 to 12.50
Cast iron borings.....	12.00 to 12.50

Rolling Mill Grades:	
Steel car axles.....	20.00 to 21.00
No. 1 railroad wrought....	13.50 to 14.00
Sheet bar crops.....	19.00 to 19.50

Cupola Grades:	
No. 1 cast.....	14.50 to 15.00
Rails 3 ft. and under.....	19.50 to 20.00

Production of electric energy by the New England Power Association in the first 11 months of 1928 was 1256 million kwhr., an increase of 24 per cent over the 1015 million kwhr. for the same period in 1927. About 52 per cent of the total was from hydroelectric plants. The "association" is a subsidiary of International Paper Co., New York. The growth of the system may be noted from the fact that the entire year's output in 1910 was equivalent to only 7 days' peak production in 1928.

Youngstown

Holiday Suspensions Brief Owing to Heavy Orders

YOUNGSTOWN, Dec. 24.—Because of heavy demands for sheets and strips, suspension of rolling mill capacity by Mahoning Valley mills is limited to Monday and Tuesday, with resumption in most cases scheduled for Wednesday. Sheet mills of the Falcon Steel Co., at Niles, a division of the Empire Steel Corporation, will resume Jan. 1, following several months' idleness. The Newton Steel Co., which originally planned to be down for the week, starts its units Wednesday, owing to heavy orders for full-finished sheets.

The Youngstown Sheet & Tube Co. has blown out for relining its Jeanette blast furnace at the Brier Hill Works, leaving 25 of 37 stacks in this district in blast. This company is planning elimination of its detached plant at Zanesville, consisting of two lap-welded and two butt-welded pipe mills, socket mill and auxiliary equipment.

District mills are well fortified with orders for first quarter and leaders of the trade are optimistic.

Ohio properties of the A. M. Byers Co., Pittsburgh, are idle for the week.

The steel industry in northeastern Ohio closes the year with steel ingot and rolling mill capacity active slightly above 80 per cent.

Motor Wheel Corporation Complaint Dismissed

The Federal Trade Commission has dismissed a complaint against the Motor Wheel Corporation, Lansing, Mich., charged with violation of section 7 of the Clayton act, which prohibits acquisition of capital stock in a competing company where the effect would be to lessen competition or create a monopoly. The Motor Wheel Corporation was charged with acquiring stock in Forsyth Brothers Co., Harvey, Ill., former manufacturer of steel wheels. Counsel for the corporation, appearing before the commission in a final argument last week, declared that Forsyth Brothers Co. had necessarily gone out of business and at the time of executing its contract with the Motor Wheel Corporation was not in competition with or in any sense a competitor of the corporation.

Experiments at the United States Forest Products Laboratory prove that knotty lumber will make a box with short, thick sides more resistant to rough handling than clear lumber, provided the boards have a slenderness ratio—length divided by thickness—less than 60. The laboratory's tests developed that clear boards are not flexible enough when subjected to rough handling to absorb the shocks produced by the box contents and relieve the direct pull on the nails.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to \$4.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars

	(Open hearth or Bessemer)	Per Gross Ton
Pittsburgh		\$33.00 to \$34.00
Youngstown		33.00 to 34.00
Cleveland		33.00 to 34.00

Slabs

	(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh		\$33.00
Youngstown		33.00
Cleveland		\$33.00 to 34.00

Skelp

	(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Grooved		1.90c. to 2.00c.
Universal		1.90c. to 2.00c.
Sheared		1.90c. to 2.00c.

Wire Rods

	(Common soft, base)	Per Gross Ton
Pittsburgh		\$42.00
Cleveland		42.00
Chicago		43.00

Prices of Raw Material

Ores

	Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron.....		\$4.55
Old range non-Bessemer, 51.50% iron.....		4.40
Mesabi Bessemer, 51.50% iron.....		4.40
Mesabi non-Bessemer, 51.50% iron.....		4.25
High phosphorus, 51.50% iron.....		4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore		Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....		10.00c.
Iron ore, low phos., Swedish, average 68% iron ..		10.00c.
Iron ore, basic Swedish, average 65% iron.....		9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus.....		36c. to 38c.
Manganese ore, Brazilian, African or Indian, basic 50%		35c. to 37c.
Tungsten ore, high grade, per unit, in 60% concentrates		\$11.40 to \$12.00
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard		\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered		50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.85
Foundry, by-product, Ch'go ovens.....	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham.....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis.....	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines.....	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines.....	70c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$34.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
10%	\$31.00	12%	\$35.00
11%	 33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
6%	\$24.00	10%	\$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltitium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Flow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t, square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. .	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 5
Stove bolts in packages, Chicago.....	80, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago.....	80, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	(1/4-In. and Larger)	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....		\$2.90
F.o.b. Chicago		3.00

Small Rivets

	(7/8-In. and Smaller)	Per Cent Off List
F.o.b. Pittsburgh		70 and 10
F.o.b. Cleveland		70 and 10
F.o.b. Chicago		70 and 10

Cap and Set Screws

	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)
	Per Cent Off List
Milled cap screws.....	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread.....	75 and 10
Upset hex. head cap screws, U.S.S. thread.....	85
Upset hex. cap screws, S.A.E. thread.....	85
Upset set screws.....	80, 10 and 5
Milled studs	70

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Chicago

Structural Steel Award of 18,500 Tons—Mills End Year With Substantial Backlogs

CHICAGO, Dec. 24.—Of primary interest in this market was the placing of 18,500 tons of steel for the new Chicago Board of Trade Building. It is probable that upward of 12,000 tons will be awarded in a day or two for the No. 1 North LaSalle Building. Many pending projects are still open, with little possibility that they will be placed until after the first of the year. In the meantime, structural shops are feeling the pinch of small order books.

Based on preliminary estimates, it is evident that shipments of sheets from local hot mills in 1928 have established a record. Local warehouses are figuring on 1200 tons of sheets needed for forms for reinforced concrete work in the Chicago Mercantile Mart.

Local steel production is steady at 85 per cent of ingot capacity. Specifications are well above current shipments, and mill output will soon be increased. Chicago mills will shut down only on Christmas Day.

This month will be one of the best Decembers on record. Specifications and shipments have been steady, while backlogs have been growing, with the result that the approach to the first quarter is more favorable than has been experienced in many years. Although prices are not above the levels maintained in the fall months, they are showing greater strength. It is probable that users of finished steel products will find deliveries more extended in January than in December. Specifications in recent weeks have been unusually heavy, the bulk of this tonnage being for shipment after the turn of the year. Releases in the past week, while not as large as in the previous week, are 30 per cent heavier than the average week for the year and they are less influenced now by specifications for rails than was the case earlier in the month.

Pig Iron.—This market is enlivened by new inquiry and a few contracts for first quarter and first half. Most foundries have closed for two days at Christmas, but many will resume operations on Wednesday. In previous years it has not been uncommon for melters to shut down for a week or 10 days at this season. Reasons for the change in practice this year appear to lie in the general business situation and the fact that many foundries have sought more stable sources of orders and are depending less on the up and down character of job-lot business. Prices for Northern iron are steady at \$20 a ton, local furnace. Although most sellers are quoting \$24 a ton, furnace, for charcoal iron, there still are odd lots that can be had at a lower price.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail) ..\$22.51 to	23.01
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent...	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Prices for carloads of spiegeleisen are stronger because of heavy order books.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Coke.—Shipments of by-product foundry coke are steady. Preliminary estimates by local producers indicate that deliveries in 1928 will establish a record. Prices are firm at \$8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets.—Few changes have taken place in this market in the past week. Specifications for delivery after Jan. 1 are heavier. Spot buying is at a standstill.

Wire Products.—Specifications for these commodities are steady, being little influenced by inventory taking. Automobile parts manufacturers in the Cleveland and Detroit districts are taking larger quantities in preparation for an expected increase in demand from makers of automobiles, several of which have already gone into greater production on new models. The jobbing trade is quiet in most sections of the country, it being quite evident that stocks in the hands of distributors are ample to carry them over the holidays. Mills have increased stocks in recent weeks, but of late have cut output to 60 per cent of capacity to more nearly balance with current shipments. Producers' warehouses are better able to meet demands than earlier in the month, but stocks are lower than usual at this time of the year, bearing out the contention made by sellers earlier in the fall that they would meet spring demands by increased production rather than by drawing from stocks built up during the winter months. Shipments and new orders for woven wire fencing are lighter, and the nail demand from rural districts has fallen off sharply. Many users of wire and wire products who have old contracts are specifying freely in an effort to take advantage of the old prices. New sales are small in the aggregate, but on the business taken prices have held.

Reinforcing Bars.—Business in the last week has been confined largely to signing contracts placed just prior to Dec. 15, when quotations at old price levels expired. Billet steel reinforcing bars are steady at 2.35c. per lb. in carload lots out of Chicago ware-

houses, and it is reported that all lower prices have been withdrawn. In rail steel bars, however, the situation is less clearly defined, with warehouses quoting 2.05c. per lb., and with some old quotations still in the hands of prospective purchasers. Among the active pending jobs is 450 tons for the Fine Arts Building, Chicago. Bids have been rejected for a second time on five Chicago junior high schools, which will take about 1500 tons.

Sheets.—Chicago mills are closing the year with a total production that is near, if it does not exceed, the best previous 12-months' record. Although hot mill operations have not been at capacity in recent months, they have been relatively steady, affording little or no time to make extensive repairs. Several mills will take advantage of the holiday season and will be shut down from Dec. 22 until Jan. 2. Inquiry is developing more rapidly, but forward contracting has reached only about one-half of the tonnage that is normally on books for the first quarter. Prices are holding on business taken for delivery after the first of the year. There is every indication that stocks in the hands of users are small, therefore producers are looking forward to a sharp upturn in demand by the middle of January.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Detroit has closed for 5700 tons of large size cast iron pipe. A bidder offering French-made pipe has been awarded 2800 tons of 36-in. pipe at \$39.90 a ton, delivered, which figures back to \$31.98, Birmingham. The United States Cast Iron Pipe & Foundry Co. has taken 800 tons of 36-in., 1500 tons of 24-in. and 600 tons of 48-in. pipe at \$41.42 a ton, delivered, or \$33.50 a ton, Birmingham. Milwaukee is scheduled to open bids on a large tonnage on Dec. 28. On the whole, this market is quiet. Scattered car lots have been taken at \$37 to \$38 a ton, Birmingham. According to sellers, the indications are that a substantial volume of business will come into the market before the end of January. Many engineers are reported to be busy in preparing plans for spring pipe laying programs.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42.20 to \$46.20; 4-in., \$46.20 to \$50.20; Class A and gas pipe, \$4 extra.

Structural Material.—Fresh inquiry totals 9000 tons and awards are not less than 5000 tons. The expansion of industrial building is further shown by inquiries for steel for an addition to a tractor plant and an open-hearth building. Shops in Milwaukee are reported as busy, while to the west of Chicago output is far below capacity. Local shops are well engaged for this time of the year, but backlogs are small, and all but two or three fabricators will be in need of work before the end of January. Shops are swinging into heavier fabricating schedules on the 38,000 tons of steel

which is to be used in the Mercantile Mart, Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Plates.—Welded pipe makers are making heavy drafts against plate contracts held by local steel producers. Plate mills are well engaged when it is considered that recent car purchases have had little bearing so far on schedules. An oil producer in Texas has ordered 1700 tons of plates for storage tanks to be fabricated in the Southwest. Inquiry for steel for large oil storage tanks totals 10,000 tons, the bulk of which will go into the Texas fields. Deliveries on wide plates range from two to four weeks.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Rails and Track Supplies.—The local rail market is quiet, except for the arrangement of rolling schedules for 1929 deliveries. Outstanding inquiry remains at 50,000 tons. It is estimated by local sellers that about 1,000,000 tons has been purchased for next year's delivery. It is believed by some this figure is less than the tonnage which had been placed by this time a year ago, but others point to the fact that several large railroads made purchases with large options for 1928. These options were not specified in full. This year these railroads have made purchases plus options, which totals about equal to actual shipments made to them in 1928. Rail mill deliveries in 1928 were heavier than in 1927, and it is generally believed here that 1929 shipments will fully equal those in 1928. Miscellaneous orders for track supplies total 5000 tons and inquiry stands at 16,000 tons. Rail output is a shade higher at 61 per cent of capacity. Track accessory departments are operating at a steady rate, with schedules that indicate an upturn in production about the middle of January.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—Prices in Chicago for iron and steel scrap are well maintained. Some specialties, such as rail-

road malleable and machinery cast, have advanced 25c. a ton on recent sales. A round tonnage of cast iron borings has been taken by a consumer at \$12.50 a gross ton, delivered, an advance of 25c. a ton. The supply of heavy tonnage grades seems to be ample to meet users' needs, but dealers are having some difficulty in obtaining carloads of specialties. This is due in part to lower shipments by producers, who are holding scrap to get better car loadings; freezing weather also is playing a part in hampering preparation and shipment. Lighter deliveries are noted to foundries, which at this time of year usually curtail output. Inquiry for immediate delivery is less urgent, but buyers are showing greater interest in the possibility of getting prompt shipments soon after the first of the year. It is noteworthy that most consumers feel confident of the future, and in many instances have well prepared plans for shop schedules for the early part of January.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$14.50 to	\$15.00
Shoveling steel	14.50 to	15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to	16.25
Hydraul. compressed sheets	13.00 to	13.50
Drop forge flashings.....	10.50 to	11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to	18.25
Rail'r'd tires, charg. box size	17.50 to	18.00
Rail'r'd leaf spring cut apart	17.50 to	18.00

Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.00 to	16.50
Coil springs	18.25 to	18.75

Electric Furnace Grades:		
Axle turnings	14.50 to	15.00
Low phos. punchings.....	16.75 to	17.25
Low phos. plate, 12 in. and under	16.50 to	17.00

Blast Furnace Grades:		
Axle turnings	12.00 to	12.50
Cast iron borings.....	12.00 to	12.50
Short shoveling turnings...	12.00 to	12.50
Machine shop turnings....	8.00 to	8.50

Rolling Mill Grades:		
Iron rails	15.00 to	15.50
Rerolling rails	16.50 to	17.00

Cupola Grades:		
Steel rails less than 3 ft..	17.25 to	17.75
Steel rails less than 2 ft..	18.75 to	19.25
Angle bars, steel.....	16.50 to	17.00
Cast iron carwheels.....	14.00 to	14.50

Malleable Grades:		
Railroad	17.25 to	17.75
Agricultural	12.50 to	13.00

Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00

Per Net Ton

Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and transoms	20.50 to	21.00
Iron car axles.....	26.50 to	27.00
Steel car axles.....	15.50 to	16.00
No. 1 railroad wrought...	13.25 to	13.75
No. 2 railroad wrought...	13.00 to	13.50
No. 1 busheling.....	11.50 to	12.00
No. 2 busheling.....	6.00 to	6.50
Locomotive tires, smooth..	13.25 to	13.75
Pipes and flues.....	9.50 to	10.00

Cupola Grades:		
No. 1 machinery cast....	15.75 to	16.25
No. 1 railroad cast.....	15.00 to	15.50
No. 1 agricultural cast....	14.50 to	15.00
Stove plate	12.25 to	12.75
Grate bars	12.50 to	13.00
Brake shoes	11.50 to	12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cold Rolled Strip.—Forward contracting has progressed steadily at 2.85c. to 2.95c. per lb., Cleveland. The freight rate to Chicago is 30c. per 100 lb. Specifications are lighter, and the industry as a whole is engaged between 65 and 75 per cent of capacity, contrasted with 80 to 85 per cent late in November.

Bars.—Soft steel bar mills are heavily engaged. Specifications are large, making it highly probable that deliveries will be pushed farther into the future. Farm implement manufacturers have been taking increasing quantities of steel and their bar requirements in 1928 have been about 50 per cent larger than in the previous year. Automobile parts makers are entering heavier specifications for delivery in the early weeks in January. Prices for soft steel bars are steady at 2c. to 2.10c. per lb., Chicago. The iron bar market is more active, as indicated by numerous small specifications for delivery in January. The alloy bar market remains steady, with some gains noted from automobile parts makers, who are producing in advance of an expected upturn in automobile output. Forward contracting in rail steel bars is practically complete at 1.95c. per lb., Chicago Heights. Users accustomed to prompt service from mills appear little concerned over deliveries after the start of the new year. Most sizes can be had in 10 days to two weeks.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Germany May Get Cartel Bonus for Low Production

WASHINGTON, Dec. 22.—It would appear that the membership of the German iron and steel industry in the International Steel Cartel has been of advantage in the recently terminated lockout in the Rhineland-Westphalia districts, according to a report received by the Department of Commerce from the trade commissioner in Berlin.

The report says:

"Another thought advanced in press discussion is that this cessation of production, which is almost sure to result in the total output of the German industry falling below the quota set by the cartel for the first time since its inauguration, may prove an actual benefit to the industry. This, it was anticipated, would result from the domestic industry being eligible to receive the \$2 per ton paid on all production not greater than 10 per cent below the quota set by the cartel, a circumstance which, with production the full 10 per cent below the quota, would make Germany eligible to receive approximately \$632,000 (2,500,000 marks) on the quarterly quota of 3,160,000 metric tons. Analysis, however, would appear to make this very unlikely, largely because production in Germany has, over the past three quarters, exceeded the allotted quota by approximately 600,000 tons per quarter."

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.35c.
Reinforc'g bars, rail steel.....	2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List

Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.20
Cement c't'd nails, base per keg.....	3.20

New York

38,000 Tons of Plates Awarded for Wanaque Pipe Line— Pig Iron Shipments Heavy

NEW YORK, Dec. 24.—Shipments of pig iron are keeping up at a surprising rate. Melters apparently have virtually no inventories and are taking iron as fast as they are using it. In most instances, buyers have been specifying fully against their fourth quarter contracts, and there will be the smallest carryover to first quarter since the war. Blast furnace stocks are also low, in some cases consisting almost entirely of iron of odd analyses. Three furnaces in the Buffalo district, however, are expected to be lighted shortly. While foundry operations will suffer minimum interruption on account of the holidays, buying interest has been adversely affected. Sales in this district for the week totaled about 7000 tons. Little new inquiry appeared, but a revival in contracting is looked for early in January, since 25 to 30 per cent of the needs of melters for the first quarter is still to be placed, according to estimates by the trade. The General Electric Co. has closed against its first quarter inquiry for 5500 tons for Erie, Pa., and other Eastern plants. Purchases of several hundred tons each have been made against the recent inquiries of the New York Central and the Delaware, Lackawanna & Western railroads. Foundry iron continues to be available at \$17.50, base, Buffalo furnace, and \$19.50, base, eastern Pennsylvania furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75	
to 2.25		\$22.41 to \$22.91
*Buf. No. 2, del'd east.		
N. J.	20.78 to	21.28
East. Pa. No. 2 fdy., sil.		
1.75 to 2.25	20.89 to	22.52
East. Pa. No. 2X fdy., sil.		
2.25 to 2.75	21.39 to	23.02
East. Pa. No. 1X fdy., sil.		
2.75 to 3.25	21.89 to	23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Warehouse Business.—Orders have diminished as the holidays approached, but some jobbers report a few sizable tonnages in the past week. Demand for structural steel has slackened and sheet business is light. On both products occasional shading is noted, but is not widespread. As the early weeks of December have been active, resumption of good business is expected early in January.

Finished Steel.—If the present rate of new orders and specifications continues through the closing days of the month, December will be one of the most satisfactory months of the year. Prices on bars, shapes and plates have generally been adjusted to meet the quotations announced last week by the leading Eastern maker, and a minimum of 2c., Eastern basing

points, on plates and shapes and 1.90c., Pittsburgh, on bars, has been adhered to on first quarter business. Small tonnages are commanding prices \$1 to \$2 a ton higher. One of the largest plate tonnages placed recently in this district will be required by the Wanaque aqueduct for the North Jersey District Water Supply Commission. The project will require about 38,000 tons of steel plates, which is expected to be placed by T. A. Gillespie & Co., low bidder on the general contract, with the Steel Corporation subsidiary. Eastern mills will also benefit by recent freight car orders placed by Eastern and Southern roads, outstanding purchases having been 2500 by the Louisville & Nashville and 100 by the New York Central. The Delaware, Lackawanna & Western has ordered 10,000 tons of 130-lb. steel rails and track supplies. Sheet prices are firm at the new levels, namely, 2.85c., 3.60c. and 2.10c., Pittsburgh, for the black, galvanized and blue annealed grades, respectively, and most of the buyers in this district have contracted for first quarter requirements. Deliveries at the old prices are now being made only from material in stock at warehouses. The demand for standard steel pipe for building work has kept up at a good rate for this season of the year. Specifications for wire nails have been heavy on account of the advance in price, but the last week has seen a general clean-up of old business on makers' books.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.17½c. to 2.27½c.; struc. shapes, 2.14½c. to 2.24½c.; bar iron, 2.14c. to 2.24c.

Cast Iron Pipe.—Northern and Southern makers of pressure pipe are maintaining prices quite firmly and are booking a moderate volume of tonnage from privately owned companies, which are placing their requirements in gas and water pipe for next year. The Federal Water Service Co., New York, has closed for several thousand tons of water pipe for its subsidiaries, and Stevens & Wood, New York, are expected to place 5000 tons or more of gas pipe before the end of the year. Yonkers, N. Y., has opened bids on about 200 tons of 6-in. water pipe, the second tonnage to be bought by this city in the past fortnight. Active municipal inquiry for pipe is not expected until about the middle of January.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$39.60 to \$41.60; 4-in. and 5-in., \$44.60 to \$46.60; 3-in., \$54.60 to \$56.60; Class A and gas pipe, \$4 to \$5 extra.

Reinforcing Bars.—The Turner Construction Co. has ordered 800 tons of reinforcing bars required for the Lackawanna terminal warehouse in Jersey City from the Jones & Laughlin Steel Corporation, but about 7500

tons is still to be bought. Lettings in the past week have been largely for small tonnages, but the volume of pending work is large, and considerable activity is expected after the first of the year. Prices are unchanged and, except in competition with foreign steel, are holding well.

Coke.—Better demand for both foundry and furnace coke is being re-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20		3.80c.
No. 22		3.95c.
No. 24		4.00c.
No. 26		4.10c.
No. 28*		4.25c.
No. 30		4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

flected in firmer prices, but there has been no advance by makers. The foundry grade is being offered at \$3.50 to \$3.75 per net ton, Connellsville, and furnace coke at \$2.85 to \$3.05. By-product foundry coke is quoted at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn. Special brands of beehive coke are available at \$4.85, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44, to New York and Brooklyn.

Old Material.—Iron and steel scrap prices have begun another upward movement, with No. 1 heavy melting steel quotable at an advance of 50c. per ton, delivered to eastern Pennsylvania consumers, based on two sizable purchases last week. A Coatesville user is understood to have bought a large tonnage of No. 1 steel at \$16.50 per ton, delivered, and a Claymont, Del., mill is reported to have paid \$16, the total of the two contracts being about 20,000 tons. Other grades of

scrap are strong, but buying prices of dealers do not yet show any advance.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$12.00 to \$12.50
Heavy melting steel (yard)	8.50 to 9.50
No. 1 hvy. breakable cast.	11.25 to 11.75
Stove plate (steel works)...	8.00 to 8.50
Locomotive grate bars....	8.50
Machine shop turnings....	7.25 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast furn. or steel works).....	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles.....	17.00 to 17.50
Iron car axles.....	24.00 to 24.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought....	12.25 to 12.75
No. 1 yard wrot., long....	11.25 to 11.75
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.50
Stove plate (foundry)....	9.50
Malleable cast (railroad)...	10.00 to 10.50
Cast borings (chemical)...	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

for pig iron from that source will be heavy for the first quarter.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25, \$22.50 to	23.00
Malleable	19.50
Ohio silvery, 8 per cent....	29.00
Basic Valley furnace.....	17.50
Stand. low phos., Valley..	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Lake furnaces consumed 4,897,404 tons of ore in November, a decrease of 127,238 tons from October. The amount consumed in November, last year, was 3,813,637 tons. Ore at furnaces Dec. 1 amounted to 33,625,980 tons, and the total amount at furnaces and Lake Erie docks on that date was 40,080,106 tons, compared with 41,471,704 tons on the same date a year ago. Central district furnaces consumed 2,590,851 tons of ore in November, a decrease of 90,499 tons for the month. Lake front furnaces used 2,121,977 tons, a decrease of 39,800 tons, and all-rail furnaces consumed 92,783 tons, a decrease of 1932 tons. Eastern furnaces used 91,793 tons, a gain of 4993 tons. On Nov. 30 there were 167 furnaces using Lake ore in blast, a decrease of two for the month.

Old Material.—A Cleveland mill has bought several thousand tons of high grade No. 1 heavy melting steel at \$17, which is about the same price that has prevailed for some time for the quality of scrap specified. The most of this will be shipped in January. While other mills have not come into the market for scrap for delivery after the first of the year, considerable buying is expected early in the month. The market is very firm, and the recent price advance is not bringing out steel making scrap in excess of the supply. Blast furnace scrap is not moving quite as well as steel making grades. The only price change is a 25c. a ton advance in machine shop turnings.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$14.75 to \$15.25
No. 2 heavy melting steel.	14.25 to 14.75
Compressed sheet steel....	14.50 to 15.00
Light bundled sheet stamp'gs	12.00 to 12.50
Drop forge flashings.....	12.25 to 12.75
Machine shop turnings....	10.25 to 10.75
No. 1 railroad wrought....	12.75 to 13.00
No. 2 railroad wrought....	14.50 to 15.00
No. 1 busheling.....	12.50 to 12.75
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades	
Low phos. forging crops....	16.00 to 16.50
Low phos., billet, bloom and slab crops.....	17.00 to 17.50
Low phos. sheet bar crops.	16.50 to 17.00
Low phos. plate scrap....	15.50 to 16.00

Blast Furnace Grades	
Cast iron borings.....	11.25 to 11.75
Mixed bor'g and short turn'gs	11.25 to 11.75
No. 2 busheling.....	11.25 to 11.75

Cupola Grades	
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25

Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling.....	16.25 to 16.50

Coke.—The price of Ohio by-product foundry coke has been reestablished at \$7.75, Painesville, for January shipments. Specifications have slowed

Cleveland

Steel Orders and Specifications for December Will Exceed Those in November—Sheet Mills Well Engaged

CLEVELAND, Dec. 24.—Specifications for steel bars, plates and shapes kept up in very satisfactory volume the past week, and most of the tonnage covered by last quarter contracts was ordered out. This steel will be shipped at the convenience of the mills and little of it will be delivered before January. Some specifications have also been issued against first quarter contracts. The tonnage entered by several of the mills during December will run over that of November. There was considerable additional contracting during the week, and most consumers are now covered for the first quarter. Forge shops are placing round lots of steel bars either in specifications or contracts and expect that their plants will be filled with orders from the automotive industry for the first quarter.

Automobile manufacturers have issued liberal specifications for alloy steel and auto body sheets for January shipment, but as yet have not come out with heavy specifications for other products. Evidently this industry has enough material on order to carry it well through January. Many of the motor car builders are now operating at reduced schedules, but will increase production after the first of the month.

Structural activity took quite a spurt the past week. The outstanding award was 7000 tons for a dirigible hangar for the Goodyear-Zeppelin Co., Akron. The market is holding firm at the regular prices of 1.90c.

Warehouse Prices, f.o.b. Cleveland

Base per Lb.

Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.50c.
Galvanized sheets (No. 24).....	4.45c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

to 1.95c., Cleveland and Pittsburgh, for steel bars and 1.90c. to 1.95c., Pittsburgh, for plates and structural shapes, with some small-lot business going at 2c.

Pig Iron.—Buying has continued in good volume for the holiday season, Cleveland interests having sold 15,000 tons during the week in foundry and malleable grades. The business was nearly all for the first quarter, as consumers are showing very little interest in contracts for iron for delivery beyond April 1. Prices are holding at recent quotations. For out of town shipment, Cleveland furnaces are getting \$18.50 for foundry and malleable iron and another Lake furnace interest is holding to \$19.50 for eastern Ohio and Indiana shipment. The Michigan market is unchanged at \$20. While some foundries have held up shipments during the past week or two, the amount suspended because of the approaching inventory time is less than usual, and several of the furnaces welcome a slowing down in demand in order that they can accumulate iron in their stocks, which are now very low. The large production program announced by the automotive industry for the early part of next year indicates that the demand

down somewhat because of the approaching inventory time and new business is light.

Sheets.—Mills received considerable business the past week in specifications against old contracts and some orders to apply on first quarter contracts. They now have enough tonnage on their books to keep them busy through the first half of January or longer. Some have made contract obligations that will keep them well filled through the first quarter. The automotive industry has not yet specified very much tonnage on first

quarter contracts. The market is firm at regular quotations.

Strip Steel.—Releases to mills of specifications for hot-rolled flats are rather light, but mills are still comfortably filled with orders. Some large consumers have not yet made first quarter commitments. Prices are holding within the range quoted, and makers are adhering to the new card of extras. Cold-rolled strip is also moving rather slowly. The market is being well maintained at the regular 2.85c., Cleveland, price.

Philadelphia

Plate and Shape Contracts Revised to New Levels— Heavy Melting Steel Up \$1 Per Ton

PHILADELPHIA, Dec. 24.—Some contracts for first quarter delivery of plates and shapes have been adjusted to the recently announced minimum of 2c. per lb., Coatesville, on plates and 2c., mill, on shapes. Small buyers are being asked to pay a minimum of 2.05c., mill. Although plate prices are firm at the new level, 2c., mill, on shapes is occasionally shaded on desirable tonnages. Sheet prices are firm, but the volume of new contracting has been small.

As a result of two sizable scrap purchases in the past week, No. 1 heavy melting steel shows an advance of \$1 a ton.

Pig Iron.—Although steel company furnaces are still adhering to \$21 per ton for first quarter tonnage, there is a tendency among merchant furnaces to consider desirable business on the basis of \$20.50, the quotation for December delivery. Many foundries are covered for part of the coming quarter, and, with no price advance in prospect, are not inclined to hasten in anticipating their needs farther ahead. Domestic low phosphorus prices are unchanged at \$23 to \$23.50 per ton, f.o.b. eastern Pennsylvania furnace, but British low phosphorus iron is reported to be obtainable at about \$22.50 per ton, duty paid, Philadelphia. Consumers are using up iron rapidly and are frequently pressing for deliveries.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	21.26 to 21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X, 2.25 to 2.75 sil.	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—A substantial tonnage of bars is under contract for the first quarter at 1.90c. to 1.95c. per lb., Pittsburgh, or 2.22c. to 2.27c., delivered Philadelphia. A number of bar users, however, have not yet renewed contracts, foreseeing no early advance in prices and preferring to buy as their needs arise. Some sizable reinforcing bar tonnages are in the market, including about 1000 tons for an Internal Revenue Bureau building in Washington and about 800 tons for a bridge in Baltimore.

Plates.—Eastern Pennsylvania mills

are adjusting contracts to the new minimum of 2c., Coatesville, or 2.10c., Philadelphia. When the tonnage involved is small, the mills insist on a minimum of 2.05c., Coatesville. Prices range from 2c. to 2.05c., Coatesville, or 2.10c. to 2.15c., Philadelphia, with occasional less-carload lots bringing 2.10c., Coatesville.

Shapes.—Contracts at 2.05c., f.o.b. nearest mill to consumer, have been adjusted to the new level of 2c., mill, or 2.06c., delivered Philadelphia, but the market is not entirely firm at the new level, and 2c., mill, is sometimes subject to concession when a desirable tonnage is offered. Several large fabricated projects are in the market, including a building in Washington for the Internal Revenue Bureau, requiring about 10,000 tons, a bridge in Baltimore, calling for 32,000 tons, and a new dormitory at the University of Pennsylvania.

Warehouse Prices, f.o.b. Philadelphia

Base per Lb.	
Plates, 1/4-in. and heavier	2.70c.
Plates, 3/8-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to 3/8-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Bl'd ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
1/4-in.	5.30c.
3/8-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Warehouse Business.—Orders for shipment from stock continue in good volume, despite the holidays, and the total for the month is expected by most jobbers to compare favorably with that of November.

Sheets.—A moderate number of first quarter contracts have been closed on blue annealed sheets at 2.10c., Pittsburgh, or 2.42c., Philadelphia. In some cases, where competition for narrow sheet business is encountered from continuous sheet mills, 2c., Pittsburgh, has prevailed. Black and galvanized sheet prices are reported quite firm at 2.85c., Pittsburgh, or 3.17c., Philadelphia, for black and 3.60c., Pittsburgh, or 3.92c., Philadelphia, for galvanized. However, contracting has not yet been extensive, and, with many consumers of galvanized sheets covered on old lower-priced contracts until mid-January, a test of present quotations is delayed.

Imports.—In the week ended Dec. 22, 3867 tons of pig iron arrived at this port, of which 3539 tons was from British India and 328 tons from Norway. Ore imports consisted of 750 tons of chrome ore from British India and 502 tons of manganese ore from Java. Steel imports were small, with 74 tons of structural shapes from Belgium and 66 tons from Germany and 55 tons of steel bars and 30 tons of billets from Sweden. Scrap imports consisted of four tons from Germany.

Old Material.—All grades of scrap show a strong undertone. No. 1 heavy melting steel has advanced \$1 a ton on purchases totaling between 15,000 and 20,000 tons by consumers at Coatesville, Pa., and Claymont, Del. The consumer at Claymont closed about a fortnight ago on several thousand tons at \$15.50 per ton and last week bought upward of 6000 tons at \$16, delivered. The Coatesville buyer also bought recently at \$15.50 per ton and in the past week paid \$16.50 per ton, delivered. Other grades of scrap are not so active as heavy melting steel, but in some instances have registered advances in price of 50c. a ton, based on small purchases.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$16.00 to \$16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	12.50
No. 1 railroad wrought (for steel works)	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equiv.)	12.50 to 13.00
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	18.50 to 19.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Fabricated Structural Steel

Bridge at Baltimore Will Take 32,000 Tons—18,500 Tons Awarded for Chicago Board of Trade Building

WITH the Chicago Board of Trade Building requiring 18,500 tons, structural steel awards during the week amounted to 44,800 tons. Other large tonnages placed were 7000 tons for an airship hangar at Akron, Ohio, and 5700 tons for Reading Railroad bridge work. Outstanding in the new work out for bids is a bridge at Baltimore, which will take 32,000 tons of the 44,000 tons reported pending. Awards follow:

BOSTON & MAINE RAILROAD, 2200 tons, five bridges, to Phoenix Bridge Co.

ANDOVER, MASS., 140 tons, dining hall, to New England Structural Co.

NEW YORK, 300 tons, building in East Eighty-eighth Street for Edward Corning, to American Bridge Co.

STATE OF NEW YORK, 150 tons, highway bridge, to American Bridge Co.

ORANGE, N. J., 800 tons, Orange Memorial Hospital, to Hinkle Steel Construction Co.

READING RAILROAD, 5700 tons, bridge work, to Phoenix Bridge Co.

BALTIMORE & OHIO RAILROAD, 250 tons, bridges, to Bethlehem Steel Co.

BEAVER FALLS, PA., 155 tons, Farmers Bank Building, to Fort Pitt Bridge Works.

MOBILE, ALA., 1155 tons, office building for Merchant Securities Co., to Virginia Bridge & Iron Co.

LOUISVILLE, KY., 1700 tons, approaches to Louisville bridge over Ohio River, to American Bridge Co.

AKRON, OHIO, 7000 tons, hangar for Goodyear Zeppelin Co., to American Bridge Co.

CHICAGO, 18,500 tons, Board of Trade Building, to American Bridge Co.

CHICAGO, 200 tons, salesroom for Studebaker Corporation, to Wendnagel & Co., local.

ST. LOUIS, 3000 tons, apartment house at Kings Highway and Maryland Avenue, to Mississippi Valley Structural Steel Co.

ST. LOUIS, 750 tons, open-hearth building for Laclede Steel Co., to Mississippi Valley Structural Steel Co.

KANSAS CITY & GRAND VIEW RAILROAD, 1100 tons, bridges, to Kansas City Structural Steel Co.

LOUISVILLE & NASHVILLE RAILROAD, 800 tons, bridges, to Nashville Bridge Co.

SAN FRANCISCO, 180 tons, gymnasium on Frederick Street, to Dyer Brothers.

SAN FRANCISCO, 146 tons, apartment building, Golden Gate Avenue and Steiner Street, to McClintic-Marshall Co.

EUGENE, ORE., 375 tons plates, three roller type dam gates for Leaburg project, to Willamette Iron & Steel Works.

PORTLAND, ORE., 180 tons plates, sulphite digesters for Oregon plant, to Willamette Iron & Steel Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 800 tons, Miss Spence's School in East Ninety-first Street.

STATE OF NEW JERSEY, 1400 tons, three highway bridges in Morris County.

BALTIMORE, 32,000 tons, bridge over arm of Chesapeake Bay.

WASHINGTON, unnamed tonnage, six buildings and alterations at Army

Medical Center; bids taken by Construction Service Quartermaster.

PHILADELPHIA 100 tons, dormitory at Hamilton Walk and Thirty-sixth Street for University of Pennsylvania.

PHILADELPHIA, 6000 tons, grade crossing elimination at Manayunk for Reading Co.; Phoenix Bridge Co., low bidder.

ROME, N. Y., 550 tons, building for Rome Wire Works.

BUFFALO, 150 tons, dock shed for Cleveland-Buffalo Transit Co.

BUFFALO, 1000 tons, Burgard Vocational School.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 450 tons, freight house at Buffalo.

CLEVELAND, 140 tons, building for Continental Lithograph Corporation.

CLEVELAND, 400 tons, Quincy Avenue bridge for Nickel Plate railroad.

CHICAGO, 1500 tons, building for Illinois Bell Telephone Co.

SPRINGFIELD, ILL., 500 tons, building for Monarch tractor division of Allis-Chalmers Mfg. Co.

MINNEAPOLIS, 4500 tons, Northern National Bank Building.

SOUTH CHICAGO, ILL., 530 tons, ore building for Mead Morrison Mfg. Co., Chicago.

SAN FRANCISCO, 155 tons, apartment building at Vallejo and Octavia Streets: bids being taken.

HELENA, MONT., 661 tons, Missouri River bridge; bids opened.

Standardizing Drawings and Drafting Room Practice

Considerable progress has been made by the sectional committee on the standardization of drawings and drawing room practice, which is sponsored by the American Society of Mechanical Engineers and the Society for the Promotion of Engineering Education.

Subcommittee No. 2, on method of indicating dimensions, met Dec. 5 and discussed a proposal which had been drafted by its chairman, E. B. Neil, manager of the research department *Automotive Industries*, Philadelphia, after careful study of the practices of a large number of industrial plants. A chart indicating proposed standard arrangement and view of mechanical drawings which employ the third angle of projection, submitted by subcommittee No. 4, on layout, has met with unanimous approval. F. G. Wolff, assistant to the general mechanical engineer American Car & Foundry Co., is chairman of the committee. Replies to a questionnaire sent to 878 firms are being

summarized by subcommittee No. 3, on lettering, which is headed by T. G. Crawford, supervisor of drafting, General Electric Co. Subcommittee No. 5, on line work, which has submitted three proposals, will issue a revised report shortly. Samuel Ketchum, engineer M. H. Treadwell Co., New York, is chairman.

Proposals for graphical symbols on drawings have been distributed by subcommittee No. 6, which is headed by G. H. Drake, chairman of the standardization committee of the National Association of Master Plumbers. Copies of the proposal are now being considered by the American Institute of Architects. Work of this committee also includes a series of graphical symbols proposed by the American Society of Heating and Ventilating Engineers.

Automobile Production Will Be a Record

NEW YORK, Dec. 24.—*Automotive Industries* this week will say:

"With a production of approximately 300,000 in December indicated by operations in car and truck factories, the total production for the industry in 1928 will be brought to about 4,650,000, an increase of about 150,000 over the former record total set up in 1926. Production for the industry in 1927 totaled 3,580,000, more than a million lower than in the present year.

"Operations in the closing week of the year will be reduced by the holidays, but only a few will be closed for inventories or other late year purposes. In many plants, work will actually be speeding up on new models, which have been sold ahead for varying periods in 1929. Ford dealers, though running into a slow delivery period in December, still have orders many weeks ahead, and Chevrolet and Willys-Overland dealers have built up large order books at their December showings."

Production of Files \$12,973,- 734 in 1927

WASHINGTON, Dec. 24.—The production of files by 36 establishments engaged primarily in that line represented a value of \$12,973,734 in 1927, a decrease of 4.2 per cent reported by 38 establishments in 1925 with a value of \$13,540,953, according to the Bureau of the Census. The 1927 values by types were as follows: Files and rasps, metalworking, \$11,854,620; woodworking, \$95,743; other files, \$396,166; other products and amount received for repair work, \$627,205. Of the establishments reporting for last year, seven were located in New Jersey, seven in Pennsylvania, five in New York, five in Ohio, three in Rhode Island, two in Connecticut, two in Illinois, two in Indiana, one in Iowa, one in Massachusetts and one in Michigan.

Boston

Pig Iron Sales Drop to Low Point—Finished Steel Business Good for Time of Year

BOSTON, Dec. 24.—Pig iron sales in this territory during the past week dropped to a minimum. Some of the Buffalo district furnaces reported larger bookings, but individual sales were in small tonnages and failed to bring the week's business up to the previous week's level. A fair amount of Indian iron also was sold. Buffalo iron is still offered at \$17.50 a ton, furnace, for No. 2 plain, and \$18 for No. 2X, while all sales of No. 1X reported were at \$19, instead of \$19.50, as openly quoted. Indications are the Mystic Iron Works' December sales will total 25,000 tons. In that event December will be the second largest month for sales in the history of the stack.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.41 to \$22.91
*Buffalo, sil. 2.25 to 2.75..	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25.	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75.	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.77
Ala., sil. 2.25 to 2.75.....	23.91 to 26.27

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Coke.—Specifications against 1928 by-product foundry coke contracts are exceptionally heavy for late December. Foundries are busier than they were a year ago. Specifications also have been made for early January shipments. New England producers quote such fuel at \$11 a ton, delivered within a \$3.10 freight rate zone, unchanged from a month ago, but 50c. a ton less than a year ago. Domestic by-product coke is in good demand and ovens are pushed to the limit to keep up with orders.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zeas	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler.....	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Finished Material.—Sales of finished material in general by the leading steel mills so far in December have run approximately 12 to 15 per cent ahead of those for November, and considerably more than that ahead of December last year. November sales in some instances were the best for any one month this year.

Old Material.—A marked slump in shipments of old material out of New England occurred in the past week. Brokers say there is nothing significant in the slump, and that it usually comes just before the close of a year. There have been no changes in prices. Further activity in the export market is expected after Jan. 1. Exporters have experienced difficulty in securing shipping space. Wire, rails,

poles and other street railway equipment, representing an investment of \$2,060,718, have been sold by the Springfield Street Railway and the Worcester Consolidated Street Railway to the New England Allite Corporation, Worcester, Mass.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.00 to \$11.50
Scrap T rails.....	10.50 to 11.00
Scrap girder rails.....	10.00 to 10.25
No. 1 railroad wrought....	11.50 to 12.00
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings....	6.25 to 6.50
Cast iron borings (steel works and rolling mill).....	6.00 to 6.25
Bundled skeleton, long....	9.00 to 9.25
Forge flashings.....	9.00 to 9.50
Blast furnace borings and turnings	5.75 to 6.10
Forge scrap	7.50 to 8.00
Shafting	13.00 to 13.50
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long) ..	9.50 to 10.00
Rails for rolling.....	11.50 to 12.00
Cast iron borings, chemical ..	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

St. Louis

Missouri Pacific Orders 55,800 Tons of Rails—3000 Tons of Steel Awarded for Apartment House

ST. LOUIS, Dec. 24.—Holiday dullness has affected the pig iron market, and sales were very light in the past week. Sales of the St. Louis Gas & Coke Corporation totaled only 1050 tons; the largest order was for 250 tons for an Illinois stove foundry. All sales were for first quarter. Two East Side melters are negotiating for a total of 1500 to 2000 tons, which will be closed this week. Shipments of the Granite City maker for December are expected to be about 40,000 tons ahead of those of the same month last year. Stove makers in the district have closed down for inventory and repairs over the holidays, but jobbing foundries will be down probably only for Christmas day. The market continues firm at unchanged prices.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$20.00
Malleable, f.o.b. Granite City.....	20.50
N'th'n No. 2 fdy., deliv'd St. Louis..	22.16
Southern No. 2 fdy., deliv'd.....	20.92
Northern malleable, deliv'd.....	22.16
Northern basic, deliv'd.....	22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Domestic coke is moving in large volume as a result of the colder weather, and the Granite City by-product concern has been able to materially reduce its piles. Heavy melt has caused a greater consumption of foundry coke.

Rails and Track Supplies.—The Missouri Pacific, including the International-Great Northern, has purchased 55,800 tons of 90 and 110-lb. rails; 151,000 pairs of angle bars and 24,000 kegs of track spikes and bolts. The rails were divided among the Illinois Steel Co., Inland Steel Co.,

Colorado Fuel & Iron Co., Tennessee Coal, Iron & Railroad Co. and Bethlehem Steel Co. These companies and the Sheffield Steel Co., Scullin Steel Co. and Railroad Supply Co. will furnish the track supplies, according to an announcement of the purchasing department.

Finished Iron and Steel.—The most important transaction of the week was the award to the Mississippi Valley Structural Steel Co. of 3000 tons for an apartment house at Kingshighway and Maryland Avenue. The Illinois Highway Commission opened bids this week for highway paving and bridge work that will require about 2250 tons of reinforcing bars. Specifications for sheets and plates have been received in satisfactory volume by the Granite City Steel Co. Warehouse business has been falling off steadily since Dec. 15.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24) ..	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.....	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Old Material.—The market for old materials was quiet during the past week, and only a few sales of items needed for fill-in purposes were made. However, the market is strong, in expectation of a heavy buying movement which is expected to develop soon. Railroad lists: Chicago & Eastern Illinois, 800 steel underframe gondola cars; Great Northern, 2500 wheels; and Frisco lines, 37 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel	12.50 to 13.00
No. 1 locomotive tires....	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart....	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought....	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings and shoveling turnings	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Heavy turnings	9.50 to 10.00
Steel car axles	19.50 to 20.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought....	13.00 to 13.50
Steel rails, less than 3 ft..	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machine cast	15.50 to 16.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Canada

Structural Steel Leads in Market Activity

TORONTO, ONT., Dec. 24.—While there has been a slight curtailment of spot pig iron buying, general business in this market continues active. A considerable number of orders have been taken for first quarter delivery. About 60 per cent of the contract buyers have covered first quarter needs. Canadian pig iron prices have not changed during the week; sales are being made at \$23.60, Toronto, for No. 1 foundry iron, and at \$25 to \$25.50 in the Montreal district.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—As a result of the record building year in Canada, several structural steel fabricators have made extensive enlargements to plants to cope with the demand. Business has fallen off in the past week, but prospects are good. In eastern Canada, Toronto heads the list in projected building; pending jobs include

1200 tons for new building on St. Joseph Street, Toronto, for St. Michael's College; 1200 tons for new automobile building at the Canadian National Exhibition, Toronto; 1200 tons for an office building on Richmond Street, and 5000 tons for a 20-story hotel on York Street, Toronto; 2500 tons for building for Victoria College, Toronto; 250 tons for factory for Rogers Batteryless Radio Co, on Fleet Street, Toronto; 125 tons for addition to plant of General Steel Wares, Ltd., London, Ont.; 250 tons for factory at Cap de la Madeleine, Que., for Claude Denis & Co.; 600 tons for addition to Empress Hotel at Victoria, B. C., for the Canadian Pacific Railway.

Old Material.—Prices in the Toron-

to and Montreal markets show no change for the last week of the year.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$7.00 to \$7.50
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00 to 11.50
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	16.00 to	17.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Many Plants to Be Shut Down for Five-Day Holiday Period —First Quarter Outlook Good

BIRMINGHAM, Dec. 24.—The only new pig iron business during the past week was a few small-lot sales. First quarter iron is more nearly covered than it has been for any like period in several seasons. Shipments are lighter as plants prepare to shut down for the holiday period. Prices are unchanged; one company quotes \$17 and the others \$16.50. There have been no changes in furnaces in blast; eight are on foundry, nine on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil. ..	\$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil. ..	17.00 to 17.50
Basic	16.50

Finished Steel.—New business and inquiries have held up remarkably well during a period that has nearly always been dull. Prospective business is reported by sales officials to be very good. Shipments dropped considerably during the past week. Major operations in the district are to be closed down for a five-day period beginning Dec. 22. Structural steel fabricators report more business on books than in several months. The Virginia Bridge & Iron Co. has booked 1155 tons for an office building at Mobile. On Dec. 19 this company shipped 32 carloads for the American Enka Corporation at Asheville, N. C. Reinforcing bar manufacturers have had a good week. New orders received by the Connors Steel Co. include 180 tons for a warehouse at Birmingham and 175 tons for a gymnasium at New Orleans. During the past week the Tennessee company operated seven and eight open-hearth at Ensley and seven at Fairfield. The Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—The market has been passive during the past week in new business. Prospective business for the first quarter is becoming more encouraging as public utility and mu-

nicipal requirements are made known. Good tonnages are in prospect from Detroit and Milwaukee. Feelers from public utilities indicate that several tonnages ranging from 15,000 to 50,000 tons will be up for figures in the near future. Most of the plants in the district will be closed down from a week to 10 days during the holiday period. Makers are maintaining quotations of \$37 to \$38 on 6 in. and larger sizes.

Coke.—Buying has slackened, and new business is expected to be small until after the holidays.

Old Material.—Only a small amount of buying is being done. Inquiries are light and the condition of the market has changed very little. Dealers look for an active market after the holidays.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	\$12.50
Scrap steel rails	\$12.00 to 12.50
Short shoveling turnings ..	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem....	13.50 to 14.00

Directors of the Laclede Steel Co., St. Louis, have declared a 50 per cent stock dividend to be submitted to stockholders on Feb. 28. Under the plan the present capitalization will be increased from \$2,750,000 to \$4,125,000, and stockholders will receive one new share for each two shares now held. It also is intended to lower the par value of the stock from \$100 to \$20, and issue five new shares for each share now held, which would give stockholders 7½ shares for each share now held. In 1928, the stock paid cash dividends of \$15 a share.

Pacific Coast

Cast Iron Pipe Leads in Week's Business—Most Lines Suffering from Year-End Dullness

SAN FRANCISCO, Dec. 22 (*By Air Mail*).—Bookings of iron and steel products on the Coast during the past week consisted mostly of cast iron pipe tonnages, of which a fair aggregate was placed. Outstanding was 1350 tons for a street improvement project in Los Angeles, awarded to the American Cast Iron Pipe Co. Mill representatives look for little new steel business until after the first of the year. The price situation is fairly firm in most lines, with the exception of out-of-stock quotations on reinforcing steel bars in Los Angeles and San Francisco.

Building permits issued in Los Angeles up to and including Dec. 12 numbered 1058, with an estimated valuation of \$2,802,266, compared with 1052 permits and a valuation of \$2,673,711 for the corresponding period in December, last year. So far this year, \$94,448,713 in permits has been issued, compared with \$118,978,201 for the same period in 1927.

Pig Iron.—Trading in foundry pig iron is limited to unimportant lots. Little improvement is noted in the rate of operations among the jobbing plants. Prices continue unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards, with two exceptions, were confined to lots of less than 100 tons. The Northwest Steel Rolling Mills took 200 tons for highway work for the State at Olympia, Wash. An apartment in Los Angeles calling for 200 tons was placed with an unnamed interest. No new inquiries of importance came up during the week. Bids have been opened on 276 tons for highway work in Imperial County, Cal., and on 121 tons for the Missouri River bridge at Helena, Mont. Prices on mild steel bars continue firm at 2.30c., c.i.f. Coast ports, while out-of-stock quotations of reinforcing bars in Los Angeles and San Francisco continue weak at 1.80c., base.

Plates.—From present indications, plate awards during 1928 will fall considerably below the aggregate booked last year. The Willamette

Iron & Steel Works took 375 tons for three roller type dam gates for the Leaburg project at Eugene, Ore., and 180 tons for sulphite digesters for an Oregon plant. Bids were opened this week on 250 tons for a steel storage tank for the Marin Municipal Water District at San Rafael, Cal. Prices are firm at 2.25c. c.i.f.

Shapes.—Although fabricators are fairly busy figuring on new work, awards this week were by no means heavy. Dyer Brothers secured 180 tons for a gymnasium in San Francisco and McClintic-Marshall Co. took 146 tons for an apartment in San Francisco. Bids were opened this week on 661 tons for the Missouri River bridge at Helena, Mont. Plain material continues firm at 2.35c., c.i.f. Coast ports.

Cincinnati

Coke and Scrap Prices Higher—Sheet Mills Well Occupied With Releases for January Shipment

CINCINNATI, Dec. 24.—The past week has been the duller of the year in the pig iron market. Scattered sales of small lots of Northern foundry iron totaled less than 2000 tons, and there are no pending inquiries of consequence before the trade. The price situation remains unchanged. One Alabama furnace is asking \$17, base Birmingham, but all other Southern producers are taking business at \$16.50. Southern Ohio foundry iron is quoted nominally at \$18.50 to \$19, base Ironton. Indications are that consumers will not resume buying on an appreciable scale until about the middle of January.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil.	1.75 to	
2.25	.....	\$20.39 to \$20.89
Ala. fdy., sil.	1.75 to 2.25	20.19 to 20.69
Ala. fdy., sil.	2.25 to 2.75	20.69 to 21.19
Tenn. fdy., sil.	1.75 to 2.25	20.19
S'th'n Ohio silvery, 8 per cent	.....	27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—District sheet manufacturers report that bookings this month have exceeded production by a comfortable margin, so that unfilled tonnage is at the highest point in several months. Maintenance of the present operating schedules well into January is assured. Automobile companies working on new models are beginning to ask for body stock, and in some cases orders for rush delivery have been placed. Prices are showing strength, with blue annealed at 2.10c., base Pittsburgh, black at 2.85c., galvanized at 3.60c., and automobile body sheets at 4.10c. The fact that quotations on bars, shapes and plates are not changed for first quarter has

Cast Iron Pipe.—Cast iron pipe representatives are keenly interested in the inquiry put out by Portland for 3135 tons, bids on which are to be opened Dec.*28. Alternate bids are being taken on Class B and sand cast pipe, the sizes ranging from 4 to 20 in. The American Cast Iron Pipe Co. booked 1350 tons of 2 to 10-in. Class B pipe for Lomita District No. 13, Los Angeles. The Pacific States Cast Iron Pipe Co. secured 250 tons of 4 and 8-in. Class 150 pipe for the East Bay Water Co., Oakland, 100 tons of 4 to 8-in. Class 150 pipe for Patterson, Cal., and 150 tons of 6 and 8-in. Class 150 for Riverside, Cal. Friday Harbor, Wash., placed 292 tons of 4 to 8-in. Class C pipe with the United States Cast Iron Pipe & Foundry Co., Burbank, Cal., awarded 66 tons of 4 and 6-in. Class B and 260 tons of 4 to 8-in. Class 250 pipe to the Pacific States Cast Iron Pipe Co. and the American Cast Iron Pipe Co., respectively. Bids have been opened on 324 tons of 6-in. Classes B and C pipe for San Diego.

taken away any price incentive which might lead to heavy specifications during the last few weeks of the year. Consequently, these products are quiet, but are steady at 1.90c. to 2c., base Pittsburgh. Rail steel reinforcing bars are quoted by a local maker at 1.90c. to 1.95c., base mill. The wire goods market is sluggish. Manufacturers are asking \$2.65 per keg, base Ironton, for common wire nails.

Coke.—By-product domestic coke for shipment to Cincinnati from district ovens will go up 50c. a ton Jan. 1, the new delivered prices being \$5.50 on walnut, \$5 on No. 2 nut and \$6.50 on egg. The schedule in Indiana will remain at the present level of \$4 on walnut, \$3.50 on No. 2 nut and \$5 on egg. At Detroit, by-product domestic egg advanced 50c. a

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and struc. shapes	.....	3.40c.
Bars, soft steel or iron	.....	3.30c.
New billet reforc. bars	.....	3.15c.
Rail steel reforc. bars	.....	3.00c.
Hoops	.....	4.00c. to 4.25c.
Bands	.....	3.95c.
Cold-fin. rounds and hex.	.....	3.85c.
Squares	.....	4.35c.
Black sheets (No. 24)	.....	3.90c.
Galvanized sheets (No. 24)	.....	4.75c.
Blue ann'd sheets (No. 10)	.....	3.45c.
Structural rivets	.....	3.85c.
Small rivets	.....	65 per cent off list
No. 9 ann'd wire, per 100 lb.	.....	\$3.00
Com. wire nails, base per keg	.....	2.95
Cement c't'd nails, base 100 lb. keg	.....	2.95
Chain, per 100 lb.	.....	7.55

Net per 100 Ft.

Lap-weld. steel boiler tubes, 2-in.	.....	\$18.00
4-in.	.....	38.00
Seamless steel boiler tubes, 2-in.	.....	19.00
4-in.	.....	39.00

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	.....	3.15c.
Soft steel bars	.....	3.15c.
Small angles, 7/8-in. and over	.....	3.15c.
Small angles, under 7/8-in.	.....	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.	.....	3.75c.
Spring steel, 1/4-in. and thicker	.....	5.00c.
Black sheets (No. 24)	.....	5.00c.
Blue ann'd sheets (No. 10)	.....	4.00c.
Galv. sheets (No. 24)	.....	5.40c.
Struc. rivets, 1/2-in. and larger	.....	5.65c.
Com. wire nails, base per keg	.....	\$3.40
Cement c't'd nails, 100 lb. keg	.....	3.40

ton to \$6.50, ovens, on Dec. 20. However, shipments for the remainder of the month specified previous to that time are being made at the old price. By-product foundry coke in this district is firm and unchanged at \$7, ovens, or \$9.14, delivered Cincinnati. Wise County beehive foundry coke is quoted at \$4.50 to \$5.25, ovens, and New River beehive foundry at from \$6.50 to \$7, ovens.

Old Material.—For the second consecutive week, heavy melting steel has advanced in price, while scrap rails, sheet clippings, bundled sheets and railroad wrought also have advanced from 25c. to 50c. a ton. District steel plants are accepting a moderate amount of scrap on current contracts, but fresh buying has been negligible. The growing strength of

prices is based largely on an anticipated increased demand for scrap during January and February rather than on the present rate of consumption.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.75 to \$14.25
Scrap rails for melting.....	13.50 to 14.00
Loose sheet clippings.....	9.75 to 10.25
Bundled sheets	10.50 to 11.00
Cast iron borings.....	9.75 to 10.25
Machine shop turnings.....	9.00 to 9.50
No. 1 busheling.....	11.00 to 11.50
No. 2 busheling.....	7.00 to 7.50
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires.....	14.00 to 14.50
No. 2 railroad wrought....	13.75 to 14.25
Short rails	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.25 to 10.75
Railroad malleable	14.75 to 15.25
Agricultural malleable	13.75 to 14.25

Finished Iron and Steel.—Mill operations have sagged sharply owing to the usual holiday lull and the disposition of the mills not to produce in excess of the demand. Bethlehem Steel Co. is down to a 50 to 60 per cent operation of mills and a corresponding drop in open-hearth operation. Several sizable structural jobs are out, but have not yet been awarded. Reinforcing bars are slow. Mills are confident of good conditions during the first quarter.

Detroit Scrap Higher

DETROIT, Dec. 24.—The market on old material is stronger, with hydraulic compressed registering an advance of 50c. to 75c. a ton, while heavy melting and shoveling steel, borings and flashings are 25c. higher.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.75 to \$14.25
Borings and short turnings	9.25 to 9.75
Long turnings	8.50 to 9.00
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets....	13.50 to 14.00
Stove plate	11.00 to 12.00
No. 1 busheling.....	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.75 to 12.25

Buffalo

Pig Iron Shipments Heavy—Steel Mill Operations Sag—Scrap Market Is Stronger

BUFFALO, Dec. 24.—The inquiry for pig iron in this territory is light over the holiday period, but shipping directions are extremely good and in some instances have been put ahead of schedule. The melt is exceptional. The General Electric Co. inquiry for 5700 tons for its various plants is still open, but the probability is that it will be placed very soon. A Pennsylvania melter seeks 300 to 400 tons of malleable, and an inquiry from the eastern part of the State is for 500 tons of foundry. An interest in the Buffalo district has inquired for 500 tons of low silicon malleable. A Donner furnace, which has been out for repairs, is expected to go back in blast about Jan. 1. Prices in the district are firm, but on sizable business for outside shipment differentials on silicon content are sometimes shaded.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25..	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal...	27.28

Old Material.—Buying has been occasional, but the market is strong, with a shortage of several grades, notably No. 1 heavy melting steel. Brokers in Youngstown and Pittsburgh have been offering \$18, delivered to those points, for hydraulic compressed and No. 1 steel. This has

drawn considerable of these grades from this territory. Dealers here predict \$18 for heavy melting steel within 30 days. Reduced operation of plants supplying turnings to the market has created something of a shortage for blast furnace requirements. There have been several sales of railroad knuckles and couplers and rolled steel wheels at \$17.50 to \$18 and some short shoveling turnings have been sold at \$12.50 to \$13. It is understood that the last tonnage of hydraulic compressed sold in this district brought \$17, though this may be an outside price.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades

No. 1 heavy melting steel.	\$15.50 to \$16.50
No. 2 heavy melting steel.	13.25 to 14.00
Scrap rails	15.50 to 16.00
Hydraul. comp. sheets....	13.50 to 14.00
Hand bundled sheets.....	12.00 to 12.50
Drop forge flashings.....	13.00 to 13.75
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings..	13.50 to 14.00
Machine shop turnings....	7.50 to 8.00
No. 1 railroad wrought....	12.50 to 13.00

Acid Open-Hearth Grades

Knuckles and couplers....	17.50 to 18.50
Coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50

Electric Furnace Grades

Short shov. steel turnings.	11.00 to 11.50
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Blast Furnace Grades

Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	9.00 to 9.50

Rolling Mill Grades

Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00

Cupola Grades

No. 1 machinery cast.....	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars....	13.00 to 13.50
Steel rails, 3 ft. and under.	17.50 to 18.00
Cast iron carwheels.....	13.00 to 13.50

Malleable Grades

Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

A. O. Smith Pipe Orders Total 174,500 Tons

The A. O. Smith Corporation, Milwaukee, in recent weeks, has received orders for five major pipe lines, calling for 174,500 tons of electrically welded steel pipe. The new lines, which have been mentioned in THE IRON AGE markets at the times of the individual lettings, are as follows: Tulsa, Okla., to Lockport, Ill., requiring 636 miles of 12-in. pipe, 70,000 tons; part of Roxana line, calling for 100 miles of 10-in. pipe, 8500 tons; El Paso natural gas line from El Paso, Tex., to Lea County, N. M., involving 205 miles of 16-in. pipe, 23,000 tons; Western Public Service line from Baxter Basin to Salt Lake City and Ogden, Utah, calling for 287 miles of 14, 16 and 18-in. pipe, 33,000 tons; and a gas line, the details of which are to be announced later, 40,000 tons. The Smith Corporation made its first shipment of pipe in September, 1927.

The Weirton Steel Co., Weirton, W. Va., has contracted with the Rust Engineering Co., Pittsburgh, for the construction of a Kathner-type normalizing furnace, employing removable bung sections over the entire length of the furnace to provide easy access to the alloy rolls. The furnace will be 84-in. wide inside and 222-ft. long. It will have a capacity of 200 tons of normalizing sheets per day, using coke oven gas for fuel. The Duraloy Co., Pittsburgh, will furnish the alloy disks and shafts.

Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struc. shapes.....	3.40c.
Soft steel bars	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10)....	3.50c.
Com. wire nails, base per keg....	\$3.60
Black wire, base per 100 lb.....	3.75

Belgian Prices Less Firm

Exporters Still Delay Buying, But Germany Is Not Yet Able to Compete—Pig Iron Quiet

ANTWERP, BELGIUM, Dec. 7.—The number of actual transactions in iron and steel is decreasing, but with slight weakness of prices evident, there is a good volume of inquiry from buyers seeking substantial concessions. Mills, however, are fairly well booked with orders and not inclined to shade present prices. Settlement of the German lockout has not brought any serious reaction in the market, but it is estimated that the German suspension has represented a loss of about 1,600,000 tons of steel production, of which about 350,000 tons would have gone for export. Buyers for export have been delaying purchases for a possible decline in prices following the end of the lockout, but German domestic demand is heavy and German mills are not seeking export tonnage at present, so some good export business is expected to develop with Belgian and French producers.

Pig Iron.—The market is quiet and prices unchanged at 118 Belgas (\$16.41) per ton for No. 3 phosphoric foundry iron, f.o.b. furnace. For export, the price is reported firm at £3 5s. (\$15.80) per ton, Antwerp, and occasional sales of small lots bring £3 6s. to £3 7s. (\$16.04 to \$16.28) per ton. British pig iron continues a factor in Bessemer and

hematite grades. The scrap market is strong and available supplies small. Open-hearth furnace steel is quoted at 103 Belgas (\$14.33) and No. 1 cast scrap for foundries at 128 Belgas (\$17.80).

Semi-Finished Material.—Consumers are seeking concessions, but most mills are well booked with orders for a number of weeks and show no inclination to accept lower than present prices. Billets are quoted at £5 2s. (\$24.79) per ton, Antwerp, for 2-in. and £4 18s. (\$23.81) per ton for 3-in. Sheet bars are firm at £5 (\$24.30) per ton, f.o.b. Antwerp.

Finished Material.—Mills are well provided with tonnage and not inclined to grant concessions sought by buyers, except on certain products. Steel bar prices are slightly easier for large sizes. On desirable specifications steel bar quotations have declined to £6 2s. per ton (1.34c. per lb.), f.o.b. Antwerp and for early delivery, premiums have brought the price to £6 3s. and £6 3s. 6d. per ton (1.35c. and 1.36c. per lb.), f.o.b. Antwerp. Normal specifications of beams bring £5 2s. per ton (1.12c. per lb.). Hot rolled hoops are quoted at £6 5s. per ton (1.37c. per lb.) and cold rolled hoops at £10 15s. per ton (2.37c. per lb.), f.o.b. Antwerp.

Brown-Lipe Gear Now Part of Unit Corporation

The Unit Corporation of America, Milwaukee, has announced the acquisition of the Brown-Lipe Gear Co., Syracuse, N. Y., as the fifth manufacturing unit to come under its control, all being engaged in the production of transmission units for automobiles, motor trucks and tractors. The Milwaukee concern originally was a consolidation of the Dallman Machine & Mfg. Co., and the Obenberger Forge Co., both of Milwaukee. Later it acquired the Universal Power & Equipment Co., Detroit, and a short time ago the Fuller & Sons Co., Kalamazoo, Mich., was added.

Coes Wrench Co. Acquired By Bemis & Call

The Bemis & Call Hardware & Tool Co., Springfield, Mass., has purchased the business of the Coes Wrench Co., Worcester, Mass., and will consolidate the manufacture of this line of screw wrenches in the Springfield factory. The Coes Wrench Co. is closely affiliated with Loring Coes & Co., manufacturers of machine knives, and this

business will continue at Worcester without change. In announcing the consolidation it is stated that there are brought together the largest American manufacturers of monkey wrenches and combination wrenches.

The Coes company was founded by Loring Coes, inventor of the screw wrench. With his brother, Aury G. Coes, he established a small factory in Worcester in 1840 for the manufacture of the newly invented wrench. The business grew rapidly, requiring from time to time increased facilities, until finally the present plant was erected in about 1875. J. C. McCarty, New York distributor of the Coes wrench, will handle the Bemis & Call line.

Hamilton, Ohio, Machinery Firms Are Merged

The Niles Tool Works Co., Hamilton, Ohio, subsidiary of the Niles-Bement-Pond Co., New York, and the Hoover, Owens, Rentschler Co., also of Hamilton, have been consolidated under the name of the General Machinery Corporation. The plants of the two companies adjoin and the consolidation will offer many advan-

tages in continuing the manufacture of heavy machinery. The Niles-Bement-Pond Co. will receive common stock in the new corporation in exchange for the stock of its subsidiary.

G. A. Rentschler, president of the Hoover, Owens, Rentschler Co., will be president of the new concern; Gordon S. Rentschler, assistant to the president; William B. Mayo, chief engineer Ford Motor Co., A. A. Byerlein and Curtis T. Ziegler, vice-presidents, and Walter A. Rentschler, secretary and treasurer.



Steel Towers Support Aviation Beacons

THE steel tower shown in the accompanying illustration, which has been erected on Mount Diablo in California by the Standard Oil Co. of California, is one of a system being established on the Pacific Coast by the Airways Division, Department of Commerce. The beacon is equipped with a 10,000,000-cp. light and the 3-ft. drum is rotated by a water-tight motor through gears at 6 r.p.m., thus giving the aviator an opportunity to pick up the flash of the beacon every 10 seconds. The code letters "SD," 10 or 12 ft. in height, are hung on the tower and are outlined in Neon lights. Twenty-three of these beacons have been established between Las Vegas, N. M., and Los Angeles and another airway between Los Angeles and San Francisco will have 34 such lights.

Non-Ferrous Metal Markets

Copper Active and Firm, Tin Very Quiet and Steady, Lead and Zinc Prices Unchanged with Sales Light

NEW YORK, Dec. 24.

Copper.—Despite the holiday season, buying by both foreign and domestic consumers has been of substantial proportions during the last few days. Foreign demand has been larger than domestic, particularly from Germany. Sales on Saturday, Dec. 22, were about 6000 tons, and the total foreign sales thus far this month are estimated at about 30,000 tons. Foreign buying has included January and February principally, but considerable metal must yet be bought for those positions.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	51.75c. to 52.75c.
Tin, bar.....	53.75c. to 54.75c.
Copper, Lake.....	17.00c.
Copper, electrolytic.....	16.75c.
Copper, casting.....	16.00c.
Zinc, slab.....	7.50c. to 8.00c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.50c. to 10.00c.
Antimony, Asiatic.....	12.00c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar'n't'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½.....	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar.....	56.50c.
Copper, Lake.....	17.00c.
Copper, electrolytic.....	17.00c.
Copper, casting.....	16.75c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.00c. to 7.25c.
Lead, bar.....	9.75c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	19.25c.
Babbitt metal, high grade.....	58.50c.
Solder, ½ and ½.....	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	20.25c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier.....	26.25c.
Seamless Tubes—	
Brass.....	25.12½c.
Copper.....	26.00c.
Brazed Brass Tubes.....	28.25c.
Brass Rods.....	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 24	Dec. 22	Dec. 21	Dec. 20	Dec. 19
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.....	49.62½	....	49.25	49.50	49.50
Lead, New York.....	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis.....	6.35	6.35	6.35	6.35	6.35
Zinc, New York.....	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis.....	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

Domestic buying, which has been quite substantial, has been largely for February delivery, with sales for March more liberal. Speculation is again active as regards prices, and opinion is heard in some quarters that quotations may be advanced before Jan. 1, particularly if present volume of demand continues. Prices are very firm at 16c., delivered in the Connecticut Valley, and at 16.25c., c.i.f. European ports, for electrolytic copper. The Lake copper market is moderately active, with prices steady at 16.12½c., delivered, and sales abreast of production; purchases into March are reported.

Tin.—One of the duller markets in many weeks is the record of the week just passed. Sales totaled only slightly over 200 tons, caused partly by the general uncertainty concerning

the future trend of the market and the approaching holidays. Neither dealers nor consumers are interested, but it is predicted that the latter will begin to buy when Straits tin falls under 49c. Today the market was stagnant with many offices closed or closing, and spot Straits tin was nominal at 49.62½c., New York. London prices were little changed from those reported on Dec. 18, with spot standard at £224, future standard at £223 15s. and spot Straits at £224 2s. 6d. The Singapore price today was £226 5s.

Lead.—Demand is sluggish and consumers are booked well ahead. Prices are fairly steady at 6.35c., St. Louis, and the leading interest continues to maintain its contract quotation at 6.50c., New York. London prices have declined considerably lately, so much

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10.25c. to 10.50c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	20.50c.
Copper, hot rolled.....	25.00c.
Zinc.....	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.
Seamless Tubes—	
High brass.....	25.37½c.
Copper.....	26.37½c.
Rods—	
High brass.....	18.25c.
Naval brass.....	20.25c.
Wire—	
Copper.....	17.87½c.
High brass.....	21.00c.
Copper in Rolls.....	24.00c.
Brazed Brass Tubing.....	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire.....	13.50c.	14.50c.
Copper, light and bottoms.....	11.50c.	12.75c.
Brass, heavy.....	7.75c.	9.00c.
Brass, light.....	6.50c.	7.50c.
Hvy. machine composition.....	10.50c.	11.50c.
No. 1 yel. brass turnings.....	9.25c.	10.00c.
No. 1 red brass or compos. turnings....	9.75c.	10.75c.
Lead, heavy.....	5.125c.	5.625c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.75c.
Sheet aluminum.....	13.00c.	15.00c.
Cast aluminum.....	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass.....	20.50c.	
Copper, hot rolled.....	25.00c.	
Copper, cold rolled, 14 oz. and heavier.....	27.25c.	
Zinc.....	10.00c.	
Lead, wide.....	10.55c.	
Seamless Tubes—		
Brass.....	26.87½c.	
Copper.....	27.87½c.	
Brass Rods.....	18.25c.	
Brazed Brass Tubes.....	28.50c.	

so that there is some prospect of Mexican lead coming into this country, and there is a possibility that this may be permitted in view of the condition of supplies, so that the trend of prices may be slightly downward in the near future.

Zinc.—Demand for prime Western is very light, but the price situation is decidedly strong, at 6.35c., East St. Louis, and 6.70c., New York, for delivery through the first quarter. Ore prices were again unchanged last week at \$40, Joplin. Sales were 10,600 tons and production was 12,700 tons. Each week an advance in the ore price has been expected and it may develop soon. Producers are booked well ahead, but considerable metal must still be bought for the first quarter.

Antimony.—This market is quiet with quotations firm at 9.75c. for spot and 9.62½c. for futures, New York, duty paid.

Nickel.—Ingot and shot nickel in wholesale lots is quoted unchanged at 35c. and 36c., respectively. Electrolytic

nickel in cathode form is quoted at 37c. for this year's delivery, but for 1929 it will be obtainable on the same basis as for ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

DEC. 24.—This market is dull and prices are steady with the exception of antimony, which has been advanced. Sales of old metals are small and few in number, but prices are holding.

Prices, per lb., in carload lots: Lake copper, 16.25c.; tin, 50.50c.; lead, 6.45c.; zinc, 6.45c.; in less-than-carload lots: antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Coal Production Continues Heavy

Output of bituminous coal in the week ended Dec. 15 is reported by the United States Bureau of Mines at 11,024,000 net tons, a loss of 1.8 per cent from the 11,211,000 tons of the preceding week. Total production for November is given at 45,762,000 tons, which was 13 per cent above the 40,468,000 tons mined in November, 1927. It showed a drop of 4,600,000 tons, however, from the total for October, 1928, accounted for wholly by the difference in number of working days.

Anthracite production in November was reported at 7,458,000 tons, compared with 8,554,000 tons in the preceding month and with 6,854,000 tons in November, 1927.

For the elapsed portion of the calendar year, through Dec. 15, production has been 473,100,000 tons of bituminous coal and 74,115,000 tons of anthracite. Both are lower than last year, when bituminous coal was raised to the total of 499,848,000 tons, up to Dec. 15, and anthracite, 77,682,000 tons.

Reinforcing Steel

Illinois Highway Work Will Take 2250 Tons

WITH Illinois State highway work calling for 2250 tons and five junior high schools at Chicago, 1500 tons, new projects totaled more than 6700 tons. The following awards, amounting to 2100 tons, include no projects of outstanding size:

RICHMOND HILL, N. Y., 175 tons, telephone building, to Concrete Steel Co.

JERSEY CITY, 800 tons, Delaware Lackawanna & Western Railroad terminal; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation. About 7500 tons yet to be placed.

MARION, N. J., 115 tons, bridge work for Pennsylvania Railroad; from Arthur McMullen Co., general contractor, to McClintic-Marshall Co.

BIRMINGHAM, 180 tons, warehouse for Long-Lewis Hardware Co., to Connors Steel Co.

NEW ORLEANS, 175 tons, new building for Young Men's Gymnastic Club, to Connors Steel Co.

PITTSBURGH, 100 tons, building for Whitaker Paper Co., to Carlem Engineering Co.

CHICAGO, 125 tons, warehouse, to Concrete Engineering Co.

CHICAGO, tonnage not stated, salesroom for Studebaker Corporation, to Inland Steel Co.

LOS ANGELES, 200 tons, apartment building, 521 South Hobart Street, to unnamed interest.

OLYMPIA, WASH., 200 tons for highway work, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BALTIMORE, 800 tons, bridge over Chesapeake Bay.

WASHINGTON, 1000 tons, building for United States Bureau of Internal Revenue.

CHICAGO, 1500 tons, five junior high schools; previous bids rejected.

CHICAGO, 450 tons, Fine Arts Building.

UNIVERSITY CITY, Mo., 400 tons, high school.

SPRINGFIELD, ILL., 2250 tons, highway paving and bridge projects for Illinois Highway Commission; bids opened.

HELENA, MONT., 121 tons, Missouri River bridge; bids opened.

SACRAMENTO, 113 tons, highway work in Los Angeles County; bids Dec. 26.

Railroad Equipment

Louisville & Nashville Orders 2500 Freight Cars

OUTSTANDING in a rather quiet week were orders for 2500 freight cars for the Louisville & Nashville and 100 gondola cars for the New York Central. Details of the week's business follow:

Louisville & Nashville has ordered 1200 gondola cars from Pressed Steel Car Co., 750 automobile and 250 gondola cars from Mount Vernon Car Mfg. Co. and 300 box cars from Pullman Car & Mfg. Corporation.

New York Central has ordered 100 70-ton high-side gondola cars from Merchants' Dispatch, Inc.

Chicago, Rock Island & Pacific has revised its inquiry for gas-electric cars and is now asking for bids on 14 instead of eight.

Norfolk & Western is inquiring for 10 baggage and express cars and five mail and baggage cars.

Wabash has ordered 35 single-sheathed automobile cars from American Car & Foundry Co.

Great Northern has ordered six 4-8-4 type locomotives from Baldwin Locomotive Works.

Atchison, Topeka & Santa Fe has ordered four 4-8-4 type locomotives from Baldwin Locomotive Works.

National Railways of Mexico are inquiring for three locomotive tenders.

Georgia Northern is inquiring for one Pacific type locomotive.

Pressed Metal Business Makes Substantial Gains

The Peter Smith Heater & Mfg. Co., which 14 months ago changed its name from the Peter Smith Heater Co. coincident with its purchase of a pressed metal plant at Fordson, Mich., reports a 62 per cent gain in its pressed metal business from Dec. 1, 1927, to Dec. 1, 1928, compared with the previous year.

Orders in October and November were 40 per cent above the average of several months previous. The company does pressed metal work for automobile companies and for railroads, in addition to its heater business. It reports excellent prospects for 1929, and expects to operate its plant at capacity.

Study Simplification of Copper Alloys

A committee of producers, consumers and trade paper representatives, under leadership of G. H. Clamer, Ajax Metal Co., Philadelphia, in cooperation with Non-Ferrous Ingot Metals Institute, is compiling and comparing the many specifications for copper alloys in ingot form, and collecting statistics on the amount of metal sold under each. It is hoped that this study will lead to a simplification of present practices, and the adoption of a few compositions with definite chemical limits to form the bases of trade paper quotations.

Rogers Brown & Crocker Brothers, brokers in pig iron, coke, ores and fluorspar, will hold their annual general sales conference at New York, Dec. 27, 28 and 29.

PERSONAL

HAROLD L. STEVENS has been elected president of the Danville Structural Steel Co., Danville, Pa. This is a re-rolling plant which was largely rebuilt last year, having two mills with combined capacity of about 12,000 tons a month. Old rails are transformed into reinforcing bars, tubing, fence posts and other specialties. Mr. Stevens, who was graduated at Cornell University in 1895, was most recently connected with A. Johnson & Co., importers, New York. Some years ago he was with Sweet's Steel Co., Williamsport, Pa., having built a large part of that plant. Later he was at Buffalo, with the Lackawanna Steel Co., thence going to Boston as district sales manager. When the Lackawanna plant was acquired by the Bethlehem Steel Corporation Mr. Stevens became sales manager Central Iron & Steel Co., Harrisburg, Pa.

C. NEWMAN DAWE is in charge of the automotive division at the Detroit office of the Vanadium Corporation of America, which has recently been removed from 1355 Book Building to 2440 Book Tower. T. N. BOURKE is assistant manager of the division.

CHARLES HARDY, of Charles Hardy, Inc., Pershing Square Building, New York, dealer in tungsten and ferro-alloys, will sail on Dec. 29 for a stay of several weeks in Europe.

DAVID MANSON, for the last 36 years traffic manager for the Ohio Iron & Metal Co., First National Bank Building, Chicago, will retire from active business on Dec. 31. In his capacity with the Ohio company he had become one of the best known men in the scrap iron business.

M. A. POSSONS has been appointed manager of the New Process Stove Co., division of the American Stove Co., Cleveland, succeeding the late JOHN G. WAY. Mr. Possons has been superintendent of the company and has been connected with it about 40 years.

EDMUND P. BURKE, for the past several years identified with the sales organization of Truscon Steel Co. at Los Angeles and San Francisco, has been transferred to Youngstown, where he will be an assistant to C. I. AUTEN, vice-president.

C. D. DALLAS, president of the Dallas Brass & Copper Co., Chicago, has been elected first vice-president and a member of the board of directors of the newly formed Republic Brass Corporation. The Dallas company and each constituent unit will continue to operate under their own names as divisions of the Republic corporation, and the Chicago company will continue the same offices and personnel.

TAYLOR ALLDERDICE has resigned as president of the National Tube Co., Pittsburgh, according to information received as THE IRON AGE goes to press. It is understood that he will be succeeded on Jan. 1 by FRED W. WATERMAN, who had charge of the construction of the Gary tube works of the National company. Mr. Allderdice became president of the company in April, 1926, following the retirement of William B. Schiller, having served as vice-president in charge of operations since 1902. He became identified with the steel industry in 1881 with the old Pittsburgh Bessemer Steel Co., Ltd., Homestead, Pa., which was later absorbed by Carnegie, Phipps & Co., Ltd., and was the nu-



TAYLOR ALLDERDICE

cleus of the present Homestead works of the Carnegie Steel Co. He continued this association until 1892, when, after spending a short time with the Pottsville Iron & Steel Co., Pottsville, Pa., he became associated with the National Tube Works Co. at McKeesport, Pa., in charge of the erection and operation of the new Bessemer steel works of the Monongahela Furnace Co. which had just been acquired by the National company.

MYRON C. TAYLOR, chairman of the finance committee of the United States Steel Corporation, New York, has made a gift of \$1,500,000 to Cornell University for a new building for the law school at Ithaca, N. Y.

RAY T. BAYLESS, editor of publications for the American Society for Steel Treating, and J. EDWARD DONNELLAN, secretary of the organization's recommended practice committee, will arrive in Los Angeles on Dec. 31 to aid in making arrangements for the Western Metal Congress to be held in that city on Jan. 14 to 18. They will be given a reception by the Los Angeles chapter of the society early in the new year.

WILLIAM G. WEISS, who has been manager of the mill and warehouse department of Briggs & Turivas, Chicago, since 1920, has been elected vice-president and treasurer of the Scott-Weiss Steel Co., 110 South Dearborn Street, Chicago, heretofore known as the Scott Steel Co. In joining this company, Mr. Weiss again becomes associated with CHARLES T. SCOTT, president, with whom he was closely identified in the Briggs & Turivas organization prior to the formation of the Scott company in April of this year. Mr. Weiss was formerly associated with the Whitaker-Glessner Co., Portsmouth, Ohio, and during the World War he served as chief ordnance inspector for the Government, having been located at the plants of the Colorado Fuel & Iron Co., Pueblo, Colo., and the American Sheet & Tin Plate Co., Gary, Ind. Before going with Briggs & Turivas he was identified with the purchasing department of the International Harvester Co.

HARRY W. JONES has retired from the presidency as well as from active participation in the affairs of the Marshall & Huschart Machinery Co., Chicago. He will be succeeded by J. R. PORTER as president and general manager. FRANK SEESE continues as secretary and treasurer.

MRS. JEAN SHASSERE has recently been made manager of the accessory department of Olney J. Dean & Co., 137 South LaSalle Street, Chicago, engineers and manufacturers of reinforcing steel.

CARL F. WEIGEL has been appointed vice-president and general manager of the Hedges-Walsh-Weidner Co., Chattanooga, Tenn., which was recently acquired by the Combustion Corporation of America, 200 Madison Avenue, New York. Prior to the combination of the Walsh & Weidner Boiler Co. and the Casey-Hedges Co., which occurred early this year, Mr. Weigel had been for many years chief engineer of the former company. Until his recent appointment he had served as chief engineer of the combined organization.

HUGH W. RANKIN, for the last eight years identified with the E. W. Bliss Co., Brooklyn, has been appointed Detroit representative for the Thomson Electric Welding Co., Lynn, Mass., with headquarters at 2-219 General Motors Building. Effective Jan. 17, C. W. HILL, who formerly represented the Thomson company in New England, will again handle sales in the entire New England territory as direct factory representative. He will take over the territory now being covered by the Taylor Hall Welding Corporation, Worcester, Mass.

EDWARD T. MONROE has been appointed general purchasing agent of the Buffalo, Rochester & Pittsburgh Railway Co., with headquarters at Rochester, N. Y.

R. L. MATTHEWS has been added to the Chicago sales organization of the Wagner Electric Corporation, St. Louis. He is a graduate of Purdue University and has previously been associated with the Michigan Bell Telephone Co., the Armstrong Cork & Insulation Co. and the National Electric Products Corporation.

GEORGE T. SINKS, until recently with the McMyler Interstate Co., Cleveland, and previously with the Industrial-Brownhoist Corporation, Bay City, Mich., has been appointed vice-president and sales manager of the Otis Engine Corporation, 130 Clinton Street, Brooklyn. EDWIN F. DALEY, who is vice-president and general manager of the company, was, until Nov. 1, chief mechanical engineer for the Morse Dry Dock & Repair Co., Brooklyn, and previously he was for a number of years assistant superintendent of motive power and equipment and director of personnel on the Delaware, Lackawanna & Western Railroad.

GEORGE A. ORROK, consulting engineer, New York, has removed his offices from 124 East Fifteenth Street and 17 Battery Place to 52 Vanderbilt Avenue.

FRED O. SMITH, secretary and manager of purchases for the Vulcan Iron Works, Wilkes-Barre, Pa., has been elected a vice-president of that company. He is also a director of the company and vice-president and a director of the Wilkes-Barre Iron Mfg. Co., Wilkes-Barre.

WILLIAM MILLER, who has been attached to the Philadelphia office, Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed district sales manager in charge of the Atlanta office, which is to be opened in the Healey Building on Jan. 1. T. G. Roberts, formerly in the Washington office, has been transferred to the Philadelphia office as assistant district sales manager. BENJAMIN P. TOLES has been appointed Canadian district sales manager, with headquarters in the Toronto Star Building, Toronto, Ont., of the Jones & Laughlin Steel Products Co., a subsidiary of the Jones & Laughlin Steel Corporation. Mr. Toles' appointment and the opening of this office are effective Jan. 1.

ABRAM F. MYERS, chairman of the Federal Trade Commission, has resigned to accept a position with a motion picture organization. At the request of the President, Mr. Myers will continue with the commission until it disposes of some of its pending cases.

W. M. JENSEN has been appointed Pacific Coast manager Pittsburgh Steel Co., with headquarters in San Francisco. Mr. Jensen for many years was associated with the late A. C. RULOFSON, who represented the company on the Pacific Coast.

Obituary

WILLIAM C. JOHNSON, president of the William C. Johnson & Sons Machinery Co., St. Louis, died at his home in that city last week, aged 82 years. He was born at New Brunswick, N. J., and went to St. Louis when he was 17 years old, where he entered the machinery business. He established his own firm in 1904.

MURRAY MORRIS DUNCAN, one of the most prominent figures in the Lake Superior iron ore industry, with which he was associated for 30 years, and vice-president and director and former general manager of the mines of the Cleveland-Cliffs Iron Co., died Dec. 18, at his home in Ishpeming, Mich., after a long illness. He was 70 years of age. Mr. Duncan was born at Washington in 1858 and was graduated from Lehigh University in 1880. His first employment was with the Cambria Iron Co., Johnstown, Pa., as assistant chemist. In 1897, after experience with several Tennessee companies, he became associated with the Cleveland-Cliffs company as agent of its mines at Ishpeming. In 1908 he was elected a director of the company succeeding the late Peter White who died that year. He was made vice-president and general manager of the mines in 1916 and retained the active management of the company's iron-mining properties until poor health necessitated his retirement. He was a member of the American Institute of Mining & Metallurgical Engineers and of the Lake Superior Mining Institute having served as president of the latter organization.

CHARLES J. RICHARDS, president-treasurer Badger-Packard Machinery Co., machine-tool jobber, and president Richards Machinery Co., manufacturing machinist, Milwaukee, died Dec. 17, after a three weeks' illness. He was born at Manitowoc, Wis., in 1876 and established the machine shop in Milwaukee in 1906, becoming interested in the Badger-Packard business in 1922.

FRANK H. PAGE, president National Equipment Co., Springfield, Mass., maker of candy-making machinery, died on Dec. 19 at his home in that city, aged 64 years. He was born at Holyoke, Mass., and was graduated from the Massachusetts Institute of Technology. He began the manufacture of confectioners' machinery at Springfield in 1891.

HARRY D. PIERCE, former president of the National Sewing Machine Co., Chicago, was drowned Dec. 17 at Palm Beach, Fla.

EDWIN B. ROBINSON, assistant order manager American Steel & Wire Co., Worcester, Mass., died at his home in that city on Dec. 20. He had been associated with the Worcester company for 27 years, beginning in the shops and working up to his last position.

Combustion Engineers to Discuss Steel Subjects

A two-day conference of the combustion engineering division of the Association of Iron and Steel Electrical Engineers will be held on Jan. 23 at the William Penn Hotel, Pittsburgh, and on Jan. 24 in Carnegie Library, Duquesne, Pa. Subjects at the first day's session will be "The Isley Open-Hearth Furnaces;" "The Use of Heat Resisting Alloy Steel in the Steel Plant;" "Furnace Bindings;" "Fuel Utilization Practices in Europe;" "Employees Training for Combustion Work and Cooperation with Other Departments." The second day's session will be devoted to a symposium on gas cleaning and air conditioning.

Pittsburgh district section, Association of Iron and Steel Electrical Engineers will have an all day symposium covering lubrication at the William Penn Hotel, Pittsburgh, Saturday, Jan. 5, by L. P. Tyler, Vacuum Oil Co., Pittsburgh; C. W. Byden, DeLaval Separator Co., New York, and C. O. Norstrum, Keystone Lubricating Co., Philadelphia.

Two Companies to Make Hollow-Rolled Bars

Announcement has been made by the Old Dominion Iron & Steel Works, Belle Isle, Richmond, Va., that a contract has been entered into with the Burden Iron Co., Troy, N. Y., by which that company has the exclusive right—outside of the Old Dominion Iron & Steel Works, Inc.—to manufacture seamless hollow-rolled staybolt iron bars and bolts, under patent rights owned by the Old Dominion company. "Hence," says the announcement, "buyers of this product will have the advantage of a competitive market, the choice of two brands of iron and ample production capacity."

Threading Heads and Taps

A comprehensive catalog of 96 pages has been issued by the Landis Machine Co., Waynesboro, Pa., covering heads, chasers, grinders and taps for thread cutting. Illustrations show clearances, while the tabular matter in the book is such as to aid in selection of equipment for specific purposes.

Davison Coke & Iron Co., which bought the Neville furnace, Neville Island, Pittsburgh, from the American Steel & Wire Co., has plans on paper for another blast furnace on the land which it acquired at the time of the furnace purchase, but it is officially stated that the construction of another stack depends upon future conditions. Building of two more batteries of by-product coke ovens, plans for which have been worked out, also is a future rather than an immediate possibility.

Machinery Markets and News of the Works

Sales at High Peak in 1928

Machine Tool Business Best Since 1919 for Many Companies
and Largest Since War for Others

MACHINE tool business in 1928 was the largest since 1919 for many companies and for some it was the best year since the war. Even war-time records have been equalled or excelled in some districts and by some builders. The gain over 1927 is fully 25 to 50 per cent in all cases.

The improvement in sales in the year is traceable largely to three sources: automobile, aircraft and agricultural implement and machinery. In addition, replacement of obsolete equipment in the general industrial field was far above the average of recent years. Railroads, however, were not conspicuously large buyers.

The outlook for the first quarter of 1929 is regarded most hopefully. Inquiries are numerous, and, while there has been some falling off in the volume of orders in December, a renewed wave of buying is believed to

be in the making, and it is expected that it will get under way early in the new year. Automobile manufacturers are expected to continue as important buyers, while needs for aircraft manufacture are growing.

The Curtiss Aeroplane & Motor Co., Buffalo, continues to buy for a new plant addition. Its purchases, while not as heavy as those recently made by the Wright Aeronautical Corporation, will probably exceed \$200,000. A prospective buyer of tools is the American Cirrus Engines, Inc., temporarily located at 84 William Street, New York, which has taken over a plant at Belleville, N. J., for the manufacture under license of the Cirrus (British) airplane engine.

The Chicago & North Western Railroad is preparing a list which includes about \$140,000 worth of machine tools.

New York

NEW YORK, Dec. 24.—Nearly all machine tool sellers in this market will close their 1928 sales records with the comforting thought that the past year has been the best since the war. For a few companies the 1928 sales may total in dollars more than in any of the war years. There has been some falling off in orders in the past week, but inquiries are numerous and promise a good first quarter. The Curtiss Aeroplane & Motor Co., Buffalo, has continued the placing of orders for equipping a plant addition. It has introduced an innovation in buying in that salesmen and engineers representing various types of machines are called in conference in groups and each company is asked to state its proposition in the presence of competitors, especially as regards production claims.

A new airplane engine manufacturer which is expected to come into the market soon for machine tools is American Cirrus Engines, Inc., which has taken over a plant at 752 Washington Avenue,

Belleville, N. J., for production of Cirrus (British) engines under license. Temporary offices are at 84 William Street, New York. G. G. De Witt is purchasing agent and A. G. Lloyd is production manager. A few tools have been bought by the Wood Newspaper Machine Corporation, Plainfield, N. J.

Niles-Bement-Pond Co. has sold in the past week a wheel press, steam hammer, boring mill, four radial drills, two grinders and an upright drilling machine. Pratt & Whitney division sold three jig borers, four engine lathes, one vertical shaper, two thread millers and a centering machine.

Bids are being asked by Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, for initial work in connection with electrification of suburban lines in New Jersey, to cost about \$10,000,000. A steam-operated electric generating plant is under consideration near Kearny, N. J., to cost about \$4,000,000 additional. Engineering department of company is in charge.

Empire Architectural Iron Works, Randall Avenue and Truxton Street, New York, has purchased additional property and is reported planning expansion.

Toy Products Mfg. Co., 465 West Broadway, New York, has leased space in building at 585 Broadway, totaling about 20,000 sq. ft. floor space, for expansion.

American Aeronautical Corporation, 730 Fifth Avenue, New York, is considering new aircraft manufacturing plant at Bayshore, L. I., for parts and assembling, to cost more than \$50,000 with equipment.

Claude Neon Lights, Inc., 50 East Forty-second Street, New York, manufacturer of electric displays, etc., with main plant at Long Island City, is arranging for increase in capital from 100,000 to 3,000,000 shares of stock, disposing of 1,000,000 new shares at once, part of proceeds to be used for expansion.

Anheuser-Busch Ice & Cold Storage Co., 979 Brook Avenue, New York, has awarded general contract to Equity Construction Co., 25 West Forty-third Street, New York, for new two-story plant to cost about \$150,000 with equipment.

Lancia Motors of America, Inc., 140 West Fifty-seventh Street, New York, affiliated with Lancia Automobile Co., Turin, Italy, has arranged for sale of stock to total \$2,200,000, part of proceeds to be used for establishment of plant. Company has acquired factory on 14 acres at Poughkeepsie, N. Y., with 129,000 sq. ft. floor space, for output of 3000 cars during coming year.

Manhattan Electrical Supply Co., 11 Park Place, New York, has acquired United States Manganese Corporation, New York, recently formed with capital of \$1,000,000, and will consolidate with organization. About 8400 acres of manganese and mineral properties in Augusta County, Va., is secured through purchase, and Manhattan company is said to be planning installation of plant, with operating, storage and distributing facilities.

Shampan & Shampan, 188 Montague Street, Brooklyn, architects, have plans for two and three-story automobile service, repair and garage building, 100 x 250 ft., to cost over \$200,000 with equipment.

Perryman Electric Co., Thirtieth Street and Fourth Place, North Bergen, N. J., has awarded general contract to Bonanno Brothers, 1827 Bergen Turnpike, for three-story radio equipment manufacturing plant, 80 x 200 ft., to cost about \$80,000 with equipment.

Liberty Auto Radiator Co., 3218 Hudson Boulevard, Jersey City, N. J., will take bids at once for new two-story plant unit, 25 x 100 ft., to cost about \$30,000 with equipment. Flagg & Stades, 665 Newark Avenue, are architects.

Glo-Lite Corporation of America, Inc., 560 Broad Street, Newark, N. J., manufacturer of electric signs and displays, with plant at Irvington, has plans for factory unit at Harrison, N. J., to cost more than \$40,000 with equipment.

American Cirrus Engines, Inc., care of Col. R. Potter Campbell, 62 Montrose

Avenue, South Orange, N. J., president, recently organized to manufacture a British type aircraft motor, has leased factory on Washington Avenue, Belleville, N. J., totaling about 38,000 sq. ft. floor space, for parts and assembling plant.

L. & K. Ice Corporation, 19 West Forty-fourth Street, New York, has plans for artificial ice plant at Newark, consisting of three one-story units, 75 x 132 ft., 73 x 81 ft., and machine division, 25 x 96 ft., to cost more than \$225,000 with machinery. Frank Grad, 1023 Broad Street, Newark, is architect.

Brown Instrument Co., Philadelphia, maker of recording instruments, has removed New York office from 50 Church Street to larger quarters at 1502 Roebling Building, 117 Liberty Street.

New England

BOSTON, Dec. 24.—Machine tool business fell off the past week. Based on active negotiations involving considerable equipment, the trade is confident that good business will be closed during January and February. Several New England machine tool builders are still operating night shifts, and delivery dates on many types of equipment are extended into March and April. Small tool demand continues active.

Standard Foundry Co., Southgate Place, Worcester, Mass., will soon start work on a two-story addition, 35 x 41 ft.

Plans have been made by Bradford Hat Co., Haverhill, Mass., to replace a two-story machine shop recently destroyed by fire.

Equipment of Edward Wilkinson & Co., Inc., 253 Georgia Avenue, Providence, R. I., including a small number of metal-working tools, will be sold at auction Jan. 3.

Lockwood Greene Engineers, Inc., 24 Federal Street, Boston, will close bids Dec. 28 on a one-story and basement machine shop addition, 130 x 123 ft., for New Departure Mfg. Co., Bristol, Conn.

Henry & Richard, 112 West Street, Boston, architects, have plans for a power house, 45 x 60 ft., at State Normal School, Bridgewater, Mass. Pason Smith, 209 State House, Boston, commissioner, is in charge.

Prentice Mfg. Co., Kensington, R. I., manufacturer of buckles, has started work on a three-story plant, 40 x 100 ft., and a three-story unit, 30 x 70 ft.

Crane Co., Bridgeport, Conn., has started work on a plant, 120 x 600 ft., and a three-story cupola and elevator shaft, 32 x 45 ft.

B. F. Sturtevant Co., Boston, manufacturer of blowers, has moved its downtown office to 89 Broad Street.

Narragansett Electric Co., Providence, is arranging fund of more than \$1,400,000 for extensions and improvements next year. About \$500,000 will be used for expansion and betterments at plant on South Street, and about like sum for new power substation in downtown district.

Uncas Mfg. Co., 85 Sprague Street, Providence, has rescinded former contract and made general award to Bowerman Brothers, 70 Bath Street, for two-story addition and improvements to jewelry manufacturing plant, to cost about \$50,000 with equipment.

Gamewell Co., Newton, Mass., manufacturer of fire alarm equipment, has

The Crane Market

VERY little new inquiry for either overhead or locomotive cranes has developed in the past week. A fair number of orders is pending, but prospective buyers are slow to place business. A recent outstanding purchase of overhead equipment was made by the International Paper Co., 11 East Forty-second Street, New York, which closed on 18 hand-power and electric cranes for shipment to Dalhousie, N. B.

In the Pittsburgh district the A. M. Byers Co. has asked for 19 overhead cranes, one slab charger and one cupola charger for its new Ambridge, Pa., plant, as follows: Two 10-ton, 65-ft. and 80-ft. spans; six 15-ton, 40, 90 and 120-ft. spans; three 25-ton, 45, 80 and 90-ft. spans; two 20-ton, 85-ft. spans; four 35-ton, 40, 70, 85 and 100-ft. spans; one 5-ton, 25-ft. span, a 2½-ton slab charger and a cupola charger. The Youngstown Sheet & Tube Co. has added one more crane to its recent list of 11 for Indiana Harbor.

Among recent purchases are:

International Paper Co., 11 East Forty-second Street, New York, seven 16-ton, two 10-ton and two 3-ton hand-power cranes from a Canadian builder and one 35-ton, three 17½-ton and three 2-ton electric cranes reported from an American builder in Canada, all for shipment to Dalhousie, N. B.

American Enka Corporation, New York, 20-ton, 42-ft. span, 1-motor and a 10-ton 40-ft. span hand-power crane for Asheville, S. C., from Box Crane & Hoist Corporation.

N. P. Nelson Mfg. Co., Passaic, N. J., 7½-ton, 39-ft. span hand-power crane from Box Crane & Hoist Corporation.

Powell & Minnock Co., Coeymans, N. Y., 2½-ton, 30-ft. span, single I beam, 1-motor crane from Chisholm & Moore Mfg. Co.

Moses Ehrlich Iron & Metal Co., Springfield, Mass., used 7½-ton Brownhoist crawl-tread crane reported from Industrial-Brownhoist Corporation.

David Hummell Building Co., Cincinnati, 20-ton, 64-ft. span overhead crane from Bedford Foundry & Machine Co.

Pittsburgh Forgings Co., Pittsburgh, 10-ton, 60-ft. span crane from Shaw Electric Crane Co.

purchased plant and business of Holtzer Cabot Electric Co., 125 Amory Street, Boston, manufacturer of signal systems and equipment, and will operate as a division. Purchasing company is authorizing increase in capital from 67,500 to 150,000 shares of stock, part of proceeds to be used for expansion.

C. H. Lockwood, 171 Westminster Street, Providence, architect, has plans for two-story jewelry manufacturing plant for local company, name temporarily withheld, to cost about \$45,000.

Sikorsky Mfg. Corporation, College Point, L. I., manufacturer of aircraft and parts, has awarded general contract to W. J. Shaughnessy, Jr., Inc., 119 Fairfield Avenue, Bridgeport, Conn., for new plant at Stratford, Conn., to cost over \$400,000 with machinery. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is architect and engineer.

Rhode Island Malleable Iron Works, Hills Grove, R. I., has purchased capital

stock of Rhode Island Fittings Co., Providence, R. I. Malleable Iron Works is a jobbing foundry, making all kinds of castings and specializing in manufacture of pipe union castings. Fittings company will continue to be operated as separate unit, and will have same officers as Malleable Iron Works.

Philadelphia

PHILADELPHIA, Dec. 24.—Contract has been let by Brinton Foundry Co., Paul and Van Dyke Streets, Philadelphia, manufacturer of iron castings, to Davidson & Lavery, 4438 Leiper Street, for one-story addition, to cost about \$20,000 with equipment.

Automatic Temperature Control Co., 2500 North Lawrence Street, Philadelphia, has purchased property, 58 x 200 ft., at Germantown, and is said to be planning construction of new plant to occupy entire site.

Philadelphia Air Terminal, Inc., F. B. Biddle, secretary and treasurer, Morris Building, Philadelphia, recently formed by Mr. Biddle, Andrew S. Webb, president S. B. & B. W. Fleisher, Inc., Twenty-fifth and Reed Streets, and associates, has engaged B. Russell Shaw Co., Inc., 810 Olivé Street, St. Louis, engineer, to prepare plans for new airport at South Philadelphia, including hangars, repair and reconditioning shops, oil storage and distributing buildings, project to cost about \$2,000,000. Bids will soon be asked on general contract.

Biddle-Garrett Co., Philadelphia, recently formed by Fenton H. Middleton, 860 North Fifth Street, and associates, plans operation of local plant to manufacture iron and steel specialties, including automobile parts. Harry Hershey, 1233 Lehigh Avenue, is interested in new organization.

Pennsylvania Flexible Metallic Tubing Co., Broad and Race Streets, Philadelphia, has awarded general contract to E. H. Keefer & Son, 1321 Rodman Street, for two-story and basement addition, 45 x 125 ft., to cost more than \$50,000 with equipment. William H. Cookman, 420 West Price Street, is architect.

Plibrico Jointless Firebrick Co., New York Avenue, Trenton, N. J., manufacturer of firebrick and other refractories, has awarded general contract to Nicholson Co., 247 Park Avenue, New York, for addition to cost about \$100,000 with equipment.

Delaware Electric Power Co., Wilmington, Del., recently formed to take over and operate Delaware Power & Light Co., is disposing of bond issue of \$8,000,000, part of proceeds to be used for expansion and improvement in power facilities. Company is affiliated with United Gas Improvement Co., 1401 Arch Street, Philadelphia. T. W. Wilson is president.

American Horseshoe Co., Phillipsburg, N. J., has been acquired by Phoenix Horse Shoe Co., Joliet, Ill., recent purchaser of Bryden-Neverslip Co., Catasauqua, Pa., manufacturer of kindred products, and will be included in merger with that company. American company will retain its real estate and equipment, and plans to convert plant for another line of iron and steel production. E. R. Yarnelle is president of last noted company.

Department of Property and Supplies, Capitol Building, Harrisburg, Pa., is reported planning new steam-operated electric power plant at Capitol Park, to cost

more than \$850,000 with equipment. B. E. Taylor is in charge.

McClintic-Marshall Co., Pittsburgh, has acquired local plant and property of Pottstown Iron Co., totaling about 30 acres, for expansion.

Cincinnati

CINCINNATI, Dec. 24.—The temporary lull in buying incident to the holidays and to the annual inventory period is affecting sales of local machine tool builders, who report that business is being booked in considerably less volume than in November. Inquiries, however, are numerous and indicate a resumption of purchasing shortly after Jan. 1.

An appraisal of local machine tool sales in the past 12 months shows a substantial and unexpected gain over 1927. With hardly an exception, leading machine tool companies report an increase in business ranging from 25 to 50 per cent, the gain over 1927 probably averaging from 30 to 35 per cent. With such a spectacular betterment of conditions, it is not surprising that many machine tool builders did the largest volume of business since 1919.

The improvement in sales the past year can be traced largely to the automobile industry, agricultural implement makers and the airplane industry. Automobile manufacturers bought equipment in much heavier volume than in 1927, and in several cases machine tool companies state that almost all of their gain in business has come from the Detroit district. The tooling up of the agricultural implement plants throughout the country contributed substantially to the bookings of machine tool builders, while the purchase of tools by companies manufacturing airplanes and airplane engines was an important factor in stimulating activities. In addition, replacement of obsolete equipment by companies in the general industrial field was above the average of recent years.

Foreign business, especially from Europe, was in slightly larger volume than in 1927, but in the main was only a small percentage of the total bookings. Machine tool executives are of the opinion that little improvement in that direction can be expected the coming year. Railroad buying was disappointing and there is no sign that carriers will increase tool purchases to an appreciable extent in 1929.

Machine tool manufacturers are looking forward to a prosperous first quarter and buying of new equipment is expected to get under way before the middle of January. It is believed that the automobile industry will continue a prominent factor in the market.

Airport Commission, Columbus, Ohio, F. F. Green, A. I. O. U. Building, chairman, has plans for municipal airport at James Pike and Pennsylvania Railroad, to include hangars, repair and reconditioning shops and other units, to cost \$850,000. R. H. Simpson, City Hall, is engineer.

Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile electric lighting and starting equipment, has secured control of Columbus Auto Parts Co., Columbus, Ohio, and will operate as subsidiary for manufacture of tie rods, drag links and other mechanisms for automobile steering wheels. Columbus company is disposing of stock issue to

total \$1,525,000, part of fund to be used for expansion.

Aeronautical Corporation of America, Inc., Cincinnati, recently organized, has engaged H. Neilson Jackson, Mercantile Library Building, architect, to prepare plans for plant at municipal airport to manufacture airplanes. Initial unit will be one-story, 100 x 300 ft., for parts and assembling, to cost more than \$85,000 with equipment. Bids will be asked on general contract in about 30 days.

Shannon Spring Bed. Mfg. Co., 659 South Ninth Street, Louisville, has acquired property at Thirteenth Street and Garfield Avenue, formerly occupied by Mercury Body Co., and will remodel for new plant.

Kentucky Color & Chemical Co., Louisville, has purchased 10 acres at Kearny, N. J., for new plant to cost over \$200,000 with machinery. A machine shop will be installed.

Ebinger Sanitary Mfg. Co., 184 Lucas Street, Columbus, Ohio, manufacturer of plumbing equipment and supplies, has awarded general contract to E. Elford & Son, 555 Park Street, South, for one-story addition to cost about \$40,000 with equipment.

Pittsburgh

PITTSBURGH, Dec. 24.—Machine tool business this month has made a relatively good showing for the final month of the year. As a whole, 1928 has been better in sales and profits than 1927, and there is much optimism over early 1929 prospects.

One of Pittsburgh's district steel companies is expected to place a good-sized list of tools soon after the turn of the new year and the Westinghouse Electric & Mfg. Co. is expected to have a heavy first quarter list, since it bought rather sparingly against its list for this quarter. A. M. Byers Co., having asked for prices on cranes for its new plant at Ambridge, Pa., is expected shortly to inquire for tools for a new machine shop.

Plans are being prepared by Kerotest Mfg. Co., 2525 Liberty Avenue, Pittsburgh, manufacturer of steel and brass valves, etc., for three-story addition, including machine shop, to cost about \$100,000 with equipment. J. T. Steen & Son, Vandergrift Building, are architects.

Hamilton Pump Co., Pittsburgh, recently organized by E. A. Hamilton, 106 Gladstone Road, and associates, plans operation of local plant to manufacture centrifugal and other pumping machinery and parts. C. G. Lane, Jr., 1415 Park Building, will be an official of new company.

Wheeling Steel Co., Wheeling, W. Va., is planning construction of factory branch and distributing plant at Rensselaer, N. Y., for Eastern base, to cost about \$100,000 with equipment.

Commercial Body Co., Bluefield, W. Va., recently formed by B. W. Curry, 912 College Street, and associates, will operate local plant for manufacture of truck and other commercial automobile bodies.

Franklin Creek Oil Works, Franklin, Pa., operated by L. Sonneborn Sons, Inc., 114 Fifth Avenue, New York, is reported planning expansion and improvements at local refinery, with installation of stills, storage and distributing facilities to double present capacity, continuing expansion program started several months ago, to cost more than \$90,000.

Board of Education, Beaver Falls, Pa., contemplates installation of manual train-

ing equipment in new multi-story high school, to cost about \$250,000, for which bids will soon be asked by Carlisle & Sharrer, Martin Building, Pittsburgh, architects.

Board of Education, Administration Building, Pittsburgh, will receive bids until Jan. 3 for steel lockers, suit storage lockers, and other equipment. George W. Gerwig is secretary.

Chicago

CHICAGO, Dec. 24.—Purchases of machine tools are confined largely to odd pieces of equipment. The market does not lack inquiry, but it is evident that much of this will be held over until after Jan. 1.

Whiting Corporation, Harvey, Ill., is moving slowly in tabulating bids against its list. Buda Co., Harvey, Ill., has purchased a few items and bids have been made on the Austin Mfg. Co.'s list. Here and there some indication is given of future railroad purchases. Chicago & North Western is preparing a 1929 budget which includes \$140,000 worth of machine tools. An electrical appliance manufacturer in Milwaukee has ordered a press.

Hayes Body Corporation, Ionia, Mich., will spend \$170,000 for plant improvements and additions.

Hallis & Mead, sheet metal workers, 309 Twenty-fourth Street, Rock Island, Ill., have purchased adjoining property for expansion.

Scott Steel Co., 110 South Dearborn Street, Chicago, has changed its name to Scott-Weiss Steel Co. William G. Weiss, formerly manager of mill and warehouse department of Briggs & Turiyas, Chicago, is vice-president and treasurer.

Hisey-Wolf Machine Co., Cincinnati, maker of portable electric machine tools, has opened branch office at 210 Machinery Hall, 549 West Washington Boulevard, Chicago, in charge of Roy D. Haworth. Complete stock of company's products will be carried.

Atlas-Chicago Co., Chicago, has been sold and transferred to Grolan Mfg. Co., Dayton, Ohio, and will hereafter be known as Atlas Duo-Rail Co., division of Grolan Mfg. Co.

Storkline Furniture Corporation, 4400 West Twenty-sixth Street, Chicago, has asked bids on general contract for one and two-story addition, to cost about \$160,000 with equipment. R. B. Kurzon, 105 West Monroe Street, is architect.

Central Illinois Public Service Co., Public Service Building, Springfield, Ill., is disposing of bond issue of \$5,700,000, part of fund to be used for extensions in power plants and other utilities, including transmission lines. Bids will soon be asked for one-story ice-manufacturing plant at Cairo, Ill., to cost about \$60,000 with equipment.

Pines Winterfront Co., 404-24 North Sacramento Street, Chicago, manufacturer of automatic radiator shutters for automobiles, etc., has awarded general contract to Scown Building Co., 36 West Randolph Street, for two-story plant to cost more than \$800,000 with equipment.

Federal Sign Co., 1215 Nicollet Avenue, Minneapolis, Minn., manufacturer of electric signs and displays, has begun superstructure for two-story and basement plant at 3014 University Avenue, S. E., to cost close to \$40,000 with equipment. Larson & McLaren, Baker Building, are architects.

St. Louis

ST. LOUIS, Dec. 24.—Gaus-Boyer Mfg. Co., St. Louis, care of Harry G. Gaus, Clinton and Main Streets, recently formed with capital of \$50,000, plans establishment of new plant to manufacture refrigerators, equipment to cost about \$25,000.

South Side Machine Co., 4016 Nebraska Street, St. Louis, has plans for one-story plant, to cost about \$40,000 with equipment. Leonard Haeger, 3844 Utah Place, is architect.

Oklahoma Steel Castings Co., 1200 North Lewis Street, Tulsa, Okla., has begun construction of one-story foundry unit for which general contract recently was let to J. R. Forner Co., Ritz Building.

Root Refining Co., El Dorado, Ark., has been organized to take over and expand Root Refineries, Inc., now completing local gasoline refinery. New company has arranged for stock issue to total \$1,545,000, part of fund to be used for plant completion and other expansion. D. P. Hamilton is vice-president.

St. Louis Smelting & Refining Co., 722 Chestnut Street, St. Louis, has purchased properties of Schulte Mining Co., Fredericktown, Mo., including lead deposits, and plans development of latter properties, including refining facilities.

City Council, Kirksville, Mo., has plans for municipal electric light and power plant, to cost more than \$200,000 with equipment. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Buffalo

BUFFALO, Dec. 24.—Bids will be received by Board of Education, Genesee Building, Buffalo, until Jan. 10 for construction of Burgard vocational school, to cost more than \$750,000 with equipment.

Harrison Radiator Corporation, Walnut Street, Lockport, N. Y., has awarded general contract to John W. Cowper Co., M. & T. Building, for three-story addition to cost about \$130,000 with equipment. J. R. Tyler, Bank of Rochester Building, Rochester, N. Y., is architect.

Dry Ice Corporation of America, Inc., 50 East Forty-second Street, New York, manufacturer of freezing material made with carbon dioxide, plans construction of new plant at Niagara Falls, N. Y., to cost over \$100,000 with machinery.

J. P. Devine Co., 1372 Clinton Street, Buffalo, manufacturer of vacuum drying apparatus, chemical machinery, etc., recently acquired by Mount Vernon Car Mfg. Co., Mount Vernon, Ill., is having plans drawn for new plant at Mount Vernon, to cost over \$350,000 with equipment.

Hooker Electro-Chemical Co., Buffalo Avenue and Union Street, Niagara Falls, N. Y., is arranging bond issue of \$1,500,000, part of proceeds to be used for expansion, including new plant at Tacoma, Wash., on which work has been started; latter works will cost over \$1,000,000 with machinery.

Board of Education, Penn Yan, N. Y., plans installation of manual training equipment in new junior high school to cost \$425,000, for which bids will be asked soon on general contract. Carl Ade, 89 East Avenue, Rochester, N. Y., is architect.

Charles Griffin, 24 Garson Avenue, Rochester, and associates, plan operation of plant in name of Griffin & Yengst Metal Finishing Co., recently organized to manufacture metal specialties. Andres Yengst, 50 Mount Vernon Avenue, will also be an official of new company.

Milwaukee

MILWAUKEE, Dec. 24.—Perhaps not since the war has there been a holiday season in which production of machine tools has held up to the extent of this year. Most shops are far behind on deliveries, with buyers exerting pressure to procure shipments. New buying, while not as brisk as in recent weeks, is above normal for this season, and fresh inquiry is excellent.

Nash Motors Co., Kenosha, Wis., has broken ground for a new \$400,000 foundry to be devoted exclusively to casting cylinder blocks, heretofore provided under contract with an independent foundry at Racine, Wis. New foundry is in addition to other extensions being made at Kenosha, Racine and Milwaukee divisions, body plant at Milwaukee, and body stock mills at Pine Bluff, Ark., which call for an expenditure of over \$3,000,000.

Hamilton Aero Mfg. Co., 60 Keefe Avenue, Milwaukee, manufacturer of aluminum alloy and laminated wood propellers for aircraft, has acquired factory at Bremen Street and Concordia Avenue, affording 68,000 sq. ft., or four times the present capacity. Production schedule for 1929 calls for 50 propellers daily. Hamilton Metalplane Co., 530 Park Street, a separate corporation manufacturing complete aircraft, also is planning an increase in output, requiring additional equipment. Thomas F. Hamilton is president and general manager of both corporations.

Eastman Mfg. Co., 1002 North Eleventh Street, Manitowoc, Wis., will be ready for bids Jan. 10 for construction of a one-story shop addition, 60 x 66 ft. Company manufactures hose couplings.

Merrill Buick Sales Co., Merrill, Wis., has placed general contract with Joseph Doheney, local, for a two-story sales and service building, 76 x 85 ft., with basement. Machine shop area will be about 50 x 76 ft. With equipment it will cost about \$55,000.

W. W. Oefflein, Inc., 110 East Wisconsin Avenue, Milwaukee, has contract to build a one-story machine and assembling shop, 200 x 600 ft., as one of three new buildings of tractor division of main works of Allis-Chalmers Mfg. Co., West Allis, Milwaukee.

Public Utilities Commission, Manitowoc, Wis., expects to ask bids about Feb. 1 for an addition to municipal steam generating plant to cost \$250,000. Plans are being made by M. Schroeder, consulting engineer. A. H. Zander is city clerk.

Oneida Gas Co., Rhinelander, Wis., has been granted franchise by city of Merrill, Wis., to build a gas plant and distribution system and is now completing plans, to be ready for bidders about Feb. 1. An investment of \$75,000 is contemplated.

Master Lock Co., 918-926 Juneau Avenue, Milwaukee, manufacturer of pad locks exclusively, has taken additional space in its present building and is in market for equipment to provide 50 per cent increase in production.

Indiana

INDIANAPOLIS, Dec. 24.—Pacific Electric Mfg. Co., 5815 Third Street, San Francisco, manufacturer of electric switches, etc., is planning branch factory at Gary, to cost more than \$50,000 with equipment. I. M. Cohen, 738 Broadway, Gary, is architect.

Bond Electric Corporation, 1120 Division Street, Indianapolis, manufacturer of storage batteries, flashlights, etc., with headquarters at Jersey City, N. J., formerly known as Yale Electric Co., has leased part of plant at 1129 East Twenty-second Street, Indianapolis, for new factory for daily output of about 250 battery units. Arthur Kane is factory manager.

C. R. Wermuth, 1036 St. Marys Street, Fort Wayne, has begun construction of one-story machine shop, 75 x 108 ft., to cost about \$25,000 with equipment. Pohlmeier & Pohlmeier, Central Building, are architects.

Standard Oil Co., 910 South Michigan Avenue, Chicago, has awarded general contract to Hay-Weaver Co., 2410 South Main Street, South Bend, for two-story storage and distributing plant at South Bend, to cost about \$75,000 with equipment.

Chrysler Motor Corporation, Detroit, has authorized one-story addition to branch plant at Newcastle, Ind., 80 x 85 ft., to cost about \$35,000 with equipment.

Knefler-Bates Mfg. Co., 165 Palmer Street, Indianapolis, plans rebuilding part of four-story corn products plant destroyed by fire Dec. 15, with loss reported over \$200,000 including equipment.

Cleveland

CLEVELAND, Dec. 24.—Machine tool business fell off the past week which was not unusual with the holidays near at hand. The only activity among dealers was the sale of a few single tools. Some prospective business will go over until the new year. Deliveries are so far extended on some lines that they have become an important factor and some manufacturers are losing orders to competitors who can make quicker shipments. While not much business is expected during the remainder of the year, the trade looks for a good volume of sales during January.

Continental Carbon Co., 13904 Lorain Avenue, Cleveland, has awarded general contract to David Gilchrist, 97 East Grand Avenue, Berea, Ohio, for two two-story additions, to cost more than \$75,000 with equipment.

Lake Erie Metal Products Co., Dunham Road, Cleveland, is having plans drawn by Henry W. Griene, Engineers' Building, architect and engineer, for new one and two-story plant, 75 x 100 ft., to cost about \$55,000 with equipment.

Spicer Mfg. Co., South Plainfield, N. J., manufacturer of universal joints, axles, and kindred products for automobiles, is said to be planning addition to plant at Toledo, Ohio, to cost more than \$60,000 with equipment.

Board of Education, East Fourth Street and Rockwell Avenue, Cleveland, has rejected bids recently received for one and two-story addition to foundry at 525 Eagle Avenue, and has had plans revised. It will cost about \$45,000 with equipment. Bids will be asked early in January.

George M. Hopkinson, Auditorium Garage Building, is school architect.

Hazel-Atlas Glass Co., Wheeling, W. Va., has plans for one-story addition to machine shop at Zanesville, Ohio, reported to cost over \$50,000 with equipment. C. E. Handsby, 134 West Main Street, Zanesville, is architect.

Ferro Enameling Co., Keith Building, Cleveland, Ohio, manufacturer of enameled steel sheets, etc., has arranged for stock issue to total \$1,737,500, part of proceeds to be used for expansion.

Toledo Edison Co., Toledo, Ohio, is arranging fund of \$3,000,000 for extensions and improvements during 1929, of which more than one-half will be used for expansion at Acme power station, including new generating and other equipment.

Eastern interests engaged in manufacture of sanitary products allied to product of National Sanitary Co., Salem, Ohio, have purchased large holdings in that company and selling organizations of two companies will work in conjunction. Present capacity of National company will be required to take care of increased demand and provision will be made for extensions when necessary. Charles G. Burton continues as president and general manager of company.

Hill Clutch Machine & Foundry Co., Cleveland, has appointed following dealers: Lombard Iron Works, Augusta, Ga.; Murray Co., Dallas, Tex.; D. de Treville, Savannah, Ga.; J. G. Iler, Charlotte, N. C.; Cameron & Barkley, Charleston, S. C., and William G. Moorman, Buffalo.

South Atlantic

BALTIMORE, Dec. 24.—Richmond Car Works, Inc., Richmond, Va., subsidiary of Standard Steel Car Co., Frick Building, Pittsburgh, is said to have plans for extensions and improvements to cost more than \$400,000 including equipment. Work is scheduled to begin in about 30 days.

Port Development Commission, Munsey Building, Baltimore, has plans for one-story warehouse and terminal building to cost about \$500,000, including conveying, elevating and other loading and handling equipment. J. E. Greiner, Lexington Building, is consulting engineer.

Western Electric Co., 195 Broadway, New York, has completed plans for first unit of new plant at River View Park, Baltimore, to manufacture radio and telephone equipment, and will break ground early next year. Work will include several units and power plant, and will cost over \$20,000,000. H. K. Ferguson Co., Cleveland, is engineer and contractor.

Eastern Silica & Chemical Co., Winchester, Va., operating at former plant of Winchester Glass Sand Co., is planning an expansion program, including new mill and pulverizing plant for silica production, to cost over \$50,000 with machinery.

Frank W. Dryden & Sons, Lancaster and Dallas Streets, Baltimore, oils, are planning new storage and distributing plant to cost about \$40,000, with equipment.

Bainbridge Power Co., Bainbridge, Ga., has authorized construction of one-story ice-manufacturing plant, to cost \$55,000 with machinery.

A. A. Whitlock, Berwick, Pa., formerly head of Berwick Gas Co., has organized a company to construct and operate an artificial gas plant at Hickory, N. C.,

with machinery installation to cost about \$100,000.

Bartlett Hayward Co., Scott and McHenry Streets, Baltimore, is planning one-story addition to plate shop, 53 x 315 ft., to cost about \$50,000 with equipment.

James A. Lenfesty, Cambridge Arms, North Charles and Thirty-fourth Streets, Baltimore, has been appointed agent in Baltimore and Washington territory for Hunter Saw & Machine Co., Pittsburgh, manufacturer of metal cutting circular saw blades, sawing machines and kindred products.

Gulf States

BIRMINGHAM, Dec. 24.—Humble Pipe Line Co., subsidiary of Humble Oil & Refining Co., Houston, Tex., has plans for construction of pipe line from Luling to Ingleside, Tex., where parent company has begun work on new refinery. Line will cost about \$1,000,000.

Chevrolet Motor Co., Pioneer Building, Birmingham, headquarters at Detroit, has taken bids on general contract for one and two-story parts and repair building, 118 x 210 ft., at North Twenty-sixth Street and Ninth Avenue, to cost more than \$100,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Ovens, power equipment, conveying and other machinery will be installed in addition to baking plant of Texas Bread Co., 1118 Taylor Street, Houston, Tex., to cost about \$130,000.

W. D. Kennedy, Dallas, Tex., operating Kennedy Machine & Brass Co., 2236 Live Oak Street, manufacturer of brass, bronze, aluminum and other metal castings, and other local industries, has acquired two-acre tract at 3110 Oak Lane Avenue, with one-story building, 100 x 300 ft., for group of factories, including El-Food Corporation and Real Arts Advertising Co., affiliated organizations. New unit will be erected at early date for Kennedy Machine company. Project will cost more than \$200,000.

American Cast Iron Pipe Co., Birmingham, has awarded contract to Southern Steel Works Co., 908 Lucien Avenue, for one-story addition, to cost about \$45,000 with equipment.

C. S. Hamilton Motor Co., Commerce and Pearl Streets, Dallas, Tex., local representative for Chrysler automobile, is planning two-story and basement service, repair and sales building, 120 x 140 ft., to cost about \$120,000 with equipment.

American Potash Co., care of Chamber of Commerce, Odessa, Tex., is planning development of potash properties near city, with raw material equipment for capacity of about 2000 tons per day, refinery, machine shop, boiler plant and other structures, to cost more than \$200,000.

Coronet Phosphate Mining Co., Coronet, Fla., is planning development of phosphate properties near Mulberry, Polk County. Mining equipment will be installed, mechanical washing plant, etc., to cost more than \$65,000. Work will begin in about 30 days.

Detroit

DETROIT, Dec. 24.—Flint Ornamental Iron & Wire Works, Flint, Mich., is having plans drawn for one-story plant, to cost about \$28,000 with equipment. G. Bachman, Pengelly Building, is architect.

Cranbrook School for Boys, Lone Pine Road, Bloomfield Hills, Mich., has plans for addition to arts and crafts school unit to cost about \$50,000 with equipment. Cranbrook Architectural Service, Lone Pine Road, a division of school, is architect.

Consumers Power Co., Jackson, Mich., has plans for one-story equipment storage and distributing plant at Grand Rapids, Mich., with repair department, to cost about \$50,000 with equipment.

Federal Screw Products Co., 3401 Martin Street, Detroit, has awarded general contract to E. D. Jackson, 5930 Commonwealth Avenue, for one-story addition for storage and distribution to cost about \$25,000 with equipment.

Automotive Panel Board Co., Detroit, care of D. E. Hokin, 1475 Boston Boulevard, recently organized by Mr. Hokin and associates with capital of \$350,000 to manufacture panel boards for automobiles and other service, has taken over a factory at Sandusky, Ohio, for new works, to cost about \$75,000 with equipment. Sampel Rosen, Sandusky, will be an official of new company.

Morse Counterbore & Tool Co., 2007 Poplar Avenue, Detroit, is said to be planning installation of additional tools and equipment in machine shop.

Allied Products Corporation, Detroit, recently organized, has taken over and will consolidate Victor-Peninsular Co., 4646 Lawton Avenue; Richard Brothers Die Works, 1560 East Milwaukee Avenue, with branch plant at Hillsdale, Mich., and Indiana Lamp Corporation, Connersville, Ind. R. O. Cunningham is president of Allied Corporation. Expansion is planned.

Federal Mogul Corporation, 11031 Shoemaker Avenue, Detroit, manufacturer of metal bearings, has awarded general contract to Austin Co., for one-story addition, 125 x 175 ft., to cost about \$70,000 with equipment.

Moyer White & Co., 2644 Lenox Avenue, Detroit, have been appointed agents in that territory for Hunter Saw & Machine Co., Pittsburgh, maker of metal cutting circular saw blades, sawing machines and kindred products.

Morris Machine Works, Baldwinsville, N. Y., maker of centrifugal pumps, has removed Detroit office to 730 Fisher Building.

Pacific Coast

SAN FRANCISCO, Dec. 19.—Willard Storage Battery Co., 246 East 131st Street, Cleveland, subsidiary of Electric Storage Battery Co., Philadelphia, is concluding purchase of property at Los Angeles for new plant for Pacific Coast trade, to cost about \$500,000 with equipment.

Thaden Metal Aircraft Corporation, Alameda, Cal., H. V. Thaden, president, is considering construction of airplane manufacturing plant, including parts and assembling, to cost more than \$150,000 with equipment.

W. Templeton Johnson, San Diego, Cal., architect, has plans for five-story automobile service, repair and garage building, 60 x 200 ft., to cost over \$125,000 including equipment.

Washington Electric Co., Stuart Building, Seattle, plans hydroelectric power plant on Columbia River, in Chelan and Douglas Counties, to cost over \$5,000,000 with transmission system.

Bergstrom Steel Co., 613 North Hewitt Street, Los Angeles, has awarded general contract to Union Iron Works for

new one-story plant, 80 x 250 ft., to cost over \$75,000, with equipment.

Kings County Packing Co., Reedley, Cal., has awarded general contract to Austin Co. of California, Inc., Los Angeles, for new plant on four-acre tract at East Oakland, Cal., with main unit two-stories, 180 x 300 ft., machine shop and boiler plant, to cost more than \$250,000 with machinery.

Pacific Public Service Co., Russ Building, San Francisco, operating Coast Counties Gas & Electric Co., Merchants Ice & Cold Storage Co., Los Angeles, and other public utilities, has arranged for stock issue to total \$1,140,000, part of proceeds to be used for expansion and betterments in plants and system. E. Foster Salisbury is president.

California Pear Growers' Association, San Francisco, Frank P. Sweet, manager, is interested in project to construct and operate a cold storage and refrigerating plant and terminal on waterfront, to cost more than \$10,000,000 with equipment.

Canada

TORONTO, Dec. 24.—While machine tool sales have slowed up, due to the holiday season, demand is still fairly active and is decidedly better than a year ago. Inquiries for single tools for replacements are numerous and many indicate a good buying movement early in the new year. Several large lists are being prepared for new plants under construction in Toronto and throughout the Province on which bids will be asked before the end of next month. The railroads are buying for shop replacements and the automotive industry is inquiring for tools both for replacement and new works.

Robert Mitchell Co., 64 Belair Avenue, Montreal, manufacturer of gas and electric fixtures, metal goods, etc., has purchased a site in St. Laurent, Que., and is having plans prepared for a foundry.

Horton Steel Works, Ltd., Bridgeburg, Ont., has purchased adjacent property on Gilmore Street and it is reported that the new site will be used for erection of two new plants same size as present works, which will be remodelled and new equipment installed.

Town of Swansea, Ont., proposes to spend \$125,000 on improvements to sewage disposal plant, including the purchase of new pumping machinery, etc. Wynne-Roberts, Son & McLean, Metropolitan Building, Toronto, are engineers.

Hospice Ste. Anne, Baie St. Paul, Que., is having plans prepared by Raoul Chenevert, 20½ d'Aiguillon Street, Quebec, for an electric light plant, to cost \$50,000.

Rogers Batteryless Radio Co., 90 Chestnut Street, Toronto, is having plans prepared by Horwood & White, 229 Yonge Street, for a new plant, to cost \$200,000. Building will be two stories and basement, 125 x 250 ft.

General Steel Wares, Ltd., 333 Wellington Street, London, Ont., has awarded contract to J. W. Putherbough, Bank of Montreal Chambers, for one-story addition, 150 x 250 ft., to its enameling plant, to cost \$100,000. George Hunt is architect.

Hydro Electric Power Commission of Ontario, University Avenue, Toronto, is preparing plans for addition to power house and gate house at Queenston, Ont., to cost \$4,000,000. Construction work will be started early in the New Year. F. A. Gaby, is chief engineer.

Collingwood Terminals, Ltd., Collingwood, Ont., has awarded contract to Carter-Halls-Aldinger Co., Ltd., Winnipeg, Man., at \$575,000 for superstructure for grain elevator to cost \$800,000. C. D. Howe & Co., Whalen Building, Port Arthur, Ont., are engineers.

Dominion Bridge Co., Ltd., head office, Montreal, has purchased 13 acres at Calgary, Alta., and will start work soon on erection of a \$200,000 structural steel fabricating plant. Company recently acquired control of Riverside Iron Works, Calgary, and contemplates erection of an addition to this plant next spring to cost \$300,000.

Foreign

OFFICIALS of Fox Brothers' International Corporation, 33 Rector Street, New York, have organized Fox Brothers' International Corporation of France, with headquarters at Paris, to carry out operations in that country. Initial work now being placed under way consists of construction of five hydroelectric generating plants on Segura and Jugar Rivers, southern part of Spain, for service at lead mines and railroad operation, as well as for city of Valencia,

to cost close to \$20,000,000 with transmission system.

Metropolitan Water Board, 173 Rosebery Avenue, London, E. C. 1, is asking bids until Jan. 17 for three 200-hp. high compression heavy oil engines with reciprocating pumps for Woodford pumping station, Essex.

Brown-Boveri Electric Co., Berne, Switzerland, has entered into agreement with city of Bucharest, Rumania, for construction of two hydroelectric power plants near that municipality, 15,000-hp. and 10,000-hp. capacity, respectively, to be owned and operated by Brown-Boveri company for period of 19 years, when stations will revert to city. Project is reported to cost about \$1,000,000 with transmission lines.

A railroad company at Dairen, Manchuria, has arranged budget of \$2,000,000 for pier construction in 1929-30 at Kwanchingtz, on north side of bay opposite Dairen, including mechanical loading equipment and devices. It is stated that an excellent opportunity is offered for sale of American-made cargo-handling equipment. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference China No. 294456.

Coke Ovens Designed for Flexible Operation

TO increase the flexibility of its equipment and its adaptability to meet conditions, which may vary from day to day, the Foundation Oven Corporation, 120 Liberty Street, New York, has rearranged the regenerators in its balanced draft coke oven design. When heating with coke oven gas, only the air passes through the regenerators and a single chamber suffices. To permit the use of producer gas or even of blast furnace gas for heating the oven, when there is a demand for coke oven gas for open-hearth furnace or other uses, the regenerators under the new arrangement are split into two parts, one be-

ing placed above the other, as shown in the illustration.

With this arrangement, whereby both the air and the heating gas for the ovens are separately regenerated, it becomes possible to utilize all of the coke oven gas for sale either to other departments or outside the plant. The ovens still are built with the usual gas duct and nozzles for oven gas, but can be switched over very quickly from the use of one gas to the other as requirements demand. This adaptation does not change the essential features of the heating system, although it permits realizing greater flexibility.

